Principal Investigator: Jonathan Simon
Application No.: 97-005
Title of Study: Economic Status and Fertility Choices Among Residents of Dhaka Slums

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population: 
   (a) Ill subjects □ Yes □ No □ Analysis
   (b) Non-ill subjects □ Yes □ No □ Analysis
   (c) Minors or persons under guardianship □ Yes □ No □ Analysis

2. Does the study involve:
   (a) Physical risks to the subjects □ Yes □ No □ Analysis
   (b) Social Risks □ Yes □ No □ Analysis
   (c) Psychological risks to subjects □ Yes □ No □ Analysis
   (d) Discomfort to subjects □ Yes □ No □ Analysis
   (e) Invasion of privacy □ Yes □ No □ Analysis
   (f) Disclosure of information damaging to subject or others □ Yes □ No □ Analysis

3. Does the study involve:
   (a) Use of records, (hospital, medical, death, birth or other) □ Yes □ No □ Analysis
   (b) Use of fetal tissue or abortus □ Yes □ No □ Analysis
   (c) Use of organs or body fluids □ Yes □ No □ Analysis

4. Are subjects clearly informed about:
   (a) Nature and purposes of study □ Yes □ No □ Analysis
   (b) Procedures to be followed including alternatives used □ Yes □ No □ Analysis
   (c) Physical risks □ Yes □ No □ Analysis
   (d) Sensitive questions □ Yes □ No □ Analysis
   (e) Benefits to be derived □ Yes □ No □ Analysis
   (f) Right to refuse to participate or to withdraw from study □ Yes □ No □ Analysis
   (g) Confidential handling of data □ Yes □ No □ Analysis
   (h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure □ Yes □ No □ Analysis

5. Will signed consent form be required:
   (a) From subjects □ Yes □ No □ Analysis
   (b) From parent or guardian (if subjects are minors) □ Yes □ No □ Analysis

6. Will precautions be taken to protect anonymity of subjects □ Yes □ No □ Analysis

7. Check documents being submitted herewith to Committee:
   * Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
   * Protocol (Required)
   * Abstract Summary (Required)
   * Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
   * Informed consent form for subjects
   * Informed consent form for parent or guardian
   * Procedure for maintaining confidentiality
   * Questionnaire or interview schedule

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:
1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Ctte for review.

We agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

Principal Investigator: Jonathan Simon
Trainee Investigator: □
International Centre for Diarrhoeal Disease Research, Bangladesh

RESEARCH PROTOCOL

1. Title of Project (Do not exceed 60 characters including spaces and punctuations)
   
   Economics Status and Fertility Choices among Residents of Dhaka Slums

2a. Name of the Principal Investigator(s) (Last, Middle, First):
   
   1. Simpson, Jonathon
   2. Baqui, H. Abdullah

2b. Position / Title
   
   Project Director
   Project Director

2c. Qualifications
   
   MPH, BSc
   MBBS, MPH, DrPH

3. Name of the Division/Branch / Programme of ICDDR,B under which the study will be carried out.
   
   Health & Population Extn. Division / MCH-FP Extension Project (Urban)

4. Contact Address of the Principal Investigator
4a. Office Location:
   
   1. ARCH Project, Harvard University
   One Elliot St., Cambridge MA02138
   2. MCH-FP Extension Project, HPED

4b. Fax No: 880-2-871568
4c. E-mail: abbaqui@cholera.bangla.net
4d. Phone / Ext: 2504

5. Use of Human Subjects

Yes [ ]
No [x]

5a. Use of Live Animal

Yes [ ]
No [x]

5b. If Yes, Specify Animal Species

N.A.

6. Dates of Proposed Period of Support

(Day, Month, Year - DD/MM/YY)

N.A.

7. Cost Required for the Budget Period

7a. 1st Year ($) : 4490
   2nd Year ($) : Total Cost ($) 

7b. Direct Cost ($) : 4490
   Total Cost ($) 

8. Approval of the Project by the Division Director of the Applicant

The above-mentioned project has been discussed and reviewed at the Division level as well by the external reviewers. The protocol has been revised according to the reviewer's comments and is approved.

Syed Shamim Ahsan
Sr. Adviser & Director, HPED

Signature

Date of Approval

9. Certification by the Principal Investigator

I certify that the statements herein are true, complete and accurate to the best of my knowledge. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. I agree to accept responsibility for the scientific conduct of the project and to provide the re-

10. Signature of PI

Date: 7 April 97

RECEIVED: 18 AUG 1999
CHECKLIST FOR SUBMISSION OF PROPOSALS TO THE RESEARCH REVIEW COMMITTEE (RRC)

[Please tick (✓) the appropriate box]

Has the proposal been reviewed, discussed and cleared at the Division level?

Yes  [✓]

No  [ ]

If 'No', please clarify the reasons: ____________________________

__________________________

Has the proposal been peer-reviewed externally?

Yes  [✓]

No  [ ]

If the answer is 'NO', please explain the reasons: ____________________________

__________________________

Has the proposal scope to address gender issues?

Yes  [ ]

No  [✓]

If the answer is 'YES', have these been adequately incorporated in the proposal. Please indicate:

__________________________

__________________________

Has a funding source been identified?

Yes  [✓]

No  [ ]

If the answer is 'YES', please indicate the name of the donor:  

__________________________

SELF FINANCING
5. Whether the proposal is a collaborative one?

Yes [ ]
No [ ]

If the answer is 'YES', the type of collaboration, name and address of the institution and name of the collaborating investigator be indicated:

W/DR A.H. BAGUL, HEALTH AND POPULATION
EXTENSION DIVISION / MCH-FP EXTENSION
PROCT (URBAN)

6. Has the budget been cleared by Finance Division?

Yes [ ]
No [ ]

If the answer is 'NO', reasons thereof be indicated: SELF FINANCED / EXTERNALLY

7. Does the study involve any procedure employing hazardous materials, or equipments?

Yes [ ]
No [ ]

If 'YES', fill the necessary form.

Date

[Signature of the Principal Investigator]
Economic Status and Fertility Choices among Residents of the Dhaka Slums

Jonathon Simon
Harvard Institute for International Development (HIID) and Department of Population Sciences and International Health
Harvard School of Public Health

Dr. Abdullah H. Baqui
Urban MCH-FP Extension Project
ICDDR,B

March 1997
Abstract

Urban slum populations are increasing rapidly worldwide. Economic globalization and current patterns of economic development are accelerating the urbanization trend. Even largely agricultural economies like Bangladesh saw their urban populations double between 1970 and 1995. Migration is one of the profound dynamics of global development with both positive and negative impacts on societies. Given their growing importance in demographic, economic, and political terms, it is surprising how few household level studies of their economic conditions and fertility practices have been conducted. Urban populations are usually treated either as a homogenous mass, assumed to be better-off in general than their rural counterparts, or divided into 2 categories --- the urban well-off and the urban poor. The aim of this investigation is to use an existing urban, low-income, household level data set develop a more specific descriptions of the economic and fertility practice variability within urban households by considering various aspects of the migration experience of the household. The study will assist in efforts to focus health and development interventions on the households at greatest risk.

Using the concept of an “epidemiologic polarization” within the health transition, this study hypothesizes that there is far greater “economic polarization” and variability than usually assumed in the “poor” urban households in a low-income country. We further hypothesize that some of the variation is a function of their migration experience (timing, cause, source) and length of residence in the urban area. These migration factors provide additional information to our understanding of low-income households which are usually described in terms of the levels of educational attainment, household composition, or occupational experience.

We also hypothesize that additional information on the female headed households, usually believed to be the poorest of the poor and therefore selected for interventions, can be generated by stratifying female-headed households in terms of the migration variables described above. In addition, we will measure the variability in the impact of female-headedness on economic status as a function of the cause (widowhood compared to divorce/desertion), the age of the woman, and whether an economically active son lives within the household.

Thirdly, we hypothesize that the migration experience and urbanization process rapidly changes the fertility patterns and practices among women of reproductive age. Recent studies argue that the rapid fall in the total fertility rate in Bangladesh is a function of increased prevalence of the use of modern contraceptives. While this appears well-documented for rural Bangladeshi populations, we question whether the contraceptive use patterns are different for urban women and whether these differences can be related to their migration experiences. We will investigate whether the fertility transition in the low-income Dhaka urban population is more related to other proximate determinants of fertility.

In describing potential variability among urban low-income households, there are three related aims of this study:
I. To describe differences in the socioeconomic status of urban slum households as a function of selected migration factors in addition to educational levels and occupational experiences;

II. To develop a model describing variability in the economic condition of female-headed households accounting for the potential impacts of age, cause, and household composition variables, and;

III.A Using Bongaarts’ proximate fertility model, to decompose the fertility experience within the Dhaka slums to determine the contribution of specific proximate determinants to the fertility reduction in this population.

III.B To describe the fertility pattern of Dhaka slum dwellers as related to economic status and migration history.

The study uses the Urban Health Extension Project (UHEP) Urban Surveillance System (USS) data set as the primary source of information on slum households in Dhaka. This data set, collected in quarterly rounds between 1991 and the end of 1993, consists of approximately 8000 households in 243 survey clusters. It was collected from five thana in Dhaka and is meant to be representative of the urban slum population of Dhaka. For comparison purposes, we will use the BDHS. This is a national representative sample of 9,640 ever-married Bangladeshi women. We will report the national estimates as well as the urban sub-sample estimates that come from the 1466 urban women interviewed. The BDHS urban sub-sample is not representative of the urban slum populations.

Detailed investigation of urban slum populations are important for understanding the impacts on national development of this rapidly increasing sub-group of the population. Better understanding of the variations within these households will offer the opportunity to improve the range and targeting of international development assistance and national social welfare programs. Additional analysis of the UHEP data set may assist ICDDR, B and USAID/Dhaka in further improvements in their urban MCH-FP program activities.
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Research Aims and Questions

Introduction

This study seeks to better understand the economic and reproductive lives of families in the urban slums of Dhaka. Globally, a period of extensive and rapid urbanization is upon us while our development studies literature is still focused more on the rural populations. Though rural dwellers are numerically superior at the current time, rural-based households will continue to diminish in importance in understanding development dynamics for the next fifty years. Urban areas are growing at rates that far exceed rural population growth rates and will continue to do so for the foreseeable future. Attempts to staunch the flow of populations to the large cities have, by and large, irrespective of the policy mechanisms used, been ineffective to date (World Bank, 1991).

New forms of organization of households are already in place. Long-term labor migrations to the Gulf States from South Asia have changed the compositions, fertility patterns, and economic performance of many households in South Asia. Households that are seasonally rural and only part-time urban are also increasing in numbers. These are direct results of the increasing globalization of the world economy. Further globalization of production will stimulate more movement in this direction. Many of these transient households will be housed, for at least some of the time, in the massive urban slums that have developed around almost every major city in the countries with low income economies. Understanding the economic condition and fertility behaviors of these slum households, and being better able to target social welfare and development programming resources are important to attempts to mitigate the impacts these global changes inflict on vulnerable sub-populations and may improve the equity aspects of the economic growth these changes promise.

We are asking three inter-related questions: 1) Does the migration experience of households relate to relative deprivation in the urban slums; 2) What are the factors that predict whether a female-headed household becomes one of the “poorest of the poor”; and 3) What are the fertility preferences and practices of the women in the Dhaka urban slum and how do these compare with national and rural estimates as calculated by the BDHS?

I. Migration, economic development, and urban slum households

Dichotomous descriptions of a population as “urban” or “rural” or urban citizens as “slum-dwellers” versus non-slum dwellers potentially obscure important differences in the populations being described. We hypothesize that there exists greater socioeconomic variability within populations, located within closely defined boundaries, that often inappropriately are categorized using over-broad dichotomous descriptors.

The assumption that urban slum-dwelling populations can be adequately described as a fairly homogenous mass of poor people is faulty and limits our abilities to understand the
economic development and social change dynamics within urban low-income households. Using the concept of an "epidemiologic polarization" (Frenk, J. et al 1989) we will investigate whether there is an analogous economic polarization even within the "poor" or "urban" in Bangladesh. Within the slums, some households seem to do better, accumulate some limited assets, make investments to further income generating opportunities (either in productive assets and/or education), and make investments in the improvement of their housing. Other households stagnate economically or, may be pushed further towards absolute poverty by urban slum life. We usually know little about the fertility practices among these household, and why they vary. The aggregation of the measurements of economic development and social practices into broad categories hides the richness of the detail of the economic and fertility behaviors of households with differing household compositions, educational levels, occupational experiences, migration factors, and social networks in urban slums.

The first section of the proposal will attempt to disaggregate the UHEP urban slum households to identify important differences (if any) in their economic condition. The UHEP Urban Surveillance System (USS) data will be stratified by a selection of migration and social factors that we hypothesize are related to the economic variability within the community. Four major categories --- migration factors, household composition with special attention to female-headed households, occupation experience/choice, and educational attainment --- will be investigated. We are limited by the data collected in the USS and therefore this study can not fully address the issue of social networks and their impact on employment, household survival, and development in Dhaka (see Ahmad, 1994).

Overall Objective: To describe potential differences in the socioeconomic status within urban slum households as a function of selected migration and social factors.

Specific Objectives: 1. To describe the impact of migration experience, household composition, occupation, and education on socioeconomic status.

Research Question 1. What are the economic effects of different migration experiences?

Variables
A. Timing of Migration effect - Do the households of recent migrants differ economically from the households of earlier migrants and or Dhaka born urban resident households?

B. Location of Migration effect - Do rural-urban migrants differ economically from urban - urban migrants?

C. Birth Origin effect - Do households of rural born lag behind households of urban born controlling for length of time since migration?
D. Cause of Migration effect - Do migrant households forced into the migrant stream due to environmental reasons (floods, etc) differ from migrant households who select the timing of their migration for economic and/or family reasons?

Research question 2. What are the economic effects of various household compositions?

Variables

A. Composition effect - Are households with joint/extended families wealthier or poorer than households with “nuclear” families in the urban slums?

B. Size effect - Are larger numbers of people (within the economically productive ages) within the household associated with wealthier (more opportunities to generate income) or poorer (more mouths to feed) households?

C. Sex distribution effect - Are households with more men than women in the economically productive ages wealthier than households with fewer men than women in the same age range?

D. Dependency ratio effect - Are households with higher dependency ratios poorer than households with lower dependency ratios?

Research question 3. What are the economic effects of different occupational experiences?

Variable

A. Which occupations are associated with increased economic status of the urban slum households?

Research question 4. What are the economic effects of different educational level of head and female respondent in the urban slum households?

Variables

A. Educational effect: Is increased levels of male educational attainment associated with increased economic status of the household?

(Note: These household composition, occupational, and educational relationships are not the primary focus of the study in large part because the relationships are well-described over and over, but need to be included as control variables for the regression analyses that follow)
II. Female-headed households - Age, cause, and household composition effects

Research question 1. What are the economic effects of being a female headed household?

Variables

A. Female-headedness effect - Are female headed households economically poorer in the Dhaka slums?

B. Cause of female headedness effect - Are women who have been "deserted" worse off than widows?

C. Interaction with age effect - Is this relationship affected by the age of the women, i.e. are older widows/divorcees/deserted better or worse off than younger widows/divorcees/deserted?

D. Interaction with presence of son effect - What impact does the presence of a biological son within the household have on the economic status of the female headed household?

III. Fertility preferences and practices in urban slum households

As documented by the Contraceptive Prevalence Surveys of the 1970s and 1980s (Ministry of Health and Population Control 1978, MHPG 1983, Mitra 1987, Mitra, et al 1993) the 1989 Bangladesh Fertility Survey (Cleland, et al, 1993, Cleland, et al, 1994), the BDHS (BDHS, 1994), and the Matlab data collected by the ICDDR,B (Khuda, 1996), Bangladesh has experienced a rapid and accelerating decline in fertility since the second half of the 1970s. The estimated TFR has declined from approximately 6.3 births per woman in the 1970s to an estimated 3.4 births per woman in the early 1990s (BDHS, 1994). The rate of fertility decline appears constant across all age groups and both rural and urban areas of Bangladesh. Fertility differentials still exist. Urban fertility is approximately thirty percent lower than rural fertility and geographical differences in the TFR remain but these differentials have not appeared to change much as reported by the various surveys and censuses undertaken since the 1970s.

The success (in terms of reduction of the TFR) of the Bangladesh family planning program challenges the conventional wisdom. Bangladesh, it was believed, should continue to experience high fertility rates. The two principal factors associated with rapid reduction in fertility --- economic growth (in terms of GDP) and increasing levels of female education --- were largely missing in the Bangladesh case. An extensive literature developed in the 1970s and 1980s that argued that countries like Bangladesh would continue to have high levels of fertility
regardless of level of input into the family planning programs due to these structural factors (see Demeny, 1975 for example).

To the surprise of the critics, the family planning program appears to have worked. Government commitment, family planning workers going door-to-door as part of a vertical program, extensive use of media, especially radio, better contraceptive method mix including the use of menstrual regulation to abort suspected pregnancies up to eight weeks, and tremendous levels of external donor support have all been given credit for the success of the program. All this progress occurred during a period of relatively little overall macroeconomic economic growth in the society. Although age at marriage (and age at first conception) has increased somewhat (BDHS, 1994), and some reviewers claim female education and employment was more important than generally realized (Khuda, 1996), the overwhelming sense of the reviewers is that the family planning program efforts and specifically the provision of modern contraceptives were the key factors in the rapid reduction in the fertility rate (Cleland, 1994).

In most other countries of the world, the utilization of family planning services has been greater in urban areas rather than in rural communities. Often this is associated with increased access to family planning services, greater removal from cultural constraints to the use of contraceptives which are reported to be greater in rural areas, and increased mean levels of education in the cities (United Nations, 1987). The urban differentials persist despite the paradox that breast feeding duration and intensity (and associated post-partum amenorrhea) often declines among urban populations and the putative risk of a pregnancy should therefore increase (Bongaarts, 1978, Bongaarts, 1983).

The success of the overall family planning efforts in Bangladesh, particularly among rural women, shows that the program is extensive and effective. Given the program’s success, we would expect that urban populations would show even greater utilization of services and reduction in fertility. The BDHS raises the question of why the rate of reduction of urban fertility is not different from the rural rate. One hypothesis may be that the urban fertility preferences and practices are the social norm and the extensive family planning program efforts closed the rural-urban gap by removing the access to services problem rural dwellers often faced. An alternative hypothesis is that the urban population has far greater variability in utilization of family planning services and the aggregate fertility rate reduction hides the practices and preferences of sub-populations.

Poorer and more recent migrants are usually claimed to behave more like a natural fertility populations with less regard for the urbanization and the economic factors that reportedly influence fertility. It may be that the urban slum population, which has been increasing in absolute numbers during the period discussed above, maintains fertility practices and preferences similar to their rural counterpart and that their increasing presence in the urban statistics is masking far greater reductions in fertility among the urban lower middle, middle and upper income classes. Disaggregating the urban slum households from the overall urban data may
provide a better sense of where family planning efforts are most successful and give some
direction to focusing additional program efforts on to reach the urban slum sub-population that
may not be utilizing family planning services as extensively.

A. Bongaarts' proximate determinants of fertility model

Overall Objective: Using Bongaarts' proximate fertility model, to decompose the fertility
experience within the slums to determine the contribution of specific
proximate determinants to the fertility reduction.

Specific Objectives: To estimate the proximate determinants indices of the fertility model
(proportion of females of reproductive age that are married, the
contraceptive use prevalence and estimates of contraceptive effectiveness,
the prevalence of menstrual regulation/induced abortion, and breast
feeding duration as a proxy for postpartum infecundability). To use the
proximate determinants model to calculate the estimated TFR among slum
dwelling women and compare to the TFR estimated by the UHEP survey.

Research Questions: 1. What proportion of females of reproductive age in the urban slums
under UHEP surveillance are currently married (defined as stable sexual,
unions and therefore assumed to be at risk for pregnancy)?

2. What methods of contraception are being used urban slum dwelling
women? What is the prevalence of use by various methods? What are the
age-specific utilization rates and method mix? What are the parity specific
utilization rates?

3. What is the prevalence of menstrual regulation/induced abortion?

4. What is the mean duration of breast-feeding among urban slum
dwelling women?

5. How does the expected TFR calculated using the Bongaarts' model
compare to the measured TFR in the UHEP survey?

B. Fertility preferences and practices of families in the urban slums of Dhaka

Overall Objective: To describe differences in the fertility practices and preferences of families
living in urban slum households of Dhaka and to compare these indicators
to national and urban sub-sample estimates derived from the Bangladesh
Demographic and Health Survey (BDHS).
Specific Objectives: 1. Describe other fertility practices, preferences, and birth outcomes among urban slum women of reproductive age and compare each indicator to BDHS data.

Research Questions: 1. What are the fertility practices of urban slum dwelling women of reproductive age (using standard demographic indicators)?

2. What are the fertility intentions of urban slum dwelling women of reproductive age?

3. What are the child bearing practices among urban slum dwelling women (last child born)?

Specific Objectives: II. To describe differences in the fertility practices and preferences as a function of migration and social factors

Research Questions: 1. What are the effects on fertility practices and preferences of differing migration experiences?

A. Timing of Migration effect - Are the fertility behaviors of recent migrants different from earlier migrants or Dhaka born urban resident households?

B. Birth origin effect - Do households of rural born have different fertility behaviors compared to urban born households?

2. What is the impact of differing socioeconomic status within the urban slums on fertility preferences and practices?

3. What is the impact of differing educational levels within the urban slums on fertility preferences and practices?

Specific Objectives: III. To describe the fertility patterns among urban slum households as a function of economic status and length of residence in Dhaka.

Research Questions: 1. Choice - Do poorer or more recent migrants choose to have a subsequent child more often than less poor or longer term Dhaka residents?

2. Timing - Do poorer or more recent migrants choose to have a subsequent child sooner than less poor or longer term Dhaka residents?
3. Choice to use contraceptives - Among non-users at baseline registration, who starts to use contraceptives?

4. Timing of contraceptive use - Among non-users at baseline registration who subsequently adopt use, when do they start to use contraceptives?
Background Literature

Section One

The Scale of Global Urbanization

"In the next two decades, the world will undergo, as a result of the urbanization process, the most radical changes ever in social, economic, and political life. (Rome Declaration on Population and the Urban Future, 1980)." Looking back, from a vantage point three-quarters of the way through the momentous period, the statement reads as a bit rhetorical and hyperbolized. But the massive scale and the global scope of the urbanization dynamic during this last quintile of the 20th century has, in fact, changed the face of the planet. The following section will review the trends in urbanization based largely on the 1990 population projections of the United Nations Department of International Economic and Social Affairs.

Urban areas have long been recognized as a double edge sword for economic development. Their concentration and control over global wealth and innovation is unquestioned. Increased urbanization, as a key element of the modernization process, is usually seen by both Marxist and neoclassical economist as absolutely essential for economic development. Long before urban poverty, pollution, and violence were topics for conferences on the challenges of development, however, cities were recognized as posing special challenges to development. Aristotle foresaw the futures of New York as well as Karachi, when he wrote that he doubted if "a very populous city can...ever be governed." The impacts of the tremendous disparities in wealth that characterize the great cities of the world today was also discussed by Aristotle. "Where some people are very wealthy and others have nothing, the result will be either extreme democracy or absolute oligarchy, or despotism will come from either of those extremes" (Politics, 4.1296a). Political concerns aside, the challenges of providing a decent standard of living, clean water, clean air, adequate food and health care, and employment opportunities vex most governments responsible for the world's rapidly growing cities.

The nineteenth and twentieth centuries have, in a short two hundred years, witnessed a tremendous change in the level of urbanization. (see Table 1). The changes in levels of urbanization are staggering. The urban population is projected to grow from 2 billion in 1985 to 3.2 billion by 2000 and on to an estimated 5.5 billion people by the year 2025. Between 1995 and 2000, over seventy percent of global population increase will occur among urban populations.

Most of this increase has occurred in the low income countries of the world. Annual urban growth rates in the low income countries of over three percent were common in the 1970s and 1980s and have slowed somewhat in the 1990s. Urban growth rates were, on average, less than one percent in the high income countries.
Table 1: Change in global levels of urbanization in the 19th and 20th centuries

<table>
<thead>
<tr>
<th>Date</th>
<th>% population in urban areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>3%</td>
</tr>
<tr>
<td>1920</td>
<td>14%</td>
</tr>
<tr>
<td>1950</td>
<td>25%</td>
</tr>
<tr>
<td>2000 (est.)</td>
<td>50%</td>
</tr>
<tr>
<td>2025 (est.)</td>
<td>61%</td>
</tr>
</tbody>
</table>

Data: United Nations Department of International Economic and Social Affairs, 1991

The increases are due to multiple factors. Rural-to-urban migration is only part of the story and may be diminishing in importance as the main factor on a global scale. Natural increase in the urban population is increasing as the major dynamic of population growth. This is due to both further secular declines in the mortality rates and to the demographic pressures of increased fertility as many of the urban residents, especially recent migrants, are in the peak child-bearing age ranges. In addition, some of the population growth is associated with the expansion of the boundaries of urban areas incorporating areas that previously were considered rural.

Though urbanization is occurring in towns, small cities and major urban areas, it is the growth of the so-called megacities that is of greatest interest. The United Nations defines a megacity as having a population greater than 8 million. In 1950, only New York City and London qualified as mega-cities. In 1990 the world had 21 mega-cities, defined by the World Bank as larger than 10 million people. Seventeen of the twenty-one were in low income countries (World Bank, 1991). By the year 2000 there are expected to be 28 mega-cities with 22 of them located in low income countries.

Poverty within these megacities is extensive. Slums and squatter communities are a consistent feature throughout the world. By 2000, one-quarter of the world population will consist of the urban poor. This represents one to one-and-a-half billion people. In 1985, an estimated 306 million people were considered to be living in absolute poverty. This was an increase of seventy-three percent since 1970. One-third of the urban population in low income countries will be living in slums. Of these poor people, over one-half will live in Asia, many of them on the subcontinent in India, Pakistan and Bangladesh.

Bangladesh’s urban population as a percent of total population more than doubled from eight to seventeen percent between 1970 and 1993 (WDR, 1995). Other sources estimate the
urban population as more than twenty percent of total population (Thwin, 1996). The average annual urban population growth rate was over five percent during that period. Dhaka, the capital city has approximately 7 million people. This is almost forty percent of the country’s urban population and six percent of the total population in 1990. Approximately seventy percent of the nation’s slum dwellers are reported to live in Dhaka. These people are the population of interest for this study.

Section Two

Theories of Migration and Urbanization

As early as the 1880s, scholars were trying to determine the “laws” that governed migration. Ravenstein (1885, 1889) was the first to detail the economic motivations for changing locations and tried to explain the impact of distance and “step” or stages of migration in understanding internal migration patterns. His work on the economic determinants of migration, though broadly expanded upon using modern analytic methods, was the basis for most all of the scholarship on migration until fairly recently.

The “modern” neoclassical economics literature on migration derives almost in its entirety from the “dual sector economy” models of Arthur Lewis from the late 1950s. All of these models focus on the differences between urban and rural wage levels. Some attempt to incorporate “migration costs or employment conditions, but all assume migration decisions are individual actions to secure income maximization. Migration is understood as a rational choice based on a cost-benefit calculation by the individual migrant. It is not until the “new economics of migration” work of Stark and Bloom (1985) that the assumption of individual action was challenged in favor of models that used the household as the unit of analysis and the motives as family risk reduction and responses to other market failures in addition to failures in the labor markets themselves.

Lewis (1954, 1958) was attempting to identify the “take off” point in development that Rostow’s “take-off into self-sustaining growth” theory postulated (Rostow, 1956). Lewis assumes that the migration process is fundamentally the pull of labour from the traditional subsistence agricultural sector where the workers marginal contribution to output approaches zero into the modern industrial sector. This “reserve army” of cheap agricultural labor freely moves to the city and accepts a wage similar to the rural subsistence wages they left behind. The Lewis model assumes full employment in the modern sector, i.e. that all the migrants are (instantaneously) absorbed into industrial sector wage jobs. The model assumes away population growth or changes in agricultural productivity changing the dynamics for rural-urban movement. It also fails to account for urban unemployment and the emergence of the urban informal sector. Its assumption that the urban wage paid to the recent migrant will be close to the
rural institutional (subsistence) wage ran up against the empirical result that urban wages are often 50 - 100% higher than the institutional rural wage.

Ranis and Fei expanded on the Lewis model by trying to mathematically identify the take-off point. They were trying to construct a economic development model whereby “balanced growth” would allow agricultural productivity to expand and the rural sector was not solely the source of surplus labor for the industrial sector. They attempted to determine the “critical minimum effort” needed to get the economy on a permanent growth trajectory. The expansion of the industrial sector was largely dependent on capital accumulation and technological change.

Ranis and Fei still assume that all the migrants are absorbed into jobs in the urban industrial sector. They decompose the postulated labor absorption by the modern industrial sector into the effects of capital accumulation, innovation, and the specific innovations relative degree of “labor-using bias.” They argue that if the effects of capital accumulation and innovation exceed the effects of population growth, such that the supply of surplus labor is eventually exhausted, then the economy will be successful in its development effort.

The next major advance in modeling migration decisions emerged from the work that tried to account for the failure of the urban labor markets to absorb all new migrants. In order to understand the persistence of migration amidst high levels of urban unemployment in East Africa, Todaro formulated a adoption of the Lewis, and Fei and Ranis models (Todaro 1969, Harris and Todaro, 1970). Todaro moved the theory forward by building a model where it was the “expected wage” rather than the wage itself that was the key to understanding migration. This change allows for the existence of the urban unemployed and a situation of chronic underemployment.

In the Todaro construct, the urban wage differential is adjusted by the probability of finding a job. The migrant is now an atomistic utility maximizer as before, but, in his/her cost-benefit calculation, he has to factor in the probability of securing a modern sector job within a reasonable time frame. If the urban unemployment rate is low and the urban economy is expanding the waiting time would probably be short. Conversely, in periods of low urban job growth and high urban unemployment, the probability of employment decreases, lengthening the waiting time. In Todaro’s model, workers spend the waiting time either unemployed or engaged in activities in the informal sector. If the waiting period is too long for the individual migrant, or she has exhausted her resources in waiting, the migrant would return to the rural economy where the subsistence costs within an extended agricultural family are assumed to be lower.

The model still assumes that workers who stay in the urban sector eventually find employment in the formal wage labor job market. Todaro’s model does not account for permanent participation in the so-called “informal sector.” The other major assumption of the model that does not appear to be consistent with empirical results is that selection of migrants for the jobs that become available is a random process that allows each migrant an equal probability
for being selected. The role of family, village, and other social networks is omitted from his analysis.

The policy implications of the Todaro model are interesting. He discusses the paradox that urban job creation will probably increase, rather than decrease, urban unemployment. The creation of additional urban jobs will stimulate greater rural-urban migration as the perceived probability of securing a job increases faster than the actual number of jobs created. Similarly, improvements in the quality of life for the urban unemployed or informal sector workers (like slum improvements or site/service schemes) will stimulate greater migrants flows as the "costs" or "risks" associated with the migration are diminished. Todaro argues for a set of development policies that foster rural development over further investments in the urban sector such as incentives to site industries in rural areas and improvements in the terms of trade for agriculture. His work, and the subsequent huge derivative work, was highly influential in development planning in the 1970s and 1980s.

The persistence of large migration flows and the inability of rural development strategies to fundamentally slow the process of urbanization led to some new thinking about the reasons migrants decide to relocate. The "new economics of migration" literature from the 1980s (Stark and Levhari, 1982, Stark, 1984, Stark and Bloom, 1985, Katz and Stark, 1986) brought the family and the household into the central position in the decision-making. In these models, the probability of household survival is maximized if risks can be minimized through diversification of family resources. One family member working in local agriculture, another working in the urban industrial sector, and some other member of the household working overseas and sending remittances is seen by the household decision maker as a far better strategy for the household as a whole over the long-run. It may not maximize utility for each member individually. At any single point in time, the rationality of one of the individual parts may not make perfect sense but when viewed through the lens of household long-run stability and reproduction through risk minimization, it appears as a sound strategy. In this model, a family member may migrate to the urban areas and face unemployment but still be a good investment for the family even if the remittances are from the rural household to the urban family member for some period of time rather than following the usual assumption that the urban family member is sending capital back to the rural areas.

This body of work looked at other market failures in addition to the urban labor market and how these posed risks that the household could mitigate through selective migration. A lack of crop insurance leads families to self-insure by sending at least one economically active member to off-farm employment. Similarly the variability in crop prices (a futures market failure) encourages sending a family member off to protect against a disastrous loss of income. Having household members in a variety of employment activities in different markets also increase the chances that the family will be able to accumulate or access investment capital.
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This diversification to minimize risk and access new income sources also potentially allows increases in income relative to the households in the sending community that do not diversify. The new economics of migration argues that it is relative wealth rather than absolute wealth which is more important (Stark and Taylor, 1989, Stark and Taylor, 1991, Stark and Yitzhaki, 1988). In an economy where income inequalities are increasing, migration makes sense even if the gains in absolute income for the household are zero or even negative, if the migration makes the household relatively less worse off than the neighboring households.

The theoretical work on migration is rich, but there are few detailed empirical studies of the migrants and of the migration process. Williamson (1988) using the historical data on urbanization during the Industrial Revolution in England (and trying to see if it was consistent with the current thinking on migration in the low income countries) showed that natural increase in the urban population usually becomes more important than the number of new migrants themselves. The increasing importance of natural increase relative to absolute numbers of migrants is due to falling mortality rates overall and the demographic effects of the migrant stream self-selecting for young adults who face both the lowest mortality risk and have the highest fertility rates.

In a detailed study of the urban labor markets in Malaysia, Mazumdar (1987) documented that specific rural areas send disproportionate numbers of workers to the cities and that in some cases these flows may be sector specific. Banerjee, studying migrants to New Delhi, tried to understand the job search process and determined that the probability of employment was not a process of random selection as assumed by Todaro, but was heavily influenced by contacts in the urban area. Access to prior information about urban sector jobs was crucial to actually securing a position. Current employees were acting as “screeners” for the employers to assist them in identifying reliable, available workers at relatively low cost to the firm.

A recent Ph.D. thesis submitted to the Food Research Institute at Stanford University extended Banerjee’s work by investigating the job search process of migrants to Chittagong and Dhaka in Bangladesh (Ahmad, 1994). The empirical data collected by Ahmad completely undermines the probabilistic notion of securing a job that is a key assumption of all the migration theories going back to Lewis. In his data, rural workers only migrate after they are relatively assured of employment. The employment opportunities are identified by family, friends, or people from the same geographic area and the news is sent back to the rural community. In his data, 98% of the migrants were employed within three months of moving to Dhaka or Chittagong. The risks, in terms of employment, were minimal, and the financial risks were minimized by the high prevalence of living in with the person/family that assisted the migrant in securing the job. Banerjee found that 85% of the newly arriving migrants in his New Delhi sample also were employed within 6 months.

Ahmad’s thesis also showed that internal labor market mobility was quite limited. Unlike Todaro’s assumption that the informal sector employment was temporary while the migrant
waited for a formal sector position to open, Ahmad argues that once a worker is placed in an occupational category in a specific sector, there is relatively little movement to new positions in other occupational categories in other sectors.

The idea that the job search occurs prior to the actual migration to the urban area is new. Ahmad argues that, in Bangladesh, where rural poverty is extensive and often absolute, the families of potential migrants can not afford and will not risk the costs of migration based on the probability that a job will be found. The expenses are too great up front so networks have developed that remove the necessity for this capital. The networks come about through “historical accidents” and once formed are largely self-reinforcing. This finding accounts for the depth of relations in specific industries between the “sending communities” and specific occupations and work places.

Family/social ties are still strong enough that the urban members of the network are willing to assume to costs of finding the jobs and housing the migrants at least initially. They also ensure that the new arrival works hard so as to maintain their reputation within the work place and to continue to be allowed to identify additional workers for the employer when the opportunity arises. Migration, in this case, appears as a tripartite arrangement among the migrant, the intermediary (often a relative), and the employer.

There are some issues to be considered in interpreting Ahmad’s findings. His survey was not based on a randomly selected set of urban households. He interviewed at places of employment and therefore has selected the migrants who are already employed. He attempted to measure the impact of this potential bias and reports that in a small sample of 200 households, found an unemployment rate of only four percent.

Who then are the urban unemployed if not the recent migrants pounding the tarmac looking for the job that Todaro believes they have probabilistically factored into their individual cost-benefit analysis? Ahmad surmises that the unemployed are past migrants or longer-term urban residents whose employment opportunity was lost due to changes in the economy or specific events. These people are unable to find new employment opportunities due to the lack of mobility in the Dhaka labor market.

Our study will attempt to disaggregate sub-groups within the Dhaka slums. If his idea that longer term residents face more unemployment due to a longer period of exposure to the risk of losing one’s job, rather than less unemployment as would be expected from theories that assume longer term residents build up social capital and establish urban networks that protect them from unemployment, the USS data set should be able to answer this question. We have the advantage of a large sample from the slums, their occupational status, and the ability to stratify the residence by length of time in Dhaka. This disaggregation of the slum population into sub-groups that may be experiencing very different economic and fertility experiences is the key to the study. Further research on the economic situation of migrants in the urban slums of Dhaka,
(as this study proposes) from a less biased sample, may identify important factors in understanding the experiences of migrants.

Section 3

The Proximate Determinants of Fertility and the Fertility Transition in Bangladesh

Description of the Bongaarts model

Forty years ago, Davis and Blake (1956) detailed eleven factors, divided among three categories, that they believe were the proximate determinant of fertility. Proximate, or intermediate determinants, are the factors through which economic and social factors operate to influence fertility levels. They grouped their determinants into factors affecting exposure to intercourse, exposure to conception, and factors affecting the gestational period and successful parturition. They were unaware, at the time, of the effects of breast-feeding on postpartum infecundability, and omitted this important area from their classification scheme. Their model was used by many scientists to develop complex reproductive models, where measurement issues often made it difficult to quantify the links between the proximate determinants and fertility.

Bongaarts (Bongaarts, 1978, Bongaarts and Potter, 1983, Bongaarts, 1987) adapted the work of Davis and Blake to develop a simplified, measurable model that allowed the impact of the proximate determinants on fertility to be quantified. Bongaarts grouped the proximate determinants into three categories --- exposure factors, deliberate marital fertility control factors, and natural marital fertility factors.

The exposure category was the simplest, and easily measured. Exposure was measured as the proportion of women of reproductive age who experience sexual intercourse on a regular basis. For ease of measurement, Bongaarts suggests limiting the exposure group to women in stable sexual unions and assumes that the rates of extramarital sexual intercourse are sufficiently low that they are unimportant in demographic terms. In countries like Bangladesh, at this time, this assumption is considered valid. Other countries, at other times, might need to adjust for the levels of extramarital sex.

The second major category was deliberate marital fertility control factors. This consists of contraception and the use of induced abortion. Contraception was measured as any method used to reduce the risk of conception. Sexual abstinence and both male and female sterilization were considered as part of contraception. The use of induced abortion attempts to capture both legal and illegal abortion. This is the proximate determinant for which it is most difficult to
attain accurate data. Some users of the model have chosen to omit the index of abortion as data is not available or reliable (Singh, 1985). This may not be appropriate for Bangladesh where abortion is reported to be widespread. Menstrual regulation, which is vacuum extraction of the uterine contents and is legal during the first eight weeks of amenorrhea, is fairly common. Of the unwanted pregnancies, which are estimated to be twenty-five percent of the last pregnancies in urban areas, approximately 14% may result in illegal abortions or menstrual regulation (BDHS, 1993 - 1994).

The third grouping of the proximate determinants are factors affecting natural marital fertility which is defined as the number of children a married woman would have she experienced the age-specific fertility rates throughout her reproductive career and remained married during this whole period. Five factors influence natural marital fertility --- lactational infecundability, frequency of intercourse, sterility, spontaneous intrauterine mortality, and the duration of the fertile period. Of these, only lactational infecundability is considered important. There is little cross-country data on coital frequency. Sterility, intrauterine mortality, and the fertile period are biologic factors outside the volitional control of the individual or couple.

The index of lactational infecundability is calculated from the ratios of average birth intervals without and with lactation. The birth interval with lactation is the sum of the biological contributions to the birth interval plus the effects due to breast-feeding. In Bangladesh, where mean breast-feeding duration is long (approximately 19 months) the natural fertility may be reduced by as much as half due to lactational infecundability.

Validity of the Bongaarts model

Bongaarts and Potter attempted to validate the model empirically. The model was fit to 41 differing populations. The populations were from developing and developed countries, and also from historical data sets of populations. In these tests, 96% of the variability in the observed TFR was accounted for by the model (Bongaarts and Potter, 1983).

Other researchers also have provided empirical tests of the proximate determinants model. The United Nations Department of International and Social Affairs used the Bongaarts model on 29 developing country data sets from the World Fertility Survey. In their work, only 70% of the variability in the observed TFR was explained by the indices (UN 1987). Whether this difference is due to the restriction to developing country data sets, or imbedded within problems with the data itself is unclear. Though the differences in the ability of the model to predict the TFR are large in these two examples, the model still appears robust in explaining a substantial amount of the variation in TFR. Given its ease of application and the limited data it requires, the difference may not be important or argue against the application of the Bongaarts' proximate determinants model to other populations or sub-groupings within populations.
Singh, Casterline, and Cleland (Singh, 1985) building on Bongaarts work, attempted to analyze the proximate determinants according to educational and residential sub-groups within twenty-nine WFS country data sets. They chose education and urbanization levels for sub-analysis because they have been shown to be related to fertility levels and many believe both are key elements of modernization. They made a series of empirical comments on the fertility inhibiting effects of the specific proximate determinants excluding the index for induced abortion where they were limited by the data available to them.

Their decomposition of the proximate determinants analysis appears to find a consistent effect whereby the potentially fertility enhancing effects caused by the reduction in postpartum infecundability due to shortened duration of breast-feeding in the more educated and more urbanized populations is more than offset by a countervailing effect of increased age at marriage and increased use of more effective contraception. It is the balance between these variables that provides the overall fertility reduction and their analysis attempts to quantitate the relative importance of each factor.

The showed an overall negative relationship between increased levels of education on fertility but, interestingly, it appears from there analysis that going from no education to a few years of primary schooling may increase fertility. They surmise that this finding may be due to lower coital frequency among the uneducated as a result of polygamy in Africa and extended households limiting privacy in Asia. More or longer separations due to labor migrations, greater levels of secondary infertility, and longer periods of postpartum abstinence are also given as potential reasons.

Rural-urban effects were weaker than the educational effects. In countries where the family planning programs have made successful efforts to increase access to contraceptive commodities for the rural population (Indonesia, possibly Bangladesh though their WFS data does not exhibit this), the index of contraception was not highly variable between the urban and rural sub-groups while the index of infecundability was more varied. Because the offsetting effect of contraception was less marked, the overall effect appears less than for the educational sub-groups.

Singh, et al. add an important methodological point to the empirical results reported above. They interpret their data as failing to replicate Bongaarts work on the close relationship between observed and predicted TFRs. They caution against discarding the other proximate determinants as relatively unimportant. They also state that “systematic analysis of differences in the intermediate variables in different socio-economic groups and their role in the generation of fertility differentials is rare” (p. 131).

Though they caution against the potential oversimplification that comes from Bongaarts focus on the four main variables, they make some similar simplifying assumptions. Most germane to this study is the assumption that urban populations are homogenous in their fertility
patterns. Though they distinguish “major urban areas” from “other urban areas” they assume consistency within these categories. It is possible that the fertility inhibiting effects of the specific intermediate determinants have differential effects among sub-groupings within the “urban” population of interest.

Moreno (1991) is also a critic of the Bongaarts model though for reasons quite different from Singh. His critique starts from questioning the baseline from which Bongaarts compares the effect of the model. Moreno questions the assumed total fecundity of 15.3 children against which all the indices are multiplied. In his paper, however, he does not explain the reasons for his doubt, nor offer an alternative explanation. If there is substantial country-specific variation in the total fecundity, then Bongaarts results could not be compared cross nationally, but I am unclear why Moreno believes this kind of variability would be profound.

Moreno continues by reviewing some Monte Carlo simulation models presented at a IUSSP Conference in 1984 (Mencken) and an unpublished Ph.D. dissertation (Reinis, Univ. Of Pennsylvania) to argue that Bongaarts estimates are imprecise. Bongaarts model (and Mencken’s simulation work) require an assumption that each proximate determinant is independent. Reinis analytically linked contraception and duration of marriage based on an assumption that fertility control efforts change according to the duration of the marriage (women change their family planning practices once their “desired family size” is attained) and reported that the Bongaarts model yielded poor estimates, overestimating the impact of later age of marriage and underestimating the impact of contraceptive use. Moreno concludes that “the evidence presented suggests the elegance and simplicity of Bongaarts’s model is achieved at the expense of demographic and statistical rigour” (p. 337). There are other, more mathematically complex models, used to estimate fertility (Page, 1977, Coale & Trussel 1974) but none are as easy to apply or provide the quick programmatic guidance that the Bongaarts model appears to offer.

Fertility Transition in Bangladesh

Fertility change in Bangladesh is a fact, not an artifact of data problems from the successive surveys since the 1970s. Whether this change occurred as a rational response to fundamental changes in the mode of production in Bangladesh where the advantages of high fertility are no longer available particularly in urban areas (Caldwell, 1978) or due to the effectiveness of the family planning program in making contraceptive commodities widely available (Cleland, 1994), or some combination of the two is a fertile area for debate. Wherever one places themselves in the debate, however, the fact remains that from 1975 to 1990, the change in the TFR was from 7.0 to 4.5 births per woman in her reproductive career. Urban fertility is lower than rural fertility, some geographic variability is seen (Chittagong Division’s rate of decline in TFR is slower), and all socioeconomic groups appear to have participated in the change. “The poor, the landless, and the illiterate have reduced their fertility at the same time and to the same extent as the better-off, the landed, and the literate” (Cleland, p.57).
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Cleland, et al. discusses a number of the alternative theories attempting to explain the fertility reduction they document. In opposition to Caldwell’s or Cain’s theses, changes in the demand/need for children (labor utility of children theories), changes in educational levels, increased levels of female and adult literacy, increased labor force participation by women, changes in the household risk environment, both in terms of agricultural production and mechanisms of risk reduction through social security, and overall socioeconomic development are reviewed and found not to be major contributors to the observed changes in fertility. Cleland, et al. believes the increased use of contraceptives is the key to the reduction, not other proximate determinants like increasing age at marriage, longer periods of lactational amenorrhea, or extensive use of menstrual regulation (induced abortion).

The one non family planning program contribution to the fertility reduction that the authors acknowledge was a long-run trend of decreasing mortality and the concomitant increase in the number of children surviving to adulthood. At the beginning of the 20th century, a woman in Bangladesh would have to bear seven children in order for 2.8 children to survive to adulthood (Cleland, p. 61). By 1960, 5.1 of the seven live born children would survive to adulthood (defined as age twenty). They postulate this led to a reappraisal of desired family size and behavioral change consistent with the new preference which are reflected in the rapid reduction of fertility levels by the 1980s. They interpret the large family sizes of the 1950s, 1960s and 1970s as historical aberrations, rather than the Bangladesh family size norm. If we believe this argument, and accept that the adjustment to the post WWII mortality decline takes twenty to thirty years to filter through the society, than Cleland’s main argument that the family planning program was the key to the success is questionable. This fundamental change in the demand/desire for children may be the driving force and the family planning program efforts, rather than being innovative, extensive, financially accessible, or culturally appropriate, may just be responding and riding along with larger societal forces.

The economic returns to children has a huge literature in economics and rural sociology. Caldwell’s work has been cited widely. Caldwell (1984) evaluated the labor needs of households as a factor in predicting fertility levels. Rural households with access to land require familial labor to meet the agricultural requirements. The tasks are age and gender related so a mixture of adults and children, males and females are preferred. If the family size is below five, the labor requirements demand exceptionally long hours of work from the fewer family members. Caldwell’s analysis is based on tradition view of household subsistence agriculture at low levels of technology. In this view, rural landless would be pushed to smaller family sizes due to the lack of need, or absorptive capacity, in the agricultural sector. Similarly, urban poor would also select for smaller family sizes for analogous reasons of limited economic returns to larger numbers of children per family.

Issues of social security are also considered important to understanding the fertility transition. Divorce and widowhood potentially are major problems for women in Bangladesh. In a patriarchal, patrilineal, and patrilocal society, a woman’s quality of life and even survival
may be largely related to the men in her life. Moderate to high fertility levels may be a rational response to the “risks” and vulnerabilities of women (Cain, 1979, Cain, 1981, Cain, 1983, Robinson, 1986, Cain, 1986). The BDHS reports seven percent of ever-married women were currently (at the time of the survey) either divorced/deserted or widowed (BDHS, 1994 p.19). The estimate for the USS urban slum population is eleven percent and surprisingly one in nine women aged between 15 and 49 had never married (Thwin, 1996 p. 17). The presence of a son in a female headed household, particularly if the son is economically active and still meeting his traditional filial responsibilities, potentially mitigates some of the negative consequences faced by a female headed household.

Most of the literature on the relation between education and fertility change has focussed on the educational level of the woman (see Cleland 1988 for example). This inverse relationship has been shown in many studies and consistently appears and is reported in the various Demographic and Health Surveys. The Bangladesh DHS reports a 33% difference in mean number of children born between women with no education and women with some secondary education (BDHS, 1994).

The mass education of children also has been implicated in fostering the fertility decline. Caldwell (1980) argues that it is the “primary determinant of the onset of the fertility transition” (Caldwell, p.225). Caldwell believes that investments in the education of children changes the social relations within the family and these changes result in changes in the economics of the family. It is the change in the wealth flows that stimulates changes in fertility behaviors.

Caldwell argues that education works through five mechanisms to stimulate fertility change. School attendance reduces the labor availability of the child. Not only is the child away from home for specified hours each day, but the child also becomes alienated from performing “traditional” chores. Secondly, education increases the cost of a child. The additional costs are both the direct costs of schooling as well as the indirect costs of the new “expectations” that come from the child participating in the external world of school. Third, schooling of the child shifts the value of the child from a present to a future producer and imposes upon the family the current costs of protecting the investment for the future. Fourth, schooling changes the focus from household production and traditional family based values to external production and “modern” values. These changes incur costs to the family. Last, Caldwell argues that school in low income, non-western countries are the major instrument for propagating western, middle class value that creates distance from the traditional family morality. This effects, taken together, reverse the wealth flow from child as generators of additional wealth for the household to child as net consumers of the household resources. Fertility reduction is the rational response to these changes in wealth flows.
Research Design and Methods

I. Study Setting - The urban population and slums of Dhaka

Bangladesh’s population in mid-1993 was estimated to be 115.2 million people. Of these people, approximately seventeen percent or 19.6 million lived in urban areas. Urban population growth rates were estimated to be as high as ten percent per annum in the late 1980s and early 1990s (Task Force on Bangladesh Development Strategies for the 1990s, 1991). Dhaka, the capital city, has borne the brunt of this rapid urbanization and has about forty percent of the urban population of the country (WDR, 1995).

Dhaka is one of the fastest growing urban areas in the world. Its population has grown from 1.7 million after the independence war in 1974 to approximately 7 to 8 million in 1995 (WDR, 1995). The rate of urban population growth has been three times the rate of population growth in the rural areas during the past twenty-five years. (Thwin A. et al., p.4) Researchers at the Centre for Urban Studies of Dhaka University (Islam, N. et al 1991) attribute the rapid growth to a mixture of high population growth rate overall (2.5 to 2.2% per annum, 1975 to 1991, BBS, 1993), expansion of the defined geographic boundaries of Dhaka for the 1981 census, and extensive rural - urban migration. Rural - urban migration appears to have been the main factor through the late 1970s. After that time, natural increase within the urban population assumed the primary role for population increase in urban Dhaka.

An estimated thirteen to fifteen percent of the urban population of Bangladesh live in slums (BDHS, 1993 and BBS, 1988). The slums of Dhaka account for approximately seventy percent of the total slum dwellers in the country. These numbers are probably under-estimates of the true population as the extent of under-enumeration in the large municipalities (SMAs) is estimated at almost nine percent (BBS, 1988).

II. Data Sets - The Urban Surveillance System (USS) and the Bangladesh Demographic and Health Survey (BDHS)

This research study will conduct secondary data analysis utilizing two data sets collected in the early 1990s — the Urban Surveillance System (USS) collected by the Urban Health Extension Project of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) [now called the Centre for Health and Population Research], and the Bangladesh Demographic and Health Survey (BDHS), 1993-1994 collected by Mitra and Associates under the authority of the Bangladesh National Institute of Population Research and Training (NIORT). Extensive documentation describing the data sets is available from the ICDDR,B and DHS/Macro International.
III. Preliminary Data Analysis Plan

Analysis plan for Part 1 - Migration, economic development and urban slum households

The analysis of the first section begins with an examination of the descriptive statistics of the sociodemographic variables listed in the four categories described earlier --- migration factors, household composition, occupation, and education. Some of these variables can be tabulated directly from the USS and BDHS data sets, while others will need to be constructed.

The data will be presented as frequency distributions and histograms. Contingency tables will be constructed to allow for comparing the means or proportions among different groups using the t-test (means) or chi-square test (proportions) as appropriate. The USS and BDHS data will be compared where identical/similar variables permit.

The outcome variable for section one is the socioeconomic status (SES) variable. Prior to fitting the models, we will evaluate the available information with the USS to determine whether it is possible to construct a SES variable that will capture potential economic variability across households with greater detail than the scoring system developed by USS to date. The USS and BDHS data sets collected information on household income, assets, and type and quality of building material. Using this information, we will construct a variable on a continuous scale by modifying the USS scoring of household goods system.

In preparation for the multiple variable linear regression analyses to follow, bivariate scatter plots of SES and each of the predictor variables from the five categories will be constructed. Where necessary, transformations of the predictor variable to improve the linearity of the relationship will be performed. Pearson product moment correlation coefficients or Spearman rank correlation coefficients will be estimated for the predictors and the outcome variable. Following Colton (1974), correlations > .25 (or < -.25) will be considered for inclusion in the regression models. As correlation coefficients are markedly affected by extreme values, we will check the transformed variable for outliers and consider deletion by re-estimating the correlation coefficients.

A series of models will be fit starting with the educational and occupational variables as they are known predictors and not the focus of the research questions. To this baseline model, the groups of variables for household composition, female headedness, and migration factors will be added either individually or in groups. These groups of variables will be added sequentially for form a nested set of models. Delta R² tests will be run for each additional model to evaluate the change in each models ability to explain the variability in the SES.

Diagnostics for collinearity will be calculated. A correlation matrix, Tolerance statistic, and eigenvalues will be estimated to determine whether there is a high correlation between independent variables. Where necessary, composite variables may be constructed. Residual
plots will be estimated to check for violations of the assumptions required for multiple regression analysis. Cook’s distance and deleted studentized residual plots will be estimated to identify influential data points which may have to be excluded from the final regression model.

Using the scoring system developed for the SES variable, we will categorize the households into very poor, poor, and less poor. In order to be able to predict the households that face abject poverty (very poor in our coding), we will estimate an ordered logistic regression model (Stata procedure OLOGIT) with the outcome variable being the categories of poverty (1, 2, 3). A similar process to fitting the models will be used as described in the multiple regression section above. A likelihood ratio $\chi^2$ test will be calculate to estimate the goodness of fit of the model. This test is only suggestive of the goodness of fit (Stata Manual, p.52).

Example equations:

Multivariable regression model:

$$Y = \beta_0 + \beta_1(HHCOMP) + \beta_2(FHH) + \beta_3(MIG) + \beta_4(EDUC) + \beta_5(OCC) + \epsilon$$

Where
- $Y =$ the estimated socioeconomic status (SES) of the household
- $\beta_0 =$ constant term
- $HHCOMP =$ $f$ (kinship, size, sex ratio, dependency ratio)
- $FHH =$ $f$ (female head, cause, age, age*cause, presence of son)
- $MIG =$ $f$ (timing, location, birth origin, cause)
- $EDUC =$ $f$ (HH head educ. level, female respondent educ. level)
- $OCC =$ (scaled on expected [usual and customary] income)
- $\epsilon =$ the error term representing unaccounted for variability

Maximum-likelihood ordered logit model

$$\log\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1(HHCOMP) + \beta_2(FHH) + \beta_3(MIG) + \beta_4(EDUC) + \beta_5(OCC) + \epsilon$$

Where
- $\pi =$ the estimated probability of being in abject poverty (SES code 1)
- $\beta_0 =$ constant term
- $HHCOMP =$ $f$ (kinship, size, sex ratio, dependency ratio)
- $FHH =$ $f$ (female head, cause, age, age*cause, presence of son)
- $MIG =$ $f$ (timing, location, birth origin, cause)
- $EDUC =$ $f$ (HH head educ. level, female respondent educ. level)
- $OCC =$ (scaled on expected [usual and customary] income)
- $\epsilon =$ the error term representing unaccounted for variability
Analysis plan for Part 2 - Female headed households: Age, cause, and household composition effects on socioeconomic status

The analysis of the second section is on a sub-sample from the full data set --- female headed households. The analytic procedures will be similar to those described above beginning with an examination of the univariate descriptive statistics of the sociodemographic variables --- female headedness, cause, son presence, and the interaction term cause* age. The outcome variable for this section is also the socioeconomic status (SES) variable. In addition, bivariate scatter plots of SES and the main effect variable (female headedness) and covariates will be constructed.

A series of models will be fit starting with the main effect of female headedness. To this baseline model, cause of female headedness, age of woman, and an interaction term crossing cause and age will be added individually. Delta R² tests will be run for each additional model to evaluate the change in each models ability to explain the variability in the SES.

Diagnostics for collinearity will be calculated. A correlation matrix, Tolerance statistic, and eigenvalues will be estimated to determine whether there is a high correlation between independent variables. Residual plots will be estimated to check for violations of the assumptions required for multiple regression analysis. Cook’s distance and deleted studentized residual plots will be estimated to identify influential data points which may have to be excluded from the final regression model.

Using the scoring system developed for the SES variable, we will categorize the households into very poor, poor, and less poor. In order to be able to predict the households that face abject poverty (very poor in our coding), we will estimate an ordered logistic regression model (Stata procedure OLOGIT) with the outcome variable being the categories of poverty (1, 2, 3). A similar process to fitting the models will be used as described in the multiple regression section above. A likelihood ratio ë test will be calculate to estimate the goodness of fit of the model. This test is only suggestive of the goodness of fit (Stata Manual, p.52).

Example equations:

Multivariable regression model:

\[ Y = \beta_0 + \beta_1(FHH) + \beta_2(CAUSE) + \beta_3(SON) + \beta_4(CAUSE*AGE) + \epsilon \]

Where

- \( Y \) = the estimated socioeconomic status (SES) of the female-headed household
- \( \beta_0 \) = constant term
- FHH = female headed household (Y, N)
CAUSE = reason for female headedness (never married, divorce, desertion, or widowhood)
SON = presence of a son or son-in-law of economically active age in the household
CAUSE*AGE = interaction term to capture age impacts on cause of female-headedness
e = the error term representing unaccounted for variability

Analysis plan for Part 3 - Fertility preferences and practices in urban slum households

Specific Objective 1 - Using Bongaarts' proximate determinants of fertility model, describe the fertility behavior of urban slum dwelling women and compare estimated TFR with observed TFR and with BDHS estimates of TFR.

Using USS and BDHS data, we will calculate the four indices (proportion married, contraception, induced abortion/menstrual regulation, and postpartum infecundability) used in the Bongaarts fertility model (Bongaarts, 1983) and then calculate the expected fertility.

Each index will be estimated using the following equations:

Index of marriage $C_m = \sum m(a) * g(a)/\sum g(a)$

where $m(a)$ is the age-specific proportion currently married
$g(a)$ is the age-specific marital fertility rate

Index of contraception $C_c = 1 - 1.08 * u * e$

where $u$ is the proportion of married women of reproductive age using contraception
$e$ is the average use-effectiveness of contraception

Index of induced abortion $C_a = \text{TFR}/\text{TFR} + .8 * (1 + u) * \text{TA}$

where we assume moderately effective contraception is practiced (.8 births averted by an abortion) and TA is the total average number of induced abortion a women will experience through the course of her reproductive period (assuming prevailing rates remain stable)

Index of postpartum infecundability $C_i = 20/18.5 + i$

where $i$ is the average duration of postpartum infecundability caused by breast-feeding or abstinence.
This decomposition of the urban fertility according to the proximate determinants and comparison to BDHS national averages or the WFS survey data that Cleland uses will allow us to indirectly assess whether the family planning program’s success in getting contraceptive methods out to the population holds true for the urban slum dwelling sub-population.

Specific Objective 2 - Comparison of fertility and birthing practices between the women in the urban slums (USS) and the national and urban estimates for Bangladeshi women (BDHS).

Descriptive summary statistics of the fertility and birthing practices of the women in the USS urban slum data set will be tabulated. Age-specific rates will be reported where appropriate. These statistics will be compared with comparable numbers from the BDHS data set using both the national estimates and the urban sub-sample estimates. T-tests and chi-square tests for evaluating whether there are differences in the means or proportions for the selected variables will be calculated.

Specific Objective 3 - Social and demographic predictors of fertility preferences

This section is focussed on investigating whether there is an impact on fertility preferences as a function of the migration experience of the household. The data on the impacts of migration on fertility will be presented as frequency distributions and histograms. Contingency tables will be constructed to allow for comparing the means or proportions among different groups using the t-test (means) or chi-square test (proportions) as appropriate.

For the regression analysis, the predictor variables are the length of residence in the Dhaka slum, cause, and origin of the migration and the control variables are socioeconomic status, parity, whether the last born child was male, women’s age and educational level. The outcome variables are both dichotomous variables (user of contraception and desire for more children) so logistic regression models will be used.

Example equations:

Model to predict use of a modern method of contraceptive:

\[
\log \left( \frac{\pi}{1 - \pi} \right) = \beta_0 + \beta_1(\text{momage}) + \beta_2(\text{parity}) + \beta_3(\text{educ}) + \beta_4(\text{son}) + \beta_5(\text{SES}) + \beta_6(\text{mtime}) + \beta_7(\text{mcause}) + \beta_8(\text{morig}) + \epsilon
\]

Where

- \( \pi \) = the estimated logit probability of being a modern contraceptive method user
- \( \beta_0 \) = constant term
- momage = age of mother
- parity = women’s parity
- educ = educational level of mother
son = whether last child born was male
SES = socioeconomic level (according to scoring system)
mtime = length of residence in Dhaka slum (four categories)
mcause = reason given for migration (from USS codes)
morig = migration origin location
ε = the error term representing unaccounted for variability

Model to predict the desire for additional children

\[
\log\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1(\text{momage}) + \beta_2(\text{parity}) + \beta_3(\text{educ}) + \beta_4(\text{son}) + \beta_5(\text{SES}) + \beta_6(\text{mtime}) + \beta_7(\text{mcause}) + \beta_8(\text{morig}) + \varepsilon
\]

Where

\( \pi \) = the estimated logit probability of desiring additional children
\( \beta_0 \) = constant term
momage = age of mother
parity = women’s parity
educ = educational level of mother
son = whether last child born was male
SES = socioeconomic level (according to scoring system)
mtime = length of residence in Dhaka slum (four categories)
mcause = reason given for migration (from USS codes)
morig = migration origin location
ε = the error term representing unaccounted for variability

**Specific Objective 4** - To describe the fertility choices and timing of women in the Dhaka slums as a function of economic status and migration history during the period 1991-93

This will be modeled as a logistic regression model to predict the probability that the family chooses (and is able) to have a conception. The covariates are SES, migration experience, woman’s age, parity, and woman’s educational level.

Example equation:

\[
\log\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1(\text{motherage}) + \beta_2(\text{parity}) + \beta_3(\text{educ}) + \beta_4(\text{migrationexp}) + \beta_5(\text{SES}) + \varepsilon
\]

Where

\( \pi \) = the estimated logit probability of having a successful conception
\( \beta_0 \) = constant term
motherage = age of mother
parity = women's parity
educ = educational level of mother
son = whether last child born was male
SES = socioeconomic level (according to scoring system)
migrationexp = composite of the migration variables
e = the error term representing unaccounted for variability

The question of time to a conception will be modeled using events history analysis (survival analysis) to predict the time it takes for a conception to occur using economic status and migration experience as the covariates of interest. The full model will also include women's age, parity, and educational level as covariates for the baseline model.

Example equation:

\[ h(t) = h_0(t)e^{(\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \epsilon)} \]

Where:

- \( h_0(t) \) = hazard when are the variables equal zero
- \( x_1 \) = migration variables
- \( x_2 \) = SES variable
- \( x_3 \) = parity variable
- \( x_4 \) = age variable
- \( x_5 \) = education variable
- \( \epsilon \) = the error term representing unaccounted for variability

**Specific Objective 5** - To describe the choice to use contraception among urban slum families as a function of length of residence and economic status during the period 1991-93

Analysis similar to specific objective 1, research question 1 and 2 above with the outcome for both the logistic model and the survival analysis model being the probability of becoming a contraceptive user and the length of time to becoming a user. The covariates in the models will be the same.

**Specific objective 6** - Duration of residence and employment

Using the migration variables and the employment information from the SES questionnaire, we will empirically test Ahmad's hypothesis that migrants come to the urban area with a position already identified. If this is correct, then unemployment becomes a function of events that occur through time that stimulate the loss of employment. We will model this using survival analysis evaluating the probability of becoming unemployed as a function of length on time in the urban areas.
Ramifications and Importance of the Study

Urban studies was a “hot” topic in the 1970s when the scale and scope of the urbanization process was being quantified. The emergence of the slums and squatter settlements around the capital cities of the low income countries was of great concern both to the government officials who feared the potential of social unrest from the rural-urban transition and also from the “development advisors” eager to explain the implications and policy options for this major societal movement. By the 1980s the focus had moved on to other pressing matters, particularly after Todaro’s argument that fostering rural development was essential to addressing the “urban problem.”

The problem fell from vogue, but the population increases in the urban low-income areas continued unabated. Huge numbers of people, often the exact numbers are unknown even to the local government, live in the urban slums of the world. At best, our estimates are gross approximations of the size of the population. There are relatively few, detailed descriptions of urban slum populations in low income countries. That reason alone, has been sufficient for the research community and donors to call for work in this area.

Urban slum dwellers are usually lumped in the “urban” group for analysis. So are the elite government officials and wealthy business people who also are urban residents. There is no greater disparity than the gap between the urban elite of low income country cities and the slum dwellers that often live nearby. Disaggregating the “urban” category to look specifically at low income populations can assist us in better understanding what is occurring in the cities of the world. This disaggregation is important not only for understanding the equity aspects of development but also to allow better focusing of social welfare and development assistance programming.

We are hypothesizing in this study that there is a process of social polarization occurring in the urban areas of the world. Building on the Frenk’s concept of a polarization in the health transition in Mexico, we are looking to see if there is further polarization in the economic development and fertility transition in Bangladesh. Decomposing the proximate determinants of fertility among the urban slum population of Dhaka will allow us determine whether the fertility transition has occurred among all sectors of the population as Cleland asserts.

Last, we are concerned with the fertility and contraceptive practices of the urban slum population. Using the longitudinal aspects of the USSR data, we are trying to determine whether the poor urban dweller is really operating as if they were in a natural fertility environment, or whether these families, like their wealthier neighbors around them, are calculating the costs and benefits of fertility choices and finding ways, within their economically constrained environment to realize those choices.
Economic development has been uneven to date and with the further globalization of the capitalist world economy due to the demise of the socialist bloc of nations, the development choices facing low-income governments are limited. These days, there is only one game in town. The next two decades will show whether the neoclassical free trade - open markets approach is beneficial or detrimental for the vast majority of the people on the planet. The most vulnerable group appears to be the inhabitants of the urban slums. Detailed studies of this sort will provide a basis for looking back in twenty years time to see what the changes have brought.

Given the projected growth of the urban slum population over the next twenty-five years stimulating economic development with increased equity, improving the health status of the poor, and continuing the reported fertility reduction patterns are major development challenges facing the Government of Bangladesh. How the international aid agencies and development banks contribute to the efforts will affect the lives of millions of people. Detailed studies of the lives of the urban slum population are necessary to provide the information for the formation of sound policies in these areas.

**Ethical Assurance for the Protection of Human Rights**

This study consists of secondary data analysis of the UHEP and BDHS data sets. Both data sets have assigned unique identifiers to households and the individuals within households such that it will be possible to ensure that the privacy of the individual respondents will be respected.

There does not appear that there are physical, social, or psychological risks to the subjects.
REFERENCES


Simon, Jonathon, Lee


Centre for Urban Studies (CUS) (1979). The Urban Poor in Bangladesh. Dhaka: Centre for Urban Studies


### Urban Data Analysis budget

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Budget justification

Principal Investigator, Jonathon Simon, is an employee of the Harvard Institute for International Development (HIID) and enrolled in the doctoral program at the Harvard School of Public Health (HSPH). HIID has agreed to pay 3 months of Mr. Simon’s salary in 1996-97 and 1997-98 fiscal years as research support for this and other projects.

Mr. Simon is self-financing the remainder of the costs associated with this research study. There currently are no grant applications outstanding for additional support. Mr. Simon will apply for the HSPH Mack Travel Fund award for 1997-98 to finance an additional trip to Bangladesh.