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Women as Industrial Labour: An Enquiry into Economic and Social Consequences of Growth of Garments Manufacturing in Bangladesh

A thesis

submitted in partial fulfilment
of the requirements for the Degree of
Doctor of Philosophy
at the University of Waikato

by

Begum Meherunnessa Zaman

Department of Economics
University of Waikato
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Abstract

Over the last quarter century, the readymade garments industry has emerged as the main export-earning manufacturing industry in Bangladesh. The industry is the first to employ women in large numbers in the formal manufacturing sector. Using information collected by the author from readymade garments firms, women workers and a group of non-working women, this thesis investigates the factors behind women's labour market entry, their earnings and subsequent impact on the lives of women and their households. The analytical framework has largely drawn upon economic models of utility maximisation. Various econometric methods have been used in empirical investigation of the issues.

The results show that labour market entry by women is mediated by several factors including poverty and education. Their earnings depend upon both education and work experience. Most working women have had several rises in wages over their working lives.

Independent earning by women has resulted in several second round effects, mostly in the positive direction, on the women themselves and their households. Women who keep their earnings to themselves spend the money on items such as food and health care. They have accumulated substantially more assets and savings than their non-working counterparts. They have also enjoyed a physical quality of life better than that of the non-working women and also their (workers') own initial situation.

A very important effect of women's employment, and the rise in their explicit opportunity cost of time, is that they have far lower fertility compared to non-working women. The lower fertility has been associated with greater demand for education for children.

The health of workers may have been impaired due to a combination of long hours of market work and home production. Other social impacts such, as changes in decision-making roles and independence of action have been limited.

Employment and education are the most important determinants of the positive impacts on the women themselves and their households. Future policy directions may therefore widen employment and education opportunities for women.

Dedication

To my parents

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Glossary, Abbreviations and Acronyms

Absolute poverty: Consumption of less than 2122 kilo calories per day per adult person.

ADL: Activities of daily Living

BBS: Bangladesh Bureau of Statistics, Government of Bangladesh

BGMEA: Bangladesh Garment Manufacturers and Exporters Association

BIDS: Bangladesh Institute of Development Studies

BLUE: Best linear unbiased estimator

BUP: Bangladesh Unnayan Parishad

CDF: Cumulative distribution function

GDP: Gross domestic product

Hardcore poverty: Consumption of less than 1805 kilo calories per day per adult person

HES: Household expenditure survey

Kcal: Kilo calories

LFPR: Labour force participation rate

LFS: Labour force survey

MFA: Multi-fibre Agreement

MoF: Ministry of Finance, Government of Bangladesh

OLS: Ordinary least squares

Purdah: Literally means a veil, social meaning is seclusion of women

Samiti: Generally a credit or cooperative society

RMG: Ready made garment

SLI: Standards of living

SPSS: Statistical packages for social sciences

Taka: Abbreviated as Tk., currency of Bangladesh, US$1 = Taka 58 in June 2002.

TFR: Total fertility rate

WTO: World Trade Organisation

CHAPTER 1
INTRODUCTION

1.1 Statement of the Problem

The readymade garment (RMG) manufacturing industry has become the major employer of women in Bangladesh in the formal sector since the early 1980s (Dowlah: 1999; Zohir and Paul-Majumder: 1996).[1] Several studies have looked into the operation of the industry and the problems of women's employment (BUP: 1990; Paul-Majumder and Sen: 2001; Zohir and Paul-Majumder: 1996). These studies, however, do not address the changes in the lives of the women working in the RMG and their households. It is by now well established that women's labour market participation has several important and interesting impacts upon them and their households (Haddad: 1999).[2] So far in Bangladesh, there has been little or no rigorous discussion or analysis of such impacts.

In a situation where women are employed on a large scale in an industry which is nationally vital owing to its critical role in export earnings (see section 1.5.3), the lack of analysis of the impacts of industrial employment of women hampers policy actions on two counts. First, it is not clear if women and their households are, on the whole, benefiting from or are adversely affected by such employment. This raises several questions for understanding necessary policy interventions. The questions are: What are the economic and social factors that determine working women's entry into the labour market, particularly in RMG factories? Does this market activity promote any other economic and social change in these households? If there are such other changes, how and to what degree can these be linked to the employment of women? What kinds of policy intervention may be necessary to curtail the negative changes and augment the positive ones?

---

[1] The term ready made garment includes two types of apparel, the stitched garments and the knit and woven garments. Industry analysts, often separate the two. For my purpose, I treat them equivalently.

[2] A burgeoning literature exists examining women's labour market activity and its impact on various intrahousehold resource allocation issues such as time allocation, food expenditure and nutrition, fertility and child care, health and expenditures for education (Haddad, Hoddinott and Alderman: 1997). The seminal theoretical underpinning is by Becker (1981; 1991). Other theoretical models have been proposed challenging some of Becker's assumptions such as common preferences within the household. For details, see the literature review in Chapter 2.

Secondly, the above questions have assumed added importance because of the future challenges the Bangladesh RMG industry may face due to the abolition of the Multi-Fibre Agreement (MFA) from 2005 under the Agreement on Textiles and Clothing (ATC) of the Uruguay Round of trade negotiations.[3] If Bangladesh's RMG industry cannot face the increased competition from other countries, women workers are likely to be laid off in large numbers. To stave off this prospect, the efficiency of the work force needs to be raised to the world standard. This may be possible only if attention is paid to various problems that women face in the work place or in the household due to market work. In this study, I make a modest attempt to fill in some of the gaps in understanding the nature and extent of the above kinds of changes and the problems in the lives of women as individuals and in their families, and the factors contributing to them. Before proceeding further, I would like to very briefly clarify a point or two regarding these consequences.

The focus of investigation in the thesis is on economic and social consequences. First, I shall look at only a selected few of these changes due to time and resource constraints. Secondly, while some changes are clearly economic (e.g., earnings of women) and some are social (decision-making role of women), there are others where such a neat division may not be possible. For example, women's large-scale employment is both a major economic and social change. So is the change in reproductive behaviour. Thus, while there is a chapter titled "Social Changes" this should not be construed to mean that it is only there that the social changes have been considered. How I differentiate between the two types of social issues is discussed in more detail in Chapter 8.

The organisation of the rest of the chapter is as follows. Section 1.2 describes the objectives of the present study. This is followed in sections 1.3 to 1.5 by short descriptions of the Bangladesh society and economy that provide a general backdrop against which many of the changes may be assessed and understood. I provide a brief structure of the rest of the thesis in section 1.6 followed finally by a summary of the chapter.

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[3] The MFA is a system of bilateral quota agreed between countries for trade in textile goods. For a review of the ATC and MFA, see Reinert (2000). For a general equilibrium analysis of withdrawal of MFA from a Bangladesh perspective see Islam (2001).

1.2 Research Objectives

The present study tries to delineate the major economic and social impacts that may be experienced by women, primarily within the household as an economic and social unit, but also in the labour market. The more specific objectives of the thesis are as follows.

Objective 1: To investigate the labour market entry of women and its correlates and the conditions of employment in RMG factories. The factors examined for analysing the labour market entry of working women include both the economic background of the family and other members (occupation, alternative sources of income) and social background (such as education and demographic characteristics including migratory behaviour) as well as personal characteristics.

Objective 2: To explore and analyse the economic changes as experienced by working women, particularly within their households. To accomplish this objective, several types of issues are investigated. These include time allocated to home and paid work outside home, household and personal factors that explain income differentials, financial management within the family and its role in consumption behaviour, savings and credit behaviour, and the physical quality of life.

Objective 3: To identify the type and extent of social changes within the household and their determinants. The main social changes that I investigate include, among others, fertility and child care behaviour, health and disease of women and their impact on earnings. Other social changes that have been investigated include independence of movement of and action by women including their roles in decision-making vis-à-vis men.

Objective 4: To assess the policy implications of the findings, in terms of promoting household welfare and betterment of women's conditions both within the household and at the work place.

1.3 The Broad Context of Women's Employment in Bangladesh

1.3.1 Population and Its Characteristics

Population growth and structure

In fifty years (1951-2001),[4] the population in Bangladesh has increased from 44.2 million to 129.2 million. The average annual rate of growth between the censuses of 1981 and 1991 was just above 2 percent and it has since fallen to an estimated 1.48 percent by 2001 (BBS: 2001a, p. 7). The density of population in 2001 was 834 persons per square kilometre (BBS: 2001a, p. 7), the highest in the world except for the city- states.

In 2001, 23 percent (28.8 million) of the total population lived in the towns (BBS: 2001a, p. 6). Although the level of urbanisation is low, the annual rate of growth of the urban population has been 3.2 percent over 1991-2001, compared to only about 1.5 percent for the national population. Rural-urban migration had been an important factor in the process. Abject poverty (see Section 1.5.4) is a major push factor in the villages while the prospects of jobs in urban areas act as a major pull factor.

The sex-ratio (i.e., the number of males per one hundred females) in 2001 in Bangladesh was 104. Compared to the national sex ratio that in the urban areas was much higher, 114 in 2001. This indicates a relatively higher level of migration of men to the towns compared to women. But, women's rural-urban migration has been increasing over time thus bringing the urban sex ratio down from 150 to 142 between 1951 and 1961 (BBS: 1994, p. 70) and from 126 to119 between 1981 and 1991.

Marriage, fertility and contraception

Most women in Bangladesh get married at an early age. In 1991 the mean age at marriage was only 17.9 years (BBS: 1994, p. 96). For men it was 24.9 years. The mean age at marriage has been rising, particularly in the urban areas. Thus, in the urban areas over 1981-1991, the proportion of married women aged 15-19 years fell from 52.7 percent to 37.9 percent. Increased education and availability of jobs for women outside home may have been major factors behind such delayed marriage.

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[4]The last population census was in 2001.

The decline in the rate of growth of population over the last two decades has been possible due to a steep decline in the total fertility rate (TFR)[5] from 6.34 in the mid-seventies to 3.41 in 1996 (BBS: 1998a, p. 36). Among the 20 poorest countries of the world, such a steep decline has been observed only in Bangladesh (Khuda and Hossain: 1997, p. 387-388). The increased age at marriage for girls and the increasing use of modern contraception (42.3 percent of all currently married women by end-1995) (BBS: 1998a, p. 601) contributed to the decline in the TFR. But the possible role of increased labour force participation of women in the fertility decline has not been adequately investigated.

1.3.2 Physical and Social Infrastructure

Physical infrastructure

Among the various physical infrastructure facilities, Bangladesh has one of the highest densities of roads in the world, although the quality is not high (Asaduzzaman: 2002). The country also has a large network of waterways. Other physical infrastructure, such as the telephone services, is limited, but the mobile telephones have spread quickly and reached many villages. These facilities along with the developing social infrastructure such as the education (see below) mean that the information regarding economic opportunities may travel and be understood faster than before. Thus, migration in search of jobs may have been facilitated more than previously.

Education and literacy

The literacy rate in Bangladesh is low,[6] only 25 percent in 1991. There are also large rural-urban (21 percent versus 40 percent) and male-female (30 percent versus 20 percent) differences. By 1995-96, the situation essentially remained unchanged.

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[5] The TFR refers to the total number of children ever born to a woman over her reproductive period (15-45 years).

[6] The definition of literacy as used by the Bangladesh Bureau of Statistics, the official statistical arm of the Government, is that a person is literate if he/she is aged 7 years or above and can write a letter (presumably in Bengali, the mother tongue of the majority of the population) (BBS: 1998b, p. 106).

Of late, the Government has taken several initiatives to encourage education, particularly among girls. A food for education programme initiated in the nineties may have resulted in children's higher enrolment (Ravallion and Wodon: 2000). At present, the Government has announced policy measures such as a stipend for all girls enrolled in schools and waived tuition fees for girls up to pre-University level of education.

Health and disease

One of the indicators of health status is mortality, which since the late 1980s has fallen from about 12 per thousand population to 8 per thousand by the mid-1990s (BIDS: 2001, p. 56). Over the same period, the infant mortality rate has declined from 110-120 per thousand to just over 60 (BIDS: 2001, p. 58). The expectation of life at birth has as a result increased from around 47 years to just about 60 years. Women are marginally worse-off in life expectancy (BIDS: 2001, p. 60).

Most infant deaths are neonatal. For infants, the major cause is the diarrhoeal disease. Adults mainly suffer and die from gastro-enteric diseases, obstetric causes, malignant neoplasm and tuberculosis (BIDS: 2001, p. 65). There appears to be little gender differences in the disease patterns.

1.4 Gender Division of Work

Up to the 1970s, the gender-division of work in Bangladesh was sharply defined. Women's work was within the household, while men worked outside. Women's traditional activities included household work (cooking, cleaning and child care), post-harvest agricultural operations (winnowing, husking) and home-based income earning activities (poultry raising, livestock keeping, vegetable gardening and tree planting) (Westergaard: 1993). Women thus contributed significantly to the household economy (Hamid: 1996). Yet, being generally home-based, women's economic role remained invisible both in physical and conceptual senses. Even the official statistics on employment did not count directly productive activities of women inside the homestead until 1995-96.

This traditional situation began to change for several reasons. The spread of education, and the contact with change agents advocating, for example, family planning or distributing micro credit began to weaken women's seclusion (Adnan:

1988). Poverty also played a considerable role because when men failed to provide for the family, poor women had to go out of their home to work.

Yet, the opportunities for work for women remained limited until the early 1980s. The expansion of the RMG industry (see Section 1.5.2) in the 1980's led to the large-scale employment of women in factories. Initially, the industry drew upon the women workers available within the towns (mostly Dhaka and Chittagong).[7] But soon it attracted even the unmarried teenage girls migrating without their families for such employment (Amin *et al.*: 1998). Women did not remain secluded any more within the household.

Women now find more jobs, are more visible, earn an income, and contribute in a major way to the family's economic welfare. The value of women's economic contribution to the household has been recognised (see Section 1.5.3) and, since 1995-96, recorded in official statistics (BBS: 1996). Yet, at another level, it has remained strongly traditional, as household chores remain women's responsibility. Thus, women still have to bear the burden of practically all work at home. They may neither have much major decision-making power nor control over their own income.

1.5 The Economy

1.5.1 Gross Domestic Product and Sectoral Shares

The Gross Domestic Product (GDP) of Bangladesh at the constant market prices (of 1989/90) grew at an average annual rate of 4.5 percent over the first half of the nineties and stood at Tk.1218 billion in 1995-96.[8] The per capita GDP, which stood at only Taka10406 by mid-1995, has grown more slowly at only 2.5 percent per annum. These rates are much lower than those achieved in South-East Asia during this period.[9] Higher rates of growth have been posted since 1998, mainly in the rural areas (MoF: 2000, p. 14)

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[7] Dhaka is the capital while Chittagong is the second largest town as well as the main port.

[8] The currency of Bangladesh is Taka (abbreviated as Tk.) and in 1997-98 (which corresponds to the survey year of the present study) the rate of exchange was Tk.48 = US$1. At present (early 2002) it is Tk.58 = US$1.

[9] Comparative rates of growth of total GDP in some of the Southeast Asian countries during this period are as follows. Thailand: 7.5 percent; Malaysia: 8.7 percent; Indonesia: 7.5 percent; Philippines: 3.3 percent. The South Asian rates had been, India: 5.9 percent; Pakistan: 4.4 percent and Sri Lanka: 4.9 percent (World Bank: 1999, p. 210-211).

Agriculture, despite a modest fall in recent years, remains the most important sector contributing a quarter to GDP. Industries, on the other hand, gained in importance rather slowly and accounted for 11 percent of GDP in the late 1990's (MoF: 2000, p. 188-189). Services have remained more or less stagnant.

1.5.2 Manufacturing and the Ready Made Garment Industry

The major industries in Bangladesh include agro-processing, ready-made garments, drugs, pharmaceuticals and other chemicals, iron and steel, electrical machinery and transport equipment (BBS: 1997b, p. 89-95). The ready made garment industry has become increasingly important to Bangladesh. Currently, its output is the largest single category of exports. By mid 1999, RMG (including both woven and knitwear) contributed nearly 72 percent of total merchandise export earnings (Planning Commission: 2000, p. 63).

The RMG industry had a very modest beginning with only six factories in 1978-79. By the mid-1990s, the BGMEA (Bangladesh Garments Manufacturers and Exporters Association) counted 2161 factories (BGMEA: undated, p. 13-65) in 1996-97. This is truly phenomenal growth.[10,11]

The RMG industry is the largest provider of employment to women and certainly their largest formal sector employer. Despite some confusion regarding definition, time frame and coverage of establishments, the relative magnitude of female labour employment is clear. In 1995-96, outside agriculture, among 198.3 thousand women who had been working in manufacturing establishments (employing at least 10 persons), 150.6 thousand or 76 percent were in the RMG (BBS: 1997b, p. 103-108). In 1999, the BGMEA estimated female employment to be 90 percent of the total in RMG (Planning Commission: 2000, p. 148).

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[10] Whether all of the 2161 factories are operational remains a matter of controversy. During my field survey, it became apparent that some of the factories exist in name only for getting certain administrative, tax and quota-related facilities.

[11] Several factors may lie behind the rise of RMG industry in Bangladesh including cost advantages (Ramaswamy and Gereffi: 1998), entrepreneurial skills (Quddus and Rashid: 2000), quality of workmanship or salesmanship and personal relationships (Bhattacharya: 1996), and foreign collaboration during the pioneering days (Rhee: 1990). Whether there had been specific local historical factors such as that in Tirpur in India remains to be investigated. Chari (1997) in his analysis shows that the emergence of the knitwear industry in Tirpur, India has been helped by a long tradition of small businesses and the present practice of worker-employer cooperation. There is no similar tradition in the Bangladesh case.

1.5.3 Employment and Women's Contribution to the Economy

In 1995/96, the national labour force participation rate (LFPR) was 64.8 percent. The corresponding rates for men and women were 78.3 and 50.6 percent. Of the total employed persons, 64 percent were in agriculture, mostly in the rural areas. Barring agriculture, the major sectors employing people were various service sectors.

Women's formal contribution to the economy is clear. Most importantly, their labour is indispensable for the RMG, the most dynamic manufacturing and export-earning industry. If their role in informal economic activities is included, women's contribution, particularly to GDP, may double.[12]

1.5.4 Poverty and Income Distribution

In Bangladesh, in 2000, some 55.8 million people or 44.3 percent of the estimated population were absolute calorie-poor (BBS: 2001b, p. 19).[13] Most of the poor (42.6 million) were in the rural areas where they accounted for 42.3 percent of the population. The urban poor numbered 13.2 million and constituted 52.5 percent of the urban population. Hard core calorie poverty was much lower in both areas.

The incidence of poverty in the rural areas coexists with landlessness. Among the landless households (owning up to 50 decimals of cultivable land),[14] 64 percent are poor compared to 16 percent for those owning land up to 5 acres. As landlessness has increased from 50 to 58 percent over 1983 to 1996 (Saha: 2001), this may have acted as a push factor behind the rural-urban migration (see Chapter 5).

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[12] Recent analysis, though limited only to the rural areas, is indicative of the role of women's work in the total value of goods and services produced within the economy (Hamid: 1996). In 1989/90, at least 25 percent of GDP was the value of women's conventional work. The addition of the value of other home-based work by women raises it to 41 percent of total GDP. If the analysis is extended to urban areas, the proportion may increase further.

[13] For understanding the extent of poverty and its change, usually two indicators are used in Bangladesh. One of these, *absolute poverty*, refers to an income level which can ensure at most 2122 kilo calories (K cal) of nutrition per adult person per day. The other called *hard core poverty* refers to the condition of those who cannot meet even 1805 K cal of nutrition. The difference between the two is that the former level of energy represents the minimum calorie intake necessary to continue normal physical activities. At the lower level of intake (1805 K cal) people can just continue to live but cannot function normally.

[14] The decimal is a measure of land and is one-hundredth of an acre.

The widespread poverty in Bangladesh coexists with a substantial inequity in the distribution of income. In 2000, the poorest 40 percent of households claimed only 11.5 percent of the total income while the richest five percent enjoyed 29 percent. The top ten percent enjoyed more than 38 percent of income. In the rural areas, the inequality appears to be somewhat less than that in the urban. The Gini coefficient, a measure of income inequality, is fairly high, 0.42 nationally. Again there has been a rise in the coefficient over the nineties with much of the change occurring in the urban areas (BBS: 1998b, p. 12).

1.6 Dissertation Structure

On the basis of the objectives stated earlier, the thesis is divided into a total of 10 chapters as follows.

Chapter 1: Introduction.

This is the present chapter detailing the objectives of the study and its rationale. The chapter also provides some background information on the economy and society of Bangladesh to provide the context for the analysis in the later chapters.

Chapter 2: A Literature Review

This chapter provides a critical review of the relevant literature on women's employment, their earnings and the impacts on the household. Particular emphasis has been put on competing theories of intrahousehold resource allocation. Other literatures that have been reviewed include those on migration, time allocation, financial management, consumption behaviour, savings, standard of living, fertility, child care, and the decision-making roles of women.

Chapter 3: A Theoretical Framework

A theoretical framework is developed in this chapter to discuss and analyse the data. Particular emphasis has been given on the extension of the Beckerian model to analyse some of the major issues under investigation.

Chapter 4: Empirical Methods

This chapter discusses the data collection methods, and the characteristics and limitations of the data. The various statistical and

econometric methods that have been used to analyse the data have also been discussed here.

Chapter 5: Women at Work

This chapter deals with four interrelated issues. First, it analyses the macro level information on women's labour market behaviour in urban Bangladesh. A new analysis of a part of the information in the Labour Force Survey 1995-96 (henceforth, LFS 1995-96) has been made. Second, it analyses the migratory behaviour of women based on information from my own survey. The chapter then provides certain micro level analyses of the labour market behaviour of women employees in RMG, their characteristics, the factory environment, factors influencing women's labour market entry, and the wages received by the women, all based upon primary data collected for the purpose.

Chapter 6: Changes in Time and Household Resource Allocation

This chapter identifies and analyses some of the changes at the household level and their causative factors. These include allocation of time between market and home production and causes thereof, management of household finance and its role in expenditure patterns, particularly of food, the savings and credit behaviour, and the standard of living.

Chapter 7: Reproductive Behaviour and Health Issues

This chapter analyses changes in fertility and birth spacing, child care, and health problems of women.

Chapter 8: Social Changes

This chapter provides an examination of some of the specific social changes such as decision-making and independence of action by women.

Chapter 9: An Assessment of Gains and Losses

A composite assessment of the gains and losses of working women has been made in this chapter. The over-all assessment depends upon the self-assessment of women themselves as well as the results of analyses in earlier chapters.

Chapter 10: Conclusions and Policy Implications

This chapter provides conclusions on the basis of the major findings of the thesis. This is followed by a discussion of the policy implications of the analytical results with a view to increasing the employment of women and improving their situations at home and the work place.

1.7 Summary

This chapter provides the rationale for the present study. It has been argued that while several studies have looked into women's employment in the RMG industry, these have paid little or only cursory attention to the economic and social changes in the lives of working women and their households. Consequently there is little or no clear understanding of the types of necessary policy interventions. Accordingly, this chapter describes four objectives of the study. These include an investigation of the labour market entry of women, their earnings and their correlates, exploration and analyses of various economic and social changes within the household such as time allocation, financial management and its effects on intrahousehold resource allocation, standard of living, fertility behaviour, decision-making, and independence of action by women. The fourth objective is to identify the policy implications on the basis of these investigations. Finally, to provide a context for the subsequent analysis, this chapter also reviews briefly the economic and social situation in Bangladesh, particularly as these relate to women.

CHAPTER 2
A LITERATURE REVIEW

2.1 Introduction

In this thesis I consider several aspects of women's labour market behaviour and the impact of this behaviour both at the individual and household level. A burgeoning literature exists on some of the issues of interest such as, fertility, earnings, and migration; while others, such as pooling of resources and its effects on consumption behaviour, and child care have attracted less attention. A full review of all these issues is beyond the scope of this thesis. Thus, this chapter provides a guide to the existing literature both on Bangladesh and other countries, which will allow the findings of the thesis to be put in the context particularly in relation to the gaps in knowledge.

The review divides the literature into three categories. The first category concerns studies related to labour market participation of women and its determinants, including home production, fertility and child care. The second category of studies examines the returns to human capital such as, education, health, and migration, which lead to wage differentials among workers. The third category includes studies on management of household finances, pooling of resources, consumption behaviour, savings behaviour, standard of living, household decisions, and mobility. The impact of labour market participation is analysed in the context of these issues.

In general, the review points out the nature of the major results in the empirical literature. Specific studies are mentioned only by way of illustration or for highlighting certain results. For the studies in Bangladesh, however, these have been individually assessed.

2.2 Women in the Labour Market

2.2.1 Labour Force Participation Rate (LFPR)

The labour force participation by women has been analysed both at the macro and micro level (Behrman: 1999; Blundell and Macurdy: 1999; Killingsworth and Heckman: 1986). For recent information on LFPR in various countries see World Bank (1995).

Much of the macro level analysis relates to developed countries particularly the U.S.A. In all these countries, the labour force participation by women has

increased over time (Blau and Ferber: 1992; Hill: 1996; Meulders, Plasman and Plasman: 1997; Pryor and Schaffer: 2000).

In Asia, the labour market characteristics have recently been studied in some detail (Acharya: 1996; Alonzo, Horton and Nayar: 1996; Ariffin, Horton and Sedlacek: 1996; Bai and Cho: 1996; Behrman and Zhang: 1995; Benjamin: 1996; Hill: 1996; Horton: 1996b; Phananiramai: 1996). In general, the LFPR by women has been rising in Asian countries, but the participation rates are lower than those in the industrialized countries and Latin America over comparable periods.

2.2.2 Life Cycle Pattern of LFPR

The life cycle profile of female labour force participation shows three kinds of patterns (Horton: 1996b, p. 4). These are a single peak, double peaks (or "M" shape) or a plateau (see Figure 2.2.2-1). They signify "entry-exit", "entry-exit-reentry", and "entry and continuation in labour market up to an advanced age" respectively. Entry is at a young age before marriage while the exit occurs due to marriage or childbearing. Reentry occurs when child care or household responsibilities are not major burdens on women. A hump (plateau) occurs either due to poverty or strong family support as in developing countries or when women want to build careers of their own (mainly in the industrialised countries).

Depending on their development stage, some countries, such as the USA, have experienced all of the stages (Blau and Ferber: 1992). In Western Europe the hump-shaped pattern is discernible while a single peak or weakened "M" pattern is observed in the poorer Southern European countries (Plantenga: 1997, p. 90-91).

Developing countries are characterised by all the three patterns, but a plateau is more common. Lim (1993) observed a low-level plateau for South Asian and a high level plateau for Southeast Asian countries. Horton (1996b) had observed both 'double peaked' and 'plateau' patterns which she tried to explain partly by institutional and cultural factors such as strong or weak family ties.

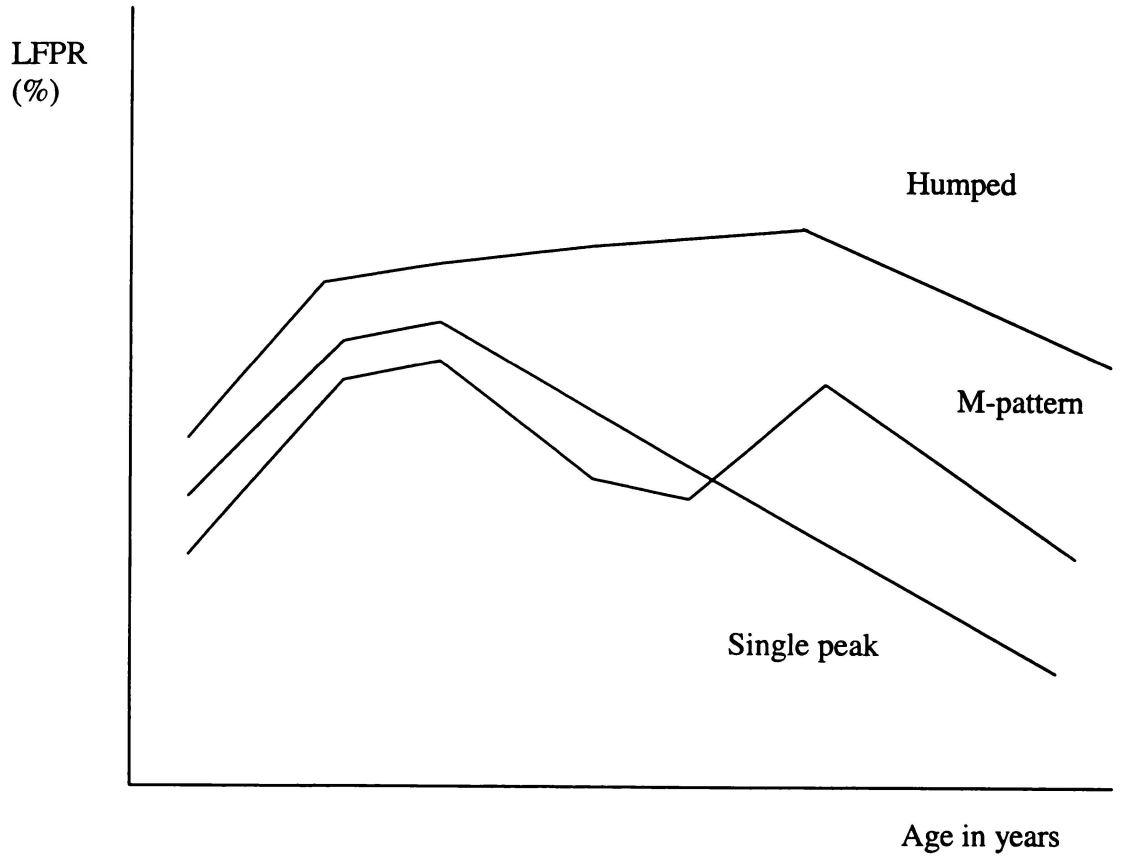

Figure 2.2.2-1: Observed LFPR Patterns for Women

2.3 Labour Market Entry and Intervening Issues

2.3.1 Overview

Here I discuss the factors that impinge upon the labour market entry of women. These factors fall within the category of various home production activities. I first provide a general review and later consider these issues separately.

Before the discussion, it may be pointed out that the analysis of urban labour markets in the developing countries is not as fully developed as that of the rural labour market especially for women. Rosenzweig (1988), and a decade later Behrman (1999), who surveyed the labor market literature on developing countries devoted their surveys practically wholly to rural labour markets. The characteristic of these rural labour markets is that often the producer (farm) that demands the labour also supplies it as the household (Behrman: 1999). Thus, the analysis of producer-cum-household may not be relevant in the context where the

employer firm and the household supplying labour are two different units as is the situation in the present case.

Both demand and supply factors may influence women's entry into the labour market. For my purpose, I take the demand factors as given and try to find out how the supply responds to such factors. For reviews on the demand side issues see various surveys in Ashenfelter and Card (1999). For major reviews on the supply side issues see Killingsworth and Heckman (1986) and Blundell and Macurdy (1999).

On the supply side, social norms may restrict women's employment outside the home (Buang: 1993) but poverty may act in an opposite direction (Bolak: 1997; Wadhera: 1976). Availability of help from relatives (Lewis: 1982; Wong and Levine: 1992) or co-wives for child-care facilitates women's labour market entry (Fapohunda: 1982). Others made similar observations regarding the influence of child care facilities (Apps: 1994; Cunningham: 2001; Kravdal: 1992; Manser and Brown: 1979; Mason and Kuhlthau: 1992; Mott and Shapiro: 1978; Shelton: 1992). In some of the recent studies, child care availability or its cost has been singled out as the major factor in women's employment decisions (Blau and Robins: 1989; Blau and Robins: 1991; Connelly: 1992; Connelly, Graff and Levison: 1996; Kimmel: 1995; Powell: 1997). But such findings may not be universal (Butler and Horowitz: 2000, on Surinam; Srivastava: 1978, on India).

Conception and childbirth influence labour force participation of women in a way similar to child care responsibilities. Kravdal (1992) estimates that the market time lost due to childbearing is very substantial and is higher for less educated women. Similarly, a new-born baby in the family lowers women's market time in Mexico while the presence of young daughters has a positive influence (Cunningham: 2001).

2.3.2 Time Allocation between Home Production and Labour Market

Practically all analyses of women's labour market entry or its impact try to account for women's time use in household activities. The theoretical underpinning is due to Becker (1991). For a review of the home production literature see Gronau (1986). Such an analysis distinguishes between the time for pure leisure and various activities for the family. The latter produces various outputs of goods and services combining time of women and goods purchased

from the market. The output of these home production activities may be meals for the family, clean clothes, a clean house, education for the children, having babies and health of the family, to name only a few. The labour market entry of women and many of its impacts are therefore outcomes of joint decisions about them by individuals. How much or when to have these home produced goods and services depend upon the opportunity cost of withdrawal from the labour market once women are employed. For a theoretical exposition see Chapter 3.

Child care is one type of home production, which has been analysed as a major determinant of women's labour market entry as discussed above. Similarly the issues of conception and childbirth have been found to be major factors in such decisions. Given their critical importance in policy-making, I treat these issues separately below.

There are very few studies that explicitly analyse time allocation between labour market and home production. An early modeling was by Wales and Woodland (1977) using US data. As often the production and household unit is the same in rural areas in developing countries, the neat division of time between market (or for employment) and for home production may be blurred and difficult to analyse. This may have been a main reason for Schultz's (1999) observation that the effect of husband's wage/earnings on wife's non-market time remains to be tested in a developing country agricultural setting.[15]

Glick's (1999) analysis of the simultaneous determination of home work and market time in Conakry, Guinea, Africa shows the usual effects of absence or presence of children of various ages on labour market behaviour of women. Thus, the presence of infants raises home time and lowers market time. But the substitution of market time by home production time is only partial. Thus, the total burden of work increases, meaning a cut in the time for pure leisure or personal time.

[15] Note that Schultz is careful in the choice of his word "non-market". Thus it is not home production time, but the combination of home production time and leisure time.

2.3.3 Interaction between Market Time and Fertility

Quantity-quality hypothesis of fertility

Childbearing and labour market behaviour both impact upon each other. Here I review further how the two may be intertwined through the demand for quality in children. Economists have considered the issue of quality versus quantity in fertility decisions since Becker (1960) who argued for analysing them as part of a joint-decision. Since then there have been volumes written on the issue and related topics (Anderson: 1983; Becker and Lewis: 1974; Becker and Tomes: 1976; Ben-Porath: 1974; Montgomery, Arends-Kuenning and Mete: 1999; Montgomery and Lloyd: 1997; Nakamura and Nakamura: 1992; Rosenzweig and Wolpin: 1980; Rosenzweig and Wolpin: 1982). Schultz (1997) contains a summary of some of the major issues.

The general consensus in the literature appears to be that while working women may desire fewer children; the actual process may be subtler. Withdrawal from the labour market due to conception and childbirth imposes an opportunity cost in terms of foregone earnings. At the same time, the desired quality of the child (better educated or with better nutrition) also has a cost after birth. If higher quality is desired, parents may postpone birth as long as possible to be able to bear the direct cost of rearing the child, which also allows the potential parents to increase their earning capacity and thus raises the opportunity cost. The realised trade-off between the conflicting factors thus becomes an empirical issue.

Birth spacing

Birth spacing as a means of fertility regulation has been analysed by several authors. Heckman and Walker (1989; 1990) have observed a strong negative opportunity cost effect of wages in case of birth of first child to Swedish women. Others, using developing country data, did not find such clear results. Newman and McCulloch (1984) observed for Costa Rica that those with higher education have lower risks of first birth. Analyses of Filipino data by Popkin *et al.* (1993) show that the effect of education depends on the distribution underlying the hazard function (Gompertz or Weibull). Cigno and Ermisch (1989), using British data, have argued that women with better means or with rapidly increasing income may have children sooner rather than later.

Newman (1983) has argued that the time input for child rearing and the associated costs may be proportionally less when more than one child is raised. The birth of babies in quicker succession may lower the opportunity cost of childbearing of working women. Ram and Rahim (1993) have argued the opposite in the Canadian context. Using New Zealand data, Morgan *et al.* (2001) observed bunching of births but had not explained the socio economic reasons.

Child care issues

The demand for and supply of child care both have implications for women's employment. How women manage child care once they are in the labour market is, however, hardly known. Yet, this may become such a problem that at times the only adjustment women can make is to leave their jobs. A variety of techniques have been used to test the impact of child care costs on women's labour supply. The results are all similar in that rising child care costs decrease women's labour supply. While, practically none of these have analysed a developing country situation, the non-availability of care facilities, unless there are unemployed women relatives in the house, means that women may be constrained in their labour market participation in such situations.

2.4 Wages, Earnings and Human Capital

The wages and earnings of workers have often been analysed in a human capital framework. The effects of education and job-experience, health and migration on wages and earnings all may be analysed in a similar manner. I review the literature in that order.

2.4.1 Education, Job-Experience and Wage Differentials

Earnings function

In the relevant literature, wages and earnings are usually not distinguished from one another (Card: 1999; Willis: 1986) while others, such as Katz and Autor (1999), argue that this should be done. In any case, wages are influenced by both institutional characteristics of the labour market (laws, rules and regulations including collective bargaining) and differences in people's capability to work. I do not wish to pursue the labour market characteristics any further as my emphasis is on the household and the individual. For surveys on and analysis of

the labour institutions see Blau and Kahn (1999) and Dinardo, Fortin and Lemiux (1996).

Regarding the supply side issues, one notes that the investigations into variation in earnings have used human capital as a factor in the outcome. The major contributions to the human capital theory to explain differential earnings have been by Becker (1962) and Becker and Chiswick (1966). The huge literature that subsequently developed, however, had its origin in the seminal contribution of Mincer (1974). For a comprehensive survey on the issue see Willis (1986) and Card (1999). Becker (1993) provides a comprehensive treatment of how human capital considerations may enter into various household decisions.

The human capital model has been applied in the context of both developed and developing countries (for major surveys, see Psacharopoulos: 1994; Rosen: 1986; Schultz: 1988; Willis: 1986). The basic analytical tool in all these empirical investigations is an earnings function in which the logarithm of earnings is expressed as a function of the education level, job-experience and its square term.

The estimates of returns to education

Estimation of the returns to education and its interpretation depend on the resolution of several methodological problems (see Sections 5.7.4 and 5.7.5 in Chapter 5). The resolution of the methodological problems such as inclusion of variables like school quality or household environment is important, as Alderman *et al.* (1997) has shown in the context of rural Pakistan. Given the caveat regarding the methodology, the survey by Psacharopoulos (1994) shows that the rates of return to education are comparable between developed and developing countries. But other studies contradict his general finding that primary education has the highest returns. Sahn and Alderman (1988) report higher returns for higher education in Sri Lanka. So do Siphambe (2000) for Botswana and van der Gagg and Vijverberg (1989) for Ivory Coast.

Very few studies take account of the school quality in the estimation of the returns to education. Doing so tended to lower the rate of return (Behrman and Birdsall: 1987). Jolliffe (1998) reports similar findings in the case of Ghana.

2.4.2 Health Issues

An analogy has been drawn between investments for improvement or maintenance of health and those in other forms of human capital such as education (Becker: 1991; Grossman: 1972; Grossman: 2000; Strauss and Thomas: 1998). While a lack of health is itself a cause of concern, ill health may also impair people's productivity and thus depress their wage and income (Currie and Madrian: 1999; Savedoff and Schultz: 2000b; Strauss and Thomas: 1998). Currie and Madrian (1999) provides a detailed summary of the estimation techniques and the results of various studies on returns to health. Savedoff and Schultz (2000a) provide detailed case studies on the interrelationship between health and earnings in several Latin American countries.

Both the supply of health facilities and their use by people determine the ultimate impact of such facilities on health (Mushkin: 1962). The choices made by the people, unless the facilities are freely available on demand, depend on the resources available to individuals and households. These are essentially income from various sources including transfers made by the state.[16] The choices made by individuals for improved health may be derived from the Beckerian model of choice of leisure and other items of consumption given time and income constraints (with given prices of consumables) and production of the particular item of desire (health status). The studies in Savedoff and Schultz (2000a) essentially follow this framework, for five types of health indicators. The multiplicity of indicators suggests that the definition of health status is a major issue. Eight types of measures of health have been used in the relevant literature (Currie and Madrian: 1999). More importantly, the health outcome (such as height for weight or age at menarche) at any time may depend on both the past and the present investments in health care and related investments such as nutrition. In such a situation, a dynamic framework may be called for a proper analysis.[17]

2.4.3 Migration

Migration may be analysed within a human capital framework similar to those used to study education and health. Thus, the spatial (rural-urban) differences in

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[16] For an interesting study on how transfer incomes in South Africa have played a major role in determining health status of people, see Case (2000).

[17] For an analysis using German data see Dustmann and Windmeijer (2000).

the productivity of labour and wages may be a driving economic force behind migration (Fei and Ranis: 1964; Greenwood: 1975; Lewis: 1954; Ravenstein: 1885, 1889 cited in Hoddinott 1994; Todaro: 1969). Recent literature indicates a consensus towards the use of a multilevel approach to explain migratory behaviour (Bilsborrow *et al.*: 1993; Ezra: 2001; Findley and Diallo: 1993; Guest: 1993; Zhao: 1999; Zhu: 1998). In essence it means that while the final decision regarding migration is taken at the individual and household levels, broader factors at the national and community levels influence such behaviour.

A household's strategy for survival and economic betterment and allocation of labour may lead to one or more of its members migrating (Cackley: 1993; Guest: 1989; Hoddinott: 1994; Kusago: 1998; Wolf: 1990; Wood: 1981).[18] Lower total costs of and higher returns from migration similarly raise the tendency to migrate (Mincer: 1978; Sjaastad: 1962).

Non-economic factors such as help from those who have migrated before may facilitate migration (Boyd: 1989; Fawcett: 1989; Fuller, Kamnuansilpa and Lightfoot: 1990; Moretti: 1999). Such networks help to reduce the risk of migration by lowering its cost and also the cost of job-search (Banerjee: 1998). Thus, people living in areas with historically high tendencies to migrate may continue to do so because of such networks (Rystad: 1992).

For women, the causes of migration are similar to those described above (Cackley: 1993; Chant and Radcliffe: 1992; de Lattes and Mychaszula: 1993; Hugo: 1992; Mincer: 1978; Prayer: 1992; Riley and Gardner: 1993; Sandell: 1977). Additionally, the literature indicates that the migration of married women may be tied with that of their husbands. This is a general phenomenon in both the developing and developed countries.

2.5 Household Impacts

There are certain impacts of women's labour market entry and earnings, which directly affect the welfare of the household. These impacts do not directly affect labour market behaviour in turn and are different from others, such as fertility, that do. Such impacts include, *inter alia*, intrahousehold resource allocation, savings and decision-making process.

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[18] Lucas (1997) provides a critical review of this strand of literature.

2.5.1 Intrahousehold Resource Allocation and Resource Pooling

As women earn an income, a major issue of interest is whether it goes into a single kitty (i.e. pooled) over which they may have little or no control; or, they keep control over their income themselves. This question is a part of the broader analytical and policy issue related to intrahousehold inequity in distribution of resources such as food (Sen: 1984; Kanbur: 2000). The control of resources within the household, particularly whether its members pool their earnings and have similar preferences, thus assume greater importance.[19] If preferences differ and people control their own individual incomes, general household welfare may increase under certain circumstances (Haddad, Kanbur and Bouis: 1995; Hallman: 1999; Hoddinott and Haddad: 1995; Shelley and Burton: 1998) while in others it may not. More particularly, it is assumed with some validation in the literature that the more women control resources, the more it is likely that expenditure will be made for the general welfare of the household, especially for children. Hence inequality within the household may be reduced, the more women have control over resources. From a policy perspective, therefore, it is important to know, in the specific context of a country, the factors that may facilitate such control by women. Studies based on data from various countries have rejected the pooling hypothesis and thus favour welfare or transfer programs that target individuals rather than households (Doss: 1997; Hoddinott and Haddad: 1995; Lundberg, Pollak and Wales: 1997).

[19] These models have been utilised for various purposes and applied to topics such as fertility, nutrition and education for children, the testing and the evolution of the alternatives to common household preferences and analysis of pooling behaviour. But the common thread through the models is that all of these, in some way or other, depict particular types or instances of intrahousehold resource allocation. Several recent excellent surveys of the literature exist on these issues. See Behrman (1992), Behrman (1998), Bergstrom (1997), Deaton (1995), Haddad, Hoddinott and Alderman (1997) and Strauss, Mwabu and Beegle (2000). For an interesting extension of the household model of determination of child nutrition to inter-country study, see Smith and Haddad (2000).

Acero (1991) studied the financial resource management practices in households of textile workers in Brazil and Argentina. Dwyer and Bruce (1988) and Fapohunda (1988) made similar investigations in the context of other developing countries. These were based on direct observations on income pooling. On the other hand, a particular analytical inadequacy in much of the relevant economic literature is the use of indirect evidence. The hypothesis of "pooling" versus "no pooling" is tested by verifying if the observed consumption behaviour is consistent with the theoretical predictions of one or the other type of model of the household (unitary or collective or bargaining) (see Chapter 3 for details). Secondly, as pooling is not directly observed, very few analyses exist of the factors that influence pooling behaviour. Thirdly, there appears to be little by way of direct examination of how expenditures behave when income is known to be pooled or not. Fourthly, much of the literature, at least on the developing countries, analyses the situation in a rural setting as in most such countries the employment and income earning opportunities are mainly in the rural areas. Analyses of the impact of formal urban employment and income earning by women on pooling and consequent expenditure behaviour are rare.

The issues studied under the heading of intrahousehold resource allocation have been varied. But in each case, the main point that is sought to be established is whether or not there are systematic patterns in expenditure or investment that result in differential outcomes of (say, education, nutrient intake or health) by sex and/or age. As any household is a multi-dimensional entity, occasionally the models become too complex both analytically and empirically. There are two specific reasons for this. One is the indirect nature of the analysis alluded to earlier. The second relates to the data problems. Behrman (1997, p. 146-147), for example, has listed at least six types of severe data limitations in estimation of parameters to test the implications of the relevant theories. In some cases, data are unobserved, in others these are not collected for the specific purpose of analysis of intrahousehold resource allocation.

2.5.2 Savings Behaviour

There is a large literature on savings behaviour in developed countries. There are comparatively few studies on developing countries. Some of the conceptual issues may, however, apply across countries. For surveys on savings in developing

countries, see Gersovitz (1988) and Besley (1995). Because of the relative dearth of literature on developing countries, the review will be brief and deal with the main issues that need to be considered in an analysis of savings.

In developing countries two types of investigation regarding savings behaviour have been made. What happens when there is financial liberalisation and also when there is a credit constraint? Both are examined at the macro level. On the whole, the evidence seems to be that the interest elasticity of savings is low in developing countries (Balassa: 1990). Under financial liberalisation, it may be more interest-elastic (Feltenstein, Lebow and Wijnbergen: 1990; Melo and Tybout: 1986). Furthermore, the consumption level is restricted by liquidity constraints, thus affecting savings. There are very few studies on micro level savings behaviour. Utilising a household behaviour model, Browning (2000) has made an interesting theoretical contribution in which wives and husbands may have different savings behaviour.

2.6 Bangladesh Studies

The total volume of Bangladesh-specific literature on some of the topics that have been discussed above is very thin (except for fertility but even here the literature on demand-side determinants is rare). I have, therefore, put them together but differentiated by themes to relate them to the discussion above. One general caveat applies. Whatever literature is available mostly relate to rural areas as nearly 80 per cent of the people are rural-resident. Thus, the findings from these studies may not be directly comparable to my analysis and their results. Yet, as these are what are available, I shall use some of this literature as it may relate to my study as background material.

2.6.1 Labour Force Participation and Intervening Factors

Labour force participation

There are very few studies, which analyse labour force participation in an urban Bangladesh context. Zaman (1998) analysed in detail, particularly the rural-urban and male-female differences and disparities in labour market participation using national level data. Khandker (1987) analyses information on married women from rural Bangladesh and found that education had a positive impact on women's labour market participation. Husband's education had a negative effect.

Land holding had a negative effect, but it was not significant. In a subsequent analysis, Khandker (1988) found education, landholding, husband's pre-marriage assets and predicted male wage to have a significantly negative influence on the labour market participation of women. But predicted female wage had a significantly positive influence. Women's education had a positive but statistically insignificant coefficient. Such results indicate the negative influence of non-labour income and assets.

Rahman (1991) analysed the hours of employment by 77 rural female wage workers. Among the explanatory variables in an OLS regression equation only two (except location dummy) were significant. The coefficient for the dummy for male earners was negative as expected, while the wage rate per hour had an unexpectedly negative coefficient. The author argued that higher wage rates may have curtailed the hours of employment, but had not substantiated the argument.

Time allocation

Very few time-allocation or similar studies have been done in Bangladesh and are either old or do not directly relate to the issues of role conflict or compatibility due to women's work outside home. The studies that exist were based on information prior to large-scale entry of women in the labour market. Before turning to the urban situation, let me briefly review the literature depicting the rural situation.

In the rural areas, women's home production and economic activities are not likely to conflict in most cases, because the latter are mainly confined within the home (Westergaard: 1993). Thus, women's economic activities can often be combined with other direct home production activities (such as cooking and baby care).

Some evidence of this can be seen in Hamid (1996). Hamid's data show that apart from purely personal and leisure time, both men and women's work are generally segregated.[20] Men are involved mainly in field farming (including livestock grazing) while women are more involved in crop processing and cattle care within household premises. Home production activities such as water collection, home care and family care are the areas of women's exclusive reserve.

They spent about 5.6 hours a day in these activities compared to only 0.6 hours by men (Hamid: 1996, p. 28). In contrast men spent 5.39 hours a day in directly economic activities outside home while women spent only 1.34 hours in these activities in an average day.

Khuda's (1982) analysis was limited due to sample size and partial coverage of time disposition (up to 7 p.m.). His data show that while women devote 2.4 hours to directly productive work and 5.6 hours to home production, the corresponding hours by men are only 5 and 0.9. Thus, measured in terms of time, women bear almost the full burden of household chores as well as a significant part of income earning work.

The above picture may be contrasted with that by Paul-Majumder (1986) for married working women in urban areas. The author used information from 284 working and 271 non-working women of similar educational backgrounds (with at least five years of education) in the early eighties. The study shows that working women devoted 7.62 hours (including both individual and joint home production) to the care of the family. Non-working women devoted almost 56 percent more time than them. However, the total time working women devoted to home production and market work was almost 15 hours. This they do by cutting down on their personal time, which was nearly 3 hours shorter than that of non-working women. Thus, there appears to be some conflict between the home production and income earning roles of women.

BUP (1990) studied 671 RMG women workers. It reported that while currently married and unmarried women worked similar hours (12.5 hours) in the factories, the corresponding home production times were 4.3 and 3.6 hours. Currently married women also had half an hour less of sleep time.

While working women cut down on their own personal time to devote to the family, the substitution is incomplete. This becomes clearer as both working and non-working women engage a similar number of domestic helpers (Paul-Majumder: 1986). Had the working women employed more domestic help, it would have meant that part of the home production time was being substituted for with such help. A major deficiency of these studies is their descriptive nature. The

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[20] Hamid's (1996) data were collected in 1991/92 from 2653 persons aged 5 years and over from a nationally representative sample of 62 villages.

identification of factors that may impact upon women's time use has not been tested rigorously with statistical or econometric techniques.

Fertility issues

There are many studies explaining fertility behaviour in Bangladesh. See Kane, Khuda and Philips (1997) for recent studies. Unfortunately, all studies relate to the rural situation where the job-market is extremely limited for women and thus its influence remains basically unobserved and unanalysed. Montgomery, Arends-Kuenning and Mete (1999) examine the issue of a quantity-quality trade off in the rural Bangladesh context. Only education of women and their spouses indicated a quantity-quality trade off. However, as the explanatory variables did not include any related to job-holding or economic activities of women, its influence on quantity-quality trade-off and fertility could not be ascertained. Zaman and Gibson (2001) used information on women working in RMG factories to find out their fertility behavoiur and whether these conform to a quantity-quality trade-off. They too found a limited support for such trade-off.

On birth spacing, one study by Khan and Raeside (1998) using Bangladesh data indicates a positive influence for age at marriage on time to first birth. On the other hand, better-educated women had a shorter spell of childlessness.

2.6.2 Wages and Earnings

Role of education

Hye (1993) surveyed the rural employment and wages literature. The wage issues, however, have not been analysed with education as an explanatory variable. Rahman (1991) tried to explain variation in female agricultural wages with a small sample. The study found that the number of dependents in the family had a negative influence, possibly by lowering the reservation wage, while male earners in the family had a positive influence for the opposite reason. Human capital variables were not used, nor was selectivity corrected in the wage equation.

One early study tried to estimate the wage equation for RMG workers (both men and women) during the mid-eighties (Hossain and Brar: 1986). They found positive and significant coefficients for both education and experience, but did not correct for selectivity bias for participation in the labour market. BUP (1990) reported that overtime allowance accounted for just about a quarter of total

compensation. Zohir and Paul-Majumder (1996) estimated an earnings function for RMG workers. They found positive effects of education, experience, job type, marital status, and size of firm but a negative effect for gender (men = 1). But they did not correct for possible selectivity bias. Their interpretation of coefficients of education is also incorrect, because the coefficients have been considered as marginal change in pay while these are, strictly speaking, marginal change in log of pay.

Health status

Khan (1997) studied health status and health expenditure in a large sample without reference to the work status of the respondents. Kabir (2001) studied health status of only old persons. Regarding the health status of working women, BUP (1990) reported that fever was a common ailment among RMG workers, as were eyesight problems (in case of 33 percent of respondents). On average, workers remain absent in work place for three days in a month. Zohir and Paul-Majumder (1996) investigated the effects of women's work outside home on their health. They have described the health conditions and diseases suffered and absence from the work place due to illness. However, they have not been able to establish whether workers suffer, more or less compared to non-working women. Secondly, they have not tried to analyse how health status is produced or if health has a bearing upon income earned.

Paul-Majumder (1996) investigated health of male and female workers in RMG firms. The study considered various health indicators and used two of them, incidence of eye trouble and weakness, in a logistic regression as dependent variables. The analysis shows that the length of daily working hours and the length of employment in RMG exacerbate health problem. Health problems are more frequent for women compared to men, and for sewing operators compared to other types of workers. These are plausible results.

Migration

In general, the relevant literature on Bangladesh has not paid much attention to migratory behaviour of urban, working women. Mahbub (1997) examines seasonal and circular movement, but not permanent migration behaviour within

the rural locality. Mahbub's analyses did not focus on women's migration and their consequences.

Afsar (1998) discusses selectivity of migrants including women in urban slums. Zohir and Paul-Majumder (1996) discuss selectivity of female migrant workers in RMG factories and also their mobility problems. Particularly, they found that single, unmarried women may be less likely to migrate on their own (Zohir and Paul-Majumder: 1996). This contrasts with BUP (1990) which found that 69 percent of unmarried compared to 58 percent of currently married women migrated specifically in search of jobs. In its sample 89 percent were migrants. It remains to be seen which pattern holds now. Zaman (2000a) used information on RMG women workers to find out about their migratory and related characteristics. She found ninety percent of the women to be migrants and that they come from districts which either have easy communication with the capital city or which are prone to natural disasters.

2.6.3 Pooling and Intrahousehold Resource Allocation

Zohir and Paul-Majumder (1996) did not study intrahousehold resource allocation directly but reported on the replies given by women and men on who had the say in the expenditure in the household. Seventy one percent of male workers had an absolute say in the expenditure decision in the household. In general the proportion goes up as one moves up the skill ladder or becomes older. For women workers, the same pattern applies. But only 35 percent of women claim to decide household expenditure solely by themselves.

Pitt, Rosenzweig and Hassan (1990) developed and estimated a model with several interlinked elements. These are the distribution of food and work activities, labour market productivity, nutrition, and health heterogeneity. In their model the household maximises a common preference function with health, food consumption and labour time of each member of the household under a budget constraint, a production function for health and the wages received. The health production function has health endowment as an argument. To avoid simultaneity bias, instruments have been used in econometric estimation. Given the demanding nature of data requirements, the authors tried to combine information from several data sets including those from a sample of 385 households for only half of which there was nutrient information.

The results are interesting, but appear counter-intuitive. First, their results show that healthier males above 12 years receive more nutrients. Females of same age get considerably less. Those less than six years old get less nutrition if they have less health endowment. These indicate that intrahousehold allocation favours those who may have better prospects of work effort. But on the whole, men are "taxed" to compensate for other members' lack of health and nutrition. This last result appears counter-intuitive and contrary to common observations of women getting less than men (Chowdhury: 1993). In fact several strong assumptions have been used by the authors, which may have resulted in such findings. Particularly note that they have posited that women's work effort is less energy-intensive than men's. It must be mentioned that while any particular activity may be less energy-intensive than another, the total work load and time devoted may be so great that on a net basis women cannot be said to be doing less energy intensive job than men.

Quisumbing and de la Brière (2000) found that women's current and marriage-time assets have positive and significant effects on household expenditure on children's education and clothing. Interestingly, the food expenditure share is positively influenced by husband's assets but not by women's assets which is contrary to findings elsewhere (Doss: 1997). In a similar study, Quisumbing and Maluccio (2000) show that women's assets at marriage have little or no influence on expenditure shares. Yet, they claim that these results reject the hypothesis of common preferences under the unitary model of the household. The conclusions of Quisumbing and de la Brière (2000) and Quisumbing and Maluccio (2000) regarding the role of assets in intrahousehold resource allocation may not be entirely correct. Pre-marriage assets may have a role only if women control either the assets or the flow of income from them. Neither assumption has been tested.

Zaman (2000b) contrasted food expenditure behaviour in pooling and non-pooling households of married women workers in RMG factories. Her results imply a substantial additional food consumption and consequent nutrition in non-pooling compared to pooling households.

2.6.4 Decision-Making and Independence of Action

In Bangladesh, movement of women for day-to-day activities is generally limited (Ahmed: 1993; Amin *et al.*: 1998). They are also constrained by a lack of adequate educational opportunities (Duza *et al.*: 1992) and other inequities (Ahmad and Khan: 1998; Jahan and Islam: 1997). Until recently, because most of women's economic activities have been informal and confined within the homestead, particularly in rural areas (Westergaard: 1993), they did not have to go against the cultural norm of *purdah*, which connotes seclusion and modesty when outside home (Ahmed: 1993).

Who has more or less freedom of action for decision-making has been investigated quantitatively by very few. The main method of investigation had been qualitative and case study-based. Hashemi, Schular and Riley (1996) used a quantitative method and found that women, who participate in rural credit programmes and thus contribute economically to the household, enjoy more autonomy of action compared to non-participants.

2.7 Summary

This chapter provides a literature review of several issues that will be investigated in subsequent chapters in this thesis. In doing so, I have emphasised the conceptual and empirical underpinnings of the findings, mainly because of the large number of issues involved and the very large literature each of these have spawned. I have pointed out that literature on developing country problems is not extensive while for Bangladesh it is extremely thin. I have briefly but critically reviewed whatever is available in terms of the conceptual framework, empirical methods and the interpretation of the results.

There is a general lack of studies on the impact of the formal labour market entry of women in the urban areas of the developing countries. Very few studies explicitly analyse simultaneous time allocation between paid market work and home production. In the estimation of earnings functions, schooling quality is often ignored. In the case of health, analyses are mainly of a static nature while a dynamic framework is likely to be more appropriate because the past as well as the present investments in health is important in determining health status. A major problem in analysis of intrahousehold resource allocation, particularly in relation to pooling, is the indirect nature of the evidence. Direct analysis of what

determines pooling and how it affects resource allocation within the household are lacking.

In Bangladesh most such types of studies are either lacking or are of very cursory nature. These include analyses of labour market entry, wage/earnings, health impact, demand side analyses of fertility, pooling and standard of living. A few studies that exist on intrahousehold resource allocation show results that are counter-intuitive. Analyses of social change due to women's entry into the formal labour market, particularly in the context of their economic underpinning also very few. In this study, I try to modestly fill up some of these gaps in analysis.

CHAPTER 3
A THEORETICAL FRAMEWORK

3.1 Introduction

This chapter discusses the theoretical framework that is used in this thesis to understand and analyse the labour market entry of women and its impact on their households.[21] For both types of analyses, it is necessary to conceptualise a household as a multi-dimensional unit. That the family is not simply a social entity, but also a space where various kinds of economic activities are planned and carried out for both production and consumption by its members, is not a new discovery. As early as 1925, Chayanov (1966) analysed the implications of such activities for the behaviour of the Russian peasantry.

In more recent times, Becker and others have emphasised the family as the unit where much of the economic and apparently non-economic (such as marriage and fertility) activities take place (Haddad, Hoddinott and Alderman: 1997). Their analysis is known as "New Home Economics". Even in the cases of "non-economic" actions, individuals and households make choices from various alternatives each of which has a "cost" or "price" associated with it. These costs or prices may be either economic or non-economic or both. So long as the costs are economic, it is possible to use some of the tools of economics to analyse certain dimensions of the problem. Here economic costs may mean either explicitly financial costs or opportunity costs i.e., costs of alternatives forgone (e.g., spending for children's education rather than buying a house). Thus, the analysis is similar to any other economic analysis of choice amongst alternatives with defined costs.

Households, in economic analyses, are assumed to maximise their satisfaction or utility from various actions (Varian: 1992). For my purposes, therefore, I use the basic theoretical framework of utility maximisation for a consumer and its extensions. I do not go into the details of the theoretical premises of utility maximisation theory, such as the properties of the indifference or iso-utility curves as these are standard materials and found in any good textbook on microeconomics (Layard and Walters; 1978; Varian; 1992; Bryant; 1992). My

[21] A household and a family may not necessarily be the same. However, unless specifically stated otherwise, I treat household and family interchangeably in this analysis.

purpose is to show how the basic theory can be used for illuminating the problems at hand.

There is a controversy regarding the nature of the household. Briefly speaking, it relates to the question regarding who takes the decision. This question divides the households into two broad types, "unitary" or "collective" (Alderman *et al.*: 1995). In a unitary household, there may be a single decision-maker who may behave like an altruistic or a benevolent dictator (thus these households are sometimes called "dictatorial" households). In contrast, in a collective or bargaining household, decisions may be taken both jointly and individually by members (say, both spouses) in the household (Alderman *et al.*: 1995). How the members arrive at a household equilibrium depends on the assumptions of the bargaining process thus giving rise to variations of the general bargaining model.

The structure of the chapter is as follows. Section 3.2 discusses the basic utility maximisation theory. Section 3.3 explains the standard neoclassical theory and its extensions by Becker and others to analyse the supply of labour. Section 3.4 concentrates on alternative theories that explain labour market entry and time allocation by members of a household and other aspects related to their labour market entry. I examine their relevance in the present context in section 3.5 and discuss how I have utilised these theories in analysing issues in Chapters 5 to 7. Section 3.6 provides a summary of the chapter.

Before passing on, I would like to point out that Chapter 3 provides only the basic theoretical framework. This may have several variants depending on the purpose at hand. These variants will be elaborated on at the places where they are used to analyse particular research problems. Thus, Chapter 5 provides a framework for labour force participation and also a human capital theory of wage and earnings. Chapter 7 provides variants of the basic model to explain fertility behaviour. Furthermore, the model behind birth spacing has also been described in the same chapter. Then again, the explanation of health status and its role in wage determination has used an analytical framework based on the basic model described in this chapter. Thus, for a fuller picture of the various theoretical/analytical frameworks that have been used in the thesis, the reader may refer to the particular chapter where the particular problem of interest has been analysed.

3.2 A Utility Model of Consumer's Equilibrium

The standard utility model of consumer's equilibrium can be used as a base to understand the theoretical implications of a household's decision-making, regarding its members' labour market entry and also the impacts of such entry upon the household. Let us take the simplest case of a consumer who has an income M, and uses that income to purchase two goods, X_1 and X_2 with prices P_1 and P_2. The consumer obtains his/her utility (satisfaction) from the consumption of these two goods. Then the utility U is a function of the level of two goods consumed. This can be written as

$$U = U(X_1, X_2); \text{ where } U_1 > 0 \text{ and } U_2 > 0 \qquad \ldots (3.2.1)$$

$U_1 = \partial U/\partial X_1$ is the partial derivative of U with respect to X_1 and thus the marginal utility of X_1. Similarly marginal utility of X_2 is written as $U_2 = \partial U/\partial X_2$.

As the total income, M, is assumed to be spent fully on the two goods, the budget constraint is

$$P_1X_1 + P_2X_2 = M \qquad \ldots (3.2.2)$$

The problem of the consumer can then be formally expressed as

$$\text{Maximise } U = U(X_1, X_2) \qquad \ldots (3.2.3)$$
$$\text{s.t. } P_1X_1 + P_2X_2 = M$$

This can be solved by using the Lagrangean multiplier (a method where the Lagrangean gives the value to the consumer of an incremental relaxation of the income constraint), which leads to the conditions of equilibrium as

$$U_1/P_1 = U_2/P_2 \qquad \ldots (3.2.4)$$

or, equivalently as

$$U_1/U_2 = P_1/P_2 \qquad \ldots (3.2.5)$$

The left hand side of the equation (3.2.5) is called the marginal rate of substitution between good 1 and 2. It shows the amount of good 1 that has to be sacrificed to get one more unit of good 2 and yet be neither worse-off nor better off than before in terms of total utility or satisfaction.

The above results are general and can be extended to the case of N commodities, where N is any number. In this case, the equilibrium condition may be written as

$$U_1/P_1 = U_2/P_2 = U_3/P_3 = \ldots = U_n/P_n \qquad \ldots (3.2.6)$$

Or, equivalently,

$$U_i/U_j = P_i/P_j \text{ for all i and j } (i,j = 1, \ldots, n;\ i \neq j) \qquad \ldots (3.2.7)$$

That is the marginal utility per unit of money derived from all goods must be the same. Equivalently, the marginal rate of substitution between any two goods must be the same and equal to the ratio of their prices. These arguments can be illustrated with the help of a diagram when there are only two goods, as shown in Figure 3.2-1.

In Figure 3.2-1, the horizontal axis shows the amount of good 1 and the vertical axis the amount of good 2. If all the money is used to buy good 1, the maximum amount that can be bought is OA, while the maximum amount for good 2 is OB. The straight line AB is called the budget line and is the graphical equivalent of the budget constraint. The value of any combination of good 1 and good 2 on this line is equal to M, the total income. The slope of this line is given by $-P_1/P_2$ (= OB/OA)[22]. As the consumer uses up all the money in purchasing the two goods, he/she must be at some point on this line when the utility (or satisfaction) is maximised.

The curves (I_1 and I_2) indicate the indifference or the iso-utility curves. The total utility derived from the various combinations of commodities consumed is the same on a given indifference curve. The consumer is indifferent on a given indifference curve among the various combinations of good 1 and good 2 as the total utility remains unchanged on that curve. The curves to the right and above indicate higher levels of utility compared to any down and to the left.[23] The slope of the indifference curve is the negative of the marginal rate of substitution i.e., $-U_1/U_2$.

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[22] To see this, note that M = OA * P_1 = OB * P_2. So, P_1 / P_2 = OB/OA. As amount of good B falls as that of good A rises, the slope is negative of this ratio.

[23] The indifference curves cannot intersect with each other. Otherwise, the combinations on one curve may some time give more and some time less of utility than on the other curve.

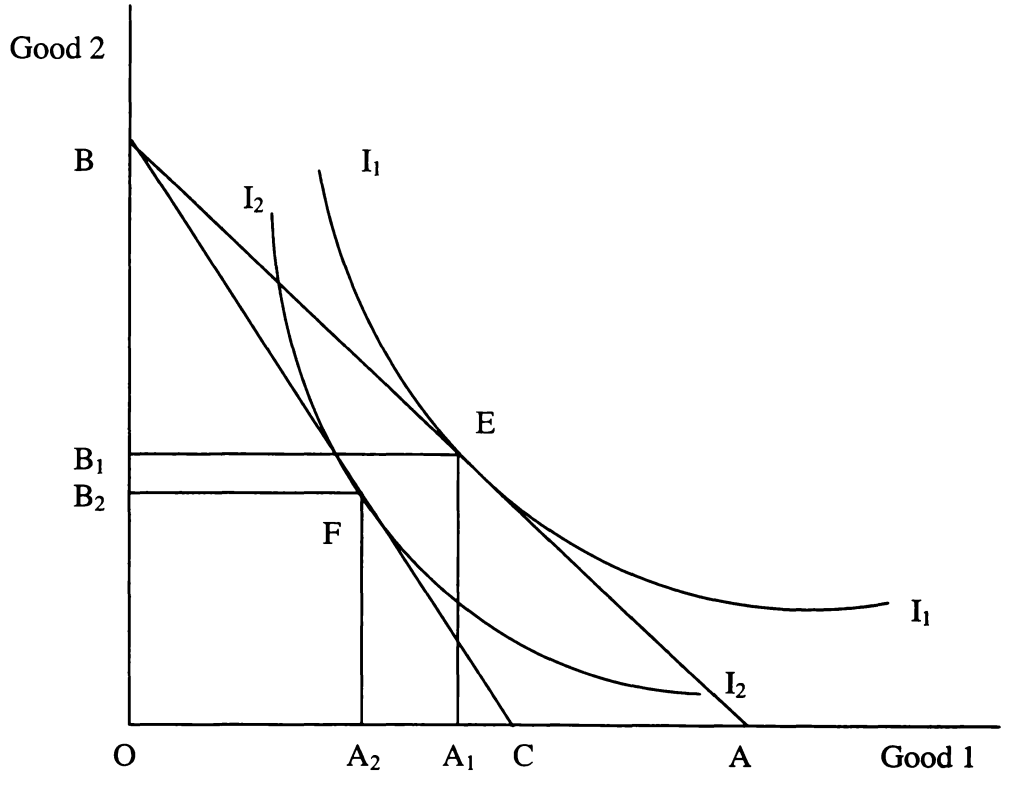

Fig. 3.2-1: Equilibrium Points of a Utility Maximising Consumer

Note: I_1 and I_2 are indifference curves. AB is the budget line.
E is initial equilibrium point with consumption OA_1 of good 1 and OB_1 of good. 2.
F is the equilibrium point after price rise of good 1 showing changed combination of good 1 (OA_2) and good 2 (OB_2).

The problem for the consumer is to reach a point as much to the right and above as possible but still remaining on the budget line. This is satisfied only on point E where the budget line just touches the indifference curve I_1, i.e., the slope of the indifference curve and that of the budget line are equal to each other. At this point, the marginal rate of substitution between the two goods is just equal to the ratio of their prices. Thus, E denotes the point of equilibrium for the consumer. The amounts of good 1 and 2 that are consumed are OA_1 and OB_1 respectively.

Now suppose that the price of good 1 increases and the consumer can buy at most OC amount of good 1 (if all income is spent on it). The price of good 2 remains unchanged. The new budget line is now BC. The consumer is at a new

equilibrium which is F and the amounts consumed of goods 1 and 2 are now OA_2 and OB_2 respectively. Note that the quantities consumed of both goods have fallen.

From the first order conditions for consumer's equilibrium (3.2.6 or 3.2.7) the demand functions can be derived for the goods 1 and 2. In general, the demand function for good i is

$$Xi = Di\ (P_1, P_2, ..P_i, ..P_n, M) \qquad \ldots (3.2.8)$$

i.e., it is a function of the prices of the goods and the consumer's income.[24]

3.3 Supply of Labour

3.3.1 The Standard Neoclassical Model

The above model can be used to analyse the labour supply of a consumer. Assume that the consumer derives utility from not only the consumption of goods, but also the amount of leisure time. For simplicity's sake, also assume that a composite good X with price P represents the goods consumed and W is the wage rate, per unit of work time. T is the total time available at the disposal of the consumer who earns an income M, by selling labour. The consumer's income is given by

$$M = W(T- L) \qquad \ldots (3.3.1)$$

where, L is the leisure time.

The utility function may then be expressed as

$$U = U\ (X, L) \text{ where } U_x > 0\ ;\ U_L > 0 \qquad \ldots (3.3.2)$$

The budget equation is

$$PX = W\ (T - L) \qquad \ldots (3.3.3)$$

But if we also assume that there are non-wage incomes e.g., property income which, for simplicity's sake, can be kept fixed, the budget equation becomes

$$PX = W(T - L) + Y_o \qquad \ldots (3.3.4)$$

where Y_o is the fixed non-wage income. This may be rewritten as

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[24] Strictly speaking, it is also dependent on the taste of the consumer which is unobserved.

$$PX + WL = WT + Y_o \quad \ldots (3.3.5)$$

(i.e., total consumption equals full time income).

Now assume that the consumer maximizes utility subject to his/her total income. This is written algebraically as

$$\text{Max } U = U(X, L)$$

$$\text{st. } PX = W(T - L) + Y_o \quad \ldots (3.3.6)$$

The demand functions from the above maximising problem would give the demand for leisure as depending upon the price of the composite good, the wage rate and the property income. The demand for leisure may fall as the wage rate increases because with higher wages leisure becomes costlier. But as wage rate increases, so will the wage income. This will induce an income effect which may be so strong that people may actually end up demanding more leisure i.e., supplying less labour than before which is the case of the classical backward-bending supply of labour (Borjas: 2000).[25] Furthermore, the demand for leisure and therefore supply of labour will also depend upon the non-wage (property) income.

The neoclassical analysis, as outlined above, has several drawbacks. The first objection is that it does not distinguish between pure leisure (such as sleep) and non-market time (household work). For example, sleep is a physiological need that has to be taken out as "not household production time". On the other hand, household members' non-market time is used to transform market goods and services before these may be consumed. Thus, raw meat bought from the market may first be cooked using labour of the household members (usually women's labour) and other goods bought from the market (such as cooking oil) before it can be consumed. The time devoted to cooking is not leisure. Becker (1965) has made this distinction and separated time devoted to home production i.e., production activities carried within home producing output for direct consumption by the family.

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[25] An example of income effect will make it clear. Suppose a consumer has a certain income and wishes to purchase two goods say 1 and 2. Let us assume that the price of good 1 increases, keeping the income and the price of good 2 unchanged. The change in demand due to change in the rate of exchange between the two goods is known as substitution effect. The change in demand due to change in purchasing power is called the income effect (Varian: 1992).

The second objection to the neoclassical model is that it assumes either the family is run by a dictator so that his/her utility function is taken as the preference of the whole household, or that the utility function of all the household members is similar. Neither may be true, because in reality households are composed of several members whose preferences are unlikely to be similar. Thus, they may bargain among themselves over the shares of household resources for increasing individual utility. In any case, Becker and others have made extensions to the basic model over time (Becker: 1973; Becker: 1981; Becker and Lewis: 1974; Gronau: 1980). The influence of the basic model remains pervasive despite its critics.[26]

3.3.2 A Beckerian Model of Labour Supply

I use Becker's basic model, extended by Gronau (1980). For this let the utility of the household be

$$U = U(X_1, X_2 + X_3) \qquad \ldots (3.3.2.1)$$

where, X_1, X_2 and X_3 are pure leisure, market consumption good and home produced goods respectively.

For simplicity, X_2 and X_3 are assumed to be perfect substitutes (for example food cooked at home or purchased from the market).

Time devoted to leisure and home production are L and H respectively.

So market time is T - L - H. ... (3.3.2.2)

Hence the budget constraint may be written as

$$PX_2 + WL + WH = WT + Y_o \qquad \ldots (3.3.2.3)$$

The home goods are produced using time H and other goods, using a technology (for example using a food processor for food mixing) which can be defined by a home production function generally as

$$X_3 = f(H, X_2) \qquad \ldots (3.3.2.4)$$

The household maximises its utility subject to the budget constraint and the quantum of the home produced goods. The solution of the problem leads to

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[26] There are many such criticisms. See the chapters in Haddad, Hoddinott and Alderman (1997) and the references cited therein. For criticism from economists with a feminist angle, but still within the neoclassical framework, see Kuiper and Sap (1995) and Dijkstra and Plantenga (1997).

demand functions, which have leisure time, time for home production, non-wage income, the wage rate and the prices of the market goods and services as arguments.

Following Veen (1997, p. 21-23) the situation may be depicted with the help of Fig. 3.3.2-1. OT is the total available time to be allocated among leisure, market time and home time. TA is the consumption out of non-labour income. So, if there is no home production nor any market time, OT is the leisure time and the consumer uses non-labour income to enjoy OC_1 amount of consumption.

To understand the slope of the budget constraint note that at A, the marginal product of home time is higher than the marginal product of market time. But as more and more time is given to home production, its marginal product (the additional production due to an infinitesimal change in home time) falls (assuming no technological change, e.g., continuation of use of less efficient old washing machines). Between B and A, the productivity of time at home is higher than that in the market and hence the consumer may not enter the market for wage employment. But beyond B (and towards C), the market wage or the marginal product of market time is higher than that for home time and the consumer enters the labour market.

If his/her preference is given by the indifference curve I_1, the consumer is in equilibrium at E_1. He/she devotes OL_1 to pure leisure, L_1L_2 to market time and L_2T to home production activities. For the consumer with the preference function represented by curve I_2, there is no market time; only leisure OL_1' and home time $L_1'T$ because the marginal productivity of home time remains larger than the market wage (or marginal productivity of market time).

If the market wage rate increases, the equalisation of marginal product of home time with market wage rate occurs nearer to A. So the point B moves towards A, and the segment L_1L_2 becomes larger i.e., more time is devoted to market compared to home production. This happens because the wage rate or the opportunity cost (i.e., the alternative forgone) of both home time and leisure increases. Apart from the price effect, a wage increase, however, also induces an income effect. These effects shift the original equilibrium point and the net effect i.e. the exact equilibrium which changes the time allocation becomes an empirical issue and may not be hypothesised *a priori*.

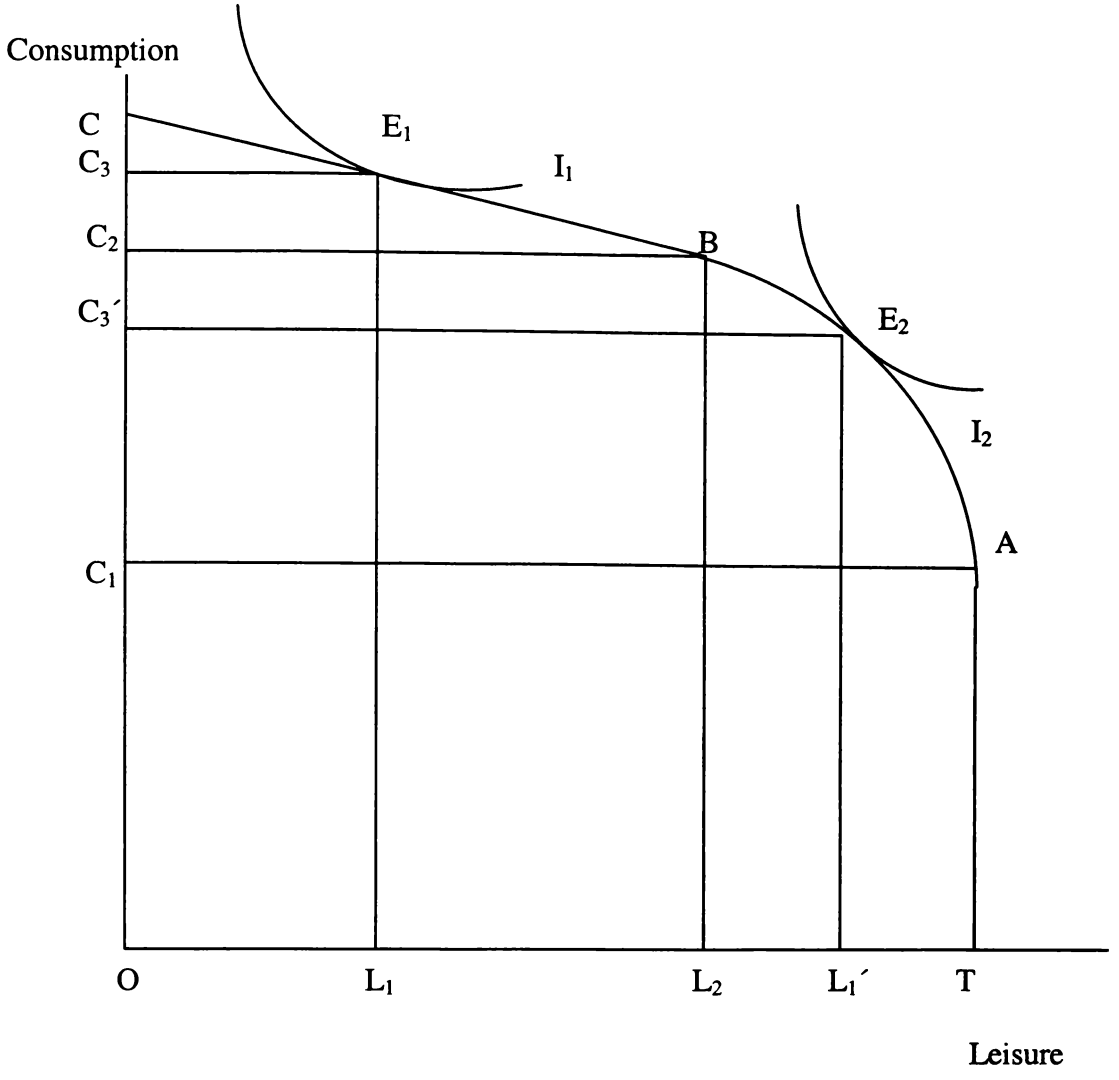

Figure. 3.3.2-1: Optimal Time Allocation by Working and Non-Working Persons

Note: TABC – border line from which consumer chooses
O L_1 – equilibrium leisure time of working consumer ;
L_1 L_2 – equilibrium market time of working consumer;
L_2 T – equilibrium home time of working consumer;
O L_1´ - equilibrium leisure time of non-working consumer;
L_1´ T - equilibrium home time of non-working consumer;
OC_3 – total consumption value of working consumer;
OC_3´ - total consumption value of non-working consumer.

In the extended Beckerian model above, the home produced goods are perfectly general consumption items.[27] These home produced goods may be health status or education of children or number of children (i.e., fertility) or a cleaner house each of which has different characteristics. The members of the family have

[27] Here consumption means that a person desires or derives utility or satisfaction from it.

to devote time to their production before they can be consumed or utility derived from them. Secondly, the home time has an opportunity cost, which is given by the earnings foregone. The consumer, therefore, has to choose between alternatives of market participation, home production (of various kinds) and pure leisure each of which has a "price". Thus, the Beckerian model has been used to analyse various kinds of home production issues such as marriage, fertility, child nutrition, and human capital acquisition (e.g. education and health).

The extended model, as stated earlier have, however, been criticised on the grounds that it does not allow the preferences of the members of the family to be different which may affect the existence of a household utility function. Particularly, if the preferences of household members are different for whatever the reason, the implications of intrahousehold allocation of resources may be different from what the above model predicts. Allowing for the differences in preferences is, in a sense, straightforward as shown in the next sub-section.

3.3.3 A Multi-Person Model

To allow for differences in preferences of members of a household, particularly between men and women, the utility function for a two-member family composed of husband and wife may be shown as

$$U = U (X_m, X_f, Z_m, Z_f, L_m, L_f) \quad \ldots (3.3.3.1)$$

where, X's are market goods;
Z's are home-produced goods;
L's are leisure time; and subscripts, m and f, denote male and female.
X_m and X_f denote goods consumed by male and female members.

For each member there is a budget constraint, which refers to his/her consumption, wage and non-wage earnings, leisure and market time. Similarly, there is a home production function, which has as arguments the consumption of market goods and, home time and other characteristics (endowments) of each member.

The household then maximises utility subject to these budget constraints and the home production functions. The resulting demand function, therefore, in its most general form looks like

$$X_m = Q_m (P, W_m, W_f, Y_{om}, Y_{of}, L_m, L_f, H_m, H_f) \quad \ldots (3.3.3.2)$$

i.e., the demand for a good by a member is a function of the price of the good, wages of both members, the leisure and home times of both members and the non-wage incomes of both members. Thus, there is no certainty that the demand for any good with respect to the characteristics of one member or his/her attributes will be the same as that for another.

The single utility function for the household is based upon the assumption that all resources are pooled or under the control of one person. It also means that no matter from which source the income is derived, the implications for expenditure will be the same. Thus, if there is a good X, the expenditure on the commodity will be the same no matter who earns the income, men or women.

To provide an example, consider two goods, for example, alcohol for adults and milk for children and assume that only the husband earns an income. The above model implies that, if the wife earns the income instead, the relative expenditure on alcohol and milk will remain the same. The worldwide mounting evidence, however, suggests that the marginal effect of wife's earning is different from that of the husband (Haddad: 1999). Thus, if the wife earns an income, the relative expenditure share of alcohol may fall and that of milk rise. This kind of result is taken as evidence that income pooling (indicating a single-decision-maker household) is not a valid assumption. The assumption of income pooling has, therefore, been widely questioned (Dwyer and Bruce: 1988; Fapohunda: 1988; Tinker: 1990). In particular, there is now a growing literature on differential outcomes that result from differences in the access to resources (due to earned or non-labour income including transfers such as pensions) for men and women in various fields of education, nutrition, food, health expenditures and the like (see Behrman: 1997, for a survey; Duflo: 2000a, 2000b; Haddad, Hoddinott and Alderman: 1997, and various chapters therein; Quisumbing and Brière: 2000; Quisumbing and Maluccio: 2000). Thus, the evidence is mounting that preferences of individuals within the family may vary and their incomes may not

be pooled or pooled only partially. All these findings and concerns have led to alternative theories of household decision-making.

3.4 Collective Approaches to Family Decision-making

3.4.1 Resolution of Issues Arising from Beckerian Models

The uneasiness regarding the assumptions and implications of the extension to the standard neoclassical model has been long-standing. Samuelson (1956) recognised the problem of a single utility function representing the preferences of members of a family with heterogeneous characteristics. Becker (1974; 1981; 1991) put forward his "rotten kid" theorem to take care of the problem by assuming that there is a single, caring altruist member in the household who values the utility of other members and is powerful enough to determine the allocation of resources to the household members or recipients. Thus, other members i.e. recipients (or, rotten kids or selfish ones) know that they are in good hands which would protect their interest and thus obey the altruist. A single household utility function determined by the altruist or benevolent dictator is therefore ensured.

The existence of a household utility function does not necessarily mean that all is well with it. The empirical estimation of the parameters of the relevant demand functions of a multi-member household may be very onerous because there are more person-specific goods than prices (Pitt: 1997). Identifying restrictions that may need to be tested are necessary for estimation of the relevant parameters.

A question arises as to whether even an explicit incorporation of different member's utilities or consumption still means that U (in equation 3.3.3.1 in the multi-person model) remains a household utility function (McElroy: 1997). This uneasiness has given rise to the development of other rules for maximising the welfare of the household. A particular class of models, which goes by the name of collective models, as opposed to the traditional or Beckerian model or its variants that are called Unitary (single-utility) models, have been proposed. While there are several variants of these other models (Haddad, Hoddinott and Alderman: 1997, and various chapters therein), the initial seminal expositions were by Manser and Brown (1980) and McElroy and Horney (1981). Excellent surveys are provided in Bergstrom (1997), Behrman (1997), Mattila-Wiro (1999) and Strauss, Mwabu and Beegle (2000).

3.4.2 Collective Models

The collective models fall in several sub-classes. The two main variants are called Cooperative and Non-cooperative. Within the cooperative category, there are two broad divisions: Pareto-efficient cooperative and Cooperative bargaining. The Cooperative approach is dependent on the assumption that the partners in a marriage enter into or remain in marriage so long as the gains of being together are more than those of remaining single. Marriage/partnership thus generates a surplus that would not have materialised without it.[28] The method of distribution of this surplus distinguishes the cooperative and other alternative models from the unitary approach.

The Pareto-efficient collective models

The cooperative approach is divided into two sub-groups, Pareto-efficient Cooperative (or collective) models and Cooperative bargaining models. The Pareto-efficient models assume that the allocations are Pareto-efficient, i.e., no other redistribution raises total utility without adversely affecting at least one party. Developed by authors such as Chiappori (1997; 1988), Bourguignon and Chiappori (1994; 1992), Browning *et al.* (1994), and Browning and Chiappori (1998), these models do not propose any solution procedure or distribution rule. These rules have to be estimated from the real life data rather than being imposed from outside.

The collective models of the Pareto-efficient variety are powerful in the sense that these imply testable hypotheses derived from them. There is a problem, though, in empirical verification of the hypothesis of income pooling which is a key assumption of the alternative unitary models. As argued by Chiappori (1997), empirical studies have to ensure that they are not just measuring substitution between leisure and consumption. The argument is that if individual incomes arise due to endogenous labour supply decisions, higher wages will lead to more working hours and thus the pattern of consumption that will result is at least partly due to substitution effect. The verification of income pooling in which only income changes (but *not* prices including wages) therefore is not guaranteed. For

[28] The additional gain may arise due to economies of scale, or that there are goods/services which are not possible to produce and/or enjoy without being married (such as leaving bequests to children in a society which does not admit the legal claims of those born out of wedlock).

that to happen, income must be exogenously given which may be true if there is only non-labour income (from property, transfers, etc.).

Thus to ensure the exogeneity of income, some of the authors (Thomas: 1990; 1997) have used non-labour income only. Bourguignon *et al.* (1993), as reported by Chiappori (1997), have considered labour income but subject to the proviso that both the partners work for maximum legal hours (and thus presumably may not change them). Furthermore, other stronger assumptions, such as separability of private consumption goods, should hold. However, non-labour income is a small fraction of total income and may be measured with error (Thomas: 1997). Hence, using non-labour income as an instrument (or proxy) for total income may be a rather strong assumption. So the general problem of empirical verification remains. In the Bourguignon *et al.* (1993) example, using the legal maximum hours may also cause errors because of two factors. First, people in various occupations or enterprises work various hours. Forced equalization of hours to suit theory is uncalled for. Secondly, even if the maximum hours remain the same, once there is a wage change, some may not work any more that many hours. After all, the backward-bending supply curve of labour is a well-tested phenomenon (Borjas: 2000).

Cooperative bargaining models

In contrast to the Pareto-efficient models, Manser and Brown (1980) and McElroy and Horney (1981) proposed cooperative bargaining, utilising game theory for a solution. Here "cooperation" is understood in the sense of game theory, i.e., collusion is possible among the contending parties.[29]

In McElroy's model (1990), the partners in marriage maximise the product of the gains in utility due to marriage for both individuals subject to joint full income constraints. There is a threat point of divorce or separation, which provides the benchmark against which the gains from remaining married have to be judged. McElroy also brings in the idea of "extra household environmental parameters" (EEPs) which delineate the boundary within which the solution has to be

[29] The game theory studies the behaviour of interacting decision makers. It has been used widely in understanding the behaviour of agents when the action of one affects the outcome of the actions of others such as price-cutting by supermarkets in a town. For a brief but succinct review of concepts in game theory see Varian (1992).

searched. Such EEPs may be legal (for example, marriage dissolution procedures) or social norms or similar other variables.

The demand functions from McElroy's model are similar to those obtained from the unitary model. Under certain conditions such as fixed and exogenous conflict outcomes (i.e., the utility of remaining single) the bargaining model collapses into the unitary model (McElroy and Horney: 1981; Ott: 1995). The threat or the maximum level of utility outside marriage depends on the prices of goods, the wage rate, non-wage incomes and the EEPs. Over a sufficiently short period, as many factors remain fixed, the Beckerian model may therefore be used as a first approximation towards analysing labour market entry and other related behaviour. Also, it may be noted that the outcomes in the cooperative bargaining models are not necessarily Pareto-efficient. It is disconcerting that even in a long-standing marriage partnership, the model does not assume that the persons concerned reach an understanding among them, which is more beneficial for both and thus efficiency-raising.

Non-cooperative bargaining models

In the cooperative bargaining models, the threat points must represent credible threats of breakup of marriage. However, in daily life it is not credible either that people will every now and then threaten a breakup. Cooperation will evolve and will coexist with conflicts (due to differential preferences) (Sen: 1990). The threat points in such cases, therefore, may also be the threat of non-cooperation with the other party but within the framework of marriage (Carter and Katz: 1997; Chen and Wolley: 2001; Haddad and Hoddinott: 1994; Lundberg and Pollak: 1997; Ulph: 1988).

Chen and Wolley (2001) have tried to rigorously formulate a non-cooperative bargaining model. However, it has some shortcomings. First, it also suffers from the same problem as that of others in not necessarily resulting in an efficient allocation. Secondly, the Chen and Wolley model has assumed away the existence of home produced goods. This is difficult to accept because much of the earlier criticism of the unitary models, that these amalgamate pure leisure and home production time together and thus wish away one of the major constraints to women's employment in practically all societies, would also apply here. Thirdly, this means that the wage income of the wife may have a much higher theoretical

upper limit in the model and consequently give her a stronger bargaining position than may actually be the case. As the predictions of the model are contingent upon the relative earnings, such a model-based (rather than a data-based) approach to bargaining strength may not be able to explain real life observations adequately.

3.5 Choice of the Theoretical Framework

In the preceding section, I have tried to describe briefly the competing types of models and also the theoretical and empirical problems in their testing. Therefore, the relevant question now is which model to follow.

In practically all cases that have been cited above, very few of the authors have generated their own data for the specific analysis they have done.[30] This is not surprising given, as I have indicated above, how complex the data demands are. Also, if home produced goods are excluded, as assumed by Chen and Wolley (2001), this questions the *raison d'être* of the whole exercise as it sidetracks the role of home production in the labour market behaviour of working women and consequently their income and bargaining power, if any. Similarly, in other cases of collective models for cooperative or non-cooperative bargaining, sometimes the problems of estimation are enormous (Haddad, Hoddinott and Alderman: 1997). Despite the criticism of the unitary model, Alderman *et al.* (1995, p. 2) states, "we do not counsel abandonment of the unitary model; it has proved to be a powerful and pliable tool for household studies".

Coming back to the issue of a theoretical framework for the present study, a comprehensive analytical work of the nature that has been attempted here is rare. To the best of my knowledge, no one has tried to achieve this before at least in the Bangladesh context. There are competing theories, none of which have all the desirable properties while the data problems sometimes are severe. Thus, it is not easy to choose one model over the others. I have, therefore, used the Beckerian model as a *first approximation* for arriving at the equations for econometric

[30] Very large socio-economic data sets that exist include the LSMS (Living Standard Measurement Studies) data sets for various countries conducted by the World Bank. The size of the samples for individual countries is enormous, sometime running into several thousands. The resource needs have also been substantial. It is only natural that in such cases, the objective of the survey has not been to test a particular hypothesis. Rather there must have been a multiplicity of objectives. Thus, even some of these are deficient in information (and use proxies to fill in the lacuna of information) for specific purposes as have been demonstrated time and again. See Grosh and Glewwe (1998) for a review of the LSMS data sets and the method of their generation.

estimation. This does not mean, however, that I am oblivious to the empirical findings such as rejection of income pooling in various circumstances, however faulty or indirect the methods have been. It must be noted, however, that the same phenomenon may have more than one explanation.[31]

My intention in this study is not to test if one or the other model fits the data best, but to find explanations for observed behaviour. As I have several issues to examine, a rigid adherence to one or the other model may not be helpful. However, because the Beckerian model has been so widely used in the past and still continues to be used, I raise and answer within its general framework two types of analytical questions in this study. These are:

a. What are the factors that determine labour force participation of women?

b. What are the effects of labour force participation by women on (i) earnings, (ii) time devoted to household work, (iii) income pooling and consequently upon consumption and intrahousehold allocation of resources such as food, (iv) reproduction which may be both biological (i.e., childbirth) and/or social (child care time, cost or arrangements), and (v) health.

Additionally other kinds of impact that have been investigated include those on savings and credit, standards of living and decision-making by women.

In most of these cases, while the Beckerian model underpins the empirical estimations, it is also explicitly recognised that various other factors such as household resource endowments, and other family and individual characteristics play a role. Some of these may be linked to the EEPs of McElroy (e.g., almost compulsory overtime work for RMG workers). I now briefly indicate how I utilise the basic theoretical framework. Details are given in specific chapters where specific issues are dealt with at length.

The Beckerian models explicitly recognise that non-market time is not necessarily pure leisure time. Probably a large part of it is actually spent in producing goods, which the household consumes and which may or may not have

[31] The following from Chiappori (1997, p. 45-46) is instructive: "Although any evidence against income pooling does suggest that the traditional approach is not correct, this finding does not support any particular alternative model. There are certainly hundreds of ad hoc assumptions that could explain the observed results within the traditional approach and thousands of more or less funny alternative models that could justify them outside it."

market substitutes. Whether a particular member of a household participates in the labour market depends on his/her opportunity costs of switching from home production to market production, determined essentially by their wage. But, this opportunity cost is also dependent upon initial resource endowments of a household, the human capital endowments of the particular person (education level, health) and other factors. In the case of poor people, such opportunity costs of not working and remaining at home, given other things constant, are likely to be lower. Poorer people may, therefore, enter the labour market more readily than others if demand for labour is not a constraint. Furthermore, the existence of market substitutes, or some such alternatives for home produced goods or the changes in the technology of production, may also influence opportunity costs and thus labour market participation.

In a developing country such as Bangladesh, where traditional values inhibit the participation in the labour market by women, the opportunity costs of labour market participation are likely to be higher. Also, among married women, the greater the number of children, the higher would be time involvement in social reproduction (child care) of which there are few market substitutes (no child care institution). Also, unless there are other relatives or older children living with the family, the opportunity costs of labour market participation may be high. The theory, therefore, predicts that labour market entry by women may be influenced by certain factors, which include marital status, education, parental/spousal background and economic conditions (at time of entry into labour market) of the household, presence or absence of children and their number. A direct test of the models for labour force participation is not intended. But their implications may be tested and also checked by comparing certain characteristics of the working and non-working women and their households.

In assessing the implications of labour market participation of women on their personal lives and on the household, the starting point is that the working women have an explicit financial value for their time. Any other activity, be it house work, conception, child-rearing, maintenance of health, that takes away her market time must be judged against this opportunity cost.

In other cases of impact, the starting point is slightly different. It is not the price of time but her earnings, which allow the working woman to potentially stake a claim over other resources such as food or better housing. In some cases,

they do this while in others they do not. In all these cases, my working principle is to discern the pattern, if any, and to explain it within an analytical framework. In some cases, an explicitly stated theoretical framework may help in arriving at the empirical analysis such as fertility behaviour or health status. In some others, I directly test behaviour such as income pooling and explain its pattern. I establish the implications of pooling directly. I do this because of the insights from the theoretical and empirical analyses under models alternative to the Beckerian one. Thus, while I have started from a Beckerian analysis, I have considered as much as possible other models in explanations of the observed behaviour in the Bangladesh context.

In some cases there is no a priori reason for indicating the probable direction of relationship because the literature is sparse and no clear guide. These are basically empirical questions. Thus, one can state only what are the variables that may be chosen for analysis based on the knowledge of the Bangladesh society. As specific questions would demand specific answers, I do develop arguments for inclusion of such variables in places where the relevant issues (such as independence of action and movement) are dealt with.

3.6 Summary

In this chapter I have discussed the various theoretical frameworks that may be used to analyse empirically the various issues raised in this thesis. Starting with the neoclassical model of labour and leisure choice within a utility maximisation framework, the basic model has been extended to take into account the distinction between home production activities and pure leisure as initially espoused by Becker. A major objection to the Beckerian as well as the neoclassical model is that these imply a single utility household in which either all members have the same preference function or the preference function of one of the members predominates. Increasingly, there has been mounting evidence against this view. New theoretical models, in which members may have different preferences, have been proposed. These go by the name of collective models but in fact there are several variants. The two main variants are called Cooperative and Non-cooperative. Some of these models use principles of game theory to solve the problems of household decisions. The problems of estimation of these models are enormous.

By now it has been recognised that while there may be objections to the Beckerian model, it provides good initial insights. It is also easy to estimate in many cases. Accordingly, many authors have used the framework to analyse various household decision problems. In this thesis, I have directly used the model or its variants to analyse problems of labour supply, wages received, fertility behaviour and health status of workers. For other problems, I approach them slightly differently. But in all these, I use the insights gained from both the Beckerian and other models of household decisions. There are certain problems that I have examined for which there is no clear guidance in the literature. In such a situation, I have based my analysis on the knowledge of Bangladesh society.

CHAPTER 4
EMPIRICAL METHODS

4.1 Introduction

This chapter deals with the methods (techniques and procedures) that have been used to collect and analyse the data. The various data sources and the sample designs are discussed and the statistical and econometrics tools used in various analyses (in Chapters 5 to 9) and their limitations are previewed in the next three sections (4.2-4.4). Sections 4.5 and 4.6 report some of the characteristics of the sampled firms and sampled respondents. Section 4.7 provides a summary of the chapter.

4.2 Data Sources and Sample Methods

4.2.1 Data Sources

Secondary data

Information from both primary (collected by the author) and secondary sources has been used in this thesis. The secondary sources include statistics that have been collected or reported by others. These are listed in Appendix 1. The information from secondary sources has been used in two ways. First, some of these have been used as the background to my own analysis and also for comparative purposes. Secondly, detailed data from the Labour Force Survey 1995-96 (BBS: 1996) have been examined for the first time here in the context of an analysis of decisions regarding labour market entry (Chapter 5).[32]

Primary data

The analysis in the present thesis is based mainly on primary data collected by the author through several sample surveys. I conducted a total of six sample surveys, of which five were administered in 1997 and one in 1999. The surveys in 1997 included a Main Survey (so named because of the very detailed information that had been collected during its course) on women workers in RMG firms. The survey also included a control group of (largely) non-working women (see Section 4.2.5, for details), a household expenditure survey of sub-samples of working and non-working women and a management survey of the RMG firms. A

[32] This set of detailed information was obtained from the Bangladesh Bureau of Statistics (BBS), the official national statistical organization.

supplementary survey of a sub-sample of workers for time use data was conducted in 1999.

Structured questionnaires in Bengali, the national language, have been used as survey instruments. The types of questions asked for various surveys are shown in Appendices 2-5. Very few questions were open-ended as such questions later on create difficulties in statistical analysis. But scope was provided for additional types of answers to questions, and later the codes were revised to accommodate the new kinds of replies.[33] Questions were both quantitative (used, for example, in the expenditure survey) and qualitative (used to obtain opinion type information).

Each questionnaire was first prepared and then pre-tested for relevance of the questions, ease of understanding, and the types of possible answers. Usually, several simple questions were included rather than a single complex question to get clear answers from the interviewees. Also, leading and skip questions were clearly provided in the questionnaires so that checks could be built in for consistency. This also helped during editing of the data.

I visited each of the selected firms (see below on selection procedure) and myself interviewed all the management and some of the workers and the control women. The rest of the workers and the control women were interviewed by a group of interviewers who had been earlier recruited and trained by me. The same procedures for preparation of the questionnaires and the interviewers were applied in the case of the Expenditure and the Time Use surveys.

During data collection, I kept in constant touch with the interviewers and met them before they left for work in the morning and during the afternoon or evening after their return to compare notes and discuss problems. I examined each questionnaire for inaccuracies and inconsistencies right after the interview, as checks were easier during the time when memory was still fresh. Every interviewer had kept field notes of conversations with the respondents, which had been recorded verbatim. These notes helped immensely in removing most of the confusion and inconsistency. Where this had not been possible, schedules were taken to the interviewee for further verification, correction and removal of

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[33] In the case of 85 questions, the pre-coded answers had an "others" category. But the interviewers were alerted to the possibility that there might be several "others' and so they must write down verbatim what these "others" are. Later new codes were devised from these additional answers.

inconsistencies within 2-3 days of actual interview when memories were still fresh both in the minds of the interviewee and the interviewer.

4.2.2 Basic Sample Design

The broad research question in this thesis relates to the changes in the lives and households of the working women. Thus, the starting point for a survey should be the selection of households. The problem is the identification of these households. As Dhaka is a very big city with 1.1 million enumerated households in 2001 (BBS: 2001a, p. 28), it is too time consuming and costly to identify them through household censuses in various parts of the city. Instead, I first sampled the RMG firms where women work and then sampled the workers. The starting point for the survey was, therefore, the identification of the firms where the workers may be located.

A stratified random sample design was used for the surveys in 1997 (see next section for the reasons of stratification). The firms were first stratified by size of the workforce and then 20 firms were drawn at random with probability proportional to their share in the total RMG workforce. At the second stage, around 12 workers were drawn at random (around eight ever married and four unmarried from each firm). Thus, each firm, in effect, became a cluster from which workers were drawn.[34]

For each group of workers from a factory, I sampled at random half as many control women (i.e., not working or at most working in very low-productivity informal jobs) but with similar marital statuses and educational backgrounds as workers. The control women were selected from areas where workers from particular factories resided. The details of the sampling methods are given below.

4.2.3 Sampling of Firms

The starting point for the sampling design was the database of Bangladesh Garments Manufacturers and Exporters Association (BGMEA) for the year 1996; published as a directory of its member firms (BGMEA: undated). The database showed that the firms were of different size. It was decided first to stratify the

[34] Ignoring the clustering structure of data may lead to smaller standard errors and thus larger t-values. The results may therefore be treated with caution (Deaton: 1997, p. 75-76).

firms by size and then draw samples of workers from therein so that they represent in aggregate the working conditions in the industry.

The first question was the choice of the firms' locations. The BGMEA database (for 1996) listed 2161 firms of which 1752 or 81 percent were in Dhaka. The next most important concentration was in Chittagong, 15 percent. Thus, only firms in Dhaka were selected as this may reflect the general situation regarding RMG firms and workers. The choice of Dhaka also helped in keeping the cost of survey down.

The second problem was the decision regarding the indicator for size of the firm. This may be measured in different ways such as value of assets, productive capacity, workforce size, etc. But total assets were difficult to assess because of lack of information on non-machinery assets in the database. The productive capacity was reported but its meaning was not clear as most firms produced more than one type of product (see the sub-section 4.5.1). Thus, the capacities were neither easily estimable nor strictly comparable. The size of the workforce was reported and gave more or less comparable information. I had therefore used the workforce size as the indicator for the size of the firm.

The third issue that had to be resolved was the proportionality criterion. Should the number of sample firms be proportional to the concentration of number of firms or the workforce? Of the 1752 RMG firms in Dhaka, 1399 or just about 80 percent had reported on the workforce in their factories. These firms reportedly employed a total of 475,363 persons. The distributions of the firms and workforce by size of the workforce are shown in Table 4.2.3-1. The data show that even when there is a preponderance of small and medium firms (with up to 300 workers) most of the workers are employed in medium and large firms (with workforce of 300 and above). As my investigation relates mainly to the workers, I therefore decided to sample the firms on the basis of the proportion of workers employed by size of firms. I decided to sample twenty firms. Their initial distribution by size was therefore as shown in the penultimate column of Table 4.2.3-1.[35] For two firms, information from workers could not be collected

[35] As the number of firms was rounded to integers, the total number of firms became 21. So, I decided to keep the number intact for the largest size group and reduce one firm from the 201-300 size group. This was done because the number sampled from the medium group was already more than one-half of the firms. As most workers were in larger firms, keeping the number of larger firms intact appeared to be a better option.

completely. Consequently, another two firms of similar size were chosen. However, the information from all the firms has been used for analysis. The final number of firms sampled was 22 as shown in the last column of Table 4.2.3-1. In all the firms, management personnel were interviewed on various aspects of the firms, in addition to the survey of workers.

Table 4.2.3-1: Distribution of RMG Firms by Workforce Size

Workforce size (no.)	Number of firms	Total workforce (no.)	Initial number of sample firms	Final number of sample firms
Up to 200	323 (23.1)	46571 (9.8)	2	2
201-300	430 (30.7)	112497 (23.7)	4	4
301-500	489 (35.0)	193414 (40.6)	8	8
501-1000	132 (9.4)	86732 (18.2)	4	5
Above 1000	25 (1.8)	36149 (7.6)	2	3
All	1399	475363	20	22

Source: Based on BGMEA (undated).

Note: 1. Figures in parentheses are percentages of column totals.

2. The numbers in the penultimate column were estimated by multiplying 20 with the proportions shown in the third column.

4.2.4 Sampling of Workers

Depending on availability, around 12 women workers were chosen at random from each sample firm. A question arose regarding whether a further stratification along marital status be done because of the expectation that the changes or adjustments due to working outside home will be more noticeable in the households and lives of married women compared to the unmarried girls. The unmarried girls live mostly with their parents or relatives and as such require less adjustment in the households because of socio-cultural factors such as less responsibility for household chores for the unmarried girl in their parental homes, (see Chapter 6). I decided therefore to apply a further stratification along marital status.

The LFS 1995/96 (BBS: 1996) shows that of the female workers in Dhaka, 74 percent were ever married (including currently married, divorcees and widows) while 26 percent were unmarried. LFS 1995/96 does not provide enough detail to calculate the ratio of married to unmarried workers in the RMG sector. Discussions with management in RMG firms showed that they have a strong preference for unmarried women as workers because they think that, being younger and unencumbered, they will be more regular in the work place and

attentive to work. So, I opted for a somewhat higher proportion of never married women in my sample, and used a ratio of 2:1 of ever married to unmarried women when selecting the workers. A previous report (BUP: 1990) showed that unmarried women comprised 40 percent of women RMG workers. If this is so, the proportion of married women in the present sample falls somewhere in-between.

Most women workers in the RMG industry are in the operator and helper levels in all the firms. In the supervisory and managerial level, women are comparatively rare and are not employed in all firms especially in the smaller ones. So to increase the range of the types of employees in the sample, these women were selected for interview at a high rate, by reducing the number of operators and helpers to keep the total number of workers in each firm at around twelve. From the twenty-two firms, 260 workers were interviewed in mid-1997.

4.2.5 The Control Sample

The sample of women used as a control or benchmark includes ideally those who are in similar situations (such as age, education, household income, and marital status) as workers but not earning an income. As it turned out, a few of the control women were employed in low-productivity and manual jobs such as brick breaking and various other odd jobs. For analysis, however, I have not differentiated between the two sub-groups in the control sample (that is, between those with no incomes and those with informal sector incomes).[36] To match the samples of control women and workers, I again ensured roughly one-third of them to be unmarried and the rest ever married. To control for educational differences I interviewed as far as possible control women of educational background similar to those of the workers from the RMG firms. Moreover, statistical methods have been used in the analyses to correct for differences in the average characteristics of the workers and controls.

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[36] A question may arise if this invalidates the worker-control comparison in some cases. Theoretically speaking, this may. However, the proportion of control women working in informal and low productivity jobs was small. On the other hand, the sample size being small, little could be gained statistically by differentiating the control into a "pure" control and "other control' sub-groups. Furthermore, the economic and social effects I am trying to examine relate to more formal and stable earning opportunities for women which are not the case with those control women in low-productivity informal jobs. Of course, if possible, in future research the apparent differentiation among the control group may be utilised to re-analyse some of the issues discussed in this thesis by having much larger samples.

To find the control women, I first had a preliminary idea of the education levels of the workers interviewed in a factory and then found the residential concentration of workers of sample firms. I then located the control women's households in the same locality as the workers of the specific firms and interviewed half as many control women for both married and unmarried workers. Anecdotal evidence suggested that residential location was somewhat determined by economic status. Thus, finding control women in localities similar to those for workers also probably helped in controlling for household income in an indirect manner. One hundred and thirty control women were interviewed at the same time as the workers.

4.2.6 Expenditure and Time Use Surveys

Expenditure survey

A sub-set of workers and control women were asked questions on various aspects of household expenditure. Restrictions on the size of the sub-sample had to do mainly with the availability of the workers many of whom were reluctant to give time both at the factory and at home to answer lengthy questions. Some of the questions on expenditure (such as that on food) were on a preceding week basis. For other expenditure (such as on health, clothes, education, etc.) respondents were asked on a preceding month, quarter or year basis. The total number of workers interviewed had been 163. However, taking into account the problem of missing data, the ultimate size of the sample for the expenditure analysis is 92. Among the control women, 105 were interviewed for expenditure information.[37] The interviews took place at the same time as the main sample survey for the worker and control women.

Time use survey

A supplementary time allocation survey among a sub-sample of workers was conducted to generate information about time use among working women. During this survey, I asked questions on actual time disposition of working women, the inter-linkages among their various activities, and the reasons behind the particular

[37] The information on expenditure by the control women was not analysed as the focus of analysis shifted to the consequences of pooling of women's earning which is generally absent in the control group households given the lack of earnings by women.

time allocation. Several issues were raised with the respondents and other members such as husband, mother-in-law (for married women), father and mother (for unmarried women if the respondents lived with them).[38] Men were asked about their views on the time allocation by the working women and on sharing household chores with them. As collection of time use data is very time-intensive, I collected information from only 65 women, which is just one quarter of the number of workers in the main survey. This particular survey was conducted in 1999 by which time some of the respondents from the earlier survey have moved. Thus, a few of the respondents in the time use survey were new respondents. However, as time use was not directly statistically linked with other analyses in the thesis, this did not pose any special problem of data consistency.

4.2.7 Final Sample Sizes

The samples had the following final sizes.

RMG firms – management survey	22
Workers main survey	260
Control main survey	130
Workers- expenditure survey	163
Control – expenditure survey	105
Workers- time use survey	65

4.2.8 Limitations of the Data Collection Method

Place of interview: Many of the interviews with the workers took place at their working place. In some cases the managers allowed interviews only during lunchtime so that workers do not lose any productive time. As the lunch times are not long this meant that not all of the interviews were carried out by the author and instead several interviewers had to be used.

The interviewers were all either graduates or Master degree holders and as such could understand well the purpose of the survey when so explained to them. Some of them had previous experience of conducting household surveys. As discussed in detail in Section 4.2.1, the interviewers were trained but were closely

[38] Some of the unmarried women workers lived either alone or with other workers or relatives in a shared housing.

supervised during the survey. Also, as discussed earlier the questionnaires were pre-tested before finalisation.

A question may be raised regarding the appropriate place of the interview. It could as well take place in the workers' own homes. There are basically two reasons why I did not attempt that. First, workers go back home rather late (see Chapter 6, Section 6.2) and have hardly any time for answering questions from a long questionnaire. Secondly, while they could be approached during the weekend, many actually are not always so available because they work over time during the weekend. However, where the worker's presence was not essential (as was the case with expenditure survey, or time allocation of other members of the family), the information were collected at the home of the workers. So was the case with all the information pertaining to the control group of women who were available only at their homes.

Interviewer bias: The collection of data through interviews rather than participant observation may have created other problems. Some of the information that was collected relates to financial management and pooling of resources. There is a possibility that replies by the respondents to such questions may not always be correct. Thus, a woman may state that she shares her earnings voluntarily with in-laws. This may be because such sharing behaviour is socially more acceptable than withholding one's own earning. Only an external and independent participant observer may be able to find out the actual situation. It may, however, be noted that for many types of questions (such as number of children or their schooling, for example) there is no reason to believe that there may be any bias except the usual bias that may occur in other similar interviews. Given the size of the samples, the number and types of the surveys and the time and resources available for them, data collection through participant observation would not have been a practical one.

The use of several interviewers may also be questioned. However, if only one person have interviewed all respondents, the interviewer bias would have been in one direction and thus biased the results of some of the econometric analysis. Also, there would have been no way of knowing the direction of the bias. On the other hand, the biases of various interviewers who have been recruited separately and not worked together previously, may mean that the biases may be random or

at least not systematic. Thus, having different interviewers may probably have helped in eliminating or minimising such bias as they may have cancelled each other to some extent.

Cross-sectional vs panel data: The data that I had collected were at one point in time. Hence to understand the changes over time, I had to look for a control group of respondents for comparison. However, the unobserved heterogeneity that cannot be controlled in such a case may invalidate such comparison. On the other hand, if data from the same respondents are collected at different points in time, the comparison between time serves to control for such unobserved heterogeneity. Panel data are therefore superior for analyses of changes over time (Deaton: 1997, p. 105-108). It is not possible, however, within the limited time and resources to conduct a large panel survey. Instead, during data collection, respondents may be asked about changes in their status over time which are critical for understanding the issues at hand. I followed this procedure. Thus, while I could not collect panel data which would have been ideal for analysing change of state over time, the deficiency could be covered to certain extent through close questioning regarding situations prevailing at times prior to the survey time.

4.2.9 Ethical Considerations

I interviewed the respondents only when they agreed to give their time freely and with assurance from the management that when the interview took place in the working place, the interview time would not be deducted from their work time. They (respondents) have allowed me to use freely the information provided by them. I also interviewed them separately to ensure confidentiality of their information and to check against biases. To honour their privacy, I have not used any name in this thesis or any identification indicator. Also, while I have used the information for various analyses, I alone am responsible for any inadequacy in interpretation of the information or the analysis in this thesis. The management of the firms, the workers and their household members are in no way responsible for these inadequacies or errors, if any.

Once the study is completed the results are expected to be in the public domain, which will be accessible to any one according to the standard practices. I observed that the survey might have raised the hopes of the respondents that their

problems would get immediate attention of the relevant authority. I made it clear that their expectation may not be fulfilled immediately. But it is hoped that some of the analyses will clarify issues for policy action that will facilitate women's labour market entry and ensure improved working conditions and coordination of time for paid work and household responsibilities.

4.3 Statistical and Econometric Tools and Software

Various types of statistical and econometric tools have been used. The details and the characteristics of these tools and the reasons for their use are described at the particular point in the thesis where they are used. Briefly speaking, for descriptive statistics, I have used mainly means and standard deviations in some cases along with tests of their equality. These tests include t-test (for means), F- test (for variance) and tests for stochastic dominance (savings and standard of living) where distributions have been compared (Atkinson: 1987). Chi-square tests have been used for testing independence of rows and columns in cross-tabulated data. All these used the SPSS procedure (SPSS: 1999a; 1999b)

For econometric analyses, the ordinary least squares (OLS) for multivariate linear regressions have been used in some cases (Greene: 2000). But, as the assumptions of the OLS are often violated in real life data, I have used other appropriate methods. Such specialised econometric tools include probit, logit, multinomial logit, ordered probit, Tobit, Cox's semi-parametric regressions and Heckman's procedure for correcting selectivity bias (Greene: 2000; Johnston and Dinardo: 1997; Kennedy: 1999). The details of some of the special procedures are discussed in relevant places in Chapters 5 -9. Table 4.3-1 provides a brief overview of the situations under which these tools and procedures have been used. To understand Table 4.3-1, note first the five conventional assumptions of classical linear regression regarding the way the data are generated.[39] Writing in matrix form X, Y and u for the set of independent and dependent variables, and the error term, the assumptions are:

[39] Note that in the relevant literature and in this thesis terms such as independent or explanatory variables or regressors all mean the same thing. Similarly, error or disturbance terms are used interchangeably.

(i) $y = X\beta + u$ - the dependent variable (y) is a linear function of the explanatory variables (X) and an error term (u) where βs are the parameters to be estimated;

(ii) $E(u) = 0$ – the expected value of the error term is zero; given (i) this means that the conditional expectation of the dependent variable, $E(Y|X) = X\beta$.

(iii) $E(uu') = \sigma^2 I$, where I is an identity matrix – the error terms are uncorrelated with each other and have uniform variance, σ^2.

(iv) X is fixed in repeated samples;

(v) No exact relationship among explanatory variables (full rank condition or lack of perfect multicollinearity).

It follows from (ii) and (iv) that the regressors and the disturbance terms are uncorrelated which is expressed as

$$E(Xu) = X\,E(u) = 0.$$

If further the assumption of normality of the error term is made the assumption (iii) means that u is independently and identically distributed (iid) with zero mean and constant variance σ^2. This is written as

(vi) u is iid $N(0, \sigma^2)$.

Under the above assumptions, ordinary least square (OLS) is the best linear unbiased estimator (BLUE) of the regression coefficients, β (Greene: 2000). In the following analyses I have used OLS in some cases, testing for some of the obvious problems of using cross-section data such as heteroskedasticity and taking corrective measures such as weighted least squares. In most cases, the nature of data, however, indicated the use of estimators other than OLS. The situations in which the use of OLS may not be appropriate are several. The cases where such a situation has arisen during econometric analysis in this thesis are summarised in Table 4.3-1.

Table 4.3-1: Conditions of Use of Alternatives to OLS

Type of observation	Violation of assumptions	Consequence of violation for OLS estimation	Alternative method used	Issue and chapter where used
Dichotomous dependent variable	(iii)	Bias due to heteroskedasticity Estimated probability falling beyond 0-1 range Non-normality of error term	Logit and Probit	Labour force participation – national data, Chapter 5 Labour force participation – sample data, Chapter 5 Pooling and control of resources – Chapter 6 Health status – Chapter 7 Residential change – Chapter 7 Independence of movement – Chapter 7
Discrete dependent variable with intrinsic order	(iii)	Bias due to heteroskedasticity Ignores rank and treat as quantitative information	Ordered probit	Children ever born – Chapter 7 Days of sick leave (grouped data) – Chapter 7
Limited dependent variable - Censored observations	(i)	Biased coefficients due to omitted variable	Tobit	Savings behaviour – Chapter 6 Days of sick leave – Chapter 7 Standard of living – Chapter 7
Limited dependent variable - Incidental truncation or sample selection	(i)	Biased coefficients due to omitted variable	Heckman's correction	Wage analysis – Chapter 5
Length of time between consecutive events- Censored data	(i)	Dependent variable unobserved for some cases bias if observations omitted	Cox's semiparametric hazard analysis	Birth-spacing – Chapter 7

Source: Constructed on the basis of Greene (2000); Gujarati (1995); Kennedy (1999).

Table 4.3-1 shows that I have often encountered a situation of binary choice. The use of OLS in such a situation leads to heteroskedasticity and the conditional probability of the event is not confined within the "0-1" range. The preferred estimator in such a situation is a logit or a probit. These models have been extensively used. A particular variant of the discrete choice model is when there is an intrinsic order in the dependent variable. In such cases ordered probit has been used.

The second most frequent problem has been that due to the limited dependent variable. In such a situation, usually the OLS method results in bias due to omitted variable problems. As Table 4.3-1 shows, the limited dependent variable and related censoring of data have arisen in several cases. The preferred alternative estimator, however, depended on the specific nature of the data as indicated in the table.

Standard SPSS programmes, versions 9 and 10, have been used in most cases for statistical and econometric analysis. In one or two cases, Stata version 6 (econometric) software had been used as SPSS did not have the specific programme (such as Tobit regression).

4.4 Data Quality and Limitations of Data and Analysis

4.4.1 Data Quality and Reliability

Consistency checks on data

The hypothesised causes of women's entry into the formal labour market and its consequences for them and their households reflect personal, family, economic and social characteristics. Furthermore, certain changes had to be traced over time to understand the underlying processes and these changes need to be explained with respect to the various individual and familial characteristics within the country's general economic and social framework. This meant that the survey questionnaires had to be very comprehensive encompassing many issues related to labour market entry and income earning and their consequences. Early on, it became clear that apart from the main survey, supplementary surveys on expenditure and time use would be necessary. Otherwise some of the underlying processes and their outcomes may not be understood and explained properly. Given that the economic and social processes that I am studying are complex, I

was very careful from the beginning with the collection of appropriate information and checking for their consistency (see section 4.2.1).

As it happens in all surveys, missing information in response to some of the questions is a problem that has occurred also in the present case, particularly with the case of expenditure data. However, because various checks and balances have been built into the questionnaire, these never became a major problem in analysis. The data collected during the sample surveys are thus both consistent and rich in detail.

Data reliability

The reliability of the data in any primary survey is a major issue. This happens most in cases where the respondent has to recall information from memory. Thus, expenditure data usually suffer from measurement error, as these are generally recall data. In the present case, some information was missing and as a result the effective sample size became smaller than intended. Yet, as shown in detail in Appendix 17, expenditure patterns, as estimated from the sample information, tally closely with those of the relevant group in the Household Expenditure Survey, 1995-96 (BBS: 1998b). Matching with the results of the Household Expenditure Survey (HES) suggest that both the sampling and the quality control procedures used in the survey conducted by the author were adequate.

4.4.2 Data Limitations

The in-depth nature of the data meant that given time and resource constraints, the sample size could not be larger, particularly as the main sample had to be supplemented with more specialised surveys. A larger sample probably would have made some of the analyses more definitive by allowing more variation in data. This appears to be the major limitation of the data that I have used.

4.4.3 Limitations of Analysis

There are two major types of limitations of the analysis. Some of the analysis could be richer if the surveys had been more comprehensive. Thus, had information on male family members' employment and wage characteristics been collected, I could have analysed the sex differences and tested for discrimination in wages which is a major policy concern. However, this was not much of an issue

in estimating, for example, total household income or women's share of total income. Other available information such as those contained in the LFS 1995/96 filled some of the gaps (see Chapter 6, Section 6.4 on Expenditure Analysis). The second type of problem arose mainly because of the small size of samples such as that for expenditure on non-food items (e.g., those on education). Another example is birth spacing the analysis of which could have been more definitive for second birth, if the sample size had been larger. Yet, as the main survey is comprehensive, the sample size in most cases has not been much of a problem.

On the whole therefore, due to severe resource constraints, the survey could not be administered to a larger sample nor could it be made even more comprehensive. The available information, however, are consistent, rich and detailed enough for the analyses that I have carried out. Yet, I have indicated in various places where the inadequacies in analysis lie and what kinds of future research or data or sizes of the sample are needed to remove uncertainties in knowledge and understanding.

4.5 Some Basic Information on Sample RMG Firms

4.5.1 Firm Characteristics

The sample firms were all export-oriented. None sold any output in the domestic market. Bangladesh entrepreneurs owned all firms except one, which was partly foreign-owned. A single entrepreneur owned a firm each in case of 11 of the 22 firms. For the rest, two or more partners owned the firms in each case.

Ready made garment firms are a new kind of enterprise. As a result most firms are young. Eight out of 20 firms (for which information was available) were established only during the three years prior to the survey, while seven were established between four and six years before the survey. Only five firms were older than six years.

Sixteen out of 22 firms were in woven wear processing while three were in knitwear business. Two firms produced both knitwear and woven wear. One was a sweater factory. The main outputs in 68 percent of firms were shirts. The other products in importance were jackets and pants (32 percent each), and trousers (23 percent). The main outputs in knitwear firms were T-shirts and polo neck shirts.

Eight of the 22 firms invested in equipment during the year prior to the survey while two firms did so only for expansion of factory space. Five firms invested in

both, while seven firms made no capital investment during the preceding year. The sources of funds for investment had been mainly profits of the firm (nine out of 22 firms) and bank loans (seven out of 22). In contrast, however, the need for working capital is met mainly from bank credit in most (17 out of 22) cases.

The last point regarding firm characteristics relates to the growth of the firms over the year before the interview. Sixteen out of 22 firms reported that they had experienced both an output and export growth over that period. Four of them reported substantial growth in both.

4.5.2 Employment and Other Issues

Factory closure and days of operation

Despite the overall growth of the sample firms as discussed above, some of them experienced factory closures due to political instability, power outage and short supply of raw materials. Particularly during the year prior to the survey there had been much political agitation, which resulted in some unscheduled closure of some of the factories. Nine out of 22 firms claimed that they had to close down for some time, although, in most cases, this was only for a few days at most. As this claim could not be verified independently, I tried to find out the scheduled number of days of operation and the actual number of days operated.

The data indicate that in 11 out of 22 firms, the actual number of days of operation was either the same or surpassed the scheduled number of days of operation. In the other 11 firms, the actual number was less than the number scheduled. In four of these firms the problem was due to power supply, while in three cases it was due to problems in raw materials supply. One firm, which suffered from power supply, reported to have remained closed for a period totaling 75 days. As power supply is a general problem in many industries, the particular claim could not be independently verified.

Employment issues and problems

Labour employment is another major problem area. Skilled workers, particularly sewing operators, are in short supply as stated by half of the firms. Only two firms stated that they had faced no such problem. But unskilled women workers are more plentiful in supply as stated by half the firms.

The problem of supply of skill means that the workers may leave a firm and join another if offered a higher wage. Many actually do so as discussed in Chapter 5. As a result, 19 out of 22 firms stated that women do often leave and in 13 cases, they were also found to be irregular in their work. On the whole, the employers singled out three problems related to labour employment. All in one way or another related to demand for higher wages. The problems are claimed to be somewhat less with the male workers.

One consequence of the above situation is that the firms often rely on older employees to recruit new workers. In 16 out of 22 firms, the management stated that they use this method for hiring new workers. Then again, they try to locate the firms in areas where labour supply may be somewhat more plentiful than in others. When questioned on the reasons for the particular location of the factories, in half of the cases, labour availability was cited as a major reason. Other reasons included transport and space facilities.

Given the high turnover of workers, the employers tried to respond to the situation by minimising expenditure on various facilities, despite the fact that their provision may make the work place environment more congenial and ultimately help in retaining workers. Thus, most claimed to pay bonuses for regular attendance (19 cases), or festival bonus (18 cases), but were willing to pay less generously for efficiency in production (nine cases), training (13 cases), provide lunch room (11 cases), or canteens (only two cases). Leave facilities were another topic of contention. While most managers claimed to have provisions for casual leave (17 cases), or medical leave (18 cases) for workers, these leave entitlements appeared to be often amalgamated together. Also, in-house medical facilities were available only in 12 cases. Only six firms provided transport facilities. Only 16 firms provided prayer room/space, while six did not have any such facility.

4.6 Some Characteristics of Sample Working and Control Women[40]

4.6.1 Demographic Characteristics

Age and marital status

Women workers in garments factories are young (Table 4.6.1-1).[41] The survey shows that around 31 percent of the sample workers are teenagers (15-19 years). The highest concentration is in age group, 20-24 years. Very few women in the garment factories are above 40 years. BUP (1990) reported age patterns similar to the present one. But another study reported somewhat different age pattern (Zohir and Paul-Majumder: 1996, p. 15) with a high prevalence of child workers (16 percent in the age-group 10-14 years). There may be two reasons for the difference. In the 1990's, there was an attempt to curtail child labour under pressure from the US Congressional sanctions. Secondly, the sample frame[42] for the Zohir and Paul-Majumder study was somewhat different.

Compared to the working women, those in the control group appear to have a more even distribution through the ages 15-39. Control women are also slightly older on the average.

Table: 4.6.1-1: Age Distribution of Sample Women (no.)

Age group (years)	RMG workers	Control group
10-14	2 (0.8)	-
15-19	80 (30.8)	39 (30.0)
20-24	82 (31.6)	29 (22.3)
25-29	49 (18.8)	27 (20.8)
30-39	41(15.8)	28 (21.5)
40-49	5 (1.9)	6 (4.6)
50-59	1 (0.4)	1 (0.8)
Total	260 (100)	130 (100)
Average (years)	23.7	24.8

Note: Figures in parentheses are percentages of the column totals.

The sample of workers had been purposively chosen so that nearly two thirds of the women workers were currently married. As it turned out, unmarried women constituted just above 34 percent of the entire sample of workers, but only 62

[40] Unless stated otherwise all information in this section refer to only the samples of working and control group women.

[41] Unless otherwise stated all information and analyses in this thesis are based on one or the other of the sample surveys conducted by the author.

[42] Sample frame denotes all the population from where the sample is drawn. (Rao: 2000).

percent were currently married (Table 4.6.1-2). Nearly four percent were either widows or divorcees. Compared to the workers, the proportion of currently married is somewhat higher among the control group females and consequently that of unmarried women is lower. But, the proportion of widows and divorcees is small.

Table 4.6.1-2: Marital Status of Sample Women (no.)

Marital status	Worker	Control
Currently married	161 (61.9)	95 (73.1)
Unmarried	89 (34.2)	32 (24.6)
Widow	2 (0.8)	2(1.5)
Divorcee	8 (3.1)	1 (0.8)
Total	260 (100)	130 (100)

Note: Figures in parentheses are percentages of the column totals.

Family size and characteristics

The family size among worker respondents varies from one to 12. Just about one-half have families from four to six persons. The average family size is 4.5 persons. Among the control women, the relative frequencies are very similar to those for the workers. The maximum family size is nine while 35 percent of families have up to three persons. The average family size is 4.6 persons.

Some of the family members live with the respondent. Of the worker families, a quarter has at least one member who lives elsewhere, mostly in villages or, in a few cases, abroad. When such persons are not considered, the size of the family living together with the worker respondent (including herself) is 3.6. The corresponding size for the control women's families is 4.4.

Families are composed of members of the immediate family and also, in some cases, in-laws and other relatives. Those consisting of only the husband, wife and children for currently married women, are nuclear families. In the case of unmarried women, such families include parents, if living, and their siblings. Widows and divorcees are in nuclear families if they are alone or with children. In all other cases, these are extended or non-nuclear families. Nuclear families constitute 78 per cent of all worker families. The corresponding percentage for the control households is 65 percent.

Husbands head the families of currently married workers in 91 percent of cases. The household heads for the unmarried girls are mostly their fathers (66

percent). The corresponding percentages for control women are 95 and 74. Female-headship is rare both in case of married and unmarried women for both workers and control. Considering all cases, female-headed households among worker and control families constitute 12-13 and 8-9 percent of all households in the respective groups.

4.6.2 Migratory Characteristics

About 90 percent of the worker respondents have migrated at one time or another to Dhaka. While migration has taken place over many years, more than a quarter had moved during the last three years. A similar proportion moved during the late 1980's and early 1990's when the RMG industry grew fast.

Women workers have come from all over Bangladesh. But migrants from only a few districts such as Barisal, Comilla and Faridpur predominate both in the case of workers and the control groups. The highest percentages are from Barisal for both workers (20 percent) and control (31 percent). Spatial and socio-economic characteristics of migration are analysed in Chapter 5.

4.6.3 Education

Sample women in the garment factories are better educated than in the general population. About 42 percent had education above primary level (five years of schooling) (Table 4.6.3-1). About 17 percent of them were at least high school graduates. Completely illiterate persons were very few in the worker sample. These figures were both similar to and different from the levels of education of the control group. Note that the samples were drawn by broadly matching respondents by levels of education. The data show that 80 percent or thereabout of women both among the workers and the control group are either semi-literate (can sign name) or have some medium of (up to five years) or high school level education (up to ten years). The difference between the two groups of women lies in incidence of people who are illiterates or in high levels of education. The former is more prevalent within the control group and the latter among the workers.

Table 4.6.3-1: Education Levels of Sample Women

Education level	Worker	Control
Illiterate	6 (2.3)	16 (12.3)
Can sign name only	60 (23.1)	37 (28.5)
Up to V	86 (33.1)	38 (29.2)
VI-X	64 (24.6)	33 (25.4)
High school graduate	37 (14.2)	5 (3.8)
College, university	7 (2.7)	1 (0.8)
Total	260 (100)	130 (100)

Note: Figures in parentheses are percentages of the column totals.

4.6.4 Land Ownership in Villages

More than seventy percent of working women claimed to have some family-owned land. In some cases (12 percent) they did not have any idea about the amount of land the family have. For those who could give definitive figures more than one half had no more than 50 decimals of land. But about 20 percent had more than one acre.

Among the control women, only 55 percent claimed to have some land while five percent do not know the exact amount they possess. Only about 40 percent had up to 50 decimals of land while those having more than one acre constituted no more than five percent. Thus, the households of control women are somewhat land-poor compared to those of the workers.

4.6.5 Validity of Comparison between Worker and Control Groups

The individual characteristics of the workers and the control women and their family level characteristics indicate that, in general, the two groups are broadly similar except perhaps in case of education levels and land ownership. Thus, much of the behavioural differences between the two groups may be taken to reflect the main difference between them that is one group is working outside home for an income, while the other is not. Furthermore, when the two groups are considered together for econometric analysis, the technique controls for the differences in the endowments or characteristics of the two groups, be it land or education or age. Thus, the differences between the two groups (for example, in fertility behaviour as analysed in Chapter 7) may be taken to be due to their working status when the effects of other intervening factors are held constant. The joint analysis thus controls for the other differences and the comparison is valid.

4.7 Summary

The core analyses in this thesis draw upon information from both secondary and primary information. The secondary data are from various official and other sources. The primary data have been collected purposively during six sample surveys. A sample of 22 firms was drawn from the universe of all the RMG firms in Dhaka. The management of each of these firms was interviewed for certain firm-specific information. From these 22 firms, around 12 (eight married and four unmarried) workers from each were drawn at random. A total of 260 workers in all were selected and interviewed. Simultaneously a sample of 130 control or non-working women had been interviewed.

Two more types of surveys were conducted among the working and the control women. One was on their household expenditure behaviour. The other was on time use of the working women and some of their family members.

The data were collected carefully to ensure consistency, quality and richness in detail. The sample design posed no major problems of aggregation or comparability. On the other hand, the patterns and estimates based on the data indicate their high quality and consistency. The major data limitation is that resource and time constraints did not allow the data sets to be more comprehensive and also larger in size. Thus, some of the analyses may need to be validated in future with larger and more comprehensive sets of data.

The validity of analysis depends on comparing like with like. It has been shown that for most background characteristics, the working and control women are similar. Thus, the comparison between the two and the main general hypothesis that the difference in their behaviour is mainly due to the labour market entry of workers may be taken to be valid. Also, it may be pointed out that simple averages have been used in some cases to highlight the differences between the two groups. But the empirical analysis of the difference between them is often based on multivariate methods that control for the differences other than working status.

CHAPTER 5
WOMEN AT WORK

5.1 Introduction

It is clear from Chapter 4 that the respondent women in the sample come from diverse personal and family backgrounds. They also face diverse situations during their employment, and afterwards. This chapter discusses and analyses how such diverse backgrounds help or hinder their entry into the labour market, their work experiences and their earnings. These findings provide essential background material for the analysis of impacts on their lives and households that follows in the later chapters.

The next section provides some background to women's employment in Bangladesh, especially in urban areas, including an analysis of the national level data on labour force participation behaviour of men and women. The rest of this chapter provides a micro level investigation into the specific situation of the women workers (and control sample, wherever necessary) interviewed in the surveys. As most of the working women were migrants, I first analyse migration behaviour and its links with employment. This is followed by an analysis of the labour force participation of women at the micro level.

The labour market entry of women may be mediated by various factors. I have tried particularly to find out how far the analysis of labour market entry based on the national level data and that based on my sample survey agree with each other, as the latter refers to job-holding in a specific industry. The analyses of the situation in the workplace and terms and conditions of work for the sample workers follow next. Subsequently I analyse, within a human capital framework, the wage and earnings differentials among working women.

5.2 Characteristics of the Labour Market for Women: A Macro Level Analysis

5.2.1 Introduction

In this section I review the national and urban labour market situations, particularly the gender differences therein; provide an exploratory analysis of labour force participation in major cities; examine whether the job markets are segregated and if so, to what extent; and finally explore earning differentials between men and women.

5.2.2 Data, Definitions and Methodology

I use the *Report on Labour Force Survey in Bangladesh 1995-96* (BBS: 1996) as the major source of information for the macro level analysis. The information portrays the aggregate labour market situation at about the same time (1995-96) as the main sample survey described in chapter 4 was carried out. Two definitions for the labour force participation rate are used in the LFS 195-96: a "Usual" and an "Extended" definition (see Appendix 6 for definition of "Economic activity" and other terms used in the LFS 1995-96).[43] The essential difference between the two definitions is that, under the usual definition, all unpaid economic work is included except household activities related to food processing and preservation, and subsistence activities carried within the household premises. Under the Extended definition, these latter household activities are part of economic activities. The labour force participation rate (LFPR) used by the LFS has two cut-off points, one refers to the rate for those 10 years of age and above and the other to 15 years of age and above.

Cross-tabulations and the Duncan Index or dissimilarity index (DI) have been used. The DI examines differences between patterns for men and women and is estimated as:

$$DI = 0.5 \sum \text{Abs} (M_i - F_i)$$

where $\sum$ denotes summation, 'Abs' is absolute value, and the M_i & F_i are the proportions for men and women in category i (occupation, earning level, etc.). The maximum value DI can take is 1 or 100 percent, which means that the men and women are completely segregated.[44] A value of zero means that the distributions for men and women are exactly the same. For more details see Duncan and Duncan (1955).

In addition to the tabular analysis, I also analyse the labour force participation behaviour of men and women in four metropolitan cities. For this, I use a probit regression, as the dependent variable is dichotomous (see sections 5.2.4 and 5.2.5).

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[43] The LFS uses the term "Usual" to denote conventional definition. Therefore, I use the same term as in LFS throughout.

[44] This means that there must be at least two sectors in the economy.

5.2.3 Aggregate Labour Force Participation

Refined activity rates[45]

The labour force participation rate or refined activity rate in Bangladesh in 1995-96 was slightly below 50 percent according to the Usual definition of employment (Table 5.2.3-1). The LFPR is only slightly higher in the rural areas compared to that in the urban areas. The difference between men and women is, however, very large both in the countryside and the towns. Thus, in the rural areas while only 17 percent of women are in the labour force, the proportion is almost 80 percent for men. The difference is almost as wide in the urban areas.

Table 5.2.3-1: Refined Activity Rates by Location and Sex
(Percent of population aged 10 years & above)

Locality	Usual definition			Extended definition		
	Both sex	Male	Female	Both sex	Male	Female
National	48.3	77.0	18.1	64.8	78.3	50.6
Urban	46.4	71.1	20.5	50.6	71.6	28.6
Rural	48.9	78.8	17.4	69.1	80.4	57.3

Source: BBS: 1996, Tables 3.20 and 3.10 p. 36 & 29.

Under the Extended definition of economic activities, the LFPR for all groups increases, more in the rural areas and for women than for men. This is because the Extended definition includes the home-based economic activities, which are carried out mostly by women, especially in the rural areas. As a result, the LFPR for rural women using Extended definition is more than three times of that under the Usual definition. In the urban areas, the female LFPR changes a little under the Extended definition, but for men it remains virtually unchanged.

LFPR by age and sex

The labour force participation rates by age groups for men and women are shown in Figure 5.2.3-1. Under both the definitions of labour force participation, the pattern for men is similar to what has been observed in many countries such as India, Indonesia, the Philippines and Thailand (Horton: 1996b). At the youngest working ages (10-14 and 15-19 years), the rate is rather low. But after age 20 it

[45] The refined activity rate is labour force participation rate with respect to the population in the specific age group. When the denominator is the total population, it is called crude activity rate.

picks up, and remains essentially flat at around 95 percent or so between 25 and 59 years of age. After 59 years, the rate falls off but still remains high even for the age groups above 65 years. Both the early entry into the job market and postponement of exit until old age are probably symptoms of poverty. The poor cannot afford to be without work, as even a meager income is better than no income. Similar patterns are found in other South Asian countries (Horton: 1996b).

For women, under the Usual definition, the LFPR for adolescent girls under the age of 15 is nearly 30 percent. Afterwards, it begins to fall off and stabilises around 15 percent up to age 59 when it falls off again. This means that as girls come of age and get married they withdraw from the labour market. They do not return to the labour market later in their life. Lack of employment opportunities may be one reason. Another may be that due to traditional social values, women do not work that much outside home.[46]

When economic activities inside the home by women are accounted for under the Extended definition of LFPR, the picture becomes quite different. The pattern of LFPR for women becomes similar to but at a lower level than that for men at all age groups. The highest rate for women is 62 percent and that is only two-thirds of the rate for men in the corresponding age group. Similar patterns have been observed in India, Indonesia, the Philippines and Thailand (Horton: 1996b).

The patterns of LFPR in the rural and urban areas are similar for both the definitions. Also, the LFPR for women in the rural areas under the Extended definition is higher than that for the corresponding age group in the urban areas possibly because of the greater opportunity for home-based work in the rural areas.

[46] For a review on the relationship between tradition and work and lack of work opportunities for women in the rural areas see Westergaard (1993) and the references cited therein.

Figure 5.2.3-1: Labour Market Participation by Women and Men
Note: "U" indicates usual definition; "E" means extended definition.

5.2.4 Who is in Labour Force?

Conceptual framework

The available LFS data allow an econometric analysis of some of the factors behind labour force participation.[47] The dependent variable is a dummy variable with a value of 1 for those in the labour force and zero otherwise. There are 13 kinds of activity status for each person in the survey. Two of these refer to those involved in household work and those not working or unemployed (BBS: 1996). These two groups, along with students, pensioners, beggars and those in "others" category, constitute the non-working category.[48] The rest includes wage workers,

[47] One peculiarity of the *Report on the Labour Force Survey in Bangladesh 1995-96* (BBS: 1996) is that while it reports on persons ten years or older, the available detailed information and questionnaire refer only to persons 15 years or older. Also not all tables are given for ten years or older groups.

[48] A question may arise regarding whether students or beggars should be included as non- working. For students, it is clear enough. For whatever reason they have chosen to study and not work. For beggars, the question is should they be included as self-employed or as unemployed. My view is that as they are not gainfully employed, they should be included among the non-working category.

self employed persons and persons who are employed, but temporarily absent from work and four kinds of unpaid family workers engaged in various economic activities of the household.[49] All these I consider to be in the labour force.

One of the ways to conceptualise labour market participation is to assume that there is a reservation wage, W_r, for every potential entrant into the labour market (see Chapter 3). If the offered wage is higher than the reservation wage, the person participates in the market work. If the offered wage is less than the reservation wage, the person does not participate in the labour market. The reservation wage, which is not observed, is assumed to be a function of various family and personal characteristics. A more formal statement is given in Section 5.5.2. Briefly speaking, the reservation wage for women is likely to be higher if the burden of home production (as reflected in family size, number of children, marital status and the like) is heavier. Thus the Beckerian model of labour force participation (in Section 3.3.2) provides the theoretical underpinning for the econometric analysis that follows.

Factors behind labour force participation

Given this conceptual framework, a model of labour force participation may include several explanatory factors. These include characteristics of the person concerned such as age and its square (to allow for non-linearity in the influence of age), status in the family, sex, marital status and education. In addition, there may be family variables such as education of the head of the household, non-labour income, size of the family, the number of infants in the family, and religion. In the analysis I also include three region/city dummies. I have used information only from the four metropolitan cities[50] to analyse the labour force status of women for two reasons. First, the rest of the analysis, based on sample surveys, refers to the situation in the urban areas. Secondly, women are likely to be involved in the formal labour market more in the urban areas. Thus the results of macro level analysis may be compared to those based on sample surveys. I have analysed the labour force participation separately for men and women as well as for a pooled

[49] These include unpaid family workers in crop production, other non-crop farming activities, agro-processing and food processing activities and cottage industry (BBS: 1996).

[50] The four metropolitan cities are Dhaka, Chittagong, Khulna, and Rajshahi which accounted for 52 percent of urban population in 2001 (BBS: 2001a).

data set to bring out the differences in their behaviour. The description and the hypothesised relationships of the explanatory variables are discussed below.

Age (years): Age may be used both as a proxy for need for income and also for experience. The probability of labour force participation therefore is expected to be higher for older people, who bear greater share of their own family burden. The coefficient for Age is thus expected to be positive.

Age-squared (years): When people get older, their capacity to work may increase only at a decreasing rate. If so, the expected sign of the coefficient is negative.

Mardum: A dummy variable that equals 1 for married women and zero otherwise. Marital status may have different influences on the labour force status of men and women. Married men are expected to be breadwinners and thus their reservation wage may be lower and consequently married men are more likely to be in the labour force than unmarried ones indicating a positive coefficient. For married women, the situation is different. They are expected to have greater responsibility for family care and thus high reservation wages. Moreover, they may also have high reservation wages because their husbands may earn an income, and this non-labour income (from the point of view of the women) should reduce participation probabilities. Consequently, the expected sign of the coefficient of marital status dummy for women is negative.

Hhdum: This variable called household headship dummy has a value of 1 if the person concerned is the household head, and zero otherwise. Household heads have the over-all responsibility for looking after the family and therefore they are more likely to work and earn an income compared to others in the family. The expected coefficient is thus positive.

Education variables: The education variables for respondents are represented by two dummy variables, *Eddum1* (education dummy 1) and *Eddum2* (education dummy 2). *Eddum1* has a value of 1 if the respondent has education up to primary level (5 years of schooling) and zero otherwise. Similarly, *Eddum2* has a value of 1 if the respondent is educated between 6-10 years in schools and zero otherwise. The excluded groups are those with education beyond 10 years.[51]

[51] Technical education is merged with the excluded group as such education presupposes 10 years of schooling.

As people get more educated, they may expect higher wages, while those with lower education may expect comparatively less. Thus, for *Eddum1* the expected sign of the coefficient is positive because those with lower reservation wages are more likely to be participants. The coefficient of *Eddum2* is similarly expected to be positive.

Several family variables have been included in the analysis. One of these is the education of the head of household, *Edhh1* and *Edhh2*. The definitions of these variables are exactly the same as for the *Eddum1* and *Eddum2* respectively but for the head of the household. The less educated a household head is, the more she/he is likely to have lower income. The reservation wage for other members in the family may therefore be lower as there would be higher pressure for earning an income. The expected sign of the coefficients of *Edhh1* and *Edhh2* are therefore positive, as the excluded category is the highest education group.

Fsize: This is family size, defined as the total number of persons in the family. The larger the family size, the greater is the burden of household chores and pressure of home production. In such a situation women's reservation wage may be higher and they may prefer to stay at home rather than join the labour force. The sign of the relevant coefficient is, therefore, expected to be negative for women. For men, on the other hand, a higher family size may mean that their role as the breadwinner may become more important and hence they are more likely to be in the workforce. The sign of the coefficient of *Fsize* for men is therefore expected to be positive.

Ninfant: This is the number of infant children (up to 5 years of age) in the family. As babies need special care, the more infants a family has, the more likely it is that a woman will quit or refrain from entering the job market. The relevant coefficient should therefore be negative. Again for men, the coefficient is expected to be positive for reasons similar to that for *Fsize*.

Landdum: Land ownership has been used as the proxy for non-labour income. The variable has been measured by a dummy variable, *Landdum*. It is zero if the family has no land and 1 otherwise. As argued in Chapter 3, access to non-labour income is expected to have a negative influence on labour market entry. For both men and women, therefore, the expected sign of the land ownership dummy variable is negative.

Sex: This is a dummy variable with a value of 1 for females and 0 for men. Given that women have to bear much of the burden of home production and thus may have a higher reservation wage compared to men, the coefficient of the sex dummy is expected to be negative.

Relgndum: A dummy with a value of 1 for Muslims and zero otherwise, has been used to see if religion has any role to play in labour market participation. There is no hypothesis behind the expected sign of the coefficient of this variable.

Regional dummies: There are 3 regional dummies for the regions where the cities are located. These are Regndum1 (regional dummy 1 = 1 for Chittagong, zero otherwise), Regndum2 (regional dummy 2 = 1 for Dhaka, zero otherwise), Regndum3 (regional dummy 3 = 1 for Khulna, zero otherwise). The fourth city/region is Rajshahi, which is the excluded category in the equation. Incidentally, Rajshahi is the smallest of the metropolitan cities. There is no *a priori* hypothesis for the signs of the coefficients of the regional dummies.

Interaction terms with the sex dummy: Several interaction terms with the sex dummy have been used. If being a women meant that for one reason or another they had to allocate time to certain activities (such as home production), their market time will be correspondingly lower. The expected signs of the coefficients in such situations are negative.

5.2.5 Estimation Results

The estimates of the probit regression are shown in Table 5.2.5-1, where labour force participation is based on the Usual definition of economic activities.[52] Consider equation 1 in the table, which shows the pooled regression for men and women with a sex dummy and also equation 2, which includes the interaction terms as well as the sex dummy. In equation 1, the sex dummy variable has a negative and highly significant coefficient but *Mardum* and *Fsize* have coefficients apparently of wrong sign and are also insignificant. *Ninfant*, has a weakly significant and negative coefficient. These seem counterintuitive. In

[52] The model that I have discussed in Chapter 3, assumes time for market work and time for home production are competitive and mutually exclusive. In the case of the extended definition of labour force participation, many of the home-based economic activities are likely to be jointly undertaken with pure home production activities and not mutually exclusive. Thus, the model that has been discussed above really does not apply in such a situation (Gronau: 1980). For this reason I have made estimates only for the usual definition. The estimation in case of Extended definition is a matter for future research.

equation 2, therefore, interaction terms with the sex dummy are introduced to check further if men and women are different in their response. The results show clear sex differentiation in labour market behaviour.

Table 5.2.5-1: Probit Estimates of Labour Force Participation in Major Cities in Bangladesh (1995/96)

Explanatory variables	Both sex	Both sex	Men	Women
	Equation 1	Equation 2	Equation 3	Equation 4
Age	0.09***	0.14***	0.21***	0.04***
	(13.18)	(13.88)	(16.43)	(3.17)
Age-sq	-0.001***	-0.002***	-0.003***	-0.0007***
	(16.23)	(18.14)	(19.60)	(4.25)
Hhdum (household	1.39***	1.21***	1.18***	0.90***
head=1)	(24.37)	(12.06)	(11.27)	(10.96)
Mardum (married=1)	0.03	0.64***	0.43***	-0.40***
	(0.57)	(6.44)	(4.19)	(5.00)
Relgndum (Muslim=1)	-0.07	-0.24**	-0.20**	0.03
	(1.15)	(2.49)	(2.02)	(0.41)
Eddum1	0.68***	1.17***	1.19***	0.35***
(up to 5 years=1)	(13.20)	(15.84)	(14.57)	(4.74)
Eddum2	0.30***	0.51***	0.55***	-0.04
(6-10 years=1)	(5.53)	(7.11)	(7.28)	(0.55)
Edhh1	-0.02	0.008	0.14*	-0.07
(up to 5 years=1)	(0.41)	(0.86)	(1.92)	(1.11)
Edhh2	-0.04	-0.02	-0.02	-0.03
(6-10 years=1)	(0.66)	(0.43)	(0.19)	(0.41)
Fsize (number)	0.002	0.02	0.02	-0.04***
	(0.27)	(1.38)	(1.31)	(3.17)
Ninfant (number)	-0.04*	0.02	0.02	-0.09***
	(1.66)	(0.68)	(0.50)	(2.82)
Landown (own land=1)	-0.20***	-0.03***	-0.07	-0.27***
	(4.56)	(0.40)	(0.96)	(4.81)
Sex (Female=1)	-1.55***	0.26	-	-
	(33.65)	(1.31)		
Sex*Age	-	-001**	-	-
		(2.09)		
Sex*Hhdum	-	-0.30**	-	-
		(2.32)		
Sex*Mardum	-	-1.29***	-	-
		(11.01)		
Sex*Relgndum	-	0.29**	-	-
		(2.26)		
Sex*Eddum1	-	-0.81***	-	-
		(8.53)		
Sex*Eddum2	-	-0.50***	-	-
		(4.72)		
Sex*fsize	-	-0.05***	-	-
		(3.19)		
Sex*Ninfant	-	-0.13**	-	-
		(2.57)		
Sex*Landown	-	-0.26***	-	-
		(2.79)		

Regndum1	0.03	0.07	0.08	0.07
(Chittagong=1)	(0.46)	(1.00)	(0.67)	(0.71)
Regndum2 (Dhaka=1)	0.14**	0.19***	0.04	0.28***
	(2.29)	(2.99)	(0.40)	(3.35)
Regndum3 (Khulna=1)	0.07	0.13*	0.03	0.19*
	(1.02)	(1.74)	(0.28)	(1.94)
Constant	1.29***	-2.55***	-3.52***	-1.01***
	(8.23)	(11.50)	(13.32)	(4.36)
Log likelihood	-3313.95	-3082.85	-1217.31	-1818.59
Pseudo R-sq	0.42	0.46	0.45	0.08
Likelihood ratio chi-sq	4847.56***	5309.77***	1999.06***	321.19***
N of observations	8278	8278	4252	4026

Dependent variable: Labour force participation dummy = 1 if participates; 0 otherwise (Usual definition).

Note:1. Figures in parentheses are absolute *z* values.

2. ***, ** and * indicate significance at 1, 5 and 10 percent probability respectively.

All the interaction terms (save for that with religion) are negative and statistically significant. Thus, when other background characteristics are held constant, women in all circumstances (except religion) have a lower probability for labour force participation compared to men. Note that the coefficient of the sex dummy is not statistically significant. Thus, there is no intrinsic reason for women not to work at the same rate as men except that as women they bear certain home production responsibilities such as child care which lead to lower time allocation to market work. This is borne out by the insignificance of the coefficients for family size and number of infants but highly significant and negative coefficients of the interaction terms of these variables with sex. Because of such sex differences, I have also separately estimated the equations for men and women. These are shown as equations 3 and 4 in the table. On the whole the results are as expected.

A household head is more likely to engage in economic activity. This is one of the most significant variables. Marital status on the other hand has different implications for entry into labour force by men and women. For example, married men are more likely to be in the labour market than unmarried ones, while the opposite is true for women. Own education, however, has similar implications for economic activities of both men and women although for women the probability is lower. The education level of the household head does not appear to be an important factor.

For both men and women, the coefficients of the land dummy are negative but are statistically significant only for women. Thus, access to this particular type of non-labour income appears to have a stronger negative influence on women's labour force participation.[53]

The variables such as family size and number of infants have expected negative and significant influence on women's labour force participation. But for men, the variables have little influence.

The religion dummy shows an interesting behaviour. Muslim men are less likely to participate in the labour market compared to Non-Muslims. But when everything else is controlled for Muslim women are more likely to be in the labour force.[54] Labour force participation appears to be significant and higher in Dhaka and Khulna than elsewhere and more so for women.

5.2.6 Other Employment Characteristics

I review here some other characteristics of employment as the background to understanding the results of micro level inquiry into women's labour market behaviour. Two qualifications regarding this review are in order. As the Extended definition affects mainly rural labour force participation, I concentrate on information based on the Usual definition as my emphasis is on the formal urban labour market. Secondly, the age grouping in the LFS has two cut-off points, ten years and above and 15 years and above. I use only the latter as child labour is not a focus of this investigation.

Given the above qualifying notes, the first point to be noted is that men constitute 86 percent and women only 14 percent of the total employed persons. The proportion of women is slightly higher in the urban (19 percent) compared to the rural areas (13 percent). Secondly, while both men and women are employed mainly in agriculture, the proportion of men (54 percent) is much higher than that for women (39 percent). Women are employed in large proportions in few other sectors except community service. Thus, employed men and women are largely

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[53] Westergaard (1993) has noted that with better economic conditions rural women hitherto in the labour market sometimes withdraw.

[54] Sociological research may throw more light on the issue.

segregated by sector. The estimated Duncan index, as a result, is 0.57, which is high.[55]

In urban areas, apart from community and personal services, women are employed mainly in manufacturing while men are employed more evenly across sectors (BBS: 1996). Again the concentration of women in a few sectors means a fairly high Duncan index (0.47). Somewhat dated information indicate that much of the women's employment in manufacturing is in textiles industry, which includes the readymade garments (BBS: 1997b). Urban working women are employed mainly in production and transport activities (34 percent) and as service workers (23 percent). Men, however, are employed in all categories of work indicating a fairly high Duncan index of 0.53 reflecting segregation of sexes.

The average weekly earnings of women (Taka 480) in the urban areas are just about one-half of that of men (Taka 958). This is because nearly 74 percent of women earn less than Taka 500 a week while 62 percent of men earn more than Taka 500 per week. However, the gross inequality of earnings may not be universal across sectors, industry or type of activity. Somewhat dated information (1991/92) indicate that in the cotton textile and RMG manufacturing industries the wage differential among production workers may not be high. In the RMG industry, where women predominate as production workers, men earned 11.6 percent more than women. In cotton textiles, it was 16 percent higher. When all the employees are considered, however, the earning gap is much higher. For RMG industry it was 42 percent.[56]

[55] Due to large weight of agriculture, the Duncan index is estimated here excluding it. See Horton (1996) and Acharya (1996) for a justification of such estimates.

[56] The reasons for the difference in wages between men and women may be that men are in higher productivity jobs compared to women. Another explanation may be that even when doing exactly the same jobs, men are favoured over women in terms of wages paid. The lack of sufficient desegregation in published data does not allow a test of either of the hypothesis.

5.2.7 Summary

The findings in Section 5.2 may be summarised as follows. Labour force participation by women is lower than that for men. But if their home-based economic activities are considered, women's labour force participation increases. The pattern of LFPR by age is similar to that observed in other developing countries at similar stages of economic development.

There are some key differences between men and women in the determinants of their labour force participation behaviour. Marriage, larger family size, children, and land ownership (as a source of non-labour income) act as deterrents to participation for women but not for men.

Women are employed mostly in specific sectors and occupations, as opposed to men who are employed more widely. In urban areas, women are concentrated particularly in RMG factories as workers. On average women earn far less than men. But the earnings differentials are not as wide for production work, in which women are engaged mostly in the RMG sector.

5.3 Migratory Behaviour of Working Women

5.3.1 Introduction

As observed in Chapter 2, rural-urban migration by women, compared to that by men, has received much less attention the world over including Bangladesh. This is also true for specific sectors, and hence the following questions have so far remained unanswered in the present context: How important are migrants for the RMG industry? Where from have they come? Do they have any special characteristics? What have been the causes of migration? What have been their migratory behaviour patterns and how have these changed over time? To answer these questions, I first discuss the conceptual ideas, methods of analysis and the nature of the data. The empirical findings follow next.

5.3.2 Rural-Urban Migration: Analytical and Empirical Methods

Migration: Theory, causes and factors

In Chapter 2, it was noted that a multilevel approach is increasingly used to explain migratory behaviour. The following specific aspects of community, household and individual factors, in addition to the national ones, are deemed important (Bilsborrow and UN Secretariat: 1993)

Community level factors: general economic conditions such as employment availability, wage levels, community norms and values at the points of origin, and available infrastructure (such as transport and communication facilities) between points of origin and destination of potential migrants;
Household level factors: the economic condition of the household of the migrant, household resource allocation strategies for survival, prior family moves, and a household's social and economic position relative to others.
Individual characteristics: age, education, marital status and sex.

Community factors, such as good infrastructure, allow people to move easily and also facilitate the spread of information about opportunities at intended destinations. Whether people from a given community will move or not also depends on a persons'/community's general level of socio-economic development.[57] In a poor area with high unemployment levels and frequent natural hazards (flood or river erosion), high inequality in land distribution, underdeveloped agriculture or an absence of anti-poverty interventions such as micro credit facilities or seasonal employment generation (such as through Food for Work activities in Bangladesh), people will try to move out for betterment of their economic and social conditions. But their actual migration will depend on household and individual opportunities and imperatives.[58]

One or more members of a household may migrate for the survival and economic betterment of the household and may allocate labour accordingly (Lucas: 1997). Yet, the migration of individual members of the household depends on the characteristics of the potential migrant as well as his/her ideas about net benefits from migration. Studies have shown that first-time migrants are generally young (Goodwin and Bedford: 1997), educated and mostly unmarried.[59] A younger person has a longer working life and is likely to be unencumbered (with family or children) compared to an older (probably married) one. Thus the

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[57] People migrate for a variety of political, social and economic reasons. In specific situations (such as warfare, genocide), people may leave in large numbers. These special situations, while important, are not discussed here.

[58] Mahbub (1997) indicates that there is no clear one to one correspondence between an individual's socio-economic situation and migration. The former is an amalgam of more than one social and economic characteristic of individual and the family, which may have influences opposite to each other on the decision to migrate.

[59] For critical reviews of the evidence in developing countries see the surveys by Lucas (1997) and Rosenzweig (1988).

potential gain in lifetime earnings for the younger person is higher (Osaki: 1999) while the associated costs (including psychic costs) are likely to be lower.

Education increases the potential earnings of a person. If a person decides to move, then education may facilitate it, particularly if the nature of the job demands such education. In the latter case, the chance of finding a job increases thus lessening the economic risks of migration.

The implications of marital status for migration depends on several factors including age and sex of the potential migrant, duration of marriage, presence or absence of children and their age, and the employment status of the spouse. In general, the probability of migration will be higher for the relatively less encumbered potential migrant. Lower total costs (including financial, non-financial, and any opportunity costs such as loss of spouse's earnings) and higher returns from migration similarly raise the tendency to migrate (Mincer: 1978).

Apart from economic variables, other factors may help or hinder migration. Prospects of help from those who have migrated before may facilitate migration (Boyd: 1989; Fawcett: 1989; Fuller, Kamnuansilpa and Lightfoot: 1990; Moretti: 1999). Such networks help to reduce the risk of migration by lowering its cost and also the cost of a job-search (Banerjee: 1998). The implication is that potential migrants with links to a prior migrant may migrate sooner than those without such links.[60]

The above discussion suggests that no one single factor, economic or non-economic, may be overriding for everybody aspiring to migrate. At times the same factor may provide the urge for and also constrain migration. Thus, poverty may push people out but may also lower their capacity to bear costs of job search.

Migration of women

The literature indicates that women migrate for reasons similar to men. But for married women, migration may be tied with that of their husbands. On the other hand, single, unmarried women may be less likely to migrate on their own in Bangladesh (Zohir and Paul-Majumder: 1996).

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[60] One can argue whether or not networks are more or less important than economic factors. Such comparisons, however, miss the essential point which is that economic factors may provide the initial impetus but the decision to migrate is facilitated by existing social networks.

Education and prior experience of migration either of self or others in the family or social links with other migrants may facilitate migration of women, as well as for men. Ordinarily, a little education may not be of much use for women who do not do outside work. But two factors in the RMG industry help them. First, the industry demands women's cheap labour (Dowlah: 1999). Secondly, for most of the jobs, and for the most crucial job women do, that of sewing operators,[61] employers often demand only a little literacy and numeracy along with some experience.

In such a situation, unmarried and untied women with some education, which is of little use in the villages for out-of-home work, are likely to increase their earning potential in the cities. They have fewer family encumbrances than married women. Thus their tendency to migrate will be higher. Their moves may also be part of a family strategy to increase the income of the whole family. Thus it could be concluded, from a general overview, that there are strong links between women, migration and the newly expanding RMG sector as it offers a chance to better their economic situation. In many ways, these migration patterns and motivations are not dissimilar to patterns and motivation that have been found elsewhere (Kusago: 1998; Osaki: 1999).

5.3.3 Method of Investigation

A precise operational definition of a migrant is needed at this stage. The respondents in my sample survey were asked: when did they move to Dhaka and from which district. Those who were born in the capital (Dhaka) city because their families were there (where the survey was done) were treated as non-migrants. Those who were born outside the capital and later moved there with or without their families have been treated as migrants. Theoretically there could be cases where people had been born outside Dhaka while their families were in the city. There were no such cases among the respondents. Furthermore, some of them may have gone back to their villages later on. But given the economic imperatives, this seemed rather unlikely.

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[61] Sewing is a monotonous job and men are reluctant to be employed as sewing operators (personal communication from various RMG factory managers).

The findings are presented mainly as tables, with tests of statistical significance, such as χ^2 and t-tests, used wherever applicable.

5.3.4 Empirical Results

Migration and length of migration

Ninety percent of the sample workers are migrants to the capital city (Table 5.3.4-1). Of the migrants, nearly 45 percent had been in Dhaka for a period of five years or less, while a quarter had arrived within the three years prior to the survey.[62]

Table 5.3.4-1: Distribution of Workers by Years since Migration

Years	Frequency	Percent
Up to 3	67	25.8
4-5	38	14.6
6-10	72	27.7
Above 10	56	21.5
Non-migrant	27	10.4
All	260	100

Origin of migrants and community characteristics

Three districts[63] were found to be prominent as origin of migrants.[64] These are Barisal, Faridpur, and Comilla (Figure 5.3.4-1). Their prominence is not random and can be explained with respect to broader community characteristics they possess.

[62] Respondents were first asked if they had migrated from outside Dhaka and in which year. Discussion with respondents indicated that they referred to their initial migration, which was the only time they had migrated. When they admitted going back to their villages, it had been only for short visits, not for long enough to be treated as repeat migrants.

[63] Administratively Bangladesh is divided into six divisions, which are further divided into districts. At present there are sixty-four districts, which have been created by subdividing 20 districts (old) in the early seventies. Here the districts refer to these old districts. Indeed when people refer to districts they still mainly mean these old districts.

[64] Incidentally Mahbub (1997) also mentioned two of these districts, Faridpur and Comilla, to be areas of high-out migration.

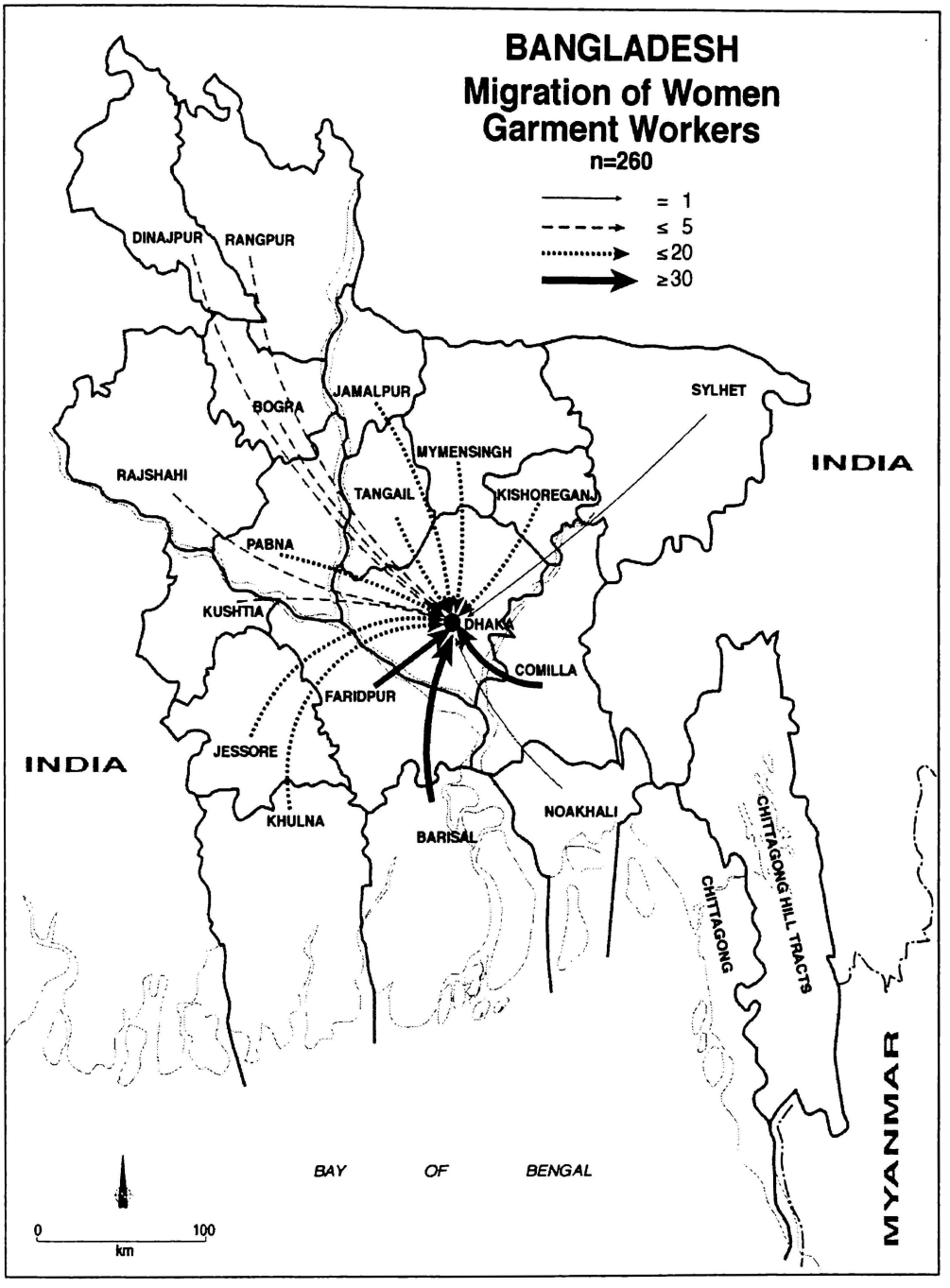

Figure 5.3.4-1: Districts of Origin of Migrant Garment Workers

All three districts have good communication with Dhaka and can be reached within a few hours. Barisal and Faridpur are also highly prone to river erosion. Thus, river erosion, loss of land and consequent poverty constitute important push factors in the cases of Barisal and Faridpur. In the case of Comilla, proximity of the district to Dhaka, along with a very good communication link acts as a pull factor. Very few migrants come from the northwestern districts, possibly because these are agriculturally better off areas and also because of the problems of communication. The rest of the migrants come mainly from other districts surrounding Dhaka. These districts usually have good communication and some of them (such as Jamalpur, parts of Mymensingh, and Kishoreganj) are also impoverished compared to others (BIDS: 2001)

The pattern of migration can also be placed in a historical context. Since the 1960s there has been net out-migration from Barisal and Chittagong Divisions in which Barisal and Comilla districts fall respectively (BBS: 1997a, p. 45). In contrast the Northwestern districts (except Rangpur because of its impoverishment) have always been destinations rather than points of origin. Thus, lack of migration from those districts to Dhaka is expected.[65]

Reasons for migration

The respondents were asked the reasons for their migration to Dhaka. In response, they immediately pointed to economic factors, especially the prospects of getting a job in an RMG factory as the most important reason for migration. A second important factor was related to the family. In some cases, women have moved either because the whole family had moved to Dhaka or their husbands had brought them (Table 5.3.4-2).

The direct evidence on the importance of economic factors fits well with the evidence on income differentials that exist between rural areas and towns, acting as a magnet for women migrating to towns.[66] In 1996, 44 percent of salaried and wage earning urban women workers earned roughly Taka 1000 or less per month

[65] Now that a bridge spans the River Jamuna facilitating communication between these districts and Dhaka, we may in a few years see if pull factors operate there.

[66] Mahbub's (1997) results apparently contradict such findings as he noted a positive relationship between level of income and the numbers of movers. However, the level of income referred to the present income, not that existing before migration. So, whether migration led to the higher income or the latter led to migration cannot be judged clearly from his data.

(BBS: 1996, p. 176). In contrast, in the same year, 62 percent of rural women earned the same income.

In fact, women working in the RMG firms fared better even than the average urban working women. Three-fourths of RMG women earned between Taka 1000-3000 per month compared to only 40 percent for the average urban working women. The differential between the wages of women in manufacturing industries in general and RMG in particular in the urban areas and women's income in rural areas was thus very wide. These differentials must have entered into the decision making process of the migrants, provided they had a means of getting the relevant information.

Availability of information about a job becomes easier if there is a prior move or migration by other family members. Two-thirds of the migrant women workers (154) had some member of the family who had been to Dhaka before their migration for one reason or another and thus they very likely had access to job information.

Table 5.3.4-2: Reasons for Migration (Workers)

Reasons	Response (Number)	Response (percent)	Respondents (percent)
For garment job	155	59.6	66.5
Education	11	4.2	4.7
Because family moved	64	24.6	27.5
For getting a job*	15	5.8	6.4
Brought by husband	3	1.2	1.3
Others	12	4.6	5.2
All responses	260	100	111.6

Note: 1. The same respondent sometimes has cited more than one reason. Thus for 233 respondents responses are 260. Two hundred and Thirty-three of the total sample of 260 are migrants

2. The reply "For getting a job" refers to any other job apart from a garment job.

There is only indirect evidence on push factors such as poverty or inadequate access to productive assets such as land. The information on land holding of respondents shows the current situation. Yet, possibly this can be interpreted to mean that poverty must have been important as nearly two-thirds had little or no land even at the time of the survey. In rural Bangladesh people try to acquire some land when they become economically better off. Thus, if the respondents were not in possession of land at the time of the survey, they probably did not

possess much land previously either. This intuition becomes stronger when the characteristics of two out of the three districts (Barisal and Faridpur) are borne in mind. These districts are most prone to river erosion, consequent loss of income and employment, and incidence of poverty. This is also evident of the high proportion of poor in these districts (BIDS: 2001).

Length of migration and reasons for migration

The RMG industry came into prominence in the mid-1980s. Therefore, the prospects of an RMG job were likely to be less important for early migrants compared to the more recent ones. Table 5.3.4-3 indicates that for the early migrants the importance of RMG jobs was much less than that for recent migrants.[67] For early migrants, moving with the family was more important than for the recent ones.

Table 5.3.4-3: Reasons for Migration by Years since Migration (Workers)

Reasons	Type of migrants (years since migration)			
	Recent (Up to 5)	Mature (6-10)	Early (10+)	All
For garment job	82	48	25	155
	(78)	(67)	(45)	(66)
Education	2	4	5	11
	(2)	(6)	(9)	(5)
Because family moved	18	22	24	64
	(17)	(31)	(43)	(28)
For getting a job	6	4	5	15
	(6)	(16)	(9)	(6)
Brought by husband	2	1	-	3
	(2)	(1)		(1)
Others	6	3	3	12
	(6)	(6)	(9)	(5)
All respondents	105	72	56	233
	(45)	(31)	(24)	

Note: 1.The figures in parentheses except those in the last row are percentages of the respective column totals. Those in the last row are percentages of the row total, which is the total number of migrants.
2. Some of the respondents have stated more than one reason for migration.
3. '-' indicates no respondent in that category.

[67] Migrants have been divided into three groups depending on when they have migrated. Recent migrants are those who have come to the cities within the last five years while those coming between six and ten years ago are termed mature. Early migrants have migrated more than ten years back.

When only women aged 10-14 years at the time of migration are considered, the proportions of respondents moving with the family were 33 percent for recent and mature migrants, and 59 percent for the early ones. Thus, for the very young at the time of migration, those migrating earlier did so mainly as tied movers while for other migrants, such moves were less important.

5.3.5 Selectivity of Migrants

Migrants do not appear to be drawn at random from the population. Rather they have certain characteristics. Such characteristics for women migrants employed in RMG work include age, education, and marital status.

Age at migration

Among sample workers, women migrated at a young age. Nearly 82 percent moved between the ages of ten and 24 (Table 5.3.5-1). Women in the same age group in the national population constitute only 48 percent of the total (BBS: 1997a, p. 30). This shows the predominance of young women among the RMG migrants, as noted for other countries (Kusago: 1998; Wolf: 1990).

Table 5.3.5-1 Distribution of Migrants by Type and Age at Migration

Age at migration	Migrant type			
	Recent (up to 5 yrs.)	Mature (6-10 yrs.)	Early (above 10 yrs.)	All
Up to 14 years	21 (20)	40 (56)	34 (61)	95
15-25 years	74 (71)	26 (36)	21 (38)	12
25+ years	10 (10)	6 (8)	1 (2)	17
All	105	72	56	233

Note: 1. Figures in parentheses are percentages of relevant column totals.
They may not add up to 100 due to rounding error.
2. Test of significance: Chi-sq = 36.25 with d.f. = 4; and significant at 1 percent.

When stratified by years since migration to Dhaka, it is clear that early (more than ten years) migrants have mostly migrated before 14 years of age. More recent (up to five years) migrants, on the other hand, are likely to have moved at comparatively much older age. The pattern was also statistically highly significant.

Education

In Chapter 4 it has been shown that illiteracy is rare among RMG workers, while a sizeable proportion has completed high school. Among the migrant RMG workers, a similar situation obtained. Of the high school achievers, 63 percent are recent migrants (Table 5.3.5-2). Similarly of those educated between 6-10 years in school 50 percent had moved recently. For mature and early migrants, these percentages are much lower. As more education means more time in school. This also explains the higher age at migration of more recent migrants.[68]

Table 5.3.5-2: Distribution of Migrant Types by Level of Education

Migrant type	Education level				Total
	Illiterate	Semi-literate	Fully literate	High school +	
Recent	2	49	28	26	105
	(40)	(38)	(49)	(63)	
Mature	3	46	15	8	72
	(60)	(35)	(26)	(19)	
Early		35	14	7	56
		(27)	(25)	(17)	
All	5	130	57	41	233

Note: 1. Figures in parentheses are percentages of relevant column totals.
2.Test of significance: Chi-sq = 11.7 with d.f. = 6; and significant at 10 percent.
3. '+' means beyond High school.

Marital status and migration

The more recent a migrant is, the more likely that she would be currently unmarried at the time of survey (Table 5.3.5-3). The relationship is monotonic and statistically highly significant. As early migrants are likely to be comparatively older and thus married, the analysis was repeated by controlling for age group to purge its effect. For the 15-24 years age group, for example, the percentages of never married are 58, 42 and 18 for the recent, mature and early migrants (not shown). Thus the general picture is true also for specific age groups.

[68] A part of the explanation for better education among the recent migrants may be increased opportunities for education over time. For example, the enrollment of girls in secondary schools rose from 772 thousand to 2327 thousand over 1985-95 (BBS: 2002, p. 514). Whether the increase has been similar in both the rural and urban areas is not clear, however, due to lack of disaggregated data.

Table 5.3.5-3: Migrant Type and Marital Status at Time of Survey

Marital status	Migrant type			
	Recent	Mature	Early	All
Ever married	54 (51)	49 (68)	52 (93)	155
Never married	51 (49)	23 (32)	4 (7)	78
All	105	72	56	233

Note: 1. Figures in parentheses are percentages of relevant column totals.
2.Test of significance: Chi-sq = 28.3 with d.f. = 2; and significant at 1percent.
3. Recent means up to 5 years, mature is 6-10 years and early is above 10 years.

When marital status at time of migration is considered by migrant type, the picture changes. At the time of migration, nearly 70 percent of migrant worker women in the sample were unmarried. The rest were married, while a few had already been divorced or became widows. But, fewer of the recent migrants were found to be unmarried compared to the mature and early migrants (Table 5.3.5-4). The pattern is only weakly significant. Note, however, that some of the early migrants had migrated before puberty (32 out of 56 by the age of 14 years). If such women are excluded the picture changes again and becomes similar to that shown in Table 5.3.5-3. Thus for women in the age group 15-24 years at the time of migration, the proportion of unmarried women were 58, 50 and 43 percent respectively for the recent, mature and early migrants (not shown).

Table 5.3.5-4: Migrant Type and Marital Status at Time of Migration

Marital status	Migrant type			
	Recent	Mature	Early	All
Ever married	41 (39)	18 (25)	15 (27)	74 (32)
Never married	64 (61)	54 (75)	41 (73)	159 (68)
All	105	72	56	233

Note: 1. Figures in parentheses are percentages of relevant column totals.
2.Test of significance: Chi-sq = 4.73 with d.f. = 2; and significant at 10 percent.
3. Recent means up to 5 years, mature is 6-10 years and early is above 10 years.

On the whole, therefore, push factors such as poverty and pull factors such as good communication infrastructure and nearness to the capital may have facilitated women's migration. Family-related factors such as a move by the family appear to have also mediated in the process. The most important reason, however, has been the prospects of immediate economic gains and more so for the more recent migrants. As indicated above, the possible gains in income are

enormous because of the differentials in income between the countryside and the cities.

An important finding is that around one half of the women even at the prime age group of 15-24 years at the time of migration were unmarried. Being better educated, unmarried and unencumbered, enabled them to take advantage of new opportunities. There is a positive relationship between education and earnings among the respondents as shown in Section 5.7.7. The proportion of more educated women is thus rising among the more recent migrants. It is for this group that the wage offer is the highest and thus the potential gain from migration is also the largest. This suggests that when opportunities present themselves, women take them up, even in a traditional society where women do not tend to work outside. In this sense, employment opportunities in the RMG sector have contributed to major social changes in Bangladesh by making women move in search of jobs.

5.3.6 Concluding Remarks

The conventional migration theories imply that women may be constrained in their migration behaviour by their family ties with men. The findings of this study suggest that substantial economic incentives may have a stronger influence on women's migration than such social norms. Also over time, tied moves have become increasingly less important, especially in the migration of women from rural to urban areas.

The absolute changes, economic and social, in RMG women's lives must have been substantial both because hitherto women have had little opportunity for economic advancement in the formal sector and also because of the very large number of women from poor families who are employed. Then again, the benefits have been widespread in the sense that while the factories are concentrated in only one or two major cities, the workforce is drawn from many places over the extensive rural areas of the country.

5.4 Circumstances Leading to Employment in RMG Firms

For most women, migration was only the first step towards employment. Only six of the 260 working women had had any kind of employment before joining their first RMG factory. Most (68.5 percent) had been without any job while around 26 percent had been studying in school. Before entry into an RMG firm, these women learned about the availability of RMG jobs mainly from other relatives and friends (33 percent of responses), neighbours (25 percent) and parental family (18 percent). A significant minority (15 percent) had obtained job-information from advertisements at the front gate of the firm.

In 83 percent of cases, women apparently did not face any problem or social obstacle while joining the RMG firms. Among those who did, the major observations are that people have bad ideas about RMG (14 percent) or believe that girls become spoiled if they work in these places (13 percent). Complaints regarding the conditions of work, such as long hours or night work, featured less prominently, but were reported in 5-6 percent of the cases. The respondents stated that over time the resistance weakened from relatives against working in RMG firms.

Poverty and the need to supplement income appear to be the major reasons for the women joining the RMG firms. Of the 89 unmarried workers in the sample, 21 percent stated that at the time of their joining the firms, the family's financial situation has been bad or very bad. Some 62 percent termed it as fair while 13 percent termed it as good or very good. For currently married women, 34 percent thought the financial situation of the family at the time of joining the factories was bad or very bad, 40 percent reported it to be fair while 26 percent described it as good to very good. Hence a significant proportion of the families of the women workers experienced poor economic circumstances before entry into RMG jobs. This acted as a push factor for them to join the RMG labour market.

5.5 Labour Market Participation

5.5.1 Introduction

In this sub-section, I shall estimate a labour force participation equation on the basis of the information for the sample respondents (working and non-working). In Chapter 3, I have discussed the theoretical framework for analysing labour force participation and applied this framework in Section 5.2.4 and 5.2.5 to

estimate a national level labour force participation equation for metropolitan Bangladesh. In what follows, I first state more formally the model based on the idea of the relationship between the reservation wage and the offered wage. In this model the labour market participation and wage equations are considered together because of the link between the two.

5.5.2 A Model of Labour Market Participation

I shall analyse the labour force participation, the wages that the working women receive and the correlates of these variables. As the wages are observed only for those who work, this may create a bias in the estimation of the parameters of the wage equation, which needs to be corrected (Heckman: 1979). The correction factor uses parameters estimated from the labour force participation equation. It is therefore common in the literature to model labour force participation and wage or (hours) equations together (Amemiya: 1990, p. 125-135; Gourieroux: 2000, p. 188-189; Greene: 2000, p. 926-934).

As argued in Section 5.2.4, a person's involvement in the labour market depends on the relationship between the wage offered and the person's reservation wage. More formally, let

$$y_i = y_{2i}^* \text{ , if } y_{1i}^* > 0 \qquad \ldots (5.5.2.1)$$
$$= 0, \text{ otherwise.}$$

where y_i is observed wage, y_{1i}^* is the difference between the offered wage and the reservation wage and y_{2i}^* is the offered wage.

Thus, if the offered (market) wage is less than the reservation wage, the person does not work. But, when the offered wage is higher than the reservation wage, the person works and receives a wage equal to the offered wage denoted by y_{2i}^*. Now, let

$$y_{1i}^* = \mathbf{X}_{1i}\, b_1 + u_{1i} \qquad \ldots (5.5.2.2)$$

labour force participation or selection equation

$$y_{2i}^* = \mathbf{X}_{2i}\, b_2 + u_{2i} \quad \text{wage equation} \qquad \ldots (5.5.2.3)$$

where y_{1i}^*, y_{2i}^* are as defined above, b_1 and b_2 are the vectors of the regression parameters and u_{1i} and u_{2i} are the error terms that are assumed to be jointly

normally distributed. The **X**'s (i.e., the variables) in the two equations may contain some of the same explanatory variables.

The problem with the selection equation (5.5.2) is that y_{1i}^* is unobserved as the expected or reservation wage is unknown. What is observed is that either a person works or does not work? We can then assume that there is an index I*, which assumes a value of 1 when the person works and a value of 0 when he/she does not. That is

$$I^* = 1 \text{ when } y_{1i}^* > 0 \qquad \ldots (5.5.2.4)$$
$$= 0, \text{ otherwise.}$$

Hence, probit estimation is used to estimate the labour force participation equation (Greene: 2000). The wage equation (5.5.3) can be estimated using the Ordinary Least Squares (OLS) method subject to correction for selectivity bias, based on the correlation between u_1i and u_2i. The most popular method for doing that is the Heckman (sometimes called Heckit) two-stage procedure. The steps to be followed are (Greene: 2000, p. 930) as follows.

First, use probit to estimate the participation equation as

$$I^* = \mathbf{X}_{1i}\, b_1 + u_{1i} \qquad \ldots (5.5.2.5)$$

Second, estimate the correction factor known as Inverse Mills Ratio

$$\lambda = f(\mathbf{X}_{1i}\, b_1) / F(\mathbf{X}_{1i}\, b_1) \qquad \ldots (5.5.2.6)$$

where the f(.) is the density of the standard normal distribution and the F(.) is the cumulative distribution function of the standard normal distribution function.

Third, use the λ in the OLS estimation of the wage equation as the additional variable to correct for selectivity bias. While the above procedure seems quite straightforward, there are certain econometric issues which need to be resolved or at least should be kept in mind while interpreting the results of empirical estimation. These issues are discussed below.

5.5.3 Econometric Issues

An on-going debate relates to the appropriateness of the probit regression for the selectivity equation (Martins: 2001; Schafgans: 2000). However, the qualitative

conclusions derived from the probit and other estimators may not differ as indicated by the results in Schafgans (2000) in the case of Malaysian women's labour force participation and wage earning. I have, therefore, used the probit regression for labour force participation in the present case.

The application of the Heckman's procedure (described above) provides consistent but inefficient estimators (Kennedy: 1999, p. 256). Inefficiency indicates that the sampling variance of the estimators may be larger than what it would be in the case of the efficient ones. Consequently, the standard errors of the coefficients may be large and the t-statistics lower than what they may really be. Maximum likelihood methods provide unbiased, consistent and efficient estimates of the parameters, but such models have likelihood functions that are difficult to manipulate to arrive at simple estimation procedures (Kennedy: 1999, p. 252). Accordingly, a simpler estimation procedure such as the Heckman's two stage method as described above may be preferred because of its simplicity even when it is inefficient (Gourieroux: 2000, p. 192), which is why it is used widely.

There are other problems such as identification and heteroskedasticity with the Heckman procedure, particularly regarding the estimation of the wage equation (Deaton: 1997). The wage equation needs to be identified by an exclusion restriction, which requires that the selection equation (labour force participation) should have at least one variable, which is not included in the wage equation. Furthermore, this identifier variable should be continuous (Deaton: 1997). Considering all these issues and also on the basis of Monte Carlo experiment results,[69] views have been expressed that the sub-sample OLS for the wage equation is more efficient (without the Heckman correction) and also more robust to non-normality of the error terms (Kennedy: 1999).

The above discussion indicates that there is no easy way out for handling the selectivity problem. Each procedure may have its strengths and weaknesses. Accordingly I try to account for the selectivity problem using Heckman's procedure. I also estimate the second equation without making any such correction as suggested above. The identification problem in the first case is taken care of by using a continuous variable called "livesize" (i.e., the size of the family

[69] Monte Carlo experiments are used to study the properties of parameter estimates using computer simulations and repeated sampling.

living together with the respondent) in the labour force participation, but not in the wage equation.

5.5.4 Variables for Empirical Estimates

The explanatory variables in the equation for labour force participation include non-labour income and other family and individual characteristics. The following factors are deemed important in determining labour force participation:

Age of respondent, square of age, migration characteristics of the individual respondent, migratory characteristics of the family, marital status of the respondent, education of the respondent and of the guardian (husband for married respondents and father or mother for unmarried respondent), size of the family living together (as a proxy for home production burden) and land ownership (as a proxy for non-labour income).

Some of these, such as age, square of age, marital status, education of respondent, size of the family, and land ownership dummy, have been defined exactly as in Section 5.2.4 in this chapter. The expected signs of the coefficients are also the same as discussed there. To recapitulate regarding their expected relationships with labour market entry the expected sign of age is positive while for square of age, marital status, family size living together, and land ownership dummy the expected signs are negative. For other variables, the expected relationships are as follows.

Migration variables: Two types of migration variables have been used here. One is the migration dummy (*Migdum*) for the respondent herself. The value is zero for non-migrants and 1 for migrants. A major reason for migration by the respondents is to look for jobs (this chapter, Section 5.3.4). Coming from a rural area and making do in a town barely known to the migrant women, they possibly cannot be very choosy about wage rates. Thus, a migrant's reservation wage is likely to be lower than that of a non-migrant. If so, migrants will be more likely to accept a job than non-migrants. Consequently, the sign of the coefficient for the migration dummy, *Migdum*, is expected to be positive.

The other migration variable is the *Fmigdum* or other family member migration dummy. If any other member of the family of the respondent has moved to Dhaka before, the value of *Fmigdum* is unity and zero otherwise. Those

respondents who have followed other members of the family to Dhaka are likely to be dependents. Secondly, this also means that there may be other family members who are earners. Thirdly, if other members of the family have migrated before, they (i.e., other members) are likely to be exposed to the opportunities available to women for work. All these may combine together to raise the reservation wage for women respondents who follow other family members. On the whole therefore, the sign of *Fmigdum* is expected to be negative.

Respondent Education variables: In the equation for national labour force participation, respondent's education has been hypothesised to have a negative relationship with labour market entry. In contrast, for entry into the RMG firm, the relationship may be opposite. One particular aspect of the RMG industry is that much of the work women do falls in the skilled category, which requires a modicum of education. Thus, persons with very low levels of education may not be offered most types of RMG jobs. In this situation, education may have a positive impact on entry into RMG jobs. As own education has been measured by two dummy variables *Eddum1* and *Eddum 2* defined earlier, with the highest level of education as the excluded category, their coefficients are expected to be negative.

Education of parents and husbands: Apart from respondent's education, I introduce two other education variables namely *Gedndum1* and *Gedndum2*. They are measured exactly like the *Eddum1* and *Eddum2* variables except that here they reflect the education levels of the guardians of the respondents. By guardian (for want of a better name), I mean a husband for a currently married woman and a father (or a mother, if the household is female-headed) for an unmarried or previously married women.[70]

[70] Note that a guardian is not necessarily a family head in these cases, particularly for married women living with parents-in-law. In such cases, generally, the father-in-law is the family head. But I assume that it is the husband's likes and dislikes that are more important than those of the father-in-law.

Better educated husbands or parents are likely to have higher incomes, raising the reservation wage of the respondent women and lowering the probability of their labour market entry. On the other hand, such guardians may be able to assess the economic prospects of women in the labour market better. As the RMG industry is growing and there is a shortage of labour, these men may be more inclined for their women to work in such firms to reap the economic benefits. In such a situation, the effect of guardians' education is expected to be negative. The net result of the two opposing effects becomes an empirical issue for both *Gedndum1* and *Gedndum2.*

5.5.5 Results of Econometric Analysis

The variables described above have means and standard deviations as shown in Appendix 7, Table A7-1. The results of probit regression are shown in Table 5.5.5-1. For comparative purposes, I have also shown a linear probability model (LPM) with the same explanatory variables in the same table.

Note first that the probit regressions show four equations. Different specifications are used to find out if the respondents' education variables do matter. The regression results indicate the following.

The variables, *Age, Migdum* and *Landdum* have positive and statistically significant coefficients in all four probit equations. Migrants are thus much more likely to enter into jobs than non-migrants. The sign of *Landdum* is contrary to expectation. So I replaced the land dummy with actual area of land owned (not shown). The coefficient remained positive and significant. Note that the land ownership variable showed the expected negative sign for the equation for labour force participation estimated from national level data. Why this should be different in the present case is difficult to understand. It may be noted, however, that family ownership does not mean women's control over land.[71] Probably more detailed information on ownership and control over the return from land may shed light on the problem. This remains a matter for future research.

[71] Women's control over land is a complex socio-religious-legal issue in Bangladesh. For a comprehensive review of these issues, see Agarwal (1994).

All other variables have negative coefficients. The most significant variables are *Gedndum1* and *Mardum* (both significant at 1 percent probability). *Livesize* also has negative and significant coefficients. Thus, the negative influence of burden of home production activities as found in Section 5.2.5 is confirmed. The signs of both *Gedndum1* and *Gedndum2* are negative and significant, indicating that higher a guardian's education level, the higher the participation of women in the labour force. Thus the signs of the coefficients of the guardian education variables underscore the positive influence of higher education of parents/husbands in women's job-market entry.

Table 5.5.5-1: Probit and LPM Estimates of Labour Force Participation by Women

Explanatory variables	Probit regression				LPM regression
	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5
Age	0.16*	0.17**	0.15*	0.18**	0.02*
	(1.69)	(1.96)	(1.84)	(2.00)	(1.74)
Age-squared	-0.003*	-0.0030**	-0.003*	-0.0032**	-0.0004**
	(1.74)	(1.96)	(1.95)	(2.03)	(2.03)
Migdum	1.76***	1.93***	1.66***	1.84***	0.47***
	(3.97)	(4.28)	(4.52)	(4.07)	(5.00)
Fmigdum	-0.31	-0.32*	-0.22	-0.31	-0.07
	(1.58)	(1.67)	(1.30)	(1.62)	(1.32)
Livesize	-0.12**	-0.13**	-0.14***	-0.12***	-0.03**
	(2.32)	(2.51)	(3.23)	(2.45)	(2.13)
Mardum	-0.84***	-0.92***	-0.70***	-0.95***	-0.17**
	(2.71)	(3.16)	(2.75)	(3.18)	(2.49)
Landdum	0.39**	0.39**	0.43***	0.41**	0.12**
	(2.10)	(2.15)	(2.67)	(2.27)	(2.10)
Gedndum1	-0.98***	-1.09***		-1.18	-0.29***
	(4.00)	(4.89)		(5.13)	(4.36)
Gedndum2	-0.63**	-0.77***		-0.79***	-0.18***
	(2.51)	(3.26)		(3.33)	(2.65)
Eddum1	-2.67		-1.85***		-0.13
	(0.65)		(3.10)		(1.52)
Eddum2	-2.96		-1.92***	-0.40**	-0.21**
	(0.73)		(3.16)	(2.05)	(2.40)
Intercept	1.07	-1.91	-0.36	-1.71	0.49**
	(0.25)	(1.47)	(0.29)	(1.32)	(2.21)
N	314	314	365	314	314
Adj-R-sq					0.255
F-statistic					10.75***

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***, ** and * signify statistical significance at 1, 5 and 10 percent probability respectively.

One of the most interesting results appears to be the initial insignificance of the respondent's education variables (*Eddum1* and *Eddum2*) in Equation 1, although both are negative as expected (recall that the excluded category has the

highest education). Yet, when the guardian education variables are dropped (in equation 3), both Eddum1 and Eddum2 have higher absolute coefficients which are statistically significant and negative. Thus, they may be picking up the influence of the excluded variables for guardians education, especially because for most other variables the coefficients do not change after dropping the guardian education dummies. Similarly, if *Eddum2* alone is entered along with the guardian education dummies (equation 4), its coefficient remains significant and negative. Thus, the exclusion of guardian education dummies in equation 3 or that of *Eddum1* in equation 4 probably do not create any major bias.

For a check, when a linear probability model (eqn. 5) is run with the same variables as in eqn 1 in Table 5.5.1-1, *Eddum2* is found to have a negative and significant coefficient. From all these, it may be concluded that lower education of either the respondents and/or their guardians have the expected negative influence on labour force participation.

One last issue relates to the variable *Fmigdum*. The sign is, as expected, negative, but it is weakly significant, if at all. The same conclusion can be made on the basis of the LPM equation.

The present results may be compared with those estimated with national level data. There are both similarities and differences between the two. Age, marital status, and family size have similar influences in both cases. But the influence of land ownership and own education are different from that for national level estimates. Probably the explanation lies in the nature of the data. The national data reflects all kinds of employment (self-employment, wage employment, and unpaid family labour). The RMG data is for a specific industry and pertains only to wage employment. Thus the present estimates are picking up the characteristics of the industry. This may be the case with coefficient for own education as argued above.[72]

Results from other countries using similar approach (probit estimation) for analysing urban women's labour force participation may be compared with the

[72] Behrman and Wolfe's (1984) analysis based on Nicaragua data show similar differences in the effect of schooling depending on the aggregation of data. For the Central metropolis as a whole education has a negative effect on labour force participation while for the formal sector in the metropolis (employing mainly wage labour) the effect is positive. For the informal sector (which presumably includes self-employed), the effect of education is again negative, though not significant.

present ones. Dowling and Worswick (1999) for example, have analysed information from three Southeast Asian countries, namely Thailand, Indonesia and the Philippines. Their results indicate the influence of higher education, migratory status and burden of family chores (as reflected in number of children present) similar to those discussed above.[73]

5.6 Employment History in RMG Firms

5.6.1 Entry into an RMG Firm

In this section I discuss the experiences of the worker respondents in the process of getting employed in the RMG firms and also the situation that they face on the shop floor. One third of the sampled workers were offered a job straight away without a prior interview. Almost one-half of the workers had to undertake a test of operating a sewing machine, with one-quarter also having to take language and aptitude tests. Hence, education and experience may affect the offer of jobs by the employers. The analysis of wage differentials in Section 5.7 confirms the importance of these two factors.

5.6.2 Type of Job and Job Segregation by Gender

Workers do a variety of jobs in the RMG firms, but most of them are sewing operators. Practically all of the sewing operators are women. They are the technical and skilled persons. There are some semi-technical jobs for folding and ironing of dresses. Women in such positions are comparatively rare. The next most numerous groups are the helpers/apprentices and thread-cutters and persons who are called Polymen. The job of helpers is to help the sewing operators by moving fabric and sewn materials from one person to another or from one section to another. Thread-cutters simply cut the loose threads hanging from sewn fabric. Polymen put the folded garments into polythene or plastic wraps.

In terms of hierarchy, the highest category of workers is in the managerial and supervisory group. There are line chiefs and floors in-charge. A line-chief is in charge of one line of operation in the process of sewing a specific dress. There

[73] Note, however, that Dowling and Worswick (1999) have used fertility variables (number of children born during last 5 years and also number of births) as explanatory variables. As causality may run from labour force participation to fertility (see Chapter 7, Section 7.2) rather than the other way round, fertility may be an endogenous variable. The authors do not appear to have taken this issue into consideration. As a result, some of the coefficients may be biased.

may be several such lines in a floor under a floor-in-charge. Quality inspectors scrutinise the completed garments for sewing or other faults. They are supervised by Quality Controllers. Managers, of course, are above all other employees. They are generally men. Line-chiefs and floors in-charge are also generally men but women are also entering these posts. Quality inspectors are in many cases women, while Quality Controllers are less frequently so. There are of course other posts in the offices of the RMG firms such as accountants, clerks and officers in charge of purchases and personnel affairs who are mostly men.

5.6.3 Job Mobility

At the time of the survey, only one-third of the respondent workers were in the same RMG job that they had entered initially. Thus, once they join the RMG firms, women may not continue for long in one place. Usually there is a shortage of skilled hands in these factories. Workers get to know this and once they gain some experience in one firm, they switch to others for better pay. This is also occasioned by the factor that most (83 percent) joined the first firm in mainly manual categories of jobs. Practically, in all the cases, the first job had been temporary or probationary.

The number of job changes amongst the sample is as high as ten, but for 60 percent of the respondents it was four times at most. Sixty eight percent left the previous firm due to low salaries while nearly 23 percent did so because of irregular salary payments. Another 27 percent left to be nearer their residence. A substantial proportion (16 percent) of respondents left the previous job due to illness.[74]

As indicated above, most of the workers had joined the first firm in manual categories of jobs. Usually they try to move into better jobs as fast as possible for which they try to learn sewing operations. Nearly 42 percent are learning such work by doing it. There is also a substantial group of workers (20 percent) who are being taught how to operate sewing machines by their colleagues.[75]

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[74] For an analysis of the health situation of workers see Chapter 7, Section 7.7.

[75] These figures add up to more than 100, as there is more than one response per person.

As a result of such experience and job changes, the workers had promotions and salary rises over the period they had been in the job in the firms where they were interviewed. Table 5.6.3-1 shows the picture regarding job-mobility of workers since first joining the RMG firms. This depicts a picture of the upward mobility of the workers.[76] While the middle rank remained the major workforce, it is clear that manual workers have become technical or semi-technical job-holders over time while some of the latter, in turn, have moved to managerial/supervisory posts.

Table 5.6.3-1: Job Mobility of Workers (Number)

Job type	First RMG	Previous RMG at exit	Present RMG at entry	Present RMG at survey time
Manual	189	54	71	48
	(83)	(20.8)	(27)	(18)
Technical/semi-technical	36	92	140	151
	(14)	(36)	(54)	(58)
Supervisory-managerial	35	28	49	61
	(3)	(11)	(19)	(23)
First job	-	85	-	-
		(33)		
All (no.)	260	260	260	260

Note: Figures in parentheses are percentages of the column totals.

As a result of this job-mobility, the salary of the workers since joining has also in general increased. Nearly 35 percent have had no salary increases, probably because they are new workers. But another 30 percent had up to two promotions and nearly 21 percent had up to four promotions. The maximum number of salary increases for one worker was 11 times.

5.6.4 Workday Characteristics

Each factory has its own normal working hours, usually varying between 8-9 hours. But there was one with 11 hours of mandatory work. In addition, the workers often have to do overtime beyond the normal work hours. Overtime work has two characteristics, which have implications for total compensation received. If the overtime work is for two hours beyond normal closure time, workers are

[76] These figures may overstate the upward mobility, as these do not refer to those workers who may have left for the lack of such mobility. The extent of the upward bias could not be estimated, however, for the lack of relevant information.

given snacks. If they have to continue beyond two hours of overtime work and work at night, they are paid charges for night meals.

Workers receive half an hour to 45 minutes, sometimes extending up to an hour, for having daytime meals. They also generally receive up to 15 minutes each for snacks and tea and also for saying their prayers. There appears to be no other free time.

5.6.5 Leave Situation

Leave is allowed on permission although 12 percent of women were not sure if they had leave privileges. In all, 56 out of 260 working women took leave in the month preceding the survey. There was leave both with and without permission. Leave with permission was taken by 26 women while another 37 took leave without permission, normally only for 1-2 days, although in one case for up to 20 days. Reasons for leave vary. Own illness was a major reason (50 percent) while sickness of other members of the family accounted for nearly 25 percent of the cases. Apart from the leave without permission and hence without pay, pay may be withheld or cut for another reason. Generally in all RMG firms, if workers are late for 3 days, 1 day's pay is cut. The penalty for being late is rather heavy and workers try to avoid such penalties as much as possible. Nine persons admitted to have been penalised for being late in the workplace during the month preceding the survey.

5.6.6 Physical Environment in the RMG Factories

Generally, the shop floor in RMG factories is congested. There is a droning sound of sewing machines almost all the time. As fabric is continuously being cut, there is suspended particulate in the air much of the time. In one factory, I almost choked. Toilet facilities for men and women are separate, but generally not very clean. Furthermore, women need permission to go to the toilet because the management thinks that women congregate there to gossip and that would lower productivity.

Adequate fire protection systems were often absent at the time of the survey. There is usually one front (exit) door, which is often kept locked to prevent workers from leaving without permission. Fire accidents do happen and some garments workers, women in particular, die as a result, both through asphyxiation

and being trampled by others rushing out in panic. However, now every factory is obliged to provide fire escapes and insurance schemes are being put in place. The physical environment in the factories along with the living conditions of the workers, mean that many of them often fall sick, though they may not take leave for fear of losing salary. The health issues are analysed in Chapter 7, Section 7.7.

5.7 Wage and Earnings Differentials

5.7.1 Introduction

In this section, I explain the earnings and wage differentials using earning functions based on human capital theory. In doing so, I differentiate between the wage rate and earnings of a worker during the estimation. I shall first discuss the definitional and measurement issues for wages and earnings followed successively by the theoretical issues, particularly the human capital model of earnings, the econometric issues and finally the results and their interpretations.

5.7.2 Definition and Measurement of Wages and Earnings

In the literature on wage and earnings, the two are often not distinguished from each other (see Katz and Autor: 1999). In my sample, non-wage payments constitute nearly 29 percent of total take-home pay of working women. Because of this difference between wage and take-home pay I distinguish between the two in the subsequent analysis.

I have information on wages of workers at two points in time during the tenure of employment in the firm where they have been interviewed, first at the time of entry into the firm and second at the time of the survey. I therefore measure workers' pay in three ways. The first is the wage offered at the time of employment in the respondent's current factory. The second is the wage received at the time of the survey. The third is the actual earnings they received (wage plus non-wage payments) at the time of the survey.

The "Entry wage" is the pay the workers would receive if they worked normal hours during a month, at the time of their first employment in the current factory. In most cases, there is also a notion of what minimum quantum of work (say, sewing so many cuffs to shirts or folding so many pairs of trousers) they are supposed to do. Each factory has its own normal hours of work, usually varying between 8-9 hours. The entry-level monthly wage is divided by the normal total

hours of work in a month (assuming 25 working days in a month as there is one day off for weekends) to arrive at the "Entry time hourly wage". The second type of pay is the current wage, observed at the time of the survey for normal hours of work in a month. The "current hourly wage" is defined and measured analogous to the entry time hourly wage.

The above two are wages offered by employers and accepted by the workers. But in many cases, the women work longer than the normal hours and are paid compensation for overtime work varying between 1.25 to 1.5 times the normal base hourly wage rate[77] as well as snacks and charges for night meals in certain circumstances.[78] Actual total earnings or compensation may thus include the normal wage (adjusted for any leave of absence beyond normal leave due) *plus* overtime pay *plus* value of snacks *plus* charges for night meals. The total actual monthly pay so received is divided by the total hours worked (normal hours *plus* over time hours) to give the actual earnings per hour.[79]

Table 5.7.2-1 contains basic statistics on the three pay rates. The entry-level wage has a much broader range than the current hourly wage although the average value of the current wage is about a third higher (although no adjustment for inflation between the time of entry and the time of the survey has been made). The hourly earnings are also higher than the current wage rate by about 20 percent. Hence, if only the variation in wages is analysed, a large part of the variation in earnings may remain unexplained. Thus, to explain earnings differentials, the variations in both wage and total realised pay needs to be analysed.

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[77] For calculating the overtime pay rate, employers usually take 60 percent of the offered wage as the base rate. The 125-150 percent rate is then applied upon this base rate, *not* the full offered wage rate.

[78] The way it is calculated by the employer, the hourly rate for overtime may be lower than the hourly rate for the normal employment time. One may thus question why the workers do not leave the job and go elsewhere. In fact, there is high job-hopping as already mentioned. Furthermore, women are compelled by poverty to work and overtime are mandatory.

[79] For certain types of employees such as supervisors, floors in-charge and managers there is no separate overtime payment. Their salaries include compensation for extra time of work beyond normal hours. But they receive snacks and charges for night meals like all others for any extended stay in the work place.

Table 5.7.2-1: Wage Rates for Workers (Taka)

Wage type	Average	Standard deviation	Range
Entry wage/hour	5.23	3.11	0.71-28.00
Current wage/hour	6.97	3.59	2.35-28.00
Actual earning/hour	8.44	3.77	0.93-25.75
Actual earning/month	2231.13	1074.55	250-8499

5.7.3 Explaining Wage Differentials

In a perfectly competitive world, in which the firms are free to hire and fire and the workers are free to enter into a job or leave it, there will be a single wage for a particular class of labour in the market. In the real world though, people differ in their inherent ability to work for one reason or another while the firms are not free to hire and fire their workers at will, thus giving rise to wage differentials (Krueger and Summers: 1987; 1988). The reasons lie both on the side of the firms (demand for labour) and the workers (supply of labour).

When the firms differ in their non-wage job-conditions, such as the risks (of health impairment, injury or simple monotony) involved in the job, they may have to offer higher wages for such jobs to compensate for the "undesirable" job characteristics. This is the theory of the compensating job-differentials (Borjas: 2000, p. 201-225; Rosen: 1986, p. 641-692). For workers in the RMG, such characteristics may include, among others, hygienic conditions and distant location of factories which create problems particularly for working mothers (Chapter 8, Section 8.4), mandatory long working hours for mangers and supervisors and the like. However, I do not pursue this line of investigation because unless there is a large variety of firms and working conditions to investigate the theory cannot be tested properly. In the present case there are only 22 firms from which information has been collected. Also all RMG factories are similar to each other (except in attributes such as location). Furthermore, as my emphasis in the thesis is on the changes in the households, I focus on the household and the individual factors that may impinge upon wages and earnings of workers. In doing so, I use the analytical frameworks that rely on the attributes of the workers, particularly their capability to work as reflected in embodied human capital.

5.7.4 The Human Capital Model of Earnings

Human capital is conceptualised as the capability that persons acquire for carrying out activities due to investments in themselves. Such investment can take various forms (Schultz: 1961). Formal schooling is the most obvious form of human capital while good health is another. A third type of human capital, which is extremely important in the present context, is the experience that people gain in the course of their employment. Migration activity may also be called human capital because people "foresake the opportunities in one location in order to exploit those in another" (Bryant: 1992, p. 170). In each of these cases, the capability due to embodied human capital as reflected in schooling or job experience may raise the earnings of the individual concerned.

As human capital raises people's income or earnings, studies of earnings variation have used human capital as an explanatory factor. Although there are major contributions by Becker (1962) and Becker and Chiswick (1966), the huge empirical literature that has developed, to explain inequality in earnings, has its origin in the seminal contribution of Mincer (1974).[80] The core analytical tool in empirical investigations in both developed and developing countries is an earnings function (for major surveys see Psacharopoulos: 1994; Rosen: 1986; Schultz: 1988; Willis: 1986). The basic earnings function incorporating schooling is stated as

$$\ln E_s = \alpha + \beta S \qquad \ldots (5.7.4.1)$$

where,

S = completed years of schooling;

E_s = earnings with S years of schooling.

If job-experience is incorporated, the equation becomes

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 \qquad \ldots (5.7.4.2)$$

where X = years of experience.

The equations I estimate are of the following types:

[80] For comprehensive surveys of this issue see Willis (1986) and Card (1999).

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 \quad \ldots (5.7.4.3a)$$

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 + \rho J + \tau(S*X) \quad \ldots (5.7.4.3b)$$

In equation (3b), type of job done (J) and interaction terms for schooling and job-experience (S*X) are included. The derivation of the equations is shown in Appendix 8.

Before passing on to estimation, two new strands of literature should be mentioned, although I shall not try to investigate them for lack of sufficient data. The first of these refer to the possible non-linear effect of schooling on log wages. The above formulations (say, 5.7.4.3a and 5.7.4.3b) depend on the assumption that each additional year of schooling adds to (log) earnings by the same amount. This may not be true. The return to secondary education may be different from that to primary education. Furthermore, it has been observed that within a given level of schooling, the completion of the last year's education which is marked by the receipt of some certificate or diploma (say, five years for primary) has a disproportionate effect on earnings. This is called the "sheepskin effect" (Gibson: 2000; Schady: 2001). The nature of the data in the present situation does not allow me to test for the sheepskin effect.

The second issue is, in fact, an old one. This relates to the possible confounding effect of the inherent ability of a person which may differ from person to person for genetic, family upbringing and environmental, reasons. It may be argued that education itself is influenced by ability, i.e., ability and schooling may be correlated because it is easier for more able students to acquire more schooling. Thus, returns to education, at least partly, may reflect the returns to ability. Therefore, unless ability is controlled for, the estimate of the returns to education may be upward biased. Controlling for ability, however, may prove difficult because it is usually unobserved. The human capital literature is full of attempts to disentangle the effects of schooling from that of ability.[81] The debate is still continuing (Arrow, Bowles and Durlauf: 2000; Knight and Sabot: 1990) and the overwhelming conclusion so far appears to be that education has an

[81] Attempts have been made to control for ability by investigating samples of twins and siblings (Ashenfelter and Krueger: 1994; Ashenfelter and Rouse: 2000; Ashenfelter and Rouse: 1998), and using IQ scores and cognitive ability (Cawley *et al.*: 2000; Griliches: 1977; Willis and Rosen: 1979) as indicators of ability and a host of family-related variables (Ashenfelter and Rouse: 2000). For developing country applications see Jolliffee (1998) and Mwabu and Schultz (1996).

influence on earnings capability and that is independent of other factors such as ability.

5.7.5 Econometric Considerations

There are several econometric issues in the estimation of a wage equation. First, wages are observed only for participants in the labour market. Using information only from such a group of people introduces selectivity bias in the wage equations. Modeling such selectivity and correcting for it has already been discussed at length in Section 5.5.2 in this chapter and will not be repeated here. Suffice it to say that I use the selectivity correction factor estimated from equation 4 in Table 5.5.5-1 in that section.

The second issue relates to the treatment of education. In a life-cycle analysis, investment in education depends, among other things, on the potential earnings for that level of education (see Weiss: 1986 for a survey). The acquired level of education is thus endogenous to the system. However, in the present situation, I am assuming that as RMG employment is comparatively new, and many of the women have only recently migrated to Dhaka for such employment, their education may be treated as exogenous. If RMG continues to be a growth industry in the future, and employs a substantial body of women, probably, such a life-cycle analysis with education as an endogenous factor may be necessary.

The third factor is health of the worker, which affects their productivity and thus wage. At the same time, depending on the level of wages, they may be better able to care for their health. Health and wages therefore become endogenous. The health issue in the wage equation is dealt with in Chapter 7, Section 7.7.

The fourth issue relates to the treatment of inherent ability and family background. Given that most of the respondents have come from a poor background, it is not implausible to assume that they will have rather similar family backgrounds. Most of the respondents were educated only up to the mid-secondary level, while the influence of inherent ability perhaps becomes clearer at higher levels of education (particularly specialised education at college or university level). If so, even if there is a correlation between ability and schooling, it is likely to be small and thus may not bias the results in a major way for the present sample of working women. I have therefore treated ability as an

unobserved variable and subsumed it within the error term that is assumed to have the usual properties.

5.7.6 Empirical Estimation

Dependent variables

Three types of dependent variables have been used for understanding the differentials in earnings and wage. The first one is the hourly wage at the time of entry into the present factory, the second is the hourly current wage and the third is the total actual earnings. I have used the natural logarithms of these quantities as the dependent variables. The third dependent variable cannot be entirely satisfactorily translated into hourly equivalents for all the respondents. This is because managerial and supervisory staffs do overtime almost on a mandatory basis but they are not paid any additional amount except the snacks and night meals, when applicable. They therefore do not keep track of actual hours beyond normal factory timings and could not report as such during interview. As these are the people who are the highest paid, their exclusion may create systematic bias in the results. I have, therefore, first used the hourly total earnings (including overtime payments and values of snacks and meals) of respondents excluding the managers and supervisors. But additionally, to avoid the bias due to the exclusion of this group, I have also analysed the total monthly earnings which takes care of the problem of estimates of hours worked by the managers and the supervisors.

Explanatory variables

The explanatory variables that have been used are described below.

Education variables: Two education variables are used, *Eddum1* and *Eddum2* which have been defined as in Section 5.2.4 in this chapter. As *Eddum1* is the lowest level of education, it should have less influence on wage/earnings than the reference group's education (beyond 10 years). Thus, *Eddum1* is expected to have a negative coefficient indicating that the lower education compared to the reference group attracts lower wages. The same applies to the coefficient of *Eddum2*.

Job experience variables: I have used two types of job-experience variables. For the entry wage, it is previous experience of RMG job. This is the variable,

Prevexp, measured in years of previous RMG experience. It is expected that persons with longer relevant job experience, given other things held constant, will be offered a higher wage. Thus, the coefficient is expected to be positive.

For explaining the current differentials in wages, the relevant job experience variable is the total RMG experience again measured in years and indicated as *Lenrmg*. Like *Prevexp*, the variable is expected to have a positive coefficient. One may argue that the relevant variable is the experience at the current factory. This was tried but had poor explanatory power, possibly because there is not much firm-specific training. Skills learnt in one RMG factory apply equally well at another as the technology is standardised.[82]

The square terms of the experience variables (*Prevexp-sq and Lenrmg-sq)* are added to the relevant equations (all the equations in Table 5.7.7-1). These are expected to have negative coefficients. This means that as experience increases, the return will be higher but at a decreasing rate. This may be so because demand for necessary skill may change over time. While experience is valued, those with long experience may no longer be adept at acquiring new skills lowering the demand for their service and thus their earnings.

Job type variables: Workers in RMG factories, as discussed in section 5.6.2 in this chapter, have different kinds of skill and are employed in different kinds of jobs that may be categorised into three types. These are manual, technical and semi-technical, and managerial and supervisory jobs. The manual jobs are the least remunerative followed by technical and semi-technical (mainly sewing operators) and managerial/supervisory in that order. But again, exact earnings will vary depending on other factors. To consider the effects of job-type, two sets of variables have been constructed. *Manual1* is a dummy variable having a value of 1 if the entry job was a manual one and zero otherwise. Similarly *Skill1* is a variable denoting a value of 1 if the job at entry was technical or semi-technical, zero otherwise. The interpretation of the coefficients of these dummy variables is similar to those for the education dummies.

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[82] The broad difference in technology is that between knitwear and sewn garments. All of the present sample, except two, are sewing factories. In knitwear firms, generally male workers do work on the knitting machines while women do the sewing after the knitting of the fabric. In the sample, respondents in knitting firms are from the sewing and other sections, not the male-dominated knitting section.

For the entry time wage, it is expected that the manual jobs will be offered lower wage than others. Thus, *Manual1* will have a negative coefficient. For *Skill1*, similarly a negative coefficient is expected.

For current job-types, two variables, *Manual2* and *Skill2,* have been defined in a manner analogous to *Manual1* and *Skill1*. Thus, these two variables are used in the case of explaining hourly normal wage at the time of the survey. Following the reasoning in the preceding paragraph, the expected coefficients for *Manual2* and *Skill2* are both negative.

Selectivity correction variable: This is the Heckman's correction factor that is applied on the basis of the selectivity into labour force that has been discussed in section 5.5.2 in this chapter. This is shown as *Lambda.* Note that Lambda is used to take care of the problem of specification error due to omitted variables. Hence if it is insignificant, this should mean that there is no specification error due to omitted variables.

5.7.7 Estimates of Earnings Functions

The means and standard deviations of the variables used in estimation of the earnings functions are shown in Appendix 9, Table A9-1. The results for the entry and current hourly wages are shown in Tables 5.7.7-1 to 5.7.7-4. Note first that the correction factor is not always statistically significant which means that the exclusion of *Lambda* does not bias the results. Hence, in some of the equations this variable has been dropped.

Entry wage equations

Table 5.7.7-1 shows the entry wage equations. Equation (1) shows the basic earnings function incorporating the selection variable, *Lambda.* Equation (2) adds the job-type variables. In both the equations, *Lambda* is insignificant. So, in equation (3), *Lambda* is dropped. In this equation the education variables were at most weakly significant. To see if interaction terms could improve the equation, the interaction terms of education and experience variables were introduced in equation (4) which resulted in significant coefficients for education variables although the explanatory power of the equation remained unchanged. For equations 2-4, there is not much change in the values of the coefficients.

Table 5.7.7-1: Earnings Functions for Entry Wage per Hour

Explanatory vars	Eqn. 1	Eqn. 2	Eqn. 3	Eqn. 4
Eddum1	-0.45***	-0.16	-0.16*	-0.20*
(primary=1)	(4.76)	(1.43)	(1.77)	(1.93)
Eddum2	-0.29**	-0.13	-0.14	-0.23**
(Mid-secondary=1)	(2.71)	(1.16)	(1.55)	(2.14)
Prevexp	0.19***	0.12***	0.11***	0.09***
	(6.78)	(4.17)	(4.73)	(3.06)
Prevexp-sq	-0.008***	-0.004	-0.005**	-0.005**
	(2.98)	(1.54)	(2.45)	(2.40)
Eddum1xPrevexp				0.02
				(0.90)
Eddum2xPrevexp				0.03
				(1.54)
Manual1		-0.71***	-0.76***	-0.77***
(Manual =1)		(6.18)	(7.78)	(7.83)
Skill1 (Skilled=1)		-0.23**	-0.23***	-0.24***
		(2.26)	(2.65)	(2.71)
Heckman's lambda	-0.13	-0.09		
	(1.32)	(0.97)		
Constant	1.56	1.75***	1.75***	1.79***
	(18.90)	(22.16)	(25.51)	(22.93)
Adj. R-sq	0.436	0.549	0.537	0.538
F-statistic	30.64***	34.39***	50.25***	38.05***
N	193	193	256	256

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***,** and * denote statistical significance of the relevant statistic at 1, 5 and 10 percent respectively.

Consider now equation 1, the basic earnings function. Coefficients of all the variables have the expected signs and are also statistically significant. Equations 2-4 show that when the job-type variables are entered, their coefficients are significant and negative as expected. But, the coefficients of both the education variables and the experience variables fall somewhat in absolute values, those of education more drastically. This indicates that at the time of entry both education and experience may have been used, among others, to assess the would-be employee's suitability for the specific job.[83] However, while the experience variable retains its statistical significance, education variables become

[83] If higher level of jobs requires higher levels of education, employers may use the latter to screen potential employees for specific jobs. If so, the returns to education may not actually be due to education *par se*, but to presumed superior ability of the aspirant for the specific job. As Psacharopoulos (1994) notes, the debate has remained inconclusive.

insignificant. In equation 4, where both the job-types and interaction variables are entered, the education, experience and job-type all variables have significant coefficients with the hypothesised signs. The interaction terms are, however, not significant.

To test if the insignificance of the education variables in equations 2 and 3 is due to multicollinearity, the bivariate correlation coefficients between education and job types have been estimated. The correlation between *Eddum1* and both of the job types are small (0.19-0.21) but are statistically significant at 1 percent. Similarly, the correlation coefficient between *Eddum2* and the job types are small while it is significant only for manual jobs but not for semi-technical/technical jobs. Thus, while the correlation coefficients are not high, their systematic behaviour (i.e., statistical significance) may have caused the coefficients of the education dummies to be insignificant.[84]

To interpret the results (see Psacharopoulos: 1994, p. 1325-26)), I use the basic earnings function (i.e., equation 1) by way of illustration. The average log entry wage for the highest educated (controlling for previous experience) is given by the constant term, which is 1.56. Following Halvorsen and Palmquist (1980), for *Eddum1*, it is 1.56-0.45 = 1.11 and for *Eddum2* it is 1.56-0.29 = 1.27. Taking anti-logs, the average wages (keeping other factors fixed) are:

for up to primary = exp (1.11) = Taka 3.03 per hour;

for 6-10 years of schooling = exp (1.27) = Taka 3.56 per hour; and

for schooling beyond 10 years = exp (1.56) = Taka 4.76 per hour.

Here exp(.) denotes raising to the power of *e*.

The highest educated, thus, received an average wage offer which is 57 percent higher than for the least educated while compared to the mid-level educated persons, they received 34 percent higher offers. Those with 6-10 years of schooling earned on an average 17.5 percent higher than those educated only up to primary level.

[84] The substantial change in the absolute value of the coefficients of the education variables itself is a sign of multicollinearity although the bivariate correlations are not high (Ramanathan: 2002, p. 217).

How do these results compare with others elsewhere? Note that, the above estimates are strictly speaking the marginal wage effects of, *not returns to*, schooling (Psacharopoulos: 1994). In particular, the marginal wage effect between primary schooling and other levels may not be interpreted as returns to schooling as primary school-goers have no opportunity cost as argued by Psacharopoulos (1994).[85]

Psacharopoulos (1994) cites estimates of returns to education in various countries. There are only a few from the low-income countries. As the present estimates are marginal wage effects, these are not comparable to those cited by Psacharopoulos (1994) who reports a global pattern of highest return to primary education. Yet the present estimates of the marginal wage effects possibly indicate higher returns to education above secondary level compared to primary or secondary education.[86] Sahn and Alderman (1988), report similar higher returns for higher education in Sri Lanka. Siphambe (2000) finds a higher return for higher education in relation to its previous lower level for Botswana. Estimates by Behrman and Wolfe (1984) for Nicaragua also indicate higher returns for higher levels of schooling. They also stressed the need for utmost caution in interpreting results based on aggregate data for a country rather than information specific to men and women, formal and informal sectors, and rural and urban areas.

A possible reason for the higher marginal wage effects for higher levels of education in the present case is that much of the work done in a readymade garment factory is skilled and technical demanding education somewhat higher than the average. In the present sample, the proportion of those educated beyond high school (above 10 years) is small (18 percent), thus also probably earning a premium.

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[85] However, primary education is not costless. A point therefore arises as to how such costs may be incorporated in estimating the rate of return to education. This remains an issue for future research.

[86] The precise estimation of rates of return to education is not possible here because the exact number of years of schooling is unknown. But noting that barring very few, the women workers had at most a higher secondary education, this will mean 2 years beyond the tenth class. Assuming a mid-value for both the primary and mid-level education, these will indicate three and eight years of education. If so, the average rates of return to secondary and higher education are equal to 3.5 percent and 8.4 percent respectively. These are certainly not high rates of return. But, note that if education is the key to get into the job initially, the rates here are possibly underestimates when judged against the backdrop of the rest of the economy. In any case, this is clearly a matter for future research.

The coefficients of experience (*Prevexp)* and squared experience variables indicate the returns to each additional year of experience. Keeping other variables constant (in equation 1), each additional year of experience results in an additional wage offer of Taka 0.69 or 15.4 percent higher per hour for an average worker. This indicates a significant influence of each additional year of experience for the average worker across education levels.[87] As indicated in section 5.6.3 in this chapter, most (83 percent) of the respondents began their career in RMG factories at the lowest rung on the job ladder. It is because of the experience that many of them have moved up in position and level of compensation.

Two previous studies in Bangladesh have tried to estimate the wage equation for RMG workers (both men and women) (Hossain and Brar: 1986; Zohir and Paul-Majumder: 1996). The earlier study found positive and significant coefficients for both education (.07) and experience (.07), but did not correct for selectivity bias for participation in the labour market.[88] Zohir and Paul-Majumder estimated an earnings function with log of monthly pay as the dependent variable. The lack of normalization for hours worked and attention to selectivity bias create problems in interpretation of the coefficient. Given this caveat, the results indicate a16-25 percent difference in marginal wage by education categories. If so, the results of this study indicate higher marginal wage differences than before.

For job-types, the coefficients of which are interpreted in a manner analogous to the education dummies, the implications are clear. The manual workers receive the lowest offer followed by the technical workers (relative to the excluded category of managerial workers). Using equation 2 in Table 5.7.7-1, the estimated offer received by manual workers on the average was Taka 2.83 per hour compared to Taka 4.57 for skilled and Taka 5.75 for managerial/supervisory jobs.

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[87] To derive the marginal influence of experience, partially differentiate the log wage with respect to experience which gives (putting the average value of *prevexp* = 2.887).
As $[\partial (\text{log wage}) / \partial (prevexp)] = 0.19 - 2 * (0.008)*(prevexp)$, this shows that the actual absolute increment in wage due to experience is dependent on the initial experience the worker has.
For the person with average length of experience, the estimated change in log wage (putting the value of average experience in the expression above) is 0.144. Average ln(entry wage) =1.4998. Hence average entry wage = $e^{1.4998}$ = Tk.4.48 per hour. An additional year's of experience leads to average log wage of 1.4998 + 0.144 = 1.6438. The average wage after change is thus, $e^{1.6438}$ = Tk.5.17. The value of an additional year of experience is thus [(5.17-4.48)/4.48]*100 = 15.4 percent over the average wage.

[88] The present sample does not show selectivity bias. But it should not be construed to mean that another sample at another time may not show such bias.

The highest paid on the average thus received an offer more than twice the rates for the lowest paid when the influence of all other factors was held constant.

With the addition of the job type variables, the interpretation of the coefficients of the education dummies changes. These now reflect the marginal wage effects within occupation. The fact that the size and significance of the education dummies falls so much, despite the absence of high multicollinearity, indicates that much of the role of education is probably in sorting workers into different types of occupation. The experience coefficients also fall somewhat when job type variables are included but remain positive and significant. While the interactions themselves are not significant, their signs are positive indicating that within each education type, experience may reinforce its influence positively.

Current wage equations

Table 5.7.7-2 shows the earnings functions for current wage per hour. Equation 1 in the table is similar to equation 1 under Table 5.7.7-1 and is interpreted in an analogous manner. Those with highest education currently receive 57 percent higher than normal wages compared to the least educated while compared to the secondary educated ones it is only 16 percent higher.[89] Thus while the difference between the least and the highest educated remain unchanged, that between the secondary and highest level falls. Similarly the premium due to experience is lower as each additional year of experience results in only 9 percent higher wages for the worker with average years of experience.[90]

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[89] The procedure for computing the difference is exactly the same as before. Thus, the average log wage per hour for the highest educated is given by the constant term which is 1.69. The anti-log is given by exp(1.69) = Taka5.42. For the least educated the log wage per hour is 1.69 - 0.35 = 1.24 the anti-log of which is exp(1.24) = Taka3.45. Compared to the least educated, the highest educated thus gets [(5.42-3.45)/3.45)]*100 = 57 percent more.
Similarly the average wage offer for those educated between 6-10 years is exp(1.69-0.15) = Taka 4.66 per hour. The highest educated thus gets [(5.42-4.66)/4.66)]*100 = 16 percent more

[90] The change in log current wage per hour due to change in *Lenrmg* is
As [∂ (log wage) / ∂ (*Lenrmg*)] = 0.14 – 2 * (0.005)*(*Lenrmg*) = 0.0866 for average *Lenrmg* (5.34 years). The average ln (current wage) = 1.83; so, the average current wage is exp(1.83) = Tk.6.23/hour. For an additional year of experience, the ln (current wage) is 1.83+0.0866 = 1.9166. So, average wage after an additional year of experience is exp(1.9166) = Taka 6.80. So change in average wage due to one additional year of experience is 9 percent over the average wage.

The inclusion of the job-type variables in Table 5.7.7-2 (equation 2), again, renders the education coefficients insignificant.[91] The insignificance lends support to the interpretation of education as possibly a screening factor for the employer to understand the employability of a worker. But once employed, this becomes a fixed factor and may not directly influence wage offers any more. It may, however, still retain some influence indirectly as the coefficient of the first interaction term shows. The sign is unexpectedly negative, but possibly may be interpreted to indicate that neither education without much experience, nor experience without much education, is of much value to the employer.

Table 5.7.7-2: Earnings Functions for Current Wage per Hour

Explanatory vars	Eqn. 1	Eqn. 2	Eqn. 3	Eqn. 4
Eddum1	-0.35***	0.01	-0.06	0.06
(primary=1)	(4.62)	(0.16)	(1.06)	(0.73)
Eddum2 (Mid-secondary=1)	-0.15*	0.09	0.009	0.05
	(1.68)	(1.21)	(0.15)	(0.52)
Lenrmg	0.14***	0.03	0.03***	0.09***
	(5.83)	(1.23)	(6.84)	(4.66)
Lenrmg-sq	-0.005***	0.0006		-0.002**
	(2.93)	(0.38)		(2.44)
Eddum1xLenrmg				-0.03***
				(2.94)
Eddum2xLenrmg				-0.02
				(1.40)
Manual2 (Manual =1)		-0.92***	-0.86***	-0.84***
		(10.43)	(12.81)	(12.34)
Skill2 (Skilled=1)		-0.30***	-0.25***	-0.25***
		(4.35)	(4.73)	(4.61)
Heckman's lambda	-0.16**	-0.08		
	(2.08)	(1.19)		
Constant	1.69***	2.04***	2.00***	1.85***
	(21.77)	(28.83)	(41.31)	(27.54)
Adj. R-sq	0.406	0.626	0.646	0.657
F-statistic	27.64***	47.67***	95.04***	62.79***
N	196	196	259	259

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***,** and * denote statistical significance of the relevant statistic at 1, 5 and 10 percent respectively.

[91] As for the entry wage, for the current wage equations, the correlation coefficients of Eddum1 with job types are both small (0.18-0.28) but statistically significant while for Eddum2 these are small (-0.1- 0.11) but not significant.

Realised earnings equations

The results for the total actual wage per hour and total actual monthly pay are shown in Tables 5.7.7-3 and 5.7.7-4. The conclusions based on Tables 5.7.7-1 and 5.7.7-2 remain largely valid.

Table 5.7.7-3: Earnings Functions for Total Earnings per Hour

Explanatory vars	Eqn. 1	Eqn. 2	Eqn. 3	Eqn. 4
Eddum1	-0.34***	-0.009	-0.11	0.09
(primary=1)	(4.65)	(0.10)	(1.54)	(0.99)
Eddum2	-0.17**	0.05	-0.02	0.02
(Mid-secondary=1)	(2.04)	(0.59)	(0.35)	(0.23)
Lenrmg	0.15***	0.05**	0.06***	0.10***
	(6.37)	(2.11)	(3.78)	(5.05)
Lenrmg-sq	-0.007***	-0.001	-0.002**	-0.003***
	(3.65)	(0.79)	(2.04)	(3.20)
Eddum1xLenrmg				-0.05***
				(3.83)
Eddum2xLenrmg				-0.02
				(1.47)
Manual2 (Manual		-0.75***	-0.69***	-0.68***
=1)		(7.45)	(8.61)	(8.82)
Skill2 (Skilled=1)		-0.26***	-0.20***	-0.17***
		(3.30)	(3.13)	(2.68)
Heckman's lambda	-0.13	-0.06		
	(1.59)	(0.81)		
Constant	1.54***	1.85***	1.81***	1.66***
	(20.44)	(24.27)	(30.54)	(22.30
Adj. R-sq	0.43	0.586	0.576	0.603
F-statistic	25.02***	33.36***	49.72***	41.78***
N	161	161	216	216

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***,** and * denote statistical significance of the relevant statistic at 1, 5 and 10 percent respectively.

Table 5.7.7-4: Earnings Functions for Total Earnings per Month

Explanatory vars	Eqn. 1	Eqn. 2	Eqn. 3	Eqn. 4
Eddum1 (primary=1)	-0.29***	0.03	-0.08	0.08
	(3.47)	(0.29)	(1.11)	(0.80)
Eddum2	-0.15	0.06	-0.002	-0.03
(Mid-secondary=1)	(1.50)	(0.67)	(0.03)	(0.28)
Lenrmg	0.15***	0.04	0.04**	0.07***
	(5.48)	(1.34)	(2.03)	(2.93)
Lenrmg-sq	-0.007***	-0.001	-0.0008	-0.002
	(3.41)	(0.51)	(0.77)	(1.52)
Eddum1xLenrmg				-0.04***
				(2.75)
Eddum2xLenrmg				-0.005
				(0.32)
Manual2		-0.86***	-0.82***	-0.83***

(Manual =1)		(7.98)	(9.42)	(9.66)
Skill2 (Skilled=1)		-0.24***	-0.22***	-0.20***
		(2.91)	(3.29)	(2.91)
Heckman's lambda	-0.18**	-0.10		
	(2.02)	(1.33)		
Constant	7.47***	7.80***	7.78***	7.67
	(86.01)	(90.86)	(115.91)	
Adj. R-sq	0.281	0.468	0.491	0.508
F-statistic	16.24***	25.51***	42.54***	34.29***
N	196	196	259	259

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***,** and * denote statistical significance of the relevant statistic at 1, 5 and 10 percent respectively

5.7.8 Concluding Remarks

The above results confirm once again the importance of education in terms of employability of workers and also in fixing their wage. The relevance of on-the-job experience has been brought out. Over time, once employed, this becomes a more important factor than education in determining the wage one gets. Admittedly the apparent rates of return to education and experience are not high. However, two points should be borne in mind. The rates refer to a specific industry where both education (somewhat higher than average) and skill are necessary to get into most of the jobs. As the RMG wages are somewhat higher than elsewhere (as shown in Section 5.3.4 in this chapter), the estimated rates of return to education are likely to be underestimates. Furthermore, while skill is in much demand, there is no dearth of supply of women to try their luck. This allows the employers to keep the wages low thus depressing the returns both to education and experience. Finally, the issue of gender gap in wages cannot be overlooked as this is a reality which may again depress the returns. Given these caveats, and that the marginal wage effects are large, the policy implications point to the importance of education and facilities for training in relevant jobs for women to get a better deal.

5.8 Summary

In this chapter I have tried to describe and analyse the situation of women at work. This has been done both at the macro level using national aggregate data, and also on the basis of information obtained from respondents in the sample survey that I specifically carried out for this purpose. At the macro level, the focus has been on the comparison between the rural and urban labour markets with special emphasis

on gender differences. At the micro level, the analysis focused on the situation of women working in the RMG firms in the capital city.

The macro level analysis has brought out the differences in the labour market behaviour of men and women. The patterns of LFPR are similar to other countries in Asia at similar levels of development, e.g., India. More importantly, it has been shown that men and women differ in their response to various exogenous variables while participating in the labour market. Thus, for women, marriage, larger family size and number of infant children discourage them from labour market participation while for men these are no deterrents. Education has a positive effect on women's labour force participation but not so in the case of men.

Based on the sample survey data, it has been found that women migrate to take advantage of better economic opportunities as reflected in the rural-urban wage differentials. The tendency to migrate for economic reasons is more pronounced among recent migrants compared to early migrants who had been more of tied movers.

The analysis based on sample survey data confirms the negative roles played by marriage and family size on women's labour market participation as found from the macro level information. The role of respondent's migration experience is positive, which is consistent with the wage differential hypothesis behind migration.

Own education played a positive role in women's tendency to enter the labour market. So did the education of parents or husbands as have been found in the case of macro level analysis. The role of non-labour income, as reflected in ownership of land, is not clear, possibly due to the lack of control of women over such resources. This is an area for future research.

A human capital approach has been used to explain the wage differentials among women workers in RMG firms. Using information on actual length of experience, wage offers and realised earnings have been explained by levels of education, work experience, and the type of job done. While inherent ability was not controlled for, the estimates were corrected for selectivity bias. The importance of education and job-experience has been brought out by these estimates. Education appeared to be more a screening factor in initial employment

while later on experience mattered more. Yet, on the whole, if there is one variable whose influence seems to be pervasive, it is education.

The labour market participation by women means a reallocation of their time away from home production and leisure. They may have to substitute one for the other given the fixed market time. The earnings of women also allow them to allocate the new financial resources in various ways, provided they have control over these resources. The next chapter discusses and analyses these issues of allocation of time and resources within the household.

CHAPTER 6
CHANGES IN TIME AND HOUSEHOLD RESOURCE ALLOCATION

6.1 Introduction

I investigate three broad questions in this chapter. Firstly, how time is allocated among various home production activities, given the time devoted to market work by the working women? Secondly, what is the nature of the financial management, and consequent impact on intrahousehold allocation of resources in the working women's households? Lastly, what is the impact of women's earnings on quality of life in their households?

Evidence from various countries indicates that even when women are involved in market work for income, they continue to bear the main burden for activities at home such as cooking, child care, house cleaning and the like (Glick: 1999). I examine if this is also true for the working women in my sample. Secondly, I assess whether the nature of market work and the characteristics of the individual and the family have any bearing upon the allocation of time for home production and purely personal (such as sleep) time. Such analysis may indicate if changes in attitudes have occurred regarding roles of men and women in the household, particularly when women work for income outside the home.

The control by a woman over her income in Bangladesh, where previously she had none, is itself a major social change and thus a matter of serious investigation in its own right. Apart from this, women's control over her earnings may have a second round of effects through its impact upon allocation of resources such as food (Pitt, Rosenzweig and Hassan: 1990). The allocation of food can exert a third round effect on the nutritional well-being of household members, particularly children and consequently on the productivity of the second generation of workers. Changes in intrahousehold resource allocation are, therefore, important issues for policy especially from the point of view of national welfare. The two main questions that I attempt to answer in this chapter therefore are: do women pool their income with others or control their own income? If they do one or the other, does this change the expenditure on food and thereby change the nutritional level in the household? I also look at the patterns of other expenditure that may be affected by such behaviour.

There is a third reason for the investigation of pooling and control of income. In the economics literature, pooling behaviour is inferred indirectly from other data (Thomas: 1990). By contrast, using direct information on pooling the findings here show that the control over resources may be a complex phenomenon. Hence indirect inferences about pooling and consequently the nature of the household (i.e., if these are unitary or collective) that are common in the literature (see Chapter 2) may not necessarily hold.

One aspect of financial management is the allocation of financial resources between consumption and savings. During the discussion on management of financial resources, I therefore also analyse the patterns of savings by women. Some of the earnings and savings may have gone into raising the physical quality of life of the working women's households. I have therefore subsequently compared the standard of living both over time for the workers and the differences between the workers and the control women's households.

The present chapter is organised as follows. Section 6.2 is devoted to the analysis of the division of time between market, home production and personal time (or leisure). Section 6.3 analyses household financial management, particularly pooling of earnings. The analyses of impact of pooling on allocation of other resources are in Section 6.4. Savings and credit behaviour is analysed in Section 6.5. Lastly, Section 6.6 investigates the standard of living of the samples of women workers and those in the control group.

6.2 Time Allocation between Paid Work and Household Work

6.2.1 Introduction

Time is a resource, which the members of a given household may distribute among various activities to maximize their utility (Chapter 3). While it is possible simultaneously to determine the allocation of time between market work and different home production activities, I use a sequential two step procedure. The interest here is in the allocation of non-market (home) time among various activities. In the first step, the division of total time for the market and home production is analysed. The home production time is analysed in the second step.[92] The first stage analysis of division of time between market and home

[92] For a direct analysis of home production time and its value see Gronau (1980).

production has already been carried out in Chapter 5. Here I shall analyse only the second stage. As the analysis depends on information from both the main survey (which has been reviewed in Chapter 4) and a supplementary survey, I first discuss the nature of the latter.

6.2.2 The Nature of the Supplementary (Time Use) Survey

A time use survey among a sub-sample of workers was conducted to generate the necessary information for the present analysis (see also Chapter 4). Sixty-five working women were approached for the information on time allocation. Of the sixty-five, information from one household has not been used as it has been found that this relates to that of a woman who has just left the job. Thus strictly speaking she no longer satisfies the criteria of a working woman. The present analysis therefore is based mainly on the information from households of the sixty-four working women.

The size of the time use survey is small mainly because it has been found to be a very much time-consuming exercise compared even to the main survey for several reasons. First, the collection of information on time-disposition takes a very long time as there are many activities, some of which are carried out jointly with others (child care and watching TV at home), some are strictly mutually exclusive (prayer and eating meals) while some may be done jointly or separately at the discretion of the person involved. I had to carefully sort these out so that the total time reported matches 24 hours. This had to be done at the time of the interview. Secondly, the exercise has been done in some cases twice or even three times, once for the respondent, once for men and lastly for the senior women. Third, as men could not always be easily found, several trips particularly during the late evening were needed to the household just to complete one interview schedule.

Apart from the information on time-disposition, all other information is qualitative. Given that the sample is small, I have tried to understand the processes and the types of problems women face rather than amassing information for specific statistical analyses. The results based on the supplementary time allocation survey should therefore be taken as indicative rather than definitive.

6.2.3 Types of Activity

The questions on time allocation were divided into 26 types of activities, some of them carried out jointly, some independent of others either by choice or given the nature of the activity. A list of these activities is provided in Appendix 10. The twenty-six types of activities are divided into three broad categories. These are: market work, home production and personal time.

Group 1: Time devoted to paid market work

This includes actual time spent in the factory and time to travel to the work place and back. Sometimes, the respondent's residences are near the factory and they go back home during lunchtime. Strictly speaking this is a break in work and has also been included in paid work time. The difficulty is that part of this time may be used up in child care, prayer or even rest. Yet, the whole of this was included within market time, as the employer has already purchased it. This points to the capability of the respondents to mix times for different activities, which blurs the usually neat division one finds in the literature between paid market work and home production. The apparent malleability of time, of course, arises because the factory managers allow their workers to use their lunchtime outside the work place and the workers sometimes take advantage of the nearness of their residence. On the other hand, the location of residence itself may be a conscious choice by the workers as analysed in Section 8.4 in Chapter 8.

Group 2: Time for home production

This comprises most of the activities at home and includes time devoted to all kinds of activities such as cooking, fetching or storing of water, all kinds of cleaning activities, child care, and time for the purchase of food and other items for consumption or processing at home. As indicated above, if child care time overlaps with the lunch break when mothers come home for a while this is not included in time disposition. But if the idea is to estimate a child care production function (which I do not attempt here), this time (during lunch break) should be included. Similarly, if children have been taken to school during the trip to work, this has not been included under home production, but under travel time to work place. Where it is possible to identify the extra time needed to take children to

school over and above that needed for travel to work, the extra time has been included under home production.

Group 3: Personal time

There are two kinds of personal time use. Some are strictly personal such as activities related to personal hygiene, prayer time and sleeping time. Others are personal but may be done in association with others. The time for social activities (visiting friends) or amusement (watching TV) may be spent in association with others in the family or those outside. All these are combined together. These personal time uses may occasionally be mixed with home production such as cooking and child care. Hence, it is not possible to disentangle them completely.[93]

One particular caveat, apart from the problems of recall and that of categorisation under one head or the other due to jointness, applies here. The data refers to just 24 hours recall. It may be that the last 24 hours have been atypical. In such a situation the pattern may not adequately reflect the situation of women's time allocation. On the other hand, however, there are two considerations. The time of the supplementary survey overlapped mainly with the second quarter of the year when the normal third quarter rush (to fulfil orders by September for the Christmas) had not yet begun while the subsequent lull of the previous quarter (after Christmas) was completely over. Thus, the timing of the supplementary survey may be taken to be a typical one. Secondly, even if this is atypical, it may have its own value in understanding the stresses women have to face in rationing their limited time among the three categories of activity.

6.2.4 Analysis of Information

Time allocation between paid market work and other activities

Table 6.2.4-1 shows the broad division of time disposition of the respondent working women. It indicates that their time use is dominated by market work. Just about half the total time (nearly 12 hours on average) is spent either in the work place or in commuting to and from work. The latter accounts for nearly forty minutes of time. Thus, the actual time spent in the work place is somewhat more than 11 hours a day. But, of course, many do reside near the factory. The present

[93] Gronau (1980) pointed to the difficulty of modeling home production in such a situation.

sub-sample also shows that the minimum commuting time needed was ten minutes, which means that the distance between the factory and the residence was short.

Table 6.2.4-1: Time Allocation between Market and Home Activities

Time use type	Minutes	Percent of total
Market time	717	50
Home production time	172	12
Personal time	551	38
(of which sleep time)	(397)	(28)
Total time	1440	100

Time spent in the work place is a matter of factory rules rather than personal choice. Working overtime is routine (Chapter 5, Section 5.7) often obligatory and at the discretion of the management. Night work for women is not legal under factory acts in Bangladesh (Khan: 1995). In practice, often some of the women have to work up to 11 at night. At least one of the workers was found to have worked up to 3 am the day before the interview.

Responsibility for home production

Before analysing the information from the supplementary survey, I present some of the results based on the main survey regarding responsibilities for home production activities. Table 6.2.4-2 shows who does the cooking. It is clear that both the workers and the matched control group women bear the major burden for cooking. Yet, in the worker households, other women particularly senior women such as mothers, mothers-in-law, elder sisters or sisters-in-law share the responsibility. In one or two cases, husbands also helped. I show later that this kind of help has major implications for division of activities by the working women within the home. Regarding non-cooking household chores, such as washing, cleaning and tutoring children, there appears to be little difference in the patterns between the workers and the control group (Table 6.2.4-3). Yet, in most cases the proportion of respondents doing such chore is somewhat lower for the workers compared to that for the control.

Table 6.2.4-2: Persons with Cooking Responsibility at Home (percent of respondents)

Responsible person	Workers	Control
Respondent herself	65.8	86.2
Mother/mother-in-law	22.7	16.2
Sisters/sisters-in-law	14.2	0.8
Husband	1.2	-
Domestic helper	1.5	-
Others	6.2	3.1
Respondent (number)	260	130
Response (number)	290	138

Note: The percentages add to more than 100 as the respondents sometimes have given more than one response.

Table 6.2.4-3: Non-cooking House Work Responsibility of Respondents (percent of respondents)

Type of household chore	Workers	Control
Washing clothes	96.2	98.5
House cleaning	76.9	91.5
Washing utensils	78.8	84.6
Teaching children	2.7	3.8
Others	1.9	0.8
Nothing else	3.1	-
N of respondents	260	130
N of responses	675	363

Note: The percentages add to more than 100 as the respondents sometimes have given more than one response.

Home production and personal time

To find out about the utilisation of non-market time it is first divided into personal and home production time. Table 6.2.4-1 shows that personal time outweighs home production time. This is due to the inclusion of sleep time under personal time. Average sleeping time is 397 minutes. As sleep is biologically unavoidable, this may perhaps be considered separately while trying to understand the intertwining of personal and home production time. Yet, women may forgo sleep, at least partially, if the demand for home production is intense.

To understand this I first ran simple linear regressions using OLS, with personal time as the dependent variable and home production time as the independent variable shown in Table 6.2.4-4. The coefficient of the home production time is – 0.51 and is highly significant. The adjusted R-square is 0.19. Thus, as home production time increases, there is a fall in personal time. The

coefficient being less than one (in absolute value) also means that the substitution is imperfect, as a certain amount of personal time is essential for remaining in good health and thus cannot be self-denied for long.

What kind of personal time do women forgo if the demand for home production increases? To see this, I ran two other simple linear regressions, one with the personal time adjusted for sleep and the other with sleep time as dependent variables. In both the cases, the independent variable has been home production time as before. The coefficients indicate that while there is a general trade-off between personal time and home production time, it is more the time for sleep, which is adjusted by women if there is a higher demand for time for home production. The data reveals that while the average sleeping time is 397 minutes, it ranges from as low as 240 minutes to as high as 525 minutes. This also suggests that probably the non-sleeping personal time of the women has already been pared down to the bare minimum.

Table 6.2.4-4: Regression between Home Production and Personal Time

Independent variable	Dependent variable		
	Total personal time	Non-sleep personal time	Sleep time
Home production time	-0.507***	-0.206**	-0.301***
	(3.97)	(2.18)	(4.582)
Constant	638.725***	190.38***	448.35***
	(25.64)	(10.35)	(34.96)
Adj. R-sq	0.19	0.06	0.24
N	65	65	65

Note: 1. Figures in parentheses are absolute t-statistics.
2. *** and ** denote significance at 1 and 5 percent probability respectively.

Intensive discussion with women revealed that a major cause of their home production burden is the restricted access to cooking fuel and water.[94] Only a few have access to individual gas (cooking fuel) supply in their kitchen. In practically all cases, the facility is shared some time among as many as six households, which makes it difficult to utilise the available time in a flexible manner. Piped water is available to most of the households, but only for part of the day, and even this has to be shared. For this reason they also have to collect water from hand tubewells. A substantial share of non-market time of women is thus spent in managing

[94] As Hewett and Montgomery (2001) show, urban households in Bangladesh are not unique in such restricted access to public utilities.

cooking and water supply for cooking and washing up.

There is a dearth of information on time allocation of the working women in Bangladesh in an urban setting except the BUP study (1990) which indicates similar findings. If Hochschild's (1989) observation is recalled, the "double-shift" that women do in Bangladesh is nothing unique. For example, Ilahi (2001) finds that in urban Peru, women work longer hours in total and devote 72 percent of that time to household chores compared to only 35 percent by men. Such a state of affairs mean that, while women are earning an income for the family and contributing to its welfare, they themselves may be losing on other essential aspects of quality of life. This may also tell upon their health as analysed in Chapter 7, Section 7.7.

6.2.5 Process of Division of Home Production Activities

Who decides?

The respondent working women were asked about who decides the division of work at home. The replies show that in about 65 percent of cases, it is the respondent herself, either alone or in association with her husband, who decides who should do what. Husbands alone do not decide the division of responsibility. Of course, this does not mean that they have no influence on the division of work. If wives' behaviours conform to the "normal" rule that they would be responsible for home production activities there is hardly any reason for husbands to take interest in doing such things. However, there are cases where the husband and wife both work in the RMG firms. In such a situation, they often help each other in household chores and decide upon a division of work together. There are cases in which the husband cooks in the morning while the wife does the washing up.

Senior women, wherever they are present, have a major role, particularly in households where working respondent women are unmarried. Mothers or senior sisters (if present) take on the burden of cooking and washing up. Where male members are present in such a situation, they take care of buying provisions or other necessary shopping. Thus the respondent unmarried women in these households have the least burden of home production activities and consequently they also have the most of the non-market time for their personal pursuits.

I have tested if the time allocation does really differ between married and unmarried women and between those where there is a senior woman or some help

is received and those where no such help is available. Table 6.2.5-1 shows, for example, that there is no statistical difference between married and unmarried women in their market time (708 and 747 minutes respectively). But these are weakly different when the categorisation is by presence of senior or other women (including hired domestic helper). Thus, women who have such help at home, spend about three-quarters of an hour more in market work everyday with consequent implications for earnings. Of course, it may be that the causality runs the other way, i.e., those who devote more time to market activity, arrange for some kind of help at home. Whichever way the causality runs the burden of home production on women is onerous. This is also understood from the fact that several of the women with small children have sent them to their parental homes, as they cannot take proper care for them because no help is available at home.

More interesting, however is the implication for the division between home production time and personal time. Unmarried women have more personal time and are engaged less in home production. Similarly, those who are helped by some other women at home are engaged less in home production and have more personal time. Thus, marital status and availability of help at home has important influences on time use patterns.

Table 6.2.5-1: AverageTime in Different Activities (minutes)

Type of time	Marital status		Availability of help	
	Married	Unmarried	Yes	No
Market time	708	747	743 *	696 *
Home production	192***	100 ***	111 ***	219 ***
Personal time	539*	593 *	586**	524**

Note: 1. ***, **, and * denote significance of difference of means at 1, 5 and 10 percent respectively.

2. The comparison is along the rows between married and unmarried women and between with and without availability of other women's help for any given type of time allocation.

Tensions in family

As women work long hours outside home and may also have inadequate personal time, including time for rest or sleep, tensions are likely to arise over the division of work responsibilities. Frequent quarrels are rare, but quarrels do happen from time to time (as has been observed in about a quarter of cases). The large majority, however, replied that quarrels never arise, very probably because there may not be

much of a difference of opinion between women and men regarding women's home production role.

When asked, men readily agreed that as women are working for the welfare of the family, they (men) should help them (women) as much as they can. Whether they actually do help, is not clear from their replies. But buying provisions is one activity, which was agreed upon by all the men that they should do. Some also stated that they help with activities such as house cleaning, looking after children and even cooking. They also agreed that such help should be provided as women too are earning money. Thus, it is a kind of *quid pro quo* that exists, probably not so much enlightenment on the part of the male members of the family.

6.2.6 Summing Up

The picture that emerges is one that Hochschild (1989) first described as *double shift* (for working women in America) in the 1960s. They have to work very long hours in the work place and also work long hours at home for various activities for the general welfare of the family. The latter is expected and accepted as the socially sanctioned normal behaviour for women. This sometimes becomes so burdensome that they have to cut down on their essential personal time such as sleep.

Men do agree that they should help women with home production activities and some also claim to do so. But their replies indicate a kind of ambivalence, in that, while expressing willingness, mostly what they do is the work that they as men are socially expected to do, such as buying food and provisions for the family. How much of that time they use in actual home production-related activity and how much in gossiping or leisure remain questions for future research. Even though the working women decide upon the division of work, tensions do arise because of such unequal burdens. Only unmarried women who live with their parents or married women who live with other senior women (e.g., mothers or mothers-in-law) get some respite from the heavy burden of home production activities.

6.3 Management of Household Finances

6.3.1 Introduction

In this section, I explore the management of the household finances in general and the patterns of pooling and control of resources, in particular from direct observation. I first discuss critically the conceptual issues related to the meaning of pooling and other related resource management behaviour. This is followed by an investigation of the factors that may influence such behaviour.

6.3.2 Concepts of "Pooling", "Control" and "Command" of Resources

In general, the concept of "pooling" is not clearly defined in the literature. Fapohunda (1988) has used the term to mean "putting together". In general, the literature on household behaviour equates pooling with a single decision-maker and thus the "lack of control" by the person whose income is pooled with those of others (Hoddinott and Haddad: 1995). If resources are pooled, this does not, however, necessarily indicate under whose control the resource is expended. In fact, quite often people may keep part of their income to themselves and pool the rest. In societies where men have more access to economic assets (more authority to spend money) than their counterpart women, even when money is kept in one place, wives may have little or no authority to spend the money, at least for major purchases (Chapter 8, Section 8.3). Thus, if the incomes of husband and wife are put together, there is no *a priori* reason to argue that the resources are controlled by the husband or the wife. If resources are not combined, then one may assume that possibly these are controlled by the respective earners.[95] Thus, while broadly speaking, "pooling" may connote "lack of control" of resources, without further information one cannot argue that they are definitely so in all circumstances.

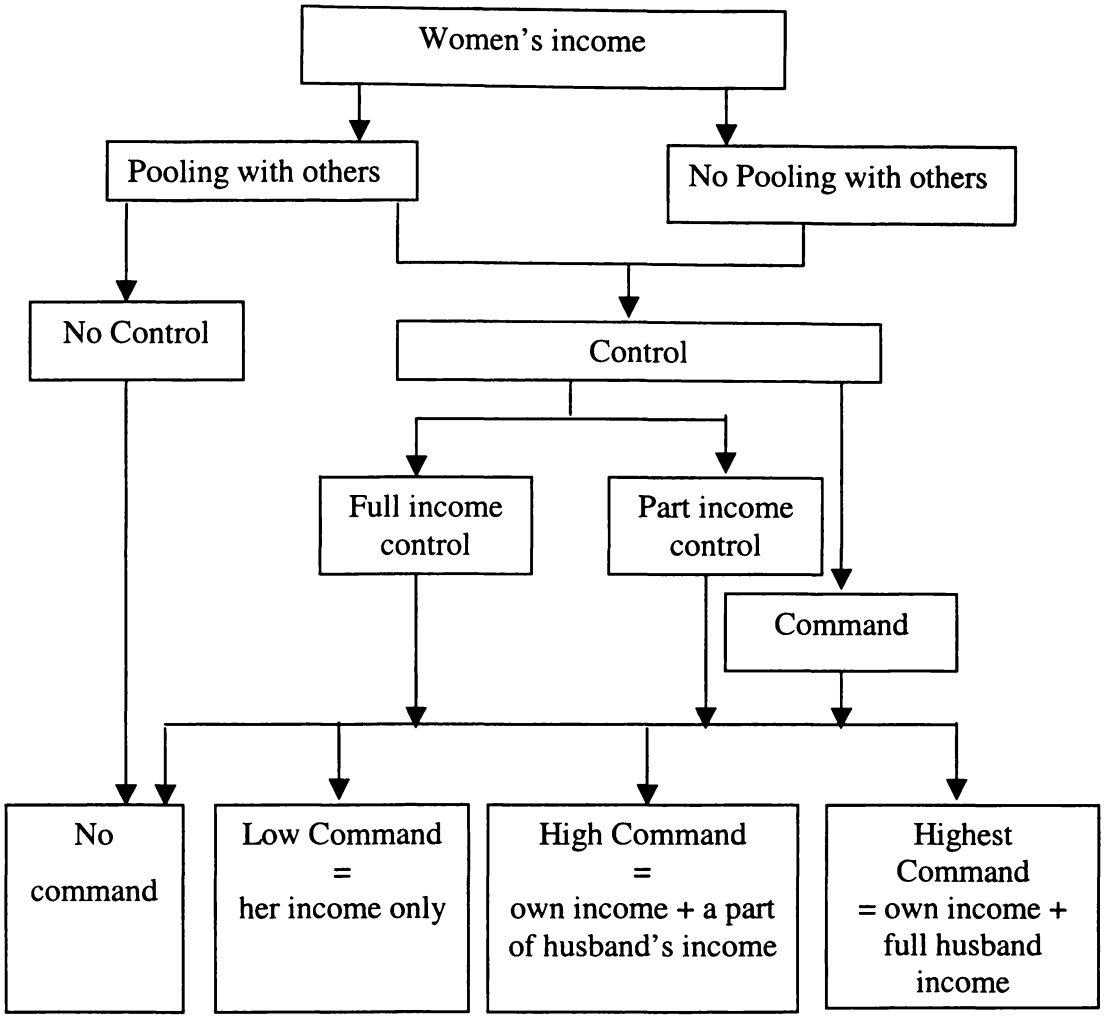
[95] "Control" of course does not mean lack of consultation. Thus, even if women do not pool their income and control it themselves, for large or specific types of purchases (e.g., consumer durables such as a TV), the whole family, rather than the woman on her own, may decide it together. See Section 8.3 in Chapter 8.

Accordingly, three concepts of access to financial resources by women are used here.[96] One of these is "pooling" which refers to combining resources in a single kitty with others in the family. Thus, pooling means both pooling by the sample respondent with others in the family and also by other members of the household with the respondent. In the latter case, the money is kept with the respondent. "Control" refers to actual use rights of the income of women by themselves through their own decisions to spend the resource whether or not this money is actually kept with the respondent. There are cases where money is in one kitty with somebody else, but the respondent has some control over expenditure from this combined resource.

"Command" is used in a higher sense of control in that here a woman's control over her own income is combined with that over resources obtained from her husband and thus the situation is applicable only to married women. Those who control their own income fully and also receive the whole income of their husbands can exercise the highest command over resources. At the other extreme are those who neither control their own incomes nor receive any from their husbands. In between are various combinations of the two. Those having partial control and receiving part of their husband's income are put in the high command category while those with no control and receiving part of the money, or having part control but receiving no money from their husband are both categorised as low command group. The concepts have been schematically shown in Figure 6.3.2-1.

Figure 6.3.2-1 shows the various pathways through which women may exercise rights over their earnings at the household level. These pathways show how pooling and "control" lead to "command" over resources at the household level. Thus, where there is complete pooling, she may have no command over her own income. When there is partial or no pooling, there is some control over own income. But it may mean low or high command depending upon what other resources she has access to and to what extent.

[96] Agarwal (1994a), in the context of rights over land by women in South Asia, similarly identified differences in the concept and practice of rights, access, control and command.



Note: 1. Highest Command = own income + income of her husband i.e full household income
2. High Command = Own income + a part of husband income i.e a part of household income
3. Low Command = Only own income i.e. a part of household income.
4. No command = No part of household income.

Figure 6.3.2-1: Different Pathways of Women's Pooling, Control and Command of Resources

The question is: does command automatically mean that the woman has the decision making power. If she has no power to take major economic decisions, simply by looking at the command position, it may difficult to conclude that she makes the decision or that if she has partial control, she makes a joint decision with others. Thus, just by looking at whether there is pooling or not, one may not infer about the household decision-making. So, pooling (along with control and command) and decision-making both have to be examined to arrive at the

conclusion whether the household model conforms to a unitary or a collective model (see Chapters 2 and 3 for a review of the literature and a discussion on the household models).

6.3.3 Data and Methods

The questions

The working women in the sample were asked questions about their financial management within the household. I asked the respondents if they pool their income with any one within the household and if so to what extent (fully or partially)? Wherever the money is kept, did they have the authority to spend it at their discretion? Currently married women were further asked if they receive any money earned by their husbands and if yes, to what extent (whole or only part)? The answers to these questions were used to construct the patterns of pooling, control and command over financial resources by women as described in Section 6.3.2.[97]

Analytical methods

The initial analysis of pooling, control and command behaviour is based on cross-tabulations of data. Later I use probit regression for econometric analysis of pooling and control using several individual and family level characteristics as explanatory variables. Pooling and control, as already stated, are measured as whether the respondents do so fully, partly or not at all. As the sample size is not large, consequently cell sizes are not large. For econometric analysis, I have merged the categories of partial pooling and full pooling together. Thus, pooling variable has two categories, viz., those who do not pool their earnings and those who do (whether partially or fully). Similarly the control categories have been regrouped into two categories, which are: with full control and those with partial or no control. As the dependent variables are now discrete variables, I have used probit regression to investigate which variables systematically influence pooling and control.

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[97] A note of caution is in order here. The reported behavioural patterns are based on the responses from one person in the family and her perceptions may differ from those of others such as husband

Variables

A number of variables have been utilised to understand the patterns of pooling, control and command. These include individual characteristics such as age, education, migratory status, level of income and a composite index which may reflect social autonomy of women within the family, and family level variables such as residential location, land ownership, family size and family headship. Most of these variables comprise categorical scales. A full description of these factors is given in Appendix 11.

6.3.4 Empirical Findings

Pooling, control and command behaviour

Of the 260 respondent women, slightly over one-half pooled their incomes fully with others in the family which, for married women, were almost invariably husbands (Table 6.3.4-1). But in a few cases these were also with fathers-in-law. The "partial pooling" group constitutes nearly a third of all women. The women in this group pooled part of their income with others and kept part of the money to themselves. The women who do not pool any money with others constitute only a small minority of about 14 percent of the respondents.

Nearly a quarter of all women control all the money they earn. Partial control is exercised by nearly a third of the women while somewhat less than one-half have absolutely no control over their earnings. Such control and pooling of resources, as may be expected, have somewhat of an inverse relationship with each other as shown in Table 6.3.4-1. Thus, none of the women with full control over own incomes, pool with anybody while nearly 82 percent of those who pool fully have no control over their earnings. The proportion of women exercising full control falls as one goes up the pooling category from none to full pooling. The pattern is highly statistically significant.

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or father, particularly with reference to control of resources. The results, therefore, need to be interpreted with caution.

Table 6.3.4-1: Pooling and Control over Income by Working Women
(Percentage of total respondents: N = 260)

Pool type	Type of control			All types
	Full	Partial	None	
None	13.8	-	-	13.8
Partial	5.4	26.1	0.8	32.3
Full	3.8	5.8	44.2	53.8
All	23.1	31.9	45.0	100

Command over resources combining control over own income and over that obtained from the husband is shown in Table 6.3.4-2 along with its pattern by pooling characteristics for currently married women. Full (highest) command, in which a woman has control over her own income and receives the whole income of husband for expenditure/management, is the privilege of only a few (about seven percent). Most women (58 percent) fall in the low command category. It may be noted that as pooling increases, the proportion of low command increases much more compared to that for high or highest command. Thus, pooling and command are somewhat opposite to each other. On the other hand, as may be expected, those with higher control over their own income also appear to exercise higher command (not shown). Both these patterns are statistically significant.

What the patterns of pooling vis-à-vis control and command show is that, on the whole, pooling means a loss of control and command over resources while no pooling depicts an opposite situation. If lack of pooling is the test of differential preferences within the family, then the figures presented above indicate a complex set of preferences. While many do pool, many others do not and they are split roughly down the middle. It is likely that while in some respects the preferences of the women earners and their spouses or other male members are similar, in some other cases, these are not. The type of expenditures for which preferences may be common and where these are not, may possibly be understood somewhat from the expenditure analyses in which pooling is one of the explanatory variables (Section 6.4, this chapter).

Table 6.3.4-2: Pooling and Command over Income by Married Working Women (Percentage of total respondents; N= 155)

Pool type	Type of command				All types
	Full	High and partial	Low and partial	None	
None	-	-	5.8	-	5.8
Partial	-	12.2	16.8	-	29.0
Full	6.5	5.8	35.5	17.4	65.2
All	6.5	18.1	58.1	17.4	100

Factors that may influence pooling and control

I have described the factors that may influence pooling and control. I now describe their expected relationships. These are as follows.

Age: As women age and raise a family, a considerable part of their income may have to be pooled together with their husbands (or other earners in the family) for meeting general household expenditure. However, as most of the expenses are possibly outside the family (buying provisions or other market goods), men may take charge of the expenditure. This lessens the control by women over their incomes. Yet as women age, in Bangladesh despite their comparatively socially inferior position compared to men, they gain certain control within the family.[98] Thus, the patterns of pooling and control by age are empirical issues.

Education: Women who are better educated may be more independent minded, taking more decisions on their own and not wanting to pool their incomes as much compared to those who are less educated. Thus, the relationship of pooling with education may be negative while that of control may be positive.

Marital status: The marital status is defined as if a woman is currently married, unmarried or a widow/divorcee. In the first category, women are the most involved (more responsible for households work) within the household and are therefore likely to pool more compared to others. Unmarried women are traditionally allocated less household responsibility (see Section 6.2, this chapter)

[98] In Islam, the religion of the majority Bangladeshi citizens, there is a specific dictum regarding a mother's position. Literally translated it means that paradise lies at the feet of mother, i.e., one may not enter paradise in after life if mother is displeased with her child. Regarding a wife's position, there is no such clear statement.

because of the widely prevalent idea that they would have less freedom later on as they get married and should therefore be allowed to enjoy themselves as much as possible at the parental home. Unmarried women may, therefore, have more freedom to spend their own money, which by implication, should mean less pooling and more control. But note that they may still have to be involved within either parental or brother's homes and bear some of the household's expenses. On the other hand, while the widow and divorcees may have their own families, they are at the same time more likely to be independent. Pooling may therefore be observed more among the currently married women and increasingly less so for the two other groups. The behaviour regarding control of one's own income is likely to be just the opposite.

Income: Higher income increases the financial options by widening the access to resources. In such cases, women are constrained less in their decisions regarding expenditure. If so, pooling is likely to be observed less among those who have higher income compared to those who have less. Again the expected pattern regarding control is the opposite.

Migration: The migrants tend to be from the rural areas (Section 5.3, Chapter 5). Previously, having no income of their own, they were totally dependent on others, particularly men in the family, for any access to financial resources. Men who earn an income usually keep and control the cash money. As habits usually change slowly, it is expected therefore that even when they work, men in the migrant women's families may continue to take the control of the money themselves. Thus, migrants among the respondents are more likely to pool and less likely to control their earnings compared to the non-migrants. On the other hand, however, it may be argued that migrants usually come from poor backgrounds and they may therefore try to hold on to their incomes as much as possible. If so, migrants may do less of pooling and control more of their income. The actual outcome therefore may not be predicted *a priori*.

Social autonomy: One particular issue of interest is the influence of the level of women's social autonomy within the family. The latter has been measured as a score depending on the strictness, or its lack, in the observance of certain social

behavioural norms linked mainly to interaction with non-kin persons, particularly men (see Appendix 12 for the method of construction of the score). The more social autonomy a woman has, the more she is likely to have independence of action and thus possibly more of a decision making power. In such a situation, social autonomy may lead to less pooling and more control over earnings.

Residential location: The respondent women live in slums and also outside slums. It may be argued that people living in the slums, coming mainly from the rural areas, will be more conservative and thus conform to more traditional behaviour in which men are the breadwinners and thus are likely to claim the incomes of women. On the other hand, anecdotal evidence suggests that possibly due to poverty, family bonds are not strong in many households in the slums. In such a situation, survival needs may force women not to pool and to keep as much control as possible over their own income. The actual outcome will depend on the relative strengths of these two tendencies and is an empirical issue.

Land ownership: Ownership of property in a rural village, particularly of land, allows people to have non-wage income, which is likely to be controlled by men.[99] When a household has such income, the dependence on women's income may be less and thus pooling may be observed less and control over own income by women may rise.

Family size: As family size increases, general household expenditure may claim a large share of the available resources. To meet such expenses, all earners in the family, including women workers, may have to pool resources. Thus, family size and pooling may be positively related while for the control the relationship is expected to be negative. Furthermore, as much of the income may have to be spent outside the family, men may take control of such expenditure lessening the control of women. The observed relationship for may thus be negative.

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[99] Among Muslims who are the majority in Bangladesh, each son, according to Islamic law, inherits property twice that of each daughter upon the death of father while a wife gets one-eighth of husband's property (which may be more if there are no surviving son). Women, quite often do not claim the share of their parental property for various social reasons. For a description of the Muslim and Hindu inheritance systems see Agarwal (1994b).

Family headship: The headship of the family may also affect resource pooling and control behaviour. Several types of headship have been found among the sample households. These are categorised as self, father or brother, husbands or in-laws, and mother and sister. Thus, there are two types of headship, male-headed and female-headed. Both self and female parental are female headships but these differ in one significant respect. In the case where women workers themselves are family heads, they earn as workers and control the resources as family heads (Handa: 1994; Kennedy and Peters: 1992). This is a situation that Handa has called "working headship". Thus, the two factors may combine to lower pooling and increase control when women respondents themselves are the family heads compared to others.

In other cases, the workers and the family heads are separate persons. Particularly, if the family is male-headed, pooling is likely to be more than in the case where the working women themselves are heads of the family as traditionally men control the resources. Generally, families headed by fathers-brothers and husband-in-laws are likely to be increasingly restrictive and thus pooling increases and control falls further.[100]

If the women's control of resources is exercised relative to men, the *raison d'être* does not exist in female-headed households (except self-headed as explained above). In such a situation, it is expected that pooling will fall and control rise for the families headed by women relatives. On the other hand, female-headed households are, in general, poor in Bangladesh (Westergaard: 1993). Poverty may force worker women in such households to pool resources (with family head) for survival. The balance of the forces shall determine whether compared to others, women will pool less or more (and thus control more or less).

6.3.5 Results of Analysis

I now present some of the observed patterns of the pooling and control behaviour by individual and family characteristics for the entire sample of worker respondents and then patterns for the married working women for whom full

[100] The restrictive nature of the in-law household can be understood from various practices of women to ensure in a clandestine manner, access to cash often in connivance with parental homes. For a discussion on these issues see Agarwal (1994b), particularly Chapter 9.

information are available. First the salient points based on the relevant cross-tabulations are presented in Tables 6.3.5-1 and 6.3.5-2.

Pooling and control: all respondents

I have used the terms, "positive" and "negative" effects or influence of factors, on pooling and control. For the positive, it means that as one moves from one state to another state (for example from slum to non-slum) of the relevant factor (as stated in the table), pooling (or the control levels as the case may be) increases. For the negative sign, it means that the levels of pooling (or control) change in the opposite direction.

Consider now Table 6.3.5-1. Two general observations may immediately be made from the table. First, in practically all cases, pooling and control appear to be opposite to each other. For any given factor, if the relationship with pooling is positive, the observed relationship with control is negative (except in two cases where the patterns are not clearly discernible). Secondly, while pooling and control may appear opposite to each other, in most cases, the relationship with control is more systematic than with pooling.

Table 6.3.5-1: Patterns of Pooling and Control by Various Factors
(N=260)

Factor	Pooling		Control	
	Direction	Significance	Direction	Significance
Individual characteristics				
Age of respondent-young/old	-	NS	+	S
Education – low/high	-	WS	+	S
Marital status – CM/UM/DW	-	S	+	S
Income – low/high	NP	NS	+	S
Migrant/non-migrant	-	NS	+	NS
Social autonomy –low/high	-	S	+	S
Family characteristics				
Residence in slum/not slum	+	NS	-	S
Village property owned/not owned	-	NS	NP	NS
Land owned-not owned	-	NS	+	WS
Family size – small/large	+	S	-	S
Family headship – self /male	+	S	-	S
Parental /In-laws/ female parental				

Note: 1. "S": Chi-square statistics statistically significant at 5 percent or less. "WS": weakly significant at 10 percent. "NS": not significant; "NP": no clear pattern.

2. "+": positive; "-": negative.
3. CM: currently married; UM: unmarried; DW: divorced and widow

Among the individual characteristics, only marital status and social autonomy have statistically significant patterns for pooling. In the case of control, except migration, all other patterns are statistically significant. Among these, marital status and social autonomy have the hypothesised relationships, so have education and income. The significance of age in the case of control indicates that the social respect one gains with age may be an important factor.

Among the family variables, family size and family headship show statistically significant relationships with pooling. In the case of control of resources, the statistically significant relationship is exhibited in all cases except for ownership of village property. The expected increasingly restrictive relationship in the case of family-headship has been observed for self-headed and other male-headed households. I have also found that the other female-headed households are the most restrictive of all households regarding pooling and control of resources by the respondents. Thus, poverty, as argued above, probably has been a major reason.

Currently married women

I now turn to the sub-sample of currently married women. Here an additional category of financial management of "command" over resources is introduced. The results are shown in Table 6.3.5-2.

The information in Table 6.3.5-2 suggests that differences in behaviour in financial management have much to do with marital status, age and the raising of children. For the sample as a whole ownership of property in a rural village was not found to have much influence on pooling/control. But, its influence on behaviour of married women appears to be stronger. Similarly, the social norms regarding behaviour are less important for married women who are also likely to be mature in age. As a result, level of social autonomy is no longer found to have much influence. The influence of education appears to be at best very weak while those of age, family headship pattern and income appear to have a more stable influence both in terms of direction of the relationship and statistical significance.

Table 6.3.5-2: Pooling, Control and Command by Currently Married Women (N=155)

Factors	Pooling		Control		Command	
	Direction	Sig.	Direction	Sig.	Direction	Sig.
Individual characteristics						
Age of respondent-young/old	-	S	+	S	+	NS
Education- low/high	+	NS	-	NS	NP	NS
Income – low/high	+	NS	+	S	+	WS
Migrant/non-migrant	NP	NS	NP	NS	+	S
Social autonomy –low/high	NP	NS	NP	NS	NP	NS
Family characteristics						
Residence in slum/not slum	+	S	-	S	-	NS
Village property owned/not owned	+	WS	-	NS	+	S
Land owned-not owned	+	NS	-	NS	NP	NS
Length of migration-short/long	-	S	+	S	+	WS
Incidence of children-yes/no	-	S	+	S	+	NS
Family size- small/large	NP	NS	+	NS	NP	NS
Family headship – self /male	+	S	-	S	-	NS
Parental /In-laws/ female parental						

Note: 1. "S": Chi-square statistics statistically significant at 5 or 1 percent.
"WS": weakly significant at 10 percent. "NS": not significant; "NP": no clear pattern.
2. "+": positive; "-": negative.

Probit regressions

Bivariate cross-tabulations, while useful, do not purge the confounding effects of other variables from that of the variable of interest. To examine the effects of factors when those of all others are held constant, I have used probit regressions to explain pooling and control behaviour. The variables used are basically the same as above but expressed in dummy forms in some cases. The means and standard deviations of the variables used in the regression equations are shown in Table A13-1 in Appendix 13. Note that here I have introduced age, square of age, family size and income as continuous variables. Also the type of job done has been included as an additional variable. The regression results are shown in Table 6.3.5-3.

While the control equations have a smaller number of statistically significant coefficients, in general, these have signs opposite to what the corresponding pooling equations have. This in a way confirms once again that pooling and control are broadly, though not always, opposite kinds of behaviour. I have, therefore, drawn conclusions mainly on the basis of the pooling equations.

The equations indicate that age, job-type, female headship, land ownership and women's social autonomy all have negative influences on pooling. Other variables such as migration and marriage dummies, primary education, and family size all have positive influences. The most significant among these appear to be the influence of family size, marital status and land ownership.

Table 6.3.5-3: Probit Regressions for Pooling and Control by Working Women

Explanatory variables	Dep var: Pooldum		Dep var: Contdum	
	Equation 1	Equation 2	Equation 3	Equation 4
Age	-0.26*	-0.30*	0.19	0.19*
	(1.71)	(1.95)	(1.61)	(1.64)
Age-squared	0.003	0.003	-0.002	-0.002
	(1.03)	(1.21)	(1.02)	(1.04)
Migdum (migrant=1)	0.77*	0.75	-0.58*	-0.58*
	(1.67)	(1.59)	(1.78)	(1.76)
Mardum (married=1)	1.54***	1.58***	-0.34	-0.34
	(3.69)	(3.68)	(1.22)	(1.20)
Eddum1(Primary=1)	0.69	0.90*	-0.16	-0.16
	(1.47)	(1.74)	(0.48)	(0.46)
Eddum2 (6-10 years=1)	0.15	0.32	0.30	0.31
	(0.30)	(0.60)	(0.88)	(0.91)
Manual2 (Manual=1)	-0.82	-0.42	0.12	0.05
	(1.55)	(0.72)	(0.33)	(0.12)
Skill2 (Tech/semi-tech=1)	-1.22***	-1.25**	0.34	0.33
	(2.51)	(2.34)	(1.15)	(1.00)
Totpay		0.0004**		-0.00004
		(1.96)		(0.34)
Landdum (own land=1)	-0.81 **	-0.86**	0.40	0.41
	(2.05)	(2.09)	(1.56)	(1.59)
Headdum (female=1)	-0.63*	-0.67*	0.47	0.48
	(1.76)	(1.77)	(1.48)	(1.48)
Livesize	0.42***	0.45***	-0.26***	-0.26***
	(4.10)	(4.10)	(3.87)	(3.86)
Socauto (social autonomy)	-0.67	-0.64	-0.03	-0.04
	(1.53)	(1.41)	(0.12)	(0.14)
Intercept	4.73**	5.32*	-2.98*	-2.94*
	(2.15)	(1.78)	(1.85)	(1.82)
N	253	253	253	253

Note: 1. Figures in parentheses are absolute z-statistics.

2. ***, ** and * indicate significance at 1, 5 and 10 percent probability respectively.

Education, wage income, and women's social autonomy do not appear to have any significant independent influence of their own. The insignificance of social autonomy (Socauto) may be due to the reason that causation runs from pooling to autonomy. This is tested in Chapter 8.

Note that the headship dummy here is different from that which has been used earlier. I have tried to use another dummy variable (Head2dum=1 for In-laws, 0 otherwise) where it is most relevant i.e., for married women. Its coefficient was insignificant (not shown).

On the whole therefore, the econometric results provide broad support to the earlier conclusions based on bivariate cross tabulations. However, these also indicate that understanding the relationships within a household with various earners and their implications for financial management is not easy. This is because a family is not just a collection of individuals. There is both cooperation as well as conflicts between individuals (Sen: 1990), in a household whose members are bound together by various bonds and subtle relationships. It is, therefore, sometimes difficult to discern very clear systematic patterns in their behaviour without recourse to more detailed information on the household. This may necessitate a much larger sample than is available at present. It may be all the more difficult in the present case as the women have started to earn an income for the first time to show a definitive and systematic pattern of control over it. Even then the apparently crude analysis that I have presented may be utilised for gaining insights into the mechanism of financial management in a household and the consequent intrahousehold allocation of resources. This is explained in the next section with the help of expenditure analysis.

6.3.6 Conclusion

This section has examined, using first hand and direct observation, the issue of pooling and control of resources and their relationships with the characteristics of the workers and their families. It has been argued that control, rather than pooling of resources, captures the essence of financial autonomy of women and by logical extension, of differential preferences within the family. On the other hand, the two have been empirically found to be broadly opposite types of behaviour. Thus what determines one, in a way, also determines the other although statistically the evidence may not always be clearly systematic.

6.4 Expenditure Analysis

6.4.1 Engel Functions

In this section, I shall analyse the pattern of expenditure in a sub-set of the working women's households and discuss the implications of the pooling behaviour. More particularly, the effect of pooling on intrahousehold allocation of resources such as food, which is a major expenditure item in a poor household (Deaton: 1997), is investigated.

The analysis of expenditure has been done by estimation of the Engel equations or functions. An Engel function shows, in its simplest form, the quantity demanded as a function of the total budget (expenditure). A particular variant due to Working-Leser, as described by Deaton (1997, p. 231-232) has been used (for a description of the model and its properties, see Appendix 14). This variant shows the share of item-specific expenditure in the total household expenditure as the dependent variable and the logarithm of per capita expenditure (PCE) and the logarithm of household size as the core explanatory variables. Several other demographic variables were also used to find out their influence on expenditure behaviour. But most importantly, I included a pooling dummy (and alternatively a control dummy) as explained later for capturing the behaviour of the households if women have to pool their earnings and thus surrender control over their own income. The definitions of these and other variables that have been used are given in Appendix 15.

6.4.2 Data and Econometric Methods

Data

All the 260 women were asked questions on financial management. As noted in Chapter 4, only a sub-set was, however, asked questions on expenditure. All of the data collected were transformed into yearly expenditure patterns. Admittedly, this is a rather crude method and errors in measurement are likely. But initial checks suggest that the patterns are similar to what is generally observed for Bangladesh (BBS: 1998b). The estimated shares of different types of expenditure for the respondents are shown in Table A16-1 in Appendix 16. These conform broadly to the results of the Household Expenditure Survey 1995-96 (BBS: 1998b) for the urban areas as shown in Appendix 17.

Taking into account the problem of missing data, the ultimate size of the sample for expenditure analyses is 92 for which complete information are available. With such a small sample a detailed disaggregation of commodities may prove unsuccessful, due to the non-consumption of some commodities in some of the households. So broad commodity groups are used for the analysis. The groups are: food, clothing and footwear, common (household) expenses, education, health, transport and miscellaneous.

Two dummy variables have been used for reflecting alternative (pool or control) behaviour regarding control of resources. One of these is the dummy for pooling with a value of one if earnings are completely pooled, and zero otherwise. The other is the control dummy for which the value is one for full control and zero otherwise.

Often in the empirical literature demographic characteristics, as reflected in proportions of various age-sex groups (such as proportion of adult male and female), are used as additional explanatory variables along with other characteristics of the households. In this section, these variables are used selectively.[101]

Econometric issues

OLS has been used as the main estimation method, although there are three potential problems that may arise in this case. The first is the difficulty in interpretation of the coefficients when the dependent variable is limited i.e. varies between zero and one as expenditures shares do. Particularly, if items of expenditures are narrowly defined, it is likely that some of the consumers may have zero expenditures on any of them at any given time interval. As indicated above, commodity grouping may avoid the problem. Yet, one particular kind of expenditure, that on education, had zero outlay for some of the respondents as they did not have any school-going person in the family. The preferred method of estimation in such a case can be Tobit regression (Greene: 2000). However, as the

[101] The inclusion of these variables did not improve the explanatory power of the equations. As Deaton (1997, p.233) has observed often PCE (per capita expenditure) and (family) Size are sufficient to explain the variation in the share of expenditure and other demographic variables are not needed. He cites results from India (p. 232) which shows many of the demographic variables with coefficients which are not significant. Also see Quisumbing and de la Brière (2000). But for an interesting exercise using data from Ivory Coast, which shows that they are important; see Hoddinott and Haddad (1995).

sample is small, I have not used Tobit. On the other hand, Deaton (1997, p. 304) has argued that the budget shares may be thought of as averaging over zero and non-zero expenditures. It is therefore possible to use OLS in the standard manner as Deaton has done. I therefore use only OLS for the full sample.

The second econometric problem is potentially more serious. The individual expenditure share equations are all parts of a simultaneous equation system and the sum of these shares must equal to unity (see Appendix 14 for properties of a system of demand functions). That means the shares of expenditures are not independent of each other. A system-wide estimation of the parameters in such a situation calls for the use of Zellner's seemingly unrelated regression estimation (SURE) procedure. However, SURE is not used as I am estimating equations individually.[102]

The third econometric problem relates to the issue of endogeneity of the explanatory variables. In single equation estimation, when demographic variables and household size are included, all these variables cannot be assumed to be exogenous. Similarly, per capita expenditure is likely to be endogenous. For all these reasons, the error term and some of the explanatory variables such as per capita expenditure may be correlated violating a major assumption of the OLS method (see Chapter 4, Section 4.3). The OLS estimates may not be consistent. In such a situation the preferred method to apply is the Two Stage Least Squares (2SLS) using instrumental variables (Kennedy: 1999, p. 157-182).

A major problem that often arises with 2SLS is the lack of good instruments. As it happened, the use of 2SLS in the present case often resulted in extremely poor explanatory power, probably because of the poor instruments. However, as the main objective of the regression analysis here is to find out the nature of influence of resource control, this can be judged as well from OLS regressions.[103] I have therefore interpreted the results on the basis of OLS estimates alone (except in the case of expenditures on education).

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[102] Also, if the right hand variables are the same in equations, OLS and SURE give the same results (Greene: 2000, p. 616).

[103] Deaton (1997, p. 231-241) provides examples of use of OLS for estimating Working's Engel curves.

6.4.3 The Estimated Expenditure Share Equations

Food share equations

Fifty one percent of the average household expenditure in the sample was on food. It is, thus, the most important resource to be allocated within a poor household. The behaviour regarding food expenditure is therefore considered in some detail. The relevant equations are shown in Table 6.4.3-1. The means and standard deviations of the relevant variables in this and other equation tables are given in Appendix 16, Table A16-1.

Consider the first equation on food share. As often observed, the sign of the coefficient of log of PCE (per capita expenditure) is negative which means that as PCE increases, the share of food expenses in total expenditure falls. Family size has a negative influence, which also tallies with observations by others (Hoddinott and Haddad: 1995).

The age of respondent variable may have two types of influence on food expenditure. Older respondents may be more adept at food management within the household and therefore may exert a negative influence on food expenditure. On the other hand, older women are also likely to be married and have children in which case, the influence is likely to be positive. The overall outcome is therefore an empirical issue. As Table 6.4.3-1 shows the coefficient of *Age* is negative and significant at five percent. Even when marital status is entered to hold its effects constant, the coefficient of *Age* remains largely unaltered, statistically significant at ten percent and negative (not shown).

Table 6.4.3-1: OLS Engels Equations for Food Expenditure Shares

Explanatory variables	Dependent variable							
	Food share	Food share	Food share	Food share	Food share	Food share	Food share	Food share
ln (PCE)	-0.11***	-0.12***	-0.12***	-0.13***	-0.11***	-0.12***	-0.12***	-0.13***
	(3.60)	(3.91)	(3.77)	(4.04)	(3.66)	(3.98)	(3.79)	(4.02)
ln (Size)	-0.04	-0.06*	-0.09	-0.03	-0.05	-0.07**	-0.05	-0.07**
	(1.19)	(1.95)	(0.26)	(0.93)	(1.57)	(2.28)	(1.59)	(2.31)
Age	-0.005**	-0.006***	-0.004**	-0.006**	-0.005**	-0.006***	-0.004**	-0.006***
	(2.20)	(2.67)	(2.10)	(2.57)	(2.20)	(2.68)	(2.13)	(2.63)
Pooldum (= 1 if full)	-0.07***		-0.07***		-0.07***		-0.08***	
	(2.66)		(2.71)		(2.75)		(2.87)	
Contdum1 (=1 if full)		0.07**		0.07**		0.08**		0.08**
		(2.46)		(2.43)		(2.51)		(2.54)
Female proportion			0.15	0.13				
			(1.21)	(1.06)				
Proportion adult					-0.10	-0.09		
					(1.38)	(1.31)		
Male up to 14							-0.004	0.02
							(0.31)	(0.18)
Female up to 14							0.14*	0.12
							(1.70)	(1.46)
Constant	1.804***	1.89**	1.72***	1.82***	1.91***	2.00***	1.88***	1.95***
	(5.43)	(5.69)	(5.10)	(5.38)	(5.63)	(5.85)	(5.582)	(5.75)
Adj. R-square	*0.196*	*0.187*	*0.20*	*0.188*	*0.204*	*0.193*	*0.204*	*0.188*
F-statistic	*6.53****	*6.22****	*5.55****	*5.21****	*5.66****	*5.36****	*4.88****	*4.51****

Note: ***, ** and * indicate significance at 1, 5 and 10 percent probability respectively.

The pooling dummy has a statistically significant and negative coefficient. Full pooling (as opposed to no pooling or partial pooling), therefore, lowers the share of food expenditure. A possible explanation may be that at full pooling, men control the expenditures and they may spend part of it on themselves (Dwyer and Bruce: 1988; Thomas: 1990), as the literature suggests, leaving less for food for the other family members.[104] In fact, this may happen in another manner. Men may eat part of their meals outside which may not have been captured well in the collected data from the household level and thus may indicate a lower share of food.

As observed in Section 6.3, pooling by women and control of their own income are broadly opposite to each other. It is thus expected that as women's control increases, the picture should be opposite to that of pooling. This is exactly what has been found. The coefficient of the control dummy is positive and statistically significant. Thus, when women control their income fully, the share of food in the expenditure increases. This also appears to be the case in other equations in which pooling and control dummies are used alternatively with other explanatory variables. In fact, coefficients of all other explanatory variables also remained more or less unaltered including their signs. The adjusted R-squares also remained more or less unchanged. The results are therefore quite robust.

The inclusion of detailed demographic variables does not result in any appreciable improvement in the equations. So these are included in a more restricted manner. In no case, save for the proportion of girls up to age 14, is the coefficient somewhat significant. Demographic variables therefore have little to offer by way of explanatory role. This was also observed by Deaton (1997, p. 233).

[104] See Deaton (1997, p. 231-24) for discussion on adult goods and goods consumed mainly by men. Also see Gibson (1997). In the present sample, these expenditures were not large.

How are the equations to be evaluated particularly in relation to pooling? For this, I evaluated the first equation in Table 6.4.3-1 in terms of observed and estimated shares of expenditure on food and their calorie implications in the presence and absence of pooling. The average observed share of food expenses is 0.5374 while the estimated share is 0.5347, which is very close to the observed value. Those who pool their income have a food expenditure share of 0.5058 while those who do not have 0.5758, which is 14 percent more than the former. Thus, households in which women do not pool resources are better off in relative access to food.

Calorie implications of higher food expenditure share

The implications of the difference in food expenditure shares of seven percentage points (= 0.5758 - 0.5058) between the fully pooling and non-pooling households may be quite far reaching. Assume for simplicity that all the additional food expenditure available to the non-pooling compared to the pooling households is spent on rice. With this extra rice expenditure, each member in the non-pooling household could have access to an additional energy of 940-950 Kcal per day over each member from a fully pooling household (for details of calculation, see Appendix 18).

Now, the poverty line calorie level is 2122 Kcal, i.e., a person consuming at least that much Kcal is not nutritionally poor. The possible additional calories available to an average member of the non-pooling households, over that in pooling households, are around 45 percent of the minimum acceptable level (see Figure 6.4.3-1). This clearly shows that the apparent small difference in food expenditure share could result in a substantial change in the nutritional welfare for members of the non-pooling households.

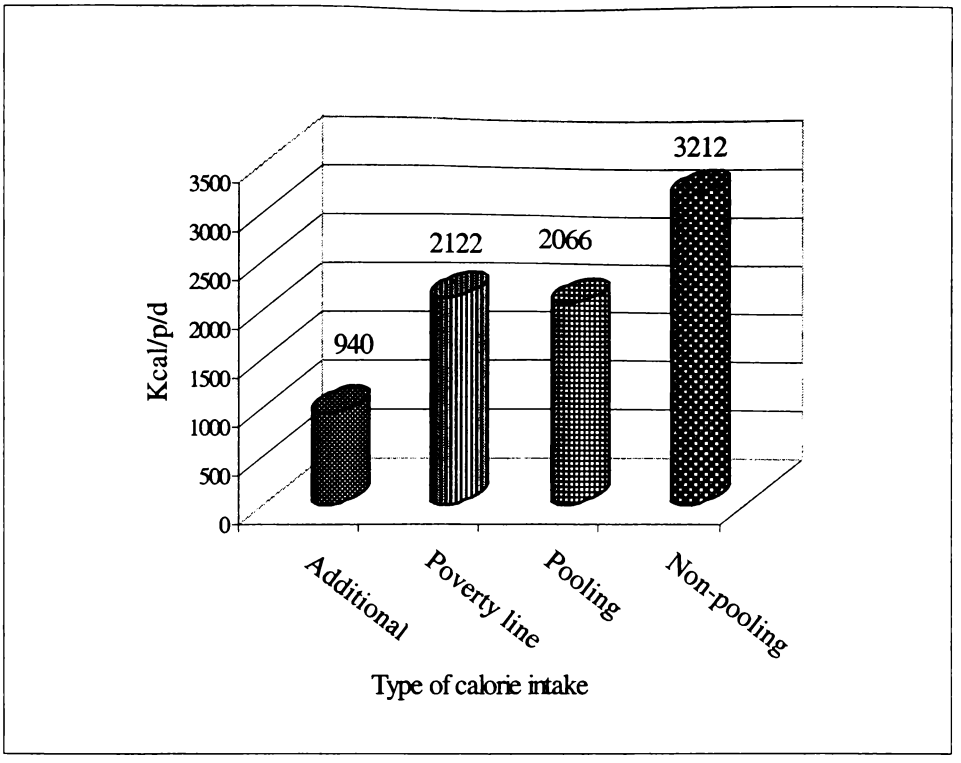

Figure 6.4.3-1: Nutritional Differences between Pooling and Non-pooling Households

There is no similar study on expenditure allocation by urban households in Bangladesh to compare with the present results. The direction of the observed changes in family nutrition, however, is in conformity with those found elsewhere. Thomas (1990), using Brazilian data, finds that unearned income in the hands of a mother has a bigger impact for both sons and daughters than income in the hands of a father. Duflo (2000a; 2000b) has shown with South African data that when women receive old age pensions, these have a large impact on children's, particularly girl children's, nutrition. For men, no such effect is observed.

It is unlikely that the additional food expenditure in non-pooling households is spent just on rice, so the impact on calories may not as great as calculated here. A full evaluation of the magnitude, rather than the direction, of nutritional welfare effects of non-pooling also depends on what items have reduced expenditure to allow for the extra spending on food. Furthermore, a larger sample may tell us more definitively just how far pooling or non-pooling of incomes of women with others, particularly men, leads to better nutrition for all. This remains a matter for future research.

Clothing share equations

The clothing share equations are shown in Table 6.4.3-2. The equations for clothing share are actually for clothing, shoes and other fabric items (e.g., bed linen). Evidently, the chosen explanatory variables explain little of the variations in clothing expenditures. However, if the pooling dummy and the log (size) are dropped, and the proportion of females in the family is included as an explanatory variable, log (PCE) has a statistically significant and positive coefficient. So does the female proportion variable. While the observed influence of female proportions agrees somewhat with evidence from elsewhere within the sub-continent,[105] the over-all explanatory power of the model remains poor.[106]

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[105] Deaton's (1997, p. 240, Table 4.4) estimates based on Pakistan data show that the coefficient for the proportion of adult women (aged 15-54) is positive for women's footwear. That is, the more the proportion of adult women rise, the more is spent on women's footwear. This is the only positive and also the significant coefficient for female demographic coefficients.

[106] The equation is

clothing share = -0.11 + 0.06 ln (PCE)** + 0.06 (Female proportion)*;
(1.47) (2.18) (1.65)

Adj. R-sq = 0.03; F-statistic= 2.42*

Table 6.4.3-2: OLS Engels Equations for Expenditure Shares for Clothes, Common Expenses and Education

Explanatory variables	Dependent variable						
	Clothing share	Clothing share	Common expense share	Common expense share	Common expense share	Common expense share	Education share (unrestricted sample)
Ln (PCE)	0.01	0.01	0.01	0.02	0.01	0.01	0.02
	(1.32)	(1.41)	(0.24)	(0.62)	(0.46)	(0.27)	(1.47)
Ln (Size)	0.07	0.009	-0.02	0.001	-0.04	-0.01	0.003
	(0.72)	(0.94)	(0.82)	(0.06)	(1.42)	(0.44)	(0.25)
Age	-0.0009	-0.0009	0.002	0.003	0.002	0.002	0.001
	(1.3)	(1.27)	(1.12)	(1.60)	(1.02)	(1.12)	(1.55)
Pooldum (=1 full)	0.005		0.07***		0.007***	0.007***	-0.018
	(0.56)		(3.34)		(3.390)	(3.40)	(1.58)
Contdum1(=1 full)		-0.001		-0.06**			
		(0.13)		(2.49)			
Female proportion					-0.13		
					(1.28)		
Proportion adult						0.06	
						(1.11)	
Male up to 14							0.11**
							(1.99)
Female up to 14							-0.001
							(0.04)
Constant	-0.08	-0.08	0.14	0.05	0.21	0.06	-0.20
	(0.70)	(0.76)	(0.49)	(0.161)	(0.73)	(0.22)	(1.35)
Adj. R-square	0.01	0.007	0.085	0.037	0.092	0.088	0.052
F-statistic	1.24	1.16	3.12**	1.87	2.84**	2.75**	1.84*

Note: ***, ** and * indicate significance at 1, 5 and 10 percent probability respectively.

Common household expenses share equations

Four equations have been reported on expenditure shares for common household items and expenses such as house rent, energy bill, other necessities for the household and other items. Such consumption can be categorised as those for a household's public good, which is enjoyed by everyone in the household. It is thus likely that, at least up to a point, once such expenditures are decided, family size will have little role to play.[107]

Table 6.4.3-2 shows that common household expenditure is influenced significantly only by the pooling or control of resources. These have coefficients of opposite signs but of roughly equal magnitude. The coefficients suggest that when women fully control their own income, the share of common household expenditure falls compared to the situation when they do not. Note that when women control their own income, they can devote a part of that to the common needs of the household, to food as shown earlier and also a part to their own personal needs. If these latter two predominate, this may lead to a negative influence on household expenditure on a range of common items.

Education expenditure share equations

Earlier, the problem of zero educational expenses was raised. As a result of the problem, the estimated equations have to be interpreted with caution. Accordingly, only one equation is shown by way of illustration. The explanatory power of the equation is poor while none of the variables, except one, have a significant coefficient. As the proportion of boys increases, the share of educational expenses increases. This is also significant showing the preference given to male (boy) education.

[107] After all, if there is an additional member in the family, it is hardly likely that a new cooking pot will be purchased. But expenditure on say, food, and therefore total expenditure, will rise. As a result, the share of household expense will fall if family size rises which explains the observed negative coefficient of log (size).

Health expenditure share equations

Health expenditure equations are shown in Table 6.4.3-3. Though less precisely estimated, health expenditure share equations behave more or less like the food share equations. Indeed, food and health expenditure have certain common characteristics. The needs for food and health are individualised and are better catered to if women control their income. Like the food share equations, per capita expenditure and family size do matter in a major way also in case of health. Age has positive and statistically significant coefficients in half of the cases.

On the other hand, the coefficients for proportions of adults in the household are positive and somewhat significant. Thus, the needs of the adults get preference over those of the non-adults. This is also evident from the negative coefficients for boys and girls up to 14 years of age. This is interesting because it indirectly supports the view that the cost of illness is high in the poor households. It is not simply that they have to spend money for getting well, but more importantly, the more they remain sick, the more they lose income and the whole family therefore suffers. The attendance rules in the RMG factories are very strict and late attendance for three consecutive days leads to loss of one day's salary (as respondents informed the author during the interview). Continued absence may also lead to the possible loss of jobs. Thus, the respondents can ill afford not to treat their illness if they fall sick or remain absent from work to nurse the sick at home.

Lastly, the behaviour of the pooling/control of resources shows that the more control women have, the more they spend on health. Given the possible costs of sickness as described above, it is hardly surprising that it is so. The coefficient, however, is not statistically significant, nor is that of pooling.

Table 6.4.3-3: OLS Engels Equations for Health Expenditure Shares

Explanatory variables	Dependent variable							
	Health share	Health share	Health share	Health share	Health share	Health share	Health share	Health share
Ln (PCE)	0.006***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***	0.06***
	(3.10)	(3.11)	(2.99)	(2.97)	(3.18)	(3.20)	(3.00)	(3.00)
Ln (Size)	0.03*	0.03*	0.04*	0.04*	0.04**	0.04**	0.04**	0.04**
	(1.94)	(1.95)	(1.74)	(1.70)	(2.37)	(2.35)	(2.35)	(2.36)
Age	0.002*	0.002	0.002*	0.002	0.002*	0.002	0.002*	0.002
	(1.82)	(1.47)	(1.83)	(1.48)	(1.83)	(1.49)	(1.85)	(1.51)
Pooldum	-0.009		-0.009		-0.007		-0.009	
	(0.58)		(0.58)		(0.49)		(0.56)	
Contdum1		0.02		0.02		0.02		0.02
		(1.14)		(1.13)		(1.10)		(1.12)
Female proportion			0.02	0.02				
			(0.29)	(0.25)				
Proportion adult					0.07*	0.07*		
					(1.64)	(1.64)		
Male up to 14							-0.10	-0.09
							(1.32)	(1.31)
Female up to 14							-0.05	-0.05
							(1.06)	(1.08)
Constant	-0.60***	-0.59***	-0.61***	-0.60	-0.67***	-0.67***	-0.59***	0.58***
	(3.00)	(3.00)	(2.99)	(2.97)	(3.33)	(3.33)	(2.92)	(2.91)
Adj. R-square	0.079	0.089	0.069)	0.079	0.096	0.106.	0.088	0.098
F-statistic	2.95*	3.33**	2.35**	2.57**	2.94**	3.17***	2.47**	2.65**

Note: ***, ** and * indicate significance at 1, 5 and 10 percent probability respectively.

6.4.4 Conclusion

Given that the sample size is small, the results of the analyses of expenditure patterns and resource allocation within the household need cautious interpretation. Yet, these show that there is a positive impact of control of resources (as a consequence of non-pooling) by women on food expenditure and on nutrition. A similar but somewhat less precise situation obtains in the case of expenditure on health. In other cases, the results are not so clear-cut. Given that food is the most important resource to be allocated within a poor household, it can be concluded, however, that women's greater control over resources may have improved the nutritional well-being of the members of the households of these urban women workers in Bangladesh.

The influence of pooling, however, may be subtler than what the above results suggest as indicated by the positive coefficients of pooling on common household expenditures. It will be shown in Section 6.6.5 in this chapter that pooling of resources may also have positive effects in terms of higher material standards of living. This is advanced through creation of household public goods, which every family member jointly shares, as opposed to expenditure on food and health, which are more individually apportioned.

6.5 Savings and Credit

6.5.1 Savings Behaviour

Most of the respondents try to save either for daily necessities in times of need or for expenditure on more durable items. Saving at the time of survey, however, was observed more frequently among the working than the control women. Thus, 58 percent of workers compared to 41 percent of the control women had some savings.[108] The average amount saved among workers was Taka 4075 and that among the control was only Taka 1218. The difference is statistically significant.[109]

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[108] The women were asked if they had any savings of their own and if they had, what was the amount.

[109] The test of significance found the two series of savings (of workers and control) to have unequal variance (F= 30.14 for equality assumption and highly significant) and the absolute t statistics = 4.92 (with unequal variance) and highly significant.

The idea of stochastic dominance (Atkinson: 1987; Deaton: 1997; Fields: 2001; Foster and Shorrocks: 1988; Ravallion and Huppi: 1991) is used to compare the distribution of savings between the worker and the control group of women. The concept of stochastic dominance is described in Appendix 19. Briefly, the method entails the estimation of the cumulative distributions of the variable of interest (savings in the present case) under different situations. Suppose the curve for cumulative distribution of control women is wholly on the left and above the curve for the workers at time of the survey. This means that for every given proportion of people, the savings in the case of the workers is higher than that for the control women.

The cumulative distribution function (CDF) of savings by the worker group first order dominates the CDF of savings for the control group.[110] Figure 6.5.1-1 shows that every point of the latter is above and to the left of the CDF for the workers. What this means is that for any given proportion of women, those among the control group have lower savings at the time of the survey than the workers. A Kolmogorov-Smirnov test found the two distributions to be different.[111]

One reason for the difference in saving behaviour could be that working women save out of their own regular income, whereas the control group women, on the other hand, save mainly out of whatever money they got from various sources such as, husbands, parents or others. Thus, for the control women there is no regular source from which to save.

Savings are kept with the respondent herself in about 29 percent of the cases both among the worker and the control group women. Twenty percent of the workers, compared to only six in the case of the control women, keep their savings in a bank account. This has important implications not only from the individual's point of view but also at the macro level.

[110] See Appendix 19 for description of first and higher order stochastic dominance.
[111] The relevant z statistic is 2.54, which is asymptotically significant at 1 percent.

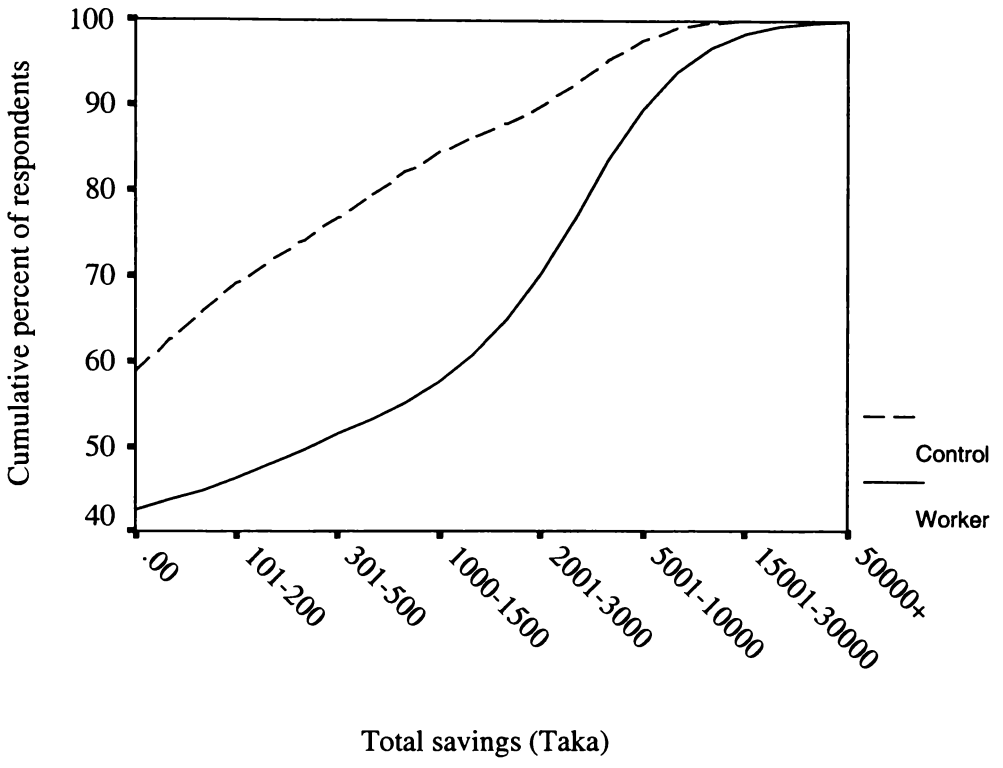

Figure 6.5.1-1: Cumulative Distribution Functions of Present Savings

The utilisation of savings has a certain commonality between the workers and the control women. Thus, among the workers, in 44 percent of the cases, some money from savings is spent either for daily necessities at times of need or for other purchases, particularly for children in the family. The corresponding percentage for the controls is the same. However, 48 percent of the workers do not spend all their money as soon as they save it. They accumulate the whole or part of it. About 21 percent of them do subsequently invest part of the savings for purchase of land, livestock or poultry or consumer durables such as ornaments, TV and furniture. Loan repayments are less important for the workers (1.4 percent cases) than for the control (3.8 percent).

6.5.2 Explaining Saving Behaviour

Introduction

Saving is usually measured as a flow variable i.e., so much saved within a given period, a year or a quarter. It is assumed, among other factors, to be a function of income and wealth (Schmidt-Hebbel, Webb and Corsetti: 1992). In countries with developed capital markets and ready availability of various instruments of saving

(such as bank deposits, bonds, shares in companies), saving is also a function of the alternative expected rates of return and riskiness of the various instruments. But in a developing country such as Bangladesh, where the capital market is not developed nor the instruments of saving widely available, people may prefer to keep their money in cash, either with themselves or in the bank.

The question studied here is whether there is any pattern in the saving behaviour of the respondents. A note of caution applies here. First, the information I have is on the amount of savings accumulated up to the time of the survey, i.e., these quantities are stocks, not flows.[112] So, the estimated equations are not the conventional savings functions. But given that income is a major variable that affects savings, variables that influence income either directly or indirectly may be used as explanatory variables in these equations.

Second, as the capital market is not developed and there is a dearth of available instruments of savings, their rates of return or riskiness are unlikely to be major factors in deciding upon whether or how much to save. In fact, it may be argued that as the public authorities in these countries often regulate the interest rates and keep them artificially low, a phenomenon called financial repression (Gupta: 1984; McKinnon: 1973; Shaw: 1973), savers may not be much interested in saving through these instruments.[113] In such a situation possibly the transactions and precautionary motives of cash holding and saving are major factors.[114] Other types of variables that have been cited in the literature and may be relevant in the developing country context include, apart from interest rates, public savings and demographic variables (Schmidt-Hebbel, Webb and Corsetti: 1992).[115] Thus, factors that influence transaction or precautionary motives and

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[112] The way it has been measured here, saving does not include any fixed investments, although a more proper estimate should include them This will, however, necessitate a much more thorough data collection method which was beyond the scope of survey for the present study.

[113] For investigations of how rigid or liberal financial regimes may affect savings behaviour in various ways such as interest rate and liquidity constraints, in developing countries, see Balassa (1990), Bandiera *et al.* (1999), Feltenstein, Lebow and Wijnbergen (1990), Haque and Montiel (1989) and Melo and Tybout (1986).

[114] The real motive may be consumption smoothing due to uncertain future income. Credit or borrowing constraints due to undeveloped capital and insurance markets in developing countries, which may help in smoothing has received a lot of attention by economists. See Browning and Lusardi (1996), Deaton (1990, 1992). Also see Morduch (1995) and Townsend (1995) on how consumption smoothing may take place in various ways.

[115] Browning (2000) has proposed an interesting model of household savings behaviour based on the premise that wives usually are younger than husbands and also live longer, thus, providing more incentives to wives for saving than men. Such a model therefore may be fruitfully used in Bangladesh in future research to explain savings behaviour of working women who also are much

demographic variables should be included among the explanatory variables in the equations to be estimated.

Econometric considerations

A large proportion of the workers and the control group women have no savings, i.e., the value of their savings is zero. The straightforward application of OLS may not be appropriate here because the dependent variable is limited between zero to any positive integer i.e. it has two components, one part is uniformly zero (lying along the X-axis) and the other part is a positive figure (Gourieroux: 2000). In such a situation the application of OLS can give biased estimates and the preferred estimation is Tobit (Gourieroux: 2000).[116] For comparative purposes, however, I have shown the OLS regression using non-limit values of the dependent variable. As income is a major determinant of savings, only information for the sample of workers has been used for estimation of the savings equations. The variables that have been used are described below.

Variables for econometric estimation

Dependent variables

Save (Present savings in taka): This is the dependent variable and measured as the accumulated savings at the time of interview. This has been used for the first OLS equation. For the logarithmic equation the dependent variable is ln(Save).

Explanatory variables

The explanatory variables are of two types, those that influence income directly or indirectly and those that influence consumption behaviour. Several such variables are age, education, marital status, sources of non-labour income, length of job experience, type of jobs done, migration and family headship. I also include the squares of age and the length of job-experience to explore non-linearity of their

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younger than their husbands. See also Cain (1981) who has invoked an insurance motive in the behaviour of women in Bangladesh.

[116] It may be noted that respondents may have purchased land with their past savings. As land ownership is one of the explanatory variables, its coefficient is likely to be biased in ordinary circumstances. However, as explained in fn. 107, such investment expenditure is not included in the estimate of savings. Hence, land ownership is not endogenous and its coefficient is not likely to be biased.

influence. Among the variables that may influence consumption or its level is family size and pooling behaviour.

A question arises if the current income of the respondent should be used as an explanatory variable. Had only last month's savings been used as the dependent variable (either in absolute or as a ratio of income), the current income could be used as an explanatory variable. However, as the dependent variable is accumulated savings, current income may not be a correct explanatory variable. If data on past incomes were available, these could be used to explain accumulated savings. One may argue, in this case, that the current income is normally dependent on past incomes. In that sense, the use of current income as an explanatory variable may be justified. Also the length of job experience shows how long the person had been working and thus earning an income. Thus, this too may serve as a good proxy for the past as well as current income.

In general, variables influencing income positively are expected to influence savings positively. More specifically age, length of experience, better education, being in managerial jobs and having an alternative source of income all lead to higher possible income, and therefore better saving capability. The signs of the coefficients of these variables are expected to be positive. If consumption smoothing is a major motive, young people may save less than the older persons. Age, from the consumption smoothing angle, may thus have a positive coefficient. But later in life, as predicted by the life cycle model of savings (Deaton: 1990), the much older ones may also dissave in which case, the square of age should have a negative sign.

Pooling of earnings results in general in less control over resources and thus the capacity to save may be lower and the coefficient will be negative. Indeed, if Browning's (2000) arguments are accepted, one of the reasons for not pooling may be to save the money by the wife for the day when the husband may no more provide for her.

Female headship usually denotes a depressed economic condition, in which case savings should be lower and the sign of the coefficient (*headdum*) will be negative. Similarly, migrants may have to send money to the villages in such a case, the savings will be lower and the sign of the coefficient (*migdum*) shall be negative. Then again, a large family size may mean burden of daily necessities lowering the capability to save and therefore the coefficient (*Livesize*) may be

negative. Married women may have either a lower or higher savings depending on the urge to save for a rainy day while the capacity to save may be lower due to burden of the family. *Mardum* may thus have either a positive or a negative coefficient. The availability of non-labour income and thus the ownership of land may raise the propensity to save particularly as this is likely to be a variable source of income (Adams: 2002). In that case, land ownership may have a positive coefficient.

As all these variables are defined in chap 5 and Section 6.4 in this chapter, I shall not repeat them here. The variables, along with their means and standard deviations, are shown in Appendix 20.

6.5.3 Results

Equation 1 in Table 6.5.3-1 is the OLS regression equation using the full sample (i.e., including zero observations). When there are a large number of observations the preferred model is Tobit (equation 1). I have estimated the Tobit regression with the lower bound taken to be zero. There is no upper bound, as the amount saved may have no maximum value.[117]

The OLS (equation one and three) and the Tobit (equation two) regressions show results, which are often quite similar. The signs generally are as expected. Age has positive and statistically significant coefficients in both equations 1 and 2 while the square term of age has the opposite sign and statistically significant coefficients in both. Consumption smoothing may thus be taken to be a major factor behind saving. Other major factors include the access to real productive wealth such as land, which again has significant and positive coefficients in both the equations. The length of job experience similarly has a significant and positive relationship with savings. Migratory status has a significant and negative influence.

Education appears to have little systematic role in saving behaviour. The influence of job type is also weak. Demographic variables such as family size have some weak influence but marital status does not. Female headship and pooling do not appear to be of much consequence.

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[117] The equation indicated heteroskedasticity. Tobit regression assumes constant variance of the error term. The presence of heteroskedasticity may create problems of inconsistency (Gourieroux: 2000, p.193-195). The results therefore need to be interpreted cautiously.

These equations may be contrasted with equation 3, which is a semi-logarithmic OLS equation. The signs of the coefficients are again mostly as expected except for the family size variable which has changed sign. But, the coefficients remain insignificant. Again, access to land and job experience turn out to have the most systematic influence. Other variables have mostly at best weak influence.

Table 6.5.3-1: Regression Equations for Savings Behaviour

Explanatory variables	Dep var: Save	Dep var: Save	Dep var: ln (Save)
	Equation 1 (OLS)	Equation 2 (Tobit)	Equation 3 (OLS)
Age (age of respondent)	1142.26*	2018.26**	0.22
	(1.89)	(2.07)	(1.50)
Agesq (age square)	-22.12**	-38.73**	-0.004
	(2.04)	(2.19)	(1.37)
Lenrmg (Years in RMG job)	1051.75**	1524.14**	0.37***
	(2.37)	(2.11)	(3.26)
Lenrmgsq (square of lenrmg)	-27.37	-49.77	-0.02**
	(0.98)	(1.05)	(2.47)
Livesize (total family members with respondent including self)	-129.09	-795.55*	0.011
	(0.50)	(1.84)	(0.16)
Eddum1	-942.73	-1068.94	-0.25
(education up to primary = 1)	(0.56)	(0.42)	(0.72)
Eddum2	1331.32	1746.23	-0.06
(education 6 – 10 years=1)	(0.80)	(0.70)	(0.17)
Manual2 (manual = 1)	-2238.67	-3865.62	-0.98**
	(1.19)	(1.33)	(2.31)
Skill2 (tech/semi-technical=1)	-3247.81**	-4131.69*	-0.54*
	(2.17)	(1.85)	(1.78)
Mardum (ever married = 1)	695.39	1627.65	0.39
	(0.53)	(0.79)	(1.22)
Landdum (own land = 1)	2526.11**	5346.16***	0.69***
	(2.27)	(2.93)	(2.61)
Migdum (migrant = 1)	-4020.34**	-6009.14**	-0.60*
	(2.53)	(2.46)	(1.70)
Headdum (female headed = 1)	-792.51	-2087.39	-0.61*
	(0.51)	(0.85)	(1.71)
Pooldum (pool =1)	-374.14	-1192.02	-0.18
	(0.24)	(0.52)	(0.57)
Constant	-9312.10	-22213.09*	4.43**
	(1.16)	(1.72)	(2.29)
Adjusted R^2 /Pseudo R^2 (tobit)	0.185	0.019	0.373
F/(log likelihood for tobit)	5.124***	-1629.70	7.21***
N of observation	256	256	147

Note: 1. Figures in the parentheses are absolute t-statistics.
2. ***, ** and * indicate statistical significance of the relevant statistic at 1, 5 and 10 percent probability respectively.

I reestimated the equations 1 and 3 with the current income as an additional explanatory variable (not shown). While it has positive and statistically significant coefficients, other results remain broadly unchanged. In case of the log-linear equations, adjusted R-sq in fact fell.

6.5.4 Credit Taken and Given

Borrowing and giving loans are both infrequent among the workers and the control group women (Table 6.5.4-1). Yet borrowing is somewhat less frequent and giving loans is more frequent among the workers compared to the control women. Also, among workers the average amount of borrowing is smaller than among the control group.

Table 6.5.4-1: Credit Behaviour of Worker and Control Women

Group (Taka)	Credit taken		Credit given	
	Worker	Control	Worker	Control
Percent participating	21.5	30.0	21.5	8.5
Average credit (Tk)	972	1521	511	71

Both workers and the control women lend money to others, the former more so than the latter. Also, the amount lent by workers is usually larger than that by the control women.

Meeting various family expenses appears to be the main reason for borrowing both among the worker (12 percent) and the control women (18 percent). It also appears that among both the groups of women there are cases, admittedly only a few, who have borrowed for the sake of their parents and husbands. The relative incidence of such borrowing is higher among the control than the workers.

6.5.5 An Over-all Assessment

The savings and credit behaviour described above indicate the general relative economic well-being of the workers compared to the control. More importantly, the thrift that the workers has shown by keeping money in banks and also accumulating as much as possible, indicates that they are actually trying to save for the future when they may no longer be working (i.e., it reflects a tendency towards consumption smoothing). Given the physical environment in which they

work and live, and the long hours of physical labour, their health may be compromised and they soon get fatigued, as revealed when discussing these issues with the women workers. Thus, their future income becomes uncertain. As an agitated girl exclaimed, "*Chirokali ki ekhane thakbo, amader ki bhobissot nai*" (we are not going to stay in this job for long, we must look forward to have a better future). On probing, they admitted that it is for this future that many do save as much as they can. This indicates that this is a precautionary motive of savings and less so for investment. If their saving is to be channeled into more productive purposes their working and living conditions must improve so that they may have longer and healthier working lives and consequently more certain future income. Some of these issues are analysed in Chapter 7, Section 7.7.

6.6 Changes in Material Standard of Living

6.6.1 Introduction

This chapter has shown that women's earnings add to their family income and affect current consumption and savings behaviour. They may also impact upon expenditure for improving quality of life or standard of living (SL). Apart from its (SL) importance in its own right as an indicator of household welfare, the standard of living is also thought to influence the health status of the respondents and their family members (Chapter 7, Section 7.7).

This section tries to measure the living standards of the families of the women workers and compare this with their own previous situation and with the situation of the control group women. The temporal comparison is for the workers between the time of their first employment in the RMG (or marriage whichever is later) and the time of the survey. The relationship between the standard of living and other personal and family characteristics of the respondents is also investigated.

6.6.2 Standard of Living Indicators and Methods of Comparison

Indicators

In this section, I construct a composite standard of living index (SLI), based on a set of physical indicators. These indicators include ownership of or access to ten types of assets or physical facilities that the family of a worker respondent had at

the time of the survey and at the beginning of work in RMG.[118] These include residential location (in slum or outside slum), access to electricity, safe water, and hygienic sanitary facility, ownership of sanitary facility, type of structure of house, cooking fuel used, having a kitchen separate from the main room and ownership of a TV or a radio/two-in-one. The same information is collected from the control group of women but only for the time of the survey as establishing a comparable benchmark in time for them was difficult.

The indicators may be used separately or an aggregate indicator may be constructed from them. Both have been used in the literature (Filmer and Pritchett: 2001; Gaviria and Pages: 2002; Hewett and Amin: 2001; Hewett and Montgomery: 2001). For the aggregate measure the questions are: what values to be imputed to the ownership of or access to the assets/facility and then how to assign weights to these values of the indicators. For the first part, usually the ownership or access to desirable facility is assigned a value of unity and its absence a value of zero. To resolve the second problem, several methods may be used. For example, the imputed values of the assets/facility may be added without assigning weights to them. This means each asset has equal weight. Prices may be used as weights but these are not available. On the other hand, using prices may give wrong impressions as cheap but effective hygienic measures (supply of piped water) will be valued less than costly assets (such as TV) which may not have any such direct role. Others (Filmer and Pritchett: 2001; Hewett and Amin: 2001) have used principal component analysis (PCA) to aggregate the indicators, which use factor scores as the weights. While PCA is an accepted method of aggregating a diverse set of variables into a few, it is not immediately obvious, however, if the factor scores so derived are better than the simple equal weights. On the other hand, the equal weights method is computationally simpler and yet can lead to interesting insights as I show below. I have therefore used only the uniform and equal weights for arriving at the aggregate SLI.

[118] For married women, the time is shifted to time of marriage if it takes place after joining RMG as otherwise the comparison would not be valid. For unmarried women, this problem does not arise.

Equal weights method: Having a safe, sanitary or quality service or facility is given a value of unity and zero otherwise (except in two cases where there is a middle value).[119] The aggregate of the values is averaged, by dividing it by ten (which is the number of types of asset or facility).

Method of comparison: Stochastic dominance

The idea of stochastic dominance discussed in Section 6.5.1 in this chapter, has been used also to compare the SLI of worker households between the time of first employment in RMG and at the time of the survey. A comparison is also made between workers and control households at the survey time.

6.6.3 Changes in Living Standards

Under the equal weights method, the value of SLI ranges from zero to unity. The mean values of SLI for the control, pre-RMG workers and post-RMG workers are 0.47, 0.53 and 0.65 respectively. The corresponding median values are 0.50, 0.55 and 0.65. These figures indicate the improvement in the standard of living of the worker households during the tenure of their employment. Furthermore, the workers at the time of the survey had a better standard of living compared to the control.

For a more concrete analysis, I have examined if the cumulative distributions under the three situations exhibit any stochastic dominance. The results are shown in Figures 6.6.3-1 and 6.6.3-2. The results demonstrate an unambiguous improvement in the standard of living of the worker households at the time of the

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[119] The values assigned are

Living outside slum = 1; 0 otherwise
Electricity connection = 1; no connection = 0
Housing structure brick-made = 1; partly brick = 0.50; thatched = 0
Water source piped = 1; hand tube well = 0.5; others = 0
Own sanitary facility = 1; not owned = 0
Hygienic sanitary facility = 1; others = 0
Cooking fuel gas/electricity = 1; wood/kerosene = 0
Kitchen separate = 1; not separate = 0
TV owned = 1; not owned = 0
Radio-two-in-one owned = 1; not owned = 0.

The values basically indicate only ranking in terms of quality of the facility. Thus, a slum is likely to be less healthy a place than others outside. Similarly, both fuel wood and kerosene lead to internal air pollution and thus less healthy than the use of electricity or gas. The sum of the values is averaged to arrive at a subjective idea of the standard of living.

survey over that at the time of entry into RMG and also over the control households at the time of the survey.

6.6.4 Proximate Determinants of SLI

The variables

The preceding discussion suggests strongly that labour force participation of women may account for the difference in the SLI between the control and the worker groups. However, there is no data on the control comparable to the pre-RMG situation of workers. I have therefore tried to explain only the difference in SLI at the time of the survey among the workers.

Both OLS and Tobit regressions are used for explaining the variation in the SLI. Tobit is used because the dependent variable (SLI) is censored on both sides (Greene: 2000) and as its expected value cannot be less than zero or more than one. The variables that have been used as are as follows.

Dependent variable: SLI estimated for worker households at the survey time (1997).

Explanatory variables: Several types of explanatory variables have been used. These are personal characteristics of the respondent (such as age, marital status, education and migration); family characteristics such as family headship, family size, number of children, economic characteristics such as work experience, income by source and resource pooling within the household. The way these variables have been measured and their expected influences on the SLI are discussed below.

Age and Age-sq: As people age, they have a chance to earn an income, raise and be more attentive to the family and thus may try to have a better life. Thus, age may have a positive influence on standard of living. However, as people may approach a saturation point for such a standard within a social setting, with age the increase in standard of living may get slower. Square of age may thus have a negative coefficient.

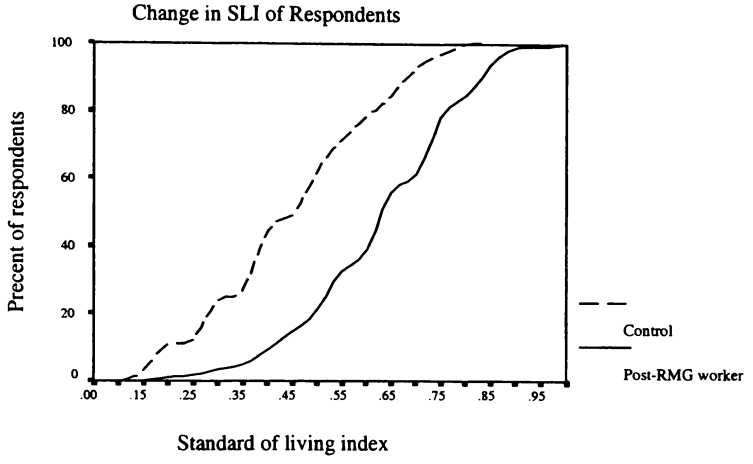

Figure 6.6.3-1: Difference in SLI between Control and Workers at Time of Survey

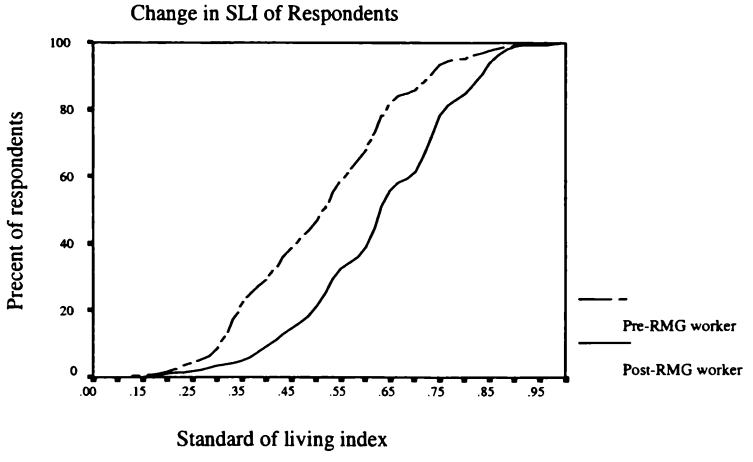

Figure 6.6.3-2: Difference in SLI between Workers at Time of RMG Entry and Survey

Migration dummy: This is a dummy variable with a value of zero for non-migrants and unity for migrants. There is no *a priori* reason to think that migrants are more or less likely compared to non-migrants to increase their standard of living. It may, however, be noted that migrants may have to remit money to the village (place of origin) and thus may be less likely than others to spend money for raising their own standard of living at least initially. If true, the migration dummy variable may have a negative coefficient.

Marital status dummy: The marital status dummy has a value of zero for unmarried and one for ever married women. A married woman is likely to have

more family obligations and to be more attentive to family welfare. Additionally, marriage also means that most likely there is at least one other earner in the family, which raises the total availability of resources. The marital dummy may therefore have a positive coefficient.[120]

Education dummies: Two education dummies have been used which are *Eddum1* (=1 if educated up to primary level (five years of schooling); zero otherwise) and *Eddum2* (= 1 if with mid-level education; = 0 otherwise). It is hypothesised that with better education and more knowledge, people may like to have a better standard of living. Thus, both *Eddum1* and *Eddum2* are expected to have negative coefficients.

Lenrmg, Length of RMG experience (years): In Chapter 5, the role of length of job experience in RMG was found to be one of the most influential variables in determining wage levels. Thus, longer experience may reflect higher income. Also, as the experience of work by women increase, it is expected that they will have more and more exposure to the outside world and the demand for a better standard of living will rise. The variable is, therefore, expected to have a positive coefficient.

Income variables: A higher income for the family is probably the best way to ensure a higher standard of living. Three income measures have been used. These are "estimated household income", "observed total monthly wage of women" and "non-labour income". The last mentioned variable is measured as a dummy for land-ownership with a value of unity for owners and zero for others. In all cases, the variables are expected to show positive coefficients.

Note, however, that except for non-labour income, others are current income, which may not be a correct measure of financial capability. The long-run average income may be a better indicator in such a situation. The actual income in any given month may be different from its long-run average for many reasons

[120] Strictly speaking one should have 3 categories here, viz., currently married, widow/divorced and unmarried. As there are only a few persons in the second group, they have been put together in the first group.

including illness and other factors. Coefficients of such income variables may, therefore, need to be interpreted cautiously.

Family headship: This is a dummy variable with a value of unity for female headed households and zero otherwise. Female-headed households are often found to be economically weaker than male-headed households and thus they may be less capable to raise their standard of living. Everything remaining the same, a female-headed household will have a lower SLI compared to a male-headed one. The coefficient of the variable is therefore expected to be negative.

Livesize (Family size): This is the total family size living together with the respondent. Everything else remaining the same, the larger a family is, the higher will be the daily expenditures and less will be left for acquiring assets or having access to facilities for a better standard of living. It is expected therefore that the relevant coefficient shall be negative.

Nchild (Number of children): Rather than using the total family size, it is possible to use the number of children a woman has as the explanatory variable here. More than family size, it is likely to be the children's welfare, which is uppermost in people's mind. There are various items of expenditure for children, such as those for proper nutrition, schooling and dress, which usually get precedence over other expenditure. More children mean more such expenditure and less for those which raise the standard of living for all in the family. In such a situation the coefficient is expected to be negative.

Resource pooling dummy: If women do not pool resources, they pay more attention to food and other similar items of expenditure (Section 6.4, this chapter). In a pooling situation it is the opposite. But if women pool, the over-all planning for daily necessities and more durable expenses for raising standard of living can possibly be done better as has been evident for common household expenditure equation in Section 6.4.3. If so, in such a situation, the pooling dummy variable (= 1 for pooling; 0 otherwise) is expected to have a positive coefficient.

There is a possibility of reverse causation here. It may be that wealthier families may pool resources and thus the observed relationship may be the

discovery of this pattern. But note that in Section 6.3, no clear relationship between income and pooling could be observed. So, the influence of pooling is unlikely to be due to the income position of the worker.

6.6.5 Results of Analysis

Means and standard deviations of the variables for the regression equations are shown in Appendix 21, Table A21-1. Table 6.6.5-1 shows that OLS and Tobit equations provide similar results. The signs of the coefficients tend to be as expected.

Among individual characteristics variables for education and migration stand out as having systematic influence. The lowest level of education (up to primary) goes with the lowest level of standard of living. Also, everything else remaining the same, migrants have a lower material standard of living than non-migrants.

Among family characteristics, family size has no significance while for number of children the signs are both negative and significant and also similar across models. Thus, everything else remaining the same, more children create conditions, which lead to lower material standards of living.

Length of job experience, whenever entered without the income variables, has a positive and significant impact on standard of living. When experience is considered together with either worker's total monthly income or total household income, one or the other of the variables becomes insignificant.[121] Again when entered alone, the actual income variable (*totpay*) has positive and statistically significant coefficients. What all this means is that either of these variables may be taken as a proxy for financial capability to save. Land ownership as the source of non-labour income is not important in determining the SLI but it mostly has a positive coefficient.

Lastly, the influence of the pooling dummy seems to be robust and, except in one equation, significant (weakly in 3 and strongly in 2 equations). Thus, pooling may allow the creation of household public goods in the form of better standard of living in which everybody shares.

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[121] The correlation coefficients between years of RMG experience on one hand and household income and monthly wage on the other are respectively only 0.08 and 0.42. Only in the latter case it is statistically significant at 1 percent probability. Possibly because of the significant relationship when the wage variable (totpay) is entered, the coefficient of the job experience variable falls sharply (equations 2 and 3).

Table 6.6.5-1 Regression Equations for Standards of Living (Workers)

Explanatory variables	OLS			Tobit		
	Eqn. 1	Eqn. 2	Eqn. 3	Eqn. 4	Eqn. 5	Eqn. 6
Age	0.0144	0.0120	0.0110	0.0132	0.0129	0.0079
	(1.02)	(1.23)	(1.15)	(1.21)	(1.18)	(0.75)
Age-sq	- 0.0003	- 0.0002	- 0.0002	-0.0002	-0.0002	-0001
	(1.14)	(1.41)	(0.95)	(1.08)	(1.05)	(0.56)
Mardum	-0.0128			0.0046	0.0078	0.0137
(married=1)	(0.45)			(0.17)	(0.28)	(0.54)
Eddum1	- 0.0843***	- 0.0630**	- .0587**	-0.0939***	-0.0944***	-0.0563**
(primary=1)	(2.81)	(2.36)	(2.23)	(3.57)	(3.59)	(2.18)
Eddum2	- 0.0478	- 0.0386	- 0.0256	-0.0451	-0.0450	-0.0236
(6-10	(1.51)	(1.31)	(0.87)	(0.14)	(1.49)	(0.81)
years=1)						
Migdum	- 0.0935***	- 0.0924***	- 0.0962***	-0.0938***	-0.0923***	-0.0994***
(migrant=1)	(2.75)	(2.97)	(3.17)	(2.85)	(2.79)	(3.20)
Livesize	-0.0036	0. 0015			0.0020	
(number)	(0.60)	(0.31)			(0.37)	
Nchild			- 0.0322**	-0.0352**	-0.0365**	-0.0317**
(number)			(2.47)	(2.53)	(2.55)	(2.40)
Headdum	- 0.0228			-0.0368	-0.0349	-0.0326
(female	(0.67)			(1.15)	(1.07)	(1.06)
headed=1)						
Lenrmg	0.0085***	0.0019	0.0038	0.0100***	0.0099***	
(years)	(2.60)	(0.61)	(1.19)	(3.26)	(3.22)	
Tothhincm	0.000007					
	(1.25)					
totpay		0.00004***	0.00004***			0.00005***
		(4.30)	(4.30)			(5.51)
Landdum	0.0098			0.0054	0.0061	-0.01328
(Own	(0.41)			(0.23)	(0.26)	(0.59)
land=1)						
Pooldum	0.0564*	0.0520*	0.06**	0.0626***	0.0592*	0.0403
(Pool=1)	(1.73)	(1.79)	(2.20)	(2.07)	(1.87)	(1.37)
Constant	0.517***	0.490***	0.48***	0.5339***	0.5307***	0.5365***
	(2.77)	(3.79)	(3.74)	(3.62)	(3.60)	(3.78)
Adj./pseudo R-sq	0.104	0.163	0.183	-0.2254	-0.2261	-0.3118
F	3.42***	6.51***	7.34***			
Log -likelihood				121.10	121.17	130.26
N of observation	251	255	255	254	254	255

Note: 1. Figures in parentheses are absolute t-statistics.
2. ***, ** and * indicate statistical significance at 1, 5 and 10 percent probability respectively.

6.6.6 Conclusion

The findings in this section show clearly that the worker women's households fared better in terms of standard of living compared to their own situation prior to entry into the RMG factories. They also fared better compared to the control women's households. Among the workers, differences in standard of living arose

due to several factors including education, long-term job-holding and consequently higher income as well as pooling of resources.

6.7 Summary

This chapter traced the changes in the time and household resource allocation patterns and behaviours in the lives of working women. These have been contrasted with the situation for the control women whenever feasible. Under the heading of resource allocation, the behaviour regarding pooling and its effects on consumption expenditure, savings and standards of living have been assessed. The salient findings are as follows.

Women work long hours both at the work place and at home. As a result, they sometimes have to sacrifice even sleep time to an extent. The unmarried women and married women who have other senior women to help at home are in somewhat better situation.

It has been argued that the control, rather than pooling, of resources captures the essence of financial autonomy of women and, by logical extension, of differential preferences within the family. On the other hand, the two are empirically broadly opposite types of behaviour. There is a positive impact of control of resources (as a consequence of non-pooling) by women on food expenditure and on nutrition. A similar but somewhat less precise situation obtains in the case of expenditure on health.

An analysis of savings revealed the general relative economic well-being of the workers compared to the control. The savings behaviour also indicated consumption smoothing and precautionary savings. Worker women's households fared better in terms of material standard of living compared to their own situation prior to entry into the RMG factories and also compared to the control women's households. Among the workers, differences in standard of living were found to be due to several factors including education, long-term job-holding and consequently higher income as well as pooling of resources.

Childbearing disrupts women's labour market participation and may lead to loss of present earnings and additional costs in terms of child care and related expenses. Chapter 7 analyses these issues. Other related issues such as health status and its possible adverse effects on women's earnings are also investigated therein.

CHAPTER 7
REPRODUCTIVE BEHAVIOUR AND HEALTH ISSUES

7.1 Introduction

In this chapter I concentrate on the reproductive behaviour, child care, and health issues that are related to women working for income outside the home. Conception, birth and rearing of a child all impose costs on the parents. Some are direct financial costs related to the medical, pre-natal and post-natal care of the mother. Others involve the opportunity cost of the time of the would-be mother, particularly if she is working. Furthermore, parents may wish to have children with certain qualities (such as good education and health), which also involve financial costs. Thus, parents have to weigh the costs and benefits of having a child before they actually decide to have and raise one.

Child care has been found to be a major issue of concern by the women workers. This may be an important consideration in labour force participation and fertility behaviour. I have, therefore, briefly discussed the child care issue to round out the analysis of demographic changes.

The physical environment in the work places, their own poor living conditions in some cases and the long hours they have to put out both at the work place and home (Chapter 6, Section 6.2) all may tell upon the health of working women. Poor health may reduce their income both by lowering productivity and increasing absence from work.

This chapter is organised in the following manner. Sections 7.2-7.4 discuss the changes in reproductive behaviour related to the number of children born while Section 7.5 concentrates on the spacing between births. Section 7.6 is on child care. The health of working and control women, and its subsequent impact on income of workers, is analysed in the Section 7.7. Section 7.8 provides an over-all summary.

7.2 Observed Fertility Behaviour

This section describes the fertility behaviour of the women in the sample. I first describe the patterns of age, timing of marriage and the consequent length of reproductive period, which influence the number of children born. It may be pointed out here that all discussion, unless otherwise stated, refers to ever married women only. The number of children born by any given time may also be

explained with reference to birth spacing, which is analysed in the later sub-sections.

7.2.1 Age at Marriage and Length of Marital Life

The age at marriage of ever married women does not differ appreciably between the working and the control groups although the latter have married at a slightly younger age (Table 7.2.1-1). More than a quarter of both the working and control women had married before 15 years of age. Such an early marriage lengthens the period of marital life and consequently that for reproduction. One third of ever married women among workers had a span of marital life above ten years corresponding to 47 percent for the control group. As a result, at the time of the survey, the average length of marital life of workers was 8.9 years compared to 11.8 years for the control.

Table 7.2.1-1: Age at Marriage, Length of Marital Life of and Children Born to Ever Married Women

Indicator	Worker	Control
Age at marriage (Years)	16.8*	16*
Length of marital life (years)	8.9***	11.8***
Children ever born (no.)	1.2***	2.6***

Note: Those with the ***, ** and * across the same row are significantly different from each other 1, 5 and 10 percent probability respectively.

7.2.2 Timing of Marriage

Timing of marriage relates to two landmarks, migration and entry into an RMG job. Some women married before migration, some afterwards. Among those who married after migration, some did so after entry into an RMG job. While just about a third of migrant workers married before migration, 60 percent did so afterwards (Table 7.2.2-1). Forty percent of working women were married after entry into an RMG job. Among the control group, 57 percent were married by the time of migration and the rest afterwards. These findings imply that the fertility behaviour of the control women may reflect more the traditional rural norm (of higher fertility)[122] compared to the worker group.

[122] The total fertility rate per woman for the rural and urban women in 1996 in Bangladesh was 3.76 and 2.48 respectively (BBS: 1997a, p. 37).

Table 7.2.2-1: Timing of Marriage of Ever Married Women

Timing of marriage	Worker		Control	
	Frequency	Percent	Frequency	Percent
Before migration	69	40.3	54	57.4
After migration but Before RMG job	34	19.9	40	42.5
After RMG	68	39.8	-	-
Total	171	100.0	94	100.0

Note: 1. The second and third groups also include non-migrants. For control, the second row refers to marriage after migration. Percentages may not add up to 100 due to rounding error.
2. Relevant information on 4 of the control group ever married women was not available.

7.2.3 Number of Children Born by Age, Length of Marital Life and Timing of Marriage

The average number of children ever born and the number of living among them per ever married working women were 1.2 and 1.1 respectively at the time of the survey (Table 7.2.1-1). Of those ever born, 61 percent were born before the women entered into RMG employment and the rest afterwards. Among the control women, the numbers of children born and still living per ever married woman were 2.6 and 2.1 respectively reflecting much higher fertility compared to the working women. This may also reflect a higher infant mortality rate among children born into the control group.[123]

Within the RMG group, nearly a third of the women had, by the time of the survey, no child (Appendix 22, Table A22-1). In contrast, less than ten percent of the control women were childless. Among the RMG women, those with more than two children ever born were rare. In the control group, nearly 44 percent have given birth to more than two children.

Higher age for both the RMG worker and control women appears to influence the total number of children born in a strong and positive manner (Tables A22-2a and A22-2b in Appendix 22). This is likely to be a reflection of the longer reproductive periods for such women.

For both the RMG workers and the control group women, the influence of length of married life on children ever born is positive and statistically significant

[123] The proportion surviving among the children ever born to the working women was 92 percent. For the control group it was 80 percent reflecting higher infant mortality among them. A major cause of high infant mortality rate in Bangladesh until recently has been the prevalence of diarrhoeal diseases, particularly in rural areas. Thus, higher infant mortality among the control women may reflect their marriage in rural areas prior to moving to the town.

(Table 7.2.3-1). More importantly, the difference, between the worker and control groups, is also clearly evident from the table as, for each category of length of married life, RMG women have a lower number of children than the corresponding control group. The differences are highly statistically significant.

Table 7.2.3-1: Number of Children Ever Born by Length of Married Life

Length of married life (years)	Worker	Control
Up to 5 years	0.40***	0.84***
	(72)	(25)
5-10 years	1.20***	2.10***
	(40)	(26)
Above 10 years	2.27***	3.94***
	(59)	(4.7)
All	1.22	2.65

Note: 1. Comparison of means is across rows. Those with the same numbers of asterisks are significantly different from each other. *** indicate significance at 1percent probability.
2. Comparisons within columns also show the numbers are statistically significantly different at 1 percent for both workers and control.

The pattern of fertility by timing of marriage for working women indicates that the observed fertility among those marrying after starting RMG work is lower than the other two groups (married before migration and, between migration and RMG work). Those marrying before migration and between migration and joining an RMG firm had, on the average, 1.6 and 1.5 ever born children. In contrast, those marrying after starting RMG work had only 0.6 children. The first two groups do not differ statistically, but both differ significantly from the third group (post-RMG married women). This difference, however, may be due to the shorter post-marriage reproductive period in the case of the former group. Nearly 72 percent of them had a married life up to five years while in the cases of pre-RMG married working women, slightly above one-half had been married for at least ten years.[124]

[124] Indirect evidence also comes from the average ages of women in these three groups. The average ages for those married before migration, those married between migration and an RMG job and those married after RMG entry are 27.8 years, 26.8 years and 23 years respectively. The difference between the first two is not statistically significant. On the other hand, the differences between the third and either of the first two are statistically highly significant.

Those who were married before migration mostly had been married in their early teens or even earlier (Table 7.2.3-2). The proportion of such early marriage falls sharply in the case of other groups. Late marriage thus may be one explanation of the shorter post-marital reproductive period and consequent lower fertility for such women.[125]

Table 7.2.3-2: Distribution of Ever Married Working Women by Timing of and Age at Marriage

Timing of marriage	Age at marriage (years)		
	Up to 14 years	15-19 years	19 + years
Before migration	56.8	38.3	24.2
Between migration & RMG	34.1	16.0	12.1
Married after RMG	9.1	45.7	63.6
All women (number)	44	94	33

Note: Figures are percentages of the absolute figures in the last row.
The pattern has a $\chi^2 = 27.4$ with 4 df which is significant at 1percent probability

There is an inverse relationship between the number of children ever born to worker women before RMG work and afterwards. This pattern persists even for those who had married before RMG work. More than three-quarters of pre-RMG married worker women bore no child after joining a RMG firm. Of these women, 57 percent had at most one child before starting RMG work. Note that 94 percent of pre-RMG married worker women are below 40 years of age and thus still fecund. That they have chosen not to have more children, therefore, may indirectly indicate the mediation of other behavioural factors such as labour force participation and income earning and consequent opportunity costs of bearing children by such women. These issues are investigated more in-depth in the following sub-sections. But before that I present the analytical framework within which the fertility behaviour is explained.

[125] Such late marriage for working women may itself be a conscious choice on their part. While I have not pursued this line of investigation, this is an exciting area for future research in the context of Bangladesh.

7.3 Explaining Fertility Behaviour

7.3.1 "Quantity versus Quality" of Children: Conceptual Issues

I use the broad framework of parental utility maximisation for analysing the number of children ever born. The rest of this section is devoted to a description of the analytical framework beginning with the concepts of quantity and quality of children. For some of the major works on the quantity-quality hypothesis, see the reviews in Chapter 2, Section 2.3.3. The model and the analysis in this section draw upon those studies.

The basic household model of labour force participation, in terms of the allocation of time for home production and market work for wages, has been discussed in Chapter 3. This model also provided the general demand function for home-produced goods. Children may be conceptualised as one such type of "home-produced good". However, children are not like "any other good" that can be bought in the market and enjoyed. Yet, the fact remains that parents derive satisfaction from children in a variety of ways (Bryant: 1992, p. 197). Bearing and rearing children are, however, costly to parents and thus, children come at a "price". Thus children can be conceptualised as a very specific type of "consumption good" for enjoyment by parents.[126]

Before proceeding further, the concept of quality of children and its cost need to be clarified. Parents may want not simply to have children, but children with certain characteristics. They want the children to survive, be healthy and well educated. They may want the children to acquire certain professional qualities for future earnings (e.g. as a physician). There may be various other such characteristics that parents may desire in their children, but probably two stand out clearly. One is to provide as much education as possible and the other is to ensure adequate nutrition (through provision of enough food). The latter, in a poor society, may be expressed as a matter of survival of children (Pitt: 1995). In

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[126] Treating children as a kind of consumption good may be anathema to many. Theodore W. Schultz (1974, p. 4) referred to this unease in the following language:
"I anticipate that many sensitive, thoughtful people will be offended by these studies ... because they may see them as debasing the family and motherhood. These highly personal activities... may seem to be far beyond the realm of the economic calculus."
The misconception arises from equating "economic" with "money-making" or "commercial". In fact, tools of economic analysis may be fruitfully used in any field where there are satisfactions to be had from choices to be made (such as to have or not to have children, or how many to have) and where there are costs associated with such choices. Such costs may or may not be entirely direct cash costs. See also Cigno (1991).

subsequent discussion on quality, I shall generally refer to these two aspects, unless indicated otherwise.[127]

Returning now to the issue of number of children, I first note that conception has its cost. During the period of conception and at the time of birth, there are medical costs to be borne.[128] A working mother also loses certain market time before and after childbirth. Because the women's wage is one type of opportunity cost of time, this loss may constitute one of the main opportunity costs of children. Net private costs, of course, depend upon the types of social security benefits (e.g., maternity benefits) she obtains. In Bangladesh, however, such benefits (including maternity benefits) hardly exist except for limited periods particularly in the public services. So I shall disregard such social security benefits in the subsequent discussion. In any case, the more a woman and her husband wish to have children, the more they have to bear all these costs.[129]

There is also the cost of quality of children. After birth, a child has to be fed properly for survival and health and resources has to be expended to meet other needs, including education. Thus, quality comes at a price and usually the higher the quality the higher is the price. For example, educating children up to high school level is costlier than educating them up to primary level.

Apart from taste for a certain number of or qualities for their children, other parental characteristics (mother's birth cohort, mother's education, husband's education and income) may also influence the decisions regarding quantity and

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[127] This view of quality may be contrasted with those of others such as De Tray (1974). He has defined quality as resource intensity with which children are raised (De Tray: 1974, p. 92-93. Also his footnote 5). This is somewhat like equating desired characteristics with its cost (including time devoted for the purpose). In any case, this will be true only if there is a clear and unique relationship between costs incurred and its outcome. Unfortunately, this may not be the case. Given the differential characteristics of the parents such as education, income level, sources of income, the same expenditure by various parents may result in different outcomes in terms of quality for their children. In fact, De Tray admitted as much when he states that "the efficiency effect is assumed to be a function of the environment in which production takes place, which, in turn depends primarily on husband's and wife's education" (De Tray: 1974, p. 92).

[128] A developed capital market may help in spreading the costs through loans and insurance cover. In Bangladesh, however, such a market hardly exists.

[129] A question may arise here regarding the quantification of such costs per child. This is an interesting question, but is not part of the central argument here. What is relevant here is that whether the time of the mother spent in childbearing has an opportunity cost, and if so, its magnitude at a given time of conception. I try to use the wage earned as a reflection of this opportunity cost as discussed later. Of course, other resources are also expended. But this does not invalidate the opportunity cost of time argument. I have therefore refrained from estimating the cost of childbearing per child. Again given sufficient information and research time such costs for different strata of women in society may be computed. This remains a matter of future research.

quality.[130] Women's education is likely to be a major factor.[131] There are several avenues for its impact upon fertility. Education may influence women's labour force participation and their earnings (as shown in Chapter 5) raising the opportunity costs of conception and child rearing but also the capacity to bear such costs. Education allows girls to defer marriage and change breast-feeding practices thus affecting fertility (Appleton: 1996). Apart from these, education allows women to be better informed or understand the complex issues related to conception and child-care (Glewwe: 1999). Education may increase women's autonomy, which in turn may influence their fertility decisions (JeJeebhoy: 1995; Jeffery and Basu: 1996b). Husband's education and income may similarly influence the decision to have children and raise them.

Before passing on to the formalisation of the analytical framework, it may be pointed out that it is based upon a perspective of demand for children. A supply side analysis may as well be carried out instead. There are several reasons why I opt here for a demand side rather than a supply side analysis such as efficacy of family planning interventions. First and foremost, many studies in Bangladesh have examined the supply side issues (see Kane, Khuda and Philips: 1997, for some of the recent studies) while demand side explanations of reproductive behaviour are still rare. Secondly, some of the authors (e.g., Dasgupta: 1995) have argued that parental demand for children is a much more potent force in determining fertility than supply of contraceptives. I intend to examine the importance of the issue where such parental demand for children imposes a clear private cost upon them because some of the mothers (present or future) are earners. Thirdly, as explained in Section 7.4.1, supply side variables, though not unimportant, may not be much influential in a major city. I now turn to the description of the formal analytical framework.

7.3.2 The Analytical Model

I now turn to a formal statement of the Quantity versus Quality model of fertility (Becker and Lewis: 1974; Bryant: 1992; Montgomery, Arends-Kuenning and Mete: 1999). In Chapter 3, I described a model of utility maximisation of the

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[130] Taste itself may be determined by some of these factors.

[131] As argued by Eloundou-Enyegou (1999), a huge literature on the relationship between education and fertility exists, but its pathways may still be only partially known.

household. To reiterate, in the model, the utility function included as its arguments leisure, consumption of goods and services purchased in the market and also produced at home. The utility function is maximised subject to a budget constraint and a home good production function which combines the time of the household members and goods and services purchased from the market to produce the home good (or service). The budget constraint shows the total resources available to the household and includes both labour and non-labour income. The budget is a function of, among others, the price of leisure (wage rate) and of market purchased commodities. The utility maximisation leads to demand functions for leisure, market goods and home goods.

Suppose now that the home good is child services, C, which is a function of number of children, N, and the average quality per child, Q. Thus,

$$C = NQ \qquad \ldots(7.3.2.1)$$

The utility of the parent is derived from two goods, which are the child services, C, and the composite of all other goods and services, S. Both involve the use of parental time in their production in the household. The preferences of the parents can be expressed in the form of a utility function (U) such as

$$U = U(C, S) \qquad \ldots(7.3.2.2)$$

This formulation implicitly assumes that parents take all the decisions and that all children are of equal quality. The first assumption may be partly justified, as parents have to, at least initially, take the decisions. Children, of course, may have a say later when they "come of age". The second assumption is harder to defend. Parents may decide to create different quality for different children (between boys and girls or between the first born and others). That boys are often favoured over girls in the distribution of food in poor economies is well-known (Behrman: 1988; Behrman, Pollak and Taubman: 1986; Bhuiya *et al.*: 1986; Chowdhury: 1993;

Deaton: 1997).[132] The assumption of the equality of quality is kept here for its analytical simplicity.

To define the total resources available to parents for expenditure, let,

$$F = WT + V \qquad \ldots(7.3.2.3)$$

and

$$E = P_c C + P_s S \qquad \ldots(7.3.2.4)$$

where F denotes full income, W is the market wage rate per unit of time of the women, T is the total time available in the market and at home, V is the income of the husband and any unearned (property) income of the household, E is the total expenditure on C and S and Ps and Pc are the prices per unit of S and C respectively.[133]

The amount of total resources available to the couple (F), can be spent to purchase/produce C and S. What this means is that the couple purchases goods and services and combines them with the time at their disposal to produce other goods and services. These latter goods and services are used for producing child services and the composite goods, which are then consumed.

Usually, the production of child services as well as that of the composite good would necessitate the use of both the parent's time. Generally, however, it is the wife's time, which is predominant in terms of bearing and rearing of children. Also, ignoring the time input of the husband keeps the treatment simpler without losing the generality of the results.

The equilibrium conditions reduce to three demand equations for the composite good, child quantity and child quality. These demand equations are reduced forms of the system of simultaneous equations, which represent the utility function, the budget lines and the production function for the production and

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[132] Morduch and Stern (1997), however, found ambiguous results in their analysis of gender-bias in children's health outcome in Bangladesh.

[133] The "price" of a unit of child services is equal to the value of the goods and services procured/purchased and then used for producing child services, where this includes the opportunity cost of the time foregone while processing these goods and services. Hence, the price of a unit of child services, P_c, can be expressed as

$$P_c = P_{xc} X_c + W T_c$$

where P_{xc} is the price per unit of good X (a composite good) used in producing C, T_c is the wife's time used in producing C, X_c is the quantity of X needed for producing a unit of child services. The price of composite goods may be expressed in an analogous manner as

$$Ps = P_{xs} X_s + W T_s$$

where P_{xs} is the price per unit of good X (a composite good) used in producing S, T_s is the wife's time used in producing S, X_s is the quantity of X needed for producing a unit of composite good.

consumption of the child services and the composite good. These demand functions may be expressed as

$$S = S\ (P_s, W, V)$$
$$N = N(P_n, W, V) \qquad \ldots(7.3.2.5)$$
$$Q = Q\ (P_q, W, V)$$

where P_n and P_q are prices of N and Q respectively.

My interest here is mainly on the last two demand functions. In real life, however, there are many other considerations that may enter into the equations. I intend to first uncover the effect of the changes in the mother's opportunity cost of time (W) and husband's and non-labour income (V) on the levels of N (number of children) and Q (average quality). Secondly, these effects are used to identify if there is any trade-off between quality and quantity of children. To discern the latter, the basic idea is to discover if the same explanatory variables have opposite effects on N and Q. If they do, then the trade-off is established. Of course, such results only reveal the existence, but not the reason, behind such a trade-off (Montgomery, Arends-Kuenning, and Mete: 1999, p. 33).[134]

7.3.3 A Graphical Exposition of the Model

The above problem of the maximisation of utility for the couple may be analysed using the conventional indifference curve and the budget line analysis. In Figure 7.3.3-1, OA and OB are the maximum amounts of the child services and composite good that may be bought with the full income. AB is thus the budget line showing the choices (i.e., combinations of C and S) that are available to the parents. I_1 and I_2 represent two indifference curves that provide various combinations of child services and other parental consumption providing the same utility (satisfaction) along the particular indifference curve. Indifference curve I_2 being further to the right and upward represents a higher level of utility than indifference curve I_1. The budget line AB touches indifference curve I_1 at P and the combination of child services and other parental consumption that maximises the utility of the couple is given by OCp and OSp respectively. This is the point of equilibrium for the parent.

[134] Such an investigation necessitates in-depth socio-economic investigation.

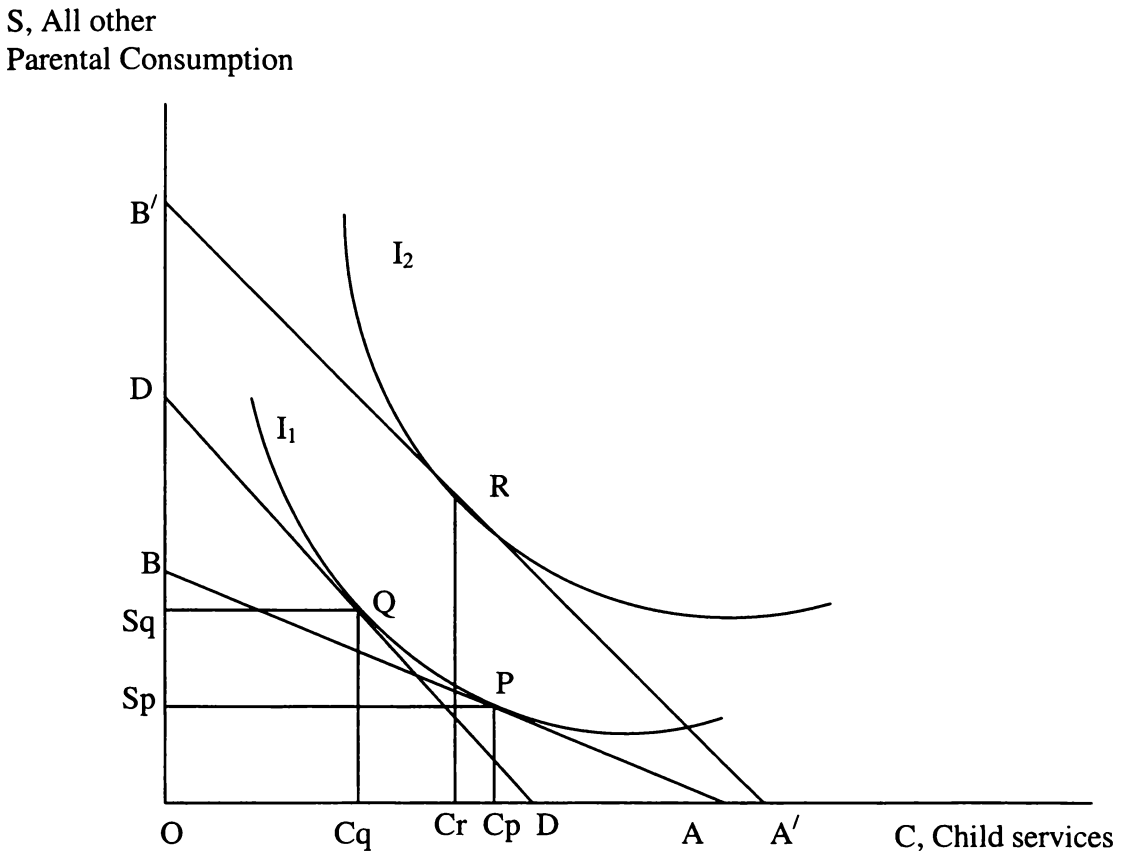

Figure 7.3.3-1: Effect of Change in Wage on Child Services

Note: AB is the initial budget line.
$A'B'$ is the budget line after wage increases. Maximum purchasable child service after wage increases is OA' in place of previous OA. DD is parallel to $A'B'$.
The old equilibrium is at P; new equilibrium at point R.
The substitution effect is Cp Cq. Income effect is Cq Cr. Net effect of wage increase is a fall in the child service by Cp Cr.

Suppose now that the wage (W) of the working mother increases while all other prices and variables remain unchanged. As W increases, the total income of the couple rises allowing the parents freedom to "purchase" more child services. However, at the same time, the price of child services increases because it includes the element W which is also the opportunity cost (i.e. wage) of the mother's time in producing and consuming child services. In any case, as W increases the maximum C that may be obtained, increases. The same conclusion applies for the maximum S. Hence, as W increases, a couple can purchase more of either S or C if the whole income is used to purchase one or the other. Hence, the

new budget line ($A'B'$) will be further to the right, as shown in the figure above the initial budget line.

The exact slope of the new budget line may or may not differ from the initial budget line. If child services are more time intensive, then a rise in W will increase the price of child services more than the price of the composite good and the new budget line will have a steeper slope. That is, the increase in the maximum C that can be bought with the new income will rise proportionately less than the maximum of S that can be purchased with the new income. Usually, C is assumed to be more time intensive than S.

The new budget line becomes tangential to a higher indifference curve say, I_2 at point R. The move from the initial equilibrium point P to the final equilibrium point R may be thought of as one from P to Q (substitution effect) and then from Q to R (income effect). To show the derivation of the substitution effect, a budget line (DD) that is parallel to $A'B'$, but tangent to the indifference curve I_1, is shown on the diagram. The substitution effect lowers the consumption of child services while the income effect increases it. The two effects act in the opposite direction. Thus the net effect is to lower child services by CpCr as the substitution effect outweighs the income effect. When the consumption of child services changes, it can arise either through changes in N or Q, or both. Thus, if parents demand quality more, they must lower N. This is what is expected to happen.

7.4 Empirical Analysis of Fertility Behaviour

7.4.1 Variables

In most empirical analyses of fertility and child quality (e.g. school attainment), various exogenous variables, in addition to the arguments on the right hand side of the relevant equation in (8), are also entered. These variables may include:

Personal characteristics of the respondent such as age and education, husband's age and education;

Demographic characteristics of the respondent and the household such as type of family, presence or absence of sons or daughters in the household and their age pattern;

Economic characteristics of the respondent and the husband that may include income, employment or occupation;

Household wealth characteristics including the ownership of house, other sources of non-labour income such as land or property rental, living standards as reflected in possession of consumer durables such as TVs; and the

Supply of reproductive health facilities (such as family planning services), and their characteristics.[135]

The exact formulation of the variables and their possible roles in determining fertility are discussed below.

For analysing fertility, the dependent variable is the number of children ever born. This is defined as follows.

Children ever born: This is the main measure of completed fertility and includes all children who have been born dead or alive. Immature babies and abortions have not been counted. This variable is the empirical counterpart to the variable N in the model and is thus the dependent variable. In the estimated equations, the number of children has been used as a discrete variable: zero, one, two and more than two children ever born.

For the analysis of quality of children, two measures are used as the dependent variable. These are "Schooling years" and the "Number of children in school". Their definitions are as follows.

Schooling years: Schooling of children has been used as the proxy for the quality of children as information on the educational level of each child has been collected. While this is accepted for individual children, a problem arises in aggregating these at the household level. Note that the main concern here is that as parents demand more education, children have to stay longer in school. The total years of schooling, parents have or had to finance, may therefore be used as a simple measure of quality. So I add up the years of schooling of each child from six years age and above.[136] There is a further problem, however, as the data is not measured in terms of years of schooling completed but in terms of a range of

[135] The information from the survey on the supply of reproductive health facilities is inadequate for the estimation of a regression equation and therefore not used. On the other hand, however, such services are better available in the capital city from where all the sample respondents have been drawn. Thus, there is unlikely to be much of a variation among respondents in terms of the access to such services, and its (i.e., information on reproductive health facility) omission therefore is not likely to appreciably hamper the present analysis. Of course, this is not the case in rural areas. Analyses of rural reproductive behaviour therefore routinely include such supply variables. See Kane, Khuda and Philips (1997) for several studies that use supply variables in analysis.

years. Values therefore have to be imputed to convert them into quantitative years of schooling.[137]

Number of children in school: The schooling variable is also measured as the number of children who have ever been to school whether now or in the past. The variable is grouped into three categories, up to one child, two children and more than two children.

The explanatory variables, which are the same for both the quantity and quality of children, are as follows.

Age of respondent: *Age* of respondent is in completed number of years. It is expected that as women age they will have more children as their length of married life will be longer.[138] The expected sign of the coefficient is positive.

Age of respondent squared: *Age-sq* is entered to consider the possibility that the effect of age is non-linear, particularly that with higher age the possibility of bearing children may fall. The variable is thus likely to have a negative coefficient.

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[136] Of course this implicitly means that two children completing five years of schooling and one child studying for ten years results in same cost or quality. This is unlikely to be true. Thus, the measure is at best an imperfect one.

[137] For imputing years to the education groups, the following equivalences have been used: Illiterate = 0; sign name only = 1; up to primary = 3; VI-X = 8; SSC = 10; College/university = 12, Primary technical = 10; Higher technical = 12.

[138] Of course only women in the childbearing ages (15-45 years) may be considered in such analyses. Women aged above 45 years number only one and two in the case of workers and control group women respectively. No adjustment, therefore, has been made to either sample in analysing children ever born.

Husband's age: In Bangladesh husbands and wives typically have a large difference in their ages (Cain: 1978). Thus even if women are in their prime childbearing ages, their husbands may be sexually less active and therefore the former may have lower realised fertility. The variable is entered as a continuous variable.[139] It is expected that the lower the husband's age group, the greater is the observed fertility. The variable is expected to have a negative coefficient.

Education of respondent and husband: The possible role of education has already been discussed in Section 7.3.1 above. Because of its multifarious role, it is expected that the education and fertility will be negatively related. Education for women is measured as a grouped variable with four groups: those who are, at most, semi-literate (illiterate or can sign name only), above signing but up to primary level (five years of schooling), 6-10 years of schooling and beyond high school (ten years of schooling). The last named is the reference group. The expected sign of education dummies is therefore positive.[140]

Husband's education is expected to have a similar influence on the number of children, for much the same reason except for the cost of time argument for the wife. In particular as aspirations rise with higher education, the greater the amount of resources that have to be set aside for raising children the lower would be the demand for the number of children. For husbands, education is measured in three groups by merging the first two (semi-literate and less than five years of schooling) into one group denoting schooling up to primary level. The other two groups are as before, schooling up to mid-level (six to ten years of schooling) and beyond high school (above ten years). The last named is the excluded category. With respect to the excluded category all other groups are expected to have coefficients with positive signs signifying more children as education level of husband falls.

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[139] The variable was alternatively introduced as an ordinal variable with age groups up to 29 years, 30-39 years and 40 years and above. As the coefficients are insignificant in both the cases, I have reported only that for the continuous measure of the variable.

[140] The move from the reference group to any of the lower education groups is a move (mathematically speaking) from 0 to 1. As lower educated persons are likely to have more children, thus both the variables are moving in the same direction. Hence the coefficients will be positive. But the mathematical relationship should not be confused with education's negative role on fertility behaviour.

Wage of worker respondent: Information on the income of members of the family, other than the respondent, was not collected during the survey. Therefore information from the LFS 1995/96 (BBS: 1996) was used to estimate an earnings function for employed persons. The estimation procedure is explained in the Appendix 23. Using this earnings function and the characteristics of the sample respondents and their family members from my survey, I have estimated the monthly labour income of each earning member of the households of the sample respondents including them. The wage of the respondent is thus the monthly labour income estimated on the basis of the earnings function using the characteristics of the workers as regressors. This is the first measure of the wage of the respondent (*Totinc97*). It is an absolute measure.

A second type of measure of wage proposed here is a relative quantity. This is estimated as the ratio of worker's monthly income to that of total estimated household income from all labour-income sources (based on the estimated earnings function from the LFS data described above). This is entered either as a continuous variable (*Winprop*) or as a grouped variable (*Wingroup*). In the latter case, four groups have been identified as zero, up to 33 percent, 33.01 -50 percent and above 50 percent. In the case of the continuous measure, the relative wage of worker variable is expected to have a negative coefficient as for the absolute measure. For the grouped relative wage variable, the reference group is the last one (the highest income earner). The coefficients for the lower groups are expected to be positive to indicate a higher number of children for these categories compared to the highest income group.

Restype - respondent type: This variable indicates whether the respondent is a working woman or is from the control sample. This is also an indicator of the existence of the opportunity cost of time which is positive for the workers and is zero for the control. As workers are used as the reference category, the coefficient for the control is expected to be positive to indicate that those without an explicit opportunity cost of time will have more children compared to those who do.

Land ownership: Land ownership in the village, measured as a grouped variable, is used as a proxy for non-labour income. The three categories of land owning groups are those owning no land, those owning up to 50 decimals (one half of an

acre) of land and those owning more than 50 decimals. These categories have been transformed into dummy variables. It is expected that the lower is the area of land owned, the lower is the non-labour income and consequently, everything else remaining the same, the smaller is the number of ever born children. Compared to the highest category as the excluded group, the two other land group dummies should therefore have negative coefficients.

Omlaby - Monthly income of other members of the family: The monthly income of an earning member of a household is estimated using his/her characteristics and the earnings function as described above. When aggregated for all such members of the household except the respondent, this provides the other members' labour income (*Omlaby*). It is expected that as *Omlaby* increases, other things remaining the same, the couple will be better able to support more children. Thus, the coefficient is expected to be positive.

Martime - timing of marriage: All women in the worker group are employed. In that sense, it is difficult to observe an employment effect on the quantity of children. They have, however, been employed at different periods over their life cycle as discussed in Section 7.2.1. It is expected that as women are employed, it raise the opportunity cost of their time. The timing of RMG employment and marriage therefore can be used as the structural breaks in their life cycle to understand the implications for childbearing. Thus, everything else remaining the same, those who had been married after being employed are expected to have the lowest fertility, while those who had been married even before coming to Dhaka, are expected to have the highest fertility, provided the employment makes a difference. The post-RMG married women constitute the reference category. Thus, the coefficients for the other two groups are expected to be positive. It may be noted that this is also an indirect way of understanding the influence of opportunity cost of time of women on childbearing, and thus akin to the "wage of women" hypothesis.

Famtype - Family type: To test the hypothesis regarding the influence of family type (nuclear or non-nuclear), I have created a family type variable.[141] The burden of various home production activities, particularly that of child care may be shared by others in a non-nuclear family. If so, the nuclear families are expected to have lower incidence of child ever born compared to the non-nuclear and the relevant coefficient is expected to be negative.

7.4.2 Econometric Considerations

The equations to be estimated are reduced form equations and therefore each can be estimated as a single equation. While OLS may be used to estimate the equations, the nature of the dependent variable is discrete and hierarchical. One may not have, say, 1.2 children. Also, one cannot have two children without having at least one. The preferred regression technique in this situation is either an ordered probit or an ordered logit (Greene: 2000; Gujarati: 1995). The two provide very similar results.

The estimation method used assumes that a particular observed behaviour (e.g., no child, one child or two children) occurs when the respondents achieve a certain level or threshold. But between the equations for any two states (say, no child or one child) the difference is only in the intercept (the threshold or cut-off point) but not in slope (i.e., the coefficients of the explanatory variables). This assumption of parallel lines (also known as proportional odds)[142] may not be valid in every case and therefore should be tested.[143]

There is another complexity. In a classical regression equation, the marginal effect of an explanatory variable is given by the estimated coefficient. This is not the case in an ordered probit equation (Greene: 2000, p. 876-878). The exact expression is somewhat complex and needs to be carefully worked out. However, if the coefficient is positive, an increase in the value of the explanatory variable

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[141] Note that in Bangladesh two types of definitions of the household are used (BBS: 1996). One is the *khana*, meaning those who take meals from the same kitchen and thus may include servants. The other is the family in which case, only those in a *khana* who are related are considered. It may be that various *khanas*, particularly in the rural areas, are all in the same compound and all inmates are related by birth or marriage. I have used the restricted version of *khana* as the definition of family. A household may include others who are not in a *khana* such as a husband staying abroad. A nuclear family has only spouses and children. All others are non-nuclear.

[142] For a lucid discussion on the ordinal regression and more particularly on the relationships between proportional odds and the parallel lines assumption, see Scott Long (1997, Chapter 5).

[143] SPSS provides a test of parallel lines.

leads to a higher probability of inclusion of the respondent in the highest category and lowers it for the lowest category. A negative coefficient on wages, for example, signifies that the probability of belonging to the highest category (more than two children) falls and that of remaining childless increase. What happens for the middle categories (bearing one or two children), however, is an entirely empirical issue (Greene: 2000, p. 876-878).

Another complexity is that, if assortative mating is the norm, the characteristics of the husband may be endogenous to the system. While this creates the possibility of bias, I leave the test of assortative mating and its implications for future research. Child mortality is another effect that may be relevant if parents wish to have children to replace those who have died. Again because of the small number of observations in the present situation, I do not pursue this line of investigation any further.

7.4.3 Results and Discussion

The results here refer only to the estimates from equations pooling information from the working and control women (Table 7.4.3-1). The equations are arranged in the following manner. The first equation contains husband's characteristics, the rest of the equations do not because of their insignificance in the first. Equations 2-4 and 8 do not include respondent type as an explanatory variable while the rest do. In both the groups of equations (with and without *Restype*), the opportunity cost of time has been entered first as absolute earnings (respondent income) and secondly as relative income. Relative income again is entered either as a continuous variable (*Winprop*) or a group variable (*Wingroup*). Equations 8 and 9 both contained the absolute and relative income measures, one with *Restype*, and the other without. This helped to check how the income variables and *Restype* behave if entered together or not and if absolute or relative wage and employment status are independently significant determinants of fertility.

The results indicate the following. The hypothesis of parallel lines (equality of slope with only the intercept varying) or proportional odds can be accepted for only four equations (equations 2,3,5 and 6). However, the relevant statistical test results indicate that conclusions regarding the parallel lines are not always definitive. Scrutiny of all the equations also shows that the results regarding signs and significance of coefficients are similar across them.

Table 7.4.3-1: Ordered Probit Regressions for Children Ever Born to Women (pooled)

Explanatory variables	Dependent variable: children ever born								
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5	Eq 6	Eq 7	Eq 8	Eq 9
Age of Respondent	0.34***	0.27***	0.26***	0.27***	0.24***	0.22**	0.24***	0.27***	0.22**
	(13.00)	(9.99)	(9.35)	(9.66)	(6.98)	(6.22)	(7.21)	(9.90)	(6.10)
Square of age	-0.003**	-0.002*	-0.002	-0.002*	-0.002	-0.002	-0.002	-0.002*	-0.002
	(4.83)	(2.72)	(2.48)	(2.64)	(1.55)	(1.26)	(1.65)	(2.70)	(1.24)
Respondent income	-0.0002***	-0.0002***			0.0001			-0.0003*	0.00001
	(8.39)	(8.21)			(0.97)			(3.34)	(0.01)
Winprop- respondent's			-0.008**			0.01*		0.002*	0.01
income as % of hh income			(5.02)			(3.51)		(0.14)	(2.56)
Wingroup – 1				0.51*			-0.57		
				(3.28)			(1.48)		
Wingroup – 2				0.39			-0.14		
				(1.35)			(0.12)		
Wingroup – 3				-0.10			-0.27		
				(0.16)			(1.05)		
Wingroup – 4 (ref)				-			-		
Omlaby- Other members'	0.00009	0.00009*	0.000005	0.00004	0.00008	0.0002**	0.0001	0.0001	0.0002**
income	(2.51)	(3.06)	(0.01)	(0.43)	(2.43)	(6.03)	(2.33)	(1.74)	(4.84)
Famtype-nuclear	0.21	0.30	0.22	0.31	0.18	0.30	0.26	0.34	0.29
	(0.87)	(2.10)	(1.07)	(2.04)	(0.71)	(1.83)	(1.44)	(2.22)	(1.64)
Famtype-non-nuclear (ref.)	-	-	-	-	-	-	-	-	-
Marriage before migration	0.71***	0.77***	0.81***	0.84***	0.73***	0.76***	0.74***	0.78***	0.76***
	(9.11)	(12.50)	(13.53)	(14.77)	(10.81)	(11.76)	(11.28)	(12.58)	(11.78)
Married after migration	0.53**	0.57**	0.64***	0.65***	0.53**	0.53**	0.55***	0.57**	0.53**
before RMG	(4.18)	(5.54)	(7.27)	(7.32)	(4.73)	(4.74)	(5.03)	(5.58)	(4.74)
Married after RMG (ref.)	-	-	-	-	-	-	-	-	-
Ed-sign name only	0.38	0.43	0.59**	0.63**	0.74**	0.72**	0.58*	0.41	0.73**
	(1.19)	(1.91)	(3.93)	(4.46)	(4.98)	(5.64)	(3.77)	(1.72)	(4.84)
Ed-up to primary (V)	0.26	0.30	0.45	0.46	0.62*	0.60**	0.49*	0.28	0.61*
	(0.59)	(1.02)	(2.38)	(2.41)	(3.71)	(4.12)	(2.74)	(0.87)	(3.59)
Ed-mid-level (VI-X)	0.72**	0.71**	0.81***	0.86***	0.97***	0.98***	0.88***	0.70**	0.99***
	(4.96)	(5.46)	(7.22)	(8.12)	(9.21)	(10.18)	(8.49)	(5.25)	(9.42)
Ed-above high school (ref.)	-	-	-	-	-	-	-	-	-
Posses no land	0.67***	0.62***	0.60***	0.62***	0.60***	0.65***	0.62***	0.63***	0.65***
	(7.98)	(7.82)	(7.32)	(7.68)	(7.30)	(8.29)	(7.67)	(7.96)	(8.26)
Posses land up to 50	0.48**	0.36*	0.37*	0.36*	0.36*	0.37*	0.36*	0.37*	0.37*
decimals	(4.67)	(2.88)	(2.98)	(2.74)	(2.74)	(2.97)	(2.76)	(2.94)	(2.97)
Posses land > 50 decimals (ref.)	-	-	-	-	-	-	-	-	-

Table 7.4.3-1: (contd.)

Explanatory variables	Dependent variable: children ever born								
	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5	Eq 6	Eq 7	Eq 8	Eq 9
Hus. age	-0.006								
	(0.08)								
Hus. schooling up to 5 years	0.14								
	(0.35)								
Hus. schooling 6-10 years	-0.006								
	(0.001)								
Hus. schooling 10+ years (ref.)	-								
Respondent type- control					1.01***	1.22***	1.02***		1.24***
					(8.52)	(14.03)	(8.51)		(10.76)
Respondent type-worker (ref)					-	-	-	-	-
Threshold 1 (no child)	6.53***	5.70***	5.49***	6.24***	6.24***	6.79***	5.81***	5.79***	6.79***
	(22.38)	(20.95)	(18.78)	(24.54)	(22.69)	(25.35)	(20.24)	(20.96)	(25.30)
Threshold 2 (1 child)	7.90***	6.99***	6.78***	7.55***	7.52***	8.13***	7.14***	7.09***	8.13***
	(31.13)	(30.09)	(27.35)	(34.13)	(31.74)	(34.59)	(28.82)	(29.98)	(34.53)
Threshold 3 (2 children)	8.96***	8.05***	7.81***	8.60***	8.64***	9.21***	8.23***	8.14***	9.21***
	(39.04)	(38.84)	(35.52)	(43.21)	(40.38)	(43.34)	(37.39)	(38.59)	(43.26)
Pseudo-R^2 (McFadden)	0.29	0.28	0.28	0.29	0.30	0.30	0.30	0.28	0.30
–2 log likelihood (model)	432.08***	472.97***	476.21***	471.19***	464.30***	461.86***	462.43***	472.83***	461.85***
Chi-sq (df) for parallel line	49.250**	29.28	17.60	49.34***	34.15	27.45	41.56*	43.98**	41.89**
hypothesis	(30)	(24)	(24)	(28)	(26)	(26)	(30)	(26)	(28)
N of observations	222	239	239	239	239	239	239	239	239

Note: 1. The dependent variable children ever born is a variable divided into four categories. These are: "no child", "1 child", "2 children", and "more than 2 children".

2. Figures in parentheses are Wald statistc distributed as chi-sq. Log likelihood is distributed as chi-sq.

3. ***, ** and * indicate statistical significance at 1, 5 and 10 percent respectively for all tests.

4. The fourth threshold (more than 2 children) is the reference group, hence not reported by SPSS programme.

5. The parallel line hypothesis tests if the slope coefficients are equal across response categories. Based on chi-sq. test, a significant value rejects the equality of slope.

Age and square of age of the respondent have the expected signs. In all equations the coefficient of age is also significant with similar values in all equations.

The coefficients of "respondent woman's wage" variable, when entered as a wage level, have the expected negative signs in three of the five equations and in all the three cases these are significant. Where it is positive in equations 5 and 9, the coefficient is not significant. Thus, an increase in the wage of the working women, which reflects the opportunity cost of their time, generally tends to lower their fertility.

The relative measure of wage (*winprop)* has a negative and statistically significant coefficient only in equation 3. When it is entered as a grouped variable (*Wingroup*), the signs are not consistent across equations. Thus, as the relative economic strength within the family of working women increases, it may have a negative effect on fertility but the relationship may not be straightforward or stable.

The absolute (respondent's income or wage) and the relative (*winprop* or *wingroup*) measures of opportunity cost are highly correlated.[144] Their inclusion in the same equation may thus result in either or both of the variables returning insignificant coefficients as has happened in some of the equations.

Employment appears to be a strong deterrent to fertility. In all the equations, those marrying prior to holding a job, appear to have higher fertility. Also, the effect seems to be somewhat larger for those who married before migration, as, for them, the coefficients are larger and significant at similar or lower probability compared to those who married after migration, but before getting into an RMG job.

[144] The estimated bivariate coefficients of correlation of estimated monthly wage of the respondent with *Winprop* and *Wingroup* are 0.83 and 0.74 respectively.

Strong support for the role of employment also comes from the four equations, eqns. 5-7 and equation 9. In these equations I include the respondent type as an explanatory variable. As expected, the control group has higher fertility, as evident from the positive and highly significant coefficient. The expected number of children ever born was estimated using equation 9 as an illustration.[145] The expected number of children ever born for the workers was 1.30 and for the control group was 2.51. Thus, for the workers it was slightly above the observed number (1.2) and for the control group slightly lower (2.6) due to the implicit equalisation of the two groups' characteristics within the regression model.

Education has a strong negative influence on childbearing which is a widely reported result in other settings (Ainsworth, Beegle and Nyamete: 1996; Montgomery, Arends-Kuenning and Mete: 1999; Thomas: 1999). Compared to those having high school education, the fertility of other women with lower levels of education is higher. In many cases, the comparison with the reference category has significant coefficients. However, it may also be noted that the coefficients for the primary education group are not significant in five out of nine equations, while in other cases, those with the least education show behaviour as theoretically predicted. Thus, education may have a non-linear influence upon fertility.

Land ownership shows the influence of non-labour income in a direction opposite to expectation. The coefficients of those having no land or land up to 50 decimals are both positive and all are significant. One reason for the positive coefficient could be insecurity, as argued by Cain (1981). If those having no land lose their job, they have no other recourse to immediate income. Hence, to secure as much future income as possible, they may desire to have more children who are expected to provide support to parents, particularly to the mothers in their old age.

Husband's age and education both appear to have little statistically significant influence on the number of children a woman bears (eq. 1). Similarly, the influence of income of other members (*Omlaby*) is generally positive but significant in only three of nine equations, and thus less stable. One of the significant coefficients is negative contrary to expectation. Thus, other things

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[145] The expected number of children has been computed as

Exp-child = P(0 child) * 0 + P(1 child)*1 + P(2 children)* 2
+ P(more than 2 children)*4.17

as the average number of children for those having more than two children is 4.17. Exp-child denotes expected number of children while P means "probability of".

remaining the same, a higher income of other members (in most cases, that of the husband) may result in women bearing more children. However, the influence is weak.

Family type has a positive coefficient, contrary to expectation. Note, however, that it is not statistically significant. Thus, family type may have little independent influence on fertility. It may be, however, that the variable should be entered differently. This may be stated as "availability of help from any non-employed person in the household," generally older daughters or other relatives or maids on hire. Unfortunately, while I have this information only for the time of the survey, the earlier situation (prior to earlier conceptions) is not known and so cannot be modelled.

Overall, there appears to be a strong inverse relationship between fertility (as measured by children ever born) with various measures of the opportunity cost of time in relation to age, education, employment and access to non-labour income (though in a direction opposite to that hypothesised). Employment thus creates a structural break in women's lives and lowers the fertility. Education has exhibited the expected relationship with fertility and, as it is also a major determinant of employment (see Chapter 5), the policy recommendations are obvious. A major path to improvement in the situation of women in general, and to influencing their reproductive behaviour in particular, lies through more and better opportunities for female education.

It is difficult to compare the results here with those of others in Bangladesh because there are so few similar analyses (Montgomery, Arends-Kuenning and Mete: 1999). Whatever is available, appear to confirm the negative association between fertility of women and education. Apart from Montgomery, Arends-Kuenning and Mete (1999), others have reported similar results (Islam *et al.*: 1997; Khan and Rahman: 1997; Khuda, Roy and Rahman: 2000; Quayum: 1998).

7.4.4 Is there a "Quantity-Quality" Trade-off?

To answer this question, I refer again to the reduced form equations 7.3.2.5 in Section 7.3.2. As both N (number of children born) and Q (quality of children) have the same explanatory variables on the right hand side of the equations, for a trade-off between the two, what raises N must lower Q. That is the sign of the coefficient of the same variable in the equations for N and Q should be opposite to

each other. Before finding out if there is a trade-off between quantity and quality of children, I therefore have to first estimate the equations for quality as reflected in schooling of children. Next I shall compare the signs of the coefficients with those for the same variables for the children ever born equations as shown in Table 7.4.3-1. I use ordered probit for these estimations.

As discussed earlier, two types of dependent variables have been used. The first dependent variable is a group variable showing years of children's education financed by parents in a household. The second dependent variable is a group variable indicating the number of children who had ever been to school. The explanatory variables are the same as for the children ever born equations (in Table 7.4.4-1.

Before proceeding further it may be useful to reiterate the reasons for choice of schooling as the measure of quality. First, all women during the survey desired better education for their children. Secondly, information on schooling was easy to collect. In fact many women also desired better nutrition for their children. Such information, however, is difficult to collect because of the special and demanding nature of the required method of data collection. I have, therefore, used schooling of the children as the measure of the parents demand for child quality. The use of nutrition or other indicators of quality in understanding fertility behaviour is a matter for future research.

For this model, I have used six years as the cut-off point at which children are expected to be in school.[146] Therefore, unless there are children of school age (aged six years or above), the observations have been dropped, resulting in a sample of 103.

The first four equations in Table 7.4.4-1 use the children's groups of aggregate schooling years as the dependent variable and the remaining four uses the grouping by the number of children ever in school.[147]

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[146] In Bangladesh literacy is defined with respect to age 7 and above (BBS: 1998b). Age of six years therefore becomes a natural cut-off point in the present case as at least one year's schooling may then be completed by age 7.

[147] The two sets of equations are not comparable in an econometric sense as the dependent variables are not the same. Thus, it is difficult to choose one set of results over the other set.

Table 7.4.4-1: Ordered Probit Regressions for Children's Schooling among Women (pooled)

Explanatory variables	Dep. Var: Children's schooling year				Dep. Var: N of children ever in school			
	Eq 1	Eq 2	Eq 3	Eq 4	Eq. 5	Eq. 6	Eq.7	Eq. 8
Age of Respondent	0.56**	0.59**	0.56**	0.57**	0.28	0.26	0.33	0.30
	(3.83)	(4.12)	(3.79)	(3.85)	(1.33)	(1.16)	(1.81)	(1.56)
Square of age	-0.006	-0.006	-0.006	-0.006	-0.002	-0.002	-0.003	-0.003
	(2.26)	(2.41)	(2.27)	(2.37)	(0.44)	(0.30)	(0.79)	(0.60)
Respondent income (est)	0.0002				0.0003			
	(0.91)				(1.19)			
Respondent's income (observed)		0.0003**				0.0003**		
		(4.75)				(5.76)		
Winprop- respondent's income as % of hh income			0.007				0.02**	
			(0.41)				(4.86)	
Wingroup – 1 (Winprop zero)				-0.29				-0.60
				(0.13)				(0.67)
Wingroup – 2 (Up to 33 percent)				-0.43				-0.13
				(0.31)				(0.04)
Wingroup – 3 (33-50 per cent)				-0.03				0.06
				(0.002)				(0.01)
Wingroup – 4 (above 50 per cent) (ref)				-				-
Omlaby- Other members' income	0.0001	0.0001	0.0002	0.0002	0.0001*	0.0001	0.0004***	0.0002
	(1.96)	(1.60)	(1.85)	(1.70)	(2.87)	(2.26)	(7.45)	(1.88)
Famtype-nuclear	0.41	0.36	0.43	0.39	-0.17	-0.26	-0.09	-0.14
	(0.79)	(0.61)	(0.86)	(0.70)	(0.17)	(0.36)	(0.04)	(0.11)
Famtype-non-nuclear (ref.)	-	-	-	-	-	-	-	-
Marriage before migration	2.36**	2.82***	2.08**	2.04**	2.00**	2.27***	1.97**	1.75**
	(6.21)	(8.50)	(5.80)	(5.83)	(5.52)	(7.23)	(6.03)	(5.13)
Married after migration before RMG	3.49***	4.03***	3.16***	3.14***	2.26***	2.59***	2.18***	1.96**
	(11.82)	(14.81)	(11.92)	(12.19)	(6.46)	(8.48)	(6.89)	(5.98)
Married after RMG (ref.)	-	-	-	-	-	-	-	-
Ed-sign name only	-0.79*	-0.77*	-0.81*	-0.82*	-0.34	-0.26	-0.28	-0.45
	(2.95)	(2.81)	(3.06)	(3.13)	(0.65)	(0.40)	(0.44)	(1.15)
Ed-up to primary (V)	-0.02	0.008	0.08	-0.02	-0.70*	-0.65	-0.77*	-0.82**
	(0.003)	(0.0)	(0.04)	(0.004)	(3.16)	(2.86)	(3.79)	(4.14)
Ed-mid-level (VI-X) and above (ref)	-	-	-	-	-	-	-	-

Table 7.4.4-1 (contd.)

Explanatory variables	Dep. Var: Children's schooling year				Dep. Var: N of children ever in school			
	Eq 1	Eq 2	Eq 3	Eq 4	Eq. 5	Eq. 6	Eq.7	Eq. 8
Posses no land	-0.08	-0.01	-0.09	-0.11	0.53	0.64	0.60	0.58
	(0.03)	(0.001)	(0.35)	(0.05)	(1.43)	(2.08)	(1.75)	(1.67)
Posses land up to 50 decimals	0.39	0.41	0.37	0.37)	0.68	0.75*	0.72*	0.70
	(0.67)	(0.73)	(0.63)	(0.62)	(2.34)	(2.77)	(2.59)	(2.41)
Posses land > 50 decimals (ref.)	-	-	-	-	-	-	-	-
Hus. age up to 39 years	-0.06	0.05	-0.08	-0.15	0.06	0.15	0.16	0.03
	(0.02)	(0.01)	(0.03)	(0.12)	(0.26)	(0.14)	(0.17)	(0.004)
Hus. age 39 years+ (ref.)	-	-	-	-	-	-	-	-
Hus. schooling up to 5 years	-1.44***	-1.44***	-1.44***	-1.47***	-0.34	-0.33	-0.30	-0.37
	(10.92)	(10.98)	(10.84)	(11.35)	(0.78)	(0.74)	(0.60)	(0.93)
Hus. schooling 6-10 years	-0.67	-0.66	-0.71	-0.80*	-0.40	-0.39	-0.38	-0.42
	(2.37)	(2.22)	(2.62)	(3.13)	(0.96)	(0.89)	(0.88)	(1.07)
Hus. schooling 10+ years (ref.)	-	-	-	-	-	-	-	-
Respondent- control	0.20	0.41	-0.03	-0.09	0.61	0.80*	0.96**	0.55
	(0.11)	(0.84)	(0.005)	(0.03)	(1.23)	(3.79)	(4.01)	(1.15)
Respondent-worker (ref)	-	-	-	-	-	-	-	-
Threshold 1 (schooling up to 5 years)	14.12**	15.54***	13.56**	13.24**	9.03**	9.36**	11.05**	8.45*
	(6.38)	(7.47)	(5.97)	(5.86)	(4.07)	(4.45)	(5.73)	(3.75)
Threshold 2 (schooling 5-10 years)	15.26***	16.72***	14.70***	14.37***	10.29**	10.66**	12.35***	9.71**
	(7.39)	(8.56)	(6.96)	(6.86)	(5.24)	(5.71)	(7.08)	(4.91)
Pseudo-R^2 (McFadden)	0.32	0.34	0.32	0.32	0.22	0.24	0.24	0.22
–2 log likelihood (model)	140.18***	136.71***	140.74***	140.60***	166.40***	162.21***	162.70***	165.85
Chi-sq (df) for	....	101.52***	90.37***	81.93***	12.55	11.85	10.90	32.04**
parallel line hypothesis		(15)	(15)	(17)	(15)	(15)	(15)	(17)
N of observation	103	103	103	103	103	103	103	103

Note: 1. The dependent variable Children's schooling year is defined in three categories (up to 5 years, 6-10 years, above 10 years). The dependent variable N (Number) of children ever in school has categories as up to 1 child ever in school, 2 children ever in school, and more than 2 children ever in school.

2. Ref means reference category.

3. ***, **, * indicate statistical significance at 1, 5 and 10 percent probability respectively.

4. Wald statistic measures if the coefficient is different from zero. It is distributed as a chi-square statistic.

5. "...." Means in equation 1the chi-sq statistic could not be computed due to problem in convergence during estimation.

6. The threshold variables for the children ever in school equations (eqns 5-8) are "Threshold 1 (schooling up to 5 years/1 child in school)", "Threshold 2 (schooling 5-10 years/2 children in school). The second description refers to the second group of equations.

The results provide limited, but interesting evidence in favour of a quality-quantity trade-off. Respondent's age and square of age, other members' income, husband's age, marital timing, and family type all have coefficients with signs similar to the equations for children ever born. For a quality-quantity trade-off these should have been the opposite. However, among these, only respondent's age and marital timing coefficients have significant results. In contrast, the opportunity cost of the respondent's time as reflected in either the monthly wage (whether estimated or observed) or their relative measures (*Winprop* or *Wingroup*), have coefficients with positive signs for the first three and negative for the last one. Except for the observed monthly income of the respondent, however, none are statistically significant. The coefficient signs, at least, are opposite to those in the equations for children ever born as predicted by the trade-off hypothesis.

A similar conclusion may be drawn regarding the coefficients for respondent education some of which are also statistically significant. The coefficients of "husband's education variable" are also opposite to those observed for the children ever born equations, with some of these statistically significant. Sign-wise, the coefficients of land ownership do not provide a clear picture, nor do those of respondent type (the worker or the control group). Generally, while some of the variables have exhibited behaviour contrary to expectation, those that support the trade-off hypothesis include two of the most important variables, namely monthly wage income of the respondent and her education as may be seen from table 7.4.4-2. Thus, generally there is some support to the trade-off between number and quality of children but evidently it is weak.

One reason for the limited nature of support could be the small size of the sample. But probably more importantly, those who have shown a strong inclination towards lower fertility are not yet at a stage of family growth where the trade-off actually takes place. Most of the women are still at the prime stage of their reproductive period. Still, some have not married at all or are postponing having a baby until they think they can raise them well or their children are not at the school-going age. Thus, the desired trade-off is yet to be experienced by the women concerned. For a more rigorous test, one should have a large enough sample where women have achieved their desired family size and some have work experience while others have not. This is a matter for future research.

Table 7.4.4-2: Comparison of Signs of Coefficients of Selected Variables in Fertility (Quantity) and Schooling (Quality) Equations

Explanatory variables	Children ever born (quantity)	Schooling (quality)	
		Schooling years	N of children in school
Age of Respondent	+ve	+ve	+ve
Marriage before migration	+ve	+ve	+ve
Married after migration before RMG	+ve	+ve	+ve
Respondent's income (observed)	-ve	+ve	+ve
Ed-sign name only	+ve	-ve	-ve
Ed-up to primary (V)	+ve	-ve	-ve

Note: The other variables are not significant and not shown in the table.

One reason for the limited nature of evidence, as stated above, could be the small sample. In such a situation, one way of understanding the quality-quantity trade-off is to analyse the time to first birth after marriage. If people have even a subjective notion of costs of child rearing, as indicated by Caldwell and Barkat-e-Khuda (1997), they should try to postpone the childbirth as late as possible. This is indeed what has been found in the subsequent analysis.

7.5 Timing and Spacing of Births

7.5.1 Time Pattern of Birth of Children

In Bangladesh, very few births take place out of wedlock. So to analyse the timing of childbirth, I first investigate the time gap between marriage and first birth. Secondly, as many mothers (worker) also had a second child, I have analysed the time gap between the first and second births. In this section, I examine the general picture regarding the patterns of the timing of births from the sample.

Of the 269 ever married women in the pooled sample of working and control women, 195 (or 72.5 percent) had given birth to at least one live child.[148] Eighteen percent of all women had their first baby within the first year of marriage. By the second year of marriage another 20 percent had their first child. By the third year one half of the women had given birth to a baby. The longest time between

[148] Not all children were born alive. Among the control women, for example, of the 260 children born to 98 ever married women, 25 were still born or were dead right after birth and 31 died later. The stillborn were not counted as live birth but counted as part of ever born. Similarly, not all of those born alive have survived to the day of the interview.

marriage and the first baby was 14 years. Figure 7.5.1-1 shows the time pattern of first births.

Of the 195 women giving birth to their first live baby, 112 or just over 57 percent also had a second baby. Of the 195, only three percent had another baby within one year of their first child while another 17 percent had a baby by the second year after the first one. By the third year, another 13 percent had their second child. The longest duration between the first and the second child was 13 years by which time a quarter had their second baby. Figure 7.5.1-2 shows the relevant histogram.

At the time of the survey, thus, only some of the ever married women had experienced a first birth and of these fewer still have had a second child. This is an example of what is called censored data in which the event of interest (i.e., live birth) has been experienced by some but not all of the respondents by the time of the survey (Greene: 2000, pp. 905-951).

7.5.2 Timing of Birth: An Event History Analysis

In this and the next sub-section, I intend to analyse the birth spacing by women in the sample. As the number of births beyond three is infrequent and for the RMG worker, births beyond two are rare, the analysis is limited to the timing of the first and second births.

Event history data and their characteristics

The analysis of timing of birth is usually undertaken with the help of duration, event history, and survival or failure time analysis.[149] These terms are used interchangeably. Event history data have two characteristics, censoring and time-varying explanatory variables, which distinguish them from others.

[149] While all of them signify the same or similar methods, the names indicate discipline-specific usage of the terms. Thus, the term "duration analysis" is often used by economists (as a major application is in analysing unemployment duration). Sociologists use "event history", biomedical researchers and demographers often use "survival analysis" and engineers use the terms "failure analysis" (as they apply it often in analysing occurrence of mechanical breakdown).

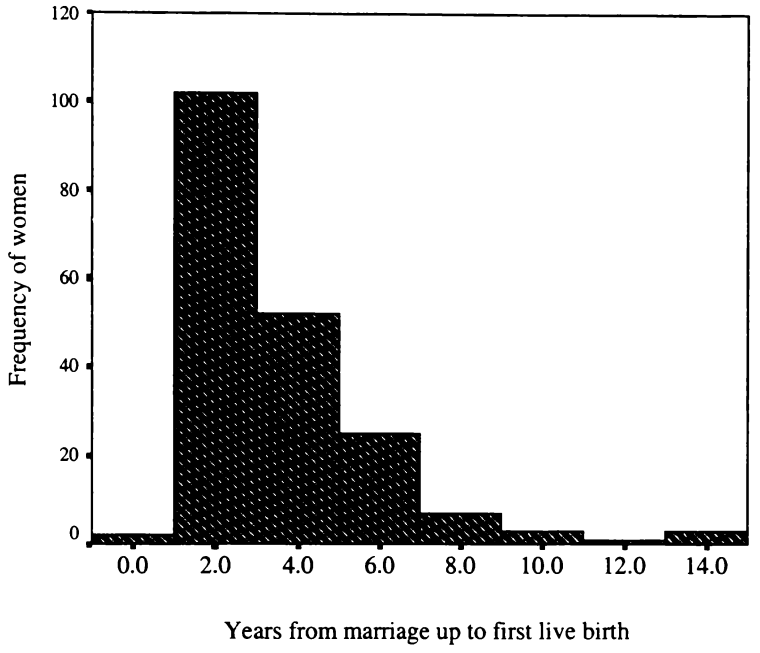

Figure 7.5.1-1: Histogram of Years from Marriage to Birth of First Child

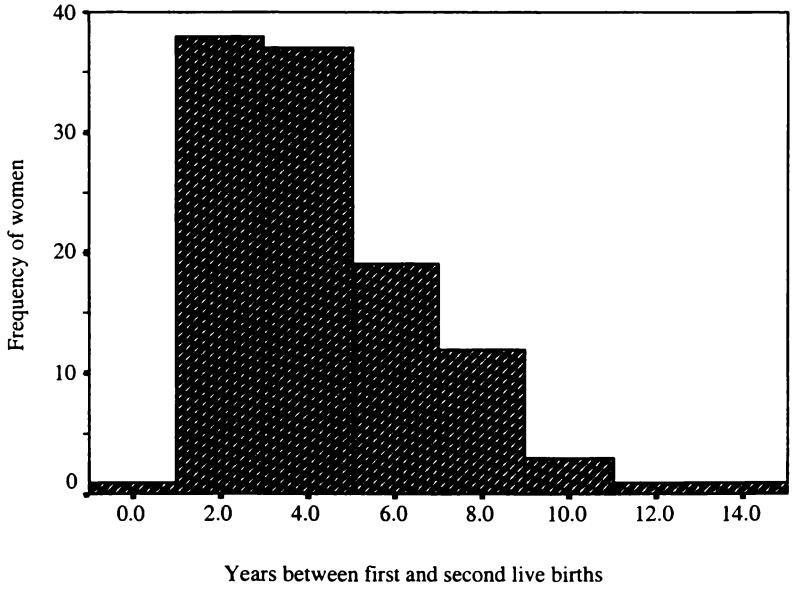

Figure 7.5.1-2: Histogram of Years from First to Second Childbirth

Censoring means that only some of the respondents may experience the event of interest (first or second birth of child in the present context). Thus, in an analysis of the time to first birth since marriage, problems may arise in using the information from those who have not given birth to a baby yet. A similar situation obtains in the case of the second birth.

The problem of time-varying variables arises because some of the explanatory factors behind the particular event may not be time-invariant. Thus the length of time to first baby after marriage may be influenced by factors, such as income of husband and women's education. Women's education, except in very special cases, is not likely to vary during the time of observation, but husband's income may vary.

Censoring and time-varying variables create problems in econometric analysis. Below I will briefly touch upon these issues. Details of the problems of censoring, time-varying factors and the estimation methods and their properties are available from various sources.[150]

Problems due to censoring

The application of OLS is problematic for censored data, as the event of interest is unobserved for some of the respondents (Allison: 1984, p. 11). Discarding observations without the event is wasteful and the representative nature of the sample may be compromised. Generally, the proportion of censored observations may be substantial and discarding them leads to large biases in the estimates of the coefficients.

At this stage the concept of hazard needs to be introduced for clearer understanding of the issues involved. The hazard is a rate and is defined as the potential of the occurrence of the event of interest per unit of time at any particular instant given that the event has not been experienced till that instant. For more rigorous definitions see Appendix 24.

Coming back now to the problem of censoring, it depends on the particular question one asks. One may ask how hazards change over time[151] or what determines the hazards. In many cases, as the present one, the main interest is not so much in finding these hazard rates but what explanatory factors determine them. This may be done by fitting a hazard function using what is known as the "proportional hazards model" developed by Cox (1972). I will first describe the hazard model and then briefly examine the statistical/econometric issues involved

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[150] Some of the excellent sources are Gourieroux (2000), Greene (2000), Vermunt (1997), Willett and Singer (1995), Griffin (1995), Blossfeld and Rohwer (1995), Heckman and Walker (1989; 1990), Kiefer (1988) and Allison (1984).

[151] For example, one may argue that the hazard for conception is high right after marriage and may fall afterwards. A Gaussian hazard model may be estimated to find these hazard rates.

before turning to the results of analysis. These, however, necessitate the clarification of certain concepts, which are given in Appendix 24.

7.5.3 The Cox Proportional Hazard Model[152]

The model

Let

t = time;

h(t) = hazard rate at time t;

$h_o(t)$ = baseline hazard function when the explanatory variables are all set to zero;

X = a column vector of explanatory variables (e.g., education) that influence the hazard rate.

e = base of natural logarithm;

β = a row vector of regression coefficients of X.

A simple hazard function then may be written as

$$h(t) = h_o(t)\, e^{\beta X} \qquad \ldots (7.5.3.1)$$

If all X are equated to zero, the hazard rate becomes the base line hazard rate. The base line hazard rate is a function of time alone while the X vector contains no time variable. The base line hazard rate is an individual-specific constant and thus reflects unobserved individual heterogeneity (Greene: 2000, p. 948). Dividing both sides by the base line hazard and taking logarithms, we obtain

$$\ln [h(t) / h_o(t)] = \ln (e^{\beta X}) = \beta X \qquad \ldots (7.5.3.2)$$

The quantity, $[h(t) / h_o(t)]$, is called the relative hazard or hazard ratio. The log of relative hazard can be used to compare relative risk with or without a particular situation (or treatment). If we write

$$Y = \ln [h(t) / h_o(t)], \qquad \ldots (7.5.3.3)$$

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[152] This part closely follows the SPSS Advanced Models manual 10.0 (1999a, p. 283-311).

then equation (2) resembles an ordinary regression equation. Y is the dependent variable in the empirical analysis that follows. The interpretation of the estimation results is rather similar to those of an ordinary regression equation.

Problems in estimating the Cox Model

Let us consider again equation (2) above. As time is separated from the explanatory variables, X, for all sample individuals the hazard function is proportional to the base line hazard. One of the major problems in estimating the Cox model is that this assumption of the proportionality may not hold. This can be tested either graphically or by inclusion of an interaction variable with time (say, X1 * "survival time" or X1* log of "survival time"). A significant coefficient of the interaction variable indicates that the assumption of proportionality may not hold without the interaction variable. The interaction variable should then be a part of the equation.

Another estimation problem relates to ties in the data. A tie is the proportion of respondents at risk who are actually experiencing the event. The Cox model is sensitive to ties. A rule of thumb for ties is that if such proportion is no more than 15 percent for a few and lower for most other time intervals, a continuous time model is adequate for analysis (Griffin: 1995, p. 329-330). In the present case, for ever married women (including both RMG workers and control group women) only in two years, was the proportion of ties higher than 15 percent and in one it was just above 15 percent. In practically all other cases, it was much lower. So in the present exercise, I use the continuous time model to analyse the data.[153]

The covariates

The covariates are the explanatory variables that may be decided on the basis of the theory. The explanatory variables here are some of the same ones that have been used for analysing number of children ever born. The variables and their expected influence on the relative hazard of childbirth are discussed below.

[153] The alternative to the continuous time model is the discrete time model. While conceptually simpler, the computation is tedious. See Griffin (1995, p. 329-330). Also see Kennedy (1999, p. 259-262) for determining the choice between continuous and discrete time models.

Age of respondent at marriage-*Marage*: In Bangladesh, the median age at first childbirth in 1996-97 was between 17 and 18 years (Mitra *et al.*: 1997, p. 39). Women marrying early are, therefore, expected to have a baby around that age. If women marry late, they may want to have a child as soon as possible after marriage to raise a family. As the age at marriage for the women rises, so shall the hazard of first birth. Consequently, the sign of the coefficient is expected to be positive.

Husband's age at marriage: Lower age at marriage of the husband may mean lower income earning capacity and consequently lower financial capability to rear children. Holding all other things constant, they may therefore wish to wait some time before raising a family. The hazard rate for first childbirth is therefore likely to be higher as husband's age at marriage rises and the time to first birth will be shorter. The relevant coefficient is hypothesised to be positive.

Respondent women's education: Birth-spacing is a method of lowering the number of children one may wish to have. It requires deciphering new and complex information regarding conception and contraception. People with more education are expected to be more capable in this regard (Islam, *et al.*: 1997). In Section 7.4 in this chapter, I have found that education has a negative and significant effect on children ever born. It is hypothesised, therefore, that education has a positive effect on birth spacing and consequently a negative effect on the hazard rate. As the level of education increases (decreases), the hazard rate falls (rises). The variable has been defined and measured as in case of the fertility analysis in Section 7.4 in this chapter. Thus, when education is entered as a categorical variable with the highest education level as the reference category, the coefficients for other categories should be positive.[154]

[154] There may be a problem of endogeneity regarding women's education and age at marriage, particularly for highest level of education. As women are educated to that level, their age at marriage generally rises and thus becomes endogenous leading to bias in the estimation of the coefficients. Again this is a complexity which I leave for future research.

Husband's education - *Husedu*: Husband's education may have two types of opposing influences on the timing of the first birth. If education is a proxy for income, then a higher level of education will mean more financial capability to raise a child so they may want babies sooner rather than later. On the other hand, education may allow them to better understand and thus practise birth control measures to defer childbearing as long as possible.[155] The sign of the relevant coefficient thus becomes an empirical issue

Marriage timing in relation to migration and job market entry - *Martime*: As analysed in Section 7.2, working women may be married before migration to the city (if they are migrants), or between migration and joining an RMG factory or after they have taken up such a job. For non-migrants, only the last two categories are relevant. Women in the first category are likely to have a low opportunity cost of their time, at least they did not have any at the time of their marriage. In contrast, women in the third category had an explicit and higher opportunity cost of their time at marriage time. For women in the second category, the opportunity cost of their time is likely to be lower than in the third group. Such higher opportunity cost of time is expected to lead to a longer time to first childbirth and consequently lower hazard rate for the third group. Compared to the first category of women as the reference group, the coefficients for others are thus expected to be negative.

Respondent type or working status - *Restype*: A woman's employment status directly captures if she has an opportunity cost of time as measured in cash earnings. It is expected that the workers, everything else remaining the same, shall defer childbearing for as long as possible, and thus compared to non-workers, their spell of childlessness shall be longer and the relative risks lower. The coefficient is therefore expected to be negative (with the control as the reference group).

[155] Both men and women may practise birth control. I assume that this is done in mutual consultation.

7.5.4 Results of Analysis

Table 7.5.4-1 shows the empirical findings.[156] In all the equations, age and square of age for both the respondents and their husbands are continuous variables. All others are categorical variables. For *Restype* and *Martime* the control and marriage before migration are the reference groups respectively. For respondent's education, the highest education category is the reference group.

The first equation includes, in addition to all the variables discussed above, squares of age of respondent and square of husband's age at marriage to guard against the possibility that age may have a non-linear influence on the hazard rate. Also, in the first equation, the respondent's education has four categories. As education here is used as a proxy for cognitive ability, very low levels of education may not be a good indicator for such ability. In the two other equations, therefore, the first two categories have been grouped together while the reference education category remains unchanged.

The final point of note on estimation problems is that the hazards were not proportional with respect to marriage timing and husband's age variables. So, two new variables were created as "Survival Time * Martime" and "Survival Time* Husband's age at marriage" in which survival time means time from marriage to first birth. As may be seen from the table, in both cases, the coefficients are statistically significant, justifying the creation and use of the time dependent variables.

[156]A point regarding the nature of data may be mentioned here. While childbearing out of wedlock is infrequent in Bangladesh, it is not completely absent (Ahmad and Khan: 1998). A question therefore arises if reported time of first birth is less than 280 days (9-10 months) or so, should it be treated as reporting error or pregnancy before marriage. My view is that the implications of birth within a few months of marriage are understood by everybody to be socially unacceptable. If even in such a situation, mothers report births, this should be taken at its face value. I have, therefore, decided against dropping such observations for possible reporting error. In practice, what happened was that only two such cases were observed. Even then their use was not made due to missing values of other variables corresponding to these births. For second birth, no such possible errors (spacing less than 10 months) were observed.

Table 7.5.4-1: Estimated Hazard Functions for First Live Child Birth

Explanatory variables	Eq 1		Eq. 2		Eq. 3	
	β	Relative risk (e^{β})	β	Relative risk (e^{β})	β	Relative risk (e^{β})
Respondent's age at marriage (years)	0.01	1.01	0.06**	1.07	0.05*	1.05
	(0.01)		(5.73)		(2.81)	
Respondent's age at marriage squared	0.001	1.00				
	(0.08)					
Hus. Age at marriage – (H)	0.23	1.26	-0.04*	0.97	0.28**	1.33
	(2.51)		(3.12)		(4.62)	
Sq of husband's age at marriage	-0.005*	0.99			-0.005**	0.99
	(2.80)				(4.19)	
Respondent's education: sign name only	0.09	1.10	a	a	a	a
	(0.06)					
Respondent's education: up to primary (V)	0.41	1..50	0.26	1.29	0.20	1.22
	(1.28))		(0.53)		(0.32)	
Respondent's education: mid-level (VI-X)	0.78**	2.18	0.75**	2.12	0.79**	2.20
	(4.89)		(4.61)		(4.98)	
Respondent's education: Higher (ref)	-	-	-	-	-	-
Husband's education: up to primary (V)	0.04	1.04	0.02	1.02	0.01	1.01
	(0.04)		(0.01)		(0.004)	
Husband's education: mid-level (VI-X)	0.36*	1.44	0.31	1..36	0.33	1.39
	(2.78)		(1.96)		(2.31)	
Husband's education: Higher - ref	-	-	-	-	-	-
Marriage before migration (M1) –ref	-	-	-	-	-	-
Marriage after migration, before work (M2)	0.21	1.24	0.16	1.18	1.05***	2.86
	(1.38)		(0.86)		(9.87)	
Marriage after beginning work (M3)	0.02	1.01	0.01	1.02	0.59	1.80
	(0.002)		(0.004)		(1.54)	
Respondent type – control (ref)	-	-	-	-	-	-
Respondent type – worker	-0.37**	0.69	-0.33*	0.72	-0.30*	0.74
	(4.57)		(3.77)		(2.97)	
Time to 1st birth * M2	-	-	-	-	-0.27***	0.76
					(7.95)	
Time to 1st birth *M3	-	-	-	-	-0.24	0.79
					(1.76)	
Time to 1st birth * H	-	-	-	-	-0.013*	0.99
					(3.55)	
-2 log likelihood	1649.04		1656.47		1631.34	
Chi-square	26.99***		22.28***		38.93***	
N of observations	236		236		236	

Note: 1. Dependent variable: ln h(t)/h(o).

2. Figures ***,** and * indicate statistical significance at 1, 5 and 10 percent probability respectively.
3. Wald statistic is distributed as a chi-sq. In all cases above, it has a df =1, in which case, it is simply the square of usual t-statistic.
4. a: The first two categories are combined into a new reference category for the rest of the equations.

Age at marriage of the respondent women and their husbands has both positive but statistically insignificant coefficients in the first equation. As this may be due to high multicollinearity,[157] I dropped both the square terms of age in the second equation. This resulted in statistically significant coefficients for both the age variables. However, while the mother's age has a positive coefficient as expected, that of the husband's age becomes negative. On the other hand, as noted above, the husband's age variable does not obey the proportionality assumption without an interaction term with the survival time. The third equation therefore includes such an interaction term and also the square term of husband's age. In this equation, both the age variables have coefficients with the expected positive signs. Both are also statistically significant. The husband's square of age variable has a statistically significant and negative coefficient. The coefficient of the interaction term of the husband's age with the survival time also has a negative although statistically weakly significant coefficient.

Thus, as women marry late, the hazard rate goes up and they are likely to have their first child sooner rather than later. For every unit increase (i.e., one year) in marriage age of women, the risk of first birth rises by 5-7 percent. On the other hand, for husband's age, the increase in risk for first birth is much higher, nearly 33 percent. But the negative coefficients of the square of husband's age at marriage shows that the rise in risk falls as husband's age increases. Similarly, the negative coefficient of the interaction variable of husband's age with survival time indicates that as the spell of childlessness lengthens, husband's age has a negative influence on the hazard rate and thus the time to first birth lengthens. It is not clear as to why this should be so. In any case, different signs of these coefficients may be offsetting influences of husband's age at marriage upon time to first birth.[158]

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[157] The ages of spouses have a correlation coefficient of 0.65 that is statistically significant at 1 percent probability. In fact all the correlation coefficients among age of women, age of their husbands and the square terms were statistically significant at 1 percent probability.

[158] Several factors may interact in a complex manner. These include the desire to continue the lineage through male offspring, biological factors determining fertility and the capability to raise a child in the towns where everything is a commodity that is bought in the market. In the present case, the information on the sex of the first child is incomplete, otherwise this probably could be used for analysis. In any case, this is an area where little research has so far been done in Bangladesh, particularly in an urban setting.

The coefficients of respondent's education are all positive and one of them is significant, at five percent probability, in all equations. Thus, compared to the reference (highest education) category, those at other levels have higher hazards and relative risks and therefore shorter time to first birth. Thus, as education increases, women may postpone first births. Indeed as the relative risk column shows, at any given time, those having a mid-level education may be more than twice as likely to have a first birth compared to the most highly educated women. Note that in the case of children ever born (Section 7.4, this chapter), the coefficient is significant for the medium education category, not for the lowest groups. Thus, again it may be concluded that education may have a non-linear influence on birth spacing for the first child. Husband's education appears to have a similar but very mild influence as only one coefficient in one equation (equation 1) is weakly significant.

Timing of marriage coefficients (in the first two equations) show that those who had married prior to migration generally had a lower hazard compared to those marrying after beginning work in the RMG factories. Only one of the coefficients (in equation 3) is statistically significant. These results are contrary to the hypothesis. On the other hand, when the variable is entered as a product with survival time to first birth, one of the coefficients of the interaction term is significant while the other is not, but both show the hypothesised negative sign. It may be noted that the coefficient of a time dependent variable shows the influence when the survival time is positive (i.e., the event does not occur instantaneously, but with a lag, if at all). Negative coefficients of Time*M2 and Time*M3 therefore mean that as survival time increases, those marrying either after migration or after getting a job both defer their first child longer than the reference group (marrying before migration).

Why the spell of childlessness (i.e., survival time) may have such an influence is not clear but, at least for those who had a job at the time of marriage, they had an explicit opportunity cost of their time and consequently an incentive to defer childbirth as long as possible. On the other hand, those who did not have a job at the time of marriage, but were already in the city (i.e., were in the M2 category), probably hoped to get a job in the RMG factories (as some actually did). They probably deferred their childbearing as otherwise it might have conflicted with their prospects of jobholding.[159]

The variable "Respondent type" has negative and statistically significant coefficients in all the equations. This means that compared to the control group, the working women have lower hazards and consequently longer time to first birth after marriage, as predicted earlier. Indeed, as the second column for each equation indicates, for workers the relative risk of first birth at any time after marriage is 25-30 percent lower compared to the non-workers. I interpret such results as a reflection of the explicit opportunity cost of time (i.e., wages earned) for the workers.

Are these results intuitively comparable to others? Much may depend on the country-specificity of the analyses. Developed country contexts may not be applicable to developing country-contexts. Yet, it may be noted that the strong negative opportunity cost effect of wages have been observed by Heckman and Walker (1989; 1990) for Swedish women's behaviour regarding first birth. No such clear result has been obtained by others with developing country data. Newman and McCulloch (1984) observed for Costa Rica that those with higher education have lower risks of first birth. Analyses of Filipino data by Popkin *et al.* (1993) show that the effect of education depends on what underlying distribution of hazard (Gompertz or Weibull) one uses. Cigno and Ermisch (1989), using British data, have argued that women with better means or with rising incomes may have children sooner rather than later.

Khan and Raeside's (1998) analyses using Bangladesh data indicate influence of age at marriage on time to first birth is similar to that in the present case. But for women's education, the results were contrary to mine as better-educated

[159] While talking to the management of the RMG factories, I clearly sensed their preference for the unwed women and those married but without children.

women had a shorter spell of childlessness. The results of Khan and Raeside's (1998) study may, however, be due to their method of categorisation.

What the results of the analysis above show is that when women work and have higher education, they may want fewer children. As birth spacing is a way of achieving that, they may do so from the first birth. However, there may be a positive scale effect in operation as argued by Newman (1983). The time input for child rearing and the associated costs may be proportionally less when more than one child is raised. For subsequent births, working women may thus lower the opportunity costs of childbearing by having babies in quicker succession. The next section investigates if this is so.

7.5.5 Timing and Spacing of Second Birth

Time to second birth has been analysed in the same way as that for the first birth. In this case, the assumption of proportionality for worker/non-worker division does not hold, as the hazard functions for the two groups appeared to diverge, though not drastically.[160] As in the case of first birth, I used the simplest interaction term with time i.e., [survival time * covariate] which yielded results very similar to other expressions for time.[161] I also estimated the hazard functions for workers alone, which again yielded results similar to those for a pooled sample of workers and non-working women.

[160] SPSS provides relevant graphs for visual inspection.

[161] Usually, the survival time for the event is taken to be the time variable, which is entered as a multiplicative term with the variable for which the proportionality do not hold. But other transformations, such as ln (survival time) are also used (SPSS, 1999a, p. 304-305).

One particular issue of interest is whether births are bunched. Bunching means women try to have their children as soon as possible once they begin childbearing. Apart from the economies of scale argument of Newman (1983) there may be another reason for such bunching. If women work outside the home and have an explicit opportunity cost of their time, as reflected in their wage rate, they may want to devote as little time to and incur as little cost as possible in child rearing. This may be achieved if babies are born close to each other. Women may want to get over it sooner rather than later, so to speak. As the length of work experience increases, working women have higher income (see Chapter 5, Section 5.7). Thus the more the childbearing is deferred, the more the opportunity cost of childbearing and rearing increases. So, whenever they have their first child and if they continue working, they should have their second baby sooner rather than later to minimise the opportunity costs and also reap the economies of scale, if any.

One way to test for bunching is to check, everything else remaining the same, if the hazard rate for women workers for second birth increases (i.e., time to second birth is shortened) compared to non-working women. Another way may be to see if survival time for the first birth has any influence on the survival time for second birth. If births are bunched, then the covariate "survival time for first birth" should have a positive coefficient in the hazard function for second birth. In such a case, as survival time for first birth increases the hazard for second birth also increases which means that the time to second birth is shortened.

The estimation of the hazard equation for the second birth posed several problems. The hazards were not proportional, so multiplicative terms of covariates and the survival time to second birth were used. More important is the issue that births constitute a repeated event; the higher order births depend on the lower order. There are three ways to detect and control for such dependencies. Each, however, poses a new difficulty.[162] I have, therefore, used a simpler method. I have restricted the sample for second birth only to those women who had given birth to at least one child. The survival time for first birth is used as a covariate to

[162] The three types of solution are the use of a random effects model, a fixed effect model or association parameters (Vermunt: 1997, p. 176-178). In the first case, results are dependent on the functional form and independence of observed factors from unobserved factors and the initial state. Both have serious limitations. In the second kind of solution, many incidental parameters have to be used which is difficult in a small sample. In the third approach, the parameters have no obvious interpretation.

test whether the two survival times are correlated. Table 7.5.5-1 shows the estimates of the hazard equation for the second birth.

These results are somewhat different from the hazard equations for first birth. Respondent's age, husband's age and education of respondent variables were not found to be significant and were dropped from the final equation.

Table 7.5.5-1: Estimated Hazard Functions for Second Live Childbirths

Explanatory variables	Coefficient (β)	Relative risk (e^{β})
Survival time for first birth	-0.02	0.98
	(0.23)	
Husband's education –	0.95a	2.59
Up to primary (H1)	(2.61)	
Husband's education –	0.87	2.39
(VI-X class) (H2)	(1.80)	
Husband's education –	-	-
SSC/tech or higher – ref (H3)		
Martime- before migration (M1)	0.88*	2.40
	(3.71)	
Martime- between migration	0.98**	2.66
before work (M2)	(4.35)	
Martime- after work (ref)- M3	-	-
H1 * Time to second birth	-0.21*	0.81
	(2.75)	
H2 * Time to second birth	-0.31**	0.73
	(4.75)	
Restype* Time to second birth	- 0.09*	1.10
	(3.54)	
- 2 log likelihood	868.78**	
N of observations	174	

Dependent variable: ln h(t)/h(o).

Note: 1. ***, ** and * indicate statistical significance at 1, 5 and 10 percent probability respectively.

2.Wald statistic is distributed as a chi-square. In all cases above, it has a df =1, in which case, it is simply the square of usual t-statistic.
– 2 log likelihood is also distributed as chi-square.

3. a: just about significant at 10 percent probability.

The difference in behaviour was also found in the case of the influence of marriage timing in relation to migration and job market entry. For first birth, it was found that those who had married after migration, but before getting a job, had a higher hazard compared to those who had married before migration. So too did those who married after job entry. In the case of the second birth, the situation was the opposite. Thus, the time to second birth for the women who had married prior to getting an RMG job, was shorter (hazard higher) compared to that for those who had married after getting a job. Thus, those who already had an explicit

opportunity cost of their time at the time of marriage had their first child earlier than others, but their second child later than others. Support for the idea also comes from the coefficient of the variable "respondent type * Time to second birth". As the reference group is the control women, a negative coefficient means that workers experience, compared to the control group, a longer period, between first and second births. Ram and Rahim (1993) have made a similar observation in the Canadian context. They found that those who always worked had lower relative risk of a second and third birth and those who never worked had much higher relative risks.

The hypothesis of bunching of birth is thus not supported for workers. In fact, it is not supported in general. The negative coefficient for the covariate "survival time to first birth" indicates that, although it is insignificant, as it becomes longer, the hazard for a second birth falls i.e., the time to second birth also lengthens.

The husband's education appeared to have a more significant influence on second birth relative to that on the first birth. Lower education for husbands increased the relative risks of, and therefore shortened the time to, second birth. However, the negative coefficients on the "husband's education * time to second birth" indicate that as the second birth is delayed, those women with husbands having less education are likely to postpone it further, while those with higher education may have the babies sooner. It is not clear why this should be the case. In any case, these results suggest that the relationship between birth and socio-economic characteristics is not so straightforward as has also been found in the case of influence of husband's age on first birth.

7.5.6 Policy Implications

The results in the preceding sub-sections on children ever born and spacing of births clearly identify the importance, among others, of the roles of education and employment for women, particularly in formal sector employment in urban Bangladesh. The first lesson is that low-productivity jobs in the informal sector may not have as strong an effect on the lowering of family size as a formal sector job. The second lesson is that as women may want to keep their family sizes small, they also want to space births as much as possible. Thus, the ease of supply of birth control facilities, as well as the increased awareness of their effectiveness, is an important policy tool. The third lesson is that men's education or other

characteristics may have little or no effect on fertility outcomes or at least these are as yet not well understood in the urban Bangladesh context. On the other hand, women's education has a strong influence on the desire to curb fertility. None of these results are unique. Such analysis and results, particularly in an urban setting in Bangladesh, have however been rare, if not non-existent (see Khan and Raeside: 1998). Yet, these results reconfirm findings based on rural samples of the relevance and importance of women's education and employment in changing their fertility behaviour to curtail the rate of population growth in a developing country.[163]

7.6 CHILD CARE

7.6.1 Women with Infant Children

The demand for and supply of child care both have implications for women's employment. I argued in Chapter 5 that the availability of caregivers might be a factor behind women's labour force participation and labour supply (i.e. hours of work). Consequently child care availability and costs of its provision may also indirectly impact upon fertility.[164]

Apart from the availability or supply factors in child care, there are also issues related to its demand. Not all women may want it. Women who have already achieved a desired family size, may not think child care to be an important issue any more whether they are holding a job or not, particularly if the grown up girl children can help in this regard. On the other hand, women who are employed full time may find it difficult to provide care for their children themselves, particularly if they have not yet achieved their desired family size. In such a situation, if parental or mothers' care is the norm, they may wish to defer having babies or may want fewer babies as they may be unable to provide the care they think to be the best.

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[163] See various contributions in Kane, Khuda and Philips (1997).

[164] In contrast to studies exploring the relationship between child care and labour force behaviour, there are fewer studies on the relationship between child care and fertility. Mason and Kuhlthau (1992) tried to explore such relationships. They also pointed to the conceptual and empirical complexities of such an exercise.

7.6.2 Child Care Arrangements

Modeling the structural relationship between child care on one hand and labour force participation and fertility on the other may be complicated (Mason and Kuhlthau: 1992). Consequently, the data needs also become involved. In this section I, therefore, only try to examine the responses of the mothers to the issues of child care availability. But before that a few words are in order to characterise the general notion of child care in Bangladesh.

In Bangladesh, mothers generally provide child care. When they are busy, as it happens during harvest seasons in the rural areas, usually relatives (such as sisters-in-law, and grand mothers) or older daughters provide the care. In urban households, the care comes from similar sources. Women are paid to help with domestic chores including care (usually in urban areas), and are another source of caregiver. However, while costly it may not provide quality care. So, paid domestic help may be used when other sources are not available. However, currently such other sources are practically non-existent.[165]

Part time work for women could possibly be an adjustment mechanism for them to combine paid work and child care. Part time employment, however, is rare in Bangladesh. As women's large-scale entry into the formal labour market for full time jobs is a phenomenon, which has been observed only for about the last two decades, institutionalised child care facilities have hardly developed to meet the demand.

I have shown in Chapter 6, Section 6.2 that RMG women work long hours. Those among them, who have a child, therefore may find little time to care for their children. The problem multiplies if the children are infants who must be cared for by others, while the mother goes out to work. In the absence of

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[165] This may have happened due to two factors both positively impacting upon girls' education. There is a Food for Education programme (BIDS: 2001) under which, schools are chosen for support to education through provision of food (usually wheat) to households to encourage them to send their children to school. In 1999/00, 2.3 million students in 2.18 million households received such benefits (MoF: 2001, p. 97). While this support is available to both boys and girls, the latter have an additional advantage in rural areas in that they do not have to pay any tuition fees. Thus, girls' education has become cheaper. Possibly, households have taken the opportunity for children's education, particularly for girls (Ravallion and Wodon: 2000). If more girls are in school and later join the labour market, they become unavailable for low-paid jobs such as domestic help. This may be truer in future as the new government policy to provide stipends to all school-going girls is fully implemented. So far there are very few studies except Ravallion and Wodon (2000) on the issues linking investment or subsidy for women's education, their schooling length and/or subsequent job-market behaviour. The paucity of such studies precludes any definitive statement on the nature of its impact.

institutionalised child care facilities, the best that the working mother of an infant can hope for in Bangladesh is to rely on other members of the family when she is away from home. In contrast, non-working mothers can provide the care themselves.

The contrast in the child care arrangements can be seen in the information from the sample of working and non-working women. I asked three specific questions regarding child care arrangements and the problems for working mothers.[166] The questions about child care arrangements were asked for both nursing babies and other children up to five years of age. The results are shown in Table 7.6.2-1.

Amongst the 171 RMG ever married women (for whom the information was available), only 28 reported having nursing babies. These 28 respondents had identified 31 different kinds of child care arrangements, because in three cases the babies have more than one caregiver. Only in two of these responses, had the mother herself taken care for the child. In most cases, working mothers depended mainly upon parents/siblings and in-laws to provide the care. In a few cases, relatives also helped. A similar situation obtains for working mothers of other small children i.e., non-nursing babies.

In contrast to the child care arrangements of the working mothers, the responses of mothers in the control group of women show that they themselves provided such care in 75 per cent of cases. Again, a similar situation obtains in the case of other small children. It may be noted that only for the RMG workers who probably can pay better than the control group women, the paid help (domestic helper or day care centre) is of some importance.

Do the caregivers live with the worker families?[167] Most interestingly, it is found that except for in-laws, others who provide care do not live in the same residence. They live elsewhere as indicated by their residential arrangements. Thus, of the ten working women whose infant children are cared for by their parents or own siblings, only in five cases do they (parents or siblings) live with the worker's family. In the case of care for other children of working mothers, of

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[166] The questions were: (a) If you have a nursing baby, who takes care of the child when you are at work? (b) If you have a child up to 5 years of age (apart from a nursing baby), who takes care of the child when you are at work? (c) Do you have problems regarding child care arrangements?

[167] The issue is important mainly for the workers, as control women themselves are caregivers in most cases.

the 13 responses, only in the case of five do parents or siblings live with the workers while in the remaining eight cases they do not. Such findings indicate that the child care arrangements may be more complex and costlier in terms of money and time than imagined.

Table 7.6.2-1: Child Care Arrangements among Mothers (N of responses)

Care giver	RMG workers		Control group	
	Nursing babies	Other Children	Nursing babies	Other children
Respondent	2	3	30	21
Husband	-	-	2	1
Respondent & husband	-	-	1	-
Parent/siblings	10 (5)	13 (5)	1	-
In-laws	8 (6)	8 (5)	1	1
Other relatives	5 (1)	5 (0)	1	3
Neighbours	1	1	1	6
Domestic helper	4	1	-	-
Crèche	1	-	-	-
Older children	-	-	1	1
No one	-	4	2	3
All responses	31	35	40	36

Note: 1. Except in the case of nursing babies amongst the control group women, there are in some cases more than one response to the question on the type of caregiver. In such cases, the total number of child care arrangements identified is higher than the number of cases.
2. Figures in parentheses show the number of cases in which the caregiver is in same residence as the worker.

7.6.3 Problems in Child Care

The lack of institutionalised child care facilities may create difficulties for working women. For example, three-fifths of the responses from working mothers to the question on problems due to the observed child care arrangements indicated anxiety about their children (Table 7.6.3-1). The type of worry next in importance was that the children might not be properly fed.

The database for analysing issues related to child care and relating them to decisions regarding labour market entry and to fertility is rather small in the present case. Yet, these responses highlight one or two issues, which might be useful for future research and policies. Research is needed in understanding the subtle links that may exist between child care availability and labour market entry of women and more particularly their fertility. Yet, one may not want to wait for such links to be established more firmly and quantified. It is clear that mothers remain worried about their children. This probably imposes two types of cost.

Worried mothers may give less attention to work and have lower productivity and thus earn less than others.[168] Secondly, while many caregivers may be part of extended larger families, in some cases they (caregivers) live elsewhere thus imposing a time cost on parents in terms of depositing and collecting the children every working day. Child care provisions in general thus may help mothers in lowering these costs and raising income while those who are not in the work force may have an incentive to look for jobs in such cases. Thirdly, the development of the child care industry itself may generate some employment in the service sector that may help females particularly as they are usually the caregivers. Fourthly, as found in the western countries, children who get preschool training in day care centres, may exhibit enhanced learning capabilities and be better prepared for school and thus have improved future productivity and earnings. Fifthly, it may also help non-working mothers to get the educational benefit of day care centres for their children. Sixthly, as paid domestic help has become comparatively rare, day care centres for child care and pre-school learning may lessen the burden of general household chores for non-working as well as working mothers.

Table 7.6.3-1: Types of Problem due to Non-maternal Child Care

Type of problem	Frequency of response	Percent of Response
Children not properly fed	13	25
Frequent illness	3	6
Remains anxious about child	32	61
Others	4	8
All	52	100

[168] The average pay drawn by those who had been worried and those who were not were Taka 2267 and 2389 respectively. The difference between the two was not however statistically significant. Among the managerial staff, the average pay for the two respective groups had been Taka 3005 and 3477, a difference of nearly 15 percent. This difference too was not significant. But these are suggestive of the pattern of the productivity differential.

7.7 Health and Morbidity Issues

7.7.1 Health Problems of Women

Long working hours for women in the working place (see Chapter 5) or at home (see Chapter 6), and the poor physical facilities and environment in both places (Chapter 5 and Chapter 6), may combine to have an adverse effect on their health. Such ill health may also impair the productivity of working women and consequently depress their wage income (Currie and Madrian: 1999; Savedoff and Schultz: 2000a; Strauss and Thomas: 1998). Thus, an analogy has been drawn between investments for improvement or maintenance of health and those in other forms of human capital such as education (Becker: 1991; Grossman: 1972; Grossman: 2000; Strauss and Thomas: 1998). Poor health, like little or no education, leads to low productive capacity of a person and additionally shortens the time available for market work, thereby reducing his/her total earnings.[169]

Regarding the determinants of health status, there are broadly speaking, two types of conceptual framework. The first type relates to the supply of health and related facilities. The choices made by people, given the supply facilities, and their outcomes constitute the second conceptual framework based on demand for health. The choices depend on the resources available to individuals and households through income from wages, self-employment or property and others such as transfers made by other family members or the state.[170] The choices may be inferred from the Beckerian model (see Chapter 3, Section 3.3 for the basic model).

The choices are circumscribed by the supply facilities for health. As the respondents in the present case live in the capital city where medical facilities are easily available, the availability of health facilities is likely to be similar across the respondents. As many of these facilities are privately provided, the realised access to health facilities and the impact this has on subsequent health status is likely to be determined more by demand rather than supply factors.[171] The following sub-

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[169] Currie and Madrian (1999) provides a detailed summary of results of various studies. Also see Strauss and Thomas (1998). Savedoff and Schultz (2000a) provide detailed case studies on the interrelationship between health and earnings in several Latin American countries.

[170] For an interesting study on how transfer incomes in South Africa have played a major role in determining health status of people, see Case (2000).

[171] In urban areas of Bangladesh, 77 percent of households financed treatment of sickness out of their own income and savings. Further more people rely on private rather than public health facilities (BIDS: 2001, p. 66-67).

sections therefore, provide a theoretical framework to analyse health status drawing upon the Beckerian model of choice.

7.7.2 Theoretical and Empirical Issues in Health Status Analysis

A theoretical framework

Let us consider an individual whose current health status is the result of past investments in health inputs (such as medical treatment, purchases of medicines, having nutritious food and safe drinking water). The unobserved endowments of individuals vary (i.e., is heterogeneous) from person to person and may also impact upon health status. Thus, given all other things the same, some people are healthier than others due to individual genetic or other factors that are unobserved. The health status production function may then be written as

$$H = H(I, Z, G) \qquad \ldots (7.7.2.1)$$

where

H = health status

I = health inputs of various kinds,

Z = observed characteristics of the individual,

G = unobserved heterogeneous endowments of individuals.

A health production function as in (1) may exist for each of the members in a household and therefore may be given a subscript *i* for the *i*-th individual. This has not been done to avoid clutter in the equations.

Assume now a household with *n* members that maximises a utility function with arguments such as health status, the consumption of other goods and services and leisure of all its members. This may be written as

$$U = U(H, C, L) \qquad \ldots (7.7.2.2)$$

where

U = utility;

H = health status;

C = consumption of other goods; and

L = leisure

The household also faces a full income constraint, which is derived from the time and the income constraints. The constraint may be shown as

$$P_c C + P_i I + W L = WT + V = S \quad \ldots (7.7.2.3)$$

Where P denotes the prices of C and I, W is the wage rate, T is the total available time, V is the non-labour income and S denotes the full income.

Maximising (2) subject to (1) and (3) leads to a reduced form of the health status equation showing it as a function of all the prices, the full income, the observed characteristics of the individual and the unobserved heterogeneity. Thus the health status function, H* may be shown as

$$H^* = H^*(P_c, P_i, S, Z, G) \quad \ldots (7.7.2.4)$$

The maximisation rule also leads to a wage equation, which may be written as

$$W = W(H^*, Z, G) \quad \ldots (7.7.2.5)$$

in which health status and unobserved heterogeneity become arguments. Moving from this conceptual framework to an empirical specification, the health status equation to be estimated may be expressed as follows:

$$H^* = \alpha + \beta_1 \text{ Age} + \beta_2 \text{ Age-sq} + \beta_3 \text{ Marital status} + \beta_4 \text{ Migrant status} + \beta_5 \text{ Education} + \beta_6 \text{ Occupation} + \beta_7 \text{ Land owned} + \beta_8 \text{ Pooling} + \beta_9 \text{ Family headship} + \Sigma_i \gamma_i \text{Env}_i + u_i \quad \ldots (7.7.2.6)$$

where, α and β_j, γ_i are the parameters to be estimated (j = 1, .., m, where m is the number of personal and family variables; and i = 1,.., n where n is the number of Env or environmental variables) and u_i is the error term.

The explanatory variables in the estimating equation (7.7.2.6) are all observed. The characteristics of the individuals such as age and marital status are elements of Z. As the data are from a cross-section sample in one locality (city), the prices (P_c, P_i) are unlikely to vary much. Their inclusion therefore may not explain the variation in health status and thus not included in equation (7.7.2.6). Environmental factors may include residential location, access to electricity, sanitary facilities, cooking fuel and kitchen facility and wealth indicators such as

housing structure, ownership of TV and radio/two-in-one[172] as proxies for S (full income).[173]

Econometric issues

Note that in terms of analysis I am not only looking at health status but also at how health status may impact upon wages of women. Two types of econometric issues warrant attention in this situation. First, there is a selectivity problem as wages are observed only for those in the labour market. Selectivity bias has already been addressed in Chapter 5, Section 5.5. There is an additional problem of health as an endogenous variable in the wage equation because of the unobserved heterogeneity that enters both the equations.[174] The two-stage least squares method is used (in the wage equation) to address this problem. Once the selectivity and the endogeneity problems are taken care of, the wage or income equation can be estimated (as in Chapter 5, Section 5.7). I now turn to the concepts and measurements of the variables including health.

[172] Access to electricity may also be used as an indicator of wealth. Unfortunately, given that many electrical connections are illegal, particularly in the slums, it would have little relationship with purchasing capability due to income. Also access to safe water should be used as a major environmental factor. However, practically all households have access to either piped or tube well water. Hence its effects will not be clearly discernible.

[173] Similar proxies for S have been used by Murrugarra and Valdivia (2000) in their analysis of health status of Peruvian adults.

[174] A major part of the literature on the relationship between labour supply, earnings and health deals with the endogeneity (of health) problem and how to deal with it (Currie and Madrian: 1999; Savedoff and Schultz: 2000a). The endogeneity problem arises because while health may have an influence on labour force participation and therefore on earnings, earnings itself may influence health through its effect on economic capacity to purchase health services and also due to unobserved heterogeneity.

7.7.3 Concept of Health and its Measurement

Concept of health

Eight types of measures of health have been described in the relevant literature.[175] Recent analyses of health status of women (Savedoff and Schultz: 2000a) have used five types of indicators. These include days disabled, days ill, activities of daily livings (ADLs), and height and age at menarche. The first three can arise from both past and present health inputs. The last two must depend mainly on past investment in nutrition. In such a situation, a dynamic setting may be called for a proper analysis. Because of the snapshot nature of the present data, such an exercise, however, is beyond the scope of the present analysis.[176]

Types of available information

The choice, in practice, from among several alternative measures is often determined by the available information. The present data set contains information on the incidence of disease during the three months prior to the survey and also of the frequency of certain diseases, which may have increased since women joined the RMG factories. Furthermore, there is information on: a) whether the patients have been treated and how; b) if during the last month prior to interview, working women had taken any leave due to their own illness; c) health expenditure incurred by subsets of both working and non-working women (that has already been analysed in Chapter 6, Section 6.4); and d) finally on other issues related to treatment (such as the decision-making role of women).

Before estimating equations, I report on the specific diseases from which women have suffered and the disease-proneness over time (for working women).[177] This is followed by a description of the sick leave reported by worker

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[175] These are "(1) self-reported health status (most often whether some one is in excellent, good, fair or poor health); (2) whether there are health limitations on the ability to work; (3) whether there are other functional limitations such as problems with activities of daily living (ADLs); (4) the presence of chronic and acute conditions; (5) the utilisation of medical care; (6) clinical assessments of such things as mental health or alcoholism; (7) nutritional status (e.g., measured by height, weight or body mass index); and (8) expected or future mortality" (Currie and Madrian: 1999, p. 3314).

[176] For a recent attempt using German data see Dustmann and Windmeijer (2000).

[177] The questions to both the worker and the control women were:
What are the diseases that you have suffered from during the last three months?
Worker women (only) were then asked: Which of these diseases have been more frequent since joining the RMG factories? Have you had any treatment for these diseases?

women and the days they were disabled.[178] I then try to find out if the health status (incidence of disease, sick leave, and the number of days sick) can be explained by the factors listed earlier and whether health status has any influence on the earnings of working women. Depending on the way the dependent variable is defined empirically, several types of regression equations have been estimated for explaining health status.

Incidence of disease

The answers to the question on the types of disease experienced by women in the worker and control groups, over the three months prior to the survey, are reported in Table 7.7.3-1. There is not much difference in the type of disease reported or the symptoms the two groups suffer from. Yet, afflictions such as headache, eye problems and respiratory diseases are more common among the workers who often work in cramped conditions amid the continuous droning sound of sewing machines. The workrooms have only a few windows and are thus not well ventilated.[179] The working women were asked if they had been experiencing some of these diseases more frequently since joining the factory. In reply, 168 out of 259 workers mentioned most frequently the first four of the diseases in Table 7.7.3-1, which are (figures in parentheses showing percent of cases): fever (43.5); headache (35.7); weakness (38.7) and burning sensation (16.7). If such self-reported information is taken at its face value,[180] it may be that the RMG women possibly had been of somewhat better health when they had started work.[181]

For workers, I have information on the number of days they had been absent in work due to sickness. This gives us two types of measure of health status, if the person was disabled for work and the number of disabled days. As Table 7.7.3-2 shows, only 11 percent of working women reported absence due to sickness. Most

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[178] The specific questions were: Have you taken any leave due to your illness during the last month? If yes, for how many days?

[179] In some of the factories in my sample, during the interview I had observed a lot of airborne particles from various fabrics in use. Some respondents also complained about it. Some used masks at their own cost.

[180] For a discussion on the debate on the efficacy of self-reported measures see Curie and Madrian (1999, p. 3313-3318). Also see Butler, Burkhauser and Mitchell (1987) who indicate that self-reported measures perform less well, but nevertheless are similar to alternative measures of health. Note also that previous Bangladesh studies have similar findings. See Chapter 2, Section 2.6.2.

[181] Such results corroborate the general findings of positive association between health and hours of work (and thus labour supply). See Currie and Madrian (1999), various pages.

of those who had taken sick leave did so only for 1-3 days, while those taking leaves for more than 7 days did so for an average of 10.3 days (not shown).

Table 7.7.3-1: Incidence of Disease during Three Months Prior to Survey (percent of respondents)

Disease	RMG workers	Control group
Fever	46.7	45.4
Headache	39.0	25.4
Weakness	30.9	26.9
Burning sensation	20.8	16.9
Minor stomach ailments	11.2	7.7
Cold	10.0	20.0
Eye pain	7.3	4.6
Jaundice	5.0	5.4
Others	24.5	24.7
No disease	17.4	23.1
All cases (N)	259	129

Table 7.7.3-2: Distribution of Working Women by Number of Days Absent in Workplace

Days absent	Non-sick women (N)	Sick women (N)	All (N)
None	231	-	231
1-3 days	-	16	16
4-7 days	-	6	6
More than 7 days	-	7	7
All	231	29	260

7.7.4 Variables for Econometric Analysis

Dependent variable

The health status (H*) for the present exercise is measured in 3 ways.

a. For both the worker and the control it has been measured as a dummy variable as $H_1^* = 1$, if experienced a disease during last 3 months,

$= 0$, otherwise.

b. Additionally for workers, two measures have been used. These are:

$H_2^* = 1$, if sick leave taken last month;

$= 0$, otherwise.

H_3^* = number of days of sick leave taken last month.

For the first two dependent variables, I use probit regression equations. For the third dependent variable, I use an OLS, Tobit, and an ordered probit regression. In the ordered probit case, the dependent variable is grouped in three categories such as "Zero days", "1-3 days" and "More than 3 days".

Explanatory variables

As listed earlier, several individual, family characteristics, environmental, standard of living and wealth indicators have been utilised as explanatory variables in the health status equations. These are discussed below.

Age and square of age: The variables are measured in years. The hypothesis is that as people age, their natural immunity against disease may wane at least after a certain age. So in the regression equation age may have a positive coefficient. By the same reasoning, the expected coefficient of square of age may be positive, i.e., as age advances, the incidence of disease may be increasingly more frequent.

Education variables - *Eddum1 and Eddum2*: The variable is measured as two dummy variables, *Eddum1* and *Eddum2* with the highest educated as the excluded group that have been described earlier in Chapter 5. Generally, it is expected that better educated people may be more knowledgeable regarding health and hygiene especially with regard to desirable food type, its intake and preparation, and cleanliness. They are thus less likely to fall sick. The coefficients of education dummies are thus expected to be negative. On the other hand, in the literature, the influence of education has often been found to be positive. This has been explained as the possible tendency of better-educated people to be more aware of their sickness compared to others (Cortez: 2000; Murrugarra and Valdivia: 2000; Strauss and Thomas: 1998). The sign of the coefficient is thus an empirical issue.

Occupation variables - *Ocpn1 and Ocpn2* (Occupational status): The variable is measured as two dummies, *Ocpn1* and *Ocpn2*. *Ocpn1* = 1 for manual workers, zero otherwise. *Ocpn2* =1 for semi-technical and technical workers, zero otherwise. As discussed elsewhere, workers may be categorised into three groups, viz., manual, semi-technical and technical and supervisory. The last named is the excluded category. The lower occupational categories generally reflect lower

levels of education and lower earnings. If education is controlled for, the category should reflect level of income. If so, people in the lower categories may be less financially capable of obtaining adequate and wholesome food and purchasing medical services. They may thus report more sickness or absence from work due to illness. The coefficient of *Ocpn1* is thus expected to be positive. Those in the group *Ocpn2* are mainly the sewing operators who do the backbreaking work. Compared with the managerial/supervisory groups they are also likely to have less financial ability to receive treatment if sick. Thus, persons in this group are likely to suffer more from ill health and the coefficient of *Ocpn2* is also expected to be positive.

Marital status - *Mardum*: Unmarried women usually have fewer day to day family and home responsibilities compared to married women (Chapter 6, Section 6.2). Even those who are divorced or widowed may have children and thus have more of such responsibilities. Ever married women compared to unmarried women may therefore more frequently fall sick. The "Marital status" variable is measured as before as a dummy variable with a value of 1 for ever married women and zero otherwise. The coefficient is expected to be positive.

Family size - *Sizedum1 and Sizedum2*: This is a more direct test of the influence of day-to-day family responsibilities. Family size may have two opposing influences. As family size increases, the burden of day-to-day family chores increases raising the tendency to fall sick. On the other hand, increased family size may mean extra hands to help which may lower the home production burden. The expected sign is therefore an empirical issue. The variable is measured as two dummies, *Sizedum1* and *Sizedum2*. *Sizedum1* =1 for family size up to two persons, zero otherwise. *Sizedum2* = 1 for family size 3-5 persons, zero otherwise. The excluded category includes families of more than five persons. In some of the equations, the actual family size, *Livesize*, has been used. The sign of its coefficient cannot be predicted *a priori* as in case of *Sizedum1* and *Sizedum2*.

Family headship - *Headdum*: The variable is measured as *Headdum* =1 for female headed households, zero otherwise. If a family is female-headed, it is likely that the problems faced by women may get more attention including treatment when

sick than if it is male-headed. This may have a salutary effect on the health of women. On the other hand, the female-headed households are generally poorer than the male-headed ones[182] lowering their capability to cope in situations of sickness. If so, it is difficult to predict the sign of the coefficient *a priori.*

Pooling of resource - *Pooldum*: If women pool their earnings with others in the family, they lose, at least partly, the control over their income (see Chapter 6, Section 6.3). In such a situation, they may not be able to independently take preventive actions against sickness. Thus, in cases where women pool their earnings with others in the family, they may be more likely to fall sick and remain so longer. Measuring the variable as *Pooldum* =1 if resources are pooled and zero otherwise, the expected relationship is positive. It may however be that those who do not pool and thus have better control over their income may more easily get medical attention if needed. In such a situation they may report more sickness. If so, the coefficient may be negative.

Land ownership - *Landum*: Ownership of land has been used as a proxy variable for access to non-labour income. This is measured as a dummy variable with a value of zero for no land and unity for having land. It has been observed that people with higher income report more frequently of sickness because they are better able to get medical attention (Strauss and Thomas: 1998, p. 791-92). This may be true also for income from various sources including non-labour income. If so, the coefficient of the land-ownership variable is expected to be positive (i.e., they will report more of sickness).

Migratory status - *Migdum*: Bangladesh villages generally lack good medical facilities. On the other hand, the physical environment therein (such as air quality) is probably better than in the cities. It is frequently observed that many of the migrants are actually pushed to the town due to poverty, which has malnutrition as an outcome. The net difference between migrants and non-migrants in terms of health status is thus difficult to predict a priori. This is an empirical issue. *Migdum*

[182] Female-headed households in Bangladesh have lower income than male-headed household (BIDS: 2001).

measures migratory status as a dummy variable having a value of 1 for migrants, zero otherwise.

Physical quality of life and environment: Hygienic conditions of living are expected to improve the chances of better health and thus lower the incidence of sickness or its severity. I asked the respondents questions regarding their access to various facilities and the standard of their living, both in the past and at present.[183] Some of these indicators as stated earlier may also be used as proxies for wealth. It is expected that people living outside slums and in brick-built houses, having access to electricity, safe water, sanitary defecating facility, using less smoky fuel for cooking (such as gas or electricity), having a separate kitchen (and thus less exposed to smoke and air-borne particulate), and more entertainment facilities at home will all have better health. They will be less prone to falling sick as these facilities improve the physical quality of life. The exact sign will depend upon the way the dummy variable is constructed as will be explained while discussing the results.

7.7.5 Estimation Results

Table A25-1 in Appendix 25 reports on the means and standard deviations of the variables that have been used in various regression equations in the discussion which follows.

[183] The questions were: "Did you have electricity/safe water/sanitary latrine/TV/Radio before the RMG job? What about the present?"
On sources of fuel for cooking and housing structure, the specific questions asked were: "What kind of fuel did you use before and currently?" and " What type of structure did you have before and currently?"

Probit regressions were estimated for explaining the occurrence of disease during the last three months (*Ghealth*) as the dependent variable.[184] The exercise was successful for neither the worker nor the control group of women as none of the coefficients turned out to be statistically significant.[185] These are therefore not reported.

Incidence of absence from work due to disability

I next tried to model the incidence of leave due to sickness by women working in RMG factories. The results of the probit regression for incidence of sick leave are shown in Table 7.7.5-1. The first equation in the table includes all the explanatory variables. There are just two variables with statistically significant coefficients. These are land-ownership and the pooling of resources. The most stable influence appears to be that of the resource pooling dummy among all equations. The sign is negative which means that those who do not pool their earnings are likely to report more frequently for sick leave compared to those who pool their earnings. It may be, as argued earlier, that as the non-pooling women keep their own earnings, they can afford to be absent when sick and probably also get medical attention more readily because of the control over their own earnings. Ownership of land similarly has a stable coefficient which is statistically significant across equations. Again as argued earlier the coefficients are positive which shows that those with non-wage sources of income may afford to remain absent from work.

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[184] For convenience of interpretation, during regression the variable H1* was redefined as *Ghealth* measured as a dummy variable as shown in Table A25-1 in Appendix 25.

[185] The problem of errors in measurement in health status is a major worry often expressed in the literature as stated earlier. In the present case, recall errors may have been large as respondents were initially asked to recall information for a period of 90 days, although even longer periods (of 180 days) has been used in some studies such as Parker (2000). Many, however, use a shorter recall period of 4 weeks or the last month (30 days) (Cortez: 2000; Ferrando, Alvarez and Savedoff: 2000; Murrugarra and Valdivia: 2000; Ribero and Nunez: 2000) as has been done in the present case of incidence of sick leave. It is expected that the errors will be less in the case of a shorter recall period. Taking leave from work in the immediate past is likely to be recalled correctly, particularly as this has implications for earnings. Also, as argued by Schultz and Tansel (1997), people may probably recall more correctly the number of days absent from work due to illness.

Table 7.7.5-1: Probit Regressions for Incidence of Sickness Leave (Workers)

Explanatory variables	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5	Equation 6
			Personal characteristics variables			
Age (years)	0.04 (0.28)	0.009 (0.08)	0.03 (0.23)	0.03 (0.30)	0.02 (0.19)	0.04 (0.34)
Square of age (years)	-0.0004 (0.17)	0.00007 (0.03)	-0.0003 (0.13)	-0.0003 (0.14)	-0.0001 (0.07)	-0.0004 (0.19)
Marital status – ever married = 1	0.07 (0.18)					
Migrant = 1	0.06 (0.13)					
Educated up to primary (V) = 1	0.85 (1.39)	0.90 (1.68)*	0.45 (1.73)*		1.16 (2.48)**	1.06 (2.39)**
Educated at mid-level (VI-X) = 1	0.54 (0.87)	0.60 (1.06)			0.84 (1.68)*	0.77 (1.61)
Manual job = 1	0.22 (0.39)			0.47 (1.14)		
Semi-technical/technical job = 1	0.63 (1.32)	0.49 (1.80)*	0.56 (2.18)**	0.89 (2.59)***		
			Family characteristics variables			
Family size (1-2 persons) =1	0.42 (0.94)					
Family size (3-5 persons) = 1	0.18 (0.43)					
Family owns land = 1	0.65 (1.89)*	0.70 (2.23)**	0.71 (2.22)**	0.68 (2.21)**	0.65 (2.09)**	0.64 (2.09)**
Pool earnings =1	-0.86 (2.35)**	-0.91 (3.17)***	-0.94 (3.32)***	-0.79 (2.88)***	-0.94 (3.35)***	-0.89 (3.21)***
Female-headed family =1	0.10 (0.23)					
			Environmental wealth indicator			
Lives in slum = 1	0.18 (0.49)					
Have electricity = 1	0.50 (0.96)					
Live in brick-built house = 1	0.52 (1.23)	0.28 (0.84)	0.42 (1.60)		0.44 (1.67)*	
Live in partly brick-built house = 1	-0.05 (0.14)	-0.22 (0.75)				
Use sanitary latrine = 1	-0.13 (0.36)					
Has separate kitchen = 1	-0.28 (0.93)					
Gas/electricity for cooking = 1	0.05 (0.13)					
Own TV = 1	0.07 (0.24)					
Own a radio or two-in-one = 1	-0.09 (0.32)					
Constant	-3.54 (1.59)	-2.44 (1.54)	-2.26 (1.46)	-2.43 (1.58)	-2.48 (1.59)	-2.55 (3.21)
Log Likelihood	-71-88	-70-78	-75-75	-77.65	-76-59	-77.96
Likelihood Ratio Chi-square	87.14**	31.83***	29.87***	26-08***	28-19***	25-47***
Number of observation	256	258	2.58	258	258	258

Dependent variable: Sickdum = 0 if never remained absent in the work place due to sickness; = 1 otherwise.

Note: 1. Figures in parentheses are t- statistic.

2. ***, ** and * indicate statistical significance of the particular statistic at 1, 5 and 10 percent probability respectively.

Neither education nor occupational status has significant coefficients in equation 1. While the bivariate correlation coefficient between the two is only 0.51, it is statistically significant which may perhaps explain the insignificance of both the coefficients in equation 1 in the table. When education alone is entered (as in equation 5), both the education variables have positive and significant coefficients. Thus compared to the highest educated, the less educated workers are likely to fall sick more frequently.

When the occupational status variables alone are entered, in the absence of education variables (equation 4), the coefficient for the manual worker is found to be positive but insignificant, while that for the technical and semi-technical jobholder is positive and significant. This means that when other variables are held constant, technical labour (mainly sewing operators) is more likely to report sickness leave. Whichever way one looks at it, the results for the influence of education and occupational status indicate that those doing managerial and supervisory work and with better education usually report less frequently for sickness leave compared to others.

All other coefficients are insignificant in equation 1, but most are positive. Generally speaking, good environmental factors have positive effects on health. Those factors which indirectly reflect wealth (such as, brick-built housing, access to electricity and TV ownership) have opposite effects but similar to that of factors such as land ownership. Female-headed households are possibly less restrained in their behaviour to report illness.

Days of absence in workplace due to sickness

Here I report the results for the regression equation with the number of days of absence on sick leave as the dependent variable. A question arises here regarding the appropriate econometric method. The dependent variable is limited in value between zero and 30 days. The preferred estimator in this situation is Tobit although care must be exercised in the interpretation of the coefficients in such a model (Gujarati: 1995, p. 572-573). Ordered probit estimates were also made to compare the results with the Tobit and the OLS estimates. As it turned out all the three estimators returned very similar results and thus I am reporting only the table for the OLS regression in the main text. The other results are shown in Appendix 25.

The initial results of the OLS regression indicated that most dummy variables have insignificant coefficients. I have therefore re-estimated the equations with the variables likely to show significant coefficients. These results are shown in Table 7.7.5-2. The full model is shown in the Appendix 25, Table A25-2. All these lead to essentially the same conclusions as before. Thus, pooling behaviour has the most significant influence. As women pool their earnings with others, the number of days reporting sick falls. I have shown before that such women do report a lower incidence of sick leave. Thus the tendency and the number of days reporting sick is lower for women who pool (i.e. have less control over earnings) and higher for those who do not pool (with control over their own earnings).

Compared to better-educated women, those with the least education remained absent for more days due to sickness. The coefficient is statistically significant at the five percent level of probability in the second equation. Those with mid-level education exhibited similar behaviour, but the coefficient is not significant.

Table 7.7.5-2: OLS Regression for Days of Sick Leave (Worker)

Explanatory variable	Equation 1	Equation 2
Personal characteristics variables		
Age (years)	0.18 (1.42)	0.20 (1.57)
Square of age (years)	-0.002 (1.05)	-0.003 (1.19)
Eddum1(Up to primary=1)	0.46 (1.04)	0.79 (2.31)**
Eddum2 (mid-level (VI-X)=1)	0.12 (0.27)	0.40 (1.05)
Ocpn1(Manual=1)	0.04 (0.08)	-
Ocpn2(semi-tech/tech=1)	0.52 (1.33)	-
Family characteristics variables		
Landum (owns land =1)	0.42 (1.49)	0.36 (1.29)
Pooldum (pool earnings =1)	-1.28 (3.48)***	-1.32 (3.61)***
Standard of living variables		
Elecdum (has access =1)	0.76 (1.82)*	0.87 (2.12)**
Hsedum1(brick-built house =1)	-0.50 (1.29)	-0.46 (1.19)
Hsedum2 (partly brick-built =1)	-0.62 (1.99)**	-0.57 (1.85)*
Constant	-2.28 (1.25)	-2.51 (1.42)
Adjusted R – sq	0.095	0.091
F-statistic	3.45***	3.85***
N of observation	258	258

Dependent variable: Number of days absent in the work place due to own illness.
Note: 1. ***, ** and * indicate statistical significance of the particular statistic at 1, 5 and 10 percent probability respectively.
2. Figures in the parentheses are absolute t-statistics.

When the occupational status variables are put in together with education, again the coefficients of both the variables become insignificant. Also the

magnitude of the coefficients for education falls substantially. Thus, very probably education has been picking up the effect of occupational status in equation 2. Yet, the signs of the coefficients for both the variables indicate that the earlier conclusion regarding the direction of influence of the two variables on health status remain unaltered.

Access to electricity and living in partly brick-built housing have weakly significant coefficients but with opposite signs. As before, some of the direct environmental indicators show the expected behaviour. However, as the results are all statistically insignificant, no firm conclusion can be drawn on their basis.

Tobit estimates

The Tobit estimates show the significance of pooling behaviour (see Table A25-3, Appendix 25). The results more or less mirror those under OLS. Pooling is the most important variable as before. The coefficients of land dummy and family size indicate that both are statistically significant, though weakly, but with opposite effects on days of sick leave. Family size has a negative sign possibly indicating that women may get some respite from work at home if there are more people in the family. The environmental dummies again have coefficients, which have signs similar to those for OLS, but all are insignificant.

Ordered probit estimates for days of absence

The dependent variable here is a grouped variable in three categories, viz., zero, 1-3 days, and above three days. The results are in Table A25-4 in Appendix 25. The observations regarding the influence of pooling practice and education are confirmed once again. Coefficients for the pooling variable and both the education variables are all positive and statistically significant. It was also found that the ownership of land shows a similar pattern and the coefficient is just about weakly significant (at ten percent of probability).

Does health status affect earnings?

To see if actual earnings are affected by health status, I have estimated the earnings functions with a health status variable but corrected for selectivity (Chapter 5, Section 5.5.2). Because of the possible endogeneity of health when wage equations are estimated with health indicators as an explanatory variable, I

used a two stage least square method. The instrumental variables that have been used are: *Eddum1, Eddum2, landdum, lenrmg, lenrmg-sq* (for definitions of these length of experience variables, see Chapter 5, Section 5.7), interaction terms of education and experience and environmental dummies for slum living and access to sanitation facilities. The earnings function is of the Mincerian type.

As Table A25-5 in Appendix 25 shows the coefficient of the health status variable, *Sickdum* (=1 if sick leave taken during last one month, zero otherwise) is not significant. But these are negative. Thus, ill health may lower the actual wage received but its effect is, at best, weak.

7.7.6 Conclusion

The results of the analysis of the health problems of women workers may now be summed up as follows.

A substantial group of women workers in RMG factories have various health problems which are evident from their self-reported disease pattern, self-reported sickness and consequent absence from work. Certain diseases appear to be more common among the working women than among the control group.

Behavioural, personal and family characteristics, along with environmental factors, appear to influence the health status of working women. On the whole, resource pooling practice appears to be the most significant factor while education, type of job done, access to non-labour income and hygienic conditions of living also influence health status to varying degrees. It may be noted that though not significant, resource pooling indicated lower expenditure shares for health in Section 6.4 in Chapter 6. Thus, these results support each other.

The inclusion of the health status variable (as measured by incidence of sick leave) has a negative coefficient in the earnings function signifying its negative impact on earnings. The coefficient, however, is not significant. Further research is needed to investigate the influence of health on wages.

7.8 Summary

This chapter has examined in-depth the fertility behaviour of women both in regard to the number of children ever born and the spacing of births. Using a quantity-quality trade-off model, it has been shown that women's employment and income earning as well as education are important determinants of observed

fertility. There is only limited evidence in favour of a quantity-quality trade-off, though. These are not unique results but have so far not been demonstrated in the case of women working in the formal sector in Bangladesh.

These findings have obvious implications for policies to encourage education and employment of women, particularly in the formal sector. There are, however, snags in the process. One major problem is child care. Women are constrained in their labour force participation due to child care problems while those already employed are weighed down by it. As a result some women are forced to send their children to parental homes in villages.

The second problem women face is the lack of a hygienic physical environment in the work place. Long hours of work at the shop floor and at home, combined with the lack of a wholesome physical environment, often make women sick. While there is no pronounced difference between workers and control women in their reported disease patterns, workers appear to suffer more frequently from certain ailments compared to the situation prior to employment. As a result, some of them have to take leave of absence from work, though only for a few days. There does not seem to be any definitive and appreciable link between sickness and earning. But given that health status may have been measured with error, more purposive future research is necessary to examine such links particularly the possible adverse impact of ill health on productivity.

Chapters 5 to 7 have analysed changes (such as large scale employment of women in the formal sector, migration of women in search of jobs, women's exercise of control over earnings and fertility behaviour) that may be termed social as well as economic or demographic. These changes have been analysed within an economic framework of maximisation of household utility in which women's time has an explicit opportunity cost due to their employment and earnings. The next chapter discusses some other types of social change that relates to the role of women in decision-making within the family and their freedom of action.

CHAPTER 8
SOCIAL CHANGE

8.1 Introduction

In this chapter, I examine three types of interrelated social issues. The distinguishing characteristics of these issues is that they may be influenced by women's employment and earnings capability, but not necessarily directly due to the opportunity cost of women's time as in case of say, fertility behaviour. I first review the situation regarding the decision-making roles of women. Secondly, I review and analyse certain types of freedom of economic and social interaction with other persons, mainly outside the household. The role of employment and earnings in such interactions is investigated. Finally, I review and analyse the mobility behaviour of women as another expression of women's freedom. In this case, I analyse how personal, household and economic factors may combine together to impact upon women's mobility. In all these, I refrain from the details of social or psychological process that may be at work. My basic intention is to examine how far the income earning role of women may have resulted, if at all, in any creation of authority for them and its exercise in their dealings within and outside the household.[186] In the analysis that follows, I deal with decision-making and the issue of economic and social interactions together because these reflect mainly the norms or their changes within the household. The mobility behaviour is dealt with separately.

8.2 Decision-making and Interactions: Questions and Empirical Methods

I report first on the incidence of various decision-making roles for women. Women were asked whether certain events had taken place during the 12 months prior to the survey. These ranged from land purchase and sale, to marriage of sons and daughters. Sixteen such events were identified (see Appendix 26, Table A26-1 first column for the list of events). For each event the questions were: if the event has taken place, whether the respondent had been consulted before any

[186] The term "autonomy" is generally used to indicate if women have independence of action. While the term may have specific connotations in sociological or anthropological literature, I use the terms "autonomy", "independence", freedom and authority" interchangeably. For an illuminating discussion on autonomy as displayed in everyday life and its various dimensions see Jejeebhoy (1995). For the use of indicators of autonomy and a critique of these, see the various papers in Jeffery and Basu (1996a).

decisions were made regarding the event, and who had taken the final decision. Nine types of decision-making person/groups were identified.[187] As my emphasis is on seeing whether working women are assuming greater roles in decision-making, some of these cases were grouped together in a way that the roles of respondent women are brought out as clearly as possible. As the exercise has been done for both the worker and the control women, the difference between the two may be taken to mean the change that may have taken place due to women's labour force participation.

For the more direct test of autonomy, women were asked if they needed permission to talk to non-kin men, to mix with their neighbours or the male relatives who are not part of the immediate family. Additionally they were asked about their movements outside home for purposes other than going to the work place such as buying provisions for the family, other kinds of shopping, purchasing dresses for family members and going to places of amusement such as the cinema, fairs or theatres. For each kind of activity, they were asked if they needed permission of their guardians, husbands, parents or in-laws. Four types of replies were documented. These were (1) permission always required, (2) required occasionally, (3) no permission needed and (9) not applicable.[188]

The questions were asked of both the working and the control women. The first three have already been combined into an index of social autonomy (Socauto), the construction of which has been described in Appendix 12. For the other activities, another index called Econauto (economic autonomy) has been constructed as described in Appendix 27. These two indices have been combined together to create another composite index called Seauto (social and economic autonomy) for an over-all idea of the situation. The replies to the questions have been analysed both as absolute and relative frequency distributions and separately to indicate the differences between activities and decisions by working status of women. The three indices have been analysed subsequently.

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[187]These were: (1) only husband, (2) only the respondent, (3) the spouses together, (4) the respondent mainly but after consulting others, (5) husband mainly but after consulting wife (respondent), (6) parents (for unmarried) or in-laws (for married), (7) others in the family, (8) the whole family together and (9) not applicable (in case the event has not occurred). For analytical simplicity, (2) and (4), have been combined together.

[188] Those who had replied "not applicable" usually clarified that they do not go for such activities either because usually it is men who do that or that the respondents do not have the time after long hours of work at the RMG factory and the home.

8.3 Results

8.3.1 Decision-making Roles of Women

I first present the results on decision-making roles of women. These are shown in Table 8.3.1-1. The full results are in Appendix 26, Tables A26-1 and A26-2. The first point of note from Table 8.3.1-1 is that some of the important events such as land sale or purchase have been infrequent, essentially for the control group. For both the worker and the control women, it is rare for them to take the main decision-making role. Yet, for the workers, there were several instances of the women being the main decision-maker. In that sense, working women may have assumed somewhat of a greater role than non-working women. In some cases, such as ornament purchase, it almost certainly reflects the earning power of women. So does the role assumed by such women in the case of children's medical treatment. Similarly the relative frequency of main decision-making role of the worker women compared to the control regarding children's education is also suggestive of their (worker) increased importance. In some case, such as marriage of children, these were joint family decisions.

Table 8.3.1-1: Incidence of Important Events and Decision-making by Women

Types of decision	Number of events during last 12 months		Number of events with main decision-making role of respondent	
	Worker	Control	Worker	Control
Land transaction	31	10	1	-
Cattle sale/purchase	28	4	2	-
Goats sale/purchase	19	4	1	-
Poultry sale/ purchase	83	36	8	2
Ornaments sold/bought	74	32	14	-
Utensils purchase	215	107	49	12
Dress making	216	102	47	5
Male child's education	78	46	8	1
Girl child's education	72	43	9	1
Child's treatment	136	93	12	5
Son's marriage	9	5	-	-
Daughter's marriage	7	5	-	1
Loan repayment	29	14	9	2
House repair	7	10	3	3
Rickshaw purchase	-	1		-

8.3.2 Women's Authority of Action: A More Direct Test

Of the seven types of activity requiring permission from elders in the family, four relate to economic autonomy as these necessitate expenditure on the part of the respondent. The others are socio-cultural. The relative frequencies of type of permission by type of activity for workers and control women are in Appendix 28. Examination of these does not suggest much of a difference between the workers and control. I therefore concentrate more on the composite indices for workers alone as they play an explicit and important economic role in the family.

All the composite indices have been normalised to measure between zero and unity. The mean values for Seauto, Econauto and Socauto are 0.69, 0.76 and 0.62 respectively. Thus, it would seem that women probably have somewhat better economic compared to social authority of action. If change has taken place, and this has only been small as the comparison with the control women indicates, it may have taken place more in the economic rather than the social sphere. This is not surprising given that social changes come much slower than economic changes. Note also that the standard deviations of the indices show that that these are much higher for social autonomy index (0.39) than for the other two (0.28 for economic and 0.27 for socio-economic indices). Thus, the social situation is much more diverse than the economic ones.

I have made an exploratory analysis of the variation in the autonomy indices. Being exploratory, no hypothesis is made at this stage.[189] The means and standard deviations of the variables used in the analysis are shown in Appendix 28, Table 28-3. The estimated equations are Tobit regressions due to the range of the dependent variable between zero and unity. The equations are shown in Table 8.3.2-1.

First, note that economic variables, including job characteristics, do not show any statistical significance, nor do education dummies. These were tried and dropped from the equations. But there is a most interesting exception, which is pooling. This is the only variable that has shown persistently negative and

[189] As Jejeebhoy and Sathar (2001) have shown with data from three states in India and Pakistan, there is substantial regional diversity in the influence of socio-economic factors on the autonomy scores. Furthermore, the indices are subjective and thus too much should not be read into their magnitudes. Rather their ranking is probably more important.

statistically significant influence.[190] These indicate that those who pool their earnings with others in the family have lower levels of autonomy of all types.[191]

Table 8.3.2-1: Tobit Regressions for Economic and Social Autonomy

Explanatory variables	Seauto	Econauto	Socauto
Age	0.03	0.07*	-0.002
	(1.27)	(1.89)	(0.03)
Age-sq	-0.0004	-0.001	0.006
	(0.78)	(1.55)	(0.47)
Mardum	-0.21***	-0.35***	-0.16
	(3.37)	(4.09)	(1.11)
Livesize	-0.04***	-0.03*	-0.09***
	(3.46)	(1.78)	(3.45)
Childdum	0.16**	0.25***	0.18
	(2.48)	(3.01)	(1.25)
Pooldum	-0.26***	-0.32***	-0.47**
	(3.48)	(3.06)	(2.58)
Constant	0.61*	0.40	1.26
	(1.78)	(0.88)	(1.44)
Log-likelihood	*-108.74*	*-162.34*	*-238.54*
LR chi--sq	*61.7****	*48.97****	*43.22****
N	*252*	*257*	*255*

Note: 1. Figures in parentheses are absolute t-statistic.
2. ***,** and * indicate statistical significance of the relevant statistics at 1, 5 and 10 percent probability respectively.

Age has a positive coefficient in all equations and two of these are weakly significant. Thus, age confers a kind of autonomy to women. This is not at all surprising given that old persons are generally venerated in the society. Yet note that though insignificant, square of age has a negative sign indicating that later in life the autonomy may decrease, probably due to lower earning power. Marital status has a negative coefficient in all the equations. Its negative influence in the case of economic autonomy is somewhat understandable given that married women have to run their families and may thus be constrained in their expenditure behaviour. On the other hand, as married women often live in families with in-laws, this may circumscribe their social autonomy of action.

The influence of children is easier to understand. If women have children, they have to make purchases specifically for them and a kind of autonomy is expected.

[190] Note that in Chapter 6, Socauto has been used as a regressor for explaining pooling. But as pointed out in that chapter, the causation may run from pooling to autonomy, I am using pooling behaviour to find its relationship with the various autonomy indices.

[191] As Jeffery and Basu (1996b) have noted a woman's position may not improve or her freedom to take actions increase unless she has control over her own earnings.

The positive coefficient for the social autonomy equation probably indicates that having a child ties women more firmly to the family. The influence of family size appears to be similar to that of marital status.

These results appear to be somewhat in conformity with the results of Jejeebhoy and Sathar (2001). Particularly, the unimportance of education, specifically, primary education is noticeable. Age has a more pervasive and positive influence. Extended family has a negative relationship. If these also mean larger families, then this is similar to the result above.

8.3.3 Conclusion

Given that the indices are somewhat arbitrary, one may not read too much in the results of the above exercise. Also, it may be noted that women have joined the formal labour force in large numbers only for the first time. A full generation has yet to pass, so it may be too much to expect all kinds of changes. Some changes have taken place in terms of fertility (Chapter 7) and the control over earnings (Chapter 6). Note that social changes come rather slowly, as it is the mindset of the people that has to change for that. It is probably with the second generation of working women that the social changes will be more perceptible and also measurable. The analysis of the process of and factors behind such change is a matter for future research.

8.4 Spatial Mobility and Related Issues

8.4.1 Introduction

In this section, I analyse spatial mobility of women. This has two aspects, migration and movement within the locality. The issue of migration has already been analysed in Chapter 5. In this section, the focus is on the other aspect of spatial mobility with particular reference to commuting to work. I emphasise spatial mobility as another dimension of women's independence of action.

I have reviewed earlier the long hours that women work in the factories (Chapter 5) and also the burden of household chores that they bear (Chapter 6). In this section, I analyse some of the implications of such burdens for their mobility behaviour. More specifically, I examine the commuting practices of women to work, the related dimensions of residential location and its change and the various considerations that may go into the selection of residential location. I also analyse

the modal choice of transport. Finally, I examine, as far as my data allow, how far women are free to move on their own.

On occasions in my analysis, I refer to sex segregation and seclusion of women, more specifically the institution of *purdah*. In my analysis, I take it only as an additional constraint on women.[192] The specific questions addressed here are: do workers change their place of residence in order to facilitate commuting to work? If so, how are such changes related to commuting time, cost and mode of travel and worker's individual and family characteristics? What roles do social factors such as obligatory household chores, particularly those due to the presence or absence of children, play in all these? How is women's independence of movement circumscribed by these factors and constraints?

8.4.2 Analytical and Empirical Methods

Analytical issues

The problem of mobility of women may be explained with recourse to individual, family and community characteristics interacting within a general socio-cultural context. While one may think of various indicators to understand the socio-cultural environment, these are not easily measurable. On the other hand at any given point in time, these factors may remain fixed and equally applicable to all. The differences in observed behaviour may therefore be due to the individual and family characteristics and circumstances that interact with the given general social environment. These individual and family characteristics are often more easily quantifiable compared to the social environment. I, therefore, try to discuss some of these characteristics in the specific case of changes in residential location.

In Bangladesh, working women have to adjust to social and economic forces acting in two opposite directions. Particularly for RMG women the demands on their time for both market and home production are onerous (see Chapter 6, Section 6.2). Residential location near the factory, therefore, becomes important as it helps women to get back home as soon as possible for household chores while at the same time minimising the involvement with public space, if so desired, outside the factory.[193]

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[192] Those interested in the issues of purdah and seclusion in Bangladesh context may consult other authors (Ahmed: 1993; Amin *et al.*: 1998).

[193] This may be important if women sometimes have to work at night.

Residential preference, however, is not always determined by nearness to the factory. It may also have to do with social prestige, particularly for those with better paying jobs. They have the financial capability to pay for the additional cost for travel and thus may live some distance from the factories in better residential areas. Presence of school-going children and another earner in the family may also pose problems for choice of residential location, as the advantages to more than one person have to be considered.

Even when working together in large numbers, as they do in readymade garment factories, women remain vulnerable and may face harassment of various sorts (Zohir and Paul-Majumder: 1996, pp. 95-96). For such reasons, women sometimes tend to move in the company of family members, relatives or colleagues while commuting to and from work, particularly during the evening (see Section 8.4.6).

Factors influencing residential location

On the basis of the discussion above, the various factors that may influence residential location and its change may be grouped and discussed as follows.

Migratory characteristics and associated factors: One of the factors that may have a relationship with change in residential location may be the migratory characteristic of the respondent and her family. Non-migrants, being natives of the capital, may have 'taken root' in the areas where they now live. If so, they are less likely to change their residence. On the other hand, long-time migrants may exhibit behaviour similar to non-migrants while the more recent ones may still remain somewhat footloose and thus be more prepared to change their residence.

Individual characteristics and residential change: Several individual characteristics may influence the decision to change residence. These are age, marital status, job-type and job-hopping.

Age of respondent may have two types of effects working in opposite directions. Older persons are likely to be married and also in better jobs with higher income, thus increasing their chances of residential change. On the other hand, they are likely to be less footloose compared to the younger workers. When marital status and job-types are controlled, age may show a negative relationship.

In general, those doing skilled or managerial jobs have higher income than others. They may have the financial capacity, compared to those holding unskilled or manual jobs, to change their residences. They may also have a higher stake in the jobs and may prefer to remain near the work place. Controlled for income, skilled and managerial jobholders are therefore more likely to change their residence.

Married women may wish to remain nearer the workplace to reduce commuting time and come back home as early as possible to look after their family. I have shown in Chapter 6 that some of the women do get back home even during the lunch breaks. Currently married women may also be economically better off because of at least another earner in the family and thus controlling for responsibility of household chores, they may have higher tendency to change residential location. Unmarried women, being younger, are likely to earn less, and may share their residence (in most cases) with non-family persons. Also, it is very difficult for unmarried women to rent a living place on their own.[194] Thus, they may not be in a position to change their residence easily when they change factories for better pay.

A higher income means better financial capability and thus those with higher income are likely to be more open to the possibility of changing residence compared to the low income earners. On the other hand, as argued earlier, if higher income and social prestige go together, people may not change residence in such cases. The role of income is thus an empirical issue.

Household chores and residential change: In general, the greater the burden of household chores on the respondent, the more likely it is that she would like to come back home as soon as possible after work and would change residence to be near the factories. One indicator of the overall burden of household chores is family size. Generally, the larger the family, the greater is the burden of such activities. Therefore, the greater may be the urge of women, given all other things, to come back home earlier and therefore reside near the factory. However, the larger the family, the greater is the potential of help with household chores from

[194] Unmarried men may face similar but less severe problems.

other members in the family. The influence of family size on change in residential location may thus go either way and becomes entirely an empirical issue.

Similarly, the presence of children and their age pattern are likely to influence residential location. Mothers with small children may wish to come back home earlier than others and thus try to have residence near the work place. Those with school-going children may wish to do so but may be constrained by the location of school. If being near the factory means being away from the school, the children's need may outweigh that of the mother. In this case, the outcome may be uncertain. In both cases, family size and availability of help from within the family may also have a role and therefore the influence of children may be masked if that of family size is not controlled.

On the basis of the discussion above, the set of testable hypotheses is as follows. Migrants will change their residence more compared to non-migrants. Among migrants, however, the tendency to change residence will be greater among the more recent migrants compared to the early migrants.

Women with skilled jobs and those who are married are relatively more likely to change residence to be near their factories compared respectively to those with lower-skilled jobs and are unmarried. The influence of income is uncertain. Controlling for availability of help with household chores, the larger is the family, the greater is the likelihood of change of residence. Also, those with children, particularly infant children, may behave similarly, but for those with children of school-going age, the outcome is uncertain.

Empirical method of investigation

The analysis here draws upon the information obtained from workers on their mobility with reference to the work place. Binary logistic regressions have been used to find and analyse odds for or against change of residential location and independence of movement. The dependent variable is thus the change of residence taking the value of unity for a change, zero otherwise.[195]

[195] The specific question that was asked was "Have you ever changed residence to be near your workplace?" Thus, the response refers to the period of the woman's employment in RMG firms.

The explanatory variables are: age of the respondent, either migratory status or the length of migration, marital status, job-type, income levels, family size and presence or absence of children. The last mentioned have been used in four alternative versions. These are if the respondent has children aged up to five years, or of six to ten years, or child of any age, or the severity of child care pressure. The exact definitions used for all the variables are given in Appendix 29, Table A29-1. The hypothesised relationships between the explanatory variables and the dependent variable are also reproduced as Table A29-2 in Appendix 29.

8.4.3 Empirical Results

The dependent variable, change in residential location, is a dichotomous variable. Therefore, binary logistic regressions have been used to identify explanatory factors that may have influence, independent of other factors, on the decision to change residences.

Four alternative formulations of the models have been used. In all of them, family size is included as an explanatory variable along with other child care proxies. The first two models include the presence or the lack of children of two age groups (infants or school-going) while the other two models include the other child care proxies described earlier in this section. The first model includes migratory status while the others use length of migration as an explanatory variable. The results shown in Table 8.4.3-1 are given as odds-ratios for their easy interpretation. The category of a variable named second is the reference category.

The results confirm most of the hypothesised relationships. Migrants are about four times more likely than non-migrants to change residence. Similarly the unmarried respondents are only half as likely, compared to the married ones, to do so. The influence of type of job is quite robust. In such cases, the skilled and managerial are two to three times more likely to change their residences compared to the unskilled workers.

The coefficients of income variable are not statistically significant possibly because of the multicollinearity with job type. But more interestingly, the higher income-earners are found to be less likely than the lower-income earners to change residence. It may be that high income-earners can financially afford to remain away from the factory to avoid difficulties of a change of residence.

Table 8.4.3-1: Odds Ratios in Favour of Change of Residence

Comparison	Model 1	Model 2	Model 3	Model 4
Mature/young	1.28	1.44	1.40	1.28
Migrant/Non-migrant	4.08***			
Recent migrants/Non-migrant		4.24**	4.24**	4.28**
Mature migrant/Non-migrant		6.18***	6.23***	6.26***
Early migrant/Non-migrant		2.70*	2.74*	2.63*
Never married/Ever married	0.53*	0.48**	0.54	0.52*
Skilled/unskilled	2.23*	2.31*	2.31*	2.37*
Managerial/unskilled	2.81**	3.13**	3.17**	3.27**
Mid/Low income	0.84	0.86	0.86	0.80
High/Low income	0.53	0.49	0.47	0.43
No child<5 /with child<5 years	1.35	1.48		
No child 6-9/with child 6-9 years	0.71	0.67		
With child/without child			1.39	
Medium size/small size family	0.96	1.00	0.92	0.93
Large size/small size family	1.14	1.27	1.12	1.21
Low/No child care				1.64
Medium/No child care				1.90
High/no child care				1.21
Correct outcome (percent)	*61*	*60*	*63*	*63*
Model chi-sq	*23.04***	*27.60****	*27.57****	*28.33****
N	*260*	*260*	*260*	*260*

Note: 1. ***, **, * denote significance of the relevant statistic (all chi-squares in these cases) at 1, 5 and 10 percent probability respectively.

2. [a] Model chi-square denotes the value of the chi-square statistic for assessing its significance for determining if all the coefficients are zero. A significant Chi- square therefore denotes that not all of them are zero.

The independent influences of household chores, as reflected in the various child care proxies and also the size of the household, are at best weak. Yet, while medium sized families are almost as likely as small ones to change their residences, the larger-sized ones are somewhat more likely to do so. Then again women without children of age up to five years are much more likely to change their residences compared to those who have such children. But, those without school-going children are less likely to change residence compared to those who

have such children.[196] Similarly, when women are categorised according to child care loads they bear, the odds in favour of change of residence increase with such pressure; but falls off somewhat for the highest pressure group.

The economic factors thus appear to have more systematic influence than the demographic and social ones. Hence, while factors such as child care and schooling may provide the initial reasons behind the change of residence, its actual implementation depends on economic conditions of the household as reflected in the earning capacity of the respondent. Given all these, however, the results are still suggestive and inconclusive. These indicate once again that there is a general need to more rigorously understand the issue of child care and its impact on response of women regarding labour force participation and subsequent changes in the household.

8.4.4 Time and Costs of Travel to and from Work

In many cases travel time and costs may be related to the incidence of change in residential location. This may be so because nearness of home to the workplace can be measured in at least three ways. One is physical distance; the other is the time to travel while the third may be the cost of commuting. Thus, while a person may be living somewhat at a distance as measured by physical distance, they may be able to afford to bear the cost of commuting and actually travel quickly and thus effectively is near the workplace.

The available information indicates that a large group of the workers live within a short distance of their workplace (42 percent within a time distance of 15 minutes). Also, just over 52 percent of the respondents spend no money for commuting as they simply walk to work. I have classified both these indicators of nearness of residence to workplace by incidence of change of residence. Very little systematic difference in these indicators exists between those who have changed their residence and those who have not. Thus both groups live near their factories as reflected in time and costs of travel. What this means is that some people did not need to change their residence as they were already near their factories or changed their job to be near their residence. Others who were not so

[196] As we lack information on school location, it is not possible to clarify the results further.

lucky to begin with did so later and had begun residing at a distance similar to that of the first group as measured in travel time and costs.

Similarly, there appears to be little systematic difference in the distribution of travel time by marital status, type of job held and monthly income while only that by level of education is statistically significant. But the distribution of travel cost by marital status, monthly income and education are significant, although, that by type of job does not appear to be so. Therefore, in general, the financial cost of travel appears to be of more interest to workers. But there is a subtler pattern.

There is little systematic pattern of travel time by marital status. Yet, when only married women are considered the pattern of travel time and cost by income are statistically significant. But these are not so for the unmarried girls. Married women apparently have to consider several factors in deciding upon their residential location such as the advantages of their own travel to and from factories, those of their husbands' or other family members and also other factors such as travel time and travel costs for children's schooling, if present. The conflicting interest of various persons in the family can be more easily resolved the higher is the level of income. For unmarried women such considerations are absent and hence income has little influence on residential location behaviour in their case.

8.4.5 Modal Choice

Both travel time and costs depend on the mode of travel. There are basically three modes of travel. Women may move about on foot or they may use a vehicle such as a bus or a rickshaw (a manually driven three-wheeler) or they can mix the modes. Rickshaws are slower and costlier than buses but are preferred by women because of the flexibility of driving them up to the entrance of the factory. Thus, people of means would rather move about in rickshaws than ride a crowded bus.

As a result, while 58 percent of women move on foot and 19 percent use a vehicle, 23 percent mix the modes depending on their situation. The proportion of respondents using a bus or a rickshaw increases with higher status jobs, higher education and higher income. All these patterns are statistically highly significant. The pattern of modal choice by marital status is, however, not significant. Yet when only the currently married women are considered, the modal patterns by job status and income groups are both statistically significant.

8.4.6 Independence of Movement

Traditionally women, particularly young girls, do not move about on their own in Bangladesh. But when they work out of home, such taboos may get weakened (Begum: 1988), more so in urban areas where these are generally less adhered to. It has been found, from the survey of women workers, that contrary to the prevalent ideas, in one half of the sample cases, women do move on their own. This corroborates earlier findings (Zohir and Paul-Majumder: 1996, p. 89).

Only about a third of the workers in the present sample now move in the company of other colleagues, of whom some are their relatives. Those moving just with their family members now constitute less than 14 percent of all women. These findings indicate that group movements have fallen considerably while independent mobility has increased over time.

Whether the women move on their own, by choice or because they have no male relative to accompany them, or that they choose their residence near the work place because of the absence of male relatives, are not explicitly known. I use a binary logistic regression to find out if the various relevant factors as used in Table 8.4.3-1 along with others (such as travel mode) play any role. While the results do not tell us about the process, knowledge of the society allows us to speculate why these may be so. The results are in Table 8.4.6-1.

The table shows that time to travel has a distinct influence on commuting behaviour. The longer it takes to reach home the lower is the likelihood of independent movement. Thus, those who take the longest time (more than 30 minutes) are one-third as likely to move on their own compared to those who take only a little while (max. 15 minutes). But those who take between 15-30 minutes (short time) are almost half as likely to move on their own compared to those who take a maximum of 15 minutes to reach home.

The use of vehicles provides women more freedom. The more they use vehicles, the more likely it is for women to move on their own compared to those who move on foot. Non-migrants, possibly being no stranger to the city, appear to be freer compared to migrants as they are 2.6 times more likely than the latter to move on their own.

The influence of other variables, such as age, marital status, job-type and income appears to be rather weak. The response of the mid-level educated over low-level educated women seems surprising as one would have expected

education to have a liberating influence. Contrary to such expectation, the odds ratio indicates a fall in the tendency to move on one's own as the level of education rises. This is also highly significant. Why this is so is difficult to understand. But note the observation of Jejeebhoy (1995) that in Muslim societies, better-educated women are sometimes more tradition-bound. The issue needs further research.

Table 8.4.6-1: Odds Ratios in Favour of Movement on One's Own

Independent variable	Odds ratios
Mature over young	0.98
Unmarried over married	0.67
Without children over with children	0.85
Non-migrants over migrants	2.63*
Middle income over low income	1.98
High income over low income	1.75
Short over very short travel time	0.44**
Long over very short travel time	0.31**
Skilled over unskilled	1.72
Managerial over unskilled	2.57
Mixed over on foot mode	2.04**
Vehicular over on-foot mode	2.50**
Mid-level educated over illiterates	0.36***
Higher educated over illiterates	1.03
Family member in RMG over not in RMG	0.74
Correct predicted outcome (%)	70
Model chi-square[a]	40.55***
N of observation	260

Note: 1. ***, **, * denote significance of the relevant chi-sq. at 1, 5 and 10 percent probability respectively.
2. [a] Model chi-square denotes the value of the chi-square statistic for assessing its significance for determining if all the coefficients are zero. A significant chi-square therefore denotes that not all of them are zero.
3. Travel times are defined as long (> 30 minutes), short (15-30 minutes) and very short (≤ 15 minutes)

The influence of the presence of other family members in RMG factories appears weak although plausible. The odds ratio may reflect the opportunity of more secure movement rather than restriction on movement.

8.4.7 Concluding Remarks

The foregoing analysis shows that there is a complex web of factors that may impact upon apparently simple decisions such as change of residence. Some factors are economic (travel costs) while others are social (attitudes towards free movement of women), some are individual while others are familial. The nature of the analysis here has been exploratory and it has not been possible to rigorously analyse exactly how the various factors interact with each other. The analysis indicates though that both economic and social factors may be important depending upon circumstances. Note particularly that migration appeared to have a major influence on decision to change residence. So did marital status, but not child care apparently. Education, surprisingly, did not have much of an influence.

Why do migrants change residence more often than others, while they move about on their own less than the non-migrants? Migrants from rural areas (which all of them are in the present sample) are likely to be more imbued compared to others with the traditional values and norms. Did these influence their behaviour? These may have. The present analysis only indicates a possibility but does not answer the question, which needs to be analysed in the course of future research.

For married women, the behaviour is possibly easier to understand as being married means that there are specific household responsibilities (as analysed in Chapter 6 above) which may also include child care, if children are present. Hence it is found that women live as near as possible to their work place measured in either time or travel cost to juggle paid work and household responsibility.

The various patterns that have been observed provide conflicting signals about the nature of some of the social changes. One reason may be that because of the poverty of the respondents, economic processes may be stronger in influencing their behaviour and thus may mask the influence of social factors, at least for the time being. That the latter remain important has been evident from the extensive discussions that I have had with the workers. These discussions suggest that the traditional cultural factors, while certainly weaker than before, may still be strong. How strong these are and how these interact with other processes are, however, matters for future research.

8.5 Summary

In this chapter I have investigated the extent of social change that has taken place in the lives of both worker and control women with the help of indices constructed for the purpose. In decision-making, workers and control women do not differ much although one discerns a slightly greater role for the workers, particularly in the case of children's education. The next chapter will show that this is indeed a concern for the women.

No appreciable change appears to have taken place in terms of autonomy. Whatever pattern is there seems to be influenced more by economic factors such as resource control than others. When other aspects of independence of action such as residential change and mobility behaviour are analysed, the extent of change is not clear, as there is a complex web of economic and social factors at work. So far these issues have received little attention in the literature. If women's employment is to be encouraged, some of these issues may need further clarification and understanding. These are, however, matters for future research.

CHAPTER 9
AN ASSESSMENT OF GAINS AND LOSSES

9.1 A Composite Assessment of Changes

Chapters 5, 6, 7 and 8 have analysed how paid work outside the family has changed the lives of the working women and also impacted upon their households. Both economic and social changes have been observed. Not all of the changes may have made the women and their households better off. The question, therefore, is how to evaluate the changes in a composite manner? Has income earning made the women net gainers or net losers? Are the gains more on the economic than on the social side? Is there a systematic pattern in who gains and who loses? The aim of this chapter is to investigate these gains and losses. To do this, I first try to weigh together the relevant findings in Chapters 5-8 and then supplement them with the women's own personal assessments of their situation.

One caveat is in order before trying to categorise the changes as either economic or social. Barring a few instances, behavioural changes are influenced by various kinds of factors, including economic (costs and prices), social (values, beliefs and norms) and others. The division between the economic and social changes is, therefore, unlikely to be watertight. For example, women's employment is both an economic and a social change in the context of Bangladesh. It is economic as wages received play an important role in women's labour market entry. It is social, in the sense that until recently women were not expected to work outside the home. The division between the economic and social changes is, therefore, somewhat arbitrary.

In earlier chapters (5 and 6), the following economic changes have been observed. Women have entered the labour market to earn an income. They have migrated to towns in search of jobs. They manage their household finances either independently or jointly with others in the family and spend their income on consumption of certain items in a specific manner dependent, to an extent, on the type of financial management they practise. They are saving part of their income and they have experienced changes in their standard of living.

The social changes include fertility behaviour, child care, sharing of household chores and time allocation in home production activities, decision-making and, independence of action and movement of women. There are other

important changes such as those related to health, which are not clearly economic or social but have economic and social ramifications.

9.2 Assessment of Economic Changes

9.2.1 A Summary of Earlier Findings

Women's large-scale labour market entry, particularly in the manufacturing sector, is a recent (over about two decades) phenomenon in Bangladesh. It has been found that women migrate to take advantage of better economic opportunities as reflected in the rural-urban wage differentials. The tendency to migrate for economic reasons is more pronounced among recent migrants compared to early migrants who were commonly tied movers. Smaller family size, delayed marriage and own education have played major roles in women's labour market entry.

Labour market entry means that women now have incomes of their own. The importance of education and job-experience in determining such income has been clearly established. In the sampled households, the income earned has been managed both independently, and jointly with others (husbands, fathers or brothers). Thus, in certain cases women have had financial autonomy, which they did not have before. This is both an economic and social change.

It has been shown that there is a positive impact of control of resources (as a consequence of non-pooling) by women on food expenditure, nutrition, and health. In other cases, the results are less clear. Given that food is the most important resource to be allocated within a poor household, it can be concluded that greater control of women over resources (income) is likely to have improved the household's nutritional welfare of urban women workers in Bangladesh.

Savings behaviour has also changed as women have gained an income. Amongst the sample workers, the level of accumulated savings is much greater compared to the control group. The manner of thrift indicates a tendency towards consumption smoothing. Borrowing and lending money both are infrequent among the worker and the control women.

The households of the working women appeared better off in terms of their material standards of living compared to either their own situation prior to entry into the RMG factories or the current situation of the control group households. Such differences arise from changes due to job holding, as shown by the

influences of own wage and, to a lesser degree, tenure in an RMG job. Other background factors, such as education and the pattern of intrahousehold allocation of resources (pooling or not), have also helped in attaining a higher standard of living.

9.2.2 Women's Own Assessment of Economic Change

Assessment methods

Women in the sample were asked about the economic situation of their household at the time of their first entry into RMG employment (initial situation) and at the time of the survey (present situation). A qualitative scale was used, ranging from very good to very bad. For unmarried girls, the situation in their households meant the situations in their parental homes. For currently married women, the family means husband's family. The situation at the time of the survey for them meant that in the families of their husbands. The initial situation for them referred to that at the time of marriage or job entry whichever happened later. For the widowed and divorcees the initial condition referred to the situation in the family they had been in at the time of the survey. These replies have been used to construct a binary response variable, *Improved* (= 1 if the situation has improved; = 0 if not).

Women experienced difficulty in ranking their situations. In some cases, they could not explicitly state what the initial situation was. In others, they were not sure about the exact economic situation at the time of the survey. In such cases, therefore, it was not possible to determine the direction of change. These cases were dropped. The analysis is thus based on replies from 239 working and 126 control group women.

Analysis of response

Table 9.2.2-1 shows the pattern of the replies to the question on the initial and present economic conditions of the worker households, and the survey time condition of the control households. Compared to the initial situation, there has been a substantial improvement in the economic condition of the households of the working women. Thus, while less than a quarter indicated that their own initial situation was good to very good, the corresponding proportion at the time of the survey was more than 57 percent. On the other side of the scale, while nearly 31

percent of the workers defined the initial condition as bad to very bad, not even one percent of them so characterised the survey time situation.

Table 9.2.2-1: Own Assessment of Economic Condition of Household (frequency)

Qualitative	Worker		Control
Assessment	Initial	Survey time	Survey time
Very good	2 (0.8)	17 (7.1)	4 (3.2)
Good	54 (22.6)	120 (50.2)	26 (20.6)
Average	110 (46.0)	100 (41.8)	63 (50.0)
Bad	66 (27.6)	2 (0.8)	30 (23.8)
Very bad	7 (2.9)	-	3 (2.4)
All (number)	239	239	126

Note: Figures in parentheses are percentages of the column totals.

As the control respondents have no past reference point to judge economic change of their households, I have compared their survey time situation with that of the workers at the same time. The control households' survey time situation is similar to that of the initial condition of working households. This means that the situation of the working households at survey time was much better than that for the control households. These results are in conformity with those on standard of living analysed in Chapter 6.

I asked the respondents who had mentioned their present economic situation to be good or very good, as to why it is so. In 96 percent of the cases, the income from RMG has been cited as a main reason. Second in importance was income earning by others (40 percent of cases). Nearly nine percent of respondents cited increase in land income. Remittances have also been mentioned in several cases.

The results show that not all of the working households have experienced a change for the better. To see how the relative situation changed, I cross-tabulated the changes in economic condition of working women's households by initial condition. Slightly more than one-half of the respondents indicated that their situation had improved, while only four percent indicated that it had deteriorated (Table 9.2.2-2). The economic gains have been comparatively more frequent among those whose initial condition had been worse compared to others. Thus, among those with good initial condition, only 22 percent moved up the economic ladder. Among those with an average initial condition, the percentage was 39 percent while among those with a bad initial condition practically all have done

better than previously. These results are thus in agreement with the analysis done earlier for changes in standard of living (Chapter 6, Section 6.6).

Table 9.2.2-2: Pattern of Change in Economic Condition by Initial Condition in Worker Households (no.)

Initial condition	Improved	No change	Deteriorated	All
Very good	-	1 (50.0)	1 (50.0)	2 (0.8)
Good	12 (22.2)	35 (64.8)	7 (13.0)	54 (22.6)
Average	43 (39.1)	66 (60.0)	1 (0.9)	110 (46.0)
Bad	65 (98.5)	1 (1.5)	-	66 (27.6)
Very bad	7 (100.)	-	-	7 (2.9)
All	127 (53.1)	103 (43.1)	9 (3.8)	239

Note: Figures in parentheses are percentages of the relevant row totals. Those in the last column are percentages of the total number of the respondents.

Explaining change in economic condition

To see who among the workers may have experienced a change for the better and who did not (i.e., experienced either a stagnant or a deteriorating condition), I used a probit regression with *Improved* as the dependent variable. The explanatory variables include migratory status, job-types, respondent's education, marital status, presence of children in family and life cycle variables such as age and its square (the list of the dependent variable and the explanatory variables along with their means and standard deviations are shown in Appendix 30, Table A30-1).

In Chapter 5, Section 5.3, it was shown that the migrants (who are a majority among workers) have mentioned advancement of economic situation as a main reason for migration. Thus, whether or not a person is a migrant is likely to influence their efforts at changing their economic condition. Migrants are thus expected to improve their situation more frequently than others.

Economic advancement depends upon access to financial resources such as wages and salaries. The available information on wages and salaries refers only to those at the time of the survey. On the other hand, economic changes have occurred, if at all, over time. Thus, it is the change in wages and salaries, which is of importance. As information on initial compensation level is lacking,[197] this may not be used as an explanatory variable. However, for comparison, I did use it and

[197] The available information is only on the offered wage at the time of first entry into the RMG firms, not on total compensation, which may vary substantially from the wage level as shown in Chapter 5.

found the results to be similar to those shown here.

Similarly, I did not use length of RMG experience as an explanatory variable as the relevant time period over which the change is being considered does not always tally with the entire period over which the economic change has been assessed (particularly, for married women). The use of length of job experience may thus result in a spurious correlation. I have therefore used the present job types as proxies for income earning capability as explained below.

Those with better jobs initially are likely to have a better opportunity to improve their conditions. Thus initial job types may be an explanatory variable. However, as shown in Chapter 5 (Section 5.6.3), 83 percent of the working women joined RMG in manual categories. Consequently, the initial job-holding variable would have little variation in the regression and may explain little of the variation in the dependent variable. However, as workers changed their jobs frequently and have been promoted over time, their present jobs may in general indicate their job-mobility. If so, present job type may reflect the experience of opportunity for economic advancement. The present job-holding variable is put in as two dummy variables, *Manual2* (=1, if present job is manual, zero otherwise) and *Skill2* (=1 if present job is skilled, zero otherwise). The reference category is the managerial/supervisory job. Thus, for both *Manual2* and *Skill2*, the expected coefficients are negative.

For education, I expect the higher the education, the better the prospect for economic advancement. *Eddum1* (=1 for primary, zero otherwise) and *Eddum2* (=1 for 6-10 years education, zero otherwise) are thus expected to have negative coefficients, as the reference group is education beyond 10 years. As income from other sources such, as land may be important, I have used a land dummy variable (*Landdum*) having a value of 1 for owners and zero for others. *Landdum* is expected to have a positive coefficient.

I have shown that a sizeable group of respondents cited earnings of other family members as a major reason for their good economic situation. As married women are likely to have at least two earners in the family, they are consequently likely to advance their economic position better than others. A marital status variable, *Mardum* (ever married=1, zero otherwise) is likely to have a positive coefficient. However, if they have children, they may not be able to improve much the economic situation of the household, as they have to spend money to

raise children.[198] In such a situation, the economic condition may not improve. So, a child dummy variable (*Childdum* =1 if has a child, zero otherwise) has been included in the equation. It may have a negative coefficient.

Life cycle variables such as age and squares of age were not found to have any significant coefficient and were thus dropped (not shown). The results of the probit regression are shown in Table 9.2.2-3.

Table 9.2.2-3: Probit Regressions for Change in Economic Condition in Worker Households

Explanatory variables	Equation 1	Equation 2	Equation 3
Eddum1 (=1, if educated up to primary)	0.38 (1.24)	0.24 (0.76)	0.21 (0.89)
Eddum2 (=1, if educated 6-10 years)	0.32 (1.06)	0.16 (0.53)	0.16 (0.64)
Manual2 (= 1 if present job is manual)	-0.66** (2.15)	-0.56* (1.78)	
Skill2 (=1, if present job skilled or semi-skilled)	-0.12 (0.46)	-0.04 (0.16)	
Totpay (current monthly income)			0.0001* (1.64)
Mardum (=1, if ever-married)	0.48*** (2.73)	0.096 (0.44)	0.10 (0.49)
Childdum (=1, if woman has child)		0.64*** (2.96)	0.60*** (2.78)
Migdum (=1, if migrant)	0.79** (2.54)	0.83*** (2.64)	0.81*** (2.60)
Landdum (=1, if owns land)	0.09 (0.47)	0.17 (0.86)	0.13 (0.65)
Constant	-1.19** (2.55)	-1.25*** (3.27)	-1.60*** (3.75)
Log likelihood	*-161.29*	*-156.85*	*-158.39*
LR chi-square	*25.35***	*34.22***	*31.13***
N	*251*	*251*	*251*

Note: 1. Figures in parentheses are absolute z statistic.
2. ***,** and * indicate statistical significance at 1, 5 and 10 percent probability respectively.

The regression results indicate that as expected migrants, married women and those with skilled or managerial jobs view the changes in their economic condition more favourably. Replacing the job-type variables by total current income of the respondent had little impact on the results. The significant and

[198] This should not, of course, be construed to mean that children are not desirable. It only shows the nature of the economic constraints when children are present.

positive impact of migration suggests that the migrants have been largely successful in realising their economic goal.

As expected, married women experienced betterment. However, the inclusion of the child dummy lowers the value of the coefficient of the marital status dummy and makes it insignificant, although it remains positive. The coefficient of child dummy, however, is positive which means that if there is children in the family then the economic condition improves. It may be that the causality runs the other way, i.e., if the economic condition improves, people are better able to rear and therefore have children.

The coefficients for manual jobholders, as expected, are negative and significant. All other explanatory variables have insignificant coefficients. The signs of the education dummies are positive, which indicate that the less educated have improved their situation. It may be that these are the initially poor people and thus for them there is no other place to go than up. Access to land, as expected, similarly has a positive influence.

On the whole, and considering both the changes in the economic conditions of the worker households and the standards of living that they enjoy, it can be said that the over-all economic gains have been positive. The gains are impressive with respect to both the workers' initial conditions and also in contrast to the control households. Furthermore the gains appear to be more systematic for the initially poorer sections among the workers. While there are various reasons for the good economic condition that they enjoy, most think that the RMG job has been a major factor.

9.3 Assessment of Social Changes

9.3.1 A Summary of Earlier Findings

A decline in the fertility of working women is the most important socio-demographic change that has occurred. The decline has been expressed both as the number of children born and also in the longer birth-spacing behaviour. The definitive roles of women's employment and income in raising the opportunity cost of their time and acting as strong deterrents against higher fertility have been demonstrated. Of course, other factors such as education also had a role to play. Rising aspirations for children's education due to women's income and education may also have been a factor in fertility decisions.

The strong positive socio-demographic impacts have been dulled to a certain extent by problems of child care. Some of the working women have sent their children to their parents' homes in villages because these working mothers cannot pay adequate attention to them. Similarly, the health of women has been impaired due to factors such as very long working hours, absence of a wholesome physical environment both at the place of residence and work. It has been observed that certain diseases increased in frequency since joining the RMG factories. Furthermore, ill health possibly had adverse effects on their earnings capability. Moreover, they have to work very long hours in the work place and at home for the welfare of the family. The latter is expected and accepted as the socially sanctioned normal behaviour for women. This sometimes becomes so burdensome that they have to cut down even on their essential personal time, such as sleep.

Men do agree that working women have tremendous burden of home production activities. A few also claim to share household chores with their wives while others are ambivalent as they are not accustomed to do such work. In general, by way of sharing the household chores, men do the grocery shopping which they would have done anyway as traditional responsibility of men. Thus, the traditional gender-division of home production responsibility in which women bear the major burden still operates.

Women have generally gained little by way of freedom of action either in terms of decision-making or in their movement or in social interactions with others outside the family. Working women may have an edge over control women in certain kinds of decision-making within the family, yet on the whole there are no great differences. The same applies in the case of social interaction. The workers and the control women hardly differ in their social freedom. In the case of freedom of movement also, the signals are not clear regarding the direction of change. These suggest that the traditional social norms, while certainly weaker than before, may still be strong, particularly as the respondents are only the first generation of women experiencing change. Only time will tell whether some of these changes will be more systematic or permanent which necessitates further research with more elaborate information.

9.3.2 Women's Own Assessment of Social Change

As indicated above, a major area where progress has been slow is the freedom of action in social interaction with others. As working women stay almost half the day outside home in the factories, part of the social interaction takes place in the work place. Women therefore were asked about their assessment of such social interactions and related problems in the work place.

Women's replies indicated that initially there appeared to be hesitation among one-half of the women to work outside the home among non-kin men. But at the time of the survey, none claimed to have any such hesitation. The reasons they cited for the absence of problems in working with non-kin men were familiarity (81 percent of cases), proper behaviour by men (65 percent) and presence of other women (26 percent). In 14 percent of the cases, women stated that managers in the work place were careful regarding proper behaviour by employees, particularly men, in dealing with their women colleagues.

Women may not have any social problem in working outside home. Yet, when asked if their family members liked them working outside home, the replies indicated certain ambivalence. Only a few replies indicated dislike (4 percent) on the part of the family members. Just about a quarter indicate a strong liking. In most cases (71 percent), however, family members appeared to be simply resigned to the situation. Thus, they have accepted that women have to work for one reason or another (poverty or income supplement), but if they could help it, probably they would not have sent their women for work.

9.3.3 Perception Changes

I asked working and control women questions on their perceptions regarding the relative importance of men and women. Several questions were asked. One question directly asks if they think that men are superior to women. A second question probes how far their sons and daughters should be educated. Thirdly, a question has been put as to how many children a woman should have and, if all of them are daughters, should they have more children to have a son? The replies are shown in Table 9.3.3-1.

There appears to be no large difference in the perceptions of working and control. Yet, workers appear to be slightly less traditional except in the case of their girl children working. Possibly, because working women know what a hard

life they have, they may not be very enthusiastic about it for their children. Much of the difference between the two groups, however, lies in their desire to educate their children. Control women have no clear idea about it. On the other hand, workers (mothers and would be mothers) want their boys to be educated more in technical areas and girls more in general higher education. But if the two education categories are merged as higher education, a surprisingly high proportion of women want the girls to be educated up to higher level.

Most women think men are superior, be it worker or control. On the other hand, there appears to be no strong son-preference. Thus, the mindsets of women are in a fluid state. Given that they are earning for the first time in their lives and many are still young, this is not surprising. It is expected that over time their views may become firmer than they are now.

Table 9.3.3-1: Perceptions of Women about Men and Children
(percent of respondents)

Perceptions	Worker	Control
Think that men are superior	86	90
Education level desired for boys	College/technical: 49 Up to secondary: 20	Not sure
Education level desired for girls	College/technical: 65 Up to primary: 15	Not sure
Son-preference: no more than 2 children even if all girls	84	75
Desirability of age at marriage for girls at 18 years	85	75
Want own girl children to work	51	62

I explored the issue of superiority of men in somewhat more in-depth. The reasons for men's supposed superiority are several and these are similar among both working and control women. Most interestingly it is the physical strength of men which tops the list of reasons (26 percent of responses in the case of workers and 29 percent for the control group). The next two important reasons are basically social, namely that women are always inferior and that lineage is known through men (26 and 13 percent respectively for workers; 26 and 15 percent respectively for the control groups). Economic reasons such as higher earning of men constitute only 14 percent of responses in the case of working women and 17 percent in the case of control. Men's education ranked low in both cases. Also in

both the cases, lack of opportunity for women as a cause of men's superiority constituted about 6 percent of responses.

These replies show that the idea of men's superiority is rather ingrained. This is clearly indicated as education of men has either little or no role in their supposed superiority. However, this may be changing and economic considerations, particularly women's role may be gaining some foothold in their minds.

I tried to find out if there are definite patterns in the replies of women regarding their own equality with men, particularly the role of economic factors. To explore this, I constructed a dummy variable called *Equdum* (equality dummy = 1 if women and men are thought to be equal; 0 otherwise). I estimated a probit regression equation with *Equdum* as the dependent variable and several explanatory variables such as age, education dummies, job-type dummies, whether the economic situation has improved (*Improved*) and marital status. As it turned out, only age and *Improved* came out to be significant, both with positive signs (not shown).

A possible reason for the positive coefficient of "Age" may be that as women age, their experience teaches them that there may be no intrinsic difference between men and women. The more important variable is possibly the betterment of economic condition (*Improved*). As the economic condition improves between the time of women's first entry into labour market and the time of the survey, this means that women have contributed to such a change. If so, this must instill in the minds of women a sense of equality with men. At the cost of repetition, it may be pointed out that analysis of national data in Chapter 5 also did not find any significant role for gender in labour force participation.

9.4 Summing Up

There are improvements in economic conditions in many cases when women work. In the social sphere, there have been positive changes in some cases while in several others the changes were either absent or less perceptible. It is not that women are actively discriminated against or that there are any explicit views against them. On the whole therefore, working women have gained in some areas whereas in some others they have yet to gain much. They certainly have gained economically, but their social freedom is only partial at best.

CHAPTER 10
CONCLUSIONS AND POLICY IMPLICATIONS

10.1 Conclusions

The findings in this study lead to several conclusions. First, if there are economic opportunities, poor women from rural areas in Bangladesh respond to them readily, to the extent that women migrate to towns for jobs. Second, their labour market entry has been mediated by among other factors, their own and parents' education. Again because of education and experience, many of the worker women are able to advance their earnings capability.

Women's employment has led to several subsequent positive effects which are important from individual, household and national points of view. While there are various factors that mediate in the process, women's employment and education are two major variables, which time and again have been seen to exert major influences on these positive outcomes. Independent sources of earning allow women to control resources and thus allocate more of it to expenditure on food thereby ensuring better nutrition and health for the family. The incidence of malnutrition may thus be reduced and nutritional poverty lowered. A similar situation obtains in the case of health expenditure. Women's earnings also have been instrumental, among other factors, in raising the physical quality of life of the households. Higher savings among the employed compared to the non-working women may have facilitated such an increase in standards of living. Much of the savings are kept in banks thus linking them (personal savings) to national level resource mobilisation.

Women's employment and education both create conditions for women's fertility to fall appreciably. In a heavily populated country such as Bangladesh, this is extremely important from the national point of view. Furthermore, the fall in demand for children is associated with a desire for better-educated children which may generate an intergenerational virtuous cycle of productivity rise and growth in future income for both the households and the national economy.

There have been certain changes more favourable to the decision-making roles of working women compared to the control group. Yet, on the whole, the social impacts, apart from fertility decline, have been less clear-cut. This is not surprising given that social norms take time to change and the working women

investigated in this study had been only part of the first generation of such workers.

Working women face certain constraints, which may not allow the positive impacts to be realised fully. Some of these are related to conditions of work while others are familial and social. Child care, particularly, has been singled out as a major impediment to women's employment. As fertility declines in general and also due to women's employment, families are expected to become smaller and the child care problem will be more acute in the future. Unless child care facilities are developed, growth in women's formal sector employment may be stunted.

The physical conditions of work in the factories, lack of proper leave and other facilities often lead to ill health of women, possibly impairing their productivity and earnings. Bangladesh can ill-afford such a productivity loss as she will face increasingly tough competition in the world market for readymade garments. This will be a critical issue when the Multi-Fibre Agreement governing trade in textile products runs its course by 31 December 2004. Factory conditions and other work facilities thus need to improve to make it more congenial and hygienic so that workers remain in good health and are able to raise productivity and earnings thus helping themselves, the entrepreneurs and the national economy.

Working women have "lost" on another ground. Despite long market hours, practically all the working women remain responsible for household chores. Their total work time thus has increased tremendously to the extent that even essential personal time such as sleep has to be sacrificed, impairing their health which ultimately adversely affects the family itself. This happens because of the social "norm" that home production activities are the responsibility of women.

10.2 Policy Implications

The policy questions that arise from the above conclusions include first and foremost increasing the facilities for women's employment in general and in the formal sector in particular. Secondly, conditions have to be created to increase the positive aspects of change and minimise its (change) negative aspects. The policy implications may therefore be of three types. The first type includes those that create an enabling condition for women's employment generation and the second

the betterment of working conditions. The third relates to the management of the changes that take place due to women's employment and earnings.

10.2.1 Creation of an Enabling Condition for Employment Generation

One of the clear policy directions from the findings is that women's employment is a significant route to their economic well-being and also the welfare of their families. All policy initiatives should therefore be taken towards employment generation in general and for employment of women in particular.

The enabling conditions for employment generation fall into two categories. One of these is spread of education for all including women. Education is of paramount importance both as the route to employment and also because of its independent and positive effect on many kinds of desirable behaviour. The second category of policies that help in employment generation relates to creation of training facilities which directly impart skills to workers. These are extremely limited now, particularly for girls. Thus, more such facilities should be created for vocational training and training for specific skills for women.

10.2.2 Policies Regarding Factory Conditions of Work

There are many issues of institutional support of concern to the women's labour market. These may be categorised under two broad headings, protection and equity. The protection relates to women's maternity benefit and protection against hazardous and night work. The equity issue deals with existence of equal opportunity and removal of all forms of discrimination against women, which includes 'marriage bars' to employment, sex-segregated job advertisements and discrimination in retirement age.

Maternity benefits

The Maternity Benefit Act dating back to 1940 is comprehensive in its provisions for dissemination of information, eligibility for receiving benefits and safeguards against abuse. There is confusion in the literature regarding the interpretation of the law by private entrepreneurs. I have found during my survey that nowhere in the factories are the provisions of the Act exhibited as required by law. Also when asked, the factory management clearly stated that they grant the leave, but no maternity benefit. If a woman returns after childbirth, she in some cases gets her

job back, although this may be at lower pay. There is thus a case for investigating this issue more clearly to find loopholes in the law and its implementation, and the possible effect on women's employment, productivity and efficiency.

Other benefits

The Factory Act of 1965 prohibits women's work in factories between 8 p.m. and 7 a.m. (Khan: 1995, p. 244). Also, legally no worker is allowed to work more than 48 hours a week for wages. If a worker exceeds the limit, the worker is entitled to have an overtime allowance at the rate of twice his/her ordinary rate of wages. In garment factories where overtime hours are the norm, my survey found no woman worker who gets this rate.

There are other legal provisions such as non-discrimination (which applies to equality of pay for equal work and to marriage bars). But there is evidence to the contrary. Entrepreneurs, for example, prefer to employ unmarried or widowed women to avoid discontinuity of work due to maternity leave and other leave due to family obligations. The provisions of the minimum wage legislation are not properly observed. Women work at the discretion of the employer and as temporary workers, as they do not have any written contact.

As indicated in Chapters 5-7, child care is a major problem for working women. On the other hand, there are legal provisions for facilities for keeping children aged six years or below in every factory where there are more than 50 women workers. None of the garment factories had this facility at the time of the survey. Anecdotal evidence suggests that of late, some organisations are trying to provide such services but these are very rudimentary.

The garment workers are long agitating for a fixed weekly holiday. This has not yet been settled. This is important given the tremendous home production burden some of them have. In fact, the ill health that many suffer from may be a direct result of the continuous backbreaking work they do. If they get a fixed weekly holiday, at least they may get some respite, which may raise their productivity and thus benefit the employers as well. Apparently, all are in the statutes but observed more in breach.

10.2.3 Policies to Reduce Drudgery of Home Production Time

Several kinds of policies may help in lightening the burden of women's home production time. Major policy initiatives are necessary to facilitate the provision of cost-effective child care services. The Government, the BGMEA and the representatives of the workers may together devise a way to do that. The private sector may be encouraged to provide various child-care services.

Other public policies may help. For example, the provision of better and regular public water supply facilities in place of the current intermittent ones may go a long way in relieving women of the drudgery of collection of water at odd hours of the day. Lowering of taxes on kitchen and food preservation aids may also increase their use and relieve somewhat the burden of women's work at home.

10.3 Future Research Needs

Several issues need closer scrutiny in future. One of these relates to the differential role of education in employment generation in general and in particular for specific sectors, industries or activities. Secondly, the issue of time allocation among market, home production and personal needs, the factors that influence their relative shares and its (allocation) process needs a more thorough investigation. The third issue that merits a closer look is how pooling and control of resources conditions intrahousehold resource allocation behaviour particularly to satisfy competing needs of the individual such as that for food and creation of household public good. The mechanism of pooling and control and its correlates, both economic and non-economic, also need further examination.

The measure of the quality of children needs further refinement. Future research may investigate the trade-off between quantity and quality of children with larger and more comprehensive data sets on working and non-working women who have achieved desired family size and those who have not. This may take due cognizance of the large literature on the relationship between education and fertility to find the proximate pathways for influencing fertility behaviour of people more precisely.

The measurement of health has been problematic. Future research may investigate the issue of health status with larger data sets and more specific information on past and present investments in health along with specific

information on supply and demand factors. The links among health status, productivity and earnings need further scrutiny.

The issues of child care, its role in women's labour force participation, particularly in the formal sectors, and subsequent child care arrangements require in-depth investigation. The costs of adjustment due to child care problems, economic and otherwise, over the life cycle of the individual, may be estimated for firm policy directions.

Finally, the decision-making roles of working vis-à-vis non-working women, and their link with the various measures of autonomy need to be reviewed carefully and in more in-depth. This may need an inter-disciplinary team of economists and other social scientists.

10.4 The Future

Women comprise half the population in Bangladesh. On them also rests the macroeconomic stability of the country because of the share of their output in export earnings. Yet, they continue to tend the home and hearth as well as taking on the new responsibilities on their hunched backs without much recognition. It is for the society to recognise that given the chance they are no less, probably better, capable compared to men in managing both. But their rite of passage need not be discordant. It should be as smooth as possible. There lies the hope for a more harmonious future society.

Epilogue

There is an old story of a Mogul King who visited a part of his realm where he had never been before and found the people living in dark caves. He was horrified at the gloom and ordered every family to be given lamps and oil to light them. Five years later he came again and found the caves still in darkness; the lamps had been broken and forgotten; the oil run out. The king, though annoyed gave new lamps, more oil, but in another five years when he came back, the caves were as dark as ever. This happened five times, and at last in despair the King asked his Vizier for an explanation.

"Ah", said the Vizier, who was a wise old man, "you gave the lamps to the men; you should have given them to the women".

The King followed the Vizier's advice and caves have been lit and the lamps kept burning ever since.

"Shiva's Pigeons"
Jon and Rumar Godden

Cited in Shamim Hamid, 1996, *Why Women Count: Essays on Women in Development in Bangladesh*, University Press Limited, Dhaka, Bangladesh.

Appendix 1

Sources of Official Statistics

The following official sources of statistical data have been used in the thesis in various places:

--Statistical Year Book, various years

--Census for Manufacturing Industries (CMI), various years

--Household Expenditure Survey, various years, particularly 1995-96 and 2001

--Labour Force Survey, various years, mainly 1995-96

--Export Promotion Bureau Statistics, various years

Appendix 2

Questionnaire on Management in Readymade Garments Factories

Note: All Survey questionnaires were in Bengali. For the readers these are translated into English.

Interviewer:
Interview date:
Card no:
Factory code:
Area code:

1. Factory name:
2. Factory address:
3 (a) Respondent's name:
(b) Respondent's management position:

Code:

4. Factory characteristics:
   (a) Year of establishment:
   (b) Export orientations:

Code:

(c) Type of output:
Code:

(d) What are the main products (maximum 5)?
(e) Initial year of production:
(f) Any closure for 3 months or over since then? Yes = 1; No = 2.
If yes, when was the last closure?
For how long?

(g) Type of foreign collaboration if any:
Code:

(h) If partly foreign owned, share of equity in capital:

(i) Legal status of ownership:
   (1) Single ownership or Partnership
   (2) Private limited Co. or other.

5. Labour information:
   (a) Types of workers and others employees by sex.

Types of employment	Males (no.)	Females (no)

(b) For which categories of job do you face problems in recruitment?
(c) Are they generally Men = 1; or, Women = 2.
(d) Which types of workers are easily available?

(e) Are they generally Men = 1; or, Women = 2.
(f) Do you have any training facility for workers?
(g) If yes, what are these?
(h) If no such facility, how do you think that their efficiency may rise?
Code:
(i) How do you get your workers?
Code:
(j) How does the contract supply system work?
(k) Why did you choose the present location of the factory?
Code:

(l) If you ever have changed location of factory, what were the reasons (maximum 3)?
Code:

(m) If changed location, did workers also move to the new location?
Code:

(n) What problems do you face regarding workers? For whom is it more applicable?

Type of problem (description)	Applicable to		
	Women	Men	Both

6. Organisation of work
(a) How do you organise works in shift / overtime?
Code:

If more than one shift, how many?
What time the first shift begins?
How many hours to a shift?

(b) How do you rate the efficiency of worker in your factory compared to that in others similar factories?
Code:

7. Facilities
(a) How do you pay your staff and workers?
Staff: Worker:
Code:

(b) How do you fix overtime rate?
(c) For how many days of late attendance do you mark one day absence?
(d) Any worker union in factory? Yes = 1; No = 2.
(e) Have there ever been any agreements with such a union on pay and other facilities?
(f) Other facilities:

Types of facility	Yes=1; No=2

8. How do you sell your output? (maximum 3)
   Code:

9. Financing investment and operational capital needs
(a) If any foreign equity, county of origin?
(b) What are the sources of your working capital?
   Code:

(c)What investment have you made in fixed capital / training during the last one year?
   Code:

(d) How did you finance these investments?
   Code:

10. Factory operation information

(a) Scheduled number of days of operation of your factory last year? ____ days
(b) How many days was it actually run? _____ days
(c) If less than scheduled, reasons thereof?

Code:
(d) Production, export and labour employment during last 3 years:

Year	Output	Export	Employment

(e) During last one year, how did the factory output change compared to that in the previous year
   Code:

(f) What is the prospect for production during the coming year? Will it
   Code:

If likely to change, reasons thereof?

(g) Change in export during last one year over proceeding year?

Code:

If changed, reasons thereof?

(h) What is the prospect for export during the coming year?

Code:

If changes are likely, reasons thereof?

Appendix 3

Questionnaire for Survey among RMG Workers and Control Women

(For control women, same questions except those related to jobs applied)

Interviewer:
Date of interview:
Card no.:
Factory code:
Area code:
Sl. no. of respondent:

Factory name:
Address:
Name of respondent:

1. Personal and social identity

a. Where do you live?
b. Is your residence in a *bustee* (slum)?
Yes, a bustee: _____; No, outside a bustee: ____
c. Your age? ____ years
d. Level/type of education you have? _____ (Codes)
e. If education below school final, why did not you study more? (Codes)
f. Which year did you first come to Dhaka?
g. From which district?
h. Did any of you family member been resident in Dhaka?
i. If yes, his/her relationship with you:
j. Major reason for his/her residence in Dhaka (codes):
k. Did other members of you family at one time or other all migrated to Dhaka?
l. What was the reason behind your migration to Dhaka? (codes)

2. Family information

a. Are you currently married? (codes of various marital statuses)
b. What is the household size excluding you?
c. Who is the household head?
d. Information on household members excl. you:

Name	Relationship	Age	Education	Occupation	If lives together at present

(codes for relationship, education, occupation)

e. If parents or husband/parents in-laws do not live together, what is you accommodation arrangement? (codes)
f. In you family, if there are persons working in RMG factories, how many did begin their jobs before and/or after you?
g. Do you still have own home in the village?
h. What about landed property?
i. If you family has landed property in village, how much is that?
j. Do you get any income/return from this land? (codes)

3. Beginning of a job

a. What did you use to do before you first job in a RMG factory? (codes)
b. From which year did you begin a RMG job?
c. Who did inform you about the availability of the job? (codes)
d. How many among the women in your family begin a RMG job before and after you?
e. At the time of first joining the RMG job, did you have any personal hesitation/misgiving or did you face any social or family-level objection?
f. If yes, what were the apprehensions?
g. Who did raise these issues/objections?
h. How was the obstacle overcome?

4. Job history prior to present job

a. Since you first RMG job, how many times have you changed you factory of work?
b. What was your post in the first RMG factory? (Codes)
c. What was the type of the post? (Codes)
d. In the factory prior to the present one (if not the first one), what post did you hold? (Codes)
e. Why did you leave that job? (Codes)

5. Description of present job

a. From when are you in this factory?
b. What type of interview did you have to face? (Codes)
c. In what post did you begin your job in this factory? (Codes)
d. How did you learn to do you job? (Codes)
e. What post do you hold now? (Codes)
f. If the present post is different from the post in the beginning, then, for how many months are you in the present post?
g. When do you begin and end your daily duty?
h. What was your monthly wage (excluding overtime and other allowances) at the time of joining this factory?
i. How much at present?
j. How many times did you have a rise in your wage rate since joining this factory?
k. When did you receive your salary for the last month?
l. Do you usually get your salary during this time of the month? (Codes)
m. How much salary did you receive for the last month?
n. Is it the full salary?
o. If not, why do you think you have received less? (Codes)
p. How much did you get for you overtime last month?
q. If overtime received only partially, how much more would you get?
r. On all the days that you had to do overtime, did you always do it willingly or unwillingly? (Codes)
s. If ever done unwillingly, why did you not want to do it? (Codes)
t. What is the rate of overtime per hour in you present post?
u. For overtime in the evening or night, do you enjoy other facilities? What are these? (Codes)
v. How many hours of overtime did you do last month?
w. On how many days during overtime did you receive snacks or meals?
x. If received any, how much would be the value of such snacks/meals?

y. Types of other facilities in this factory and the ones enjoyed by the respondent during the last one year:

Type of facility	Exists	Whether enjoyed

z. What number of days one has to be late in the job to be marked as absent?
aa. How many days were you marked absence during the last month for being late in the factory?
ab. How many days of your salary/overtime did you lose for being late/absent in this manner?

6. Is any of your relative/neighbour employed in this factory?

7. Social environment and facilities in the factory

a. Do you work along with men in the same work bench or side by side?
b. Do those men who do the same job as you do and been employed in this factory from the same time as you, get higher/lower wage than you? If so, why?
c. Does the factory has separates toilet facilities for men and women?
d. Do you need permission to go to the toilet?
e. If yes, why? (Codes)
f. How many times during the last day you did want to go to the toilet but was denied permission?
g.Where do you usually have your lunch? (Codes)
h. Do you lunch alone or with others? (Codes)
i. How long is the lunch-break?
j. How much other breaks do you get and for what purpose?
k. Do you get leave if asked for? (Codes)
l. What were the reasons for your leave taking, if any during the last month? (Codes)
m. How many days of leave did you have during the last month with and without permission?
n. How much wage and overtime did you lose for such leaves?

8. Employer/other employee behaviour

a. How do others behave with you in the factory? (code of types of behaviour)
Other women employees:
Other male colleagues:
Mid-level management (supervisors etc.):
Top management:

b. If bad or very bad, what are nature/type of behaviour? (codes in each case)
In case of women employees:
In case of male colleagues:
In case of management:

c. Did ever think of giving up your job because of such behaviour by others?
d. If yes, why did not you leave your job? (3 most important reasons)
e. During the last one month did the following incidents occur in case of you or other female colleagues of yours?

Event	In your case		In case of others	
	Work place	On way	Work place	On way

(Codes for frequency)

9. Transport arrangements

a. Have you ever changed or rented a house for facilitating transport to and from your place of work?
b. How do you generally travel to your working place? (codes for modes of transport)
c. How much time does it take to travel to your working place in this manner?
d. Do you go to your place alone or along with others? (codes of arrangement))
e. How much do you usually spend per month for such travel?
f. Since you first job in a RMG factory, are you going to your work place in this manner?
g. If not, how did you do it before?
h. Why did you change your manner of travel? (codes)

10. Social changes

a. When you first started your job, did you have any hesitation because you will have to work with unknown, non-relative males?
b. Do you still have any such hesitation?
c. If yes, why? (codes)
d. If no, why not? (codes)
e. From your experience, what would you suggest as the good and bad points of work in a RMG factory?
Good points: (codes); Bad points: (codes)
f. If among good points, independence of behaviour is cited, what are the areas in which such independence is expressed? (codes)
g. If among bad points, it is mentioned that people think them to be bad girls or make sarcastic comments about their working outside home, do you believe that these ideas of the people are correct? (codes)
h. If such ideas are not at all correct, why do people have such ideas? (codes)
i. Do your parents/husband or in-laws like your working in factory? (codes)
j. If they do not approve your working outside home, what are the reasons? (codes)
k. Do you have quarrels or tensions in the family because of this? (codes)
l. Do you go out of home for reasons other than going to your job?
m. If yes, for what purposes? (codes)
n. Do you go alone or along with others? (codes)
o. Before taking up a job in the RMG factory, did you go out of home for these purposes? (codes)
p. If yes, for what purposes?
q. Did you at that time go alone or along with others? (codes)

11. Economic changes (for married women, the change in the family has to be assessed from the time of marriage and in the in-laws' family)

a. When you first started working, how many others in your family was an earning member?

b. When you first started working, how would you rate the economic condition of your family? (codes)
c. If bad or very bad, why so? (codes)
d. If mentions, lack of earning member, why so? (codes)
e. If married, how would you rate the economic condition of the family at the time of marriage or first job, whichever happened later?
f. How would you rate the present economic condition of the family compared to the earlier one?
g. If good or very good, reasons thereof? (codes)
h. If bad or very bad, reasons thereof? (codes)

12. Changes in quality of life

a. Between the time of your first job and now, what have been the changes in the quality of life? (for married women, changes to be considered from the holding of first job or marriage whichever happened later)

Indicators	At time of first job	At present

b. Who is (are) the main bread earner(s) in your family? (code)
c. How many different types of dress do you have?
d. During the last six months, for whom have you bought dresses or had them tailored?

13. Financial arrangements

a. How much money do you have to pay every month for your food and lodge upon receiving your wage/overtime to those with whom you live? (This question was asked as some of the girls were found to be living as paying guests with others.)
b. After such payments, if any, do you keep the rest of the money with yourself or give them to others? (code)
c. If partially or fully given to others, to whom? (codes)
d. Do you give such money willingly or unwillingly?
e. If the latter, who insists that you give the money to them? (codes)
f. Is this arrangement continuing since your first job in RMG factory?
g. If a later phenomenon, how did it happen?
h. If part of the income is passed on to others, how do you decide as to how much to keep for yourself? (codes)
i. If the whole money is given to others. how do you meet your personal expenses? (codes)
j. Do you get the required money easily as and when you ask for it? (codes)
k. Do the incomes of other family members kept with the person to whom you give your money?
l. If not, then with whom are such incomes kept?
m. If you keep the whole money with yourself, is this arrangement a later phenomenon or continuing since your first job?
n. If from the very beginning, did you use to live with your family then or lived alone?
o. If married, does you husband give part of his income to you? How much? (codes)
p. Whoever keeps the money in the family, who actually decides about expenditures? (codes)

14. Birth of children, family planning

a. If married, when did you marry, before or after your first RMG job?
b. Year of marriage:
c. If widowed or divorced/separated from which year?
d. How many children were born to you before your first job in RMG?
e. If any was born, how many were born in a hospital/nursing home?
f. If none, why so? (codes)
g. Since your first job in RMG, how many children were born and in what birth condition? (codes)
h. Was any born in a hospital/nursing home?
i. If not, why so? (codes)
j. Did you and your husband ever before and after your job in RMG uses any birth-control method?
k. If neither does so, why? (codes)
l. Do you think that since taking up a job in RMG, you and/or your husband is more attentive to the need of birth control?
m. If either or both are so attentive, how did you decide upon family planning? (codes)
n. Reasons for family planning?
o. If unmarried, do you think that one should after marriage practice birth control?
p. If yes, why so? (codes)
q. If yes, who should be responsible, husband, wife or both?
r. If you breastfeed a baby, how do you mange to look after the baby while you are away from home? (codes)
s. If you have babies (not breastfed and up to 5 years of age), how do you mange to look after the baby while you are away from home? (codes)
t. What are the problems with such arrangements? (codes)

15. Household chores

a. Who do(es) the cooking in your family? (codes)
b. If not self, did you ever cook before?
c. If yes, when from have you given up cooking? (codes)
d. If you do not cook or have given up cooking, what are the reasons? (codes)
e. If cooking is done by others, do you help them? (codes)
f. If you cook yourself, when do you do the cooking? (codes)
g. Does any body help you in cooking? If so, who? (codes)
h. What other household chores do you do? (codes)
i. Does any body help you in these chores? Who? (codes)

16. Breakfast problems

a. Are you able to have a full breakfast every morning before leaving for your job?
b. What breakfast do you usually have? (codes)
c. Do others in the family have the same breakfast?
d If not, what do they usually have? (codes)
e. If it happens that you cannot have full breakfast some time, why so? (codes)
f. Do you ever leave for job without your morning meal?
g. If yes, how many times did it happen during the last one week?
h. Did you buy breakfast from outside on these occasions?
i. If not, why so? (codes)

17. Food consumption changes

a. At present, how much rice and wheat flour is consumed daily in your family?
b. Are these quantities more or less or about the same compared to those when you first entered your RMG job?
c. If more, why so? (codes)
d. If less, why so? (codes)
(These questions are repeated for both rice and flour)
e. Since your first job in the RMG, which foods are consumed more and which ones less?
f. Whatever changes in food habit takes place in the family, do you personally get more or less or about the same to eat?
g. Do you get more or less fish and meat?
h. What about milk and eggs?
i. If you get more or better quality food, who has decided that you should get more or better food? (codes)
j. How many times during the last 7 days have you eaten the following?
Fish: ; Meat: ; Eggs: ; Milk:

18. Health-related changes

a. During the last 3 months what diseases did you suffers from or is still suffering? (codes)
b. Did you have any treatment for these diseases? What type of treatment? (codes)
c. If used allopathic medicines, how did you decide the medicine? (codes)
d. If consulted a doctor or had a treatment, did you have to take permission for it from anybody? if so, from whom? (codes)
e. If no treatment done, why so? (codes)
f. Do any of the diseases that you suffered from during the last three months are more frequent since taking up a job in the RMG?
g. If yes, which ones? (codes)
h. Did you go to work when you had these diseases?
i. If you had, was it willingly or upon pressure from somebody?
j. If gone willingly, why? (codes)
k. If gone unwillingly due to pressure from somebody, who put pressure on you? (codes)
l. If gone due to pressure from somebody despite illness, what he/she/they would have done if you had refused to go to work? (codes)

19. Major decision-making in the family

a. Since your entry into a RMG factory or over the last one year whichever is less, which of the following events happened in your family and what role did you have in the decision-making?

Type of event	If occurred	Whether discussed with you	Who took decision

b. Which of the following needs your parent's/husband's/in-laws' permission?

Type of activity	Nature of permission

20. Savings, loans etc.

a. Do you save any money out of your income?
b. If yes, who do you keep the money with? (codes)
c. How much savings do you have now?
d. What have you done with your own savings during the last one year? (codes)
e. Do your parents or husband know of your savings?
f. If yes, have they ever asked for the money?
g. If yes, have you given them the money?
h. If yes, did you give the money upon request or upon pressure from them?
i. If not given money upon request, has there been any problem due to your refusal?
j. Have you any debt?
k. If yes, how much in cash and kind?
l. Who did you borrow from?
m. Reasons for borrowing:
n. Did you let others know of your borrowing?
o. If so, whom?
p. Did you need his permission to borrow the money?
q. Have you given loan to anybody during the last one year?
r. If yes, how much in cash and kind?
s. Before giving loan, did you have to take anybody's permission?
t. If yes, whose?
u. Did you have any problem due to giving such loan?
v. If yes, what problems?

21. Perceptions

a. If married, how do you think about the your husband's position relative to you? (codes)
b. If currently not married (include. never married), how do you think about a man's position relative to you? (codes)
c. If the man's position is above you, why so? (codes)
d. If the man's position is the same or below you why so? (codes)
e. Have you ever thought of leaving your RMG job?
f. If yes, under what circumstances? (codes)
g. If no, why so? (codes)
h. Do you think that your sister/daughter or other female relative also should be in a RMG job?
i. Do you think that your marriage is being delayed because you are working in a RMG factory?
j. If yes, for what reasons? (codes)
k. If dowry is stated as a reason, why do you think that a dowry is being demanded? (codes)
l. Do you save money for your own marriage?
m. At what age do you think girls should marry?
n. Should they have job before marriage?
o. How far do you wish to educate your sons and daughters?
p. Do you think women should not have more than a certain number babies? If so, how many is enough?
q. If all of them are girls, how many babies do you think that one may still have for a son?

Appendix 4

Questionnaire for Survey among RMG Workers and Control Women
Assets and Expenditure Schedule

Interviewer:
Date of interview:
Card no.:
Factory code:
Area code:
Sl. no. of respondent:

Factory name:
Address:
Name of worker:
Name of respondent:
Relationship of worker with respondent:

1. Family assets

1(a) Land

Type of land	If owned	Area owned	Market value

1(b) Housing

Description of structure	If owned	Value

1(c) Domestic animals

Type of animal	Number owned	Value

1(d) Agricultural implements used in village home

Description	If owned	Value

1(e) Transport equipments

Description	Number	Value

1(f) Fixed capital in industry or business

Description	Value when new	Present value

1(g) Financial and other assets

Description	Total value

1(h) Financial and other liabilities

Description	Total debt	During last one year		With/without
	Loan taken	Interest rate	Repaid	collateral

Description	Total debt	Last year loan	Interest rate	Repaid	With or without collateral

2. Expenditures

2(a) Food expenditure during last one week

Type of food	Amount consumed	Value

2(b) Other daily necessities and essential expenditure (last 3 months)

Consumption item	Purchase value

2(c) Education, health, services, remittances expenditure (last 3 months)

Items	Expenditure

2(d) Expenditures for and acquisition of assets or investment and disinvestment (last one year)

Asset/investment type	Purchase/improvement	Sale value

Appendix 5

Questionnaire/Checklist for RMG Workers Time Use

Date of interview:
Investigator:
Factory: Code:
Principal interviewee: Card No.:

To be asked of only the RMG worker

1. Time use between waking up yesterday and today?
   Yesterday woke up at:_____ AM

Description of all activities since then.

Activity list (code)	If done jointly	Hours/ minutes	Time of day when done	If ordinarily does

2(a). Do any senior woman such as mother, mother-in-law, sister-in-law or others of such category live with you?
   Yes_____ No_____
(b) Who decides about the various household work arrangements? What roles do these senior women play?
(c) How do they decide?

3. Any conflicts regarding such work arrangements?
   Yes, often_____ Yes, some time_____ No, never_____

4(a) Have you ever thought that you are working outside home for your family, so others should help you in household chores?
   Yes_____ No_____

(b) Have ever discussed this with your husband? Yes_____ No_____
(c) If yes, what has been his response?
(d) If not discussed, why not? (codes)

5. Suppose you have suddenly received Taka 1000. What would you use this for (in terms of priority)?

To be asked of husband/father/brother

6. Time use between waking up yesterday and today?
   Yesterday woke up at: AM

Description of all activities since then.

Activity list (code)	If done jointly	Hours/ minutes	Time of day when done	If normally does

7(a). How did you react to the idea when your wife/daughter/sister had wanted to join RMG factory for the first time? (codes)
(b) Now that she has been working for some time, how do you rate it? Good and/or bad? Why so? (codes)

8(a). Do you think that men should help with household chores if women work outside home? (codes)
(b) Reasons for particular response:

9(a) Is there any difference between men women working for an income? (codes)
(b) Reasons for particular response:

10(a) What are the household responsibilities that you carry out within home and without?
(b) What are the activities in which you help your wife/daughter/sister?
(c) Do you help them on your own or only when so requested?
(d) What are the household expenses you finance from your own income?
(e) For what purposes do you give money to your wife/daughter/sister?
(f) What are the household expenditures that you decide, which ones your wife/daughter/sister decide and which ones are decided jointly?

Husband/Father/Brother	Wife/daughter/Sister	Jointly

(g) Whose income is used for which household purpose?

Type of expense	Whose income	Code

(h) Who keeps the income of your wife/daughter/sister? (codes)
(j) If replies (2) or (3), is there any problem if most of the income is kept with wife/daughter/sister? Yes_____ No_____
(k) What problem? (codes)

11(a) Does your wife/daughter/sister know of your income level? (codes)
(b) If informs irregularly or not at all, reasons thereof:

12. In what areas do you think men and women should have equal rights? If you disagree, reasons thereof:

Rights (codes)	Agree =1 Disagree=2	Reasons if disagree (codes)

13.How various family matters are decided? Who is consulted and who takes final decision?

Household chores (codes)	Consulted with (codes)	Final decision by (codes)

14. Suppose you have suddenly received Taka 1000. What would you use this for (in terms of priority)?

To be asked of senior women (mother, mother-in-law/elder sister-in-law) in the family

15(a) Who decides about the various household work arrangements? What roles do you play?
(b) How do you decide?
(c) Any conflicts regarding such work arrangements and among whom? (codes)

16. (If it is seen that the worker respondent has to most of the household chores, then) why do you think she has to do all these after working so hard for the family outside home? Do you help? If not, why not? (codes)

17(a) How do you like women working outside home for an income? (codes)
(b) Why do you think so?

18(a) Is there any difference between men and women working for an income? (codes)

(b) Reasons for particular response:

19(a) What are the household responsibilities that you carry out within home and without?
(b) What are the activities in which you help your daughter-in-law/daughter?
(c) Do you help them on your own or you do so when requested?
(d) Do you do any work outside home? Yes_____ No_____
If yes, what are these?

(e) What are the household expenses you finance from your own income?
(f) For what purposes do you give money to your daughter-in-law/daughter?
(f) What are the household expenditures that you decide, which ones your daughter-in-law/daughter/sister decide and which ones are decided jointly? (codes)

20(a) Do all in this family have their main meals together or at different times?
(b) If women eat later do they have the same food, or not always so?
(c) Those who work outside home do they get better or more food? (codes)

21. In what areas do you think men and women should have equal rights? If you disagree, reasons thereof (codes)

Rights	Agree =1 Disagree=2	Reasons if disagree

Appendix 6
Concepts in Labour Force Survey 1995-96

Bangladesh Bureau of Statistics, *Report on Labour Force Survey in Bangladesh 1995-96*, 1996, Dhaka, Government of Bangladesh.

The following definitions have been used in the above document

Absolute Poverty is measured as having food intake up to 2122 K. cal/per person/ per day.

Economic activity: The extended definition is synonymous with the definitions of UN System of National Accounts and includes all market production and various types of non-market production for personal consumption, own account construction and production of fixed assets for own use. Thus, husking of rice for own consumption and for market sale are both covered under the definition. Unpaid domestic activities and voluntary community services are not included. The usual or conventional definition excludes all non-market economic activities. Thus, the usual definition will exclude husking for own consumption but not for market sale. In previous labour force surveys, the extended definition has not been used thus precluding any comparability.

Employed person: a person working for at least one hour during the reference week or someone who had a job for pay or profit.

Labour force or economically active population: Employed or unemployed persons aged at least 10 years except disabled, retired, income recipients, full time housewives, students, beggars or other persons who did not work for pay or profit for at least one hour during the reference period.

Labour force participation rate: This is defined as the ratios of the people aged 10 years or above who are economically active to the total population in that age group. This is also called refined activity rate.

Leave: East Bengal Shops and Establishment Act 1951, and The Factories Act 1965 define leave as holidays with wages.

Reference period: Seven days prior to the day of enumeration.

Appendix 7

Table A7-1: Means and Standard Deviations of Variables for Probit Regression for Labour Force Participation (sample data)

Variables	Mean	Standard deviation
Labstat - Labour force status	0.63	0.48
Age – Age of respondent (years)	23.99	6.75
Age-squared (years)	626.92	384.77
Migdum- Migration status of respondent (Migrant = 1)	0.92	0.27
Fmigdum- Migration status of family (Migrant = 1)	0.72	0.45
Livesize - Total family size living together (number)	3.89	1.83
Mardum – Marital dummy (Ever married = 1)	0.74	0.44
Landum – Land owned dummy (Own = 1)	0.70	0.46
Eddum1 – Education dummy 1 (up to 5 years = 1)	0.63	0.48
Eddum2 – Education dummy 2 (6 – 10 years = 1)	0.25	0.44
Gedndum1 - Guardian education dummy 1	0.45	0.50
Gedndum2 - Guardian education dummy 2	0.27	0.45
Number of valid observations	314	

Appendix 8

Derivation of the Earnings Function

The basic earnings function incorporating schooling is stated as

$$\ln E_s = \alpha + \beta S \qquad \ldots (1)$$

where,

S = completed years of schooling;
E_s = earnings with S years of schooling.

Following Chiswick (1997), (1) may be derived as follows.
Let,

E_0 = earnings with no schooling;
E_t = earnings with t years of schooling;
C_t = amount of investment in year t of schooling;
R_t = rate of return on investments in year t of schooling;

$K_t = C_t / E_{t-1}$ = investment in level of schooling t relative to a full year's potential earning if investments were not made in this level of schooling.

From the expression for K_t note that:

$$C_t = K_t E_{t-1} \qquad \ldots (2)$$

The last quantity, K_t, is crucial for the derivation of the equation. When somebody is in school in time period t, he/she is using up *all* his/her potential earnings due to schooling up to period t-1. It is assumed that $K_t = 1$, for the period the person is in school. Which implies that all the costs of schooling are borne privately by the person concerned. When there are subsidies of any kind, $K_t < 1$. For periods after leaving school, K_t must be zero.

Assume now that the investment in schooling is made for a person for only one period (year). The earnings due to such schooling are the earnings that he/she could have without any schooling plus the return on the investment for one year of schooling. Thus,

$$E_1 = E_0 + R_1 C_1$$

$= E_0 + R_1K_1E_0$ (using 2)

$= E_0 (1 + R_1K_1)$ ... (3)

For schooling investment for two periods (years), similarly

$E_2 = E_1 + R_2C_2$

$= E_1 + R_2K_2 E_1$ (using 2)

$= E_1 (1 + R_2K_2)$

$= E_0 (1 + R_1K_1) (1 + R_2K_2)$ (using 3)

For S periods (years) of investment in schooling using the same principles,

$E_s = E_0 (1 + R_1K_1) (1 + R_2K_2) (1 + R_3K_3)...(1+ R_sK_s)$ ... (4)

Taking natural logarithms (ln) on both sides of (4),

$\ln E_s = \ln E_0 + \ln (1 + R_1K_1) + \ln (1 + R_2K_2) ...+ \ln (1+ R_sK_s)$ ... (5)

If $R_t K_t$ is small, then $\ln (1 + R_tK_t) = R_tK_t$.[199] Hence (5) may be rewritten as,

$\ln E_s = \ln E_0 + R_1K_1 + R_2K_2+ ...+ R_sK_s$ ... (6)

Assuming that the rate of return for any additional year of schooling is the same and the proportion of earnings in earlier periods that are invested in schooling in the following period are also invariant for all periods, one gets

$R_1 = R_2 = ... = R_s = R$ and $K_1 = K_2 = ... = K_s = K$ which substituted in (6) give

$\ln E_s = \ln E_0 + RK + RK+ ...+ RK = \ln E_0 + RKS$ ... (7)

Assuming K =1 on the basis of earlier arguments, and noting that E_0 being a fixed quantity, $\ln E_0$ is also constant, and writing β for R which is fixed, this further

[199] For example, if $\varepsilon = 0.0105$, $\ln (1+ \varepsilon) = 0.0100$ and for $\varepsilon = 0.0513$, $\ln (1+ \varepsilon) = 0.05$. In general, the smaller the value of ε, the closer shall be the approximation.

reduces to

$\ln E_s = \alpha + \beta S$ which is the earnings equation (1) denoted above.

Before bringing in the issue of on-the-job training, let us first examine the equation (1) above. If an error term is added to the equation and a regression equation is estimated, the estimated value of β is often termed as the private rate of return to education (provided of course the investment is made mainly from private resources). But, as Chiswick (1997) has shown, this interpretation of β is erroneous and holds only in specific cases where R and K are constant across levels of schooling. This need not be so as the rate of return for say primary, secondary and tertiary education may differ substantially. The same applies to K. Assuming as before that K is unity, but that the rates of return differ among various levels of education, say primary (P years), secondary (M years) and tertiary (H years), the equation (1) may be rewritten as

$$\ln E_s = \alpha + \beta_p P + \beta_m M + \beta_h H \quad \ldots (8)$$

On-the-job training: Education is a kind of human capital, which increases the productivity of a person. So does his/her experience in the job-market, particularly if it is relevant for the type of job the person is doing. If so, while estimating the return to human capital, the exclusion of on-the-job training as an explanatory variable may result in an upward bias in the estimate of the coefficient of schooling (Mincer: 1974). It has also been widely observed that the return to experience increases at a decreasing rate. To reflect the effect of experience and training, therefore, a quadratic term in experience is added to the earnings equation. Equation (1) may therefore be rewritten as

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 \quad \ldots (9)$$

where X = years of experience.

Given a level of education, the productivity due to on-the-job experience may vary, particularly if different levels of education influence the capability to assimilate experience. To capture this aspect, interaction terms between the level of education and experience may be used.

A further refinement is to include controls for the type of job done. The

equations under each set are therefore

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 \qquad \ldots(10a)$$

$$\ln E_s = \alpha + \beta S + \gamma X + \delta X^2 + \rho J + \tau(S*X) \qquad \ldots(10b)$$

where J denotes job type (manual, skilled or managerial) and S*X is the interaction term.

Appendix 9

Table A9-1: Means and Standard Deviations of the Variables for Estimating Earnings Functions

Variables name	Mean	Standard Deviation
logpay: Log of total pay (including non-wage payments) per month	7.60	0.48
Lgbpay: Log of entry wage per hour	1.50	0.57
Lgnpay: Log of current wage per hour	1.83	0.46
lgothr: Log pay per hour	1.71	0.42
Eddum1: Education dummy 1(primary=1)	0.58	0.49
Eddum2: Education dummy 2 (Mid-secondary=1)	0.24	0.43
Heckman's lambda (estimated from labour force participation equation)	0.63	0.37
Manual1: If initial job in present RMG manual (Manual=1)	0.27	0.45
Skill1: If initial job technical/semi-technical (Skilled =1)	0.53	0.49
Manual2: If present job manual (manual=1)	0.18	0.39
Skilled2: If present job technical/semi-technical (skilled =1)	0.58	0.49
Lenrmg: Time since first RMG job (yrs)	5.34	3.88
Prevexp: Years in RMG prior to present factory	2.88	3.34
Lenrmg-sq: Square of length in RMG	43.57	57.94
Prevexp-sq: Previous experience squared	19.46	34.82
Eddum1*Prevexp: Multiplication of Eddum1 by previous experience	1.71	2.88
Eddum2*Prevexp: Multiplication of Eddum2 by previous experience	0.77	2.18
Eddum1*Lenrmg: Multiplication of Eddum1 by total experience	3.15	3.83
Eddum2*Lenrmg: Multiplication of Eddum2 by total experience	1.44	3.16

Note: Very few persons in managerial/supervisory positions could provide answers to the actual hours worked for reasons explained in the text. This explains the lower value of log of pay or actual earnings per hour (estimated over a smaller sample of 217 workers) compared to the log of current wage per hour (estimated over the full sample of workers).

Appendix 10

List of Activities in the Household

The following activities were identified for time disposition on a 24-hour recall basis. These were asked as much as possible in sequence of their occurrence particularly for morning activities (say, serials 1–6 and part of 8 below) to help the respondent remember correctly the time involved.

1. Personal hygiene in the morning (toilet, washing)
2. Breakfast making
3. Main meal cooking
4. Bath, dressing up and breakfast
5. Travel to and from work place
6. Time in work place
7. Returning home during lunch time (if applicable)
8. Taking children to and from school
9. Purchase of daily necessities
10. Other shopping
11. House cleaning
12. Washing up of clothes
13. Utensils cleaning
14. Own study
15. Helping children with study
16. Other child care
17. Cooking in the evening
18. Amusement time (Watching TV, listening to radio, playing games)
19. Religious activities (prayer – up to five times a day)
20. Social activities
21. Meetings/*samiti* work
22. Sewing etc.
23. Night sleep
24. Other rest time
25. Dinner
26. Others

Appendix 11

Definitions of Variables for Analysing Pooling, Control and Command in Cross-tabulation Analysis

Residential location: Whether live in slums or outside slum

Ownership of village property: If owned or not owned

Ownership of land: If land owned or not

Marital status: If currently married, unmarried or divorced/widowed

Migration status: If a migrant or non-migrant

Length of migration: From short duration to long duration

Family size: The total number of persons in the family

Incidence of children: If has children or not

Education: Level of education from low to high

Social autonomy: The level of social autonomy of women within the family from low to high level

Age of respondent: Age variation from young to old

Family headship: From self to male parental (father/brother) to in-laws to female parental (mother or sister)

Income: Monthly income as it varies from low to high

Appendix 12

Construction of Score for Social Autonomy (Socauto)

The data from the survey contains replies to 3 questions on the level of permission required to talk to non-kin men, mix with neighbours and talking to male relatives outside family. For each of the questions, there are four possible replies which are "Always required", "Sometime required", "Not required" and "Not applicable". Assuming that these are indicators of social freedom or independence, arbitrarily these replies have been given respective weights of 0, 0.5, 1. For NA, no weight has been given (Sysmis). The reasoning is that those who need permission always to talk to non-kin men, mix with neighbours or talk to male relatives outside family must be socially the least free. So they have been given a value of 0. Those who do not require any permission have the most social freedom. So they are given a value of 1. Those who require permission sometime are given a value in-between, i.e., 0.5. Now for each of the questions on social freedom, for each respondent a value is thus assigned. Thus each respondent has three such scores of social freedom or autonomy and are called Socauto1, Socauto2 and Socauto3.

Next, I combine them together into one weighted score. Here I needed to apply the knowledge of Bangladesh society. Talking to men who are not kin, is the most socially courageous thing and those who can do that can be taken to be the most independent or autonomous and so Socauto1 may be given a weight of 1. Next in importance probably is talking to male relatives outside family. In fact, in many cases, it is usually thought that they can do the most mischief and so girls are often kept from even mixing with them. Thus, Socauto3 is given a weight of 0.5. People get used to neighbours as they live together. So in this case, the weight is the least, 0.25. It must be understood that these weights are arbitrary. But so are those put by others (see Hashmi, Schuler and Riley: 1996). The more difficult is the criticism that how does one put 0.25 for Socauto2 and 0.5 for Socauto3. In some cases, this may be the other way round. But as argued, the relative ranking is on the basis of the knowledge of the society.

Now given these weights, I have tried to normalise them so that the overall score falls between 0 and 1. To do that note that 1 + 0.5 + 0.25 = 1.75. Then, 1/1.75 = 0.57; 0.5/1.75 = 0.29 and 0.25/1.75 = 0.14. So to get a weighted average we get

Socauto = Socauto1 * 0.57 + Socauto2 * 0.14 + Socauto3 * 0.29

Thus, for every respondent I get a social independence or autonomy score. The frequency distribution shows that this has the following distribution.

Socauto	Frequency	Percent	Value label
0	45	17.6	No autonomy
Up to 0.5	60	23.6	Low autonomy
0.51-0.99	53	20.8	Medium autonomy
1	97	38.0	Full autonomy

Alternatively, the categories may be 0 - 0.25; 0.251 - 0.75 and 0.75+ defined as low, medium and high autonomy. This is the Autoscl2 (recoded Socauto) that has been used in the cross-tabulations while the Socauto scores have been used directly in the regression equations.

Appendix 13

Table A13-1: Means and Standard Deviations of Variables Used for Probit Regressions for Pooling and Control

Variables	Mean	Std. Deviation
Pooling dummy (Full pool=1)	0.88	0.33
Control dummy (Full control=1)	0.21	0.41
Age (years)	23.10	6.24
Age-sq (years)	572.38	336.96
Migdum (migrant=1)	.0.90	0.30
Mardum (ever-married=1)	0.65	0.48
Eddum 1 (Up to primary=1)	0.58	0.49
Eddum2 (6-10 years=1)	0.24	0.43
Manual2 (manual =1)	0.18	0.39
Skill2 (technical/semi-technical =1)	0.58	0.49
Totpay (last month's wage in Taka)	2223.95	1061.82
Landdum (own land =1)	0.74	0.44
Headdum1 (Female-headed=1)	0.117	0.31
Livesize (total family members)	3.59	1.96
Socauto (Score of social autonomy)	0.62	0.39

Appendix 14

Demand Functions and Engel Functions

A demand function and its properties

Let $q_i = f_i (x, p)$ be the demand function for a good i where

q_i = quantity of i-th good, x = total expenditure or budget outlay and p is a vector of prices. f_i is the function for i-th good.

A well-behaved demand function is expected to satisfy two rules. One is the "adding-up" constraint. This means that the expenditure on all goods and services when added together must equal the total expenditure. Formally, this means

$$\Sigma_k p_k q_k = x.$$

The other is the condition of homogeneity or, that the demand function is "homogeneous of degree zero". That is if all prices and total expenditure (or budget outlay) increases by the same proportion, the quantity demanded will not change. Let the proportion be m, which is a positive number. Then, formally the condition of homogeneity of degree zero means that

$$f_i (mx, mp) = f_i (x, p) = q_i.$$

This condition is also known as the absence of money illusion. This happens because increasing all prices say by 100 percent and also expenditure by 100 percent means that the real expenditure remains the same. Also, the relative prices also remain the same. To check the last one, see that

$$m\, p_i / m\, p_j = p_i/p_j.$$

Engel functions

Engel functions were first introduced by Ernst Engel in the 19th century (Engel: 1895) while analysing family budget data. The general form of an Engel function or curve is as follows:

$$q_i = g_i(x).$$

Quantity demanded and consumed is a function of total expenditure or budget outlay. Thus, in Engel functions prices play no role because, the data are cross-section data and all consumers are assumed to pay the same average price.

Various types of Engel functions have been estimated and reported in the literature. One particular type is due to Working which was later used by Leser and is referred to as Working-Leser model. This formulation relates budget shares linearly to logarithm of total expenditure. Denoting

E = total expenditure;
Ei = the expenditure on i-th good;
Si = Ei / E; and
F = family size,

the basic formulation of this variant of the Working-Leser model is

$$E_i / E = S_i = \alpha_i + \beta_i (\ln E) + \gamma_i F \quad \ldots \quad (1)$$

where α_i, β_i, γ_i, are all constants. "i" - here refers to the i-th commodity, not i-th observation.

This functional form allows for non-linear relationships between consumption and income. It also controls for household characteristics such as family size. Others such as age and proportion of, say, children can also be included easily.

The model may be estimated with Ei as the dependent variable. But, to avoid heteroskedasticity, the model is estimated in share form (Delgado: 1998, p. 32-34).

In this formulation, there are goods which may have $\beta_i > 0$ or < 0. If it is positive ($\beta_i > 0$), that means that as total expenditure rises, the share of the expenditure on the good in question rises. These are luxury goods. For necessities, the coefficients are negative ($\beta_i < 0$). In such cases, the share of the good in question falls. This is what Engel observed for food. Thus, we expect for food, the coefficient β_i to be negative.

Estimation of Engel functions

The Engel functions can be estimated in several forms. Some of the variables such as family size may enter as log (size). Also, logarithm of per capita total expenditure can be used rather than logarithm of total expenditure. This is done to compare expenditure behaviour across households. But family size is retained as an explanatory variable so that its independent influence can be judged. In any case, when per capita expenditure is used in place of total expenditure, this is replaced in every case where E is used in estimation of equation (2).

The equation in (2) is estimated by adding an error term and may be estimated by using OLS. The use of OLS is common (Delgado: 1998). However, when demographic variables are included, household size and these variables all cannot be assumed to be exogenous. Similarly, per capita expenditure is likely to be endogenous and thus the error term and the total expenditure may be correlated and the OLS estimates may not be consistent. In such a situation instrumental variables are used in the 2SLS estimation.

Appendix 15

Definition of Variables for Engel Equations

Food: This includes all expenses on food including *pan*, tobacco, cigarettes, if there are any. These latter items were infrequently cited.

Cloth: All clothing, dresses and shoes and related items

Common expense: Includes all expenses which are common for the household, and not individualised such as household effects, soap, energy expenses, house rent and other monthly expenses for daily necessities. Does not include luxury items.

Health: All health related expenses.

Education: All education related expenses including tuition fees (if applicable), textbooks, school stationary but not school meal or snack costs.

Transport: All transport related expenses

Miscellaneous: All others, which include all investments including housing improvement. Investment expenses were very infrequent.

The survey used different reference periods for different types of expenditure but in all cases these were converted into a yearly basis (e.g., by multiplying weekly food expenses by 52 and quarterly clothing expenses by four).

Family size: Total number of family persons living together with the respondent and eating from the same kitchen.

Age of respondent: Age in completed years.

Female proportion: Proportion of all females in family size.

Proportion adult: Proportion of all persons in family size who are above 14 years of age.

Male up to 14: Proportion of all boys in family up to 14 years of age.

Female up to 14: Proportion of all girls in family up to 14 years of age.

Pooling and control dummy variables: Each of pooling and control has three categories and therefore should enter the equations as two dummies each. However as this creates the problem of multicollinearity, only one for each has been used.

For pooling dummy the definition is

Pooldum = 1 if pool fully; = 0, otherwise.

Similarly for control, Contdum1 = 1 if control fully; = 0, otherwise.

Appendix 16

Table A16-1: Means and Standard Deviations of the Variables in Equations for Expenditure Analysis

Variable	Mean	Sd. Deviation
Share of food expenditure	0.54	0.13
Share of clothing expenditure	0.04	0.04
Share of common expenses	0.26	0.10
Share of educational expenses	0.03	0.05
Share of health expenses	0.05	0.07
Share of transport expenses	0.04	0.03
Share of misc. expenses	0.03	0.08
Log (PCE)	9.60	0.59
Log (size)	1.33	0.63
Age of respondent (years)	23.87	6.16
Proportion of females in family	0.68	0.16
Proportion of adults in family	0.82	0.19
Proportion of boys (≤14) in family	0.07	0.11
Proportion of girls (≤14) in family	0.10	0.15
Pool dummy	0.59	0.49
Control dummy	0.24	0.43

Appendix 17

Table A17-1: Yearly Average Expenditure per Household in RMG Worker Households (Taka)

Expenditure items	Mean (Taka)	Average budget share (percent)
Food	31928	51.1
Clothing	2847	4.6
Common household	16403	26.3
Education	1927	3.1
Health	4002	6.4
Transport	2856	4.6
Miscellaneous	2481	4.0
Total (annual)	62446	100
Total (monthly)	5204	

Note: Exchange rate for Taka, the Bangladesh currency, was Tk. 47 = US$1 in 1997.

From the sample, the average monthly expenditure comes to nearly Taka 5200 (Tk 47 = US$1). In the Household Expenditure Survey 1995-96 (BBS: 1998b), the household group that comes nearest to the average monthly expenditure from the sample had an expenditure of Taka 5118. This HES group spent 56 percent of its budget on food and beverages and 6.5 percent on clothing and footwear. The clear divisions for other items are not available. But several items together can be termed as common household expenses (includes house rent, fuel and lighting and household effects) and was 21 percent for the group. These compare well with the sample percentages as shown in Table A17-1 above.

Appendix 18

Calculation of Calorie Consumption Implications of Higher Food Expenditure Share in Non-Pooling Households

Note that the average sample household has a monthly expenditure of Taka 5204. This translates into a difference of expenditure of Taka 364.28 (= 5204 * 0.07) per month or Taka 12.14 (= Taka 364.28/30) per day between fully pooling and other non-or partially pooling groups. The latter has an average family size of 3.92 persons. So the non-pooling households spent Taka 3.10 (= Taka 12.14/3.92) more per person per day on food. For simplicity's sake, assume that all of these are spent on purchasing more rice.

During the survey, the quantities purchased of (1110.50 kg in a week) and money spent (Taka 12497.50) on rice indicated an average price of Taka 11.25 per kg (Taka 12497.50/1110.50). Thus, each member in non-pooling households could eat an additional 0.2755 kg (= 3.10/11.25) or 275 grams of rice. Now the average calorific value or Kilocalorie (Kcal) per gram of rice is 3.46.[200] Thus, each member in the non- or partially pooling household could have access to an additional energy of at least 950 Kcal (= 275 * 3.46) over each member from a fully pooling household. If the yearly figure of expenditure on food is used, a similar calculation produces a value of additional calorie of

940 Kcal (= [(62446*0.07)/(365*3.92*11.25)]*3.46*1000) per person per day.

[200] Estimated on the basis of information in the HES 1995-96, (BBS: 1998b, p. 46-47).

Appendix 19

Stochastic Dominance

Stochastic dominance has played a major role in understanding welfare rankings between situations (across time, groups or countries). The basic idea is simple. Suppose there are two rankings of welfare between two groups (which may be actually the same group at two different times such as has been used in understanding changes in poverty). Welfare may be measured as income, consumption or standard of living. The two welfare rankings are two distributions the cumulative distribution functions of which are, say, $F_1(X)$ and $F_2(X)$. Then, the concept of first order dominance is defined as follows:

> $F_1(X)$ first order stochastically dominates $F_2(X)$, if and only if for all values of X, $F_2(X) \geq F_1(X)$.

This means that if the two cumulative distributions are graphed, curve of $F_2(X)$ shall lie above and to the left of $F_1(X)$.

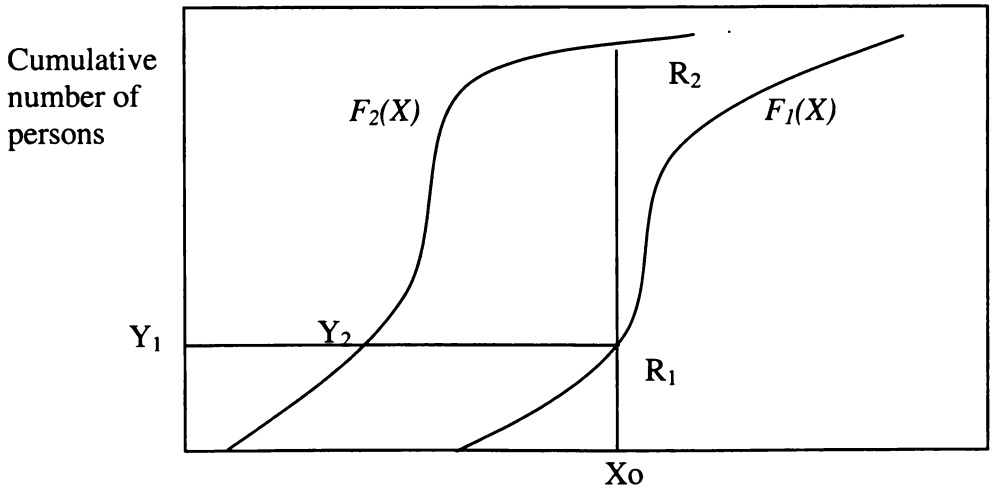

Figure 1: Cumulative Distribution function

Figure 1 makes the idea clear. The value of $F_2(X)$ lies wholly to the left of $F_1(X)$. Thus, for any given value of x, the value of $F_2(X)$ is greater than that of $F_1(X)$. For example, for $X = X_0$, the value of $F_2(X)$ is $R2X_0$ while the value of $F_1(X)$ is much lower, R_1X_0.

Now assume that the x values are the estimated savings. So, if $F_1(X)$ denotes the savings for workers and $F_2(X)$ denotes that for control, then for any level of

savings, the proportion of people for control will be greater than that for workers. In other words, for any given proportion of people, the savings for the control will always be less than that for the worker group ($Y_1Y_2 < R_1Y_1$). This means that the workers are better off than the control.

There is also a second order stochastic dominance rule for ranking the distributions when they cross at some point. In such a situation the distributions are different. Yet, if it is found that the area under one curve (distribution) is less than the other then the first distribution second order dominates the other. It may be borne in mind that the first order dominance always implies the second order dominance, but not the other way round.

Appendix 20

Table A20-1: Means and Standard Deviations of Variables Used in OLS and Tobit Equations to Explain Savings

Variables	Mean	Standard deviation
Present savings in Taka	4102.05	7907.62
W9 (age of respondent)	23.19	6.29
Agesq (age square)	577.49	329.88
Lenrmg (Time in RMG job in years)	5.30	3.87
Lenrmgsq (square of Lenrmg)	43.08	57.47
Livesize (total family size including self)	3.57	1.96
Eddum1 (education up to primary = 1)	0.58	0.49
Eddum2 (education 6 – 10 years =1)	0.25	0.43
Manual2 (manual = 1)	0.18	0.39
Skill2 (tech/semi-technical=1)	0.58	0.49
Mardum (ever married = 1)	0.66	0.47
Landdum (own land = 1)	0.74	0.44
Migdum (migrant = 1)	0.90	0.30
Headdum (female headed = 1)	0.12	0.32
Pooldum (pool =1)	0.87	0.34

Appendix 21

Table A21-1: Means and Standard Deviations of Variables for SLI Regressions

Variables	Mean	Standard deviation
Age	23.28	6.34
Age-sq	581.95	0.47
Mardum (married=1)	0.65	0.47
Eddum1(primary=1)	0.58	0.49
Eddum2 (6-10 years=1)	0.25	0.43
Migdum (migrant=1)	0.90	0.31
Livesize (number)	3.58	1.95
Nchild (number)	0.72	1.07
Headdum (female headed=1)	0.12	0.33
Lenrmg (years)	5.32	3.89
Tothhincm	5374.97	2209.63
Totpay	2231.13	1074.55
Landdum (Own land=1)	0.74	0.44
Pooldum (Pool=1)	0.86	0.35
SLI (current)	0.65	0.16

Appendix 22

Table A22-1: Percentage Distribution of Ever Married Women by Number of Children

No. of children	RMG workers		Control group	
	Children ever born	Children surviving	Children ever born	Children surviving
None	32.7	37.4	8.2	10.2
1	32.2	31.0	26.5	31.6
2	22.8	21.6	21.4	25.5
> 2	12.3	9.9	43.9	32.7
All (no.)	100	100	100	100

Note: N= 171 for working and N=98 for control women. Percentages may not add to hundred due to rounding.

Table A22-2a: Percentage Distribution of RMG Workers by Children Ever Born & Age Group

Women's Age Group (years)	None	1 Child	More than 1 Child	All Women (no.)	Average no. of Children Ever Born
Up to 19	76.2	23.8	0.0	21	0.24
20-24	45.8	42.4	11.9	59	0.68
25-29	20.0	40.0	40.0	45	1.29
29+	8.7	15.2	76.1	46	2.29
All	32.7	32.2	35.1	171	1.22

Note: Percentages refer to absolute number of women in the penultimate column.
Chi-sq statistic 71.6 with 6 df. Significant at 0 percent (no expected cell value less than 5).
All the group means in the last column are statistically different from each other at 1 percent probability.

Table A22-2b: Percentage Distribution of Control Women by Children Ever Born & Age Group

Age Group (years)	None	1 Child	More than 1 Child	All Women (no.)	Average No. of Children Ever Born
Up to 24	19.4	47.2	33.3	36	1.33
Above 24	1.6	14.5	83.9	62	3.42
All	8.2	26.5	65.3	98	2.65

Note: Percentages refer to absolute number of women in the penultimate column.
Chi-sq statistic is 27.0 with 2 degrees of freedom significant at 0 percent (one expected cell value less than 5).
The group means in the last column are statistically different from each other at 1 percent probability.

Appendix 23

Procedure for Estimation of Incomes of Family Members from LFS Data

The LFS data contain information on age, sex, education and occupation of all members of a household. The data also indicate where the family is located. Using these data, the first step was to estimate the income for 97 by adjusting the observed income in LFS for 95 using suitable wage inflation indicators. These were 12 percent for manufacturing, 10 percent for construction and 8 percent for all others or general wages. The estimated income for 97 was then regressed upon the characteristics of the income earners in LFS using the following general formula:

Ln(inc97) = f(lnager, lnagersq, sex, eddum1, eddum2, ocpdum1, ocpdum2, ocpdum3, ocpdum4, Capital)

The variable definitions are as follows:

Inc97 = income in 1997

Ager = completed age in years in 1995 plus 1.5 (to reflect that those in end 1995 would be 1.5 years older in mid-1997);

Eddum1 = education dummy 1 (for schooling up to primary level=0; 1 otherwise)

Eddum2 = education dummy 2 (for schooling 6-10 years =0; 1 otherwise)

Ocp1 = occupation dummy 1 (manual except domestic = 0; 1 otherwise)

Ocp2 = occupation dummy 2 (skilled worker = 0; 1 otherwise)

Ocp3 = occupation dummy 3 (self-employed except vendors = 0; 1 otherwise)

Ocp4 = occupation dummy 4 (clerical = 0; 1 otherwise)

Sex (female =0; male =1)

Capital (those living in Dhaka =1; 0 otherwise).

The age was recomputed to reflect that in mid-1997, when my sample survey was undertaken, respondents in LFS survey were 1.5 years older than when they were interviewed under LFS. So to use the LFS information correctly, their age had to be adjusted.

Once the regression equation was estimated, the characteristics of the workers and their family members from my sample survey were inserted into the equation to estimate the income of the respondent women and their family members.

Appendix 24

Concepts for a Hazard Analysis

Probability of an event: Let X be a continuous random variable. Then probability of occurrence of X at time t is given as P(t). Obviously the maximum probability that X can have is 1.

Survival probability: This is the probability of non-occurrence of X at time t. Thus, if survival probability is S(t), then S(t) = 1 – P(t).

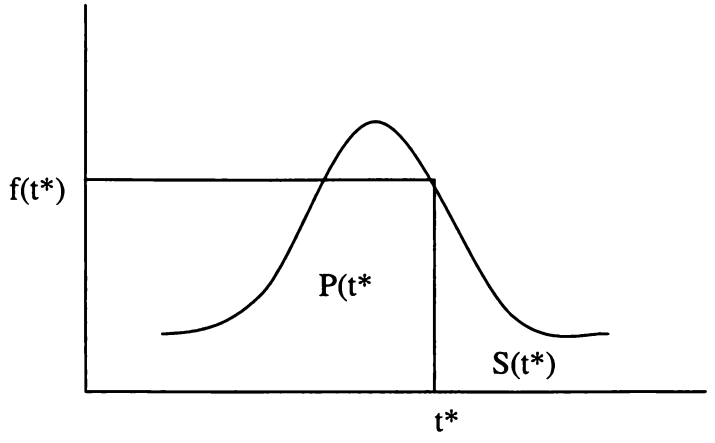

Figure 1: Probability Distribution of X over time, t.

If the above graph portrays a probability distribution of X, then P(t*) is the region under the curve to the left and up to t = t*. S(t*) is the area under the curve to the right of t = t*.

Hazard rate: This may be conceptualised as the unobserved rate at which events occur. This is obtained as a ratio of the instantaneous probability of X* (which is given by the length of perpendicular at t*) and the survival probability at time t. Thus hazard of X at time t is given as

$$h(t) = f(t) / S(t).$$

There is thus a relationship between the survival probability and the hazard rate. Note that hazard rate is not a probability. So its value may be any positive value up to infinity. For example if h(t) = 1.5, it means that 1.5 events take place per unit of time. Thus one event takes place per 0.67 (= 1/1.5) units of time. It may be noted that depending on the discipline, the hazard rate is called simply the hazard,

the hazard function, the transition intensity or the transition rate and is typically symbolised as h(t), λ (t) or r(t). But they are all the same.

In general the hazard rate represents the degree of risk of experiencing the event at each point in time. Thus, high hazards mean shorter duration of time prior to the event. Thus, a hazard rate of 3.2 compared to 1.5 mean that in the former case, the event occurs earlier than in the second case.

Parametric, non-parametric and semi-parametric methods: In a parametric model, the hazard rate changes according to some known distribution. This is not the case with Life Tables and Kaplan-Meier analyses. In such cases, no assumption is made about such a distribution. However, if the investigator is interested in how the hazard changes over time, some idea of the underlying time-distribution is needed. In such cases, these models are called "parametric hazard models". Usually, three types of distributions are used extensively, the exponential, the Weibull and the Gompertz. The difference between them is the way time enters as a variable in the equation (Allison: 1984, p. 24-25).[201]

The semi-parametric method is due to Cox (1972). This is intermediate between the parametric and the non-parametric methods, where the emphasis is on the factors that influence hazard rather than on the manner in which hazard changes over time. The Cox model does not include the influence of time (prior to the experience of the event). Thus, the hazards for various individuals remain constant over this time. Between any two individuals they remain fixed ratio. This is why it is also called a "proportional hazards model".

In summary, I use the proportional hazards model or its non-proportional variant when interested in finding the way explanatory variables (called "covariates" in the event history literature) influence the hazards of experiencing the event. If the interest is in how hazards change over time, a parametric model may be used (Griffin: 1995, p. 319-320).

[201] Thus, for the exponential distribution, time has no role in determining hazard. In Gompertz distribution, log of hazard is linearly dependent on absolute time. In the Weibull distribution, the log of hazard depends linearly upon log of time. See Allison (1984, p.24-25).

Baseline hazard: Base line hazard is the hazard rate that would occur independent of the explanatory variables or covariates. Thus, one does not observe fecundity of an individual woman but it is known that some women have a higher a propensity to conceive while others have a lower propensity. The hazard rate for conception due to fecundity can then be taken as the base line hazard. This can also arise from other unobservables, which will be discussed later.

Continuous and discrete time models: Should time be measured as a discrete variable and the hazard rate for that time period be analysed? Or, should this be measured as an instantaneous variable? There are several *ad hoc* rules for this. In any case, the estimation of the discrete models do not need any new type of statistical/econometric technique (a logistic regression sometime suffices), but may be a tedious exercise because the data have to be prepared in a specific manner before analysis (Griffin: 1995, p. 330). In the continuous time case, no special preparation of the data is required. Griffin (1995, p. 331) has observed that the choice between a discrete and a continuous time model is often based on a rule of thumb. More importantly, the discrete model may exhibit a downward bias in the standard errors of the estimated coefficients. Thus, what may appear as statistically significant may in fact not be so. Thus, the results may suggest the wrong policy conclusions. Given the ease of data analysis, I therefore opt for a continuous time analysis.

In a continuous time model, the shape of the distribution of the base line hazard may be used or it may be ignored. The Cox semi-parametric, proportional hazard model ignores this and concentrates rather on the behaviour of the covariates in determining the hazard rate. But this model has one disadvantage related to ties. A tie is the proportion of respondents at risk who are actually experiencing the event. The Cox model is sensitive to ties. A rule of thumb in the case of ties is that if there are no more than 5 percent ties in any given time interval, then, a continuous time model is appropriate. If the proportion is no more than 15 percent for a few and lower for most others, a continuous time model is adequate (Griffin: 1995,p. 329-330). In the present case, for ever married workers in RMG, the proportion of ties higher than 15 percent was observed only in three years. I therefore use the continuous model to analyse the data in this case.

Appendix 25

Table A25-1: Descriptive Statistics of Variables Used in Regression Equations for Explaining Health Status

Variables used in equations	Mean	Std. Deviation
Ghealth: In good health last 3 months (Yes=1; 0 otherwise) workers	0.17	0.38
Ghealth: In good health last 3 months (Yes=1; 0 otherwise) control	0023	0.42
Sickdum: Sickness leave dummy last month (sick=1; 0 otherwise)	0.11	0.31
Sickleav: days leave taken due to own sickness (number)	0.51	2.00
Age: Age of respondent (years)	23.28	6.35
Agesq: Age squared (years)	581.95	342.90
Livesize: Total family size	3.58	1.98
Sizedum: Family size (up to 2 = 1; 0 otherwise)	0.35	0.48
Sizedum2: Family size (3 –5 = 1; 0 otherwise)	0.49	0.50
Mardum: Marital dummy (ever married=1; 0 otherwise)	0.66	0.47
Landdum: Land owned dummy (own=1; 0 otherwise)	0.74	0.44
Migdum: Migration dummy (migrant=1; 0 otherwise)	0.90	0.31
Eddum1: Education dummy 1 (Up to 5 years=1; 0 otherwise)	0.58	0.49
Eddum2: Education dummy 2 (6-10 years=1; 0 otherwise)	0.25	0.43
Ocpn1: Occupation dummy1 (Manual = 1; 0 otherwise)	0.18	0.39
Ocpn2: Occupational dummy 2 (Semi-tech/technical =1; 0 otherwise)	0.58	0.49
Headdum: Family headship dummy (Female headed=1; 0 otherwise)	0.12	0.33
Pooldum: Pooling dummy (Pool earnings=1; 0 otherwise)	0.86	0.35
Slumdum: Slum dummy (Live in slum=1; 0 otherwise)	0.12	0.33
Elecdum: Electricity dummy (Have access = 1; 0 otherwise)	0.90	0.30
Hsedum1: Housing dummy 1 (Brick-built=1; 0 otherwise)	0.19	0.40
Hsedum2: Housing dummy 2 (Partly brick-built =1; 0 otherwise)	0.60	0.49
Sandum: Sanitation dummy (sanitary latrine =1; 0 otherwise)	0.84	0.37
Kitdum: Kitchen dummy (Separate kitchen =1; 0 otherwise)	0.82	0.38
Fueldum: Cooking fuel dummy (Gas-electricity=1; 0 otherwise)	0.84	0.36
Tvdum: TV ownership dummy (Own = 1; 0 otherwise)	0.38	0.49
Raddum: Radio-two-in-one dummy (Own =1; 0 otherwise)	0.53	0.50

Appendix 25

Table A25-2: OLS Regression Explaining Days of Sickness Leave (Workers)

Explanatory variable	Coefficient	t-statistic (absolute)
Personal characteristics variables		
Age (years)	0.21	1.48
Square of age (years)	-0.003	1.21
Marital status dummy	0.08	0.24
Migrant dummy	0.22	0.52
Educated up to primary (V) dummy	0.83**	2.37
Educated up to mid-level (VI-X) dummy	0.41	1.04
Family characteristics variables		
Family size (number)	-0.06	0.78
Family owns land dummy	0.30	0.97
Pooling of earnings dummy	-1.10**	2.56
Female-headed family dummy		
Quality of life characteristics variables		
Lives in slum dummy	-0.12	0.28
Electricity dummy	0.90**	2.01
Live in brick-built house dummy	-0.26	0.57
Live in partly brick-built house dummy	-0.50	1.34
Use sanitary latrine dummy	-0.25	0.60
Has separate kitchen dummy	-0.42	1.19
Use gas/electricity for cooking dummy	0.20	0.52
Own TV dummy	0.23	0.80
Own a radio or two-in-one dummy	-0.02	0.06
Constant	-2.72	1.29
Adjusted R – sq	0.07	
F-statistic	2.06***	
N of observation	256	

Dependent variable: Number of days absent in the work place due to own illness.

Note: ***, ** and * indicate statistical significance of the particular statistic at 1, 5 and 10 percent probability respectively.

Appendix 25

Table A25-3: Tobit Estimates of Days of Sickness Leave (Workers)

Explanatory variable	Coefficient	t-statistic (absolute)
Personal characteristics variables		
Age (years)	0.65	0.48
Square of age (years)	-0.008	0.631
Eddum1 (up to primary =1)	5.44	0.21
Eddum2 (VI-X =1)	2.70	0.54
Ocpn1 (manual =1)	2.25	0.57
Ocpn2 (skilled/semi-skilled=1)	5.49	0.12
Family characteristics variables		
Livesize- family size (number)	-1.00*	0.09
Landdum- family owns land =1	4.18*	0.08
Pooldum (pool earnings =1)	-5.52**	2.22
Quality of life characteristics variables		
Elecdum (Electricity access=1)	4.81	0.18
Hsedum1 (Live in brick-built house=1)	1.97	0.44
Hsedum2 (live in partly brick-built house=1)	-2.10	0.33
Constant	-27.31**	1.96
Psedo R – sq	0.12	
Log likelihood	-144.03	
N of observation	258	

Dependent variable: Days of sick leave taken

Note: ***, ** and * indicate statistical significance of the absolute t statistic at 1, 5 and 10 percent probability respectively.

Appendix 25

Table A25-4: Ordered Probit Regression Explaining Health Status (Worker)

Explanatory variable	Coefficient	Wald-statistic
Personal characteristics variables		
Age (years)	0.09	0.42
Square of age (years)	-0.001	0.31
Marital status – ever married	0.10	0.09
Marital status – never married (ref)	-	-
Migrant	0.16	0.12
Non-migrant (ref)	-	-
Educated up to primary (V)	1.27**	6.25
Educated up to mid-level (VI-X)	0.89*	2.82
Highly educated (beyond X) – (ref)	-	-
Family characteristics variables		
Family size (1-2 persons)	0.30	0.52
Family size (3-5 persons)	0.15	0.15
Family size (more than 5 persons) (ref)	-	-
Family owns land	0.51	2.58
Family owns no land (ref)	-	-
No pooling of earnings	0.94***	7.54
Pool earnings (ref)	-	-
Female-headed family	0.13	0.11
Male-headed family (ref)	-	-
Quality of life characteristics variables		
Lives in slum	0.17	0.24
Do not live in slum (ref)	-	-
Have electricity	0.74	2.05
Have no electricity (ref)	-	-
Live in brick-built house	0.42	1.10
Live in partly brick-built house	-0.06	0.03
Live in thatched house (ref)	-	-
Use sanitary latrine	-0.16	0.20
Use unsanitary latrine (ref)	-	-
Has separate kitchen	-0.25	0.74
Has no separate kitchen (ref)	-	-
Use gas/electricity for cooking	0.16	0.18
Use firewood/kerosene for cooking (ref)	-	-
Own TV	0.25	0.86
Do not own TV (ref)	-	-
Own a radio or two-in-one	-0.22	0.75
Do not own a radio or two-in-one (ref)	-	-
Threshold 1 (No sick days)	5.18**	6.22
Threshold 2 (1-3 days)	5.70***	7.49
Threshold 3 (> 3 days) (ref)	-	-
Model fitting information		
-2 log likelihood	185.82	
Chi-sq (model)	34.97**	
McFadden pseudo R-sq	0.16	
N of observation	256	

Dependent variable: Number of days sick in 3 groups; Zero days, 1-3 days and above 3 days

Note: ***, ** and * indicate statistical significance of the particular statistic at 1, 5 and 10 percent probability respectively.

Appendix 25

Table A25-5: Factors (including health) Explaining Differentials in Earnings

Explanatory vars	Earnings/hour	Earnings/month
Eddum1 (primary=1)	- 0.21**	0.28
	(2.34)	(2.71)
Eddum2	- 0.10	- 0.18
(Mid-secondary=1)	(0.91)	(1.38)
Lenrmg	0.18***	0.15***
	(7.50)	(5.51)
Lenrmg-sq	- 0.006***	- 0.005***
	(5.45)	(4.06)
Eddum1xLenrmg	- 0.04***	-0.03**
	(2.67)	(1.58)
Eddum2xLenrmg	- 0.03*	0.15
	(1.85)	(0.76)
Sickdum (Sick leave taken =1)	-0.04	- 0.14
	(0.17)	(0.51)
Constant	1.38***	7.38***
	(16.55)	(75.87)
Adj. R-sq	0.417	0.289
F-statistic	22.67***	15.80***
N	213	255

Note: Figures in parentheses are absolute t-statistics. ***, ** and * indicate statistical significance at 1, 5 and 10 percent of probability respectively.

Appendix 26

Table A26-1: Incidence of Events and Decision-making by Working Women

Type of decision	If occurred last 12 months (N)	If consulted (N)	Role of respondent (N)		
			Main	With spouse	Family
Land transaction	31	27	1	13	1
Cattle sale/purchase	28	24	2	10	3
Goats sale/purchase	19	19	1	8	3
Poultry sale/ purchase	83	68	8	29	8
Ornaments sold/bought	74	70	14	37	6
Utensils purchase	215	200	49	100	16
Dress making	216	206	47	109	17
Male child's education	78	68	8	34	10
Girl child's education	72	65	9	32	8
Child's treatment	136	122	12	67	15
Son's marriage	9	8	-	1	6
Daughter's marriage	7	6	-	2	3
Loan repayment	29	28	9	10	4
House repair	7	7	3	1	-

Table A26-2: Incidence of Events and Decision-making by Control Women

Type of decision	If done last 12 months (N)	If consulted (N)	Role of respondent (N)		
			Main	With spouse	Family
Land transaction	10	10	-	4	2
Cattle sale/buy	4	4	-	1	1
Goats sale/buy	4	4	-	2	1
Poultry sale/buy	36	35	2	17	6
Ornaments	32	31	-	18	4
Utensils	107	98	12	64	7
Dress making	102	96	5	68	8
Male child's education	46	42	1	26	7
Girl child's education	43	40	1	27	6
Child's treatment	93	86	5	63	9
Son's marriage	5	5	-	3	-
Daughter's marriage	5	5	1	3	-
Loan repayment	14	12	2	9	-
House repair	10	9	3	2	-
Rickshaw purchase	1	1	-	-	-

Appendix 27

Construction of Econauto and Seauto Indices

The basic procedure for construction of Socauto scores described in Appendix 12 has been used for construction of the same for Econauto. The major difference is that here all the individual scores of all the four activities have been given equal weight and averaged for arriving at the aggregate Econauto. There is another difference. The "not applicable" answers have been given a value of unity as it has been found that these are not really missing values but that the women do not have to be involved in these activities if they do not wish to be. The resulting Econauto scores have a range from zero to unity.

Seauto is the average of Socauto and Econauto. Thus, I have given equal weights to the social and economic autonomy.

Appendix 28

Table A28-1: Constraints to Women's Freedom (Percent of response - workers)

Require permission	Buying provisions	Shopping	Dress purchase	Going to places of amusement	Talk to non-kin men	Mix with neighbours	Talk to non-family male relatives
Always	9	10	17	19	26	20	23
Sometime	17	25	28	13	23	22	34
Not required	36	44	34	18	50	56	41
N/A	38	20	20	50	1	2	2
All	100	100	100	100	100	100	100

Note: N= 260. N/A : not applicable. See text for explanation.

Table A28-2: Constraints to Women's Freedom (Percent of response - control)

Require permission	Buying provisions	Shopping	Dress purchase	Going to places of amusement	Talk to non-kin men	Mix with neighbours	Talk to non-family male relatives
Always	9	11	26	21	25	18	24
Sometime	12	20	25	11	27	18	32
Not required	41	39	25	16	46	62	41
N/A	38	29	24	52	2	2	3
All	100	100	100	100	100	100	100

Note: N= 130. N/A : not applicable. See text for explanation.

Appendix 28

Table A28-3: Means and Standard Deviations of Variables in Regression Equations for Autonomy Scores

Variables	Mean	Standard deviation
Age	23.28	6.35
Age-sq	581.95	342.90
Livesize	3.58	1.95
Pooling dummy	0.86	0.35
Marital dummy	0.66	0.47
Child dummy	0.41	0.49
Socauto	0.62	0.39
Econauto	0.76	0.28
Seauto	0.69	0.27

Appendix 29

Table A29-1:
Definitions of Variables for Regressions in Table 8.4.3-1 in Section 8.4.3

Variable	Definition
Changed residence	0 - No 1 - Yes
Age	1 - Up to 24 years (young) 2 – above 24 years (mature)
Migratory status	1 - Migrant 2 - Non-migrant
Length of migration	1 - Up to 3 years (recent) 2 - 4-5 years (mature) 3 - 5+ years (old)
Job type	1 - Manual 2 - Semi-skilled/Skilled 3 - Managerial/supervisory
Income	1 - Up to Taka 1000 (low) 2 - Taka 1001 – 3000 (mid) 3 - Taka 3000+ (high)
Marital status	1 - Ever married 2 - Never married
Child up to 5 years	1 - Present 2 - Not present
Child between 6- 10 years	1 - Present 2 - Not present
Children	1 - Present 2 - Not present
Child pressure	1 - No child 2 - Child 10 years or more only 3 - Child 6-10 years only 4 - Child up to 5 years and between 6-9 years
Family size	1 - 1-2 persons (small) 2 - 3-5 persons (medium) 3 - 5+ persons (large)

Appendix 29

Table A29-2: The Independent and Dependent Variable Relationships for Change of Residence

Independent variable	Effect on dependent variable
Age	?
Migration	+
Marriage	+
Job type	+
Income	?
Children up to 5 years present	+
Children in 6-10 years present	?
Children present	+
Child pressure	+
Family size	+

Note: 1. '?' means *a priori* indeterminate in favour of change
2. '+' means positive relationship in favour of change

Appendix 30

Table A30-1: Means and Standard Deviations of Variables for Regressions to Explain "Improved"

Variables	Mean	Standard deviation
Eddum1 (Up to primary=1)	.59	.49
Eddum2 (6-10 yrs of education=1)	.24	.43
Manual2 (Present job manual=1)	.18	.38
Skill2 (Present job skilled/semi-skilled=1)	.58	.49
Madum (Ever married=1)	.69	.46
Landdum (Own land=1)	.73	.44
Migdum (Migrant=1)	.90	.29
Childdum (Has child=1)	.44	.50
Improved (Financial situation improved=1)	.53	.50

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