

Patterns of Urban-Rural Fertility Differentials in Developing Countries

A Suggested Framework



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PATTERNS OF URBAN-RURAL FERTILITY DIFFERENTIALS IN
DEVELOPING COUNTRIES: A SUGGESTED FRAMEWORK

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PREFACE

This study, which was funded by the Office of Urban Development, Bureau for Development Support, Agency for International Development, explores some basic and persistent questions in the social sciences and especially in the study of urbanization.

Urban fertility rates tend to be higher than rural fertility rates. Is this universally so? What is the general magnitude of this differential and what factors are involved? Fertility levels in large cities tend to be lower than in other cities. Is this a general phenomenon? What factors are involved in this difference? If there are exceptions to those general tendencies, what characterizes such anomalies? Can a framework be developed to examine these questions more thoroughly at the micro level? What are the potential policy implications of this kind of study? What additional research or adaptation is needed to translate the findings into practical applications in developing countries?

Sally Findley and Ann Orr of General Electric-TEMPO's Center for Advanced Studies have done an admirable job of exploring these and other questions, having made cross-national analyses and prepared four case studies of Peru, Tanzania, Egypt, and the Philippines.

We hope the reader will find this report of their research a useful guide to increased understanding of fertility differentials, a stimulus to needed further research, and an aid in policy and program development.

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INTRODUCTION

There is much interest in the urban and rural poor in developing countries and among international development assistance agencies. Attempts are being made to revise development strategies to incorporate these groups more equitably into the process of development. At the same time there is concern over the problems associated with high fertility and rapid population growth. What is not clear is how development efforts aimed at the urban and rural poor affect population growth rates. If we are to understand how urban and rural development programs affect population growth, we need to know the mechanisms underlying urban and rural fertility behavior. When development projects affect these mechanisms, it is likely that they may affect fertility.

Conventional discussions of the determinants of fertility tend not to be related to place. "Urbanization" generally is expected to lower fertility, but there is no single theory that accounts for both general urban-related declines and variations within the urban sector. Urbanization hypothetically leads to changes in perceived costs and benefits of children and subsequently to reduced demand for children, but there is disagreement over just what aspects of urbanization produce these changes. Not all cities have low fertility and not all residents within a city have lower fertility than rural residents.

Recent analysis of urban-rural fertility differences shows that in some countries urban fertility is not necessarily lower than rural fertility (Caldwell, 1966; Paydarfar, 1975; Norgan, 1975; Fernando, 1974; Bray, 1975). So before we can analyze the determinants of urban-rural differences, we must first identify the pattern of differentials. Other studies show that in urban and rural areas, fertility is not necessarily inversely related to socio-economic status (Caldwell, 1976; Ajami, 1976; Bernard, 1972; Handwerker, 1972; Clignet and Sween, 1974). Nor do all persons working in "modern" occupations have small families (Morgan, 1975;

Hass, 1972). A priori, we do not know to what extent these variations in urban-rural fertility differences or the variation in fertility among urban women reflect the influence of the place, i.e., the urban or rural environment, or of the individual.

The purpose of this project is to analyze urban and rural fertility patterns in order to identify how "place" and "person" factors influence fertility behavior. From this analysis, we may be able to suggest how urban and rural development projects affect fertility through their impact on the person or place variables.

In Chapter I, we shall examine the pattern of urban and rural fertility. Data from recent censuses or surveys in developing countries will be used to demonstrate where urban fertility is higher or lower than rural fertility. Because the age difference or tempo of childbearing may affect the size of the differential, we shall closely scrutinize age specific fertility. In addition, it is possible that variation in the degree and pattern of urbanization may also modify the urban-rural differential, therefore, we shall consider whether different city size distributions affect the differential. This discussion will be fairly technical and some readers may wish to skim over the first chapter.

In Chapter II, we shall examine the theories that attempt to account for urban-rural variations in fertility. We shall present the relevant theory and empirical evidence to show how mortality and health differences, education differentials, cost-benefit differences, cultural or social factors, and modernity patterns influence fertility. It is seen that each theory contributes to our understanding of person and place related fertility differentials, but that we still need some overall framework by which to structure the relative importance of each set of factors. This chapter concludes with a presentation of a framework that can be used to analyze inter-sectoral

and intra-sectoral fertility differences. The framework makes explicit where place and person factors enter into the fertility decision process.

In Chapter III, we present four case studies showing how this framework can be used to examine urban-rural, intra-urban, and intra-rural fertility differentials. The four cases are Egypt, Peru, Philippines and Tanzania. Each case study represents one of the classes in the typology of urban-rural fertility differences developed in the first chapter. Because of the limited scope for this research, each discussion focuses on one particular aspect of the framework.

In Chapter IV, the research findings are summarized. Although the project has not been able to show precisely why urban-rural fertility differences vary, we feel that some general inferences for urban and rural development programs can be made. These are presented together with suggestions for additional research that is needed to clarify the interaction of person-and place-related fertility factors so that more specific policy applications can be made.

CHAPTER I

THE PATTERN OF URBAN-RURAL FERTILITY DIFFERENTIALS

This exploratory analysis investigates differential fertility between urban and rural areas in developing countries. We investigate the following: 1) whether urban-rural fertility differentials form a discernible pattern, 2) whether there is any consistent relationship between urbanization variables and these differentials, 3) whether the same differentials exist when the data are disaggregated by age groups.

This study is motivated by current interest in the disparity in fertility levels between urban and rural areas. Previous comprehensive studies on differentials have mainly relied on the cruder measures of fertility, such as the crude birth rate (CBR) or the child-woman ratio (CWR) for the period from the 1950's to the early 1960's (Kuznets, 1974). Other studies have utilized more refined measures and more recent data but have been limited in the scope of countries (Schultz, 1976). The 1975 UN Demographic Yearbook provides current data on urban and rural fertility levels but by no means comprehensive. Thus, it seems that an examination of the phenomenon based on relatively reliable and comprehensive data is a necessary first step in studying urban-rural fertility differences.

Addressing the strictly demographic aspects of the issue, we shall attempt to answer the following questions:

- 1) Where is urban fertility lower (higher) than rural fertility?
- 2) What patterns of urban and rural fertility differentials are discernible from a selected sample of developing countries?
- 3) To what extent are the differentials a result of a low (high) urban (rural) fertility level?
- 4) Is there an age pattern in the urban and rural differentials?
- 5) What is the relationship between fertility differentials and aggregate measures of urbanization?
 - a) Is the degree of urbanization (ruralization) in a country correlated with the differentials?

- b) Is the definition of urban (rural) areas correlated with the differentials?
- c) Is there a correlation between differentials and the distribution of the urban population in large cities?

This chapter presents the results of these investigations. The first section describes the data collected, the fertility measures used and the interpretation of the differential. The quality of the data, caveats for the interpretation of the data and justifications for our choice of measures will be discussed in Appendix 1. The second section discusses the present patterns of urban-rural fertility differentials observed in the data. This includes the pattern of urban-rural differentials in total fertility rates and age-specific tempos or spacing of children. A typology for classifying nations by levels of total urban and rural fertility and size of urban-rural differentials will also be presented. The third section discusses the relationships between the various measures of fertility differentials and urbanization variables, controlling for possible regional characteristics in these variables.

Data and Measures Used

The Data

Responding to the research questions posed above requires considerably more detailed data than have been used in previous analyses. Fortunately, more recent data on urban and rural fertility are now available, due to the 1970 round of censuses and circa 1970 major fertility surveys. We have undertaken to collect data for developing countries from these sources. Unlike the Kuznets analysis (1974), we focus on differentials within developing countries, not between developing and developed countries. As Kuznets (1974) himself points out, age-standardized data provide a much sounder base than crude rates. Therefore, we have attempted to use only age-specific fertility rates (ASFR) because they are less susceptible to

problems of misreporting in cases of infant mortality. On occasion we were forced to substitute children ever born (CEB), by age of mother. An attempt was made to include only census results or data from fairly large or national sample surveys.

Data were collected for the period after 1965 from thirty to forty developing countries distributed relatively proportionately between Latin America, Africa, and Asia. The 1970 round of censuses, recent fertility and KAP surveys, and in some instances, supplemental information from statistical annuals or the UN Demographic Yearbook were used. Appendix I gives a detailed account of the sources used for each country.

Age-specific fertility rates or children ever born by age of mother for urban and rural women were obtained for all but two of the 38 countries in the sample. For many countries, fertility rates were also available for the largest city and other subsets of the urban population. We originally hoped to include an analysis of migrant fertility; however, even when the child-woman ratio was accepted as a substitute measure, migrant fertility was available for only twelve nations. In light of this fact, and the varying or unknown definitions of migrant, migrant fertility was deleted from the subsequent analysis.

Measures of Fertility

The measure of fertility level used is the cumulative fertility for the age group in question. Cumulative fertility at age 45 - 49 is the total fertility rate (TFR), the number of live births at the end of the child-bearing years. Measures of fertility differentials are urban-rural ratios of cumulative fertility at different ages. The measure of the tempo or spacing of childbearing is the proportion of total fertility completed at that age. The following are the definitions of differential measures used in this study.

$$(1) \quad \text{URDIF} = \frac{\text{TFR}_{\text{Urban}}}{\text{TFR}_{\text{Rural}}}$$

$$(2) \quad \text{DIF}_{ij} = \frac{\text{CEB}_{ij \text{ Urban}}}{\text{CEB}_{ij \text{ Rural}}}$$

where ij denotes
the delineation of
the 5-year age group

$$(3) \quad \text{TEMP}_{ij} = \left(\frac{\text{CEB}_{ij}}{\text{TFR}} \right)_{\text{Urban}} \div \left(\frac{\text{CEB}_{ij}}{\text{TFR}} \right)_{\text{Rural}}$$

This study uses urban-rural ratios of fertility levels because its fundamental objective is to compare urban and rural fertility levels within countries. However, the use of these ratio measures tends to obscure the absolute levels of fertility; therefore, it is necessary to interpret the measures cautiously. The same value of the ratio can be obtained from two very different values of the numerator and denominator.

Analysis of Patterns of Fertility Differentials

The data presented in Table 1 show that there is a great deal of variation in urban and rural fertility differentials both across and within geographic regions. The mean urban-rural differential is 0.76 indicating that on the average urban fertility is about one-fourth lower than rural fertility. The mean urban total fertility rate (TFR) of 4.95 and rural TFR of 6.35 are consistent with the differentials found by both Kuznets and Schultz (1974 and 1976). Table 2 shows the ranking of the urban-rural fertility differentials from highest to lowest. These are broken into five approximately equal classes, with means and standard deviations as shown. The first class contains countries in which urban fertility tends to equal rural fertility. The next class contains countries with urban fertility slightly lower than urban and rural fertility, and so on.

Cursory examination of the data suggests that variations in the differential result from variations in urban fertility since urban fertility varies more than rural fertility. Indeed, this is borne out by a Spearman rank correlation coefficient of 0.542 for the correlation between urban fertility and the urban-rural ratio of total fertility, URDIF. This coefficient is significantly different from zero at the 1% level. The same coefficient for the correlation of the fertility differential with rural fertility is 0.164, statistically insignificant. This suggests that differences in the urban-rural differential primarily reflect the differences in urban fertility levels across these classes and that there is no systematic variation in rural fertility levels. Thus, a high urban-rural ratio may be attributed to high urban fertility and not to low rural fertility.

Table 1: Urban-Rural Fertility Differentials for Developing Countries, circa 1970

<u>Country</u>	<u>Measure and Year</u>	<u>Urban Fertility Rate</u>	<u>Rural Fertility Rate</u>	<u>Urban/Rural</u>
<u>Africa</u>				
Algeria	ASFR, 1969-70	7.35	8.09	.91
Botswana	ASFR, 1971	4.80	5.91	.82
Egypt	CBR, 1969	33.0	39.4	.84
Ethiopia	CEB, 1969-70	3.57	5.29	.68
Ghana	ASFR, 1968-69	6.00	6.80	.88
Kenya	ASFR, 1972	5.67	8.58	.66
Liberia	ASFR, 1971	4.92	6.33	.78
Morocco	ASFR, 1972-73	4.50	7.34	.61
Niger	CEB, 1970	4.00	5.00	.80
Rwanda	ASFR, 1970	6.66	7.52	.89
Senegal	CWR ₀₋₁ , 1970-71	.17	.12	1.45
Sierra Leone	CEB, 1969-70	5.20	8.80	.59
Tanzania	CEB, 1969-70	3.91	5.02	.78
Togo	CWR ₀₋₁ , 1969	.11	.19	.58
Uganda	CWR ₀₋₄ , 1969	.69	.90	.76
Upper Volta	CEB, 1969	6.10	7.70	.79
<u>Asia</u>				
Afghanistan	CEB, 1975	7.80	7.70	1.01
Bangladesh	ASFR, 1974	6.60	7.10	.93
Indonesia	ASFR, 1965	4.95	5.57	.89
Korea (S.)	ASFR, 1971	3.97	5.23	.76
Malaysia	ASFR, 1973	4.43	5.45	.81
Philippines	CEB, 1970	4.92	5.67	.87
Sri Lanka	CEB, 1969-70	3.83	4.12	.93
Taiwan	ASFR, 1969	3.64	4.60	.79
Thailand	CEB, 1970	5.51	6.70	.82
Turkey	ASFR, 1965-67	3.88	6.12	.63
<u>Latin America</u>				
Brazil	ASFR, 1970	3.47	5.82	.60
Chile	CEB, 1970	3.70	6.32	.59
Colombia	ASFR, 1969	3.35	5.22	.64
Costa Rica	CEB, 1970	5.12	8.14	.63
Dominican Rep.	ASFR, 1970	5.55	6.70	.83
El Salvador	CEB, 1971	5.27	7.30	.72
Guatemala	CEB, 1973	5.54	7.17	.77
Honduras	ASFR, 1971	5.28	8.69	.61
Mexico	CEB, 1970	5.87	7.10	.83
Panama	ASFR, 1970	3.90	6.67	.58
Peru	ASFR, 1970	4.23	6.31	.67
Venezuela	CEB (est), 1971	4.87	5.75	.85
Mean		4.95	6.35	.76
Standard Deviation		1.13	1.62	.20
N=38				

Sources: See Appendix 2.

Table 2: Countries Ranked by Urban-Rural Fertility Differential

Rank	Country	Differential	Urban TFR	Rural TFR
1.	Senegal	1.45	NA	6.41
2.	Afghanistan	1.01	7.80	6.72
3.	Sri Lanka	.93	3.83	4.12
4.	Algeria	.91	7.35	8.09
5.	Bangladesh	.90	6.60	7.10
6.	Indonesia	s = .204 x̄ = 1.00	s = 1.38 x̄ = 6.20	s = 1.32 x̄ = 6.50
7.	Rwanda	.89	4.95	5.57
			6.67	7.52
8.	Ghana	.88	6.00	6.8
9.	Philippines	.87	4.92	5.67
10.	Venezuela	.85	4.87	7.63
11.	Egypt	.84	NA	NA
12.	Dominican Republic	.83	5.50	6.70
13.	Mexico	.83	5.87	7.10
14.	Botswana	.82	4.85	5.91
15.	Thailand	.82	5.51	6.70
16.	Malaysia	s = .27 x̄ = .84	s = .74 x̄ = 5.05	s = .91 x̄ = 6.28
17.	Niger	.80	4.43	5.45
			4.00	5.00
18.	Upper Volta	.79	6.10	7.70
19.	Taiwan	.79	3.64	4.60
20.	Liberia	.78	4.92	6.33
21.	Tanzania	.78	3.91	5.03
22.	Guatemala	.77	5.54	7.17
23.	Uganda	.76	NA	NA
24.	Korea (S.)	s = .22 x̄ = .77	s = .94 x̄ = 4.76	s = 1.24 x̄ = 6.19
25.	El Salvador	.76	3.97	5.23
			5.27	7.30
26.	Ethiopia	.68	3.58	5.29
27.	Peru	.67	4.23	6.31
28.	Kenya	.66	5.67	8.58
29.	Colombia	.64	3.35	5.22
30.	Turkey	s = .18 x̄ = .65	s = 1.82 x̄ = 4.05	s = 1.31 x̄ = 6.62
31.	Costa Rica	.63	3.88	6.13
			5.12	8.14
32.	Morocco	.61	4.50	7.34
33.	Honduras	.61	5.28	8.69
34.	Brazil	.60	3.47	5.82
35.	Sierra Leone	.59	5.20	8.80
36.	Chile	.59	3.70	6.32
37.	Panama	s = .10 x̄ = .59	s = .78 x̄ = 4.34	s = 1.24 x̄ = 7.27
38.	Togo	.58	3.90	6.67
			NA	NA

s = Standard deviation

x̄ = Mean of class

The Pattern of Differentials in Total Fertility

What is the pattern of total fertility differentials? The classes presented in Table 2 are one way of grouping like countries, but a more useful description of the patterns is found in Figure 1, which presents six classes of countries by levels of urban and rural fertility. This classification of levels of urban and rural fertility reflects a pattern observed at one point in time. It can, however, be used to indicate the extent to which these classes of countries correspond to or deviate from the phases of fertility decline experienced by Western European countries.

The stages in the historical fertility decline in Western European countries can be traced to a decline in birth rates which first began in urban areas where socio-economic factors, such as, cost of children, wages, income, employment opportunities for women, lower mortality and less traditional attitudes towards children, were conducive to smaller families. This decline later spread to rural areas where fertility had been stable at a high level. The following stages experienced in Western Europe may be used as a basis of comparison for the observed patterns of urban-rural fertility in our sample of countries:

- A. Pre-decline: very high urban and rural fertility; little differential
- B. Early: high to moderate urban and very high rural fertility; widening urban-rural differential

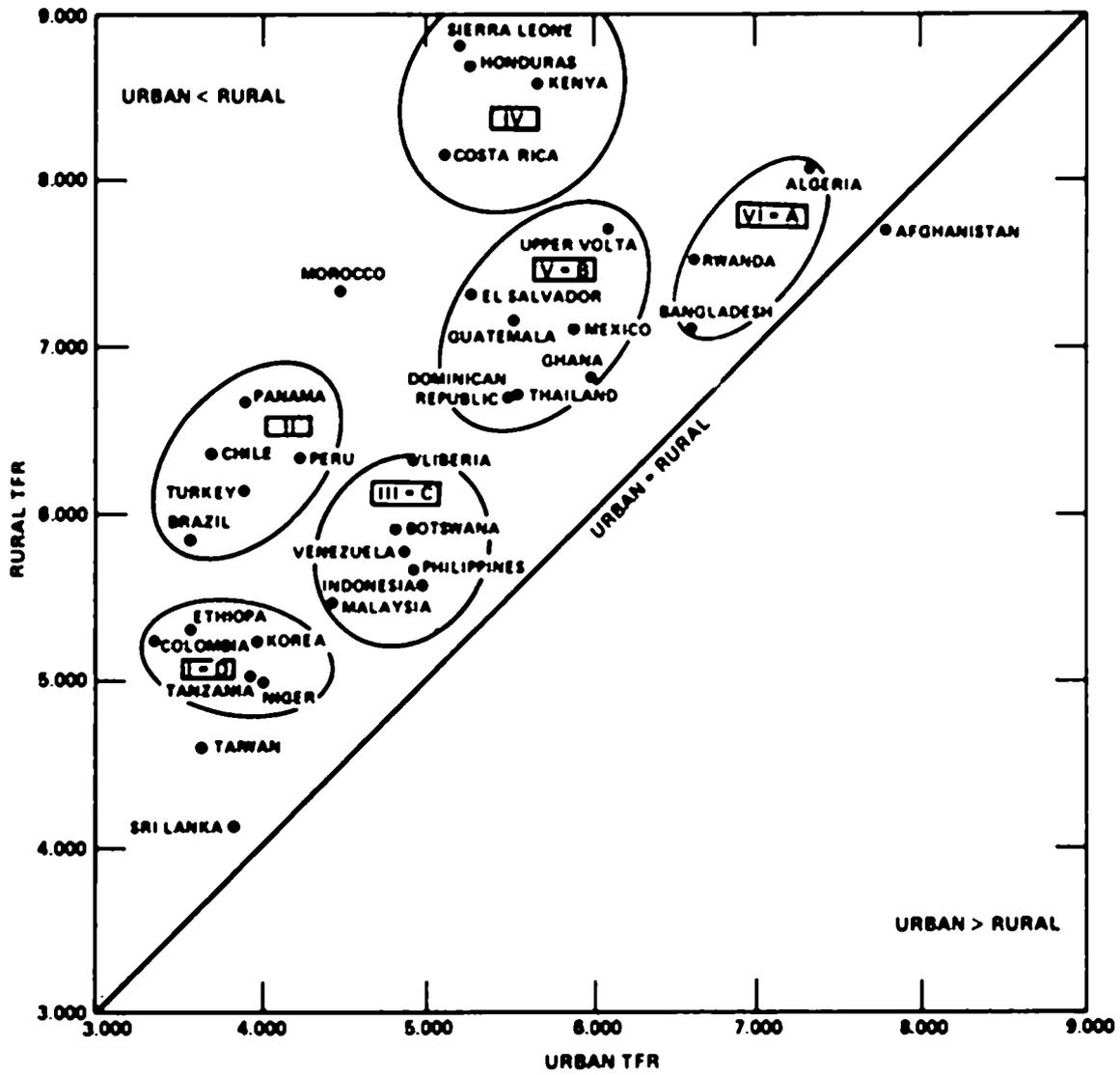


FIGURE 1. URBAN VS. RURAL FERTILITY, CIRCA 1970

- C. Middle: moderate urban and rural fertility; small to medium differential
- D. Late: low urban and low to moderate rural fertility; medium but declining differential
- E. Equilibrium: very low urban and low rural fertility with stable and small differential

Our classification of countries approximately corresponds to these phases of fertility decline. Figure 2 illustrates our class of countries and their correspondence with stages experienced in Western Europe. Afghanistan and Class VI countries belong in Phase A; Class V countries are in Phase B; Class III in Phase C; and Class I corresponds to Phase D. None of the countries in our sample has reached Phase E, although Sri Lanka comes the closest.

It appears that Class II and Class IV countries are marginal cases with regard to the phases of fertility decline discussed above. Class II countries have low urban fertility but high-moderate rural fertility indicating a significant lag in fertility decline in rural areas. Class IV countries also exhibit a lag in rural fertility decline given their moderate levels of urban fertility. These are predominantly Central and South American countries but include Turkey, Kenya, and Sierra Leone. The factors that determine urban and rural fertility in these countries should be investigated to better understand their distinctly larger differences between urban and rural fertility levels.

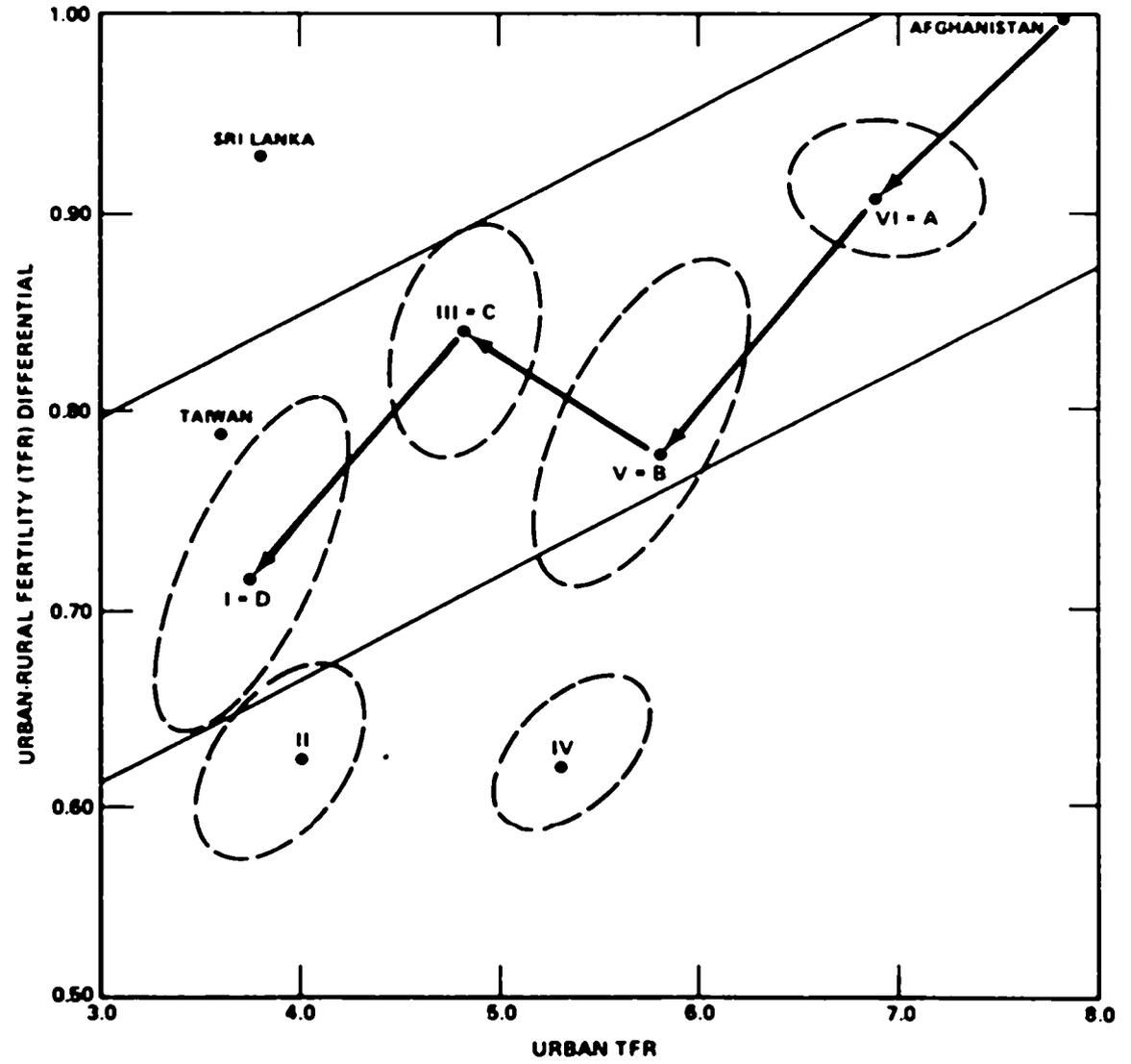


FIGURE 2. CLASS OF URBAN-RURAL FERTILITY DIFFERENCE BY STAGE OF FERTILITY DECLINE

Patterns of Age-Specific Fertility Differentials

The preceding discussion of patterns of total fertility differentials ignores age-specific differentials which may exist between urban and rural areas. Because the measures of total fertility rates are composed of age-specific rates, differentials disaggregated by age may provide insight into the factors underlying the total differentials. They may also provide information on fertility trends in these countries.

Table 3 indicates that differentials in cumulative fertility (children ever born) vary by age group. Though fertility for the 15-19 age group is higher in urban than in rural areas for some countries, on the average urban fertility is about a third lower than rural fertility for this age group. This differential in cumulative fertility is considerably reduced by age 25 indicating that urban and rural fertility are relatively close for the 20-24 age group. Between the ages of 20 and 45, cumulative fertility for urban areas is about 20% lower than that for rural areas. The slight increase in the differential for the 45-49 age group indicates that older women in rural areas bear more children than their urban counterparts.

Table 3 also shows that there are regional differences by age. In Africa, urban relative to rural fertility is lowest in the middle child-bearing years of 25-39. The Asian age differentials show little variation, ranging from about a 20% difference in the 15-24 cohorts to about 10% difference for all other cohorts. The most marked differences are found in

Table 3. Age-Specific Urban-Rural Differentials
in Cumulative Fertility Children Ever Born

	<u>Age Group</u>					
	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
<u>Africa</u>						
Algeria	0.66	0.97	0.99	0.99	1.09	0.91
Botswana	0.37	-	0.59	0.87	1.04	0.82
Ethiopia	0.68	0.85	0.88	0.83	0.78	0.68
Ghana	0.66	0.81	0.83	0.86	0.93	0.88
Kenya	0.63	0.78	0.72	0.71	0.81	0.66
Liberia	1.10	0.94	0.78	0.78	0.82	0.78
Morocco	0.76	0.89	0.69	0.62	0.71	0.61
Niger	1.00	0.75	0.79	0.91	0.89	0.80
Rwanda	1.16	0.90	0.92	0.96	1.10	0.89
Sierra Leone	1.19	0.75	0.84	0.75	0.85	0.59
Tanzania	1.04	0.89	0.89	0.82	0.78	0.78
Upper Volta	1.98	0.76	0.72	0.91	0.88	0.79
Mean	0.81	0.85	0.74	0.71	0.82	0.77
<u>Asia</u>						
Afghanistan	0.79	1.07	0.97	1.06	1.13	1.01
Bangladesh	0.90	0.98	0.96	1.00	0.98	0.93
Indonesia	0.68	0.89	0.87	0.90	0.94	0.89
Korea (S.)	0.31	0.79	0.84	0.82	1.05	0.76
Malaysia	0.71	0.70	0.82	0.80	0.83	0.81
Philippines	0.95	0.80	0.82	0.86	0.95	0.87
Sri Lanka	1.05	1.05	1.03	0.92	1.00	0.93
Taiwan	0.78	0.75	0.76	0.79	0.82	0.79
Thailand	1.05	0.81	0.95	0.82	0.93	0.82
Mean	0.80	0.79	0.89	0.89	0.96	0.87
<u>Latin America</u>						
Brazil	0.63	0.64	0.67	0.72	0.80	0.60
Chile	0.59	0.66	0.65	-	-	0.59
Colombia	0.45	0.73	0.66	0.74	0.87	0.64
Costa Rica	0.49	0.54	0.59	0.63	0.74	0.63
Dominican Rep.	0.66	0.79	0.80	0.81	0.92	0.83
El Salvador	0.64	0.64	0.68	0.74	0.82	0.72
Guatemala	0.50	0.71	0.72	0.86	0.99	0.77
Honduras	0.57	0.71	0.64	0.63	0.71	0.61
Mexico	0.67	0.71	0.80	0.85	0.92	0.83
Panama	0.44	0.66	0.63	0.60	0.63	0.58
Peru	0.61	0.68	0.70	0.70	0.76	0.67
Mean	0.48	0.62	0.69	0.73	0.82	0.68
<u>OVERALL MEAN</u>	0.68	0.79	0.80	0.81	0.79	0.76

N = 32

the Latin American countries, where differences are very large (40-50%) in the 15-24 year cohorts, then rising to an approximately 30% difference. For all the groups the 40-44 cohort shows a much smaller urban-rural difference than younger or older cohorts. This may be due to more rural underreporting at this age, whereas after age 44 underreporting (forgetting births) may be a problem in both urban and rural areas. Or, it can accurately reflect an overall trend for rural women to have a slightly longer period of childbearing, continuing right up to age 49.

By making the assumption that the urban-rural differential is constant over time for each of the 5-year cohorts currently between 30 and 49 years of age, a comparison of fertility differentials for the 25-29 and 45-49 age groups can provide some insights into fertility trends in the last twenty years. Since cumulative fertility in the 45-49 age group is made up of cumulative fertility of the 15-44 age groups, the comparison of fertility differential of the 25-29 age group with that of the 45-49 age group in effect, highlights the differential in the 30-49 age groups. Also, since the current 30-49 age groups were the 10-29 age groups of twenty years ago, a small differential for the current 25-29 age group compared to that for the current 45-49 group suggests a decline in the difference over the last twenty years.

In Table 4, the countries have been regrouped according to the classes outlined in Figure 1. Class VI includes countries at an early stage of fertility decline (Stage A), where urban fertility is not much lower than rural fertility at any age. Class V countries represent Stage B, where urban fertility has experienced substantial declines relative to rural fertility. The age-differentials suggest that at this stage the urban decline may be concentrated in the middle childbearing years. Class IV countries represent an exaggeration of Stage B, and it is possible that the wide differences at all ages may lead these countries in an alternative path from Stage B directly to Stage D. Class III countries more closely represent what we expect for Stage

Table 4. Age-Specific Urban-Rural Fertility and Tempo Differentials by Classes of Countries

STAGE:	Stage D		Stage C	Quasi B	Stage B	Stage A	TOTAL
CLASS:	I	II	III	IV	V	VI	
DIFF 15-19	.70	.57	.76	.72	.88	.91	.68
DIFF 25-29	.81	.66	.78	.70	.79	.96	.80
DIFF 35-39	.82	.67	.84	.68	.84	.98	.81
DIFF 40-44	.87	.73	.92	.78	.91	1.06	.79
DIFF 45-49	.73	.61	.92	.62	.81	.91	-
TEMP 15-19	.94	.93	.92	1.17	1.09	1.00	1.02
TEMP 25-29	1.12	1.09	.93	1.13	.97	1.05	1.09
TEMP 35-39	1.13	1.09	1.01	1.10	1.04	1.08	1.09
TEMP 40-44	1.25	1.19	1.10	1.25	1.13	1.16	1.07
TEMP 45-49	1.00	1.00	1.00	1.00	1.00	1.00	1.00
URDIF	.74	.62	.84	.62	.80	.88	.81
URBAN TFR	3.80	4.00	4.80	5.30	5.69	6.87	5.13
RURAL TFR	5.15	6.30	5.70	8.50	7.10	7.57	6.25
N =	5	4	5	4	7	3	

For definition of measures see pp. 6-7, above.

Source: Calculated by authors from data sources given in Appendix 1.

C, the middle period of fertility decline where rural fertility declines are catching up to urban declines. The age-differentials suggest that this transition may include urban relative to rural fertility declines among the youngest cohorts. Class I and II countries approximate Stage D, where there is a moderate and declining urban-rural difference. Compared to Stage B and C countries (Classes V and III), the Stage D countries (I and II) show a larger difference for the 40-44 year olds, as well as even lower urban than rural fertility in the 15-19 cohort.

This analysis of age differentials is limited by the cross-sectional nature of our data. We can only conclude that at each stage of overall urban-rural fertility decline, different cohorts show greater urban-rural declines than in previous or subsequent stages. These data suggest that declines occur first in the middle childbearing years, then in the early years, and finally in the early and late years, but only retrospective data can show the specific age patterns that produce the observed differentials in completed fertility.

Patterns of Urban-Rural Differentials in Tempo of Childbearing

Urban women in most countries start having children at a later age and finish at an earlier age than their rural counterparts. This finding is based on our analysis in this section of differences in the tempo or spacing of childbearing. Tempo of childbearing is a measure which indicates the proportion of total completed fertility experienced by women at each age.*/ The measure assumes that the present 45-49 age cohort experienced approximately the same pattern of childbearing at each age as is experienced today by younger cohorts. The possible biases resulting from using this assumption are discussed in Appendix 3.

*/ See p. 7 for the mathematical formulation of $TEMP_{ij}$, the tempo variables.

Table 5 presents the ratio of urban to rural tempo of childbearing for different age groups. These ratios do not provide information on the relative fertility levels in urban and rural areas; rather they indicate urban-rural differences in the temporal spacing of childbearing. The following simple example illustrates the concept of urban-rural tempo ratio:

	<u>URBAN</u>	<u>RURAL</u>
Children ever born, CEB, ages 25-29	3.0	3.5
Children ever born, CEB, ages 45-49	6.0	8.0
Tempo, 25-29, (=CEB 25-29 ÷ CEB 45-49)	.50	.44

The urban-rural tempo ratio for this example is $.50 \div .44 = 1.14$.

A tempo ratio of greater than 1.0 indicates that urban women have had a greater proportion of their children by age 29 than have rural women.

The tempo measures for the 15-19 cohorts in Asia and Latin America indicate that most urban women start bearing children at a later age than their rural counterparts. The converse is true in Africa where urban women tend to start earlier. Most countries of our sample had large increases in the ratios between the 15-19 and 25-29 age cohorts; this means that between the ages of 20 and 29, urban women have a greater share of their total births than do rural women. The ratios for the 35-39 cohort are similar to those for the 25-29 cohort, therefore we conclude that during these middle child-bearing years the relative tempos do not change. The dramatic increase in the ratio for the 40-44 cohort suggests that urban women may have completed their families by this age while rural women continue bearing up to age 49, when both urban and rural fertility are complete.

In summary, in all countries in our sample at all stages of fertility decline, urban women stop having children at a younger age than rural women. For countries in later stages of fertility decline, i.e., Classes I and II (Table 4), urban women start bearing children at a later age than their rural

Table 5. Age-Specific Urban-Rural Ratios of Tempo of Childbearing

	<u>Age Group</u>				
	<u>15-19</u>	<u>25-29</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
<u>Africa</u>					
Algeria	0.73	1.09	1.09	1.20	1.00
Botswana	0.45	0.72	1.06	1.27	1.00
Ethiopia	1.00	1.30	1.22	1.14	1.00
Ghana	0.74	0.95	0.98	1.06	1.00
Kenya	0.96	1.09	1.07	1.23	1.00
Liberia	1.41	1.00	1.00	1.05	1.00
Morocco	1.24	1.13	1.01	1.15	1.00
Nigeria	1.25	0.99	1.14	1.11	1.00
Rwanda	1.31	1.04	1.08	1.24	1.00
Sierra Leone	1.87	1.42	1.27	1.44	1.00
Tanzania	1.34	1.15	1.05	1.01	1.00
Upper Volta	<u>2.50</u>	<u>0.91</u>	<u>1.15</u>	<u>1.11</u>	<u>1.00</u>
Mean	1.14	1.06	1.09	1.17	1.00
<u>Asia</u>					
Afghanistan	0.78	0.96	1.05	1.12	1.00
Bangladesh	0.97	1.03	1.07	1.05	1.00
Indonesia	0.77	0.98	1.01	1.06	1.00
Korea (S.)	0.41	1.11	1.08	1.38	1.00
Malaysia	0.87	1.01	0.98	1.03	1.00
Philippines	1.09	0.95	0.99	1.10	1.00
Sri Lanka	1.13	1.10	0.99	1.08	1.00
Taiwan	0.99	0.96	1.00	1.03	1.00
Thailand	<u>1.28</u>	<u>1.16</u>	<u>1.00</u>	<u>1.13</u>	<u>1.00</u>
Mean	0.92	1.03	1.02	1.11	1.00
<u>Latin America</u>					
Brazil	1.06	1.12	1.21	1.34	1.00
Chile	1.02	1.10	----	----	1.00
Colombia	0.70	1.03	1.15	1.35	1.00
Costa Rica	0.77	0.94	1.01	1.18	1.00
Dominican Rep.	0.79	0.97	0.98	1.11	1.00
El Salvador	0.88	0.95	1.03	1.13	1.00
Guatemala	0.65	0.94	1.11	1.28	1.00
Honduras	0.93	1.06	1.04	1.17	1.00
Mexico	0.81	0.96	1.03	1.11	1.00
Panama	0.75	1.08	1.03	1.08	1.00
Peru	<u>0.92</u>	<u>1.05</u>	<u>1.04</u>	<u>1.14</u>	<u>1.00</u>
Mean	0.84	1.02	1.06	1.19	1.00
<u>OVERALL MEAN</u>	0.97	1.04	1.06	1.16	1.00
N = 32					

counterparts, compressing childbearing into a much shorter period. For countries in earlier stages of fertility decline, urban women tend to begin bearing children at an earlier age than those living in rural areas. These preliminary findings should provide guidelines for other researchers and policy makers interested in fertility reduction.

The Pattern of Urbanization and Urban-Rural Fertility Differentials

It has been generally accepted that urbanization tends to depress fertility due to socio-economic factors in urban areas which are more conducive to lower fertility. A higher degree of urbanization increases the proportion of the total population subject to these factors. The pattern of urbanization, i.e. the distribution of urban population by settlement size, may also have an effect on aggregate fertility. Larger urban centers are more "urban" and tend to have more anti-natal and fewer pro-natal factors, consequently fertility levels in larger cities are generally lower than those in smaller cities. In addition, if urbanization facilitates the spread of these anti-natal factors to rural areas, it can lead to lower rural fertility.

Intraurban Fertility Differentials

We were only able to collect fertility data by city size for thirty nations. Seven of these are based on child-woman ratios or crude birth rates, so statistical analysis of differences in the age pattern are not possible. Table 6 summarizes intraurban fertility differentials. The source notes in the Appendix indicate the definition of small cities varies; we have attempted to keep the upper size limit at 50,000 and most fall within the 2,000-20,000 range. Columns 1 and 2 indicate that there is considerable variation in the percentage urban and percentage of urban population in the largest city. Despite these variations some generalizations can be made.

Table 6. Pattern of Urbanization and Urban/Rural Fertility Differentials, circa 1970

COUNTRY	Percent Urban	Share Urban in Largest City	Largest City/Urban TFR	Largest City/Small City TFR
	(1)	(2)	(3)	(4)
<u>AFRICA</u>				
Algeria	45%	.19	.93	.92
Botswana	10	.31	1.04	1.06
Egypt	42	.35	1.01	---
Ethiopia	10	.35	.67	.64
Ghana	29	.22	.95	.93
Niger	3	1.00	1.00	---
Rwanda	4	.65	1.00	---
Senegal	23	.65	1.04	1.19
Sierra Leone	14	.61	1.02	1.04
Tanzania	7	.47	.94	.91
Togo	13	.58	1.28	1.64
Uganda	8	.45	1.05	---
Upper Volta	10	.29	1.03	---
Mean			.97	1.04
<u>ASIA</u>				
Afghanistan	15	.12	1.02	1.03
South Korea	41	.42	.89	.81
Malaysia	29	.18	.80	.63
Philippines	32	.12	.87	---
Taiwan	62	.19	.88	.77
Thailand	13	.41	.94	.90
Turkey		.21	.85	.87
Mean			.87	.84
<u>LATIN AMERICA</u>				
Brazil	56	.16	.87	.90
Chile	76	.46	.97	---
Colombia	59	.19	1.25	1.25
Costa Rica	41	.28	.92	---
El Salvador	39	.24	.60	1.33
Guatemala	34	.38	.82	.73
Mexico	59	.29	.75	.75
Panama	48	.24	.88	.88
Peru	54	.37	.57	.57
Venezuela	73	.28	.81	.65
Mean			.84	.88
<u>OVERALL MEAN</u>			.92	.93

Sources & notes: See Appendix 4.

The data suggest that, in general, the larger the city size, the lower the level of fertility. In Asian and Latin American countries largest city fertility rates were less than small city fertility rates by 16% and 12%, respectively. The table indicates that the general relationship between fertility and city size does not appear to hold for most African countries.

Regression Analyses of the Relation Between Fertility Differentials and Urbanization

This exploratory analysis does not permit analysis of the determinants of the different patterns of urban-rural differentials. We can, however, use regression analysis to sort out the correlations between the various age differentials and the different urbanization patterns. First, we shall use regression analysis to determine the extent to which urban and rural fertility levels are influenced by the degree and pattern of urbanization, as measured by percent urban and shares of population in small, medium, large, and primate cities. Second, the measures of degree and pattern of urbanization will be regressed on the individual age differentials. These regression equations will also include a control for urban definition, to determine if the differentials are influenced by having very small urban areas included in the urban population, and controls for regional location. These regional variables are included to allow for regional cultural, social, or economic differences not accounted for by the urbanization variables. The variables used in the analyses include:

A. Fertility variables

- 1) urban fertility level, URBAN TFR;
- 2) rural fertility level, RURAL TFR;
- 3) urban-rural fertility differentials --
 - total fertility, URDIF,
 - ages 15-19, DIF1519
 - ages 25-29, DIF2529
 - ages 25-39, DIF3539
 - ages 40-44, DIF4044

- 4) urban-rural ratios in tempo of childbirth --
ages 15-19, TEMP1519
ages 25-29, TEMP2529
ages 35-39, TEMP3539
ages 40-44, TEMP4044

B. Urbanization variables

- 1) percentage population urban, PCURB;
- 2) proportion total population in --
small cities up to 20,000, SMPPOP;
medium sized cities 20,000-99,999, MDPOP;
large cities over 100,000, LGPOP;
- 3) primacy or percentage of urban population in the largest
city, BIGPCU;
- 4) lower limit of country definition of urban, URLVL.

C. Regional dummy variables

- 1) Asia countries, ASIA
- 2) African countries, AFRICA
- 3) Islamic countries, ISLAM
- 4) Latin American countries, represented by assigning zeros
to all other regional dummy variables.

Because the per cent urban matches the per cent in small, medium, and large cities, PCURB can not be included in equations with the three urban distribution variables.

Key Results of Regression Analysis

The regression results in Table 7 reveal some interesting associations between urbanization characteristics and levels of urban and rural fertility. With respect to these fertility levels, the most important urbanization factor is percentage of population in cities of over 100,000 (LGPOP), not per cent urban (PCURB). The concentration of population in large cities has a negative influence on both urban and rural fertility, with the strongest influence on

urban fertility. Consequently, this factor is associated with larger urban-rural differentials, especially among women under age 30. Percentage of population in large cities is also correlated with the urban-rural tempo ratio. This indicates that the greater the percentage of population in large cities, the greater the urban-rural difference in the temporal spacing of childbearing; i.e., the shorter duration of total childbearing for urban women relative to rural women.

These regression results suggest that large cities generate or contain forces which influence urban and rural number and spacing of children. Countries with mostly small cities do not evidence the same reduction in fertility; perhaps due to differences in the opportunities or attitudes in small versus large cities. Apparently, the impact of factors influencing fertility in the large city is initially stronger in urban areas causing a divergence between urban and rural fertility levels and patterns. In the long run, however, these influences may spread into rural areas and continued declines in rural areas result in smaller urban-rural differences.

The lower limit of the definition of "urban" areas (URLVL) is negatively related to both urban and rural fertility levels. As expected, the smaller the size of settlement included as "urban" the higher the fertility levels in urban and rural areas. However, the fact that this variable, URLVL, has an insignificant effect on urban-rural fertility differential means that our analysis of these differentials is not hampered by the differing definitions of "urban" used by the countries in our sample.

Table 7. Standardized Beta Coefficients of the Regression of Urbanization and Regional Variables on Fertility Variables

Dependent Variable:	Independent Variables									R ² /F
	PCURB	LGPOP	MDPOP	SMPOP	BIGPCU	URLVL	ASIA	AFRICA	ISLAM	
1. URBAN TFR	.958*	-1.078*	.637	----	----	-.767*	.300*	.436	.750*	.55/12.7
2. RURAL TFR	.685	-.809*	.653	----	----	-.855*	.062	.190	.406	.37/6.56
3. URDIF a.	.860*	-.976*	.237	----	----	-.269	.399*	.502	.815*	.59/14.98
b.	----	.036	.273	.738*	.264	---	-.399	.658*	.781*	.62/16.1
4. DIF519 a.	-.507	-.318	-.647	----	----	---	-.141	-.131	-.121	.34/6.75
b.	----	-.736*	-.334	-.367	.070	---	-.388	-.154	-.277	.36/6.0
5. DIF2529 a.	.502	-.474*	-.065	----	----	---	.445*	.641*	.774*	.63/19.8
b.	----	-.001	.056	-.001	-.030	---	.453*	.760*	.834*	.61/15.4
6. DIF3539 a.	.716	-.487	-.130	----	----	---	.590*	.611*	.461*	.43/9.09
b.	----	.246	.221	.533*	.398	---	.607*	.650*	.500*	.49/9.66
7. DIF4044 a.	.644	.477	.240	----	----	---	.588*	.524	.550*	.38/7.4
b.	---	.118	.399	.411	.232	---	.598*	.547	.573*	
8. TEMP1519	-.977*	.278	-.222	----	----	---	-.323	-.477	-.590*	.33/6.4
9. TEMP2529	-.587	.771*	-.042	----	----	---	.099	.365	.165	.24/4.47
10. TEMP3539	-1.51*	1.42*	.253	----	----	---	.097	-.299	-.760*	.65/20.7
11. TEMP4044	-1.58*	1.41*	.645*	----	----	---	.125	-.399	-.116*	.73/30.49

Sources: See Appendix

*= Significantly different from zero at the .05 level

--- Not Included

Standardized Beta Coefficients give the amount of change in the dependent variable per unit change in the Independent variable.

N = 24 for all regressions

The effect of an urban population distribution including many small cities varies but is only significantly correlated with the age differentials after age 40. Evidently nations with population concentrated in small cities tend to have more nearly equal urban and rural fertility levels at the older ages, perhaps because the older urban women in nations with small cities are migrants from rural areas or because these women had their children when the cities were very small, and not large enough to generate the fertility reducing influences of larger cities. Primacy and percent in medium size cities are not correlated in any systematic way with the age differentials. The regressions also indicate that there are considerable differences between geographic regions. In Latin American countries other non-urbanization factors (cultural, social, or economic) tend to generate lower urban fertility and larger urban-rural differentials, while in Asian, African, and Islamic countries these non-urban factors are associated with higher urban fertility and smaller urban-rural differentials. In addition, after controlling for urbanization, Islamic countries, as a group, have more homogeneous urban-rural ratios of child spacing (tempo) than the other groupings of countries.

In conclusion, regression analysis has enabled us to identify certain patterns of association between the various fertility differentials and the degree and pattern of urbanization. Without more refined data to account for other variables relevant to explaining these differentials, our results can only be used as the statistical basis for suggesting associations between fertility and urbanization, not as explanations of fertility differentials. The analysis also showed regional patterns in most of these differentials which suggest that variables important in the determination of urban and rural fertility may differ significantly by geographic region.

Summary and Conclusions

In a sample of thirty-eight developing countries it was found that all except two have lower urban than rural total fertility; on the average urban fertility differentials between countries are generally associated with differences in urban fertility levels; rural fertility had an insignificant correlation with the differentials.

A categorization of these countries by urban and rural fertility level results in the emergence of six distinct classes, each with a unique combination of urban and rural fertility (Figure 1). Each class characterizes a stage of fertility decline and approximates the stages of historical fertility decline experienced by Western European countries. The size of the urban-rural differential does not vary linearly with the classes of countries. Rather, it fluctuates due to differences in the timing of urban and rural fertility declines.

Analyses of age specific fertility and the tempo of childbearing also produced some interesting findings. Although there was considerable variation between countries in our sample, on the average, the fertility of urban women under age twenty is about a third lower than that of rural women. This differential is smaller for women between age twenty and forty and increases again for older women. In other words, urban women generally start childbearing at a later age and finish at an earlier age than women in rural areas. A comparison of urban-rural differentials for different age cohorts indicated that these differentials have declined during the last

two decades for more than half of the countries analyzed. In these countries, urban fertility rates have decreased faster than rural rates causing the differential to decline. Analysis of the age differentials for countries showed that urban-rural differences appear in different cohorts, depending on the stage of urban-rural decline.

Relationships between the pattern of urbanization and fertility differentials also were analyzed. In general, the larger the city size the lower the fertility level; for Asian and Latin American countries, women in the largest cities had fertility rates lower than those in small cities by 16% and 12%, respectively.

Regression analyses were also used to more rigorously analyze the relation between fertility differentials and urbanization variables. The regression results suggest that large cities of over 100,000 generate forces which influence urban and rural fertility decline and the spacing of childbearing. The impact of these large city fertility influences is apparently stronger in urban areas, causing a divergence between urban and rural fertility levels and the temporal spacing of childbearing.

The analysis also indicated that regional characteristics influence urban-rural fertility differences, even after controlling for urbanization. Very briefly, the results show that in Latin American countries, urban fertility rates are clearly lower, resulting in urban-rural differentials greater than in other regions. Most African countries are exceptions to our general findings, in that large city size is not correlated with lower fertility rates

and African urban women may begin childbearing at a younger age than rural women. In most Islamic countries, urban fertility rates are higher and the tempos or spacing of childbearing are more similar in urban and rural areas. These regional patterns suggest that socio-economic influences on fertility are not homogeneous across cultures or regions. Thus, although regional categorizations of levels and differentials of fertility alone are not very informative, these categorizations combined with analyses of the effects of socio-economic factors can contribute to the understanding of the determinants of fertility.

CHAPTER II

A FRAMEWORK FOR ANALYZING FERTILITY DIFFERENTIALS

In the previous chapter we documented the existence of fertility differences between urban and rural areas. Because the purpose of that analysis was to show through comparative analysis the range and pattern of urban-rural differentials, we looked principally at aggregate urban and rural statistics, although these were disaggregated by age. By looking carefully at the differences that emerged among age groups, regions, and patterns of urbanization, we showed that urban-rural fertility differentials are by no means uniform, and that variations in the urban-rural ratio of fertility exist depending on the age group considered, the continental region in which the groups are found, and the relative distributions of population among small, medium and large cities. In this chapter, we will explore some possible reasons for the overall differentials, and more importantly, for the finer variations among urban and rural women. In fact, these within-group variations offer the key to unravelling the complex issue of urban-rural fertility differentials.

During the last fifteen years or so, several explanations have been offered to account for observed urban and rural differences in fertility. While all of them to a certain extent focus on variations between individuals, these may be broadly grouped as those emphasizing differences due to varying concentrations of women with specified characteristics (e.g., literacy, non-agricultural employment, etc.) and those focusing on women who are subject to varying influences of place-related factors (e.g., agricultural zones, income distribution, mass media influence, etc.). If the person-related characteristics fully explain urban-rural fertility differences, then persons with the same set of characteristics can be expected to have similar fertility behavior. While this is of course a gross oversimplification, the converse holds for place-related factors, namely, that if place-related factors entirely determine behavior, then women in places with the same characteristics are expected to have the same patterns of fertility, regardless of differences among the women themselves.

Needless to say, there are no cases in which these absolutes hold. Some studies show that after controlling for variations among women, there are still variations that seem to be due to the place of residence, while others have opposite findings, i.e., that after controlling for variations in the degree of urbanization differences still persist among women. To get at the heart of the matter, it is necessary to take both approaches, first isolating the person factors and then the place factors.

Focusing on these individual and place or community variables, we pose the following questions:

- 1) What units of analysis for "urban" and "rural" define the levels of community most relevant for examining fertility influences: village, neighborhood, community, or city? How small must we subdivide urban and rural to maintain an assumption of relatively homogeneous influence upon individuals living there, while still keeping a large enough area to encompass diverse location related influences or opportunities? Do we need to look at both micro and macro residence characteristics?
- 2) What factors influencing fertility are most distinctively place linked? These might include neighbors, job opportunities, wage structure, investment possibilities, schools, access, etc.
- 3) What factors are more strongly linked to individuals? These may include educational attainment, income, age, place of origin, aspirations, etc.
- 4) How do individual characteristics operate within the context of community related factors in determining attitudes towards children and family size?
- 5) How do varying opportunities or conditions in communities affect the desire and ability of women to have small families?

In attempting to answer these questions, we will begin by looking closely at intra-urban and intra-rural variations in fertility. Based on this discussion, several potential mechanisms for influencing fertility differentials will be identified. These mechanisms are subsequently developed in the discussion of the major theories that have been offered for explaining urban-rural fertility differences: health and sexual behavior reasons, educational differences, cost-benefit differences, cultural and social factors, and modernity factors. Each of these will be discussed, giving the general theory, some evidence in support of the theory, and some modifications that have been made to respond to inconsistencies between hypotheses and evidence.

After considering each of the major theories pertaining to inter-sectoral and intrasectoral differences in fertility behavior, we conclude that no single theory is capable of accounting for the nuances in age, tempo, or intrasectoral differentials. In the last section of this chapter we have merged elements from each of the theories into a more comprehensive theory. The theory is presented as a framework by which to analyze fertility differentials. The framework is not a simple one, but it is comprehensive. Certain locational and individual characteristics are highlighted as being critical to fertility behavior. Because there is much variation in the degree to which these characteristics correlate with high or low fertility, we discuss these with careful reference to the contexts under which they appear to influence the size and nature of the urban-rural fertility differentials.

A Closer Look at Urban and Rural Fertility Variations

In the previous chapter, we showed that while generally urban fertility is lower than rural fertility, there are considerable variations both in the overall differences and for specific age groups. Because the intention in the previous chapter was the development of a general typology for identifying urban-rural fertility differences between countries, we focused almost exclus-

ively on intersectoral differences at the national level. Although some attempt was made to hypothesize why there were variations associated with different age groups, patterns of urbanization, or regions, the analysis was largely descriptive. The purpose here, however, is causal analysis: what accounts for these patterns? Because the data analysis suggested that the effect of urbanization is not simple, and that variations do occur for different patterns, to adequately explore the causal mechanisms for urban-rural differentials requires a more fine-grained picture of urban and rural fertility differences.

Urban-Rural Fertility Differences

As indicated above, a large number of sample surveys show that urban fertility is lower than rural fertility. For example, in Colombia, Costa Rica, Ghana, Honduras, Korea, Nigeria, Sierra Leone, Thailand, and Turkey, urban fertility is lower than rural fertility (Schultz, 1971; Michielutte et al, 1975; Caldwell, 1967; Nance and Thomas, 1971; Cho, 1973; Akinbode, 1971; Dow and Benjamin, 1975, Knodel and Prachuabmoh, 1973; and Schnaiberg, 1970). Most of these studies have focused on differences between urban and rural women as the source of variation between urban and rural fertility rates. Individual characteristics identified as accounting for part of the variation include education, approval and use of contraceptives, income, and mother's age at first birth. In their analysis of differentials in Costa Rica, Michielutte, Haney, Cochrane, and Vincent find that urban fertility may be lower than rural fertility because urban women stop bearing children at an earlier age than rural women, probably by using contraceptives. They find the strongest inverse correlations of urban residence and fertility among the thirty-five and older cohorts, even after controlling for differences in education, income, religiosity, and age at first birth. Dow and Benjamin's study of rural and urban Sierra Leone women further buttresses these findings. Even after controlling for educational differences, rural women are less likely to desire small families or use contraceptives than town or metropolitan women (Dow and Benjamin, 1975; 439-446).

Some studies of aggregate urban-rural differentials find that urban and rural fertility are approximately equal. Interestingly, most of these are Islamic nations, or at least have a large Moslem population. Using 1952 data for Egypt, Abu-Lughod suggests that urban fertility equals rural because these migrants bring high fertility patterns with them. In 1965, the ratio of the urban to rural general fertility rate was .927, a very small difference (Omran, 1973). Bindary et al. have looked at more recent Egyptian data, yet there is still little difference between urban and rural women, probably because non-working women in urban and rural areas have the same fertility levels and urban female labor force participation rates are low in Egypt, as in almost all other Islamic nations (Bindary et al., 1973; Boserup, 1970: 177). Paydarfar finds that controlling for duration of marriage removes almost all of the apparent differences between urban, rural, and tribal women in Iran (Paydarfar, 1975: 155-166). And in his analysis of urban-rural differentials in Algeria, Vallin finds only a slight difference between country and city fertility, which he suggests results from the fact that the factors reducing urban fertility (i.e., delay in marriage, use of contraceptives) are offset by fertility increasing factors such as less sterility and pregnancy wastage, shorter breast feeding periods, and longer reproductive periods. If anything, after age 20, Algerian urban fertility may exceed rural fertility (Vallin, 1973).

A few studies find that urban fertility exceeds rural fertility. Kohli shows that in Iraq the zones that are least urbanized and have the lowest literacy rates also have the earliest ages at marriage and almost universal marriage. These are also the zones with high urban and rural fertility, where urban fertility may even exceed rural fertility (Kohli, 1977: 180). A similar phenomenon is found for women before age 25 in Sri Lanka (Fernando, 1974). A recent analysis of fertility in metropolitan Lagos, Ibadan, and rural Nigeria suggests that the observed differences in fertility may be due to a shortening of breast feeding and post-partum sex taboos, so that the shortest durations are found in the more urban areas. The result is that although there are low fertility women in Lagos, in the aggregate Lagos has

the highest total fertility rate, 7.30, while Ibadan and the villages have only 5.3 and 5.8, respectively (Adegbola, Page and Lesthaege, 1977). Similarly, Arowolo finds that young urban Ibadan Yorubas have higher fertility than their rural counterparts, and because they comprise a large share of the childbearing cohorts, total fertility rises (Arowolo, 1976). Thus, changes in customs in urban areas may lead to either higher or lower fertility.

It seems that urban and rural fertility differences are affected by differences in the spacing of births for individual cohorts. Urban fertility may be lower because city women marry later, but late marriage may not create a differential if urban women "catch-up" or even overcompensate, as the Nigerian and Sri Lanka analyses suggest. Subsequent use of contraceptives among city women may reduce fertility. The net fertility differential is a weighted sum of all these factors.

Individual Factors Affecting Urban and Rural Fertility

The selected studies mentioned above have made some attempts to differentiate low from high fertility women in each sample. Women who have smaller completed families tend to be more educated, upper income, married to white collar workers, and may have their own professions. These correlations, while not universal, have been substantially supported by studies in Algeria, Costa Rica, Iran, Mexico, Nigeria, Sierra Leone, and Thailand (Vallin, 1973; Carvajal and Geithman, 1976; Paydarfar and Sarram, 1970; Zarate, 1967; Morgan, 1976; Dow and Benjamin, 1975; and Knodel and Prachuabmoh, 1973, respectively). Surprisingly, those with some education and moderate incomes have larger families than either the next higher and lower classes of women in both Nigeria and Thailand. We can not assume that any of the above individual factors has a simple inverse linear relation with fertility. By controlling for these variables among women, researchers have been able to reduce the amount of variation observed for fertility rates in both the cities and countryside. After controlling for these differences, some researchers have still found lower urban than rural fertility, as for example in Costa Rica, Sierra Leone and Thailand. This suggests that different places also influence

fertility behavior. We turn now to these place-related factors.

Place Factors Affecting Urban and Rural Fertility

Many studies of place-related factors control for differences in women's educational levels. When samples are controlled for level of education, women with the same levels of education do not necessarily have lower fertility in a large city. In Venezuela, for example, those with more education tend to favor small families. In cities both over and under 200,000 approximately the same percent of women with secondary education favor small families. However, among women with primary education there are substantial differences in preferences: 20% of those with some primary education living in rural areas favor small families, while 33% of those in the 20,000-999,999 city size class favor small families and 45% of those in the 200,000 and over category favor small families (Kennedy et al., 1974). In this case education seems to have a stronger impact on attitudes favoring small families in larger cities. Elsewhere, education differentials may not vary as much between urban areas. In Korea, women with education have successively smaller families as the perspective shifts from rural to town and then to metropolitan areas, but the largest marginal change in fertility for women with either primary or secondary schooling results from comparing town and rural women, not town and metropolitan women (Cho, 1973:20). Literate women in Freetown, Sierra Leone actually have slightly higher fertility than literate women in other towns and up to ages 40-49 the non-educated have higher fertility than town non-educated women (Dow and Benjamin, 195:434-5). The effects of living in a large city and being educated do not always act in concert to lower fertility goals or behavior.

Another individual variable for which place-factor studies control is approval and use of contraceptives, for which differentials are more consistent by size of place. Educated women in Freetown are more likely than their town counterparts to use contraceptive methods (Dow and Benjamin, 1975:446). In Costa Rica, Puerto Rico and Thailand, living in or near the capital metropolis is correlated with a higher likelihood of using contraceptives or terminating childbearing earlier than elsewhere (Michiellute et al., 1975; Stinner et al., 1975; Knodel and Prachuabmoh, 1973). In Brazil, however, there is a stronger

association between industrialization and desire for and attainment of small families than between city size and small families (Rosen and La Raia, 1972: 353). The most unexpected finding is that in Korea small town women are more likely to favor and use contraceptive methods than women living in small cities. It is suggested that this results from the fact that in small towns there is more face-to-face communication, which may be a better medium for communicating family planning information than mass media.

What are some of the place related factors to which these differences are attributed? Rosen and LaRaia emphasize correlation between smaller families, modern attitudes, and industrialization. In a complementary article Rosen and Simmons show that industrialization provides a context for exposure of young women to alternative role models and interactions which are conducive to favoring and actually deciding to have small families (Rosen and Simmons, 1971:46-69). In attempting to show why more education does not necessarily produce modern attitudes and behavior with respect to small families, various explanations have been offered as to the necessary complementary conditions. These include non-agricultural work, women's work incompatible with child care, higher returns for education, commitment of the wife to her work, exposure to alternative roles and approval of outside-the-home activities for women. After considering all these conditions it seems that heterogeneous contacts, neighbors, and opportunities for women are the key place factors affecting these attitudinal changes. Goldberg's comparative analysis of Mexican and Turkish women highlights this factor as a better discriminator between high and low fertility women than socio-economic status or migrant history (Goldberg, 1976; 387-465). Because a number of the low fertility factors operating on individuals are seen to operate through changes in awareness and aspirations, this theory of heterogeneous contacts and opportunities is particularly attractive.

While this discussion has not covered the full range of interactions between individual and place variables in the urban setting it is enough to suggest that places themselves moderate the effect of individual characteristics.

Further, the moderating effect does not seem to be the same across different classes of cities, as shown by the discussion of education, city size, and fertility differences.

These varying effects can be due to differences between and within cities of any class. As Nagata has shown for Malaysia, cities may contain similar people but through differences in historical development will emphasize different value orientations and opportunity sets. As a result, it is possible for Malays in a smaller city to be more modern, self-confident, and economically independent than Malays in a larger town which was subject to more intensive colonial pressures (Nagata, 1974: 1-26). In addition, city size changes alone may not systematically correlate with variations in socio-economic variables, because cities are heterogeneous and fragmented. For uniform influences to occur the social structure needs a high degree of integration (Namboodiri, 1966: 38-39). Finally the cities themselves may be made up of persons who are not native to the city. Even if the city were to exert uniform influences, migrants would not be subject to the same influences. Many studies show that migrants have lower fertility than natives, particularly if they come from other cities. These are all reasons why there may be no pure or city-wide "urban" effects associated with different sizes of cities. If Goldberg's concept of heterogeneous contacts and options is valid, place factors would seem to operate primarily at the neighborhood level and secondarily on a wider city opportunity set, which may vary with industrialization, employment opportunities, historical development, and general opportunities for women, among other things.

Inter-Rural Variations in Fertility

Analysis of inter-rural variations may also help clarify the levels at which place factors operate. Part of the between-rural fertility variations result from variations in economic monetization, diversification and dynamism. Caldwell's 1963 study of three zones in rural Ghana concluded that the largest families were found among the most subsistence agricultural zone. This high fertility is related to high infant mortality and the need for children to

work on the farm. In the more modernized areas the complementary shifts to more cash crops and more education for children have reduced parental demands for and ability to afford large families (Caldwell, 1967:222-28). In his contrast of monocrop and diversified agricultural zones, Yengoyam also finds that the more commercialized and diversified zone generally has smaller families, again because children are not as heavily utilized in the work, but also because the diversified economy provides alternative investment opportunities to children (Yengoyam, 1974:58-72). A contrast of rural Tanzanian populations with different levels of diversification, investment patterns, and economic dynamism suggests that the more dynamic areas may have slightly lower fertility, although the differences are not as clear cut as in the previous examples (Kocher, 1976:87-91). However, for India (1961), Kleinman has shown that more resources, i.e. more land per household, more non-agricultural jobs and more cash cropping, are correlated with higher fertility. While some of the difference between Kleinman's and others' findings may result from comparison of different measures of resource levels, the difference also reflects the fact that fertility is restricted where resources are not available to support large families, a theory supported by anthropologist Polgar (Kleinman, 1973:690-694; Polgar, 1972:203-209).

Some clarification in interpreting these conflicting findings comes from the anthropological perspective. Studies in rural Guatemala, Mexico, and Kenya suggest that fertility differences between villages result from differences in openness to change, hope, and patterns of community self-help. A Guatemalan village with a background of getting things done to improve itself exhibits a greater tendency for women to feel responsible for their children's health and therefore abstain from sex while nursing than do women in a more dependent, fatalistic community (Hinshaw et al., 1972:227-230). The same pattern of lower fertility among women in towns more open to change or with a philosophy of hope and self-improvement is shown for Mexico

and to a certain extent, Kenya (Reining et al., 1977). These studies suggest that combined differences in resources, economic diversification, and community-wide attitudes towards self-improvement may affect inter-rural differences in fertility.

Inter-Rural Fertility Differences

But just as within cities there is a wide range of fertility behavior, there is wide variation within rural areas. Differences among the women themselves may partially account for fertility variations. As among urban women, differences are attributed to age at marriage, spacing between births, education, and income. For Iraq, Kohli has shown that higher rural fertility is correlated with earlier age at marriage, as it is in Korea, Sierra Leone, Guatemala, and several other Latin American nations (Kohli, op cit., Dow and Benjamin, op cit., Cho, op. cit., Hinshaw, op cit., and Balakrishnan, 1976:168). Fertility is also higher among women who space births closely, either because they experience infant and child deaths which interrupt lactation and reduce post partum amenorrhea and the period of sex taboo associated with nursing, or because they do not practice lengthy periods of abstinence while nursing. In rural Chile, high rates of infant and child mortality shorten the birth interval by 4½ months, raising completed fertility (Oberg, 1971:131). In Bangladesh upper class women are likely to shorten the breastfeeding period, or at least to reduce its frequency until it no longer produces amenorrhea (Huffman et al., 1977). The same phenomenon occurs among upper income Philippine women, but there better educated, poor women are more likely to breast-feed and to do so for a longer period (Popkin and deJesus, 1976). Because these latter studies do not include an analysis of family size goals, it is difficult to assess whether these changes in custom are conscious means to have more children or merely a setting aside of traditional ways.

Because in urban areas higher educational attainment and upper incomes have often been associated with smaller families, some researchers have expected that the same correlations will hold for rural families. The empirical findings do not unanimously support this hypothesis, however. A 1973 survey of rural Egyptian women strongly confirms the inverse relation between education and fertility (Khalifa, 1976:54-5). Miro and Mertens have also shown that this relationship holds for rural Chile, Columbia, and Mexico (Miro and Mertens, 1968:105). Among rural women ages 30-49 in Sierra Leone, literate rural women have substantially more children than their town or village counterparts. Rural women with at least one year of formal education have fewer children than rural women without schooling, but the differences are small except for the oldest cohort (Dow and Benjamin, 1975: 434-5). In Thailand and Iran, researchers found no consistent relation between education and fertility among rural women (Ajami, 1976:460; Knodel and Prachuabmoh, 1973b:53-5). Education is correlated with higher fertility among rural women in Iran (Paydarfar, 1975:151-166).

The findings regarding rural income level and fertility offer even less support to the hypothesis of inverse relation. In Thailand there is no consistent relation between rural fertility and material possessions (Knodel and Prachuabmoh, 1973b). In Tanzania, there seems to be a weak relation between possession of material goods and perception of the disadvantages of large families, but whether this represents a net inverse effect on completed fertility is questionable (Kocher, 1976:81-82). A positive relation is shown in Iran, where ownership of consumer durables is positively correlated with children ever born (Ajami, 1976:458). Paydarfar has suggested that the lack of an inverse correlation between education or income and rural fertility may reflect the fact that the traditional large family goals still prevail, with better education or higher income becoming "modern" tools by which to better attain traditional goals (Paydarfar, 1975:166).

As in the urban milieu, the correlations between individual characteristics and fertility are not uniform. In some rural areas, more educated women have lower fertility; in others, the opposite is the case. The correlation between income and rural fertility seems even weaker and more varied. Stronger relations exist between fertility and age at marriage, duration of breastfeeding, and post-partum taboos, but the women who delay marriage or respect taboos are not always the same ones. In fact, it seems that while more educated women may marry later, they are also among the first to shorten the breastfeeding period. Among the place related variables, the variables which may influence rural fertility include monetization and diversification of the economy, resource scarcity, and community progressiveness or openness to change.

Although factors operating in urban and rural areas are not necessarily the same, there are some common themes to the analyses for both areas. Health factors and customs relating to sexual behavior are important both at community levels and among individual women. Education and income factors exert varying degrees of inverse impact on fertility. It seems that place related variables may act as important intermediate variables in determining whether "modern" attributes lead to traditional or modern family goals. Community, social, and economic heterogeneity, "modernity," and diversity may influence the degree to which women are aware of, approve of, and actually obtain smaller families. In the following section we systematically explore each of the factors.

Theoretical Approaches to Urban-Rural Fertility Differentials

The discussion above shows that there are some inconsistencies between the correlates of low urban and rural fertility. Although customarily it has been expected that better educated, higher income women, especially those in the "urban" city, will have lower

fertility than uneducated, low income women, we have seen that this is certainly not the rule, particularly in rural areas where almost the reverse is the case. With the other evidence presented, we take this to mean that locational factors operate in conjunction with the individual characteristics. In fact, it would seem that the same factors may operate in a dual sense, first to alter constraints or considerations for individuals and second to produce broad changes in the community wide values or constraints. For example, education may enable women to perceive advantages to small families, but without a higher general education level creating opportunities to see others with smaller families or to perceive that children can and do go to school longer, it may not be realistic to expect that a small change in the individual can counter the overriding community constraints. Health factors, education, costs and benefits of children, attitudes to families and the role of women, and modernity all vary among individuals, but they vary among places, too, and their net effect on any woman's fertility will be a joint product of the individual and place differences. For some the place differences may be more critical than individual ones, but for others, individual differences may predominate.

The Davis-Blake Model

A simple model for explaining fertility differentials was offered by Kingsley Davis and Judith Blake in 1956. According to their model fertility within any culture can be accounted for by factors affecting exposure to intercourse, conception, and gestation and successful parturition. High fertility results from frequent coitus, little use of contraception and low fetal mortality. There are two sets of factors affecting exposure to intercourse: establishment and dissolution of unions and exposure to intercourse within unions. Establishment and dissolution of unions is regulated by age of entry into sexual unions, proportion of permanent celibacy, and length of time between unions, while exposure to intercourse within unions is governed by voluntary abstinence, involuntary abstinence (e.g. illness or separation), and coital

frequency. Intercourse is, however, no guarantee of conception, and Davis and Blake suggest that the probability of conception is in turn affected by health related fecundity or infecundity, use of contraceptive methods, and voluntary infecundity (i.e. sterilization). Similarly, not every conception results in a birth. Fetal mortality from involuntary or voluntary causes may result in abortion or still-birth.

Varying customs and constraints in pre-industrial societies affect these intermediate variables to produce high fertility, while in industrial societies low fertility tends to result. In pre-industrial societies extended family systems benefit from early marriage, because this increases the likelihood of being able to have large families guaranteeing heirs. Marriage is nearly universal and there are no well developed or accepted ways of integrating single persons into a family-based society, except as religious figures. Likewise, there are strong pressures to remain married and unions are dissolved infrequently. Coital frequency and, of course, involuntary abstinence vary between societies. In pre-industrial societies, little use is made of voluntary contraception, not because methods are necessarily unknown, but because they are often unpleasant or unhealthy. Further, given high mortality rates, couples may fear that births averted now will be wanted later. In an atmosphere of little couple communication, this generally acts to limit use of methods to control contraception. Abortion practices also vary between societies, but where they are practiced this can limit fertility. High fetal mortality rates may also reduce the likelihood of a live birth. A more common fertility reducing practice is voluntary abstinence, usually after a birth, but also at other times. These generally protect either the child or parent from health risks or ritual dangers. In fact, in many pre-industrial societies voluntary abstinence may be the strongest and only factor acting to lower fertility. Given the composite effect of factors stimulating high fertility, high fertility in pre-industrial societies is almost a certainty (Davis and Blake, 1956).

Although Davis and Blake originally intended the model to be used for analyzing differences between societies, it can also be used to examine intrasocietal differences. If these various intermediate variables were known for any given community, its fertility could be predicted with reasonable accuracy. At first glance it appears that rural communities might conform to the high fertility pattern described above and that urban would follow the industrial pattern. However, our examination of intra-urban variations leads us to question this assumption. There are definitely high fertility groups within industrialized cities as well as low fertility groups in rural areas. While the model's intermediate variables are still valid, to be useful for describing intra-urban or intra-rural variations an additional level of analysis is necessary, namely the individual, social and cultural factors that affect the intermediate variables themselves. It is to these factors we now turn our attention.

Infant Mortality and Fertility Differentials

Perhaps the simplest theory for describing fertility differentials is that which links high mortality to high fertility. In societies where post-partum amenorrhea and voluntary abstinence while nursing constitute the major impediments to high fertility, any shortening of either period may lead to an earlier exposure to the risk of pregnancy. Where infants die soon after birth, lactation is suspended and can actually reduce the period of post-partum amenorrhea to as little as 1.5 months. Where children are breastfed for two years the average period of amenorrhea is 7-8.5 months. If a child dies before age two, this may drop to 5-7 months (Hinshaw et al., 1972: 227; Oberg, 1971:131; Saena, 1977:48). Even if there is no taboo on sex while a mother is nursing, high infant mortality can reduce intervals between births by shortening the period of amenorrhea. More commonly, couples practice voluntary abstinence while nursing, primarily to protect the infant's health from "bad" influences, but sometimes to consciously avoid pregnancy too soon after births. Where nursing continues up to two years, as it often does, this will give an almost three year spacing between births. If infants die before they are

weaned this shortens the inter-birth interval by allowing earlier resumption of intercourse.

As Ridley, Sheps, Lingner, and Menken have shown, overall mortality declines can also increase the length of the reproductive period, which tends to raise fertility, but if women practice post-partum abstinence the net effect is lower completed fertility (Ridley et al., 1967:86). If women are not fully fecund before the mortality decline, fertility may actually rise with increased survival rates. In conditions of high mortality, women may be sick or malnourished, consequently subfecund. Because improvements in survival rates may be accompanied by better nutrition and reduced incidence of debilitating diseases, women who were previously subfecund may become more fertile. Better nutrition can also shorten the period of post-partum amenorrhea as for example in Bangladesh (Huffman et al., 1977; Frisch, 1975: 19-20). If subfecundity is prevalent, as in rural Central Africa, then mortality declines may be associated with higher fertility before any fertility declines (Retel-Laurentin and Benoit, 1976:280).

In general, however, the spacing effect of lower infant mortality prevails and infant mortality and fertility are directly correlated, as has been shown in Chile, Guatemala, Senegal, Taiwan, and a number of other countries (Oberg, 1971; Hinshaw et al., 1972, Cantrelle and Leridon, 1971; Li, 1973; Schultz, 1976). As expected, mortality related fertility declines are greater when couples practice abstinence while breastfeeding (Hinshaw et al., 1972; Cantrelle and Leridon, 1971). Of interest is the fact that a decline in infant mortality had a stronger fertility reducing impact in rural than urban Taiwan (Li, 1973: 103-4). This may be due to the fact that the custom of abstaining while nursing is more often followed in the rural areas, but in urban areas where the custom is less prevalent, other factors more strongly influence fertility. Similar urban-rural differences in upholding

abstinence while nursing are reported for Algeria, Guatemala, and Nigeria (Vallin, 1973; Teller et al., 1977; Adegbola et al., 1977).

Even among rural areas, not all groups practice long periods of post-partum sex taboos. In rural New Guinea, infant mortality has dropped from 189 to 49 per thousand in the last twenty years, but at the same time there has been a decline in the period of post-partum abstinence and an increase in fecundity due to the eradication of gonorrhea. As a result rural fertility is close to the biological maximum (Ring and Scragg, 1973:95). Many factors influence the establishment and persistence of long post-partum sex taboos. Long sex taboos are more common among societies practicing extensive agriculture and polygyny, ascribing low status to women both at home and at work, having unilineal kin groups with tight communities and rigid rules of inheritance, and providing separate huts for each wife and her children. In these groups the post-partum sex taboo is considered necessary to ensure the faithfulness of a wife who might otherwise stray from an older husband who has several other wives (Saucier, 1972:247). Where women have significant and independent roles and cultivators, they may stop breastfeeding or use supplemental feeding sooner. Ironically, this may result in malnourishment for the infant and higher infant mortality, resulting in closer spacing between births (Nerlove, 1974:210-213).

Another factor that influences the degree to which a mortality decline is transmitted into a fertility decline is the extent to which parents continue to expect high mortality and have extra births to compensate for anticipated deaths. As Schultz (1976) has shown, there is a price inelastic demand for a certain number of surviving children, especially a son, surviving to maturity (O'Hara, 1972:486). Yet even after mortality has declined, parents will continue to behave as if this had not happened because of a lag in perception of the mortality decline.

The lag between mortality and fertility declines is about 12 years, or one-half generation, and the desire to replace infant deaths is strongest among the oldest and youngest cohorts. While mortality is declining, replacement responses may actually increase completed family sizes by 50% over previous targets under high mortality conditions. To reduce family size under conditions of increased life expectancy and higher child survival rates, women need to reduce births by 130% per unit mortality decline. (Schultz 1976:265-283). Where the concern for replacement of infant deaths is not strong, mortality declines have been associated with constant or smaller family sizes, but elsewhere families may grow until the mortality risks are correctly perceived.

We have some evidence about locational conditions associated with infant and child mortality declines, including better water supplies, material and child health care, more equitable income distribution, but what about the perception of falling mortality and the reduced pressure to replace infant deaths? Here there are few analyses. A study of replacement responses among rural Guatemalans suggests that less replacement response is found among families that prefer healthy children to a large and possibly unhealthy family. Hinshaw, Pyeatt, and Habicht show that this occurs more frequently in a more forward-looking, socially and economically advanced town (Hinshaw et al, 1972). Logically, one expects that women who have contact with other women whose children are more healthy, i.e. through broader work contacts, neighbors, the media, may perceive changes more rapidly than women in isolated communities or neighborhoods, but we know of no studies that empirically test this relationship.

In general urban infant and child mortality rates are lower than rural rates. Where post-partum sex taboos are practiced, this

differential alone can result in a urban-rural fertility difference. The difference due to better child survival usually appears after a lag, so if urban mortality declines before rural mortality, urban fertility will drop first. To the extent that urban women do not practice post-partum abstinence while nursing or do not nurse at all, the mortality-related fertility declines are less than expected. This may be the explanation for the stronger rural than urban association between mortality declines and fertility declines. However, women in rural areas may be slower to perceive the changes in mortality, which leads to continued anticipated replacement responses that may result in slightly larger families until the women's perceptions match reality.

Education and Fertility Differentials

In many comparative analyses, education is shown to be inversely related to fertility. Female education has a stronger inverse impact on fertility than male education. Also, not all education has an inverse effect. Though findings differ, negative relations between fertility and female education emerge after 4-6 years (Williams, 1976: 133-5). There is no single, uniform theory showing why this is the case. Education itself does not reduce fertility. It operates through intervening variables.* Women having some education may have lower fertility because they:

- 1) Marry at an older age.
- 2) Have better access to information about contraceptives and small families.
- 3) Have aspirations of upward mobility.
- 4) Emphasize present consumption of modern goods.
- 5) Have better employment options at better pay.
- 6) Desire education for their children, which increases their cost.

*For a detailed review of the theories and evidence regarding education intervening variables and fertility interactions see Cochrane (1977).

- 7) Have more egalitarian relations and participate in decision with their husbands.
- 8) Experience lower infant and child mortality.
- 9) Have a sense of control over their own fate (personal efficacy).

Holsinger and Kasarda stress the importance of education for increasing the likelihood that people will desire and work to achieve conformance between their attitudes and behaviors. Thus, if a woman decides that small families are better than larger ones, if she has some education, she may be more likely to do something to achieve a small family. Unlike her less educated sisters, she does so because she has a sense of personal efficacy or control over her own life (Holsinger and Kasarda, 1976). The combination of aspirations for the future, consumerism, and a sense of personal efficacy are often included in modernity indices, and education is strongly correlated with these factors (Miller and Inkeles, 1974; Schnaiberg and Armer, 1974). Cochrane has compared regression equation coefficients for some of these variables. While her variables do not include consumerism aspirations, or self-efficacy, she does consider preferences for children relative to other goods, education costs for children, husband-wife communication, and the other variables listed above. Her analysis shows that the strongest effect of education is on approval and use of birth control, because of access to more information and, more importantly, better perception of the costs of children. Education's effects are strong in urban areas, but weak in rural areas (Cochrane, 1977).

This urban-rural difference in the effect of education is found in other empirical studies. Kennedy, Paul-Bello and Rojas de Lara (1974) show that education's impact on fertility in Venezuela is much less in rural areas. In all areas literacy correlates with greater use of family planning, but only among higher parity women. Similarly, the

higher propensity to work among educated women correlates with lower fertility, but because lower paid women also have lower fertility, this inverse relation is not due to the opportunity cost of children. Lower class women have less likelihood of lower fertility, but for middle and upper class women there is no consistent support for the argument that women trade higher status and more consumerism for lower fertility. Across the age and social class spectra, the strongest effects of education on fertility operate through higher aspirations: education changes women's perceptions of themselves, increases their effectiveness in communicating with their husbands, and, especially, raises their desires to maximize opportunities for their own children by limiting their number.

The correlation between education and fertility is weak among rural women because the first act undertaken to enhance her own or her children's chances for upward mobility is often migration to the city, leaving behind women with low aspirations. This may also explain why over three-quarters of those with some secondary education live in the cities: either they moved so they could be educated at the secondary level, or having secondary education their aspirations could only be realized in the city. Once in the city, a woman's aspirations motivate her to find out about and use methods to limit her family to the number she can raise in the way she wants (Kennedy et al., 1974:21-23).

This perspective on how education operates to reduce fertility removes some of the confusion concerning urban-rural differences. First, it explains why education has a stronger inverse impact in urban areas and less or no such impact in rural areas as is demonstrated by studies in Iran, Korea, Nigeria, Taiwan, and several Latin American nations (Paydarfar, 1975; Lee, 1976; Lucas, 1977; Li, 1973; Edmonston and McGinnis, 1976; and Carleton, 1965). Second, it explains why a little education is less likely to have an inverse impact while more than primary or secondary does have an inverse impact, as is shown for Korea

and several Latin American nations (Lee, 1976; Carleton, 1965; Edmonston and McGinnis, 1976). Third, the higher aspirations argument is not inconsistent with the findings that higher education is not necessarily correlated with smaller families, as in Latin America, Liberia, Cameroun, or Nigeria. These women may have high aspirations, but because they can earn more they can educate more children than their poorer sisters and can afford to pay servants to help out while they work. Therefore, large families are not necessarily incompatible with aspirations among the highly educated (Carleton, 1965; Handwerker, 1977; Koenig, 1977; Caldwell and Caldwell, 1977). Fourth, where education raises aspirations, this may also delay marriage for young girls attaining additional schooling or working to "establish" themselves; again because opportunities to do so are more readily available in the urban milieu, this further strengthens the urban over the rural impact of education and accounts for Balakrishnan's findings that education is not correlated with delayed age of marriage in rural Latin America (Balakrishnan, 1976:170).

Costs and Benefits of Children and Fertility Differentials

The education-fertility relation can be viewed as a subset of the theory that, ceteris paribus, differences in the perceived costs and benefits of children account for fertility differentials. The perceived costs and benefits may vary among individuals, but different socio-economic settings may also determine the range of child costs and benefits. In the section that follows we shall show what contributions this theory has and has not made to explaining the determinants of place-related fertility differentials.*

The cost-benefit theory of fertility focuses on the household, and assumes that conscious decisions are made about family size. The

*For a more detailed review of economic analyses of fertility see Schultz (1973). For a critique of the "new household economics" see Leibenstein (1974) and Nerlove (1974).

decision is made by household members, and is based on their individual perceptions of net benefits or cost of children. Both economists and sociologists have contributed to the theory. The economic approach emphasizes the maximization of utility by the household, given the relative prices of children versus other goods (Becker 1967, 1974). The sociological approach emphasizes the factors which determine those preferences. Syntheses of the two approaches have been made, attempting to give due consideration to both sociological and economic variables (Easterlin 1969, 1973; Leibenstein 1974).

To reflect both the economic and sociological perspectives, the theory considers pecuniary and non-pecuniary costs and benefits. Pecuniary costs include maintenance costs, education costs, direct and/or opportunity costs of child care, opportunity costs of foregone consumption, and costs related to child mortality. Non-pecuniary costs include psychic or emotional costs, losses in social and/or geographic mobility, increased dependency on kin, and loss of leisure. Pecuniary benefits include children's contributions to household income from working outside the home, contributions in kind to household tasks or child care, payment for schooling of siblings, and support to parents when sick or old. Non-pecuniary benefits include psychic rewards, status or prestige to the parents, fulfillment of ritual or lineage needs, and enhanced security for the parents. Because of the non-quantifiable, culture-linked nature of the non-pecuniary costs and benefits, these are less well integrated into the framework, but some attempts have been made to discover what weights couples assign these factors in their decision process. We have included them here to show their importance, but where these non-pecuniary factors are overriding households may be constrained to a less than optimal decision (Easterlin 1973). The number of children a couple can support is still constrained by their income and the price of children, but their choice may not minimize pecuniary costs or maximize pecuniary benefits.

It is important to note that the cost-benefit framework is relevant for two basic types of decisions: desired family size and whether to have a child at any given parity. Thus a young couple may perceive four as a desirable number of children, but with endogenous and exogenous changes in cost-benefit considerations they may decide to stop after three. Changing opportunity and maintenance costs of children at different parity levels may lead couples to postpone births or reduce the desired family size. Decisions to migrate or to obtain an education may alter the social and locational environment and the cost-benefit considerations of couples. Furthermore, exogenous changes in the community's social and economic structure and values can also alter significantly the economic and social benefits of children. This is of major interest here, because it helps demonstrate how women living in changing urban and rural worlds modify their fertility expectations and behavior over time. What are salient costs to a woman contemplating her first birth may become insignificant for her fourth and what were tangible benefits to a woman in the country may evaporate when she moves to town. Without allowing for these variations, the static model can not account for real world fluctuations. In the following discussion we highlight how changes in parity, opportunities, or socio-economic status can affect child decisions.

Pecuniary Costs of Children

Maintenance costs

The major items of maintenance expenditures on children are food and clothing. Housing is a cost that is not directly attributable to any additional child (Lindert 1973). At low levels of income, expenditure on these basic needs constitutes a large percentage of total income, because these expenditures are very unresponsive to changes in the level of income. Therefore, each additional child will increase the share of expenditures on basic necessities. At low levels of income this means

that large families can substantially reduce income available for non-basics (Espenshade, 1973).

Maintenance costs per child also seem to decline with higher parity. The highest marginal costs are those for the first child, and thereafter marginal costs decline slightly per child. Using historical data on the United States, Lindert (1973) found that the marginal cost of housing and child care for an additional child in a household with children is negligible. For other maintenance costs such as clothing economies of scale also exist, with the marginal cost of clothing highest for the first child. As a result, it is possible for the maintenance cost consideration to be less critical at higher parities.

In addition, at different parity levels maintenance costs may be allocated differently. Tienda shows that depending on the lifecycle state and parity level, couples may send children to live with other kin (e.g. brothers or sisters), thereby reducing maintenance costs of additional children (Tienda, 1976). Families in urban or rural areas may share the cost of children in this fashion, although it is more common to send rural children to town, where they may live with kin while attending school, as in Guatemala City, Manila, and Nairobi (Van der Tak and Gendell, 1973; Stinner, 1977; Weisner, 1976). Later when their children are working or have left home, these families may reciprocate by taking in other families' young children. Thus, different living arrangements can be used to smooth out the costs of raising children.

Education costs

By far the most significant costs are educational costs, both direct and indirect. These costs include not only fees, supplies, and clothing, both required and expected, but also the opportunity cost of

a child going to school and not working. Therefore, where these costs are high, parents are expected either not to send children to school or to limit their family to the number that they can afford to educate. Typically where children participate in farm work or in the urban service sector, the opportunity cost of their school attendance may be significant. Even though children may not actually earn much, their relative contributions may be significant for families at low income levels. Furthermore, their activities may free other household members for better paying jobs, as for example in Laguna, Philippines where older girls work at home while their mothers work outside the home (Boulier, 1976). These opportunity costs may vary by sex and, other things being equal, parents may perceive a lower cost to sending boys to school, if, as in many African nations, girls perform useful and even essential household tasks from an early age (Cleave, 1974; Boserup, 1970).

Substantial as these direct, related, and opportunity costs often are, parents in both cities and villages strive to send their children to school. In many cases, if they can ensure that at least one child completes secondary school, the first educated child shares the responsibility for assisting siblings in getting through school. This is customary and expected, for example, in Hong Kong, Singapore, Nigeria, and Kenya (Salaff and Wong, 1977; Okediji et al, 1976; Reining et al, 1977). This assistance may also substantially lower education costs for younger children and lessen the negative financial burden for large families.

The great willingness of parents to send children, especially sons, to school derives from the fact that educated children are seen as an investment. In a static economy with narrow wage differentials and few differentiated skills, the costs of education may not be warranted, and in fact enrollment rates are much lower in rural areas. But where there are sizable wage differentials associated with education, there is

considerable incentive to educate children in hopes that they will be able to obtain a higher paying job. In Tanzania during 1966-70, for example, non-educated men in cities earned 230 Tanzanian shillings/month. Men with one to four years of education were able to slightly better this wage but for five to eight years of schooling the increase was considerable, to 322 shillings. Those lucky enough to get more than eight years of schooling could hope for another income jump, to 448 shillings per month (Barnum and Sabot, 1976). If educated children do obtain higher paying jobs, they can and do contribute substantially to their parents' income. They contribute cash and gifts (often the parents' only durable good consumption), pay school fees for siblings, and, of equal if not more importance, can be counted on to support their parents in old age. Given high unemployment rates among the educated in some countries, this seems like a very risky investment, but where alternative investments are limited and even more risky or where no other investment can be made to ensure old age support, parents often prefer investing in their children's education (Caldwell, 1976; Court, 1976; De Tray, 1976).

Given these costs, ways of meeting them and incentives to do so, under what circumstances do the costs actually act as a brake on fertility? This is very difficult to determine empirically because of the lag between births and education outlays, but evidence from Peru, Kenya, Nigeria and Venezuela suggests that women who would like to "properly" school their children, who have aspirations for them, are more likely to desire and have the smaller families they can afford to educate (Smith, 1973; Reining et al, 1977; Caldwell, 1976; Kennedy et al, 1974). In Latin America where costs of raising and educating children are perceived as high, couples are more likely to favor relatively small families (Simmons, 1974; Micklin and Marnane, 1975).

Living in town or in the country affects perceptions of education costs and options. Mortality rates generally are higher in rural areas,

therefore parents in rural areas may feel that they need more children than their urban counterparts. If girls have significant responsibilities for housework, parents may not feel they can afford to educate girls and instead will focus on sons. Given unemployment risks, parents may still feel compelled to educate two or more sons. If education entails significant direct, indirect, or opportunity costs, there may be less incentive for low income families to attempt to educate either girls or boys, particularly if only higher levels of education have higher payoffs. Nypan has shown that in Tanzania where there are sharp socio-economic differentials there are also sharp differentials in education aspirations: the urban elite expect their children to be well educated and can afford to provide that education, while few of the poorer farm families sustain such high aspirations, and even if they do, cannot afford enough schooling to reap the high rewards. A vicious circle results with urban families obtaining more education, higher salaries and higher aspirations for their children while the farmers, especially subsistence ones, become more and more educationally disadvantaged, with relatively lower educational aspirations for their children, and for our purposes, less consideration of the high educational costs of large families (Nypan, 1972). Therefore, differences in aspirations, mortality, and income act to limit the relevance of educational costs for many rural families.

Income opportunity costs

After educational costs, the next major cost associated with children is the opportunity cost of the time inputs for child care. Because a child reduces the amount of time a woman spends working productively, children can reduce earning potential. Conversely, if women work, they may not as easily take care of children, thus work and child care may be conflicting activities. Studies have not been able to consistently support this hypothesis, however. For the labor force-fertility or opportunity cost-fertility relation to hold certain conditions are required.

The first modification of the theory has resulted from observations that in rural areas, labor force participation has no inverse impact on fertility. Stycos and Weller suggested that this is because there is no role conflict, because children accompany their mothers to the field (Stycos and Weller, 1967:210-217). An inverse relation is expected only between fertility and non agricultural work, which generally limits the inverse impact of work to urban women. Consistent with this theory, urban, but not rural, negative labor force-fertility relations have been documented in Thailand, Chile, Philippines, and elsewhere (Goldstein, 1972; DaVanzo, 1972; Harman, 1970).

Even among urban women, working is not always related to lower fertility. With the growth of an "informal" sector in metropolitan areas of many developing countries, petty service occupations in this sector provide employment compatible with child care responsibilities. Children can easily accompany women to the market, and they may even be recruited as assistants at an early age. Probably for this reason Latin American women are heavily represented in the informal sales and service sectors (Merrick, 1977). Where women can operate out of their own homes child care and work are even more compatible. Therefore, there are strong pressures to acquire a home and set up shop at home (Smith, 1973). As a result, informal sector occupations and home industries fail to correlate with small families, even in the urban areas (Goldstein, 1972:430; Speare, 1973: 323-34; Blumberg, 1976:16).

After separating "compatible" from "incompatible" occupations studies of women in cities of Venezuela, Peru, Philippines, Cameroun, and Nigeria have failed to find a consistent inverse relation between incompatible work and family size (Bamberger, del Negro and Gamble, 1976; Roy, 1969:69; Boulier, 1976; Koenig, 1977; Caldwell and Caldwell, 1976). This is because even though these women have to trade work for child care, they have daughters who take care of younger siblings, can afford to support kin (sisters, mothers, etc.), or can hire servants to take

care of children while they work. In fact, because the cost of domestic servants is so low, even middle class women can hire servants to take care of children while they work (Smith, 1974; Caldwell, 1976). If domestic servants were paid more, there might be a stronger inverse relation between non-compatible work and fertility, especially in urban areas.

Not all women who can afford servants and not all women who work at "compatible" sales or service jobs have large families. After analyzing Latin American survey data for urban women, Hass has suggested that what is important, regardless of income, occupation, or work status, is the attitude that women have toward their work and their lives. If women perceive and approve of nondomestic, non-child related roles for women, whether they work or not they will have lower fertility. This relation is similar to that found by Hass for Latin America and Speare for Taiwan. As expected this effect is stronger in urban than rural areas (Hass, 1972; Speare, 1973). Similar negative relations between work, approval of outside roles, and fertility have been found in Greece, Turkey, Mexico, Venezuela, and Zaire (Safilios-Rothschild, 1970; Holmstrom, 1973; Goldberg, 1976; Bamberger, del Negro, and Gamble, 1976; Bernard, 1972).

It seems, then, that city women have almost as many ways as rural women to raise children while working. As Piepmeier and Adkins aptly point out, it only takes one child to make work outside the home "incompatible" with child care, and few women are going to remain childless simply to work (Piepmeier and Adkins, 1973:515). One possible solution is to bear children spaced closely together so that child-related disruptions to labor force availability are concentrated in a shorter time period.

The evidence reviewed here suggests that the perceived costs of educating children are more critical than the opportunity cost of not working. This does not mean that women do not suffer economically from having children. Indeed, children significantly reduce women's work options, making lower paid work much more likely (Blumberg, 1976). Where the opportunity cost issue may have some relevance is in the timing of first births and, perhaps, the spacing between them. The case of city women in Ibadan best demonstrates this situation: women use contraception to delay having children so that they can finish schooling. Where these options for self-advancement do not exist, they see no reason to delay births. Likewise, they would be willing to avert subsequent births if there were an exclusive choice between a good job and another child (Caldwell, 1976:213). The point here is that even in the city women generally are not faced with these choices. There are either no desirable non-child options or no incompatibilities between present work options and having children.

Consumption opportunity costs

A fourth major cost associated with children is a reduction in the family's ability to purchase modern consumer goods. This depends on the family's income, its preference for non-essential consumer goods, and the availability and price of such goods. A recent study in Costa Rica has shown that with increasing income, there is a shift in preferences toward consumption of more modern goods (Carvajal and Geithman, 1976). Many studies have shown that couples who own or wish to own consumer durables tend to prefer or even have smaller families than couples without these preferences (Freedman, 1976; Schnaiberg, 1971:89; Kocher, 1976). One study in Taiwan has shown that particularly among husbands over age 30 consumption aspirations, ownership of consumer durables, and consumption of modern recreation services are inversely related to the desired number of children (Freedman, 1969). Of course, for the consumption-fertility effect to occur goods must be available and affordable. This

may be one reason why the goods-child tradeoff is little seen in more isolated rural areas where consumer goods are not readily available and are not a tangible reason for not having children. Similarly, if the desired goods, i.e. radios, sewing machines, bicycles, are not within the family's reach because their income leaves no room for discretionary purchases, the tradeoff is not a very realistic option.

In addition, there is no guarantee that parents will perceive a necessary tradeoff between children and consumer goods. Again, the Ibadan survey shows that parents do not view children as consumption goods, and they see no inconsistency between wanting large families and modern consumer goods (although not too many conspicuous ones or they might end up with more requests for aid from kin than they can handle) (Caldwell, 1976:244-5).

Part of the increased demand for consumer goods is embodied in an income-related change in taste about goods needed for children themselves. With increases in income parents can and want to purchase more modern goods, and part of the additional goods are for their children (Leibenstein, 1974). With higher consumption expectations, parents may more readily perceive a conflict between large families and their ability to afford the goods with the "child quality" they desire. This income-child quality-fertility effect may not be monotonic with rising income. For example, in Costa Rica as a couple's income rises within a socio-economic group, they have more than the average number of children for that group, indicating that within groups child demand is income elastic. However, between groups, income has the opposite effect: higher income groups spend more per child and their demands fall. For any given socio-economic status, couples will have as many children as they can afford, but the norm of what is "affordable" declines for progressively higher socio-economic groups (Carvajal and Geithman, 1976).

Mortality costs

A final set of child-related costs that are often overlooked are costs associated with infant or child deaths. The demand for children is really a demand for surviving children. Where infant and child mortality are high, couples may have to bear more than one child per surviving child. Yet they incur costs for all children borne, so high mortality raises the cost per surviving child. Because parents have a strong desire to replace infant deaths, it is not likely that they will limit births simply to keep cost per survivor at some maximum level, but, as shown above, this anticipation of mortality may affect the composition or total level of expenditures on children.

Non-Pecuniary Costs of Children

As mentioned above, the non-pecuniary costs of children have been much less adequately integrated into the cost-benefit theory. We shall treat them more fully in the following sections, but these costs deserve mention here because they can influence parental decisions. The most commonly cited non-pecuniary cost is the emotional strain of raising children, but it is not known whether this increases uniformly per child or whether average psychic costs decline or increase per child in different family sizes (Becker and Lewis, 1974). Nor is it known to what extent parents actually limit births for fear of draining too heavily on their emotional reserves. It seems that psychic costs are not terribly important, because this cost is seldom, if ever, mentioned as a disadvantage of large families (Simmons, 1974; Caldwell, 1976). There is a loss of leisure with larger families. The few empirical studies of this factor show that parents work harder and longer when they have large families. In Laguna, Philippines, for example, each additional pre-school child increases the father's work time by about three hours per week and with other child related responsibilities, a father loses four hours per-week. Women lose even more leisure time per child. Infants reduce a mother's leisure by six hours per week

(Boulier, 1976:87-88). If the causality between these variables can be established and if these findings hold for other cases, this suggests that fathers always lose leisure with increases in family size. Mothers lose more but their losses can be mitigated by help from older daughters or other kin living in the house.

Another cost of children, particularly for women, is the opportunity cost of losses in mobility. Women are generally less geographically mobile than men, but a woman without children can more easily take the risk of moving than one with children (Papanek, 1976:64). Particularly in rural areas where a woman's only chance for upward mobility may come through geographic mobility, this loss of mobility may not be insignificant.

Comparing the non-pecuniary and pecuniary costs, it seems that the pecuniary considerations are generally more salient. Non-pecuniary costs may cause delays of births, but they do not seem to be weighted heavily in decisions to alter family size. Loss of leisure or harder work is a disadvantage of large families, but much less critical than educational costs, which may be a prime consideration in shifting couples' preferences to small families.

Pecuniary Benefits of Children

The discussion of the costs of children has shown that relative costs vary with aspirations for children, income, options for women, and infant mortality, and that these are important to influencing parental attitudes toward family size. Of equal if not greater importance, however, are the benefits of children. Although the pecuniary benefits may be small in absolute terms, parents may find that the nature, timing or potential for these benefits justifies their investment in children. This section discusses the following pecuniary benefits: cash income

from children, in-kind contributions at home, cash remittances from adult children, and old age support.

The first pecuniary benefit parents receive from children results from their productive work on the farm or as helpers in various categories. These inputs may start from a very early age, as for example among the Kikuyu of Kenya where girls as young as age three start helping their mothers by chasing away birds. While part of a daughter's assistance is learning the responsibilities of being a wife and mother, the work also contributes to household income (Reining et al., 1977: 100). In Tanzania, for example, a survey of a cotton-growing region showed that boys and girls aged 10-14 both average 5-7 hours of farm work per day (Cleave, 1976:57). In Kenya, large families among the Kikuyu have traditionally been able to cultivate more land and thereby live better. And in Mexico, childless couples simply cannot farm their plots without obtaining outside help. As this may be more costly than using their own children, childless persons are usually the poorest of the area (Reining et al., 1977:97-190).

In some cases the value of the contribution is likely to be fairly small until children reach adolescence, nonetheless it may be important in relative terms. Where children work, particularly in rural economies, there is a tendency to have larger families, as for example in the Philippines and Chile. Conversely, where children are expected to go to school and where school opportunities exist fertility is lower (Harman, 1970: DaVanzo, 1972).

A cross-national study of agricultural economies has shown that after weighing child inputs by productivity indices, children are actually net liabilities until their late teens. When they do become net assets, boys generally contribute more in direct value (Mueller, 1976). If children are net liabilities until this age, why do parents value the contribution of children? What matters is the relative

contribution. In parts of East Africa, for example, children are essential at the peak of labor demand times (Cleave, 1976:57). Also, where land and capital are scarce, labor may be the only route by which parents can increase their income. Even though per child marginal increases in productivity may be small, at low incomes, this may provide a margin of safety for families hovering at the edge of subsistence (Repetto, 1976). This is particularly relevant for single parents, especially women. Blumberg and Garcia have shown that in Caracas, Venezuela incomes for women are so low that they simply cannot survive without help from their children. They also show that children's contributions may be equally valuable to rural women who live in polygynous households where they are responsible for a large share of their own children's expenses and where the political economy is such that children's labor is essential to the survival of the mother-child unit (Blumberg and Garcia, 1972:99-163).

A second and perhaps more important reason that parents feel that children may be of benefit is that children, especially girls, help out at home. On tea farms in Uganda, for example girls aged 10-15 spent 300 hours per year at school and almost 300 hours doing housework and other non-farm tasks (Cleave, 1976:155). Among rural households in Laguna, Philippines, older male children substituted directly for a mother's work time, allowing 2-4 more hours of leisure per week for the mother. Older girls worked at home and were able to free up the mother for four or more hours of work per week (Boulier, 1976:88). It is difficult for parents to evaluate the net contribution of children, but surveys in rural Latin America show that help from children is an oft-cited advantage of large families (Simmons, 1974:132). Among the Yoruba of Nigeria, more couples feel that the marginal child makes the family richer than believe that additional children make families poorer. This is true for both country and city residents (Caldwell, 1976:203).

Children's direct and indirect contributions to current income can be made in the town as well as in the country, but to the extent that children go to school and are released from other responsibilities, their contributions to current income may be reduced. In many rural areas, school is timed so that children can continue to meet their responsibilities, but in towns they may not be expected to work while in school. In Peru, for example, children living with their families in rural areas are twice as likely to be economically active than in urban areas. In town only 3% of those in school during the ages 10-13 also work, but 38.4% do so in the rural areas (Tienda, 1977: 8-10).

The nature of the job opportunities for children may also vary for cities and towns, and these variations may affect the nature of their contributions. Merrick has shown that there are many young people in the urban informal sector in Latin America (Merrick, 1977) and Boserup has shown that in many countries city girls help their mothers in petty trade or home industries (Boserup, 1970:140). Girls often find it easier to work in town than in the country. In Peru, for example, girls aged 6-13 are more likely to work in town because they more easily find work, mainly as domestic servants, but in the country boys are more likely to find work. There are also urban-rural variations in the expectations and opportunities for any given age group. In rural areas, young men and women may marry earlier and establish independent households that no longer contribute directly to parental incomes. On the other hand, in urban areas where housing is scarce and continuing employment less likely, young adults may continue living with their parents longer, thereby making direct economic contributions for a longer period of time. In Peru, 65% of all working children residing with the family are over 18, but in rural areas only 26% are over 18 (Tienda, 1976:8). In urban areas the value of the current income contributions from young adults may far surpass that of their rural counterparts. Finally, urban middle class families better understand how mobility is

attained, and they can educate their children longer and otherwise assist them with contacts to find salaried jobs. Urban youths have a better chance at getting good jobs. For all these reasons, urban parents may realize more substantial assistance from their older children than rural parents.

Older children who have been educated and find jobs in town are generally expected to help out with school fees for younger siblings. Thus education of one child can have substantial payoffs for parents who are then relieved of some of their education cost burdens. These contributions may come as remittances from children in town, and such remittance may account for 10-20% of the family's cash income (Johnson and Whitelaw, 1974:473-9; Connell et al, 1974:53). Or siblings may be sent to live with older brothers or sisters, who then support them while they attend school. Particularly in Africa successful children are under strong pressure to fulfill these obligations to their parents, and the net contributions may be significant (Little, 1973:150). Among urban white collar households in Ibadan, two-thirds have other children living with them but even one-fourth of the farm households in rural areas have other children (Caldwell, 1976:219-20).

By far the most significant financial return parents receive from their children is the assistance they receive from adult, married children. While a large part of this assistance is expected when they are old and incapable of supporting themselves, parents also benefit from children when they are not sick or old. Grown children may assist parents with their farms and they often give gifts of cash or goods. For many parents in Yorubaland, for example, these gifts are the way that parents achieve prestige and a better way of life than they could ever achieve on their own. Among respondents over forty years old only 23% had not received assistance from their children, and most of these were city white collar workers who had achieved mobility on their own (Caldwell, 1976:231-2).

The pension motive has been highlighted as a major benefit of children. In societies where there is no form of old age insurance, grown children are needed to fulfill these needs. The Nigerian survey found that in large and small cities, commercial and traditional rural areas, parents all agreed that children are important because of the help they give to parents when they are old (Caldwell, 1976:232). Where child mortality rates are high parents place a premium on maximizing the likelihood that they will have children to support them. Because sons usually have this responsibility, parents may wish to have extra "insurance" sons simply to guarantee that at least one will be able to meet their needs (O'Hara 1972:485-498). Presumably as mortality declines and old age insurance becomes available, parents will have contributed to the availability of pension plans and the resultant decline in need to have children to fulfill the old age security function. However, little "hard", quantitative evidence has been marshalled in support of the pension plan-fertility argument, partially because coverage is limited and often includes persons who for other socio-economic reasons might have small families (Repetto, 1976:85-87).

This discussion shows that the direct economic benefits of child labor and old age support may not be as substantial as first thought. To a certain extent, differences do emerge between urban and rural areas, but these may be differences in the timing rather than absolute values of inputs. The greatest differences in parents' benefit streams seem to depend on whether or not they send children to school. A child who obtains a white collar job can be a great help to parents, both by helping to pay other children's school fees and by providing a number of tangible pecuniary returns: relief of seasonal bottlenecks; time inputs allowing mothers to spend less time at home and more time working for cash; assistance with school fees; and gifts and cash parents otherwise cannot obtain. While the absolute value of these benefits

may be fairly small, the fact that they may be perceived as being available only through children may lead parents to especially value these benefits.

Non-Pecuniary Benefits of Children

Some studies indicate that couples in both urban and rural areas perceive the non-pecuniary benefits much more clearly than the pecuniary benefits. Children are emotionally satisfying, they give status or prestige to the parents, they fulfill certain religious or hereditary needs, and, perhaps, most important of all, they reduce risks for the parents. Even where parents do perceive that children are costly, they may still favor large families for these reasons.

A key non-pecuniary benefit is the status or prestige that children give to their parents. In societies which offer women few avenues to social prestige or power, children may offer the greatest chance to attain prestige (Blumberg, 1976). This connection between children and a woman's status or power may be strongest in societies which exclude women from other activities, as Dixon has shown for Islamic and Eastern societies which practice female seclusion. Women who marry early into an arranged marriage may find that they are not really accepted by the husband's family until they have children (Dixon, 1976:302). This necessity for women to prove themselves to their kin is by no means limited to rural women. In urban Kinshasa and Kampala, women are expected to have children and be good mothers. Because they are not expected to work, children are their only route to approval by their husbands or kin (Bernard, 1972: 266-7; Swartz, 1969:82).

There are various subtleties in the ways that children generate status for their parents. Most researchers have tended to focus on needs among women, but children are generally considered a source of prestige to both parents. Among the Yoruba simply having a large family

traditionally increased prestige, but when parents can tangibly share in their children's successes via increased consumption the parents' belief that large families enhance their status is reinforced (Caldwell, 1976:246). Although in rural areas there is more of a traditional prestige associated with large families per se, both in urban and rural areas there is still widespread support for the idea that children give parents prestige, as in Nigeria, Comeroun, Liberia, Iran and elsewhere (ibid, Clignet and Sween, 1974:221-3; Handwerker, 1977; Ajami, 1976:458; Reining et al., 1977).

Children may also be important to parents as a means to cement the bond between themselves. This may be particularly important to couples in consensual or serial unions, as for example in Guayaquil, Ecuador. Even though women realize that they may suffer financially, children are felt to promote constancy in the union (Chen, Wishik, and Scrimshaw, 1974:358). In Islamic nations, fear of repudiation may motivate women to have children (Dixon, 1975:16-17).

Children may also serve ritual or lineage needs. Children are important because they can continue the lineage. Furthermore, in many tropical African societies children are the only way by which their parents' spirits are perceived to live on after death. Given high levels of mortality 4-6 children may be necessary to guarantee an heir to carry out the necessary rituals (Caldwell, 1976:207).

The final non-pecuniary benefit, security, is perhaps the most central one. This last benefit is also described as risk-reduction or dependability. In a world perceived as in flux and where it may be extremely difficult for parents to achieve long-term financial security through land or capital investments, children may be viewed as the most risk-free means by which to protect themselves against disaster, sickness or old age (Schnaiberg and Goldenberg, 1975:937-953). If children are central to parents' implicit or explicit strategies to maintain their

status or to protect against calamity, large families will be highly valued. While part of the risk-reduction and security is linked to economic welfare, part is a more intangible sense of having "dependable" children and a wide network of marriage and child related bonds providing emotional and social supports (Swartz, 1969; Campbell, 1976: 270-272). Where those security needs are more closely related to economic security, parents may weigh heavily the pecuniary benefits of children when deciding to replace an infant death or have one more child. As will be suggested below, however, where these needs are paramount and the number of children a couple desires is within their economic constraints, the number of children a couple has may not be economically optimal.

Costs and Benefits of Children: Scope for Urban and Rural Differences

There is currently some controversy over whether parents in either urban or rural areas actually make rational decisions about family size based on cost-benefit considerations. In a test of the model, Snyder has shown that the model holds up for Freetown, Sierre Leone, but that the tradeoff between child quality and quantity is not as strong as expected (Synder, 1974). After including many of the considerations discussed above, Caldwell suggests that in Nigeria children generally are not perceived in economic terms, although he suggests that economic aspects may be growing more salient, especially in towns, as the costs of education rise. The first groups who seem to "fit" the cost-benefit model as persons who consciously limit their families are the urban elite and the urban poor, often single women (Caldwell, 1976). Several studies of African women suggest that economic pressure to limit families' size become effective first among the urban poor, who do so for economic reasons, and last among the urban middle class, who continue longer to weigh heavily the value of children for social security and status. Of the urban groups: this last group may be the last to show fertility declines because they will continue to rely on traditional kin groups for

social prestige, but with their economic resources and orientation, they will also educate as many children as possible to guarantee that one or more will secure a firm foothold in the professional or business world (Morgan, 1976; Handwerker, 1977; Koenig, 1977). These same pressures may operate in the rural world, but in this situation the "upper class" may be comparable to the urban middle class or salaried workers, with no real upper class as it exists among the urban elite.

What factors might propel these changes? Probably the most critical is the emergence of non-child related sources of status and security. If these are available, parents are able to consider other costs and benefits of children. Related to this may be a shift in the emphasis of child functions, from children as investment goods to consumption goods. When might this happen? A shift could be facilitated if parents develop alternate ways of reducing risks or obtaining financial security, such as through more land or business investment opportunities. Similarly if there are major changes in the costs or benefits upon which the concepts of child related security and status traditionally have been based, this may generate an increasingly sharp discrepancy between the perceptions and realities of the costs and benefits of children. Such is the case, for example, in cities where education becomes very costly yet is the only route that parents see for attaining their goals. A different perception of the net benefits of children may also result from a change in the value assigned to benefits that children provide, as might occur with changes in consumption tastes. In short, what seems important are changes which shift the parents' focus of attention from what children provide for them to what children require and expect from parents. Because this shift is intricately bound up in any group's culture and social structure we turn next to a discussion of the cultural and social contexts of child-bearing.

Cultural and Social Contexts of Urban-Rural Differentials

To a certain extent, the discussion of the non-pecuniary benefits of children has already touched on the major cultural and social factors affecting family size, but these were seen more as determining weights couples assign to costs and benefits. If, however, the cultural or social factors are of sufficient strength, the assumption of a rational cost-benefit decision process seems unjustified. Instead, from an ecological perspective family size may be viewed as the adaptation that families make to their organization, environment, and technology (Duncan and Schnore, 1959:136). Instead of focusing on individual women or couples, the unit of analysis is a wider socially and spatially based unit. It may be the kin group, the clan, or the community. What is important is that the locus of decision making tends to be removed from the couple.

From this perspective, cultural and social variables are seen as setting the acceptable size and basic timing of births for all families. According to Polgar, societies have always regulated their growth to match their resources and technologies. Norms are prescribed for who may bear children and when, and various sanctions have been imposed on women or couples who do not comply with these norms (Polgar, 1972:209-211). Within these basic norms, couples' fertility behavior may vary with individual differences in their perception of the costs and benefits of children.

This cultural and ecological perspective allows for the fact that many couples may never make conscious decisions about first births or any subsequent births. This may be due to a lack of understanding of the reproductive process (Shedlin and Hass, 1976; Swartz, 1969), or to the feeling that women should have as many children "as God gives." Based on her observations among the Kikuyu of Kenya, Reining suggests that there is a relation between making independent decisions of any kind and fertility.

Those who do not have a history of independent choice and decision-making also never question their childbearing patterns (Reining, et al., 1977:92).

Another aspect of this shift in control from the individual to outside forces is typified by what Mitchell and Pratto term commitment to familism. Where people are more concerned with the family as a unit than with individual activities or development, there is a higher likelihood of having large families. Based on an analysis of U.S. survey data, they show that those who perceive that raising children is emotionally difficult and who value non-home centered activities and individual advancement tend to have small families, while those who value the emotional rewards of raising children and prefer home-based, group activities also tend to have larger families (Mitchell and Pratto, 1976:17-28). These relative commitments to individuals and families may change during a life cycle, which may cause a shift in family size preferences (Mitchell and Pratto, 1976:17-30).

Through what mechanisms have groups transmitted the commitment to families, particularly to large ones? First, let us examine the context under which the need for large families emerged. Faris has shown that with the advent of capitalism, individuals who lacked access to land or capital could only improve their status by increasing their labor contributions. Thus, there were incentives for families to have many children (Faris, 1975:259-266). Given this context it became important for those who had land to maintain control of it, which stimulated the development of lineage systems guarding rights to property. The lineage also needed to ensure the availability of labor to work the land, therefore, a wide array of customs evolved to guarantee early marriage, birth of many children, and nurturing to ensure healthy children well acculturated to their roles and expectations. These customs included bride-wealth or dowry payments, sex taboos while nursing, polygyny, and severe limitation of women's rights in cases of divorce or abandonment (Dixon, 1975).

Individuals who did not conform to the accepted patterns were subject to sanctions, such as loss of social status or power within the kin group, risk of downward mobility, and expectation that their spirits would die. For persons who did conform to child related needs of the kin group, there were ample rewards: prestige as good mothers and fathers; access to lineage land; wealth from children's labor; and some form of immortality.

According to this theory, in high fertility societies parents are dependent on children, several of them, for fulfilling some of their essential needs: only through children can parents maintain social status or avoid downward mobility. Children alone can mitigate the uncertainties to which parents were subject. For the lower class, children's relative contributions to income and their dependability are prized because a child's input or dependability in times of crisis aided parents in avoiding downward mobility. Among the middle class, children may make large enough contributions to be useful on an absolute basis, while buttressing the social status of their parents while the parents strive to advance their economic status. Finally, for the upper class, children function as essential heirs to their parents' wealth. By being able to assist or take over in times of need or when parents retire, they provide a guarantee that gains will be kept within the family. As long as children are the only institutions through which parents can meet these needs, other factors that might induce smaller families will be ineffective (Schnaiberg and Goldenberg, 1975:940-46).

There is another aspect of this parental dependency and need for large families. When the whole community feels powerless or dependent its residents are less likely to actively direct their lives or the growth of their families. This is clearly demonstrated by contrasts of two Mexican and two Guatemalan villages (Reining et al., 1977:123-129; Hinshaw, Pyeatt, and Habicht, 1972:277-80). In these cases, what seems critical are the unquestioned social patterns of community and household

dependency that resulted from the hacienda system: workers are powerless unless they supply labor to the hacienda and parents are powerless if they cannot produce children to help them.

In what cultural settings has parental dependency evolved? Michaelson and Goldschmidt find that the need to guarantee heirs and have large families is strongest among patrilineal societies. This is often associated with an ideology of male dominance. Men have authority over women and stress obedience, hard work, and children. Women cannot own property and their only access to land is through male kin, e.g., father, husband, son. Because the lineage is dependent on sons, women gain status by having sons who will guarantee the survival of the lineage. Patrilineal societies are often patrifocal, and when young brides marry they leave their kin. They do not gain full rights in their husband's lineage until sons are born. To reinforce the submissive stature of women, these patrilineal societies often practice pre-marital chastity, lengthy post-partum sex taboos, rigid sexual division of labor, and sexual segregation.*

Although one expects to see this pattern primarily among rural peoples, it also appears among urban residents or migrants. Based on his analysis of Nigerian survey results, Morgan concludes that couples in town may become more dependent on their children for social status, perhaps because in town women are deprived of status giving work. They are even more dependent on approval of their kin, for which they need and want large families. More importantly, children are still the couple's insurance; if they fail to succeed in the modern world, with children linking them to the traditional society they can always go back to the traditional reliance on children and kin. Thus among families in Lagos, fertility is highest among the families where the head has not completed secondary school, is a semi-skilled worker, and is basically transitional between traditional and modern societies (Morgan, 1976: 22-41).

*Bilateral inheritance systems do not stress procreation and female submissiveness (Michaelson and Goldschmidt, 1971:330-341).

Perhaps the most constrained are rural-urban migrant families who have no security in the urban setting and must maintain rural options. Because the migrant cannot afford to support his family in town, he must leave his wife and children behind. Their subsistence farming also provides back-up insurance should the migrant fail (Ferraro, 1974:92-105).

In both town and country the need for children may only decrease when parents have access to other means to reduce the uncertainties in their lives, to other "unconditional" sources of social status, or to ways to meet ritual or lineage needs with fewer children. In her study of women in the town of Digei, Liberia, Beldsoe shows that women are willing to deemphasize having sons when they can purchase services which otherwise were performed by a spouse or children. Using cash is preferred, because there are no reciprocal obligations to which they must bind themselves. Women can make enough money to buy the help of men, and they no longer need to marry them to gain access to land or a business. Women also use their cash incomes to free themselves from unhappy marriages by paying back their bridewealth their fathers received when they married. Children are still assets, but not their only ones (Bledsoe, 1976:327-89).

Although parental dependency on children may change in both city and country, it is the urban area which leads the way in altering social and cultural constraints. In towns, people are subject to increased pressure to respond as members of a peer group rather than as members of a clan or lineage, with its prescribed and rigid expectations (Sarmela, 1975:220-3; Butterworth, 1972:29-50). As we have shown, this may happen when alternative institutions are available to meet parental needs, but it also accompanies a shift in social perspective. Where the routes to power and prestige continue to be linked to family based systems, parents will continue to view mobility as a family affair, with children the means for kin groups and parents to achieve mobility.

But when people increasingly perceive mobility as an individual phenomenon, then families may be willing to loosen their claims on their children, to allow children to independently choose their own lives. Children and parents may still help each other out, but the net transfer is no longer from children to parents and kin group. According to Ryder, this intergenerational equity may be essential to a social structure allowing small families (Ryder, 1974).

Modernism and Fertility Differentials

In the last section we showed how cultural and familial constraints may maintain high fertility patterns. A shift away from the family determined mode is in large part predicated on a change in perspective. This is often reflected in the modernization process, and several researchers have highlighted the importance of modern attitudes and role perceptions in changing fertility behavior. As will be shown below, modernism may be the best single factor for synthesizing all the various factors that produce urban-rural, intra-urban and intra-rural fertility differentials.

In their comparative analyses of various modernity-fertility studies Schnaiberg and Armer highlight the concept of planning or future orientation as the modern attitude most correlated with use of contraceptives. Their analysis of data for rural and urban migrants in Chicago shows that controlling for modernity and socio-economic status removes a large part of the variation in use of family planning methods, irrespective of origin, but leaves much variance unexplained for the family size goal variable, especially among the lower or working class. They conclude that being modern may change attitudes towards using contraceptives to accomplish a different timing of births but may not necessarily alter family size goals. Similar findings are echoed by studies in Colombia, Nigeria, Turkey, and Mexico (Baldwin and Ford, 1976:76; Caldwell and Caldwell,, 1976:353-59; Goldberg, 1976:394-406).

The correlation between modernity and smaller families is not as simple as it might first appear. First, it seems clear that modernity does not come about just by living in a city. Studies in Brazil, Bangladesh, India, Israel, Nigeria, Mexico and Turkey all show that women may live in cities and still not lead modern lives, as typified by educational level, occupation, openness to change, or aspirations (Namboodiri, 1966; Rosen and La Raia, 1972; Miller and Inkeles, 1974; Goldberg, 1976). Second, although the urban white collar or professional worker is more likely to be modern than other non-skilled workers, there is no guarantee of modernism. Third, because modern experiences do not always lead to modern outlook, attitudes seem to be the critical component of modernism. Under various guises, it has been suggested that the real measure of modern attitudes is the individual's perceptions about himself, his future, and his relation with the world. Modern women have a broader understanding of the world (Baldwin and Ford, 1976), more interest and concern with their own and their children's future (Rosen and Simmons, 1971; Caldwell and Caldwell, 1976; Miller and Inkeles, 1974; Schnaiberg and Armer, 1974), a greater sense of self-efficacy and willingness to plan to achieve aspirations (Schnaiberg and Armer, 1974; Rosen and La Raia, 1972; Caldwell and Caldwell, 1976; Goldberg, 1976; Hass, 1972; Straus, 1972), and an openness to change and to the outside world (Schnaiberg, 1971; Goldberg, 1976; Korean Institute for Research in the Behavioral Sciences, 1971; Miller and Inkeles, 1974). Where women have these modern attitudes they are indeed more likely to want and achieve small families.

What modern behaviors are associated with lower fertility goals and levels? As discussed in the preceding discussions of the cost-benefit model of fertility, women working at modern occupations may have a higher likelihood of "modern" fertility attitudes, but not always. What is more important is a commitment to the work itself and approval of women's participation in activities outside the home (Hass, 1972; Safilios-Rothschild, 1970). In Accra, Tunis, Athens, and several Latin American

cities women with this approval of and commitment to their own work have lower fertility (Oppong, 1970; Suzman, Miller, and Charrad, 1976; Safilios-Rothschild, 1970; and Hass, 1972). This commitment and interest in one's work is also important among rural women in Kenya, where women who like and take pride in their work have smaller families (Reining et al., 1977:94).

Studies have often shown that approval of outside activities is associated with egalitarian decision-making patterns between couples, which is in turn associated with lower fertility. Stycos, Back, and Hill were the first to suggest that intra-urban differentials might be due to differences in the pattern of husband-wife communication and decision-making. They found that women who had talked about family size goals were more likely to use birth control, regardless of age or educational level (Stycos, Back, and Hill, 1959:211). Subsequent studies generally support the link between egalitarian decision-making and use of contraceptive methods. Mitchell has shown that husband-wife communication and joint decision-making correlate with use of contraceptive methods in urban Hong Kong (Mitchell, 1972:139-146). Studies among urban families living in Accra, Istanbul, Kinshasa, Mexico City, and Sao Paulo provide additional support for this correlation (Oppong, 1970; Holstrom, 1973; Bernard, 1972, Goldberg, 1976; Rosen and La Raia, 1972). In addition, husband-wife communication is also correlated with use of birth control methods in rural areas, for example, of Mexico (Shedlin and Hass, 1976; Reining et al., 1977:136).

Egalitarian decision making is also correlated with joint conjugal roles, which in turn correlates with lower fertility.

Social network theory provides an additional perspective on the role-sharing.* Where each spouse has a small network on which to rely or where there are many cross-links between spouses' social networks, spouses tend to share responsibilities. Sharing of activities and joint decision-making correlates with lower fertility because the wife has fewer of her own network members to call on for help, which makes having a large family more difficult than where she can rely on a wide network for aid in caring for her children. Conversely, where social networks are dense and not highly overlapping, the wife's activities are more segregated, but she has a large number of persons from whom she can ask assistance. This "mutual aid" network enables her to have a large family. If she has few direct links to her husband, she may value more strongly those which derive from their children than if she had more opportunities to interact with her husband. In the urban-rural setting, we might expect joint networks to emerge more frequently in urban areas, especially among migrants, but also among couples who are not intricately bound into separate kin networks. Joint roles tend to be much less likely in rural areas, but could emerge in economically diversified areas where the activities of men and women are interdependent or where a wife has independent rights to land or property which affect her husband's status or activities. Few studies have investigated this relation; one study shows that couples in rural Colombia who are not well integrated into their relatives' networks have small family goals (Micklin and Marnane, 1975:49).

*Where couples share many activities and decisions each person has only a limited number of persons she or he can call on for support, help, or companionship, therefore they are forced to rely on each other more frequently and to flexibly share household tasks. Such networks are likely to emerge when the couple has moved and both have suffered losses of members in their networks (Bott, 1975:140-165). Kapferer has recently provided a significant clarification of Bott's theory: couples exhibit joint conjugal roles when there is a high degree of overlap between their networks, such that the overlapped members are critical to each spouse's self interests. When these critical cross-links occur, couples will be committed to helping each other simply to guarantee that they will reciprocate in fulfilling obligations with the members of the critical cross-linkages. Without these cross-linkages there is less incentive to share activities and be mutually supportive, and segregated conjugal roles tend to emerge (Kapferer, 1973:90-108).

Some suggest that nuclear families are "modern" and that these correlate with lower fertility. Kerchoff (1965) shows that there is more conjugal role-sharing in nuclear households, and because conjugal role sharing is correlated with lower fertility, nuclear families may be smaller. Among university students in Ghana, there is a correlation between a desire to live as a nuclear family and to have few children (Oppong, 1974). However, other studies fail to find a uniform correlation between nuclear families and smaller family goals (Burch and Gendell, 1970). While couples who set up their own separate households may delay marriage and births, it is not clear that this delay ultimately results in a smaller family (Torres, 1976; Mitchell, 1971). With the availability of assistance through kin or mutual aid networks, there is not much loss in child care assistance. Furthermore, there is no reliable correlation between urban living, modernism or nuclear families. Even in cities, if people can afford to absorb additional members, they will (Pakrasi and Malaker, 1967; Stinner, 1977; Van der Tak and Gendell, 1973; Tienda, 1976).

Consumerism is another modern attitude that may correlate with lower fertility, because couples that wish to own modern consumer goods may have to make a tradeoff between goods and large families (Freedman, 1976). As we have indicated above, consumerism and large families are not necessarily exclusive, but among lower and middle class urban or rural families there is a possibility for this tradeoff. For example, in Mexico, many younger women want small families so they can be free to buy things and have fun, and in rural Colombia those who favor the urban way of life also favor small families (Reining et al., 1977; Micklin and Marnane, 1975:53). In a rural village near the town of Moshi, Tanzania, families with more modern consumer goods have fewer children than others (Kocher, 1976). And in Taiwan, there is a strong correlation between exposure to media, the desire for consumer goods, and smaller families (Freedman, 1976:374).

Do the correlations between fertility and modern attitudes of openness and planning for the future hold for rural as well as urban areas? Miller and Inkeles find that overall modernity in attitudes correlates with acceptance of family limitation, regardless of place of residence. The key attitudinal variables in this correlation are beliefs in science and medicine and in secularism, both of which suggest perception of a rational world where man can play a role in changing it (Miller and Inkeles, 1972:181). Women in small towns in Korea who perceive the environment as modifiable or rational are also more likely to practice family planning (Korean Institute for Research in the Behavioral Sciences, 1971:46-7). This perception of a modifiable environment is similar to the sense of self-efficacy, that the individual can do something to affect the course of his life. In Kenya, Mexico, and the Philippines women who take advantage of opportunities or who feel through their own efforts they can influence events are more likely to have smaller families. Their families and communities each have a history of doing things to better their lives. In contrast, among families or communities where fertility is high, there is a feeling of helplessness in the face of political or economic pressures, a feeling that the individual is powerless to change or cope with the outside world (Reining et al., 1977:89-98; 124-5; 233).

Related to the sense of individual power is hope for the future and for a good life for one's children. Comparative studies in Kenya, Mexico, and the Philippines highlight the role that hope plays in motivating women to limit their families. If a woman is prosperous, as among the commercial farmers in Kenya, she will have no conflict between optimism about the future and affording a large family, which will also assist her to better her income and status. If a woman is hopeful but not prosperous, she is the most likely candidate to limit her fertility. In rural Kenya, Mexico, and the Philippines, women with small families are hopeful and confident that they can direct their lives to help improve their children's lives. They realize they can do so only if

they limit their births. If a woman has little hope for her own situation or for her children, she may take no steps to limit her births, and resignation to large families, unhappy marriage, and/or poverty may result. These women may seek religion as an escape, but they will not take concrete steps to better their own situation. The hopeless are often the most impoverished, but the evidence of other poor women who have been able to achieve some mobility demonstrates that poverty and hopelessness are not necessarily bedfellows (Reining et al., 1977:6-8). This same theme of hopelessness and high fertility are echoed in studies of Guatemala, Peru, Puerto Rico, and elsewhere in Kenya (Hinshaw, Pyeatt, and Habicht, 1972; Kellert et al, 1967: 412; Crader and Belcher, 1975; LeVine, Dixon and LeVine, 1976). To a certain extent, hopelessness and fatalism result from the unrelenting growth of a woman's family, but it is likely that the fatalism and hopelessness were present in some form before the woman had a large family.

In rural areas who are the hopeful and how does this happen? The limited evidence suggests that the strongest correlate of hopefulness, of having aspirations for one's children, and of wanting to do something to achieve these aspirations is education. Those who come from educated families, or who have gone to school are more likely to feel they can do something to improve their lives (Reining et al, 1977:6; Kellert et al., 1967:412; Kennedy et al, 1974). Education is not necessary, however, to produce this attitude. Women generally have economic responsibilities for raising their children and paying their school fees. Some have more options through which to save money and may independently choose to do so. In Mexico, Kenya, Philippines, and Peru, women who have some degree of economic autonomy are more likely to use this autonomy together with family limitation to offer the best chances to their children.

If women have no way to augment family income or to independently manage their plots to accumulate a little savings for school fees, they have little reason to be hopeful. Therefore, the community and family context also influence the degree to which a woman is hopeful or plans for her children's future. If there are opportunities for women to do a little extra weaving, to sew shirts, to raise vegetables, chickens, or a little extra coffee, women who wish to send their children to school will have a means by which to do so. In communities that lack these options, women may find no reason to be hopeful.

The lack of options for women may result from attitudes about women's roles (Dixon, 1976) or from a broader community economic situation. In Mexico and Guatemala where villagers have never exercised political or economic autonomy, always being dependent on outside politicians or landowners, they have little reason to expect independence or autonomy. Because they have little incentive to take control of their own or the village's destiny couples do not perceive the payoffs of education and see no reason to limit or space births to improve their offspring's chances (Hinshaw et al., 1972:227-30; Reining et al., 1977: 119-129). Similar feelings of hopelessness and the futility of investing in oneself or one's children could develop in areas of high infant mortality, where parents never know how long a child will live.

Finally, a very basic sense of hopelessness and lack of control can emerge among women who have little knowledge of the reproductive process or who do not know that it is possible to control births (Crader and Belcher, 1975; Morris and Sission, 1974). If women do not understand how children are conceived or that they are likely to conceive, they may not be aware of their exposure until they have an unexpected and perhaps unwanted pregnancy (Hass, 1974). Even if they are aware of the reproductive process, they still may have no information about reliable methods of controlling conception. They may welcome the first few births, but if they cannot cope with more children, the births past this point may be

unwanted and lead to a sense of futility (LeVine, Dixon and LeVine, 1974; Kellert et al., 1967).

What are the factors in urban areas that stimulate a sense of hopefulness and willingness to take steps to achieve a better life for oneself and one's children? While we recognize that cities are far from homogeneous, certain factors have been suggested. These can be seen to operate at two levels: a micro-level affecting individual decision making and a macro-level setting the range within which the micro-level factors operate. Looking first at individual factors, studies in Turkey, Ghana, Nigeria, Venezuela, Mexico and elsewhere suggest that giving a girl some education facilitates the development of self-efficacy and hope for a better future (Schnaiberg, 1971; Oppong, 1970; Caldwell, 1976, Kennedy et al., 1974; Goldberg, 1976). Because female enrollment rates are much higher in urban areas, there is a large group of women for whom attitudinal changes are likely. For both men and women, the urban environment can offer rich exposure to media, opportunities to purchase goods, and opportunities to earn money to enable these purchases. Finally, contraceptive information and materials are much more widely available in cities. But as we have shown, education, media, and availability of consumer goods do not mean that all urban women rush out to get their supply of pills so they can have small families with educated children, televisions, and refrigerators.

At the macro-level what seems to make the difference between wanting and not wanting small families is heterogeneity of contacts, experiences, and opportunities. Simmons and Noordham suggest that community level of education interacts with wife's level of education to produce an increase in desire for small families, because the community level of education is a proxy for a wide range of opportunities. If there are no opportunities to use education, education will be of little consequence (Simmons and Noordham, 1977).

Individual education may prepare a woman to perceive and understand the implications of different experiences, but without access to these wider experiences, the education has little impact. Migrant women in Istanbul, Lima, and Sao Paulo who work for "modern" middleclass women had picked up many more urban aspirations and perceptions of the benefits of small families than had their counterparts not exposed to alternate role models (Holmstrom, 1973; Smith, 1973; Rosen and Simmons, 1971).

Media are effective at changing tastes only if they are utilized. Goldberg has shown that in Ankara and Mexico City couples who go out to movies, parties, and restaurants have an increased likelihood of desiring a smaller family (Goldberg, 1976:398-403). Some studies show that migrants at first do not take advantage of the media opportunities or social affairs outside their own home-town club, thus being a recent migrant may reduce the likelihood of the media and the "outside life" factor (Butterworth, 1972; Roberts, 1975; Skeldon, 1976).

Interest in the outside world may be stimulated if persons live in heterogeneous neighborhoods (Goldberg, 1976). If persons live in mixed neighborhoods or in neighborhoods that are scattered among different zones, the residents are exposed to a greater variety of ways of living. If migrants or natives live only with each other, they have no one from whom to learn different values or patterns of behavior. Some researchers suggest that it is the physical mixing which takes place in cities that creates the modern outlook and allows migrants to take part in transforming urban society rather than simply adapting rural ways to the urban environment (Uzzell, 1974; Roberts, 1974; Leeds, 1974). For example, Uzzell shows that new residents flowing into Lima's pueblo jovenes generate changes in the neighborhood, which are reflected in turn among the residents.

Living in a heterogeneous neighborhood is particularly relevant for exposing women to small families. According to Schnaiberg and Reed,

couples may not want small families because they simply do not know enough about small families to view their outcomes as anything but uncertain. Until they can see what happens to parents and children in small families, they will have little incentive to try small families (Schnaiberg and Reed, 1974).

In Colombia, general knowledge differentiates city users of birth control from all other non-users. In addition, city women know much more especially about small families (Baldwin and Ford, 1976:77). Town life provides many more routes by which women can learn about contraceptives, particularly through the more effective mode of face-to-face communication with users (Bamberger, del Negro, and Gambel, 1976; Korean Institute for Research in the Behavioral Sciences, 1971). Fertility decisions are based on beliefs about the consequences of the behavior (eg., using contraceptives, having an abortion, having a child), weighted by the value of those consequences and about what relevant others think the woman should do, weighted by the woman's desires to comply with these persons. A test of this model in one U.S. city shows that Catholics are more likely than Protestants to think that they should not want a 2-child family; they are also more likely to have more than two children. They were also more likely to ascribe negative attributes to the the 2-child family (Jaccard and Davidson, 1976). Preliminary studies among university students and working class women in Mexico City show that these normative components of attitudes are efficient predictors of intentions to use contraceptives (Davidson et al., 1976). If a woman has contact with people who demonstrate the positive aspects of small families or from whom the woman expects approval if she limits births, she is more likely to adopt these behaviors. Therefore, heterogeneous role models, experiences, and social environments can all increase the likelihood of her deciding to use contraceptives.

Perhaps the single most important factor by which cities facilitate development of modern attitudes and favor for small families is heterogeneous opportunities. While upward mobility is not easy, it is possible.

Natives and migrants alike can better their lives. For many rural women, such mobility may only be possible in cities. Particularly for young women, cities hold out hope: to finish schooling; to be able to work while taking night classes; to independently earn money as a vendor; to find a salaried job that will enable them to buy the things they want; to escape from an undesirable marriage; and so on. The opportunities may be realized only through competition and hard work, but at least they exist in the city. No such options exist for many rural women faced with the prospect of early marriage and a hard life at the mercy of one's spouse or in-laws (Dixon, 1976; Boserup, 1970; Little, 1973).

The net result of the exposure to a multitude of experiences, people, and opportunities may force a recognition that individuals can - and must - choose to lead their own lives, apart from their kin (Roberts, 1973: 150-193). Additionally, the scope of acceptable social roles is much broader in the city. If a woman chooses to be childless, she can do so in the city, while in the country the kin based social system may not leave any niche for the childless woman (Reining et al., 1977:7). Rather than being centered on the family with its proscribed passage through its life-cycle, individuals or couples in the city may be free to vary the nature of their union and parenthood without becoming social outcasts. Social life becomes centered around groups, not kin (Butterworth, 1974). This does not imply that couples will sever all ties with the family; in fact, they may find it advantageous to keep certain links and roles (Little, 1973:166-178), but they may begin to exercise more individual choice in governing their own affairs. In effect, living in the city may stimulate the shift from commitment to familism to individualism.

Synthesis: A Framework for Analysing Fertility Differentials

In this chapter we have reviewed the theories and evidence pertaining to several theories about urban-rural fertility differences. This review has shown that there is no one theory that provides the key to understanding

urban-rural fertility differences. Similarly, it shows that there is no single conclusive set of answers to our research questions. There are, however, indications of general types of factors that can interact with person or place factors to affect fertility behavior. These are summarized below:

1) Relevant community level at which place factors operate: The evidence presented here suggests that the distinctions between urban and rural may be useful, but only as a very crude distinction between agricultural and non-agricultural communities. In fact, within-community fertility variations may be greater than those between communities.

Our analysis suggests that factors affecting fertility operate at two levels of community. The first or macro-level of interest is the city, for urban areas, and the district, for rural areas. These higher level places determine the types of opportunities generally available and set the context for micro-level behavior. Due to historical, cultural, or economic differences in the evolution and development of a city, people living in one city may have different range options than those residing in another. These variations in acceptability or feasibility of certain options affect aspirations and consequently, what persons choose to do. If a certain pattern of behavior is not common within a community, it is not likely that persons in the community will consider that action feasible.

The second community level is the neighborhood or village. The evidence we have presented here suggests that this micro-level is important in affecting individual characteristics which, in turn, affect fertility behavior.

Let us use an example to show how the two levels of community interact to affect fertility behavior. Picture a small village where few girls have any schooling and all are expected to marry early, have many children, and be hard-working wives. This village is fairly homogeneous socially

and economically, and women have almost no choice but to follow this pattern. If the village were located in a district which has a good system of roads and markets and has more diverse economic opportunities, there would be a greater likelihood that if a woman within this village did not want to live in the usual way, she might be able to do so. This potential alternative depends on the nature of the district or higher level community. The factors operating at the micro village level (e.g., schooling, clan constraints, etc.) affect a woman's desire to pursue non-traditional options, but it is the district or macro-level context which makes it possible for her to do so.

2) Place factors influencing fertility: Place factors operate jointly at the micro and macro levels to make it more (or less) feasible for women to have small families. These are variables that set the context for individual decisions. Major place factors affecting fertility decisions are shown in Figure 3.

Perhaps the most apt descriptor of the place factors increasing the likelihood of small families is heterogeneity; heterogeneity of contacts, neighbors, family sizes, options for women, expectations for children, and consumption and investment alternatives. This may be most important for the poor, for whom options normally may be much more limited than among the rich who by virtue of their own resources are less reliant on outside factors as the source of diverse opportunities.

Figure 3: SUMMARY OF PERSON AND PLACE FACTORS AFFECTING FERTILITY VARIABLES

Fertility Variables	Place Factors	Person Factors
Age at marriage or first birth	Roles of young women in family Educational or economic opportunities	Patrilineal inheritance Status of young woman Non-marriage options
Fecundity	Prevalence of venereal diseases General sanitation and health levels Maternal and child health care	Own nutrition and health status
Exposure to intercourse	Community's sexual customs General concern for replacement	Own infant and child mortality Knowledge of reproductive process Type of marriage Breastfeeding duration
Decision to limit births	Social or cultural importance of children Child costs-benefits Examples of small families Range of economic opportunities for women General educational level and costs Access to long-term investment capital Access to consumer goods Maternal and child health care Community attitude to innovation and change	Own educational attainment Own awareness of reproductive process and FP methods Approval of non-motherhood roles Consumer good preference Own employment experience and options Own aspirations Importance of own children to reducing risks Own health level and childbearing experience
Ability to limit births or family size	Access to acceptable, low-cost FP methods and counseling Access to abortions	Family influence on child decisions Husband-Wife egalitarian, decision-making Normative support for decision

3) Individual and family factors: The individual factors are the individual's characteristics which affect her or his perception of and ability to have a small family. Many of these operate through the family to alter individual options relevant to the timing of first or subsequent births. Figure 3 also summarizes the major person factors.

The evidence presented here suggests that the overall "modernity" of a woman may be a good way to characterize the woman's attributes which affect her fertility. "Modernity" does not always imply a desire for small families, but when that "modernity" is characterized by a sense of self-efficacy, aspirations for the future, and openness to the world, it is often correlated with wanting a smaller family, even after controlling for age, perhaps because modern attitudes seem to include perceptions that a small family allows attainment of other goals.

These individual factors can be expected to vary during a woman's reproductive career. Older children or relatives can help with child care, for example, and reduce the opportunity cost of additional children. Migration and changes in occupation or income can also affect decisions to have a child at any given parity level and, of course, changes in spouses can also affect a woman's desire to have a child.

4) Mechanism of integrating individual and place factors: Integration of person and place factors seems to occur in the following manner:

First, the macro-community factors set the parameters for the degree to which small families are possible. Where the city or district has enough heterogeneity of social, economic, and demographic types that several life options may be feasible for any class of individuals, then individuals can perceive a wider range of possibilities and can develop aspirations for one of the alternatives (Blumberg, 1976, . Life options which seem to affect family size outcomes are: feasible opportunities for economic independence from reliance on children (Schnaiberg and Goldberg, 1975); accessible educational opportunities for children (Kocher, forthcoming; Reining et al., 1977); and models of small families which "work" under similar sets of economic or social constraints (Schnaiberg and Reed, 1974). Also, at a macro-level, low levels of infant mortality and information about family planning methods demonstrate that small families are possible and less risky.

Second, micro-level place factors influence the development of the individual and family factors which determine to what extent people perceive and utilize the available opportunities. A combination of education and exposure to modern values and life-styles can lead to the development of individual aspirations and/or consumer preferences and a sense of self-efficacy. Thus, place factors seem to determine the nature of consequences for averting a birth or having a small family, while place plus individual characteristics determine whether a woman perceives, wants, and acts to achieve these consequences.

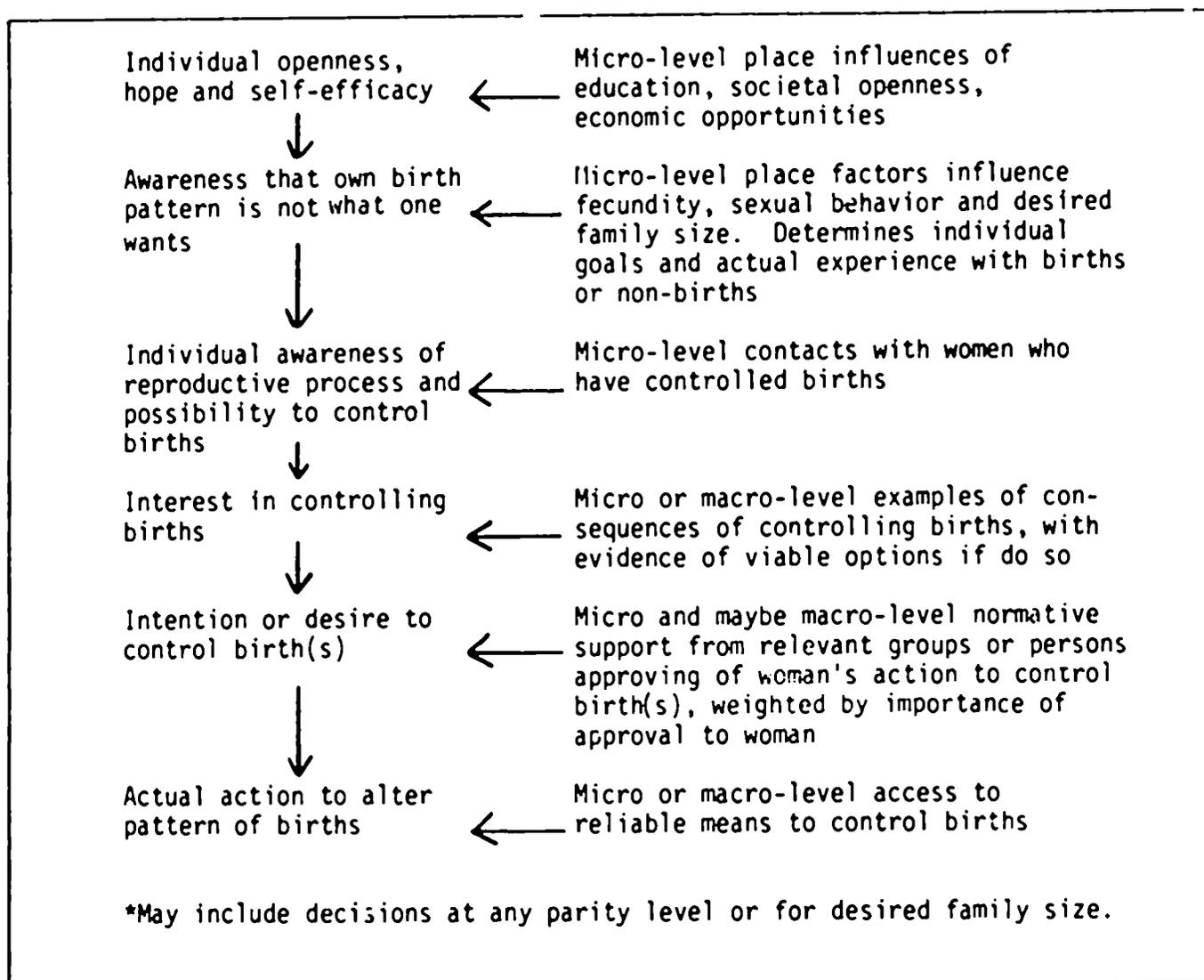
The most critical part of the model is the link between these individual characteristics and the place characteristics. This link is the fertility decision process. Following the Fishbein model of decision-making, if we assume that a woman's fertility decisions are based on her belief about consequences of having or not having a child at any given time, weighted by the importance of those consequences to her and by her belief and relative consideration of what "relevant others" think she should do, it follows that (Jaccard and Davidson, 1976):

1. If she lives in a community where she has few role models of women with small families, she will have limited knowledge about the consequences of small families and is unlikely to choose this pattern. She may not even know that it is possible to control births and therefore may not perceive that a choice exists. This awareness of small families is very much determined by the micro-level characteristics and the range of prevalent family sizes.
2. If she does know about small families, she may not choose to limit her births if there are so few cases that the consequences are undesirable or uncertain as might be the case if only a few women with small families live in her neighborhood or village.
3. If she views the consequences of limiting births as desirable, she may still not limit births if she feels that relevant others whose opinions she values will disapprove of limiting births. In this case, micro-level heterogeneity is important to provide a broad range of examples of desirable consequences, both for the woman and for her kin, friends or other influential people because they are not likely to approve of limitation or delays if they themselves know little about the consequences.
4. If a woman feels that the consequences are ones she prefers despite the lack of adequate normative support from local kin or other groups, she may still take steps to achieve her desired birth pattern if she feels that there are persons at the macro-level community who support her action. In this case, it would seem to take a strong personal set of preferences as well as strong support from macro-level groups. Such might be the case for the better educated woman who can find support from people for whom she works or with whom she studies, as Davidson et al., (1976) have shown in Mexico.

5. Finally, a woman may still take steps to achieve a given birth pattern in the absence of micro- or macro-level normative support if her preferences are so great that they override the lack of approval. Such might be the case, for example, of women who move to town to get an abortion and thereafter do not return to their home village. In this case the woman's action includes moving away from possible negative sanctions.

Figure 4 presents a very generalized model of the interaction of place factors in the childbearing decision process. The model attempts to include the awareness, attitudinal, and normative components discussed above. Not all women go through the entire process. Furthermore, at any point in the process, the place factor conditions may not allow the woman to make any further progress toward taking steps to alter the pattern of her births.

Figure 4: MODEL OF PLACE FACTORS AFFECTING THE CHILDBEARING DECISION PROCESS*



This model seems to operate for both family size goals and individual parity decisions. With regard to the family size goals, it seems logical that the consequences in question are the perceived pecuniary costs and benefits and non-pecuniary parental or societal benefits of children, weighted by expected mortality. This seems to correspond to the individual, rational decision process discussed above. The normative component embodies the cultural and social factors highlighted above. Where family preferences

are weighted heavily, a family size decision may be constrained by family preferences and may not be economically optimal. At specific parity levels the perceived consequences are those associated with having or not having a child at a specific point in time.

To avoid giving the impression that all births are calculated as wanted or unwanted, we reiterate the possibility of not making a decision. If a woman is not aware that she is likely to conceive, she is not likely to make any decision about conception. If then she does conceive, she will have to decide whether or not to have the birth. It is at this point that the decision process begins. She can decide she either wants or doesn't want the child, based on her own perception of the consequences of having or aborting the child. Even if she does not want the child, the normative component can override her own perceptions, resulting in a birth others may want more than the mother herself. Less likely but also feasible, especially where abortions are difficult or dangerous, is not even deciding until after the child's birth (Hass, 1974). At this point she may still reject the child emotionally or physically (LeVine, Dixon and LeVine, 1974), but clearly her options are far more limited, and are very much determined by what is acceptable within the society, i.e., by the normative component.

In Figure 5 we have attempted to fit this decision model into the more detailed sets of influences discussed above.

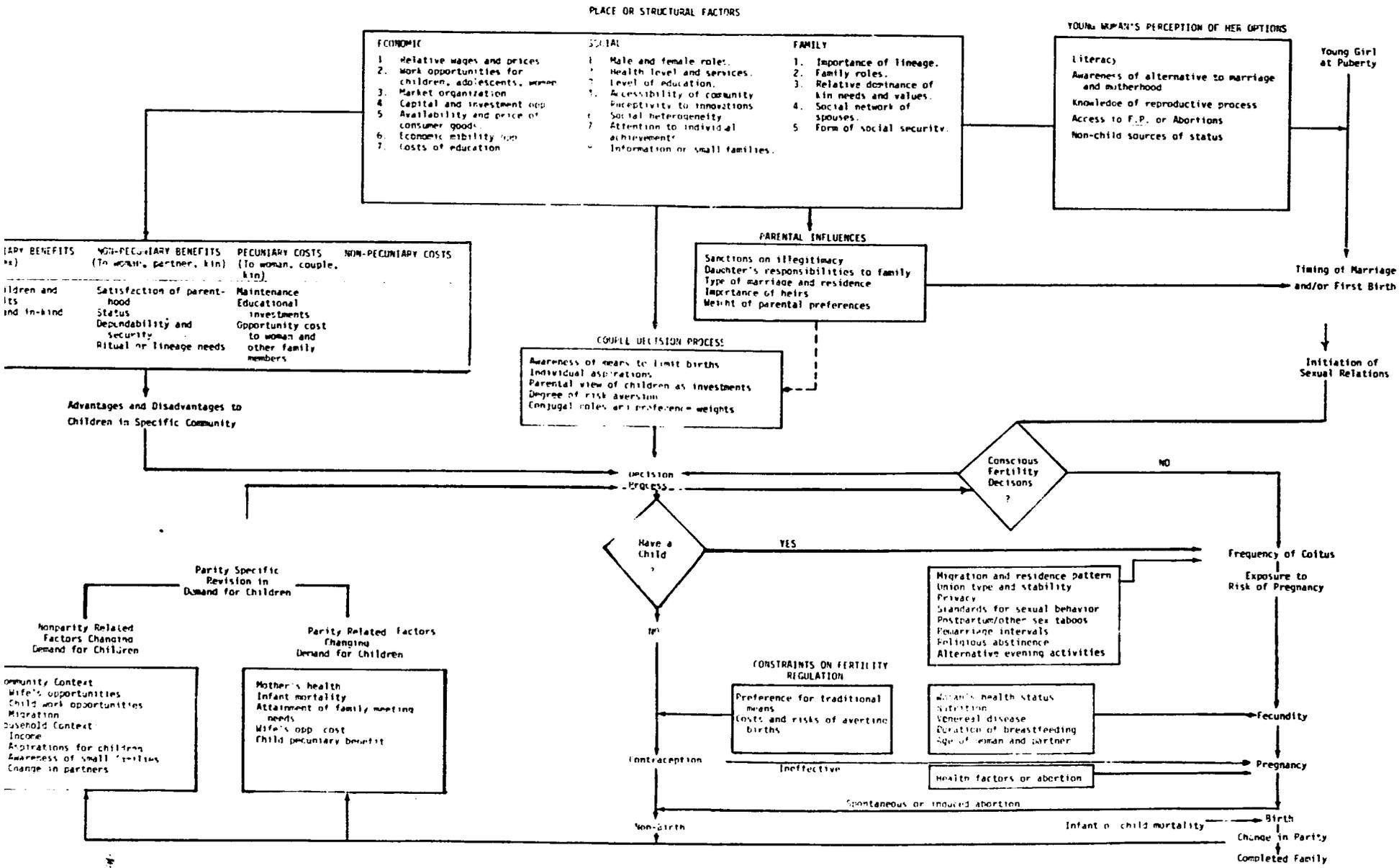
The heart of the framework is the decision to have or not have a child. The framework shows the place or community factors that are likely to influence a young, childless woman's perception of her life options, e.g., early motherhood, more schooling and a job, migration to town, or other possibilities. The framework also shows how place or structural factors influence the general community's perceptions of the advantages and disadvantages of children. Certain place factors also determine the

manner and extent to which a young woman's family influences the timing of her marriage or first birth. Depending on these combined influences, when a young woman begins having sexual relations, she may or may not make a conscious decision to have a child. If she does make a conscious decision, this decision will be influenced by the relative weights accorded the desires of her parents, spouse or partner, and herself. All parties to the decision may be heavily influenced by what they perceive to be the current advantages and disadvantages of children in that specific community. If there is a decision to have a child, the timing of the birth is affected by the same factors affecting the woman who makes no conscious decisions. If she decides to avoid conceiving at the present time, her success at averting a birth depends on her ability to regulate her fertility which is influenced by several place factors. At each parity level, there are individual and place factors which influence the woman's demand for children. Some operate by virtue of the woman having attained a certain parity and others because of changes in her status or lifestyle. Congruence between her actual completed family and some initially desired number depends on the mix of these factors at different stages in her reproductive career.

The framework is intended as a guide to analyzing fertility differences among families both within and between communities. We have tried to include all the individual and place factors that can affect desired family size and actual completed family sizes. Not every factor will be relevant in any given community, but in addressing the issue of fertility differences, we feel that it is important to definitely rule out a factor, rather than to omit it in ignorance. Some may not be relevant for a community while others may affect fertility decisions at more than one stage in the process.

In the next chapter we will use four brief examples to demonstrate how different patterns of person-place factor interaction produce varying urban-rural, intra-urban and intra-rural fertility differentials.

FIGURE 5: A FRAMEWORK FOR ANALYSING FERTILITY DIFFERENTIALS



CHAPTER III

ILLUSTRATIONS OF THE ANALYTICAL FRAMEWORK

Having presented a framework which is appropriate for the analysis of place-related fertility differentials, it is useful to illustrate how this framework may be applied. Ideally, this should be done with detailed data to test specific hypotheses generated from the more general framework. However, intensive empirical studies of individual countries are beyond the scope of this research. Rather, we shall make use of existing empirical studies which have dealt with variables relevant to portions of the framework. Because these studies were not formulated according to our framework some assumptions may have to be made to show how their findings support or disprove the postulates of the framework. Despite these limitations, the presentation of country case studies can highlight particular aspects of the framework which are of special interest to understanding urban-rural fertility differentials in developing countries.

The countries we have chosen to study are the Philippines, Peru, Tanzania, and Egypt. Each country represents one of the four fertility differential groups given in the typology presented in Figure 1 of Chapter 1. The choice of countries with different socio-cultural attributes also may enable us to examine the significance of these differences in the determination of fertility. For each country a different aspect of the framework will be discussed, although the difference or similarity between urban and rural areas will be stressed in all cases.

This discussion of the Philippines focuses on the economic costs and benefits of having children in urban and rural areas. Both perceived and actual costs are discussed. This study shows that rural couples perceive the economic contribution of children to be more important than do urban couples, although couples in both urban and rural areas emphasize the importance of children to maintaining the continuity of the family. Both urban and rural women consider childbearing their primary function and therefore do not feel that having children interferes with their work.

Actual costs of children are not significantly different for urban and rural areas, although there are variations by income group. Children's contributions to current family income, however, seem to be slightly greater in the urban than the rural areas, but more studies are needed to determine the net difference of contributions. If actual net benefits, both short and long-term, match perceptions, rural parents benefit more from children. This difference can partially explain the higher rural fertility levels.

The effect of social and economic dependency on fertility is illustrated in the chapter on Peru. It is shown that the tradition of the economic patron-client relationships has interacted with the subservience of women to have a positive effect on family size in rural communities. This is contrasted with the situation in urban areas where changing values, aspirations and economic opportunities for women break their traditional dependency, enabling them to have smaller families. The extent to which urban women or rural migrants to urban areas take advantage of these options depends on their own attributes, such as their desire to be economically independent and their ability to exploit economic opportunities.

For Tanzania the emphasis is on the mechanism by which urban values and constraints influence rural fertility behavior. The mediating effect of rural attributes and values on this impact is also discussed. It was found that the value structure as well as the economic structure of the community exerts considerable impact on extra-familial options for women. Contact with many who have successfully taken advantage of economic and educational opportunities buttresses the confidence of individuals in assessing the probability of their own success in these pursuits. Finally, various place-factors also influence the perception of falling infant mortality, which also correlates with smaller family ideals.

In the Egyptian study we have focused on women's options and roles that influence fertility level. Studies show that migrants and non-migrants have only slightly different fertility, thus migration has not substantially raised urban fertility. This may be due to the fact that in both town and country women are secluded, poorly educated, and generally not working outside the family domain. This study shows that seclusion leads to lower education and labor force participation of women, which may in turn reinforce high fertility tendencies of the culture and religion. Differentials in fertility within urban areas vary significantly with the person characteristics of socio-economic status, education, "modernism", and work outside the home in child-care incompatible employment. Although most urban women still belong to the traditional high fertility group, if educational attainment and employment outside the home become more widespread, there is a greater likelihood that urban fertility will fall and the urban-rural differential widen. Such a widening will be offset by any education related changes in rural infant and child mortality, which can lead to rural women having fewer births.

These illustrative studies show how the effect of person-related variables depend on the context in which they operate. Education's effect on fertility is a good example of this variation. In Peru, education inspires aspirations among rural women, who may migrate to town to pursue these aspirations. They may or may not have smaller families, depending on their urban experiences. In Egypt, education in rural areas leads to lower infant and child mortality, which correlates with lower fertility. Migration is a less feasible option for educated women, because of the Moslem religion's traditional proscriptions on women's behavior. In both situations the net impact of education on fertility depends on the context in which these changes occur, as well as the options available to educated women. The mechanisms by which person factors affect fertility may also vary with the community context. In one Tanzanian community, for example, women who want fewer children are those who believe that infant mortality is falling. In actuality, mortality

declines are occurring in several of the surveyed communities, but due to location and other factors women in one community are better able to perceive and react to the declines. The case studies are too brief to allow definitive conclusions about the country-specific nuances of person-place factor interactions; they do serve, however, to show that subsequent analyses need to carefully examine these interactions in order to correctly model fertility influences.

Illustration 1: A Comparison of the Costs and Benefits of Children in Urban and Rural Philippines

This section focuses on urban-rural differences in the costs and benefits of children. Both perceived and actual costs and benefits are considered. As shown in the framework, these are important to determining generally acceptable family sizes, as well as the number which any particular couple desires. The perceived costs and benefits of children are determined by place factors, because children's economic benefits or liabilities depend on location-specific opportunities for them to make economic contributions net of the location-specific costs incurred to rear and educate the children. This study utilizes materials from two selected urban areas and one rural area, allowing us to look at cost-benefit differences and similarities both between and within communities. We will look first at the patterns of urban-rural, inter-urban, and inter-rural fertility differentials and second at how the urban and rural perceptions of economic costs and benefits of children compare to actual costs and benefits.

Urban-Rural Fertility Differentials in the Philippines

In the Philippines during the period 1970-73, the number of children ever born for ever-married women was 4.92 in urban areas and 5.67 in rural areas, which gives an urban-rural fertility ratio of 0.882 (See Table 1, Chapter 1). A closer look at urban areas of different population sizes reveals that the largest city, Manila, has a level of fertility 13.4% lower than all other urban areas; the difference between Manila's and rural fertility is 23.6%.

As shown in Table 8, there is considerable region-by-region variation in the urban-rural fertility ratio. In Luzon, the urban-rural ratio is much smaller than the nationwide average, but in the Visayas there is little difference between urban and rural fertility. Furthermore, urban fertility in both the Visayas and Luzon (outside of Manila) is higher than that in rural Mindanao.

Table 8. Total Marital Births to Ever-married Women 25-34, 1968

Residence	Region				
	All	Greater	Other Luzon	Visayas	Mindanao
Urban	3.54	3.28	3.79	3.75	3.23
Rural	3.94	--	4.21	3.77	3.63

Source: Concepcion et al., 1975, p. 131.

The discussion above demonstrates that while urban fertility is lower than rural fertility for the Philippines as a whole, there are exceptions to this average when more localized regions are examined. The data for Visayas and Luzon suggest that even within urban areas there are components of high fertility. In the following section we look at how economic costs and benefits of children may affect these differentials.

The Economic Advantages and Disadvantages of Children

As shown in the fertility analysis framework presented above (Figure 5, Chapter II), parents' perceptions of the costs and benefits of children influence their desired family size. These perceptions are weighted by the parents' subjective valuations of these costs and benefits. This section of the discussion of Philippine urban-rural fertility differentials looks at the differences between urban and rural parents' perceptions of these costs and benefits. This discussion will be followed by a comparison of actual costs and benefits. The discussion utilizes the results of studies in metropolitan Manila and rural areas outside of Manila. Because the survey population lives in one of the most urbanized regions of the Philippines, the results are not necessarily generalizable to the whole country. Nevertheless, they do highlight some interesting urban-rural and intra-urban differences in perceptions.

Perceived Costs and Benefits

There are urban-rural differences in the perception of non-pecuniary costs and benefits. These include emotional strains and rewards, status, security, and lineage continuity. As compared to urban couples, rural couples are much more likely to stress that children provide "family continuity." Having heirs to inherit the family farm is apparently much more important to rural families. On the other hand, urban couples are more sensitive to the emotional strains of raising children. As opposed to life in rural villages, there are many more ways for city parents to spend their time, and they are much more conscious of the leisure time they must sacrifice to raise children (Bulatao, 1975). No other nonpecuniary costs or benefits show substantial urban-rural differences, but these differences alone suggest that rural parents tend to perceive more non-quantifiable benefits from their children than city parents.

Another cost discussed above is the opportunity cost to the mother: A mother who spends her time caring for children may not be able to work and therefore sacrifices some of her earning potential. Studies of both urban and rural Filipino women show that they do not feel that having children interferes with their work responsibilities. This may be due to the fact that among these women, childbearing, not labor force participation, is considered the primary activity (Bulatao, 1976). A study of women in a rural fishing village near Davao City shows the same prioritization. All women are expected to have children, but not necessarily to work, although most do. Childless women are likely to be abandoned by their husbands (Reining et al., 1977). This means that children are an important factor determining a woman's status.

A major pecuniary benefit discussed above is the cash and in-kind contribution that children make to their parents, both when the children are young and when they are adults. In this sample, rural parents perceive that their children make a more substantial present and future economic contribution than do urban parents. Rural parents also expect to receive more financial help from children, and they prize more highly the help itself. Not surprisingly, more than any group of urban parents, rural parents also believe that their children are more willing to contribute this help. Perhaps because they do not expect as much financial help from their children, the urban middle class is more likely to emphasize the net economic cost of children, with the urban lower class falling midway between the urban middle class and rural parents in their perception of the net economic cost of children (Bulatao, 1975). This difference may relate to the fact that urban middle class children are much more likely to go to school longer than urban lower class or rural children (Hackenberg, 1973).

Combining these perceptions of net pecuniary and non-pecuniary costs and benefits, we expect rural parents to perceive more net benefits from children than urban parents of any class. If so, this may be one reason

for the observed higher fertility of rural women. Among the urban groups, the urban lower class tends to value children more than the middle class, therefore this might lead to their having more children than the urban middle class. In fact, this is the case among the urban poor in Davao City, as shown in Table 9, but it is not the case among those surveyed by Bulatao (1975) in metropolitan Manila.

This survey shows that the urban lower class perceives children as more of a burden than do rural or urban middle class parents, perhaps because the costs of raising children in the metropolitan area may cut more severely into the pockets of the poor than of the middle class. As a result, average parities for Manila's urban lower class are 2.9; while they are 3.4 for the middle class and 3.3 for rural women. The survey does not provide enough information to determine why the Manila urban middle class has a fertility level the same or slightly higher than the rural group. It could reflect the class-related differences observed by Morgan in Nigeria (see p. 37, above), but without more detailed information we can not determine that the urban middle class feels compelled to have larger families to safeguard their status on traditional bases. What this does show, however, is that even between cities there are variations in socioeconomic groups' perceptions of the costs and benefits of children.

Table 9. Marital Total Fertility Rate and Child Employment^{*/}

	Total Fertility Rate 1974	Child Employment		Total Fertility Rate 1971-74	Child Employment
<u>Davao City</u> ¹			<u>Plantation</u> ²		
Lower	9.93	10.37%	FARMINGTON	7.26	7.48%
Middle	9.03	10.03%	AMS	7.54	4.68%
Upper	9.42	9.12%	LADECO	6.74	2.74%
Total	9.43	9.06%	Total	7.16	5.26%

^{*/} Percent of household members (by type) working for wages.

Sources: ¹Hackenberg 1976 and from Tables 4 and 9.

²Hackenberg 1975 and from p. 4 and Table 16.

Actual Costs and Benefits

What are the actual costs and pecuniary benefits of young children in rural and urban areas? One study dealing with the time allocation of children in rural households of Laguna in Southern Luzon sheds some light on these time contributions (Boulier, 1976). As compared to those in non-farm households, children in farm households contribute less time to the family's income generating activities. Farm children only earn 15% of total family income, either on or off the farm. They are, however, responsible for a large share of the non-income generating activities at home, as compared to children in rural non-farm families. The average cash value of the farm and non-farm children's work is about the same, if both income generating and household work are considered (Boulier, 1976). This study indicates that all rural children contribute to household income, either directly or through in-kind contributions.

Let us now compare the net economic contributions of children in urban and rural areas. An approximate idea of the costs and contribution of children in the rural and urban areas of Davao is presented in Hackenberg's studies of Davao City and of banana plantation workers in Davao (Hackenberg, 1975). The latter sample was taken from three banana plantations; all of which are large-scale rural industries.

In 1974 about 10% of the children in each household in Davao City was employed, regardless of class (see Table 10). Although the study gives no statistics for the actual cash value of the work, the slight differences in employment rates indicate that lower class children may contribute more to household income than upper class children. If this is a strong factor affecting the demand for children, parents of lower class children would have a slightly higher demand for children.

Table 10 Davao City Employment Rate (%)

Class	Spouse		Children		Others	
	<u>1972</u>	<u>1974</u>	<u>1972</u>	<u>1974</u>	<u>1972</u>	<u>1974</u>
Lower	17	30	6.63	10.37	23.19	21.74
Middle	24	33	6.08	10.03	16.22	20.27
Upper	31	34	9.82	9.12	14.94	8.44
Total	23	32	7.5	9.06	17.2	16.13

Computed from Hackenberg, 1976, Tables 3 and 4.

About half as many, 5%, of the children of rural plantation workers were employed (see Table 11). Their average monthly income was 10% of mean household income (see Table 12). These results suggest that plantation children work less and contribute less to family income than do their rural farm counterparts. The most unexpected finding is the much lower employment rate of children among the plantation households than among the Davao City households: 5.26% versus 9.06%. The primary employer is the plantation and, with one or two exceptions, children who are employed work on the plantations (Hackenberg, 1975, Appendix I, Tables 17A-C). There may be more alternative employment opportunities for children in the city, which is consistent with our previous discussion of women and children working in the urban informal sector (see p.69, above). Another possible explanation is that a larger percentage of plantation children work not for wages but for small family businesses. In two of the plantations, LADECO and AMS, over half of the wives who work have their own small businesses in which children can be of considerable help (ibid.). The differences in employment may also be due to the fact that Davao City children are doing the same things as plantation children but there they are counted as work for wages (Hackenberg, 1974).

Table 11. Plantation Households Employment Rate (%) 1974

<u>Plantation</u>	<u>Spouse</u>	<u>Children</u>	<u>Others</u>
LADECO	34.3	2.74	42.35
AMS	19.6	4.68	59.70
FARMINGTON	12.2	7.84	60.98
Total	22.5	5.26	50.75

Computed from Hackenberg, 1975, Tables 17A-C.

Table 12. Plantation Population: Sources of Household Income

	<u>Household Head</u>		<u>Spouse</u>		<u>Children</u>		<u>Others</u>		<u>Total</u>
LADECO	403	68.6%	93	15.12%	11	1.79%	89	14.47%	615
AMS	328	69.57%	27	5.91%	28	6.13%	84	18.39%	457
FARMINGTON	314	68.75%	28	6.25%	44	9.82%	68	15.18%	448
Total	348	69.48%	48	9.45%	30	5.91%	77	15.16%	508

Source: Hackenberg, 1975, Tables 17A-C

The comparisons of child employment rates and marital fertility rates in Table 9 show that there is no systematic relation between child employment and fertility. However, because the measure of employment may differ for the two samples and because there is no indication of the actual income earned by these children, either directly or by enabling parents to work more, it is not possible to conclude that there is no relation between the two. Other studies which have systematically explored the relationship have found a positive correlation between employment of children and fertility (Herman, 1970).

These two studies by Hackenberg make no specific reference to the comparative costs of children, but inferences can be made from a comparison of monthly budgets. In Davao City, food expenditures account for more than 50% of income for two-thirds of all households, including lower and middle class families. Housing is on average only 10% of all household's income, plantation households spend even less for housing, 5% of income*/. In all households, members own very few possessions. Net of food, rent, utilities, and transportation there seems to be little discretionary income. Because food is a major item of expenditure on children, especially in low income households, this means that each additional child substantially increases the share of food expenses, which already accounts for over 50% of income. The child related food expenditures take a larger cut out of the incomes of lower class families. The very non-existence of discretionary income rules out educational or other child-related expenditures for the plantation workers and the poor of Davao City, and probably for the urban middle class, as well.

It is interesting to note that the budgets of the urban lower and middle class are not that different from those of the plantation households. Because these two groups comprise over two-thirds of the population of Davao City, it is not surprising that budgets for all of Davao City are not significantly different from those for the plantation households. This shows that rural plantation households do not face lower child maintenance costs, a finding

*/ This may be due to the availability of low-cost company housing.

which is consistent with others which show no significant perceived difference in the economic cost of children between the rural and urban population of the Philippines (Bulatao, 1975).

Another cost of children is the mother's foregone income. As discussed earlier, Bulatao found that neither urban nor rural respondents perceive children as obstacles to their careers or work. Yet results from the Laguna study indicate that young children reduce a mother's time for income-earning activities or leisure (Boulier, 1976). Evidently, Philippine women do not perceive this tradeoff as a sacrifice in earnings.

The work-child care tradeoff varies over time. While young children may discourage a mother's labor force participation, the mother is free to work when they are older. If, as shown in the section above, most women perceive that they will both have children and work, at the end of their working lives cumulative time out of the labor force may not be significantly different for women with many versus those with few children. A study of the determinants of employment of Philippine women found that there is a work-childcare tradeoff in the 25-34 age group, the peak child bearing years (Rosenzweig, 1976). However, past work experience does not reduce the subsequent number of children desired for the sample as a whole. This supports the results of studies discussed above suggesting that while a tradeoff does exist, especially when the children are young, the choice is to subordinate employment to childbearing activities.

Among Davao City and plantation households, the spouse's employment rates are directly related to household income, suggesting that the wife's income is an important contribution to household resources. The correlation is most pronounced among the plantation households. The female employment rates are much lower for the plantation households than for Davao City, probably due to the much lower employment rates among the lower income plantation women who can not obtain employment on the plantation but lack

capital to set up a small business. Less than half the women can find work on the plantation. The remaining working women are self-employed in vending, trading, or cottage industries, activities which are compatible with raising children. In Davao City, more than half the upper and middle income women who are employed are also in economic activities compatible with childcare activities, similar to those in which rural women engage. These findings demonstrate that for over half the urban and rural women in the sample, work does not conflict with childcare responsibilities, and there is no direct opportunity cost^{*/}.

It is possible that other individuals in the household, namely, children and relatives substitute for the mother's childcare time, reducing the conflict between the mother's work and childcare activities. The Laguna study of rural households found that older children, especially females, substitute for their mother's childcare time. Furthermore, there are economies of scale in childcare time. As a family grows larger, each additional child results in a smaller marginal increase in required childcare time. The employment rates for non-parental members of the Davao City households show that they are less likely to work outside the home, while they presumably help out more at home. This may account for the higher employment rates among Davao City mothers.

Not all children and relatives stay at home, however. Among the poorest plantation families, it is the wife who stays at home while her children and relatives work. The Hackenberg study does not permit ex-

^{*/} There may be an indirect cost if women are constrained to lower paying occupations because they must be able to care for children while working.

ploration of the causal factors underlying this role pattern. It may be due to the fact that the poorest of the plantation wives cannot afford to set up a business, and because there are few other employment opportunities for women on the plantation, this lack of capital closes out the possibility of work. Religious or health factors may also explain why these women stay at home. A study of rural fishing villages also shows that work outside the home is least likely among the poorest women (Reining et al., 1977). Obviously, the family's low income may relate to having a smaller number of adult earners, but as with the plantation workers, these women may stay at home not out of choice but because they have no other more productive use of their time.

Conclusions

This brief review of the differences in urban and rural costs and benefits of Philippine children does not permit definitive conclusions about the exact nature of these differences. It is sufficient, however, to show that differences exist which may underlie the observed 12% urban-rural fertility differential.

First there are differences in the perceptions of both costs and benefits of children.

- a) Rural parents tend to perceive more non-pecuniary benefits and fewer non-pecuniary costs to children than do urban parents. Although children are important to both urban and rural parents, rural parents value children more for family continuity than do urban parents. Rural parents also feel that children are easier to raise than city parents.

- b) Rural and urban parents also differ in their perceptions of the pecuniary costs and benefits of children. Here, again, rural parents expect more financial help from children and feel they are less costly to raise than do their urban counterparts. Neither urban nor rural mothers perceive a tradeoff between working and having children, thus there is no perceived opportunity cost to children. For all women children, not work, seems to be the top priority. There are some differences in perceived costs among urban parents. The urban middle class expects the least financial help from children and the urban lower class, at least in Manila, perceives children as most costly to raise, perhaps because the child-related food costs constitute a large and inflexible share of their low incomes.

Adding together these different perceptions, it is clear that rural parents value and expect more benefits from their children than do urban parents. Rural Filipino parents are more likely to perceive a net benefit to children than their urban counterparts.

Second, although the differences in actual costs and benefits of children are less completely documented, the evidence presented here shows that there are both differences and similarities between urban and rural parents.

- a) There is no doubt that parents incur costs for each additional child. The major expense for children (not including education, which is a consideration for the urban middle and upper classes) is food. This is a larger proportion of total income for lower income than for higher income families. The limited data considered here suggest that these costs are felt in relatively the same magnitude by rural and urban lower class parents, but less by urban middle class parents than rural middle class families.
- b) Another potential cost is foregone income of the mother. The studies show that in some cases there is no tradeoff between working and having children, perhaps because women on the farms, on plantations, and in cities tend to be self-employed, working at jobs which are compatible with raising children and in which children may actually help. Children and other relatives also

help out at home, substituting for the mother's time at home and allowing her to work outside the home. The poorest women are the only ones who do not work outside the home. In this case, the cause for not working may be lack of capital with which to start a business more than it is the responsibilities of staying home with children.

- c) Children work both in the town and the country. In rural areas, their work accounts for 15% of family income. Without additional studies on the value of their contributions we can only say that the slight variation in their employment fails to correlate with family size variations. Studies of their cumulative contributions to parental income are needed. Rural parents seem to expect more lifetime benefits from children, and it would be useful to know if these perceptions match reality.

There is some indication that the net balance of pecuniary costs and benefits shifts throughout the family lifecycle for different types of rural and urban parents. Children are costly to feed and school, yet they also contribute to family income, particularly as they grow older. To fully comprehend the urban and rural difference it is necessary to look at different stages in the family's lifecycle. Only then can we identify the nuances in economic costs and benefits for urban and rural parents at different income levels.

In summary, part of the difference in urban and rural fertility in the Philippines may be due to differences in the perceived benefits of children. Particularly within urban areas, it may also be due to differences in the actual pecuniary costs and benefits of children, but more detailed studies of the economic benefits accruing from children at all ages are needed to specify the exact differences, particularly of differences in costs and benefits by income class, for both urban and rural families.

Illustration 2: Dependency and Fertility in Peru

Peru is a country with low urban fertility and high rural fertility. What are the relevant social, cultural, and economic factors underlying this relationship? While a full case study application of the framework developed above is beyond the scope of this project, a cursory review of the salient cultural, social, and economic settings in urban and rural Peru suggests that the patterns of economic and social dependency have something to do with these differences and their relationship. These patterns of dependency are embodied in the young woman's perceptions of her life options and her attitude toward change and innovation, as well as in the varying social and economic opportunities emerging at different stages in her lifecycle. As shown in the fertility analysis framework (Figure 5, Chapter II, above), each of these is influenced by economic, social, and family structures of the place where a woman lives.

This framework illustration briefly describes the Peruvian example, showing how economic dependency and large families are mutually reinforcing in rural areas, but how urban areas, Lima in particular, present opportunities to break out of this dependency. First, we shall discuss the age-specific fertility differences between urban and rural areas, and then between Lima and all urban areas^{*/}. Second, we shall show how traditions of dependency, symbolized in the patron-client relationship, have interacted with subservience in women to produce high fertility in many rural communities. Third, we shall show how the city environment can perpetuate this dependency, or how it can be countered by the opportunities and aspirations of urban life, resulting in smaller family sizes for both migrants and natives.

^{*/} Arequipa is broken down separately in the census statistics, as is Lima. However, since age-specific and total fertility rates for Arequipa and all urban areas are so similar, we did not attempt a comparative analysis.

Lima's fertility is even lower than total urban fertility. At ages 15-19, Lima women have less than half the fertility rate for rural women. For the peak child-bearing cohort of 20-24 Lima's fertility is 57% of rural women's, but thereafter it declines*/. We see the same pattern of delay-rapid childbearing in Lima as among all urban women, but compared to rural women, Lima women bear their children even faster than other urban women. In addition, there is evidence of delay only in the youngest cohort, as opposed to both the first and second, as for all urban women.

What has caused such dramatic changes in child bearing patterns among urban and especially metropolitan Lima women? We do not hope in this brief examination to fully explore this issue, but by looking at the differences in situations for Lima and country women, we can suggest some possible mechanisms.

Dependency and Fertility In the Countryside

There has long been a pattern of dependency in rural Peru. The hacienda system in parts of rural Peru was based on a patron-client relationship wherein the client (the Indian who worked the land) was dependent on the patron (the landowner). In a highly stereotyped example, the patron exploited the client, but in some ways he also protected his client. Each client hoped that he would find an omnipotent and benevolent patron who would reliably help him without treating him too badly. The patron obviously had many resources with which to impose his will, but the workers also manipulated the patron to meet their needs. Recognizing that part of the patron's power lay in the support of the fellow members of the "gentry", the workers could hold the patron to his word by threatening to expose him, which could cause him to lose face (Bourricaud, 1970:28-36).

*/ Cohort 40-44 for Lima indicates some problems with reporting, so we do not discuss this cohort's fertility.

Although the patrons have changed, patron-client relationships continue to govern the lives of rural peasants. Today the patrons are the technicians and bureaucrats, the educated, professional, or military. Their domains are the government-run farms, schools, or hospitals. They control the availability of the goods and services which peasants want, but the old ways of managing the patrons do not work when the patrons have no inherent interest in the community (Conlin, 1971).

Peasants still may use traditional means of denying deference, non-cooperation, and other support withdrawing tactics, but because these patrons are paid and not dependent on the clients, these tactics may not work. Despite the efforts to secure participation among peasants, they may be more powerless now than in the hacienda days. However, there is a difference. Today, peasants can see that there are ways out of this situation, and the bureaucrats hold the keys to some of the paths. If they can get education for their children, when their children break away they can find a better life in the city. For this reason, peasants continue to cooperate with the new patrons (Conlin, 1971:151-3; Kley Meyer, 1977a and 1977b).

This long history of patron-client relations has engrained in peasants a sense of economic dependency and powerlessness. As in parts of Mexico and Guatemala, the legacy of the haciendas is a feeling that one cannot control one's destiny (Reining et al., 1977, Hinshaw et al., 1972). The old who have seen little change in long years are more likely to be fatalistic or pessimistic about change, and skeptical about attempting to use local institutions to bring improvements into their lives. Women may be even more fatalistic than men. They are less educated, and face more barriers to change than do men at any age (Kellert et al, 1967:412).

After examining the roles of women in eleven Andean Peru communities, Bourque and Warren (1976) conclude that women have few rights and are clearly subordinate to men. Even where men participate as comuneros,

cooperative farmers, wives are still dependent on their husbands. Women work arduously and take major responsibility on the farm, yet they are paid less for their work. Their husbands do not perceive the full amount or value of the woman's work. Land reform and communal farming have done little to change the powerlessness and economic dependency of rural women.

This sense of powerlessness and lack of control may carry over to attitudes toward themselves which influence fertility. A recent survey in rural and small town Peru shows that barely one-fourth recognize any birth control method listed. Three-fourths of the women fear using birth control and almost as many oppose teaching women about the reproductive process. While fear of birth control is common among rural women in other Latin American countries, this unwillingness to even talk or teach about pregnancy or intercourse is unique to Peru and Mexico (Simmons, 1977). The unwillingness even to expose themselves to new ideas may reflect a coping or stress avoidance technique learned through a tradition of not being able to change their own lives (Kellert et al, 1967).

Because rural women either see no alternatives to the way that women have always lived, do not know about the reproductive process, or see no reasons why they should not want children, they are likely to marry and have a child sooner than their urban counterparts. Their attitudes towards children are not clearcut. 76% of the rural and small town Peruvian women see advantages to large families and only 62% see disadvantages to large families. 77% also see advantages to small families while 33% see disadvantages to small families. Of all the countries surveyed*/ this is the lowest rate of perception of disadvantages of large or small families.

*/ Colombia, Costa Rica, Mexico, Peru

If all the responses are ranked by degree of preference for large or small families, 19% clearly favor large families, 40% do not favor large or small families, and 41% favor small families (Simmons, 1974: 132-33). Given the attitudes of powerlessness and fatalism, one would expect that those who are ambivalent will end up having large families because they do nothing to prevent having children.

The rural Peruvian women favor large families because children help out financially or in other ways (Simmons, 1974). Statistics do show that children in rural households are twice as likely to work in rural than in urban areas (Tienda, 1977). 94% of all 6-13 year olds working are in agriculture, but this drops by almost half for age groups over 14. In rural areas, school children are ten times more likely to work than urban school children. Young rural boys are more likely to work than young rural girls. Rural working children tend to be younger than urban workers, many of whom start work only after schooling. Because children begin work at an early age, they are considered an economic benefit.

The timing and known availability of help from children is important to rural parents. Where the women have few resources, their only source of help is likely to be their own children, so children may be a non-substitutable item (Reining et al., 1977). Children are also important to the husband in his work. Torres (1976) has shown that where there are some non-agricultural employment opportunities, the mother and children will continue to farm, providing a much-needed subsistence guarantee while the husband risks development of an enterprise (Kimmerling, 1971). Even for farmers who commercialize, large families are advantageous, if not essential. Children can find wage or seasonal work. More importantly, children who move to town can act as necessary town adjuncts to the business (Roberts, 1975). Finally, among the non-commercialized farmers who lack opportunities for developing any other enterprise, children are particularly critical because only by increasing the number of workers in the family can they increase their income (Torres, 1976:100-167).

Large families may not have a productive job for all able children. In Peru migration has traditionally siphoned off these extra family members (Soberon, 1975). Where land resources are limited, young couples will live with parents until they can become independent, but this is not the preferred option. Migration opens more doors because migrants in the town find independent work which frees them from their economic dependency.

If rural couples do choose to have small families, education is the most likely factor to motivate such a drastic change in attitudes about children. There are several avenues to this change. First, agricultural incomes can become so depressed that additional children can not earn enough to enable mobility. Second, and probably in combination with the first, the payoffs to education can dramatically increase, through lower educated unemployment or a greater differential between educated and uneducated labor, reducing the risks to investment in education and increasing the return. Third, parents' consumerism can rise and be satisfied only through some combination of fewer children, education, and delayed marriage. Or, fourth, increased economic independence and hope for women can open up new opportunities that are not linked to having large families.

We see that high fertility among rural Peruvian families may result from many factors: traditions of dependency, powerlessness among women, fear and distrust of birth control, and parental dependency on children for economic survival or mobility. This dependency may even extend into town, if children are critical to developing an urban base for an enterprise.

Dependency and Independence in the City

In this subsection, the focus shifts from rural women to urban women, particularly those who have migrated from the countryside. City life may

expose women to different opportunities and constraints which may affect their demand for children and specific childbearing pattern. Because Lima is the primary place to which young women go, as well as the major center for the entire nation, women in Lima are the primary consideration of this discussion.

Lima is by far the largest city of Peru and presents a classic case of primacy. In 1970 Lima accounted for 58% of the urban population in places over 20,000. It contained 3,318,000 persons and was ten times larger than the next largest city, Arequipa (Fox, 1975:24). Over one million more people are expected to reside in Lima by 1980. Therefore, when we talk about "urban" Peru, almost 2/3 of this is Lima alone.

Lima is also the city receiving the largest share of migrants. Those who have come from the coast may have lived in other towns first, but for Sierra and Selva migrants, Lima is the destination of a one-stop move. Therefore, a large share of Lima's population is of rural origin. In 1970, 43.3% of Lima's population was migrant, with migrants fairly equally distributed between males and females (Ministerio de Trabajo, Peru, 1971).

One reason so many migrants go directly to Lima is because income levels are highest in Lima. Andean farmers in 1961 netted 7400 soles per year, as compared to 23,300 in Lima. If the average personal income for Peru were given a weight of 100, rural areas had an income of 63, urban traditional 94, and urban modern 260. The rural Sierra had the lowest relative income, 57. Even though incomes grew more slowly in the urban traditional sector, the rate of growth per year still exceeded the Sierra's by 1.3% (Hebb, 1975:223-5). The government has had little effect on reducing interregional income differentials, despite a policy of "regional development."

By several measures, opportunities are more plentiful and more diverse in Lima. Incomes are higher, and households in Lima have a higher discretionary income than in other towns or rural areas. Only 30% of the national population live in Lima, but they account for 42% of private income (Institute Nacional de Planificacion, 1975). There are many more schools at all levels in Lima, with the result that in Lima in 1973, only 9% of the women were without any schooling, while among their rural counterparts 56% had never attended school. In rural areas, only 2% of the women had secondary education but 33% had reached this level in Lima. Furthermore, women in Lima are just as likely as men to have some secondary education, while in rural areas they are only half as likely to have primary or secondary schooling. Although rural parents have high aspirations for their children, Lima parents have even higher aspirations, particularly for daughters. Lima parents want their daughters to be nurses, pharmacists, primary school teachers, or other professionals. In Lima women are the majority in these professions and they are 10% or more of all dentists, public accountants, architects, and lawyers.

At all levels of education below university women fill over one-third of the positions (Villalobos de Urrutia, 1975:A-20). To the rural villager this suggests that opportunities for a better life are certainly more favorable in Lima. And for women, there is no doubt that Lima offers opportunities not available in rural areas.

Who are the women who move to Lima? A recent study of domestic servants shows that most single women come between ages 10 and 24, are of mixed Indian origin, and are not always childless. Domestic servants are more likely to come from provincial towns but have rural backgrounds. Most have little or no education. These women are unfamiliar with city ways, and even if they have had some schooling, they find themselves able to work at little else than domestic service. During 1956-65, 30% of all adult female migrants

were first employed as domestic servants. If one counts only working migrant women, nearly two-thirds started as servants (Smith, 1973:194-205).

Coming to Lima may be an escape from autocratic parents or spouses. Or young girls may come because they have nowhere else to look for work. Aspirations to improve their lives and their children's often stimulate a move. Moving to Lima to look for a job is the first step toward actualizing those aspirations.

Servants are expected to work hard, and they are easily exploited. Days are long, and the servants must always be on call. For some the life is not greatly different from their home life, with the exception that as servants they are paid. Despite the difficult life, many girls struggle to go to night school, to learn Spanish, to learn sewing so that they will have the skills by which to get a better job.

Many want to set themselves up as street vendors. To do this properly, however, takes some capital, however meagre. Domestic service is the best way for young women to accumulate enough savings to buy a pushcart or some merchandise for resale. Street vending and other own account work offers a much larger degree of economic independence. For some it actually gives a higher likelihood of mobility than wage employment (Nelson, forthcoming: I-35 ff). In addition, own account work provides women with a flexibility to integrate their childrearing, housework, and earning activities as best suits their needs. Even though their earnings may not dramatically improve, the independence, possibility for mobility, and flexibility make vending especially attractive to women leaving domestic service.

Domestic servants' aspirations for mobility are often linked to marriage. They want to marry a man with a good job, have a home, and work out of their home, for example, as a seamstress or beautician (Smith, 1973:195-8). The young girls' aspirations are enough to motivate a search for work in the city, but most do not contemplate major occupational mobility. Most want to be

upper-lower class housewives, raising 2-3 healthy and educated children (Smith, 1973:199). This aspiration corresponds to the modern woman's image in the media. The modern woman is expected to be a good housewife, humble, self-sacrificing, and otherwise ineffective and passive (Flora, 1973:59-83).

Some may realize their ambitions; others will not fare as well. In Lima, domestic servants may work for as long as seven years, but many work for shorter periods. Not all will succeed in accumulating the savings to set up a stable vending operation. When they leave domestic service (often due to pregnancy), they may find themselves with few options. Many vendors were once domestic servants who were forced to leave when a child was born, and who were not prepared to set up business. Once saddled with children and inadequate savings it is extremely difficult for them to prosper on their own. There certainly is turnover among servants, but not all manage to use domestic service as a ladder to more stable and better paying jobs (Smith, 1973; Papanek, 1976).

In Lima, women are most likely to be laterally mobile, but not significantly upwardly mobile. Almost 88% of Lima's women who start working at unskilled sales and services jobs remain there, never experiencing occupational mobility. An additional 22% of those who start in semi-skilled positions are downwardly mobile. In both cases women fare much worse than men, who are almost twice as likely to move up from unskilled occupations. This may account for the fact that women are slightly over half of all vendors and almost three-fourths of all service workers, most of whom are domestic servants. Among women who start at clerical-technician jobs, there is little downward mobility, but neither is there upward mobility. Fully 91% remain at the same occupational level. Men at the same level risk downward mobility, but at least they have some chance of moving up the occupational ladder (Suarez, 1975:22, 61).

Education can substantially increase the chances of upward mobility. Many of the younger migrants are educated, and their chances are better (Roy, 1969). Those without any training or incomplete primary school have only a 20% chance of rising above an entry level position as an unskilled worker. Completion of primary school increases the chances to 40%. At the semi-skilled level, however, education up to secondary level may be necessary just to avoid downward mobility, and completion of secondary school is virtually an entry requirement for clerical or white collar jobs (Suarez, 1975:70). Because couples perceive the importance of education to the mobility process, they struggle to educate their children.

Migrant status may actually enhance an individual's mobility prospects, and migration alone does not increase the likelihood of downward mobility. For the unskilled category, 24% of those who have experienced upward mobility come from the country, and an additional 18% are from other towns, while only 14% of the natives in unskilled jobs are mobile. At higher occupational categories, migrant status alone has little bearing on mobility (Suarez, 1975:58).

In a recent analysis of women in two Bogota (Colombia) barrios, Harkess observes that while for males credentialism pervades the job market, for women there are fewer skilled job options, and credentialism is not as important to finding work. Therefore, there are no wide migrant-nonmigrant mobility differentials for women. Their lives are fairly similar whether they arrived recently or long ago (Harkess, 1973:239). The same may be true for Peruvian women. Their own chances for significant mobility are limited and do not necessarily depend on an urban background.

Outwardly many women's lives in Lima are similar: most are mothers, work in sales or service occupations, and aspire to be stable upper-lower or lower-middle class wives. If they do achieve mobility it is only through

marriage and pooling of income with a husband and other kin (Smith, 1973: Tienda, 1976:159-174). Women working alone to support children simply can not earn enough in the informal sector to survive, let alone be upwardly mobile in even a limited fashion.

Women's aspirations for their children, and especially their daughters, may differ substantially, however. In Lima, most ex-servants have high aspirations for their sons, but few wish their daughters to be anything but housewives (Smith, 1973:200). In Bogota, for example, the very poor, recent migrants envision their daughters as housewives, because they know they cannot afford to send both sons and daughters to go to high schools are given precedence in payment of school fees. The more established, upper-lower class women also do not want their daughters to go to high school, but their reason differs: girls who will be housewives have no need of education. Both groups resemble rural women in aspirations and reasoning. Between the two groups, however, are the women who are "less poor" and not new to the city. These women want both sons and daughters to be equally well-educated and have professional aspirations for both sexes (Harkess, 1973:240-1).

The Bogota women who have strong aspirations for both sons and daughters are also lower class, but they differ from those poorer and those better off than they. These women take a much more active role in making decisions and sharing responsibilities with their spouses. They are not powerless before their husband; neither are they economically dependent in an absolute or relative sense because they have independent responsibilities for their children and themselves. But these women are still not without economic difficulties. Given their hopes for all their children and their personal sense of responsibility for their welfare and future, we expect such women to have fewer children, and they do (Harkess, 1973:245).

If the Bogota pattern of aspirations holds for Lima, where fertility differences between the lower and middle class women resemble those in Bogota, the sense of personal responsibility coupled with aspirations for one's children may be the key to understanding the fertility differences. The "less poor" women at any age have fewer births than the "very poor" women. At age 20 there is little difference but the gap widens at subsequent ages, and especially after age 30. The less poor clearly have more effective mechanisms to control family size. Frisancho, Klayman and Matos (1976) suggest that this results from lower infant and child mortality among the less poor. The less poor have higher incomes and spend more on food, which may reduce mortality. After controlling for age, education and income, the women who have experienced child deaths have higher birth rates. Women with child deaths are more likely to have more births either because they feel they must replace the deaths, or because they use no other birth control than abstinence while nursing and a death shortens the period of abstinence.

The "less poor" are also better educated than the poorest of those surveyed in Lima. Because education and use of birth control are correlated for women living in Lima (Roy, 1969:52), this may provide the link between lower mortality and lower birth rates. For every increment in educational level, at every age, women in the Lima *barriada* El Agustino have lower fertility than their less educated counterparts. Up to ages 30-34 this seems to be due to spacing but thereafter it reflects use of birth control to actually restrict births. Women with even 5-6 years of schooling will space births from age 25 onward.

Without more detailed information on aspirations and life histories, we can only observe that having some schooling combines with aspirations and better income to produce lower infant mortality and use of contraceptives. It does so among both migrants and natives in the lowest socio-economic groups, which comprise the bulk of Lima's population.

Why does some education make the difference? Returning to the theme of "modern" attitudes and diverse exposure, we suggest that through education women learn more about the world. They learn that they have options and that they need not be powerless and dependent on their husband or kin. In Lima, more than in the provinces or small towns, as servants and in the informal sector they have opportunities to work towards achieving goals for themselves and for their children. Even though many achieve no major mobility in their lifetimes, they are able to provide much better opportunities for their children. This may be particularly applicable to the "less poor."

Several processes may facilitate their efforts and allow them to have the 2-4 healthy children they want:

- 1) Some education increases the woman's own mobility chances. Without education she is unlikely to rise above an entry level unskilled service job.
- 2) Informal sector sales and service occupations offer women economic independence. With economic independence, a woman is less likely to feel powerless or feel compelled to remain economically dependent on her family or spouse. Women who earn more tend to have a more egalitarian relationship with their spouses.
- 3) Better pay allows her to care for and better feed her children, who are healthier and less likely to die. There is, therefore, less pressure (by kin, spouse, or self) to replace deaths with births and more likelihood that longer lactation will delay the next birth.
- 4) Living in the city can expose her to more heterogeneous people, who directly or indirectly provide information about small families and birth control. Hence, she is more likely to know more about small families and to want to use birth control. This is more likely if she has some schooling.
- 5) With her own broader information horizons and experiences, she is more likely to perceive that mobility is possible and that she herself can change her life. And with a less precarious economic situation, she is also more able to cope with uncertainties or take risks associated with innovations or changes in her life.

- 6) But she will also see that her limited level of education is not enough to "make it." Only men and women with at least some secondary schooling are likely to find skilled, technical, or white collar jobs. If she wants her own children to do better than she has, she will see the need to educate them for as long as possible.
- 7) Education is costly and in Lima school children are less likely to help their mother at home, or financially. Both factors raise childrearing costs. Even with occasional help from relatives, to ensure education for her children, any but a well-off woman must have a small family.

Not all women who come to Lima will break out of dependent relations. If they are unable to establish their own viable independent economic enterprises, hopes of economic independence may be slim. Surprisingly many do make it. Neither is the path from dependence to independence a straight one. Given an image of modern women as docile, nonworking wives completely dependent on their husbands, many women, especially in the middle class, trade dependence on parents for dependence on husbands.

These variations in economic independence may account for what seems to be a non-linear relation between socio-economic status and fertility. The very poorest and the middle class are dependent on children. The poorest need children as workers from an early age on, while the middle class are dependent on children for social status maintenance. In between, the less poor are more independent. They do not rely heavily on children for either economic or social needs.

In an environment of diversity where opportunities are more varied, there is a possibility of perceiving other non-traditional ways of living one's life. With increased market diversification, road access, education, varied work opportunities, contacts with "city folk," and so on, even rural young people may choose among several different options. Their choice may lead to the city and it does not always lead to attainment of aspirations. Nor do all who become less economically dependent on children have small families.

For those who do choose the small family route, a key factor might be a shift to reliance on oneself. Self-reliance can result from being cut adrift by parents unable to offer further help. Or, self-reliance can result from individual choice and aspirations. Instead of following the dictates of patron, family, parents, or spouse, young men and women may increasingly orient to individual goals. The struggle to achieve these may often be combined with fulfilling parental or family obligations, but it is the individual concerns that are weighted more heavily.

Conclusions

Peru is an example of a country where there is a very large difference between urban and rural fertility. Completed urban fertility is over 30% less than the rural level. The fertility analysis framework presented in the preceding chapter shows that there are many place-related variables which may influence fertility. In the preceding section, we have highlighted the ways in which a woman's economic dependency on children influences her childbearing pattern.

While health and cultural factors not studied here may also contribute to the higher rural than urban fertility rates, we conclude that the parental economic dependency on children, the social powerlessness and fatalism of women, and the lack of interest in or knowledge about reproductive matters all bias rural women toward having larger families. The rural place variables that may correlate with these factors are continuing pattern of peasant dependency on patrons and economic dependency of women on men. Rural areas offer limited education or employment opportunities for girls; even servant positions are limited to the cities. A tradition of fatalism, particularly among the women, may lead to unquestioning acceptance of many births. There is also general ignorance on reproductive matters and an unavailability of contraceptives in rural areas. Perhaps the most important factor is the fact that children make substantial contributions to the family income and this is seen as one of

the major advantages of large families. A major disadvantage of children is their cost, but for many rural families, this is attenuated by the rural-urban migration of elder children.

At every age urban fertility is lower than rural fertility. Because much of the urban population is in Lima, for which we also have the most survey materials, we have focused on women in Lima. Not all women in Lima have small families. High fertility rates prevail among the "most poor," but among the "less poor" small families are more likely. Less poor women in Lima may have fewer children because their relatively higher incomes allow them to spend more on food, which may reduce their children's mortality rates. These lower mortality rates increase the spacing and decrease the cumulative frequency of births. In addition, a *barriada* survey shows that these women are more likely to know about and use contraceptives, which are more readily available in the city than in the country. The less poor women may also have a broader set of economic opportunities and may be less dependent on their children, and therefore have less need for a large family. Finally, aspirations of the less poor women may also be higher than for the very poor women, and the less poor may limit their family size to the number for which they can afford education. Consistent with this possibility is the fact that educational attainment levels are higher among the less poor than among the very poor.

What are some of the place factors which produce these changes in economic opportunities and in aspirations? It is not possible from this limited study to include all factors; nor is it possible to rank them by level of importance. Among the place-factors which may influence opportunities and aspirations are, relative to rural areas:

- a) Better access to schools and higher educational attainment rates, especially for girls. This is complemented by the low employment rates of students in cities.

- b) Higher incomes allowing better nutrition and lower infant and child mortality.
- c) Higher probability of economic upward mobility, particularly for women with some education.
- d) More diverse role models and contacts, particularly for servant girls.
- e) Access to hospitals and to contraceptive information.

In both urban and rural Peru, parental dependency on children seems to affect the number of children a couple has. Other factors which may account for the urban-rural differential are differences in aspirations for children and in economic opportunities for women. These conclusions are only tentative, as more specific studies of differentials in opportunities, attitudes, and aspirations are needed to identify the exact way in which these factors interact to produce fertility variations.

Illustration 3: Family, Clan, and Fertility in Rural Tanzania

This illustration of the fertility analysis framework focuses on urban-rural differences in Tanzania. In this case study, we focus on the cultural factors which influence rural childbearing patterns and on the ways that urban-based factors may influence rural childbearing. This illustration utilizes the results of the 1973 National Demographic Survey of Tanzania, with additional economic, sociological, and anthropological materials.

First, we shall examine the overall urban-rural fertility differential and explore urban factors that may reduce urban childbearing relative to rural childbearing. Second, the mechanisms underlying high rural fertility are demonstrated by examining a high fertility group, the Chagga. We also discuss the possible mechanisms of a fertility decline among this high fertility tribe. Finally, we contrast the Chagga example with a brief review of a high fertility group where fertility is not likely to fall soon.

Overall Urban-Rural Differentials

The 1973 National Demographic Survey shows that on average the completed families of urban areas are 23% smaller than rural families. As shown in Table 18, large and small urban areas have about the same size completed family (4.2-4.4), about 16% lower than rural fertility. The most sizable urban-rural

Table 14: Children Ever Born By Age of Mother for Urban and Rural Tanzania, 1973

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
<u>Area</u>							
Rural	.401	1.751	3.177	4.302	4.865	4.949	5.024
Total Urban	.419	1.626	2.833	3.320	3.975	3.822	3.906
Urban Small (towns)	.460	1.784	3.106	4.036	4.498	4.388	4.046
Urban Large (cities)	.394	1.668	2.980	3.407	4.130	4.227	4.123
Dar es Salaam	.430	1.555	2.645	3.079	3.724	3.287	3.680
<u>Age Differentials</u>							
Towns/Rural	1.147	1.019	.978	.938	.925	.887	.805
Cities/Rural	.983	.952	.938	.792	.849	.854	.821
Dar es Salaam/ Rural	1.072	.888	.833	.716	.766	.664	.732

Marginal Differences in Number Children for Each Successive Cohort

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>
Rural	.401	1.35	1.43	1.13	.56
Urban	.419	1.21	1.21	.49	.65
Towns	.460	1.32	1.32	.93	.46
Cities	.394	1.27	1.31	.43	.72
Dar es Salaam	.430	1.13	1.09	.43	.65

Source: 1973 National Demographic Survey of Tanzania, Vol. 1. Urban large are larger towns down to 14,000 and urban small are towns up to that size. Age differentials are the urban/rural ratios for each cohort; tempo differentials are the urban/rural ratios of completed fertility at any age. Data are unadjusted and do not reflect analyses incorporated into Vol. 6.

difference is the 27% difference between fertility of women in rural areas and those in the capital city of Dar es Salaam.

Urban fertility is lower than rural fertility at every age except the 15-19 cohort of young women in towns and Dar es Salaam and the 20-24 cohort of women in towns. Because births to the 15-19 cohort are often pre-marital (Henin et al., 1977: 121), the differences for the 15-19 cohort may reflect a higher incidence of premarital births among city women. Cultural factors may limit such births in rural and some urban areas, but not in the towns or capital city. In addition, the higher rate observed in towns may reflect migration of young pregnant girls from their home villages to towns.

Rural women bear more children than urban women at every age between 20 and 34. By the end of the 30-34 cohort, rural women have borne 4.3 children, one child more than the urban women. Although after age 34 some urban women may bear children at a faster rate than rural women, they never catch up with the rural women.

It is possible that these differences by cohorts are the product of misreporting or under-reporting. However, even if we assume that under-reporting is likely to be more of a problem among rural women, we can still expect higher birth rates among rural women, particularly among the cohorts over 30-34 years where under-reporting of live births is often a problem. Recent analyses by Ewbank place the TFR in Dar es Salaam at 4.7, so if the relative difference holds, this would put rural fertility at least at 6.0, and higher if there is under-reporting in rural areas (Ewbank in Henin et al., 1977:91).

What are some of the causes for this lower urban fertility at most ages? Our framework indicates that age at first birth may account for some of the differences.. However, almost 50% of all

15-19 year old women in towns, cities and Dar es Salaam give birth before age 17. If anything, there are more births before age 17 to Dar es Salaam women. Lower urban fertility does not seem to result from later age at first maternity.

Marital type can also influence the frequency of coitus. Monogamy and religious marriages are more prevalent in urban areas, and both tend to raise fertility. In rural areas over 33% of the women aged 45-49 are polygynous while only 12% of this cohort are polygynous in Dar es Salaam. Because monogamous women aged 30-39 have about 10% higher parity levels, the lower incidence of polygyny among urban women may raise fertility (National Demographic Survey, 1973). Likewise, the highest parity levels are found among Catholics and Protestants with religious marriage ceremonies (Ewbank, 1977:7). Over 70% of all urban women and 85% of Dar es Salaam women aged 30-34 had religious ceremonies (National Demographic Survey, 1973). It seems that lower urban fertility also does not result from marital type or religion.

The residence and migration pattern of spouses may also influence fertility. In many African nations women do not move to town with their husbands, and if a woman does accompany her husband, she often returns to their farm plot when she has children (Weisner, 1976). This means that the proportion of childless women will be higher in urban areas, and in Tanzania it is. At each age, urban areas have about 4% more childless women (NDS, 1973, vol.1). Although there are very clear economic incentives keeping women and children out of the cities and on the farm (Mbilinyi, 1972: 62), the practice may slightly depress urban total fertility levels.

Our framework suggests that the urban-rural differentials may result from education differentials by changing city women's perceptions, opportunities, or knowledge of birth control.

In Tanzania, after controlling for age those with 1-4 years of education have higher parity levels than those with no education, but for those with 5-8 years of schooling, parity is .4 lower at almost every age, so we expect the zone with more highly educated women to have lower fertility (Ewbank, 1977:8). In all urban areas, the share of city women aged 25-29 with 5-8 years of schooling is over four times larger than among rural women. In addition, the inverse impact of education on births is heightened by urban residence (Henin et al., 1977:119). As mentioned in the discussion above, this may result from the fact that the educated young girls move into town where they can pursue their ambitions, leaving behind girls for whom education is less likely to have a fertility impact via changed aspirations.

Differences in work opportunities and occupations also may partially account for the observed fertility differentials. The National Demographic Survey shows that generally women in higher status professional and clerical jobs have more children than women in other occupations. In Dar es Salaam this is reversed: women aged 34-44 average 3.3-3.4 births compared to 3.7 for other women. Furthermore, within each occupational type the more urban women have fewer births than their rural counterparts (Henin et al., 1977:120). Whether these differences are due to city opportunities, attitudes, or cost of living is unclear, but in any case the differences are not insubstantial and can contribute to the overall fertility differential.

City living may also affect the perceived advantages and disadvantages of children. Shorter shows that, especially in Tanzanian cities, age and lineage are no longer sufficient criteria for social status. Higher levels of living, education and professional seniority have become the new status symbols (Shorter, 1974:71).

Thus, city women and men are less dependent on children for status than in the past. Education is the key to these new status symbols. Persons with secondary or university education in the city earn almost four times what non-educated persons earn (Barnum and Sabot, 1976: 54). Educational opportunities are better in towns, thus if parents can afford to bring children up in the city, they may try to do so. But because living costs are high in the city, city couples may not be able to afford the large families of their rural counterparts.

This brief descriptive analysis shows that the longer spacing between urban births, especially in the early and peak childbearing years as well as the smaller completed urban family size, may result from a larger share of more educated women and a different occupational mix. This may be due to differences in opportunities for women, attitudes towards families, cost of living, educational aspirations, hygiene, access to family planning, or to several other factors which we cannot ascertain from the available data. The lower urban fertility does not seem to result from later age at first birth or marital type. The discussion is by no means conclusive. Clearly many other factors can differentially affect urban and rural fertility. Very obvious omissions are fecundity and health-related differences. We hope, however, that the discussion has shown how the framework can be used to systematically examine potential correlates of lower urban than rural fertility.

Potential Correlates of High Rural Fertility

The fertility analysis framework may also be used to identify potential correlates of high fertility. There are many plausible explanations for high fertility. Our framework indicates that major factors operating in rural areas are the actual and perceived levels of infant mortality, differences in fecundity and health practices, cultural attitudes toward children and women, degree of

economic heterogeneity and opportunity, and dependence on children for support. This section of the paper examines some of these factors.

After analyzing the regional variations in fertility, Ewbank concludes that childlessness and early sterility are responsible for a large share in the variation of total fertility rates. This sterility seems to be most common in regions where malaria is prevalent (Ewbank in Henin et al., 1977:92). In addition, unstable, polygynous, or traditional marriages also tend to have fewer children than other marital types.

Despite these fertility depressing factors, rural fertility is still almost one-fourth higher than urban fertility. One tribe with very high fertility are the Chagga, who live near Kilimanjaro where malaria is not present. In this section of the paper we look at this tribe in order to identify the cultural and other factors which generate high fertility where women are able to bear large families. In the next section of the paper we shall discuss the factors which correlate with lower fertility among women who can otherwise have large families.

The Chagga have long inhabited the slopes of Kilimanjaro. They are known as an aggressive, entrepreneurial people who have strong individual achievement motivations. Their mountain environment is free from malaria and has long been an attractive place for missionaries. As a result of this contact most Chagga are now Christians (Stahl, 1969; Kocher, 1976).

The Chagga are a patrilineal society. Women do not own or inherit land, but upon marriage gain use of a portion of their husbands' land. From this land a woman must support herself and her children. When her husband dies, this land passes through her to her sons (Goody and Buckley, 1973:115).

A woman is not a true "wife" until she has two children (Henin, et al., 1977: 163). By bearing sons, a woman gains status

in her husband's lineage. But it is only as a mother-in-law that she acquires power, i.e., power over her daughter-in-law. Chagga women therefore want sons so they will have this route to power. Sons are also important to a woman because they will support her in her old age.

Large families are wanted for other reasons. Men want a large family to demonstrate their wealth and virility (Henin et al., 1977: 163). In addition, a couple's parents' spirits become "immortal" through their own children, who are named for each of the couple's parents. Therefore, couples want to have at least two of each sex (Zalla, in progress; Herzog, 1971).

Because children are important ritually and economically, the Chagga culture has a series of myths and practices which are designed to ensure that women produce viable offspring, i.e., healthy ones that are legitimate members of the clan. At initiation, women learn why they should respect men and how they can earn respect by having children. For example, according to the "Myth of the Anal Plug" men used to be able to bear children but this power was lost when women took the "anal plug." Women are "unplugged" during menstruation and not "replugged" until pregnant (Zalla, in progress).

Additional myths have helped the Chagga to maintain the spacing between births in order to bear healthy children. Women are told that they must not conceive while nursing, because if they do the fetus will "defecate on the milk" and poison the nursing child. If a child is "poisoned" the ancestor's spirits associated with that child can bring about bad luck (Zalla, in progress).

Women are also told the proper conditions under which they may conceive. If a child is improperly conceived, the ancestor who is "reincarnated" in that child can wreak havoc on the woman. "Proper" conception implies partners who are full blooded members of the lineage, thus illegitimacy incurs heavy penalties such as loss of

the right to a "good" or even clan-approved marriage (Zalla, in progress).

These myths are still part of today's socialization, but they are no longer all controlling. If a woman or couple can counter the potential bad effects of ancestors because of good land, status, etc., then an unsanctioned child may be kept. Otherwise, abortion or infanticide is used to protect themselves and the lineage (Zalla, in progress).

Male and female roles are strongly segregated among the Chagga. Each woman has her own house where she lives with her children. Women have very clearly defined responsibilities. They work extremely hard and have less leisure than men (Zalla, in progress). Like women elsewhere in East Africa, they may work over 2,000 hours per year on the farm and off. Women do most of the cultivating, arable crop production, and household tasks (Cleave, 1974: 49).

A woman relies on her children to help ease the onerous burden of her duties. Young boys have major responsibilities for tending livestock while young girls help their mothers in all their duties. Not surprisingly, a 1973 survey of the Chagga women in Moshi shows that they are more likely than men to value children for their help on the farm (Kocher, 1976: 83).

Thus, culturally and economically there have been strong pro-natal forces operating among the Chagga. These in combination with their healthful environment have resulted in large families. In 1973 their total fertility rate of 6.4 was one of the highest in Tanzania (Henin et al., 1977: 167).

In addition to these cultural motives for large families there are other pro-natal factors which can raise fertility among the Chagga. Education related changes may also raise fertility. Analyses of the 1967 census and the 1973 NDS show that fertility is actually higher among women with 1-4 years of education than for those with no education. This is probably due to a better under-

standing and appreciation of pre-natal care and hygiene, both of which enhance the likelihood of healthy, full-term babies (Ewbank, 1977: 7). Because the Chagga tribe has long been influenced by missionaries and schools, their educational attainment is one of the highest in rural Tanzania. Twenty-seven percent of the Kilimanjaro women have 1-4 years of education, compared to 15% of all rural women (NDS, 1973, vol. 1). Thus, a larger share of women with a little education can raise Chagga fertility.

The district's economic structure may also influence child-bearing. The sample survey among the Chagga of Moshi district shows that the area's economy has been rapidly growing and is now quite diversified. Most farms are small with subsistence staples (bananas, plantains, maize) and coffee as a cash crop. In 1973 the main annual value for all crops produced in Moshi was about 900 Shs. per household, most of which came from coffee (Kocher, 1976: 64-89). As a result of their coffee and other income, Moshi residents live fairly well. Because families invest savings in improving their homes a good indicator of wealth is housing. Over two-thirds have tin or tile roofs and over half have cement floors (Kocher, forthcoming: 93-4). The higher incomes also make it possible for the residents of Moshi to afford the large families their culture emphasizes, therefore we expect larger families among these prosperous people.

Marital type can also influence fertility patterns. Due to the long influence of the Christian missionaries, Christianity is the predominant religion among the Chagga. Polygamy, which is a more Islamic custom, is therefore less common among the Chagga (Kocher, 1976: 83-89). Because monogamous women attain higher parity levels than polygamous women, this marital pattern has a pronatal effect. The Chagga also have almost twice as many stable marriages as the rest of rural Tanzania. This stability increases the total duration during which a woman is exposed to the risk of pregnancy,

which further increases the likelihood of having a large family (Henin et al., 1977: 172).

Finally, various health factors tend to shorten the spacing between births, thereby raising fertility. There has been a recent decline in the period of breastfeeding to 22-24 months, and with this decline the sex taboos operate for a shorter duration (Kocher, 1976: 83-89).

Table 15 shows that Kilimanjaro women have much higher fertility rates than in the rest of mainland Tanzania. Their shorter breastfeeding periods and health conditions permit high fertility, and there as yet has been little modification in their economically and culturally-based desire for children. A very striking exception is the 15-19 age group, which has the lowest fertility of the nation. The discussion below will examine some possible mechanisms of fertility decline among this cohort, both now and in subsequent years.

Table 15: Fertility Rates for the Chagga of Kilimanjaro District, Tanzania, 1973

	<u>Age of Mother</u>						
	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
<u>Age Specific Fertility Rates</u>							
Kilimanjaro	.076	.286	.298	.258	.201	.112	.039
Mainland	.137	.283	.256	.195	.145	.074	.037

Age of Mother

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
<u>Children Ever Born</u>							
Moshi	---	1.9	3.5	5.3	6.1		--6.9--
Less prosperous	---	2.1	3.5	5.1	6.2		--6.7--
More prosperous	---	1.6	3.4	5.5	6.0		--7.0--

Source: 1973 National Demographic Survey of Tanzania, Table 30908, Vol. 1. Kocher (forthcoming, Table A10, p. 105).

Potential for Lower Fertility Among the Chagga

As among any peoples, fertility behavior is by no means uniform among the Chagga. Table 15 above shows that up to age 24 Chagga women of Kilimanjaro bear fewer children than the average for mainland Tanzania. Although this may represent delay of initial fertility, it is possible that these young women will not "catch up" with the older women. This section explores some potential explanations of fertility declines, both among the younger women and among older women with a smaller than average family.

Figure 5 (Chapter II) shows that women may alter their child-bearing pattern if their experience is inconsistent with other expectations. Chief among these may be differences in child survival (Kocher, 1976a). Women may have fewer children because infant and child mortality is falling and they no longer feel that they must have one or two extra children to replace expected deaths (Taylor et al., 1976: 94-100). Partially as a result of missionary involvement, the Chagga have a well-developed health care system totalling 56 health care facilities, complete with seven hospitals. Almost the entire population lives within ten kilometers of a health facility (Henin et al., 1977: 162). Kocher's 1973 survey of the women of Moshi district shows that over 70% of the women aged 20-29 had delivered their last baby in a hospital. Perhaps as a result of the better maternal and infant care in Moshi, child survival rates are 93% among 20-29 year olds, and many believe that children live longer these days (Kocher, forthcoming: 104-107). This perception is correlated with a desire for no more children, especially after having 4-5 surviving children. In a less prosperous community of Moshi, 76% of the women and 89% of the men feel that children live longer while in the more prosperous community only 65% of the men and women feel that mortality is declining. The less prosperous community has better access to Moshi town, and this accessibility has brought

new ideas and aspirations earlier than in the more distant but more prosperous community. As a result, the former may have a stronger belief in the efficacy of health care. This may increase the willingness of women to see mortality declines, because in fact the two communities have similar child mortality rates (Kocher, forthcoming: 34, 90-104).

Completed family size may also fall if the age at marriage rises, thereby shortening the duration of the childbearing period and reducing fertility. In Moshi, the age at marriage has been rising (Kocher, forthcoming: 57, 108-110). The cause for this later age at marriage is not clear, but it may be due to young girls attending school longer and therefore delaying marriage. Most Chagga children go to school at the age of ten (Henin et al., 1977: 162), therefore attaining eight years of schooling can delay marriages and first births at least until age 18. Almost half the Kilimanjaro women of age 15-19 have 5-8 years of schooling, a proportion equal to that in cities and towns.

The fertility analysis framework suggests that fertility decisions may change if the perceived economic advantages of children change. One Chagga motive for large families has been the mother's need for help in working her land, but in recent years, population density has risen and there are now problems with farm fragmentation (Henin et al., 1977: 161). Therefore, women may find large families less necessary for farm work. In addition, the family may increasingly rely on non-agricultural sources of income which may also reduce the family's reliance on children for help. Kocher's survey of Moshi district residents shows that by 1973 over 20% of the Moshi men and 7% of the Moshi women were primarily nonagricultural workers.

Along with farm fragmentation, there has been an overall deterioration in rural incomes relative to urban incomes. In the period of 1955-1970, smallholder farm incomes stagnated while urban incomes rose. By 1969 the overall urban to rural income ratio was 258%. This difference strongly biases parents in favor of sending children to the city rather than keeping them on the farm.

Secondary or university education dramatically improves one's chances for a job at a higher salary (Court, 1976; Barnum and Sabot, 1976). Up to four years of schooling has little effect on wages, but more than eight years of schooling can increase the wage by 242%. Not surprisingly, parents struggle to get their children post-primary schooling, and due to the costs of schooling they may feel that they can provide education for only 3-4 children not 5-6. But if secondary schooling is not available, they may not feel that education investments will really pay off.

Clearly, these wage incentives to educate children operate throughout rural Tanzania. Why do the Chagga of Kilimanjaro seem to respond to these incentives more than other tribes? Due to the early efforts of missionaries, the Chagga have long had access to schooling. Kocher's survey shows that although not all Moshi households have children who have gone to secondary school, enough have gone to make the goal of secondary school appear feasible for nearly all families (Kocher, forthcoming: 64). Furthermore, as noted above, farm fragmentation is a problem for the Chagga, and the lack of farm options for children strengthens the existing interest in education. Sons have traditionally supported elderly parents by farming their inherited lands, but where farms have become successively smaller, parents can no longer rely on children to have surpluses above their own nuclear family's needs.

Then, the only way parents may be able to provide for their old age is by seeing that their children get jobs which pay enough to support the parents (Moock, 1973: 306).

The high rural out-migration rates for Kilimanjaro region shown in Table 16 demonstrate that education cum migration is a very common pattern among the Chagga. Given the employment and wage probabilities for those with post-primary schooling, examples of success are wide-spread enough among the Chagga to make this education-migration option known at the district levels, feasible, less risky, and advantageous relative to the traditional pattern of farming the land.

Table: 16 1967 Rural Out-Migration Rates by Educational Level
(Per 100 males)

<u>Region and Age</u>	<u>Education Level</u>				<u>Average</u>
	<u>None</u>	<u>1-4 yrs.</u>	<u>5-8 yrs.</u>	<u>More than 8 yrs.</u>	
<u>Kilimanjaro</u>					
20-24 yrs.	2.3	13.4	39.7	68.4	26.7
25-34	2.5	3.7	19.0	89.8	11.4
35+	0.5	2.7	8.3	33.0	2.6
All ≥ 20 yrs.	0.9	4.7	19.4	65.2	8.2
<u>All Rural ≥</u>					
<u>20 yrs.</u>	1.1	3.2	12.3	24.9	-----

Source: Barnum and Sabot, 1976: Appendix

The young educated Chagga women may be the first cohort to see these education-migration successes in large enough quantities to develop aspirations of a better life for themselves and their children. If they perceive (correctly) that the better life is linked to getting oneself or one's children educated, having a moderate or small size family may be viewed as facilitating these

attainments, either because large families leave no room in the budget for schooling or because the education-migration strategy needs only 2-3 well-educated children.

Education also alters perceptions of the advantages of children. Educated women of Moshi are more likely to say that there are disadvantages to large families, which is in turn correlated with wanting no more children (Kocher, 1976b: 109). They are also more likely to see advantages to small families. This may result from the fact that Moshi parents value children for old age support, and less for their help as workers. Because the children most able to provide assistance to their parents are the better educated ones with jobs in towns, parents pressed by rising costs may prefer two well-educated sons to three or four less educated ones.

It is interesting to note that it is the less prosperous educated men and women who are most likely to see disadvantages to large families and advantages to small ones. Two Moshi communities have similar levels of female educational attainment and shares of non-agricultural workers, yet in the "less prosperous" community which has a ten percent lower income and where only 65%, as opposed to 97%, have invested in good roofs, only one-third of the women think there are advantages to large families, as compared to over half the women in the slightly more prosperous community. Evidently, it is the combination of high educational aspiration plus slight economic limitations which alters couple's perceptions of family size benefits. As in urban areas in other African nations, those who may be the first to limit family size are those who have hopes of getting ahead the new way, via education, but who can afford to do so only with a small family (Caldwell and Caldwell, 1977).

In summary, it is possible that the present low levels of

fertility among 15-24 year olds merely reflect delays in child-bearing, but according to the decision process outlined above, the 15-24 year old, more educated Chagga women of the less prosperous Moshi district may have smaller families than those currently attained among the Chagga because they are educated or aspire to education for their children, and no longer expect child deaths, and prefer a smaller well-educated family with adult children working in town rather than on the farm.

Limited Potential for fertility Declines in Lushoto District

Moshi's fertility response contrasts with that of a non-Chagga community, Lushoto, in Tanga region. Like Moshi, Lushoto is in the highlands, but it is no longer economically growing. Coffee was introduced by the Germans and since that time the area has declined economically. Population growth has been rapid, and there has been deterioration of the soils from overgrazing and over-cultivation (Kocher, forthcoming, 31-33). The Sumbaa, who are the dominant tribe in Lushoto, are not like the Chagga, however, and they have not responded to these pressures by intensifying cultivation. Perhaps due to its greater proximity to Dar es Salaam, migration has been the preferred alternative. Tanga has the highest out-migration rates in Tanzania (Barnum and Sabot, 1976).

There is less of the Chagga-type independent, achievement orientation among the Sumbaa. They have made less use of educational opportunities. Their educational attainment is average for rural Tanzania. In one Lushoto community only 36% of the 15-19 year old girls have 5-8 years of schooling. Educational attainment among Lushoto men is also much lower than for Moshi men (Kocher, forthcoming: 99).

Incomes, wealth, and consumption are also less in Lushoto. A typical household in Lushoto produced 20% less in crop value than a Moshi household. Very few men or women work primarily in the non-agricultural sector. As a result, these families live barely above subsistence. Only 1/3 can afford a good roof and almost none have other housing improvements. Compared to the more prosperous Moshi community the Lushoto community owned about one-half to two-thirds as many modern goods (Kocher, forthcoming: 86-95).

Although women in Lushoto also have fairly good access to health care facilities, they use these facilities much less than Moshi women. Fewer Lushoto women have visited a prenatal clinic or delivered their last baby in a hospital, and child mortality is slightly higher in Lushoto. Not surprisingly, less than one-third of the Lushoto men or women believe that children are less likely to die these days (Kocher, forthcoming: 104-75).

Lushoto women are much more likely than Moshi women to feel that there are advantages to children. For them, education has not opened any new horizons; nor has economic diversification provided new options. Children are valued for their help with work, not for old age support. In Lushoto, 65% of the young women and more of the older ones (up to age 50) say that there are advantages to large families.*

*Among the elderly, the drop in percent seeing advantages to large families may reflect the fact that children are not able to provide for parents as well as they did in the past, especially with small farms that result from fragmentation.

Marriage customs are also more traditional in Lushoto: 61% of the Lushoto community women are married by age 20. Polygyny is more common, even among younger persons, although this may also reflect the contrast between predominantly Moslem Lushoto and Christian Moshi. Women in Lushoto still follow traditional taboos and breastfeed their children for an average of 32 months, with little change over the last twenty years.

We expect Lushoto women to have high fertility, and they do (Table 17). Because of the more common practice of polygamy and lengthy breastfeeding, births are not as closely spaced as in Moshi. But the early start and longer bearing combined with strong incentives to have children lead to a total fertility rate of 6.5 for Lushoto. If Lushoto women adopted the more "modern" shorter breastfeeding practices of Moshi women, Lushoto fertility might be much higher than Moshi fertility.

What are some of the place factors which differ for Lushoto and Moshi? In contrast to Moshi, the Lushoto community is isolated. It is not on any major road or near a town. It has poorer access to education facilities, and without the Chagga aggressiveness or individualism, few attempts have been made to enrich the offerings. Coffee growing came to the region, but it was introduced from "outside," and the Lushoto people have not prevented agricultural stagnation. The isolation and the stagnation are reflected in the continuation of old patterns of behavior, including fertility.

It is interesting to note, however, that the introduction of a new economic enterprise in a neighboring community has dramatically raised incomes. Although it is too early to look for fertility responses to the new prosperity, survey results suggest that the economic prosperity and diversification may have introduced some

affecting fertility. Currently the major change is less traditionalism in marriage and sex taboos, with higher fertility, but if the diversification changes men and women's perceptions about opportunities or about the roles of children, they may slowly follow in the steps of the less prosperous Moshi community. 30% of this second Lushoto community now say there are advantages to small families, 7% more than in the other, more traditional, isolated Lushoto community (Kocher, 1976: 83-86).

Conclusions

The analysis of the age patterns of childbearing shows that the urban-rural fertility difference largely results from more rapid rural and urban childbearing between ages 20 and 34. We have shown that the reduced incidence of polygyny, higher proportions of religious marriages, and earlier age at first birth in urban areas tend to raise, not lower, urban fertility. A slightly higher proportion of childless women in urban areas may lower fertility, but a more substantial fertility-reducing effect seems to result from the larger urban shares of women with more than primary schooling and of women working in white-collar jobs, who only in urban areas have lower parity levels at all ages. In this brief analysis, we have been unable to specify the exact causes for these correlations, but they may be due to a change in status symbols, higher cost of living, and higher potential wages among those living in urban areas.

Turning next to possible correlates of high rural fertility, we have shown that among two rural tribes high fertility results from a number of health factors that allow high fertility in combination with cultural and economic incentives to have large families.

Although the total fertility in Moshi and Lushoto are similar and high, there are indications in Moshi that fertility may drop in the future. The Chagga of Moshi have long had a tradition of individualism and aspirations, which is reflected by their warm enthusiasm for education, for integration with the outside world, and sense of personal self-efficacy. Even among the poor there is a hope that they too by their own successes can become as rich as one of their better-off clan-mates. Among the Chagga, clan-mates may provide assistance on a reciprocal basis, but basically each man or woman must fend for himself or herself (Zalla, in progress).

In Moshi, men and women have become more oriented to individual achievements and goals and less to the traditional clan or family goals. Though they still follow age-old clan customs of marriage, childbearing, and work, women in Moshi today seem less dependent on clan approval for status, thus unsanctioned births and shorter breastfeeding periods are now tolerated. Further, both men and women no longer rely on clan approval or children for status. Education, an improved house, and modern consumption are increasingly important (Zalla, in progress). Even for women large families are less important.

Attitudes towards children have changed most rapidly for young women, and particularly for ones living in a physically and socially accessible community. They are more likely to see advantages to large families and are less reliant on children for farmwork, because they have other economic options or because they perceive that children are more valuable to them as salaried workers. Viewed from the context of the place in which these women live, the better educated young women of Moshi are more likely to have smaller families than older cohorts because they:

- (1) Live in a district (macro-level place) where educational attainments are high and where education past the primary

level is a feasible goal for many residents.

- (2) Live in a district with high rural out-migration rates for the better educated and probably have direct knowledge (at the micro or local level) of the favorable consequences of the education-migration strategy through acquaintance with successful Chagga migrants to cities.
- (3) Live in a district (macro-level) with improving health status and in a village (micro-level) where women actually have access to and use prenatal and maternal care services, which alters perceptions and experiences of child mortality, thereby making family limitation seem less risky.
- (4) Live in a village (micro-level) which has problems of farm fragmentation or other economic constraints which make large families more costly and less advantageous, thereby reducing the economic justification for the traditional large family.
- (5) Live in a village (micro-level) with good transportation and communication access to a nearby town, providing opportunities for alternative jobs and access to modern consumer goods, both of which may alter parental perceptions about the need for children and possible tradeoffs between children and buying a radio or other desirable consumer items.
- (6) Have more than a "little education" and therefore a different set of individual aspirations that may be incompatible with the traditional large family pattern.
- (7) Are a member of a cultural group which has a strong entrepreneurial and individual achievement orientation, and therefore are more likely to act to attain the aspirations.

Thus, a whole set of place characteristics may affect these young women's perceptions about family size advantages or disadvantages. Our data does not permit analysis of the current child-bearing decisions, but they do suggest that these women will be operating under a somewhat different set of constraints than their predecessors and may be more likely to want a non-traditional birth pattern with fewer children. Chagga children may be no less important to parents, but the timing and nature of their contributions may shift their importance from many young children helping with the farm work to a few well-placed adult children sending

remittances back to the parents.

This discussion of place factors affecting fertility decisions does not include all possible factors. The framework suggests additional analysis at least of the unmentioned fields of access to reliable and acceptable contraceptive methods, of changes in employment among educated women, and of changing kin attitudes to smaller families.

Although the present illustration is limited, we hope it shows the importance of looking at the fertility decision both in the cultural and locational contexts.

Illustration 4: The Seclusion of Women and Fertility in Egypt

In this illustration we address the issue of fertility and seclusion of women. High fertility in Moslem countries is often attributed to the fact that women are prevented from leading active lives outside the home. Egypt presents an interesting case for testing this hypothesis. The data analysis above shows that urban and rural fertility are very similar in Egypt. In this section we will examine available studies to determine the extent to which the small difference is due to seclusion practices common to urban and rural areas. Few studies actually use the variable of seclusion, so this analysis will rely on variables correlated with seclusion, namely the Moslem religion, early age at marriage, low female labor force participation, low educational attainment, and "traditionalism." Before looking at these seclusion variables we shall discuss the nature of the urban-rural fertility differentials and urban growth trends which may have affected the fertility differential. Due to the scarcity of recent data, especially micro data, most of the studies utilize data from 1965 or earlier.

Urban-Rural Fertility Differentials and Urban Growth in Egypt

From about 1944 to 1960 the general fertility rate (GFR) in rural areas has remained fairly stable, hovering around 200-210 per 1000. In contrast, the urban GFR increased dramatically between 1940 and 1950, at which time it peaked. From the early 1940's to shortly before 1965, urban fertility exceeded rural fertility. In 1965 the urban GFR was down to 190 per 1000 while the rural rate remained at 205, resulting in a difference of only 7% (Omran, 1973). Due to the stability of the rural rate between 1947 and 1966 the urban-rural fertility differential was largely determined by the urban fertility level.

Table 17 Annual Intercensal Rate of Growth of the Rural and Urban Populations of Egypt

	1947-60	1960-66	1966-77
Urban Governorates	3.54	3.71	3.62
Lower Egypt Governorates			
Urban	2.92	4.39	3.15
Rural	2.06	1.81	2.10
Upper Egypt Governorates			
Urban	2.96	4.97	3.54
Rural	1.56	1.06	1.46

Source: Omran, 1973, pp. 32 and 36

Partially due to the higher birth rates since 1947 the growth rate of the urban population has been higher than the rural rate (See Table 17). During 1947-60, the major urban centers of Cairo, Alexandria, Ismailia, Suez and Port-Said had the highest rate of increase. The rates of urban population increase in the less urbanized upper Egypt governorates and in the lower Egypt governorates were both lower than that of the urban governorates. In 1960, however, urban growth in upper Egypt accelerated rapidly. As a result, during 1960-66, the faster growing cities were in the less urbanized regions.

This change, however, failed to decrease the share of urban population in cities over 100,000. By 1966, the number of very small cities (less than 10,000) had declined while the number of medium size cities (20,000-100,000) had grown (Nassef, 1973:194). This indicates a greater concentration of the urban population in larger communities which probably reduces the "rural" characteristics in the urban population.

Since migration is a major source of growth of urban areas in developing countries, we now look at the rate of migration over the 1947-66 period. Table 18 shows the contribution of migrant natural increase and net migration to growth in the governorates. The contribution of migrant natural increase is difficult to interpret because it is a function of the net migration of previous as well as current periods. However, the contribution of net migration is very clear. Migrants directly accounted for about one-third of the total urban increase in both periods. For the upper and lower governorates, the contribution doubled in the second period from 20% to 42% and 21% to 49%, respectively. By 1966, rural-urban migrants comprised a much larger share of the urban population than in 1947.

To what extent do the flows of migrants into urban areas alter the socioeconomic and demographic characteristics of the urban and rural areas? Data on migrants are not readily available for all urban areas and studies on the differences between rural-urban migrants and rural non-migrants are more difficult to find. There have been some studies on migrants to Cairo. Cairo is not necessarily representative of all Egyptian urban areas because it is the capital and largest city of the country. Therefore, migrants to Cairo may be very different from migrants to smaller urban areas. Petersen's 1959 study shows that Cairo migrants did not tend to segregate themselves

Table 18

Components of Urban Growth in Egyptian Governorates

	1947-1960				1960-1966			
	Percent of urban growth from Natural increase ¹		Migration ²		Percent of urban growth from Natural increase ¹		Migration ²	
	MNI	MNI	MNI+MNI	NM	NNI	MNI	NNI+MNI	NM
<i>Urban Governorates</i>								
Cairo	60.5	6.0	66.5	33.5	58.8	5.4	66.2	37.8
Alexandria	62.1	5.8	67.9	32.1	81.4	1.5	82.9	17.1
Port Said	75.6	3.7	79.3	20.7	99.6	0.0	99.6	0.4
Ismailia	61.4	5.9	67.3	32.7	71.6	2.4	74.0	26.0
Suez	41.3	8.9	50.2	49.8	51.4	4.1	55.5	44.5
Sum of urban governorates	60.7	6.0	66.7	33.3	65.1	2.9	68.0	32.0
<i>Lower Egypt Governorates</i>								
Dahietta	94.3	0.9	95.2	4.8	83.1	1.4	84.5	15.5
Dakahlia	79.5	3.1	82.6	17.4	52.8	3.9	56.7	43.3
Sharkia	77.9	3.4	81.3	18.7	48.4	4.3	52.7	47.3
Kalyubia	48.2	7.9	56.1	43.9	29.2	5.9	35.1	64.9
Kafr-el-Sheikh	84.7	2.3	87.0	13.0	54.0	3.8	57.8	42.2
Gharbia	80.8	2.9	83.7	16.3	64.1	3.0	67.1	32.9
Menoufia	100.0	0.0	100.0	nl	51.8	4.0	55.8	44.2
Beheira	71.0	4.4	75.4	24.6	100.0	0.0	100.0	nl
Sum of Lower Egypt governorates	76.9	3.5	80.4	19.6	53.8	3.9	57.7	42.3
<i>Upper Egypt Governorates</i>								
Giza	27.8	11.0	38.8	61.2	31.0	5.8	36.8	63.2
Beni Suef	100.0	0.0	100.0	nl	100.0	0.0	100.0	nl
Fayoum	100.0	0.0	100.0	nl	64.2	3.0	67.2	32.8
Minya	100.0	0.0	100.0	nl	57.9	3.5	61.4	38.6
Assiut	95.4	0.7	96.1	3.9	95.5	0.4	95.9	4.1
Souhag	100.0	0.0	100.0	nl	79.9	1.7	81.6	18.4
Qena	100.0	0.0	100.0	nl	30.0	5.9	35.9	64.1
Aswan	61.1	5.9	67.0	33.0	17.7	6.9	24.6	75.4
Sum of Upper Egypt governorates	75.8	3.7	79.5	20.5	46.7	4.5	51.2	48.8
All Egypt, Urban	67.4	5.0	72.4	27.6	66.1	2.8	68.9	31.1

¹Natural increase: MNI is native natural increase, and MNI is migrant natural increase; the sum of the two equals total percent growth due to natural increase.

²Migration: NM is net migration; for governorates with negative net migration or net loss, as shown by the notation "nl," the percentage of growth due to natural increase is set at 100.0.

Source: Burden, 1973, Table 5

by socio-economic status. However, they mainly came into contact with people of rural origins, a finding corroborated in a later analysis by Abu-Lughod (Petersen, 1971; Abu-Lughod, 1976). Migrants did not have much contact with or access to any distinctively urban attitudes or ways of life. This relative homogeneity among migrant contacts may have enabled them to maintain more elements of their rural lifestyle and attitudes than if they had mixed more with city natives.

In 1963 lifetime migrants to Cairo had slightly higher total fertility rates than non-migrants. For those married 5-14 years, cumulative fertility was almost identical, but for those married 15-24 years, migrants average 6.51 children ever born, as compared to 6.04 for non-migrants. About the same difference, .5 children, held for women married more than 24 years (Hassan, 1973:243). If these different age groups are assumed to represent the different ages of a synthetic cohort, migrants and non-migrants have different tempos of childbearing. Migrants tend to delay births in their early childbearing years, but more than make up for the delay in the middle childbearing years, ultimately having a higher completed fertility rate than non-migrants. In some cases where migrant fertility exceeds native fertility the difference is due to migrant women bringing rural born children with them to the city (Macisco, Bouvier and Renzi, 1969:177). This is clearly not the case in Cairo, but the net result is the same: migrant fertility exceeds non-migrant fertility. This may not hold if controls are introduced for education, religion, or employment. Nonetheless, the aggregate results suggest that migrants to Cairo slightly raise urban fertility, thereby slightly diminishing urban-rural differences. In the context of the recent urban fertility declines this migrant non-migrant differential means that the decline has been slower than if the difference did not exist.

Despite the migrant contribution of young women with slightly higher fertility, urban fertility has steadily declined since 1950. In 1965, the ratio of urban to rural fertility (as measured by the GFR) was .927. The

difference at the early part of this decline (1950-58) may be overstated by previous errors in the reporting of births and enumeration of population in the late 1940's and early 1950's, but since the late 1950's the decline is quite marked and probably real. This decline, as well as the urban population growth since 1960, may have resulted from economic growth. It also may have resulted from the increased urbanization itself. By mid-1969 even rural-urban migrants interacting only with previous migrants would have been interacting with migrants with more urban experience than in previous decades. They also would be more likely than before to be in contact with natives and less likely to be surrounded by rural compatriots. The larger cities are also favorable to lower fertility, due to better educational and health services. In the next section we shall examine the extent to which urban life itself includes changing customs for women, and, if so, whether these alter childbearing patterns.

Seclusion of Women and Fertility in Urban and Rural Egypt

One possible explanation for the small difference between urban and rural fertility may be a continuity of customs and roles, whether women live in cities or villages. Youssef has shown that "...the Middle East (has) traditionally sanctioned strong familism, patriarchy, male supremacy and an established religion... which reinforce the subordinate position of women in the social structure" (Youssef, 1974:83). Because the main source of self identity lies within the family, familial loyalty puts pressure on individuals to conform to norms which govern all behavior and levels of social interaction. Male honor is one of the major ideals and requires men to be "manly" and women to be sexually pure before and submissive after marriage.

This concept of male honor determines the roles of men and women in the society and in the family. Women are supposed to be submissive to male

members of the family, to ensure isolation from the opposite sex, and are excluded from participation in public life. To ensure virginity of young girls, parents arrange early marriages. This lowers the age of marriage of women. In a society where family planning may not be prevalent, this can lengthen the period of sexual activity and raise completed family size. A low age at marriage is also associated with low educational attainment and labor force participation both of which correlate with high fertility.

Seclusion also means discouragement from obtaining an education and from working outside the home except in occupations which only require mingling with other females, such as teaching in all-girls schools. As a result the educational attainment and the level of labor force participation among Egyptian women has been lower than other societies at a comparable level of economic development (Youssef, 1974). We expect seclusion of women to have a positive correlation with fertility. The orientation toward familism may also favor a preference for a large family as well as emphasize the importance of childbearing for women relative to all other activities.

Statistics show that there is a high level of illiteracy in both urban and rural Egypt. In 1963, 93.4% of rural women and 68.5% of urban women were illiterate (Youssef, 1974). This difference suggests that women in urban areas may have better access to schooling. Part of the urban-rural educational differential may also be due to the fact that those who do obtain schooling in rural areas may be much more likely to move to town where they can use their education in work outside the home. The fertility effects of these different levels of educational attainment are, however, limited.

Women with higher education are less traditional in their attitudes towards childbearing and do have a greater knowledge and interest in family planning, but they number only 10% of the literate women (ibid). Literacy alone does not correlate with lower fertility, therefore, the higher urban literacy rates are unlikely to account for even the small urban-rural fertility difference. To put it in other words, the small urban-rural fertility difference is in part due to the fact that literacy alone does not result in lower fertility among Egyptian women living in town.

Youssef (1971) found that Moslem countries (Egypt included) have a much lower rate of labor force participation by women than Latin American countries of a comparable level of development (Youssef, 1971, Table 2). Egypt has an occupational and industrial structure similar to that of Chile and Mexico, yet Egypt like other Moslem countries has a significantly lower percentage of women employed in all occupations. The labor force participation rate of Egyptian women in non-agricultural employment is very low, 3.5%. Most of these women are concentrated in nursing, teaching and service professions, professions traditionally considered compatible with female roles. Many of these women live and work in town, yet there job situations are traditional and not likely to involve contact with non-traditional roles (Youssef, 1974).

There are some urban-rural differences in the Moslem practice of early arranged marriages. In 1965 the age of marriage was 19.8 and 20.6 for rural and urban women, respectively; a difference of almost a year. Between 1965 and 1968 the rural age at marriage remained at about 20 whereas it increased by about seven months in urban areas (El-Guindy, 1973). The practice of early marriage may be declining rapidly in urban areas, but without additional

studies it is not possible to determine the forces raising the age at marriage.

These urban-rural differences in seclusion-related variables are shown in Table 19. Although there are many other variables influencing women's behavior, seclusion seems to lower their level of educational attainment and their age at marriage. With a lower educational attainment they are more likely to retain traditional values and place a high priority on childbearing and a low priority on extra-familial activities (Youssef, 1974). Furthermore, with little or no education, there are few employment opportunities open to them. The discussion below may shed some light on the linkages between these variables, showing how they might differ in rural and urban areas.

Table 19: Indicators of Seclusion Among Urban and Rural Women of Egypt

	Rural	Urban	Total
Per Cent Illiterate (1963) ¹	93.4%	68.5%	84.2%
Non-agricultural Labor Force Participation Rate (1960) ²			3.5%
Age of Marriage (1965) ³	19.8	20.6	
General Fertility Rate (1965) ⁴	205/1000	190/1000	202/1000

Sources: 1,2 : Youssef, 1974.

3 : El-Guindy, 1973.

4 : Omran, 1973.

Using 1969 Census data Abu-Lughod (1965) found a strong negative correlation between education and age at marriage for Cairo. Furthermore, postponing marriage from under age twenty to age twenty to twenty-five was correlated with lower fertility. Education was also inversely related to the number of live births for currently married women. In addition, the husband's occupation influenced fertility. After controlling for wife's educational level, wives of professionals, technical, and managerial manpower had lower fertility than wives of craftsmen or semiskilled workers.

Another study using 1970 Cairo data supports this finding of an inverse relation between both husband's occupation and wife's education and completed family size. In addition, modernity, as measured by ownership of consumer durables, exposure to mass media, and attitudes towards the role of women, is also inversely related to completed family size. It is interesting to note that neither variable affects ideal family size. Modernity and socio-economic status are intercorrelated, and because the analysis does not control for this relation, we can only conclude that some mix of modernity and socio-economic status correlate with smaller completed but not smaller ideal family size (Khalifa, 1973).

Studies of rural Egypt have confirmed the validity of part but not all of these interactions. Hassan (1971) found that in 1965-66 after standardizing for duration of marriage the age of marriage was negatively related to children ever born for rural women. The striking finding of this study is that among rural women lower educational attainment and lower occupational status were correlated with smaller completed family sizes. Because completed family size is inversely related to infant and child mortality, which is inversely related to educational attainment, the relation between education, occupational status, and completed family size may be spurious (Khalifa, 1976).

The number of live births is a more accurate measure of fertility, A second study by Hassan clarified these interactions and clearly showed that more educated rural women do have fewer live births, as well as lower child mortality (Hassan, 1973) These findings suggest that in rural areas, raising female educational attainment may reduce infant and child mortality and, therefore, completed family size.

Studies of data for all of Egypt show that when both education and percent of women employed in the non-agricultural sector are correlated with fertility, the negative effect of education becomes insignificant (Schultz, 1970). When the total population is disaggregated into urban and rural areas, differences in direction of effect emerge. The negative effect of female employment on fertility holds for urban areas, but in rural areas female labor force participation is positively correlated with the child-woman ratio (Bindary et al., 1973). Because economic activities in rural areas are mainly agricultural, the results suggest that labor force participation of women is negatively related to fertility only if labor force participation is in non-agricultural occupations, which are incompatible with child care responsibilities. In rural areas where work may be compatible with child care, a higher labor force participation rate increases family income which can lead to higher fertility because the family can afford more children.

One problem with these studies of female labor force participation and fertility is that the direction of causation between the variables is indeterminate. Women with few children may work because they have more time to work, or they may work and therefore have less time to have children. A study of the El-Waily district in Cairo has attempted to identify the direction of influence. Using a representative sample of currently married women age 20-45, Morcose (1974) categorized those who worked outside the home for a

salary as "working" and all others as "non-working." The working and non-working women were comparable with respect to age, husband's occupation, education and family income. There was no significant difference in infant and child mortality. It was found that the working group had a mean number of 3.2 live births while the non-working mean births was 4.3. Standardizing for duration of marriage, it was found that working women had an average of .28 and non-working women .35 live births per year of marriage. This negative relation between fertility and work outside the home did not hold for uneducated women. This implies that even in cities work outside the home does not in itself depress fertility. Uneducated women tend to be employed in lower-skilled jobs such as cottage industries or petty services, which are often easily combined with child care. Therefore, the insignificant difference between the numbers of births for uneducated working and non-working women can be explained by the fact that the work of uneducated women does not conflict with their responsibilities for child care. Of course other factors may also influence this difference. As shown above, educated women are more likely to know about and be interested in family planning. Thus, part of the similarity may be because non-working wives, like uneducated working wives, are unfamiliar with family planning methods.

Conclusions

In 1966 urban fertility in Egypt was only 7% lower than rural fertility. This illustration has explored possible explanations for this relatively small differential. First, the analysis focused on the migrant contribution to urban growth, on the theory that migrant-non-migrant fertility differentials may partially account for the observed similarities.

This analysis revealed that migration had only a slight positive effect on urban fertility but probably delayed overall urban fertility declines.

Next, we considered seclusion and related factors affecting women's fertility. Urban-rural similarities in this practice or its correlates may also result in little difference between urban and rural fertility.

Seclusion of women is a practice common to many Moslem societies. As elsewhere, in Egypt it is reflected by low levels of educational attainment among women, early marriages, very low female labor force participation rates, especially off-farm, and an emphasis on motherhood and childbearing. The analysis above shows that this general pattern holds for both urban and rural areas. There are, however, variations in the pattern, and these correlate with the small differences in fertility behavior. Urban women tend to marry one year later, and this slightly depresses fertility. Urban women are almost five times more likely to be literate, but literacy alone seems to have little correlation with fertility. More importantly, women are also a little more likely to work outside the home in the city, and working outside the home correlates with lower completed family sizes.

What are perhaps the most interesting findings of this study are those showing differences in how education and labor force participation affect fertility in urban and rural areas. It seems that in rural areas higher educational attainment correlates with lower fertility because educated women experience lower levels of infant and child mortality. Women who work on farms do not have lower fertility than other rural women, probably because agricultural work is compatible with child care responsibilities. In urban areas more education is correlated with later age at marriage, which in turn correlates with lower fertility. In town, education also

enhances a woman's modernity, which is inversely related to completed family size, although it has no effect on ideal family size.

Education of city women, however, does not exert as strong an effect on fertility as work outside the home. After standardizing for age, husband's occupation, education and family income, working women in Cairo have on average one child fewer than non-working wives. Uneducated working wives have almost the same fertility as non-working wives. Thus, it seems that education plus better health levels correlates with smaller rural families, while education plus work outside the home increases the likelihood of small urban families.

This study raises more questions than it answers: Would rural wives behave like urban working wives if non-agricultural work opportunities were open to them? Are there uneducated working urban wives with small families, and, if so, what characteristics distinguish them from uneducated working wives with large families? Will rising levels of education expectations and attainment change a major basis of urban and rural seclusion? If so, how will this affect modernity, employment, and fertility of the newly literate? It is hoped that this illustration has demonstrated the importance of considering how the fertility influence of different factors varies with the context or place in which they operate.

CHAPTER IV
CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This research was undertaken to define and examine the nature of current urban-rural fertility differentials in developing countries. First, we investigated the pattern of differences to identify where urban fertility is lower than rural fertility and where it is not. We also examined data that would indicate whether these differentials varied with different patterns of urbanization. Second, after documenting the current pattern of urban-rural differentials, we investigated the underlying causal factors producing these fertility differences. Specifically, we examined the separate and mutual effects on fertility behavior of "person" and "place" variables, considered from both macro- and micro-level community contexts. In this chapter, we summarize our research findings, raise some tentative policy recommendations that stem from this research, and suggest areas of future research. This analysis suggests the following conclusions:

1. Urban fertility is lower than rural fertility. Circa 1970 data collected from 32 developing countries shows that urban fertility is 25% lower than rural fertility. This differential results more from declining urban than from declining or rising rural fertility.
2. The urban-rural differential varies with stages of fertility decline. The fertility differentials in this sample tend to cluster in six classes, each of which corresponds to a different stage of urban and rural fertility decline. Our analysis shows that declines occur first in urban areas and then in rural areas, but the decline is not linear in either area and therefore the fertility differential

fluctuates. Countries in the earliest stages of fertility decline have small or no urban-rural fertility differences. Fertility declines occur first in urban areas and the fertility difference widens, then as rural fertility declines begin to accelerate, the gap diminishes. Next, urban fertility declines again outpace rural declines, resulting in a recurrence of sizable urban-rural differentials. Ultimately, rural declines may parallel urban changes, but no countries in our sample have reached the stage of low urban and low rural fertility with little differential.

3. The age pattern of childbearing is important to understanding urban-rural differentials. In general, the greatest differences between urban and rural fertility are observed among women of ages 15-19, where the difference averages about 33%. During the peak or middle childbearing years the difference narrows, but urban fertility is still less than rural fertility at age 30. After age 30, there generally is a widening of the difference as urban childbearing slows relative to rural bearing. Analysis of the age differentials for the different classes of urban-rural fertility decline shows that at the early stages of little or no urban decline, there are no marked cohort variations. As fertility declines proceed in urban and then rural areas, sizable urban-rural differences occur first among the women of the middle childbearing years, then in the early childbearing years, and finally in both late and early childbearing years. Additional analysis of the tempo or pace of childbearing suggests that these absolute age differentials may result from differences in the timing of childbearing. Where large urban-rural differences exist, as in the later stages of urban-rural fertility decline, urban women start childbearing later, bear most of their children between ages 20 and 30, and complete their families sooner than rural women.

4. Patterns of urbanization affect the overall and age-specific differentials. Nations with a large share of their population in large cities of over 100,000 tend to have a greater overall urban-rural fertility difference than nations with many small or medium-size cities.

This may result from the fact that women in large cities tend to have about 10% lower fertility than women in small cities. Large cities appear to exert a strong negative effect on both urban and rural fertility levels. However, the effect on urban fertility is stronger than on rural fertility, suggesting that large cities may play a major role in the initial stages of urban fertility decline and later influence rural areas through some sort of "spread effect." Regression analysis of the correlations between city size distribution and age differentials shows that the large city exerts its strongest effect on women under age 30. No other urbanization measure (definition, percent urban, small or medium size cities) demonstrates such pervasive influences.

5. Regional factors also influence the fertility differentials. After controlling for differences in urbanization, Latin American nations tend to have much lower urban than rural fertility than in other regions. This suggests that there are cultural, social or economic factors unique to each region which additionally influence the size and pattern of its fertility differential. These regional variations also are associated with different patterns of child-bearing: Latin American women conform most closely to the general pattern described above while in Africa the pattern is reversed. In Africa, urban women may actually start bearing children at an earlier age than in rural areas, and there is no inverse relation between city size and overall fertility. Islamic countries tend to have the most similar urban-rural tempos of childbearing, and Asian countries fall in between Latin American and Islamic nations with moderate differentials at all ages.

6. There are sizable inter-urban and inter-rural fertility variations. Variations between urban areas are almost as large as variations between urban and rural areas. Smaller cities tend to have

fertility levels closer to rural than large urban levels. In the rural areas, the more economically diversified regions tend to have lower fertility than monoculture zones. These variations suggests that community type influences fertility.

7. Factors influencing fertility operate at two levels of community size. Place factors (or characteristics) of the macro-level community or district influence fertility by setting the parameters for the degree to which small families are possible. The micro-level or local community influences individual development and the exact manner in which families and individuals perceive and utilize the available opportunities. Macro-level place factors determine the consequences of having a small family, while micro-level place factors plus individual characteristics determine whether a person perceives, wants, and acts to achieve these consequences.

8. Heterogeneity and diverse opportunities may be the place characteristics of most importance. Heterogeneity of contacts, opportunities, and experiences at the city-wide or district levels is important to determining whether people consider small families feasible, but these are not enough to induce fertility change. The local level factors are also important to determining the ways that people perceive and use these opportunities. At a local level, women from families and local communities which are not homogeneous seem more likely to have small families because women can directly observe variations in family size experiences. It is important also that the local culture give women the possibility for independent choice. Women still may choose to follow large family norms, but they will do so because their preferences match those of the wider kin groups.

9. Variations in characteristics at the district or local level may partially account for observed differences in relationships between socio-economic variables and fertility. Socio-economic correlates of small families vary. In many cities education is inversely related to fertility, but the relation is not uniform. Neither is income consistently inversely related to family size. In rural areas even less consistency is found in the relation between socio-economic status and fertility. These differences result from the fact that the factors influencing fertility of any given socio-economic class are moderated by place of residence and by the opportunities available in that place.

10. Although analysis of place characteristics is important for understanding urban-rural fertility differentials, it is also important to consider differences among individuals. Although a woman's characteristics are shaped by the opportunities of the place(s) in which she lives, her own attitudes and characteristics strongly influence her childbearing pattern. Research reviewed here suggests that the individual characteristics which correlate with "small family" goals or attainment, in either city or village result from the exercise of independent choice, willingness to plan for future accomplishments, and some degree of economic independence. These characteristics often are correlated with overall modern attitudes, and they are not limited to city residents. Although small families may result from low fecundity or limited exposure to the risk of pregnancy, they otherwise result from a woman's intention to have few children.

11. Family size intentions are shaped by culturally and economically determined perceptions of the advantages and disadvantages of children. Research reviewed here suggests that place factors operate at the macro-level by helping to determine the cultural and economic advantages and disadvantages of children. Where parents are

dependent on either young or adult children to fulfill essential economic or cultural needs, large families will be advantageous and encouraged. In many urban and rural areas, children fulfill essential risk-reduction or security needs, and they are taken as a "given" despite their net economic liability as children. Small families will be viewed as advantageous only if fewer children are necessary to meet these cultural or economic needs, there are substitutes to children for fulfilling the needs, or the cost of children becomes so high as to prohibit dependence on children to meet needs. If parents value children for old age support, this shift in advantages may result from conditions of low infant and child mortality, high payoffs to education via remittances to parents, and education costs too high to allow education of more than two or three children. In addition to these place related conditions, individual variations in income, risk-taking aversion, and education may influence the extent to which individuals correctly perceive and respond to these different conditions.

12. Differences between perceived and actual advantages of children may also account for individual fertility variations observed between similarly located individuals. Childbearing decisions are based on the perceived consequences of having a child at a specific point in time. Therefore, if perceptions of advantages do not match the actual distribution of advantages or disadvantages, decisions may appear irrational where in fact the decisions may simply reflect conditions of uncertainty or perceptions that lag behind changes in advantages. Childbearing decisions also balance perceptions of expected consequences against beliefs about what family or friends want. Even if having a child may be disadvantageous to a woman if it is sanctioned by others, she may have the child. Finally, perceived advantages of children may change over time. It is fully possible for childbearing decisions to be consistent with perceived advantages of having a child at the

time of the birth, but later, due to changes in a woman's residence, life-style, or opportunities, those perceived advantages may change or diminish.

13. Actual fertility outcomes may not match intention.

If a woman is sterile or subfecund--a condition which is influenced partially by the general disease levels of her home community-- completed family size may be small regardless of residence or desire. Another woman may make a conscious decision to have only 2-3 children but without access to contraceptive techniques end up with 5-6 children. Finally, if a woman has not thought about advantages or disadvantages of having children, i.e., has no predispositions about family size, she may not make any conscious decisions to have or not have children, and her fertility will be influenced by other cultural or health factors.

14. A number of place factors increase the likelihood of intentional decisions to limit births. The case studies presented in this research show that place factors which influence willingness to make decisions in favor of small families are: (a) perceptions of low infant and child mortality; (b) heterogeneous contacts, especially with women who have small families; (c) knowledge of the ability and means to control births; (d) feasibility of education and other means by which to realize aspirations for oneself or one's children; (e) economic independence from the economic inputs of children; (f) access to independent economic opportunities, particularly for women; and (g) access to incentive consumer goods at affordable prices.

Policy Recommendations

Although this research has been intended only as an exploratory effort, it has yielded certain general policy recommendations. These are presented below. After discussing these general recommendations, we shall present an illustrative list of programs to give the reader a sense of the wide range of possibilities. In general:

1. Analysis of the urban-rural fertility differential can help identify target groups that may be most likely to next experience fertility declines. The analysis of the age differentials shows that urban fertility declines occur among different cohorts, depending on the relative levels of and differences between urban and rural fertility. For example, one difference between Class VI and V countries is a relative decline in urban fertility in the middle childbearing years. Thus, a possible target group for Class VI nations is the urban 20-29 age cohorts. Looking at where a country is now and where it might be next in the stages of urban and rural fertility decline may help identify key target groups which may be ready to use family planning information.
2. Because cities in the 100,000 or more size class seem to facilitate urban and rural fertility decline, growth and development of these cities could hasten urban and rural fertility decline. This suggests that urban development policies will be most consistent with attempts to lower fertility if they foster development of the 100,000+ size class. Similarly, because women in larger cities tend to have lower fertility than elsewhere, migration policies which facilitate movement to these cities would seem to be contributory to lower urban fertility levels.
3. The location of programs generating a broader set of opportunities for education and employment is of major interest to policymakers concerned with fertility change. Our research shows that access to diverse opportunities may be critical to decisions to limit births. Ongoing programs to expand services and opportunities in rural market centers

and in cities of different sizes already address the creation of these opportunities, but careful consideration of the outreach and access aspects of these projects is also needed. Programs to bring opportunities to rural districts via market town development probably would help to lower rural fertility only if women in the more dispersed villages could actually get to and use the opportunities (e.g., marketing, manufacturing, or obtaining health care). Similarly, in the city environment, women in separate city neighborhoods may be isolated from city-wide opportunities due to lack of information about these possibilities, lack of transportation, or lack of capital with which to set up a business. Without such opportunities, these women may be less likely to perceive a need for small families. Because perception of these opportunities precedes action, programs may be more effective if there is initial "outreach" to ensure that women know about and use the opportunities. Thereafter, these initial participants can spread the word.

4. Encouraging migration to cities can facilitate subsequent changes in attitudes about family size and may be supportive of efforts to stimulate overall fertility declines. For example, where it is not feasible or realistic to expect each village to have the full complement of opportunities and conditions which stimulates interest in limiting births, migration is an acceptable solution.
5. Encouraging young migrant women or families to live in heterogeneous neighborhoods may encourage fertility declines among these migrants. Fertility declines may be hastened because women living in mixed neighborhoods are in contact with a greater variety of people, including women who are active outside the home and who may have small families. This contact may encourage development of attitudes approving of small families or of non-homebound roles for women. Housing programs that allow for this kind of mixture may hasten urban fertility declines.

6. Similar programs may have dissimilar outcomes in regions or nations with different cultural backgrounds or socio-economic conditions. The analysis has shown that cultural, social, or economic factors unique to each of the major regions influence the age patterns of childbearing. Therefore, it is essential to consider these inherent differences before selecting target groups or programs. If, for example, having children is the only way a woman can show that she is mature or marriageable, then programs to stimulate contraception among teens will have limited acceptance. In another context, however, these same young women may view a young child as a hindrance to their mobility, education, marriage or job chances, and such programs may be of great interest to these teens.

7. The fertility analysis framework can be used to identify the most appropriate timing and site for program implementation. Research has shown that place factors operate at district and local levels. For any given area, the existing pattern of social and economic opportunities and constraints can be analysed to determine where and when program inputs might have the most impact at district or local levels. The framework can also be used to identify the types of programs that generally operate better at these levels. Our analysis suggests that higher education and employment or other economic opportunities may be more useful at the district level, provided there is access from local communities, and programs facilitating attitude change and perception of these opportunities are better located at the local levels where face-to-face communication, the most effective mode for attitude change, is prevalent. Such analysis, for example, can identify which aspects of a health and family planning program to locate in local communities. These are very general policy guidelines, and more country-specific research is needed to determine specifics. Designation of the most suitable location (i.e., micro or macro level) depends on more detailed country research. Similarly, selection of the most appropriate set of programs depends on identification

of the most salient from among the range of possible variables in the framework. Analysis of specific age and tempo differentials is important for identifying the most important target groups. Depending on its stage of fertility transition, one country, for example, may find that young 15-19 year olds who delay their first births seem to "catch-up" and that interventions altering options for this cohort are most effective. In another case, analysis may show that it is important to intervene for the 25-30 year old group, which otherwise continues bearing to the end of the childbearing years. Finally, analysis of migrant and city size differences may show that different programs or target groups are required for these categories of individuals or places.

Our research has shown that not all women make conscious decisions about births. Therefore, if policymakers wish to encourage fertility declines among these women, programs are needed that bring childbearing to the level of conscious decision.

This may be done through several routes. In cases where conscious decisions are not made, programs that lengthen birth intervals through lower infant mortality rates and increase duration of breastfeeding can reduce family size. In other cases, decisions may be initiated only after several children have been born. Making contraceptive information available to women in their middle and late childbearing years may enable older women who feel that their families are large enough to make decisions to limit subsequent births. Alternatively, earlier in the childbearing years, decisions about births may be stimulated first by showing that planning and decisions are possible and are necessary to alter the pattern of childbearing. Our research suggests that these decisions may be facilitated by programs which: (a) stimulate attitudes of self-help in decisionmaking; (b) expose people to

a wide range of role models;(c) affect aspirations; (d) reduce parental dependency; (e) increase women's economic independence; (f) and expand macro-level economic options. Examples of programs which address each of these mechanisms are described below.

1) Programs to reduce the infant mortality rate and increase birth intervals

- Maternal and child health care programs (especially among the very poor).
- Discouragement of non-nutritional supplemental feeding in lieu of breastfeeding.
- Programs to reduce incidence of venereal disease may raise fertility before it lowers it. (See Retel-Laurentin and Benoit, 1976).
- Integration of information about the reproductive process with traditional myths and initiation rituals.

2) Programs stimulating attitudes of self-help and participation in decisions

- Granting of responsibilities and rights for women cooperative members.
- Adult education to increase awareness of own problems and potentials to solve them (e.g. Frere method).
- Grant women single heads of household rights to participate in sites and service projects.

3) Programs to increase heterogeneity of contacts among the poor

- Stimulation of heterogeneous urban neighborhoods through varied selection criteria for sites and services and more mixture of housing programs.
- Improvement of physical access between villages and to district centers.
- Mass media.

- Diversify media image to show women and men in different roles and different family sizes (see Flora, 1973).
 - Stimulate formal-informal or government-informal sector interaction.
 - Diversify the channels through which family planning information is available (e.g. via peers, work, market, neighbors).
- 4) Programs affecting aspirations for self or children
- Education at least up to 4-6 years for girls in rural and urban areas.
 - Availability of secondary education in rural areas.
(May cause rural emigration which may raise the rural general fertility rate by decreasing the share of low fertility women).
 - Availability and affordability of consumer goods via market outlets.
 - Mass media.
- 5) Programs to reduce parental social and economic reliance on children
- Introduction of non-child sources of status for young women.
 - Introduction of innovations which allow a net reduction of women's work time (net of associated changes).
 - Availability of capital for alternative investments, especially for rural parents. Includes short and long term investment in improvements, agricultural inputs, housing, land.
 - Educational bond programs (as in Taiwan).
 - Small-scale sector pension plans which allow different levels of contribution depending on income (urban and rural areas).
 - Innovations in rural areas to even out seasonal labor peaks to reduce the need for children.
 - Allow urban small-scale rental market to flourish to create alternative income sources for homeowners.
- 6) Programs to increase the economic independence of women
- Availability to adolescent women in urban and rural areas of non-family residential and work alternatives, as suggested by Dixon (1976).

- Diversification of agricultural zones via increased production for urban markets or via multi-crop possibilities (see Torres, 1976).
 - Expand the network of roads, jitneys, and truck services between districts. Network should meet needs of men and women entrepreneurs or farmers.
- 7) Programs that expand macro-level economic options
- Develop market-town-city links to open up new entrepreneurial enterprises (see Roberts, 1975).
 - Access to information, inputs, and markets for alternative crops to allow women to diversify production if their time and energy permit.
 - Stimulation of the informal sector via training for own-account workers, access to capital, market organization, etc., both in cities and rural market towns.
 - Grant land and property rights to women and especially single women.

Obviously, not all of these programs are necessary to affect urban-rural fertility changes. Nor is the list all-inclusive. Many other programs could be suggested. We hope the list illustrates the wide range of urban and rural programs that can affect fertility differentials.

Areas of Future Research

This research has enabled us to identify what appear to be the major person and place factors that influence urban and rural fertility differentials. We have offered a framework for analyzing the interaction of these two sets of factors. While this has provided us with important insights about the nature of urban-rural fertility differentials, a number of additional research questions have emerged.

In making these suggestions for future research, we wish to make clear that we do not recommend undertaking a major new set of KAP* or equivalent studies. We believe that even at the country level much of the data for testing framework hypotheses already exists, e.g., in the recent census, World Fertility Surveys and the Rand Malaysian study and other major interdisciplinary efforts. We recommend using existing data, supplemented as needed by small sample surveys and anthropological studies. Reference to the framework presented above can aid in narrowing down relevant hypotheses, as well as in selection of samples. Although this type of research introduces problems of sample comparability, we feel that the advantages from recycling available data are preferred to the considerable time and financial cost of mounting major new data collection endeavors.

*Knowledge, attitude practice -- refers to a basic form of family planning study.

This analysis suggests that a number of countries may share similar urban-rural differentials. Research savings may be realized by capitalizing on these similarities. Countries of the same region with similar age and tempo differentials, levels of urban fertility and patterns of urbanization could pool their efforts for one case study that might identify key framework parameters for their own situations. Specific areas of future research are discussed below.

- 1) With respect to the statistical analysis of urban-rural fertility differentials, the analysis of age-specific differentials suggests that the tempo of childbearing very much affects the total fertility differential. More research should use available longitudinal or retrospective data to avoid the difficulties we encountered above. At each stage of urban-rural fertility decline, what is the tempo of childbearing for each cohort? Of particular interest are differences in tempo for women in different city size categories and in different socio-economic groupings. Techniques developed by Bumpass et al., (1978) may be appropriate for this research.

- 2) The analysis of age and tempo differentials suggests that not all cities have the same impact on the relative differences between cohorts. Research needs to identify exactly what place factors account for fertility differences between small, medium and large cities. Are the differences in effect due to quantity or quality of opportunities? Are there differences in economic diversification and social integration that affect fertility? Do these patterns vary by region, as our analysis suggests? Or do city size differentials reflect differences in individuals residing in the city (e.g., by migration history, occupation type, education level and marital status)? Our data did not permit disaggregation of the 100,000 + (Large Cities) category; additional research is needed to identify whether there is also some upper size limit to the relationship between large cities and fertility differentials.

- 3) We have distinguished between macro and micro level place factors. More studies are needed on the effects of macro variables on fertility net of the effects of micro variables but above all, of the interaction of the micro and macro level variables on fertility. We need to know at what level, for specific country settings, a given factor exerts a stronger effect on changing attitudes and practices toward small families.
- 4) We have highlighted the importance of the attitudes of self-efficacy and hope for the future. There are several studies showing variables correlated with these attitudes in Asian nations, but more studies are needed in African and Latin American nations. Research needs to distinguish between current and historical macro and micro level factors as well as between economic and non-economic factors.
- 5) Our framework has postulated a dynamic parity-specific process of fertility decision-making but few studies have tested out this element of the model. More in-depth studies of the endogenous changes in costs and benefits over time are needed, for example: studies on the changing economic costs of children with their number and age, changes due to migration decisions, and changes in the time-preference of the couple, i.e., their willingness to sacrifice present for future consumption.
- 6) Are migrants a key link between urban and rural fertility declines? What is the role of migrants in exposing rural residents to new ideas? How does the possibility of migration affect rural family size decisions? How do return migrants and seasonal migrants alter fertility patterns? Does migration act as a spacing mechanism? How do migrants alter urban-rural differentials by simultaneously changing urban and rural fertility and how does this change with different stages of urban and rural fertility decline?

To what extent is migration itself a response to pronatal or antinatal pressures?

We feel that the research on the tempo of childbearing is especially important. Our cross-sectional data suggest that at each stage of fertility decline there are distinctive tempo patterns for urban and rural women. If longitudinal data confirm the existence of these age patterns, knowledge of these tempos provides guidelines for the identification of the specific place factors to which these tempo patterns are a response.

Although research on these topics is important, we do not wish to imply that the framework developed here is not usable in its present form. On the contrary, many of the interactions shown in the framework already have been substantiated by research. We think we have provided a much needed perspective on how the variables operate in time and place. This integrated perspective can be just as useful in looking at current programs as at future research priorities.

APPENDICES

APPENDIX 1

Quality of Data Used in Measures of Fertility

First, the years of the analyses varied, but with the exception of Turkey, all data are for the years 1967-73. For any given country, all data are generally for the same year but some of the countries utilized urban and rural fertility measures from successive years. Given the fairly long gestation period for accomplishment of demographic change, it is felt that neither time span is large enough to compromise the characterization of the data as "circa 1970."

Second, age-specific fertility rates were found for two-thirds of the sample. The rest used children ever born by age of mother, with the exceptions of Ethiopia, Senegal, Togo, Uganda and Venezuela, for which it was necessary to use child-woman ratios to calculate the urban-rural differential. Also, many of the countries did not have age-specific fertility measures for subsets of the urban population. In these cases, a child-woman ratio was used as the substitute measure.

It became critical to the analysis, then, to devise a means by which to make these measures comparable. Before discussing the approach utilized, let us look at some of the problems generally encountered in using each of the measures.

Advantages and Disadvantages of Possible Fertility Measures:

Age-specific fertility rates (ASFRs) are judged to be the most reliable as they explicitly control for differences in fertility at different ages. Because they are derived from a woman's very recent child bearing experience, there is less tendency for women to forget births of dead children or to attribute births to the wrong age. But when rates are derived from birth registration which is incomplete,

Appendix 1 (continued)

they may be quite inaccurate. This is especially true in rural areas where underreporting is common. As a result, even with age-specific rates, one expects a downward bias in rural rates. Another problem is that the total fertility rate (TFR) is calculated as the weighted sum of each age-specific rate times five (for five-year cohorts), for cohorts aged 15-49. If women have children before age 15, they will not be counted. This is generally not a problem, but there were instances of birth rates given for under 14 years, and the resulting TFRs would be low.

Children-ever-born (CEB) by age of mother is also an age-standardized measure. But because it is cumulative, use of children ever born raises some problems. First, the children-ever-born statistics for women of older ages will represent the pattern of bearing for that older cohort. If fertility has recently fallen, the births currently reported by younger women will not represent those experienced by the older women when they were younger. Second, it is well known that older women tend to forget about children that died in infancy. This may be particularly true in regions where baptism or naming is not performed until a child is several months old or more.

Thus, there would be a tendency for the CEB reported for older ages to underestimate the number of children actually born (Carleton, 1965:21). Third, and this is a problem with age-specific rates also, inaccuracies may be introduced by the misreporting of the woman's age. Especially in Africa, women may not know their ages. In this case, the enumerator must estimate the age. If a woman has "aged" fast through hard work or bearing many children, the enumerator may overestimate age. On the other hand, there is a tendency to underestimate the ages of women who have never borne children (Brass *et al.*, 1968:48-49). Either case distorts the fertility registered for women of the correct and incorrect cohorts.

Whether ASFRs or CEBs are used, use of census or cross-sectional data introduces an additional limitation to the analysis. These age-

Appendix I (continued)

specific measures do give an accurate picture of how women of different ages vary in their fertility at a given point in time, but the data do not show how fertility of a given cohort varies as she ages (Shryock and Siegel, 1975: 535). As shown here, this would be extremely useful information, but it is only available from longitudinal or retrospective surveys, which have not been used here.

Use of child-woman ratios (CWR) poses the most problems. The child-woman ratio is calculated as the number of children aged 0-4 years divided by the number of women aged 15-49 years. The ratio does not include children who died before reaching age four. Thus, it would be an underestimator of fertility in regions with high infant or child mortality, as is the case in many of the countries in the sample. This would also be the case where there is underenumeration of young children, which may also be a problem, especially in rural areas. Similarly, the ratio is distorted if there are high maternal mortality rates. If women do not reach the age of 49, they will not be included in the denominator and this will give an upward bias to the CWR. Finally, the CWR is not aged standardized. There is no way to differentiate the case where a large share of the women are in their peak childbearing.

Carleton (1965) shows that differences in age structure alone may account for a 50% difference between CWR and CEB figures. Also, migration may alter the CWR, as for example, where young women go home to rural villages to have their children, but return to the city when children are school-age. In this example, these essentially urban women would raise the rural CWR.

Selection of Fertility Measures:

How were these difficulties confronted in the present analysis? First, where ever possible, age-specific fertility rates were used. Because of the volume of data included in this study, no further

Appendix I (continued)

attempts were made to correct for relative differences in under-registration. To the extent that underregistration is more severe in rural than urban areas, the ratio of urban to rural fertility levels will be biased upward in value. In the case of our sample, where all the ratios are less than 1, this underregistration would push the ratio toward value of 1. This is a weakness of the data, but probably not so weak as to invalidate the analysis.

Second, the urban-rural differential measure was defined as the urban total fertility rate (TFR) divided by the rural TFR. Because the TFR is the cumulative number of births a woman would have by age 49 at the fertility rates given for each age, it is comparable to the CEB at age 49. Both are age standardized, but because the rural CEB at age 49 may be downwardly biased due to infant death omissions or underregistration, it is recognized that the differentials calculated from CEB data may be smaller than the real differentials. Third, in the few instances where CWR data have been used, the differential is calculated as urban CWR over rural CWR. To minimize the depressing effects of high child mortality rates, wherever possible the child-woman ratio was calculated with the child component only including the 0-1 cohort. The same practice was followed for calculating the various city-size differentials. However, no further attempts were made to adjust the CWR for variations in mortality or registration. For this reason, the CWR-based differentials may be more downwardly biased than the other differential estimators, but less so due to the use of the CWR 0-1. Table 1 (p. 9) shows the differentials for each country.

There are several advantages to using the differential itself as the measure of the urban-rural fertility differential. Most importantly, it gets around the problem of directly comparing urban and rural rates for countries with vastly different fertility levels. Use of the differential also minimizes the inaccuracies that would be introduced if the levels of infant mortality, underregistration or age misreporting differ within countries, while it removes the neces-

Appendix 1 (continued)

sity of worrying about these differences between countries because the focus is on the size of the difference between urban and rural fertility, not on the differences between all urban and rural fertility levels, taken separately.

But the differential measure does not fully utilize the age-specific nature of the data. This is possible only if CEB and ASFR data for individual cohorts can be made comparable, i.e., interconvertible. Brass has derived a technique for generating sets of age-specific fertility rates from average parity data, but the Brass technique requires more time and data than were at hand (Brass et al., 1968).

Theoretically, one can convert children-ever-born data to age-specific fertility rates and vice versa, but only if there are no problems with underregistration or omission of infant deaths and no significant longitudinal changes in the fertility level. When conversions were attempted for the countries for which both types of data were available, the results showed that these assumptions did not hold. But close inspection showed that great inaccuracies were only found at the beginning and end of the childbearing years. Thus, if CEB data were converted to ASFRs for only cohorts aged 20-39, the resulting rates would be reasonable and allow comparison across countries. Table A-1 gives the age-specific data as collected and Table A-2 gives the age-specific urban and rural fertility rates with conversions for cohorts 20-39 years. The latter table indicates which are original data and which are conversions.

Table A-1: Age Specific Fertility in Urban and Rural Areas of Developing Countries, Circa 1970.

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	<u>Ratio of 15-29 to TFR</u>	<u>Urban/ Rural Ratio of Share Births by Age 29</u>	<u>Urban/ Rural Ratio of Share Births by Age 19</u>
Africa										
Algeria (ASFR)										
Urban	.084	.318	.350	.330	.242	.125	.020	.539	1.093	.731
Rural	.126	.328	.359	.329	.273	.158	.045	.493		
Botswana (ASFR)										
Urban	.059	.196	.220	.176	.154	.108	.056	.486	.722	.450
Rural	.079	.256	.252	.224	.181	.126	.065	.673		
Ethiopia (CEB)										
Urban	.30	1.33	2.44	3.31	3.90	3.62	3.57	.364	1.304	1.004
Rural	.44	1.65	2.92	3.98	4.72	4.97	5.29	.283		
Ghana (ASFR)										
Urban	.110	.252	.279	.234	.168	.089	.072	.534	.945	.742
Rural	.168	.312	.289	.264	.183	.102	.039	.565		
Kenya (ASFR)										
Urban	.078	.264	.279	.247	.144	.093	.009	.526	1.090	.959
Rural	.125	.353	.335	.308	.297	.187	.112	.482		
Liberia (ASFR)										
Urban	.200	.231	.213	.192	.105	.042	NA	.654	1.008	1.410
Rural	.181	.247	.394	.204	.182	.051	NA	.649		
Morocco (ASFR)										
Urban	.045	.211	.267	.187	.118	.064	.008	.581	1.126	1.240
Rural	.060	.280	.417	.331	.252	.087	.040	.516		
Niger (CEB)										
Urban	.50	1.7	2.6	3.3	4.1	4.0	4.0	.650	.985	1.250
Rural	.50	2.1	3.3	3.9	4.6	5.3	5.0	.660		
Rwanda (ASFR)										
Urban	.056	.304	.359	.305	.170	.103	.037	.490	1.036	
Rural	.047	.337	.384	.350	.253	.119	.047	.473		

Table A-1: Age Specific Fertility in Urban and Rural Areas of Developing Countries, Circa 1970.

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	Ratio of 15-29 to TFR	Urban/ Rural Ratio of Share Births by Age 29	Urban/ Rural Ratio of Share Births by Age 19
Sierra Leone (CEB)										
Urban	.95	1.85	3.1	4.5	4.95	5.6	5.2	.596	1.419	2.010
Rural	.80	2.0	3.7	4.8	6.6	8.3	8.8	.420		
Tanzania (CEB)										
Urban	.42	1.63	2.82	3.32	3.98	3.82	3.91	.725	1.147	1.340
Rural	.40	1.75	3.18	4.30	4.87	4.95	5.02	.632		
Upper Volta (CEB)										
Urban	.60	1.9	3.25	4.75	5.65	5.45	6.10	.435	.906	2.500
Rural	.20	1.9	3.7	4.7	6.2	5.7	7.7	.480		
<u>Asia</u>										
Afghanistan (CEB)										
Urban	.80	2.3	3.9	5.7	7.1	7.6	7.8	.500	1.013	1.127
Rural	.70	2.1	3.8	5.4	6.7	7.3	7.7	.494		
Bangladesh (ASFR)										
Urban	.180	.329	.306	.242	.170	.077	.010	.616	1.032	.965
Rural	.201	.336	.311	.262	.197	.096	.014	.597		
Indonesia (ASFR)										
Urban	.110	.247	.259	.201	.116	.044	.013	.622	.982	.766
Rural	.161	.279	.266	.207	.125	.057	.019	.634		
Korea (ASFR)										
Urban	.003	.167	.320	.196	.091	.029	0	.616	1.109	.410
Rural	.009	.211	.363	.266	.144	.049	.004	.556		
Malaysia (ASFR)										
Urban	.038	.186	.294	.201	.129	.033	.007	.584	1.007	.870
Rural	.059	.267	.306	.215	.174	.057	.011	.580		
Philippines (CEB)*										
Urban	.65	1.45	2.41	3.46	4.39	4.84	4.92	.491	.946	1.090
Rural	.69	1.68	2.94	4.15	5.09	5.49	5.67	.519		

Table A-1: Age Specific Fertility in Urban and Rural Areas of Developing Countries, Circa 1970.

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	Ratio of 15-29 to TFR	Urban/ Rural Ratio of Share Births by Age 29	Urban/ Rural Ratio of Share Births by Age 19
<u>Asia Cont.</u>										
Sri Lanka (CEB)*										
Urban	.66	1.50	2.83	3.75	4.92	5.36	5.27	.537	1.087	1.13
Rural	.65	1.45	2.90	3.97	5.34	6.12	5.87	.494		
Taiwan (ASFR)										
Urban	.035	.206	.267	.137	.057	.019	NA	.667	.954	.990
Rural	.045	.274	.323	.168	.075	.029	NA	.699		
Thailand (CEB)*										
Urban	.78	1.67	2.62	3.69	4.66	5.29	5.52	.485	1.048	1.277
Rural	.74	1.84	3.10	4.42	5.68	6.52	6.70	.463		
<u>Latin America</u>										
202 Brazil (ASFR)										
Urban	.038	.157	.184	.147	.104	.050	.013	.547	1.126	1.058
Rural	.060	.234	.272	.252	.202	.110	.034	.486		
Chile (CEB)										
Urban	.098	1.167		3.044		3.700		.315	1.109	1.015
Rural	.165	1.796		4.805		6.322		.284		
Colombia (ASFR)										
Urban	.093	.214	.223	.201	.118	.064	.004	.792	1.033	.703
Rural	.132	.336	.331	.340	.223	.102	.016	.766		
Costa Rica (CEB)										
Urban	.103	.757	1.857	3.125	4.196	4.912	5.124	.362	.943	.773
Rural	.211	1.416	3.130	4.977	6.634	7.731	8.143	.384		
Dominican Republic (ASFR)										
Urban	.068	.200	.240	.221	.182	.123	.077	.457	.965	.792
Rural	.085	.254	.295	.270	.222	.135	.078	.474		

Table A-1: Age Specific Fertility in Urban and Rural Areas of Developing Countries, Circa 1970.

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>	<u>Ratio of 15-29 to TFR</u>	<u>Urban/ Rural Ratio of Share Births by Age 29</u>	<u>Urban/ Rural Ratio of Share Births by Age 19</u>
<u>Latin America Cont.</u>										
El Salvador (CEB)										
Urban	.186	1.141	2.468	3.733	4.704	5.200	5.273	.468	.948	.884
Rural	.291	1.788	3.603	5.093	6.358	7.136	7.301	.494		
Guatemala (CEB)										
Urban	.19	1.20	2.50	3.79	4.80	5.53	5.54	.451	.935	.647
Rural	.38	1.81	3.46	4.90	5.60	6.81	7.17	.483		
Honduras (ASFR)										
Urban	.114	.249	.254	.215	.146	.064	.013	.584	1.055	.931
Rural	.202	.353	.380	.354	.260	.163	.021	.554		
Mexico (CEB)										
Urban	.200	1.20	2.78	4.26	5.36	5.88	5.87	.474	.961	.806
Rural	.300	1.70	3.50	5.00	6.30	6.90	7.10	.493		
Panama (ASFR)										
Urban	.061	.207	.212	.154	.096	.038	.011	.616	1.081	.750
Rural	.139	.314	.307	.261	.196	.090	.026	.570		
Peru (ASFR)										
Urban	.043	.165	.212	.192	.147	.074	.022	.497	1.045	.916
Rural	.078	.244	.278	.266	.225	.126	.044	.476		

Table A-2: Age-Specific Fertility Rates for Ages 20-39, Urban and Rural, circa 1970.

Africa	Ages			
	20-24	25-29	30-34	35-39
Algeria (ASFR)				
Urban	.318	.350	.330	.242
Rural	.328	.359	.329	.273
Botswana (ASFR)				
Urban	.139	.279	.087	.068
Rural	.176	.261	.171	.041
Ethiopia (CEB)*				
Urban	.206	.222	.118	.056
Rural	.242	.254	.212	.148
Ghana (ASFR)				
Urban	.252	.279	.234	.168
Rural	.312	.289	.264	.183
Kenya (ASFR)				
Urban	.264	.279	.247	.144
Rural	.353	.335	.308	.296
Liberia (ASFR)				
Urban	.200	.231	.213	.192
Rural	.181	.247	.394	.204
Morocco (ASFR)				
Urban	.211	.267	.187	.118
Rural	.280	.417	.331	.252
Niger (CEB)*				
Urban	.240	.180	.140	.160
Rural	.320	.240	.120	.140
Rwanda (ASFR)				
Urban	.304	.359	.305	.170
Rural	.303	.384	.350	.253
Senegal (CEB)*				
Rural	.326	.284	.226	.198
Sierra Leone (CEB)*				
Urban	.180	.250	.280	.090
Rural	.240	.340	.220	.360

*Conversion from children ever born by age of mother. These are reasonably accurate ($\pm 5 - 10\%$) for cohorts 20-39 years.

Table A-2: Age-Specific Fertility Rates for Ages 20-39,
Urban and Rural, Circa 1970

<u>Africa (Cont.)</u>	Ages			
	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>
Tanzania (CEB)*				
Urban	.241	.241	.097	.131
Rural	.270	.285	.225	.113
Uganda (CEB)*				
Total	.307	.285	.206	.113
Upper Volta (CEB)*				
Urban (Ouga)	.300	.160	.340	.180
Rural	.340	.360	.200	.300
<u>Asia</u>				
Afganistan (ASFR)				
Urban	.245	.273	.256	.182
Rural	.288	.314	.262	.217
Bangladesh (ASFR)				
Urban	.329	.306	.242	.170
Rural	.336	.311	.262	.194
Indonesia (ASFR)				
Urban	.247	.259	.201	.116
Rural	.279	.266	.207	.125
S. Korea (ASFR) *				
Urban	.164	.315	.193	.089
	.211	.363	.265	.144
Malaysia (ASFR)				
Urban	.185	.294	.201	.129
Rural	.267	.306	.215	.174
Philippines (CEB)*				
Urban	.160	.193	.209	.185
Rural	.199	.251	.242	.188
Sri Lanka (CEB)*				
Urban	.168	.266	.184	.234
Rural	.160	.290	.214	.272
Taiwan (ASFR)				
Urban	.206	.267	.137	.057
Rural	.274	.323	.168	.075
Thailand (CEB)*				
Urban	.180	.204	.178	.116
Rural	.252	.264	.256	.168

Table A-2: Age Specific Fertility Rates for Ages 20-39,
Urban and Rural, circa 1970.

<u>Latin America</u>	<u>Ages</u>			
	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>
Brazil (ASFR)				
Urban	.157	.184	.147	.104
Rural	.234	.272	.252	.202
Chile (CEB)*				
Urban	.107	.107	.188	.188
Rural	.163	.163	.301	.301
Colombia (ASFR)				
Urban	.214	.233	.201	.118
Rural	.336	.331	.340	.223
Costa Rica (CEB)*				
Urban	.131	.220	.254	.214
Rural	.241	.343	.369	.331
Dominican Republic				
Urban (ASFR)	.200	.240	.221	.182
Rural	.254	.295	.270	.222
El Salvador (CEB)*				
Urban	.191	.265	.253	.194
Rural	.299	.363	.299	.253
Guatemala (CEB)*				
Urban	.202	.260	.258	.202
Rural	.286	.330	.288	.140
Honduras (ASFR)				
Urban	.249	.254	.215	.146
Rural	.353	.380	.354	.260
Mexico (CEB)*				
Urban	.200	.316	.296	.220
Rural	.280	.360	.300	.260
Panama (ASFR)				
Urban	.207	.212	.154	.096
Rural	.314	.307	.261	.196
Peru (ASFR)				
Urban	.165	.212	.192	.147
Rural	.244	.278	.266	.225

APPENDIX 2

SOURCES FOR TABLE 1 LATIN AMERICA: MEASURES & SOURCES (Fertility for all Women (15-40) unless otherwise noted).

Country and Major Source	URDIF	Largest City & measure	>20,000 Middle-size Diff'l.	Migrant Fertility	20-24/30-34 YNGFRT	Migrant Percent Urban	PCU	Urban Definition	Percent Urban >20,000	>100,000 Cities
Brazil 1970 Census	ASFR 1970 Census	Sao Paulo CEB	CEB 7500,000	ASFR Resid >10 yr. urban.	ASFR	Census	UNDY Census	Urban Adm. Centers (2000)	†	UNDY
Chile 1970 Census Includes nonlive births*	CEB* 1970 Census	Santiago CMR	--- NA	CMR In-mig to Santiago, Urban	CEB	Census	UNDY	Urban Adm. Centers 2000	†	UNDY
Colombia 1969 Encuesta Nat'l de Fecundidad	ASFR E.N.F.	Bogota NA	E.N.F. 20,000 ASFR	CEB (median) Rural-town by child resid.	ASFR	NA	UNDY	20,000 for Survey 1500+census	Survey	UNDY
Costa Rica 1970 Census	CEB Census	San Jose CEB (Urban)	NA	NA	CEB	Census Interstate	Census	Canton Centers (1000)	Census	UNDY
Dominican Rep. Income Vital Reg'n, UNDY	ASFR UNDY	Santa Domingo NA	NA	NA	NA	NA	UNDY	Canton Centers (1000)	UNDY Census	UNDY
El Salvador 1971 Census	CEB Census	San Salvador CMR Census	CMR Census	NA	CEB	Mig not born in San. Salv.	UNDY	Admin. Centers (1000)	UNDY, Census	Census
Guatemala 1973 Census	CEB Census	Guatemala City UNDY	NA	NA	CEB	NA	UNDY	≥2000	†	UNDY
Honduras 1971 Demog. Survey (EDEM)	ASFR EDEMI	Tegucigalpa UNDY	NA	CMR R-U mig EDEMI	ASFR	COENH	UNDY	>1000 (UNDY)	NA	UNDY
Mexico	CEB Census	Mexico City CEB Census	CEB 20-50,000+	NA	CEB	Mig to D.F. Census	Census (>2500)	>2500 (Census)	Census	Census
Panama 1970 Census	ASFR Census	Panama City CBR Anuario Estadistico	CBR (Colon + Panama)	NA	ASFR	5 yr mig. to Colon or Panama	UNDY (Census)	≥1500	Census (Panama + Colon)	UNDY
Peru 1972 Census	ASFR	Lima ASFR, Census	CMR 1970 III Survey	CMR 1970 III Survey	ASFR	Mig ≥5yr Census	Census	District Capitals >2000	Census, UNDY	UNDY
Venezuela 1971 Census	CMR Census	Caracas, CMR Census	CMR Census	NA	NA	Lifetime mig. to metro. areas	Census	≥2500 (From Census tables)	Census	Census

* Source: Eric Chetwynd, unpublished data

† Source: Robert Fox, Urban Population Growth Trends in Latin America. Washington, DC. Inter-American Development Bank, 1975.

SOURCES: ASIA: Measures & Sources
Fertility for all women (15-49) unless otherwise noted.

	URDIF	Largest City & measure	Urban > 20,000 Measure	Migrant Def'n & Measure	AGEDIF YNGFRT YNGDIF	Migrant Percent Urban	PCU	Urban Def'n.	Urban > 20,000	Urban > 100,000
Afghanistan 1975 National Demo. and Family Guidance Survey of Settled Pop.	CEB 1975	Khabul NA	NA	CWR Urban mig. inter provincial by birth	CEB	Survey	UNDY	≥5000	NA	UNDY
Bangladesh 1974 Bangl. Retrospective Survey of Fertility and Mortality	ASFR	Dacca	NA	NA	ASFR	NA	UNDY	NA	NA	UNDY
Indonesia 1965-70 Fertility Mortality Survey	ASFR (1971)	Djakarta NA	NA	1964 Nat'l Sample survey; migrants inter-region in urban	ASFR	1964	UNDY	Urban municipalities NA	UNDY	UNDY
Korea 1971 Fertility-Abortion Survey	ASFR Survey	Seoul ASFR 1970 Census	NA	R-U mign's ASFR 1970 Census	ASFR	1972 stat. Yearbook Net in mig to 7 largest	UNDY	≥5000	UNDY 1966	UNDY
Malaysia (Penin.) 1973 Vital Stat. + 1970 Census	ASFR Stat-Census	Kuala Lumpur NA	Stat. + Census ASFR (Metro + Urb. lg.)	NA	ASFR	NA	UNDY	≥10,000	•	UNDY
Philippines 1970 Census & 1973 Nat'l Demog Survey	ASFR 1970 Marital	Manila TFR 1970	NA	CEB 1973 migrants to urban areas	CEB marital 1973 Farm-non-Farm	1970 Census Ten yr. inter-provincial	UNDY	≥1000/km ²	UNDY	UNDY
Sri Lanka 1969-70 Socio-Economic Survey of Ceylon	CEB 1970	Colombo NA	NA	Place of birth, Colombo	CEB 1970	All inter-state mig.	UNDY	Admin. centers NA	UNDY	UNDY
Taiwan 1969 Taiwan Provincial Insti. of F.P. Survey	ASFR 1969	Taipei ASFR	ASFR 25,000	Rural-urban 5 yr 1968	ASFR 1969	R-U Taiwan Mig. Record Study 1967-68	UNDY	≥2000	UNDY	UNDY
Thailand 1968-70 Thai Longitudinal Survey	ASFR Marital 1969	Bangkok-Thonburi ASFR	NA	1970 Census Lifetime urban mig. + urban mig.	ASFR Marital 1969	5-year Rural-Urban	UNDY	≥5000	•	UNDY
Turkey Turkish Demog. Survey 1965-67	ASFR 1966	TFR 1966	CEB 1966 ≥15,000	CEB	NA	NA	UNDY	≥2000	UNDY	UNDY

SOURCES: AFRICA: Measures & Sources
 Fertility for all women (15-49) unless otherwise noted.

	URDIF	Largest City & Measure	Urban > 20,000 & Measure	Migrant Def'n & Measure	AGEDIF Etc.	Migrant Percent Urban	PCU	Urban Def'n.	Urban > 20,000	Urban > 100,000
Algeria Enquete de fecondite Algerienne, 1970	ASFR 1970	Alger (metro) CEB	NA	Mig. to metro after marriage CEB cf. Vallin	ASFR 1969	Lifetime mig to Survey Vallin	UNDY	Admin. centers (2000)	*	UNDY
Botswana 1970-71 Census & 1975 NIRDAS Gaborone Mig. Survey	ASFR 1975/1971	Francis Town ASFR 1975	Francis Town ASFR '71	Lifetime NA	ASFR	Lifetime to Gaborone Survey	UNDY	Gaborone Labatsi Francistown (10,000)	UNDY	UNDY
Egypt 1969 vital stat.	CBR 1969	Cairo CBR	NA	NA	NA	NA	UNDY	Towns & dist. caps. (5000)	NA	UNDY
Ethiopia 1970 National Sample Survey = R 1967 Urban Sample Survey = U	CEB 1967/70	Addis CEB '67	Urban ≥ 10,000 CWR	U ≥ 10,000 CWR	CEB 1967-1970	Lifetime to U ≥ 10,000 1967	UNDY	NA (1000)	*	UNDY
Ghana 1968-9 Nat'l. Demog. Sample Survey	ASFR 1968	Accra 1965-66 Ghana Fert. Survey	NA	NA	ASFR 1968	NA	UNDY	5000	*	UNDY
Kenya 1969 Census 1973 Demog. Baseline Survey	ASFR 1973	Nairobi NA	NA	Lifetime CWR Interprovincial In urban 1969	1973 ASFR	Lifetime in towns 1969	Census 2000	≥10,000 Census		UNDY
Liberia Pop. Growth Survey 1971	ASFR 1971	Monrovia NA	NA	CWR R-U Mig. Lifetime	ASFR	1971 Survey R-U mig/U pop.	UNDY	2000	NA	UNDY
Morocco 1972-3 Registration of births & deaths	ASFR 1973	NA	NA		ASFR 1973	Urban mig. by birth in other city, 1971	UNDY	117 Urban Centers (2000)	NA	UNDY

Niger 1970 Survey on fertility and the family	CEB 1970	Niamey CEB; survey	Niamey CEB '70	NA	CEB '70 Niamey/ Niger	NA	UNDY	(Niamey) (5000)	Niamey. Survey	UNDY
Rwanda 1970 Demog. Survey	ASFR 1970	Kigali ASFR	Kigali CEB (?)	NA Survey	CEB '70	Interpre- fecture (by birth) to urban sector	Survey	Mostly Kigali Dist. Centers (1000)	Kigali (Survey)	UNDY (Survey)
Senegal 1970 Enquete Demog.	CMR 1970	Cape Verde CMR	NA	NA	1965 Sine- Saloum Survey; CEB (vine- ges)	NA	UNDY	Dakar/Cape Vert (2000)	NA	UNDY
Sierra Leone 1969-70 KAP Survey	CEB 1969-70	Freetown CEB	NA	Mig to Free- town (life- time) CEB	CEB	NA	UNDY	NA (1000)	NA	UNDY
Tanzania 1973 Nat'l. Demog. Survey	CEB 73	Dar:Salaam CEB	Urban large +Dar. CEB	NA	CEB	NA	UNDY	16 towns (2000)	Urban Large M.D.S.	UNDY
Togo 1970 Census	CMR 1970	Lome CMR	NA	Mig. to Lome & towns. CMR Inter-regional lifetime	NA	Census	Census	Registered towns & Lome (10,000)	•	Undy
Uganda 1969 Census	Ugandans CMR 1969	Kampala CMR	NA	NA	NA	NA	UNDY	(Kampala + Mbale) (5000)	•	UNDY
Upper Volta 1969 Fertility Survey (ORSTOM/CVRS)	CEB 1969	Ougadougou CEB	NA	NA	CEB Ouga/Rural	NA	UNDY 1969	NA-Ouaga. (2000)	NA	UNDY 1966

Notes to Table 1:

- (1) Chile is children ever born, including still births. All other data is live births.
- (2) City size and migrant calculations may use children ever born at age 45-49 TFR, CWR, or CBR, but only with each other.
- (3) Niger urban is Niamey.
- (4) Uganda's urban-rural differential is Kampala and Mbale divided by Uganda total.
- (5) Urban definitions often are given as "administrative centers". In this case the figures for urban places were examined to determine the minimum threshold.
- (6) CEB may reflect under counts for older cohorts, especially in rural areas. This may upwardly bias the ratios.
- (7) Fertility rates except for selected Asian nations refer to all women, both married and single.

APPENDIX 3

Measure of Tempo of Childbearing

Without retrospective or longitudinal data it is impossible to calculate actual proportions of completed family size attained at any given age, but we can calculate children ever born at specified ages as a share of total fertility if the cohorts were to attain the same size families as present older women. These may be calculated separately for urban and rural women, then compared to demonstrate whether or not at any age urban women have borne a larger share of an expected family than rural women at the same age. If this measure, $TEMP_{ij}$, is larger than 1.0, urban women have borne a relatively larger share of expected completed families at that age; if it is less than this, they have borne relatively fewer.

This measure assumes that the young women will have roughly the same size families as older women. This is true only if there have been no substantial declines in fertility for that group of women. If we set 10% decline in crude birth rates during the last twenty-five years as a criterion for "substantial fertility decline," half of the countries in the sample, mainly African but some Asian, have not experienced declines (United Nations, 1975). For the other half, the share of children born at any age will be underestimated. Because more changes have occurred in the urban areas, for nations with greater than 10% decline, the $TEMP_{ij}$ measure is probably an underestimate.

APPENDIX 4

Sources and notes to Table 6:

1. Algeria: Vallin, Jacques, "Influence de divers facteurs économiques et sociaux sur la fécondité de l'Algérie," Population 28/4-5: October 1973.
2. Botswana: Report on the Population Census, 1971 August 1972, Central Statistical Office, Botswana.
Small town is Selebi-Pikwe, a mining town.
3. Ethiopia: Urban Sample Survey, 1967.
Small towns are Group A towns, 8-40,000.
4. Ghana: Accra is largest city, Kumasi is smaller city.
Ghana Fertility Survey, 1965-66.
5. Senegal: Small Cities are Semi-urban
CWR is 0-4/15-49 yrs.
1970-71 Enquete Demographique Nationale
6. Sierra Leone: 1969-70 Fertility Survey
Freetown is largest city
7. Tanzania: 1973 National Demographic Survey
8. Afghanistan: 1972-73 National Demographic Survey and Family Guidance Survey. Largest city is urban major, smallest is urban minor.
9. Korea: 1971 Fertility Abortion Survey
Small cities are "other urban" less Seoul.
10. Malaysia: 1970 Census and 1973 vital statistics
Largest city is metrotowns. All are Peninsular Malaysia.
11. Taiwan: Taiwan Provincial Institute of Family Planning Survey
Small cities are "towns."
12. Thailand: 1970 Census, ever married women
Small cities are provincial urban
13. Turkey: 1966-67 Turkish Demographic Society
Small cities are 2000-14,999.

Appendix 4 (continued)

14. Brazil: 1970 Census
Data are average CEB; small cities are metro areas less than 1 million.
15. Chile: 1970 Census, all births to women
16. Colombia: 1969 National Fertility Survey
Largest city are cities, small cities are towns.
17. Costa Rica: 1970 Census
Largest city is the urban portion of San Jose.
18. El Salvador: 1971 Census
Small cities are 18-25,000.
19. Guatemala: 1973 Census
Small cities are other urban less Guatemala City.
20. Mexico: 1970 Census
Small cities are under 20,000.
21. Panama: 1970 Vital Statistics
Colon is small city (pop.=52,504, 1970)
22. Peru: 1972 Census
Small city is Arequipa
23. Venezuela: 1971 Census
Small cities are 25000-19,999.

GLOSSARY

- Age Specific Fertility Rate:** The average number of live births during a given year born to a woman of a given age or age group.
- Child Woman Ratio:** The ratio of the number of young children, ages 0-1 or 0-4, in the population to the number of women in the reproductive age groups, 15-49.
- Children Ever Born:** The average number of live children born to a woman up to a given age or age groups.
- Cohort Fertility:** The fertility experienced over time by a group of women who were born or married in the same time period (month, year).
- Crude Birth Rate:** The ratio of the total number of live births in a population in a given year to the total number of the population during that year.
- Cumulative Fertility:** See "Children Ever Born."
- Differential Fertility:** Differences in fertility patterns and levels between subgroups of a population.
- Menarche:** The beginning of menstruation.
- Post Partum Amenorrhea:** Absence of menstruation in a woman after the birth of a child.
- Total Fertility Rate:** The average total number of births to a woman by the end of her reproductive age.

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