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Socio-Demographic and Economic Factors Affecting Fertility in Rural and Urban Thailand

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CHAPTER I

INTRODUCTION

The major purpose of this study is to measure the relationship between socio-demographic and economic factors and fertility of rural and urban women in Thailand, utilizing national level survey data collected in 1972 and 1973. Specifically, a regression model of fertility and socio-demographic and economic variables will be developed and analyzed. Also, a general comparison will be made between the results of the present study, based on the 1972 and 1973 surveys, with those from an earlier round of surveys conducted in 1969 and 1970.

The study of fertility differentials and factors affecting fertility in Thailand are of paramount importance because of the recent emphasis in those programs aimed at reduction of fertility by the Thai government. Thus, several studies on differential fertility have already been conducted in Thailand. The Potharam Studies (1964, 1965, 1966, 1967, 1968) were the first to provide data on fertility differentials, as well as on knowledge, attitude and practice of family planning. In 1969, the Bangkhen Study was conducted among women who lived in the suburbs of Bangkok. These surveys provided important and interesting information, both from practical and academic points of view. However, these studies were mostly confined to particular local areas.

In the summer of 1969, the first round of the Longitudinal Study of Social, Economic and Demographic Change of the rural areas was conducted by the Institute of Population Studies, Chulalongkorn

University, Thailand. One year later a similar survey was conducted in urban areas. Both surveys were sampled at the national level. Analysis of data from these two surveys has been done and published by a few authors (i.e. Prachuabmoh et al., 1972; Knodel and Prachuabmoh, 1973; Knodel and Pitaktepsombati, 1973; Prasithrattasin, 1973). Three years later, in 1972, the former respondents of the rural sample round one were re-interviewed, and new respondents were added. Similarly, in 1973, a follow-up survey was conducted in urban areas. (For a brief description of the sampling, see Chapter 3.)

The present study will be primarily based on the data collected from the 1972 rural and the 1973 urban samples and the results of the 1972-73 surveys will be compared with those from the 1969-70 surveys. There are several reasons for undertaking such a study:

1. Since the 1969-70 surveys were conducted, a population policy has been adopted by the Thai government. The population policy, which was designed to reduce fertility, was incorporated in the Third National Economic and Social Development Plan, covering the period 1972-76. It aims at providing family planning services on a voluntary basis to some two million new couples during the five years of the plan. Although the family planning services were informally provided, within a limited scope since mid-1960's, it was not until the late 1960's that the services became more widespread, eventually leading to the adoption of the national policy. Comparing the results of the 1972-73 surveys with the previous studies, especially the 1969-70 surveys, may reveal some changes in fertility level and changes in factors affecting fertility, during the period, because of the important changes mentioned above.

2. Most analyses done in the previous studies were of a descriptive nature and did not attempt to identify causal relationships between independent variables and fertility. Therefore, data were presented in two or three way tables, usually controlled only by current age or age at first marriage. Similarly, occupational mobility, which may have a significant effect on fertility, was not considered in the previous analyses.

3. The 1972-73 surveys included several additional questions relating to fertility which were not included in the previous studies. These include: direct questions on family planning, old age support, attitudes toward family according to the size of the family, place of birth delivery of the children.

Purposes of This Study

The general purpose of this study is to assess the relationship between social, demographic and economic factors on the one hand, and women's fertility on the other, in both rural and urban areas of Thailand. The present study will specifically attempt to address the following objectives:

1. Assessment of the nature, and magnitude of fertility differentials in 1972 and 1973. Consequently, the results of the present study will be compared with the previous studies, especially the 1969 rural and the 1970 urban surveys. This may enable one to see whether the previous findings still hold true. The findings of the previous studies indicated the following: 1) Education, in most cases, is inversely related to fertility (Hawley and Prachuabmoh, 1969; Goldstein et. al., 1973; Burnight et. al., 1968; Knodel and

Prachuabmoh, 1973). 2) Infant mortality is highly and positively correlated with fertility (Knodel and Prachuabmoh, 1973; Kirananda, 1977). 3) The relationship between women's labor force participation and fertility is different according to different sources of data. Results based on the 1960 census and the World Fertility Survey, 1975, indicated that women who are working generally have higher fertility than those who never worked or are not working now (Goldstein et. al., 1973; World Fertility Survey/Survey of Fertility of Thai Women, Report No. 2, 1977). However, using the Longitudinal Study round one, Debavalya (1975) found conflicting results. 4) The relationship between households possessing modern items and fertility was found to be negative (Knodel and Prachuabmoh, 1973; Burnight et. al., 1968). 5) Fertility was found to be inversely related to the level of family income (World Fertility Survey/Survey of Fertility of Thai Women, Report No. 2, 1977). The present study will attempt to reaffirm or modify the findings of the previous studies.

2. Analysis of the effects of those factors which were not included in the earlier studies on fertility. The variables to be included in this study are: duration of marriages (as controlled variable), wife's and husband's education; wife's and husband's age at first marriage; women's work experience before and after marriage; women's work and place of work; women's work and education; husband's occupation mobility; a direct question on attitude toward family planning; old age support; attitude toward having a family of 2, a family of 5, 6, 7 or more; where and by whom babies were to be delivered.

3. To assess the effect, quantitatively, of the social, demographic, and economic variables on fertility. Specifically, this study attempts to a) assess a total effect of the selected variables on fertility, b) compare the importance of the effect of each variable among the selected variables, c) compare the effect of the same variable across the duration of marriage.

Population Growth* and Population Policies and Programs**

Population growth. Thailand's population, which numbered only about six million persons in 1900, was enumerated at 26.3 million in 1960, and at 34.4 million in 1970. The latter figure, however, is regarded as an undercount, with the true figure at about 36 million (Arnold and Phananiramai, 1975). This sixfold increase in 70 years reflects an average annual growth rate of about 2% for the thirty years following World War I, and, most significant, an increase to 3.2% per annum in the years between the 1947 and 1960 censuses. Growth continued at about the same level in the following decade, although there is some evidence of a slight decline.

Thailand's mortality levels have been declining consistently throughout this century. Bourgeois-Pichat's (1959) yearly estimates for the crude death rate, adjusted for under-registration, for the period 1920-1955 indicate a high rate, close to 30 per 1,000 for the years before 1938, a slightly lower rate ranging between 24-28 per 1,000 for the years 1938-1944, and a slightly higher rate of 30-32 per 1,000 during 1945-47. Between 1948 and 1955, his calculations indicate

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*This part is selected from Tirasawat, 1977.

**This part is selected from Knodel and Pitaktempsombati, 1973.

a steady decline to 18 per 1,000 (Bourgeois-Pichat, 1959:38). The rapid adoption of modern medical technology and the expansion of health facilities throughout the country led to still further improvements. The crude death rate is estimated to have declined further to 13 per 1,000 at the time of the 1960 census, and to 11 per 1,000 in 1964-65 (Thailand, National Statistical Office, 1969). Thelatter figure does not, however, include Bangkok and Thon Buri for which data were not collected. Dramatic changes are further evidenced in the increase in life expectancy from about 35 years in 1937 to 56 years for men and 62 years for women in 1964-66. The United Nations medium estimates for 1975 suggest a slight rise to 58 and 63 years for males and females, respectively (United Nations Population Division, 1975a).

Unlike mortality, fertility levels in Thailand have remained high and relatively constant throughout the twentieth century, with the exception of the period of the Second World War, and the last few years. Estimates of fertility between 1920 and 1955 (Bourgeois-Pichat, 1959:38) indicate that the crude birth rate remained at a level of 45-50 per 1,000 throughout the period, with a moderate drop to 40-44 per 1,000 during 1944-46. By the mid-1960's, the crude birth rate for the country, excluding Bangkok, declined only slightly to 42.2 per 1,000. Refined fertility measures, using data from different sources, also indicate the persistence of a high and constand fertility level. The gross reproduction rate at 3.1 in 1964-1965, estimated from the Survey of Population Change, for example, was essentially the same as that of 3.2 for 1950-1955, as estimated by the United Nations (1965:46). Yet there is some evidence of the

beginning of a fertility decline in Thailand. The United Nations Population Division (1975a) medium estimates indicate a gross reproduction rate of 2.9 for 1975. Data from the National Longitudinal Study indicate that for the period 1969-1970 and 1972-1973, for the whole kingdom, marital fertility declined by over 12%, reflecting the increase in the use of contraception (Knodel and Pitaktepsombati, 1973). The adoption by the Thai government in 1970 of a policy to reduce fertility levels and overall growth rates may have expedited the declines suggested in the most recent data.

Overall, these vital rates lead to the conclusion that Thailand's annual rate of natural increase before the Second World War fluctuated around 20 per 1,000. The rate never exceeded 23 per 1,000 until 1950, after which it increased steadily to a high of 31 per 1,000 in 1955. The rate remained steady at about 30 per 1,000 until the most recent official estimates. These natural increase rates coincide with broad intercensal growth rates (Table 1). The more than four-fold increase of population between 1911 and 1970 reflects an average annual growth rate of about 2% in the years between 1911 and 1947, and an increase to about 3% in the years after 1947. The 1960-1970 intercensal growth rate of 2.7% per year is more likely the result of the under-enumeration of more than 2 million in the 1970 census rather than indicating an actual sharp decline of the population growth rate. The United Nations estimated the rate of increase to be 3.2 in the mid-1970's.

Data from all available sources indicate that urban areas have lower levels of fertility and mortality, as well as lower natural increase. Regardless of which fertility measure was used, the level

Table 1. Census population size, intercensal change, and annual growth rates, Thailand, 1911-60 (population in 000's).

Census Year	Total Population	Intercensal Increase	Annual Growth Rate*
1911	8,266	-	-
1919	9,207	941	1.3
1929	11,506	2,299	2.2
1937	14,464	2,958	2.9
1947	17,443	2,979	1.9
1960	26,258	8,815	3.2
1970	34,397	8,139	2.7

*Exponential rate.

Source: Population Censuses of Thailand, 1911-1970; and Arnold and Phananiramai. 1975. Revised Estimates of the 1970 Population of Thailand.

of births in urban areas was far below that in rural areas. According to the 1964-1965 Survey of Population Change, the fertility rate for urban areas (excluding Bangkok) was about one-third lower than those for rural areas (Table 2). Data from the first round of the Longitudinal Study and the 1970 census show similar patterns. The average ever married woman in rural areas in 1969 had borne about 5.0 children, compared to 4.2 and 3.8 children for those in Provincial Urban Places and in Bangkok (in 1970), respectively. Corresponding figures from the 1970 census are 4.8, 4.2, and 3.9, respectively (Knodel and Prachuabmoh, 1973:12).

Population policies and programs. In the past Thailand's official stance on population was predominantly pronatalist under the assumption that quantity could be equated with strength. One major reason for setting up a public health service in 1914 was to increase the rate of population growth by reducing mortality. During World

Table 2. Age specific fertility rate and related measures of fertility, by urban and rural place of residence, 1964-1965.

Age Group	Urban*	Rural	Total Kingdom
15 - 19	47.8	68.2	66.4
20 - 24	164.4	267.7	258.9
25 - 29	223.3	309.5	302.6
30 - 34	171.8	282.9	237.1
35 - 39	142.5	229.4	222.0
40 - 44	89.2	114.5	112.3
45 - 49	7.7	25.6	24.1
50 - 54	0.4	6.7	6.7
Crude Birth Rate	29.9	43.2	42.2
Total Fertility Rate**	4.2	6.5	6.3
Gross Reproduction Rate**	2.1	3.2	3.1
Net Reproduction Rate	1.7	2.6	2.6

*Excludes Bangkok for which data were not collected.
**Excludes specific rates for age group 50-54.

Source: Thailand, National Statistical Office, 1969. Report of the Survey of Population Change, 1964-65.

War II, early marriages were encouraged, and, as recently as 1956, bonuses were offered for large families. During the late 1950's, however, some senior government officials began to view the population question differently. A junior official of the Central Statistical Office (the present National Statistical Office) and a faculty member of Chulalongkorn University were sent abroad to be trained in demography. The change in viewpoint was accelerated by a World Bank economic mission report in 1959, which warned of the adverse effects of an excessively high population growth rate on Thailand's economic and social development. A series of committees were established to study the problem and three National Population Seminars were held. Finally, in March 1970, the Cabinet, after accepting a comprehensive report of the National Economic Development Board, prepared in collaboration

with the Ministry of Public Health and the Institute of Population Studies, declared an official national population policy, which called for lowering the high rate of growth through the practice of voluntary family planning. The Ministry of Public Health was authorized to implement and operate the National Family Planning Program. The program goal was to lower the national growth rate to 2.5% per annum by 1975, and to 1.9 in 1979.

Even prior to the announcement of the national policy, family planning activities were being carried out under the Family Health Project, a research project that enabled the Ministry of Public Health to train physicians and nurses in family planning during 1968-1970 and to open family planning clinics in hospitals and health centers. Thus, the National Family Planning Program had a substantial base to build on when it was officially established following the government's policy announcement.

CHAPTER II

LITERATURE REVIEW: THEORITICAL MODELS AND EMPIRICAL EVIDNECES AND HYPOTHESES

The study of the relationship between fertility and other factors should be based on both theoretical conceptions and previous empirical eivdences, since both can be used as guidance to the study being planned. In this chapter, theoretical conception models which have been proposed by demographers will be briefly reviewed. In addition, results of empirical research from both developed and less developed societies will be briefly summarized.

Theoretical Models in Fertility Analysis

In studying fertility differentials demographers have proposed several models. Among these models, three models became most widely accepted. Tien (1968:138) labeled these models as follows: First, the "institutional model" proposed by Davis and Blake; second, the "interactional model" suggested by Hill, Stycos and Back; and third, the "normative model" advanced by Freedman.

The Davis and Blake model, or institutional model, as presented in their article, "Social Structure and Fertility: An Analytical Framework", identified eleven "intermediate variables" through which, and only through which, cultural conditions can affect fertility. These variables, or factors, are directly connected with one or another of the three broad steps involved in the process of reproduction: 1) intercourse, 2) conception, and 3) gestation and parturition.

These factors may also be classified as voluntary and involuntary. Each factor may have negative or positive effects on fertility. Davis and Blake have considered a factor to have high fertility value for a society if its effect in that society is more positive than that represented by the midpoint of its possible range of influence. They have made the following preliminary generalization about fertility values of the eleven factors in non-industrial society (1956:211-35). 1) Usually high fertility values: age of entry to union, celibacy, contraception, fecundity as affected by voluntary causes. 2) High or low values: time between unstable union, post-widowhood celibacy, voluntary fetal mortality. 3) Usually low fertility values: voluntary abstinence, involuntary fetal mortality. 4) Indeterminate: involuntary abstinence, frequency of coitus, involuntary sterility.

The Hill, Stycos and Back's model, or interactional model, briefly, makes use of such key concepts as: 1) Status and interstatus relations, which become the basis for authority patterns and initiative taking; 2) Role, role conceptions, role playing and role organization; and, 3) Process of communication, consultation, conflict, compromise and consensus (1959).

The Freedman model, or normative model, briefly, specified that the fertility of any social collectivity tends to correspond with a level prescribed by the social norms which are in turn an adjustment to the way in which varying numbers of children affect the achievement of socially valued objectives. In the long run, the end effect of intermediate variables affecting fertility should approximately produce normative reproductive levels. In all, eight classes of variables affecting fertility are identified (1961-2:1-121).

Certain variables, which will be used in this study, can be considered as coming from these three models.

Results of Fertility Differentials from Empirical Researches

In carrying out their research on fertility, demographers from both developed and less developed societies may either explicitly or implicitly apply one or a combination of these models, since using these models seems unavoidable in carrying out research on fertility and knowledge, attitude and practice of family planning. The results of empirical research selected to be reviewed here are by no means all-inclusive.

Fertility and Education

Education has long been regarded as a crucial variable in the study of fertility, and its influence has been widely recognized. Indeed, it was one of the (negative) controls recommended by Malthus (1803) himself:

> In an attempt to better the condition of the lower classes of society, our object should be to raise this standard as high as possible, by cultivating a spirit of independence, a decent pride, and a taste for cleanliness and comfort among the poor. These habits would be best inclucated by a system of education and, when strongly fixed, would be the most powerful means of preventing their marriage with the prospect of being obliged to forfeit such advantages; and would consequently raise them nearer to the middle classes of society.

There is no doubt that education is still one of the most critical variables affecting fertility changes, although the means through which it affects fertility is not yet fully understood.

Some evidences from developing societies. The relationship between women's educational attainment and fertility has been frequently

studied and a considerable body of literature has been developed. Most, but not all, of these data indicate that the two are inversely related (Heer, 1971). Moreover, this pattern of difference is by no means fixed. The experience of the developed countries points to a marked convergence in recent years (Kiser, 1971). For most developing countries for which data are available, the evidence points to sharp differences. In Ghana, for example, fertility falls with length of education; completed fertility for those whose highest level was an elementary, secondary, or tertiary education was 6%, 66%, and 94%, respectively (Caldwell, 1971:752). Similarly, a CELADE study of Latin American fertility concluded that "no other socio-economic variable shows such a clearcut negative relationship to fertility as does education" (Miro and Mertens, 1968:11). It went on to report that "explaining the rural-urban differences in fertility, the differential distribution of the women by education is an important explanatory variable (Ibid:15). By contrast, in India available evidence on the relationship between education and fertility suggests a changing pattern in the recent past. Kumudini Dandekar points out in his overall assessment of the effect of education on fertility in Poona and Mysore State in the earlier part of the 1950 decade indicates that there was no appreciable change in the number of children as the level of the education rose, especially as between the illiterates and those with seven or fewer years of schooling (1965:146-169). Abu Lughod, using the 1960 census of Egypt, found education to be a significant variable in the fertility of urban Egyptian women. There was a clear inverse relationship between educational attainment of wives and the number of children born by them (1965:236). A similar inverse relationship

between fertility and educational attainment is revealed in the Rio de Janeiro metropolitan area by a survey conducted in 1963 (Miro and Rath, 1965:5). Timur reviewed these relationships by using the so-called "demographic transition model". She found that for countries in Stage I (crude birth rates in the upper forties and fairly constant), there is no cut-and-dried fertility-education pattern. Although for a few countries there is the semblance of a hump-backed curve with fertility highest for the intermediate educational categories, in others the relationship is negative, notably for the higher educational categories. For Stage II, in a very large number of developing countries in the early transitional stage, there appears to be a rather clearcut inverse association between female education and fertility. In Stage III, countries' differentials are slight and have been narrowing almost to the point of convergence. There is evidence for some Western European countries that the inverse relationship previously existing between female educational achievement and family size has recently given way to a flat U-shape relationship with the highest fertility occurring among the least, but also among the most educated groups (1977:469-478).

Using country and regional data of the world, the United Nations (1977:278-319) summarized the relationship.

For countries in Africa: the available data for countries of North Africa generally show little variation between women with no education and those with a few years of schooling. The few studies in tropical Africa have generally shown lower fertility among more educated women, especially the small group of women who have more than primary school education (p. 285).

In each of the East Asian countries (Japan, Hong Kong and Republic of Korea), education is a very important factor influencing the fertility of ever-married women (p. 295).

For the countries representing Eastern South Asia (Malaysia, the Philippines, Singapore and Thailand), education appears to have a very significant impact on the number of children a woman bears (p. 295).

For countries in Latin America: The cumulative fertility of women, regardless of whether all women, ever-married women or just currently married women are included, is negatively related to their level of education; but comparisons of the range of differentials and the differences among women in various education categories are greatly complicated by variation in the fertility measures and in the classification of education. The classification of parity data by age and level of education for women in Argentina, Paraguay and Panama reveals a strong inverse relationship between education and fertility of women of all ages. Considering only women near the end of child bearing, the level of education that has a large depressing effect on fertility varies among countries; but education at secondary level, especially completion of secondary schook, is associated with much lower fertility. In several countries (Argentina, Jamaica, Panama, Puerto Rico and Trinidad and Tobago), there is also a substantial difference in ultimate family size between women who have completed primary school and the group with little or no education (p. 305).

Some evidences from developed societies. Traditionally, a pronounced negative relationship has existed between fertility and and education of married women in Europe and the other low-fertility countries.

The National Fertility Study survey in the U.S., which was based on a national sample of married women, showed a more or less negative relation of education to the number of children already born, as well as to desired and expected fertility. Only the women having the highest education, i.e. four years of college, displayed a slightly higher desired and expected number of children than women immediately below them (Ryder and Westoff, 1971:53-57).

Recent data from western Europe suggest that the U-shaped relation of fertility and education is much more developed there. In France, a survey of the INSEE showed that the number of children ever born was lowest in the group of women with secondary education without baccalaureat education (i.e., university or similar education) showed a number of children almost as high as the group having the lowest education, at least in the first fifteen years of marriage (Tabah, 1971:40).

In the Netherlands, the fertility survey of 1958, 1963 and 1968 marriage cohorts did not show any relationship between wife's education and the expected number of children, while for the husbands the relation seems to be very slightly positive (Moore, 1974:73-74).

Using country and regional data, the United Nations (op. cit., 317) has summarized the relationships. Studies of differential fertility based on surveys or census data generally confirm the fairly sharp inverse relationship between schooling and parity in Southern and Eastern Europe and in the low-fertility in North America. On the other hand, additional evidence from the censuses and other surveys in Western Europe show the emergence of U-shaped patterns of fertility differences, with the highest fertility among the least and the most

educated. A recent analysis of data from the 1966 Australian census also indicated that the average number of children ever born to women near the end of childbearing is lower among women who have completed secondary school than among women whose educational attainment was above or below that level.

Summary on the relationship. Mason and others (1971:48), after reviewing literature up to the late 1960's, stated that their hypothesis--"the higher the educational level of the husband or wife, the lower the fertility"--was overwhelmingly supported. That is, of 24 empirical studies from various countries, a clearcut and, in most instances, strong inverse relationship, is found. Recently, Cochran (1979) did an intensive review on the relationship between these two variables and summarized as follows:

> Several recent reviews on the determinants of fertility have concluded that the inverse relation between education and fertility is one of the most consistent and best documented in the literature...The fairly extensive review of the evidence in this (her) study, however, shows that relation is not always inverse...At aggregate level of education in a country and the crude birth rate...Such aggregate relations are almost invariably inverse when countries with different educational levels are compared... If the age structure of population and level of income are controlled, then statistically significant inverse relations are only observed in less than 60 per cent of the cases. In addition, when cross-regional data from within developing countries are used and the age structure and extent of urbanization are controlled, there are statistically significant inverse relations in less than 60 per cent of the cases, and in some cases significant postiive relationships are observed. These aggregate data tend to indicate that the inverse relations are less likely in the least developed countries. (p. 142)
>
> ...Two kinds of cross-individual studies of the relation in developing countries are reviewed: those simply comparing the fertility (adjusted for age) of individuals with different levels of education, and multiple regression studies in which fertility is explained using education

> and income as two of the explanatory variables and introducing a control for age. The first kind of study shows an inverse relation (not necessarily significant) in 49 per cent of the cases; the second type shows an inverse relation in about 58 per cent of the cases...Both kinds of studies show that: a) female education is more likely to be inversely related than male education; b) education in urban areas is more likely to be inversely related than in rural areas; and c) education in countries with literacy rate above 40 per cent is more likely to be inversely related than in less literate countries (pp. 142-143).

The magnitude of the effect of education on fertility. Stycos used 1950 census data of eleven Latin American countries, and concluded that at a general level some relation between crude measures of fertility and education is found for most of these countries. Although considerable variation in size of the relation between these two measures (child-women ratio and literacy rates) was apparent, in all cases the relation was negative, ranging from lows of -0.10 to -0.26 for Honduras, Panama, Mexico and Venezuela, through the moderate correlation of -0.36 and -0.46 for Guatemala and Columbia, to a correlation of -0.60 and over for El Salvador, Costa Rica, Nicaragua, Chile and Argentina (1970:453-454). Bogue's analysis of the relative impact of nine indexes of modernization on fertility revealed that education and literacy have the largest effect in terms of explained variance. In his analysis, education alone accounted for 56% of the variance in the movement of nations from high to low fertility, where all other indexes of modernization combined accounted for only an additional 16% of the variance (1969:676-677). Utilizing 1955 sample survey data from the Puerto Rican Bureau of Labor Statistics, Jaffe concluded that, "...at least six and possibly nine years of schooling for women is required before any significant decline in the birth rate occurs",

and, "the combined influence of increasing education and increasing participation of women in modern economic enterprise is likely to be more effective than either factor by itself" (1959:196-197). Stycos, in his study of the relationship between education and fertility in Puerto Rico, stated that the data indicate an acclerating effect of education on fertility, starting very slowly in the lower primary school, and reaching a high level toward the end of junior high school which is maintained thereafter (1970:455). The study of Egyptian women in urban areas found that among women married for less than five years, the influence of education is best observed by the operation of what appears to be a universal pattern of immediate, unspaced child-bearing, regardless of educational level. However, among women married for longer durations, differences in education are increasingly reflected in fertility differential. The mechanism of this divergence is the tendency of women with less education to sustain throughout their marital histories the uncontrolled reproduction characteristic of the opening years of marriage, whereas women of higher educational achievement appear to terminate the initial period of high fertility earlier and more effectively (Abu-Lughod, 1965:236-237).

Besides the magnitude of the effect, the question of whose education--a woman's or her husband's--has more effect on a woman's fertility is an interesting one. Kandis (1977:19) studied the effect of education and fertility in Jordan, and compared the impact of a wife's education and her husband's education on fertility. He concluded that data from both the fertility studies used in his analysis indicated that educating either parent leads to a substantial reduction in family size and that this reduction continues with education

attainment. However, the data also indicate that educating the mother results in a more substantial reduction in family size and that this reduction continues with educational attainment. Furthermore, the effect of a wife's education on family size is at its maximum at low levels of the husband's education. The evidence, therefore, suggests that the effects of education on fertility are heavily influenced by the wife's educational level (pp. 19-20) (average reduction of a little more than one-fourth of a child for every additional year of school for the wife's education compared to a little less than one-fourth of a child for the husband's). Using the first round of the Longitudinal Studies, this author found that a wife's education seems to exert more influence on the number of children living than her husband's education (1979:96-101). These findings are consistent with the summary presented by Cochrane.

How does education affect fertility? Even though there are plenty of empirical evidences about the nature and magnitude of the relationship between education and fertility, studies on how education affects fertility are less prevalent. Demographers have tried to provide theoretical explanations, models through which education affects fertility. For example, Heer (1971:1905) stated that advance in educational attainment may affect (1) the amount of resources available for the pursuit of all goals, (2) the relative value of children compared to other goals, and (3) the relative cost of children compared to the cost of other goals. Freedman (1963:220-245) argued that educational advance might affect the preference for children: with increased education and literacy, the population becomes involved with the ideas and institutions of a larger modern culture. If the

individual is, or believes he is, part of a larger nonfamilial system, he begins to find rewards in social relationships for which large numbers of children become irrelevant. And he also argues that educational advance might affect the preference for children through its effect on reducing infant and child mortality. Holsinger and Kasarda (1976:154-169) provided a rather comprehensive list of reasons on how education affects fertility. They divided the effects into three groups:

1. Direct effect, i.e. education has a substantial direct effect on an individual's attitude, values and beliefs toward small family size, etc.

2. Indirect effect, i.e. female schooling delays marriage and thereby reduces the total possible number of childbearing years of the wife, etc.

3. Joint effect, i.e. importance of the role of education on the modernization process, and hence, in bringing about lower fertility rates.

Cochrane (Op. cit.,:7-8) proposed a model in which education does not affect fertility directly, but acts through many variables. The model hypothesizes that fertility is determined by the biological supply of children, by the demand for children by husbands and wives, and by the regulation of fertility. Through these variables, education affects fertility. Westoff and Ryder (1970:287-292) mentioned that there are several only loosely interrelated aspects of variable (education) that are significant for fertility. The first is the social status dimension. A second aspect of education operates through the

women's individual interest. Education serves to open increasing numbers of interests to women, interests which may compete with the traditional child-bearing and maternal roles. A more direct implication of education for fertility is the knowledge and information imparted about reproduction and contraception. Higher education not only provides information and knowledge but also promotes secular values and an ethos of rationality, in vivid contrast to religious and traditional orientations. The number of years of schooling not only influences fertility but can be a consequence of fertility, i.e. dropping out from school as a result of premarital pregnancy.

Fertility and education in Thailand: Past research and results. The first Fertility-KAP survey in Thailand was carried out in 1964 as a pilot project to establish baseline data, and was called "the Potharam Study." It consisted of a series of five surveys which showed that Thai women desired fewer children than they had. The results of these studies led to conclusive evidence of the need for adopting family planning in 1970. The results from the first survey in 1964 showed that the relationship between education and live births was inverse, women with no education having 5.5 live births while women with five years and more of education had only 3.7, and this relationship held in every age group. The result of the later survey (1965) was similar to the survey in 1964 (Institute of Population Studies, 1971:1-120). Sidney Goldstein used a one percent sample from the 1960 Population Census to relate years of school completed to number of children ever born, and found that the number of children ever born to women with no education was almost twice that of children born to women with one or more years of university education.

Furthermore, the number of children ever born decreased as years of school completed increased (Table 3).

Table 3. Number of children ever born per 1,000 ever married women by years of school completed, by urban-rural area and for total kingdom 1960.

Area	Years of Schooling			
	None	Primary 1-4 yrs.	Secondary 1-6 yrs.	University 1 or more yrs.
Bangkok	3,635	3,357	3,389	1,695
Other urban, Non-Agriculture	4,232	3,810	3,314	2,729
Urban, Agriculture	4,488	4,371	3,615	2,011
Rural, non-Agriculture	3,870	3,872	3,642	1,871
Rural Agriculture	4,038	3,750	3,366	-
Total Kingdom (Standardized for age)	4,368	4,127	3,297	2,280

Source: Sidney Goldstein and others, "The Influence of Labor Force Participation and Education on Fertility in Thailand", Research Report No. 9, IPS, Chulalongkorn University 1972, Table 9, p. 23.

In addition to this, the results of the analysis of the relationship between number of children ever born and literacy are similar to the results of Table 3 (Ibid: 16-26). The study of a suburban area of Thailand-Bangkhen, showed a clear inverse relationship between these two variables. For example, the women with no education had an average of 100% more live births than women with five or more years of education (Burnight and others, 1968:5). Using the Longitudinal data of both rural and urban round one, Knodel and Prachuabmoh (1973:55-58) concluded that:

> In sum, when the age of women is controlled, cumulative fertility shows no regular relationship with education of the husband among rural women and shows only a roughly inverse relation among urban women. For both rural and urban women, a much clearer inverse relationship is evident between fertility and women's own education. This relationship can be considered striking, however, only among urban women.

Using the same sources of data as above, Thienchay applied ordinary least squares regression and treated children ever born per women age 15-54 as the dependent variable and eight other factors as independent variables. He concluded that a wife's age, a wife's education, and her husband's education are less significant than infant and child mortality the preference for sons, ideal family size, length of marriage, and the use of contraception in explaining the variation in fertility (Kirananda, 1977:9).

Fertility and Social Mobility

A well-known thesis on the impact of social mobility on fertility was formulated in 1890 by Arsene Dumont. His thesis of "Capillarite' Sociale" states that "just as a column of liquid has to be thin in order to rise under the force of capillarity, so a family must be small in order to rise in the social scale." (quoted according to Blau and Duncan 1967:367). Sorokin (1959), in his classic work on social mobility, considered that social differences in fertility, as well as the fact that those who are most gifted (and therefore mobile from the lower classes into the elite) must have a similar low fertility in order to be able to achieve the upward movement, might lead to a gradual deterioration in the quality of the population because fertility of the less gifted is higher. Andorka (1978:266-7)

stated that if fertility is influenced by the socio-economic status of the parent, an obvious further assumption is that any change in status, either intergenerationally, i.e. from parent to child, or intragenerationally, i.e. during the career of the respondent--will have an impact of social mobility on fertility. Furthermore, he added that thus all these authors, (i.e. Dumont, Sorokin) hypothesized a special impact on fertility by social mobility causing it to be lower in mobile (or only upwardly mobile) couples than in non-mobile ones. Alternatively, it might be hypothesized that only the additive effects of mobility are existent--that is, the number of children of mobile couples is intermediate between that of couples in their group of origin and couples in their group of destination.

Some evidences from developing countries. A study of the relationship between fertility and social mobility is uncommon and hard to find. Hutchinson's study (1961:182-189) of fertility and social mobility in Brazil among 2,224 men and women who had been married for ten years and more found that a man marrying a woman of social origin higher than his own had a smaller average family than he would have had from an endogamous marriage, while a man marrying "beneath" him had an average family slightly larger than he could have expected from marriage with a woman of his own social origin. The same pattern prevails when the matter is viewed conversely, with wives marrying upwards having a smaller, and those marrying downwards a larger, than the average family in their class of origin. The data for intergenerational mobility offer evidence of a similar compromise. In their male sample, the average family of a husband who was born and had remained in the manual category was approximately 60% greater than that of a man born and

remaining in the non-manual class. In addition to these, the inverse relationship between status and fertility is evident among rural born and urban born males. Thus, the existing evidences of developing societies seem to confine the long recognized hypothesis of inverse relationship between fertility and social mobility.

Some evidences from developed societies. The first large-scale national social mobility survey investigating the relations of fertility and mobility was a British survey in 1949. Berent (1952:244-260) investigated the impact of social mobility and personal mobility on family size. The data showed the relationship in the expected direction, that is, women who moved upward (compared between social origin of husband and present social class) have smaller family size than women who remained in their original class or women who moved downward. For example, women in class IV (the lowest class) who moved to class III, II and I (the higher classes respectively) had an average family size of 3.22, 3.20 and 2.40 compared to 3.68 among those who remained at the original class. This is also true for women in class III and class II who moved upward. For women in classes I, II, and II who moved downward, fertility increased in response to decrease in class. For example, women in class I who moved down to class II, III, or IV had an average family size of 1.79, 1.96 or 2.00 compared to only 1.74 among women who maintained their class. Those women who experienced upward mobility had lower fertility than those who experienced static or downward mobility. Berent's conclusion was simple: Upward mobility leads to lower fertility, and downward mobility to higher fertility. Scott (1958:254-60) studied the relationship between fertility and social mobility among teachers in England and Wales. His major

findings can be summarized as follows: 1) holding social origin constant, family size is inversely related to present social status, 2) holding present social status constant, family size is also inversely related to social origin, 3) holding social origin constant, those who have moved up have smaller families than those who remain static or who have moved down, 4) holding present social status constant, those who have moved up, however, have larger families than those who remain static, or who have moved down.

In a survey of a more specialized sample, that of the social elite of Philadelphia, Baltzel (1953:411-20) found that the newcomer to the elite (i.e. the upwardly mobile couples) had a lower fertility than both their groups of origin and the traditional elite. It might be surmised that the efforts necessary for the upward mobility into the elite induced these newcomers to limit the size of their families, while the traditional elite, who were not obliged to make similar efforts, were less induced to have small families. Studies in the United States by Blau and Duncan (1967) found that the fertility of mobile persons is typically intermediate between the average fertilities of the class of origin and class of destination and they also found that social mobility in either direction tends to depress fertility slightly over what would be expected from a purely additive model, but the effect is too small to account for much variation. The influence of mobility is much overshadowed by other variables, namely white collar status, late marriage and urbanization. Using occupational mobility, change in income, pattern of income change, perception of opportunity, drive to get ahead and aspiration to send children to

college as indices of social mobility, Westoff, et. al. (1963:132-147) concluded,

> the results continue to discourage any conclusion other than that social mobility as measured has at best a trivial statistical association with fertility. There are some indications that the relationships, as in the case of socio-economic status, go in one direction (positive) for Catholics and in the other for Protestants...In conclusion, it should be reiterated that social mobility has been measured with very crude instruments and in a highly specialized sample so that the negative conclusion cannot be considered definitive.

Studies by Tien (1965) of faculty members at Australian University as well as by Boggs (1957) of a white collar sample in the United States also fail to find any consistent or significant relationship between upward social mobility and fertility level. The result of the Hungarian social mobility survey thus seems to indicate that the effect of social mobility on fertility cannot be analyzed in general, without taking into account the type of mobility and the economic and social condition in which the mobility process occurs (Andorka 1978: 278). Manson and others mentioned that the failure to find the expected mobility relationship in the developed countries may suggest a qualification on the original hypothesis. Perhaps only when upward mobility represents a shift from the agricultural or traditional sector of society to the industrial, rather than more or less "normal" upward movement within the industrial sector, does it have significant impact on fertility. Freedman (1962:225-26) suggests the original hypothesis of negative correlation is linked to an outdated view of urban society. He further mentioned that such a model may be applicable to the transitional stage when an urban society is developing indigenous institutions and drawing large masses of immigrants from

rural areas. In this situation a large number of people are unaccustomed to urban institutions and without established precedents or rules to guide their careers. But in contemporary America some large numbers have been socialized as indigenous urbanites to expect social change. Change and mobility are an established part of the social structure. The large bureaucratic enterprises in which more and more people work institutionalize mobility. People learn to expect and plan for change within reasonable limits as part of the routine of life.

Fertility and Modernity (values and practices)

Value orientations are viewed as mediating the relationship between socio-economic status and fertility behavior variables. In an attempt to determine what influences the differences in fertility behavior, Rainwater (1960:44) suggested that we turn to the "goals and orientations to the world" which couples reveal in their family planning. Similarly, Misher and Westoff (1955:132) suggested that a particular pattern of fertility performance and control depend on the extent to which having a child (or a certain number of children) is compatible with other life values and interest. Kahl (1968:86) has shown how important and successful is the use of values in explaining fertility: "Modern values are useful intervening variables...They predict both educational and fertility norms in a pattern which is consistent with our knowledge of the stratification system, but which goes beyond it." Some such approach based on the study of values will be necessary to explain the striking differences in fertility ideals discovered between Brazil and Mexico. These differences cannot adequately be understood through the usual notions of stage of economic

development, degree of urbanization. Clifford (1971:46) studied value orientation and fertility behavior of 275 women in Lexington, Kentucky and found that value orientation is of help in predicting fertility behavior in a pattern which is consistent with and supplements our knowledge of stratification systems and aids in interpreting the relationship between socio-economic status and fertility behavior.

Results from single culture, cross-cultural studies on modernism and fertility seem to provide a consistent report, that is, women or men, with more modern values, tend to have fewer children and want a smaller number of children than those who hold traditional values. For example, Clifford (Ibid.,:42-43) found that the mean number of the ideal, desired, expected number of children among women with modern value orientations is smaller than those of women who are in the intermediate and those who hold traditional values. In addition to this, the proportion of unplanned births is higher among traditional value oriented groups than the intermediate and modern groups. The results of Kahl's (Ibid.,:77) study in Mexico and Brazil indicated that the modernists prefer somewhat smaller families than do the traditionalists. For example, among the high manual group, men with high modernism want 2.4 compared to 2.8 among men with low modernism. Among the seven main features of the modern man is the openness to new experience, both with people and new ways of doing things, such as attempting to control births (Inkeles, 1969:210).

Some evidences of previous studies in Thailand. Hawley and Prachaubmoh (1971:23-4) used th3 1964 fertility Survey of the Photharam study and constructed a modernization scale. The scale rests on ownership or non-ownership of fourteen different items. It was found

that women with the highest score on the scale (20 and more) have the lowest number of children ever born. However, it was not the lowest on the scale that have the highest fertility; instead, it was women who have quite high scores (15-19) on the scale that have the highest number of children ever born. When age is controlled, the lowest fertility still remained among women who were on the top of the scale, and the highest fertility distributed among different scales. Using the follow-up data, 1965, and the same procedure in constructing a modernization scale, Hawley and Prachuabmoh (Ibid., 76-76) found a positive relationship between fertility and the modernization scale, that is, women with scores under 5 had 5.1 children born, compared with only 4.1 among women with scores of 15-19 and 20 and more.

Fertility and Child Mortality

In their discussion of factors affecting fertility, Thompson and Lewis (1965:309) stated that the decline in the death rate has unquestionably been an important factor leading many people in the more industrialized countries to undertake control of the size of their family. U.N. (1958:39) mentioned that high fertility has frequently been a response to high mortality. The decline in mortality in industrialized countries, particularly among infants and young children was an important element in evaluating an atmosphere favorable to the development of family limitation. In his classification of the eight variables that affect fertility, Freedman mentioned the mortality level which determines how large a surplus of births is required to produce the normative number of children. In later writing, Freedman (1963:220-45) suggested that known low mortality is one of the necessary

conditions for an effective social policy for reducing fertility. Friedlander (1977:183-203) provided a theoretical explanation of how child mortality affects fertility. He mentioned that the impact of child mortality on fertility has been divided into four different effects: 1) replacement effect, 2) insurance effect, 3) physiological effect, and 4) effect on fertility of alternative societal responses to change in child mortality. The three fertility responses are of a compensatory nature. That is, as child mortality declines the three fertility effects lead to a decline in actual fertility. The alternative societal response, on the other hand, tends to reduce (or avert altogether) the intensity of these fertility declines. In the less developed societies (i.e. transitional societies), only the physiological effect may be expected to have an important demographic impact while the other two effects have little demographic importance, and, on the whole, we may expect a compensatory demographic impact of "medium" intensity in fertility as a result of a change in child mortality. In the modernized societies all effects have low intensity demographic impact and the compensatory effect has on the whole little demographic importance. A statistical investigation by Heer seems to support the notion that high mortality may be a cause of high fertility (1966). Later, Heer and Smith (1968:104-106) provided the reasons why the level of mortality should have a direct effect on fertility. First, the level of mortality affects the economic cost of supporting a family. Second, for reasons of human biology, a high rate of infant mortality should also lead to increased fertility in any society when substantial proportions of mothers breast-feed their children. Third, there is a possible connection between the level of

mortality and the amont of emotional energy which parents invest in their children, i.e. more emotional involvement with each child should lower fertility. Fourth, it was hypothesized that the desire for a minimum number of surviving children might elevate fertility in high mortality areas to such a degree that the net reproduction rate might be greater than in areas where mortality is low.

Some evidences from developing countries. Using data from a fertility survey conducted in 1963 in Cairo, Egypt, Hassan (1973:355-369) studied the relationship between child mortality experience and fertility performance among women who married in a) 1929-38, b) 1939-48, or c) 1949-58. He found that the average number of children ever born among both Muslim and Christian mothers who experienced some child mortality were higher than those who did not experience any death of their child. For example, Muslim mothers with 1, 2, 3 or more child mortalities have a standardized average number of children of 4.1, 5.9, 7.4 respectively while mothers with no child loss have only 3.2 children. This is also true among Christian mothers. That is, mothers with 3 or more child deaths have 6.6 children ever born, compared to only 3.2 among mothers with no loss. In addition to this, the desired number of children among mothers with no child loss, of all three marriage cohorts, was lower than the number desired by another with at least one child loss. For example, women who married in 1949-58 with no child loss wanted only 2.1 children compared with 3.7 children among women with some child loss. In his conclusion, he stated that the most effective and practical solution to Egypt's population problems may lie in the drastic control of child diseases and death. It can be suggested that a sudden and dramatic drop in

childhood mortality may result in a remarkable decrease in fertility. In contrast, if no sudden check of childhood mortality takes place, the rate of population growth can be expected to continue to increase because of the perpetuation of the practice of compensatory fertility. Driver (1963:104-112) found that percentage of dead increases continually while the number of children ever born increases. For example, with only one child ever born, the percentage death is 22.6%, and it increases to 41.8% when the number of children ever born is 10 or more. Rele (1963:183-199), using the data of a fertility survey conducted in 1956 in rural areas of the state of Uttar Pradesh in India, stated that it would thus appear that the higher fertility of the lower classes works to compensate for the higher mortality which leaves the number of children living about the same level for all the four classes. Singh (1974:385-388) studied 311 married women living in Chandigarh, India, and summarized that the incidence of child mortality greatly depends upon social status. In addition, when the incidence of mortality is lower, fertility is also lower.

Some evidences from previous studies in Thailand. Using data from the Longitudinal Study Round One, Knodel and Prachuabmoh (1973:35-39) said that in both rural and urban samples, a clear association between the number of children ever born and infant mortality is apparent. That is, among the total rural women, infant mortality was twice as high as for those with 9 or more live births than those with only one or two. They also mentioned that several interpretations of the association between infant mortality and fertility are possible. A positive relationship is to be expected first among couples who practice family limitation, and second, as a result of the indirect

influence of infant mortality in post partum fecundibility. Using the same sources of data, Kirananda (1977:9) applied ordinary least square regression, treating children ever born to women age 15-54 as dependent variables and eight other factors as independent variables. He found that infant mortality is one factor which significantly explains variation in fertility.

Old Age Security and Fertility

Children may be seen as a source of security in old age or at other times of need. This is sometimes referred to as the "pension motive" for having children. In countries that do not have a well-developed system of pensions, social security, unemployment compensation, and other insurance schemes, children may be the only reliable source of security for their parents, particularly in old age. (Arnold and Pejaranonda, 1980) On the other hand, Robinson (1972) argued that, empirically, children are not a good investment for old age. Of course, monetary support is not the only kind of help parents need in old age. Physical and emotional support may be every bit as important and these types of help are often inextricably intertwined with purely financial consideration. Hohm (1975) has shown that social security programs have had a negative effect on subsequent levels of fertility in a large number of countries. Neher (1971) believes that the pension motive is a major motive for having children in primitive societies. A large majority of young Taiwanese couples say they expect to live with a married son and to receive financial support from him in their old age (Freedman, 1979). The analysis of National sample survey data by the Operations Research Group, Baroda, showed that

almost all the 25,000 families included in the survey felt the necessity ot at least one son to carry on family lineage and to provide security in old age. Parents do not stop having children unless they have achieved a desireable sex ratio and unless they have ensured that at least one or two sons will survive to take care of them in their old age. (Bhatia, 1978)

In Thailand, children can be helpful in doing work around the house. The sons begin to make a useful contribution to housework and work in the family enterprise at an average age of 12 years and daughters at about 11 years of age although many felt that children make a useful contribution by the time they are seven or eight years old. (Arnold and Pejaranonda, 1980) In addition to the productive utility of children, their parents also showed a strong interest in help that children provide in the parents' old age or when the parents become ill. Children can provide both financial and emotional security that may not be available from any other source.

Knowledge, Attitude and Practice of Family Planning and Fertility

Some evidences from developed societies. Freedman et. al. (1959) found a significant difference in fertility levels between users and non-users of contraceptives at various socio-economic levels even among their sample group of which the majority were contraceptive users. They also concluded that levels of education are great determining factors as when women began using contraceptives. That is, college educated users were more prone to use contraceptive methods earlier in their marriage than those with grade school education. For example, 68% of college graudates in their sample group used

contraceptive methods before their first pregnancy, compared to only 24% of the women with grade school education.

As may be expected, a significant difference of knowledge and attitudes of family planning exist among urban and rural dwellers. Such difference seems to have a cause-effect relationship on the women's use of contraceptives. The Potharam Study, the first KAP study conducted in Thailand, found that 2 out of 2 women interviewed in 1964 had absolutely no knowledge of contraceptive methods. Eight months after the study, a family planning program was in operation. When the second survey took place in 1965, 21% of the sample group reported using birth control.

Another study of rural women's attitudes and knowledge of contraceptive methods was done in Bang Pong, a northern rural village. It found that over one half of the women interviewed approved of birth control. However, only 5% of the women were practicing any form of contraception. The method used by these women was mainly tubal sterilization. After 18 months of action program, however, the study showed a drastic increase in the use of birth control--50% of women reported using some form of contraceptive. The most popular method also changed from tubal sterilization to oral pills. (Jones and Rachapaetaryakom, 1979)

Another interesting KAP study of rural dwellers is that conducted in rural Yala, 1968. The study was aimed at studying the birth control pattern of the Moslim minority in the predominantly Moslem area of Yala. The high percentage of respondents with no knowledge of birth control is extremely remakable. Note that 80% of male and 98% of

female respondents admitted to knowing nothing of birth control methods (Suvipakit, 1969).

Compare the initial ignorance of rural women discussed above to suburban women interviewed in the Bangkhen Study (Burnight, 1971). In 1967-1968 a KAP study was conducted in Bangkhen, a suburb included in the Bangkok Dhonburi larger metropolitan area, 94.6% of these suburban women admitted to having some knowledge of birth control while 41.3% of these women were actually practicing some form of birth control method. Their most popular method was tubal sterilization. After 18 months of the action program, the study showed a significant increase in the use of birth control among the sample population. That is, about 50% of women started a family planning program. Oral pills became the most preferred method.

Data from the Longitudinal Study Round One showed that women who are using or have ever used contraceptive methods before had more live births than those who never used. In addition, a much smaller proportion of couples who have yet to achieve their stated desired family size use contraception in comparison to the proportion of users among couples who have reached or exceeded their family size (Knodel and Pitaktepsombati, 1973) indicating that couples wait until they already have all the children they want before attempting to control their fertility.

Fertility and Women's Labor Force Participation

Women have traditionally engaged in three types of economically productive work. First, they have produced goods and services for their family's own consumption; second, they have engaged in household

production for sale or exchange on the market; third, they have worked for pay outside the home. The process of industrialization has brought about a reallocation in the relative importance of these three types of economic activities, greatly increasing the absolute and relative number of women who seek and obtain paid employment (Blau, 1979:265).

Study of the relationship between women's labor force participation and fertility was one of the most prolific and fruitful ones. It is fairly well established that in industrialized societies a negative relationship exists between female employment and fertility (i.e., Whelpton 1976:107-111; Piepmeier and Adkins 1973:507-20; Weller 1977: 497-98). In the less modernized countries, a negative relationship between female employment and fertility may be either weak or not present. Within these countries, the probability of observing a negative relationship between female employment and fertility is greater in urban areas than in rural areas, if the wife works for pay rather than as an unpaid or self-employed worker, if she works away from home rather than at home, and if she has a white collar occupation rather than some other occupation. Thus, women's employment and fertility tend to be negatively related only when the women are engaged in the modern sector of the labor force (Weller, ibid.:498; Hawthorn, 1970:103-05).

Some evidences from developing societies. Using areal data collected in Egypt, Bindary et. al. (1973:159-167) observed a positive relationship between rate of female economic activity and the Child Women Ratio in rural areas and a negative relationship in urban areas. Zambian wives with white collar occupations had lower fertility rates

than women in other occupations, whose fertility was similar to that of housewives. Indeed, those in sales (who are largely petty traders) had higher fertility than the housewives (Ohadike 1971:213-225). Gendell reviewed the available evidences and concluded there is no "secure basis for ascertaining the nature of the relationship between economic activity and maternal responsibility in India." Driver's (1963:95-6) study of Central India found a positive relationship between employment status and fertility. This relationship still holds when age is controlled, except for women in age group 35-44, where fertility of both employed or unemployed wives is almost the same (5.9 and 6.0 respectively). Japanese data indicated that women who work for wages and salary income in non-agricultural activities located outside the home have lower fertility than other women (Jaffe and Azumi 1960:52-63; Taeuber 1960:28-39). Speare et. al. (1973: 323-334) concluded that work experience has little effect on fertility attitude and behavior, and acts mainly to delay childbearing within marriage. If all these women were able to have exactly the number of children they desired, their completed family size would not differ from that of non-working women. However, delays in childbearing tend to result in fewer children on the average. In the Philippines, there appears to be no significant association between employment and fertility, except among women living in metropolitan Manila (Concepcion 1974:503-17).

Areal data for several Latin American countries show a negative relationship between women's labor force participation and fertility (i.e., Heer and Turner 1965:279-92; Zarate 1967:363-73). The study

of differential fertility in Monterrey, Mexico found that the mean number of live births to men whose wives were currently working was 4.08 as compared to 4.31 for men whose wives were not currently working. When the men whose wives were currently working were classified according to place of work of their wives, the results show that men whose wives worked outside the home had fewer children than those whose wives worked in the home (3.89 and 4.41 children, respectively). In addition to these, men whose wives worked after marriage had about the same number of children as those whose wives did not work before marriage (4.32 and 4.28 respectively); men whose wives worked before marriage had much lower fertility than those who did not work before marriage (3.82 and 4.79 children, respectively), (Zarate 1967a:103). A study of Female Employment and Fertility in Lima, Peru found a negative relationship between these two variables, even after the socio-economic status is controlled. However, there was no consistent relation between working status and ideal number of children when class (SES) and number of children are controlled (Stycos 1968: 241-245). In Puerto Rico, the negative relationship between female employment and fertility is maintained even when age, marital status, education and residence are controlled (Weller 1968:507-26). In Turkey, fertility of women is different according to their working status. For example, women who are currently employed in nonagriculture have on the average 2.9 live births compared to 3.1, 3.5, 3.9 and 4.2 for women who were previously employed in nonagriculture, urban women who never worked, currently employed women in agriculture, and rural women who never worked, respectively. This relationship is

still true when community type is controlled. She also concluded that the data suggest that female employment depresses fertility. However, it is also clear that in Turkey, the relationship between women's working status and fertility is weaker than the relation of other socio-economic variables with fertility (Timur 1978:68-71).

Some evidences from developed societies. Unlike the case in developing societies, the relationship between work and fertility in developed societies is rather well-established. Most of the research findings are consistent with one another; women with fewer children are more likely to be economically active, women in the labor force tend to have and to desire smaller family size and to be users of contraceptive methods.

Data from the Family Institution of England and Wales in 1967 showed that a much larger percentage of women without children were working at the time of the interview than of women with children. It was supposed that a large part of these women were sterile. However, also among fertile women, the working ones had a lower fertility. Thus, engagement in work outside the home was proved to be a factor reducing fertility (Andorka 1978:293). A survey carried out in 1966 in West Germany investigated the work history of married women aged 40-44. The respondents were classified into five groups according to their history, and the number of children living in the household was analyzed. The results, however, do not confirm the theoretical expectation, as although the women working at the time of the interview had slightly fewer children than inactive ones, those who had continuous working careers did not have fewer but tended to have more children than those who interrupted their working career. Thus, the working

career has no simple influence on fertility, but rather the type of employment (hours of work, character of work, etc.) ought to be taken into consideration (ibid.:294). A comparative study of twelve national surveys on fertility and family (UN 1976:50-1) reveals that the employment differential in achieved fertility amounted to about one child in Belgium, Czechoslovakia and England and Wales, but was distinctively less in most other countries. Women in the category "worked before, not currently" usually occupy an intermediary position between the currently working and never worked categories. With regard to the level of achieved fertility, as one would expect, among the economically active women, there was generally a higher proportion of women with no children and a smaller proportion of women with large families than among women who did not work. The wife's employment status differential appears to hold for both manual and non-manual non-agricultural categories of the husband's socio-occupational status, but somewhat less so for those in agricultural occupations. Excluding Turkey, where the recorded employment of married women is extremely low in any case, family size appears to be inversely correlated with the duration of the wife's employment since marriage. Using the Detroit Area Studies, Freedman and Coombs (1966:177-222) concluded that at the beginning of marriage there were no great differences in preferred and expected fertility between working and dependent wives. However, the later work history influenced both these preferences and expected fertilities and also actual fertility. Kupinsky's (1971:353-367) analysis of the 1960 U.S. census data indicated that there was a gradient from rural farm areas to large metropolitan centers in which

the fertility differential--by work status--becomes increasingly evident. Among residents of rural farm areas, and of all socio-economic status, the mean number of live births to non-workers was about .5 higher than that of the workers. However, the difference was equivalent to about 1 child more for non-workers. On the basis of the results of the 1960 Census in the United States, Sweet (1970) recently investigated the interrelation of women and fertility by multiple regression analysis and found that causal links go in both directions. On the one hand, the fact of being employed has a negative effect on fertility. Using the 1960 U.S. census data, Powers (195-66:476-7) found that of live births for married women aged 35-44, for all SES scores, the highest rate (4,479 live births/1,000 mothers) was among non-white women who were not in the labor force and the lowest rate was among white women who were in the labor force. Weller (1976) has conducted an analysis of the 1960 and 1970 census data of the United States in which he concluded that women at work have a smaller cumulative family size than women not in the labor force and that working wives who contribute substantially to family income have fewer live births than working wives who contribute less. Women in white collar occupations have fewer live births than women in other occupations. These relationships remain after controls are introduced for duration of marriage, wife's education, husband's income, and color. The relationship between employment status and live births is strongest among wives who have been married less than 10 years, who have at least high school education, and who do not have any relative living in their household. Among the other segments of the population, the employment/live birth relationship is relatively weak or even non-existent.

Blake's (1971:1181-1200) analysis of data collected from high school and college female students showed that even the desire to work is related with a lower desired family size.

It will be interesting to know why the labor force participation depresses or inflates fertility. Various reasons have been advanced to explain this relationship. Collver and Langlois (1968:55-60) describe high fertility as costly in an industrial setting, because the cost of children is measured, not only in amount of expenditure necessary for them, but also in the amount of time the mother loses from work.

In addition to the analysis of this relationship in some contexts, e.g. rural and urban or type of employment, demographers with more detailed data have paid more attention to the analysis of this relationship in the context of history or stages of employment--namely, employment before and after marriage. Several authors have theorized that labor force participation before marriage is an important socializing experience, providing young women with additional skills and role definitions which might later compete with the mother role. Westoff and Ryder (1967:313-330) reported that among the recently married women the data indicate that, after controlling for education and age at marriage, premarital employment is associated with substantially lower fertility only among blacks. However, current employment is particularly bothersome with respect to problems of selectivity. Higher-fertility women are more likely to be pregnant or to have recently given birth at the time of interview, and, for that reason, are less likely to be currently employed. Reed and Udry

(1973:597-602) concluded that there appear to be three possible causes for the inverse relationship between female work and fertility. First, females of less than average fecundity may self-select into the labor force. Second, labor force participation itself may reduce the fecundity of females. Third, working women may make conscious efforts to avoid conception. Blake (op. cit.:1195) contended that foregoing employment is an indirect cost considered by the working wife and that this indirect cost has a negative influence on the decision of the working wife to bear additional children. Furthermore, she contended that employment often entials satisfactions alternative to children such as companionship, recreation, stimulation, and creative activity, or the means to such satisfactions in the form of financial renumeration. However, for the developed societies, there is no concensus on the causes, especially with respect to the nature of the intervening variables. In particular, there has been no agreement over whether the lower fertility of labor force participants is due to the utilization of birth control within marriage, later age at marriage or possibly lower fecundity. Some explanations have been offered to explain the positive, non-existent or weak negative relationship. For example, Stycos and Weller (1967:210-17) mentioned situations in either of which the expected correlation fails to appear: 1) women have no contraceptive techniques available or 2) they find no incompatibility between participating in labor force and rearing children.

In summarizing the nature of the relationship, Weller (op. cit.: 513) stated that the relationship between female labor force participation and fertility is negative and strongest when economic rewards

associated with working are great, when it is difficult to be both a worker and a mother, when there exists some means for women to prevent births, and when there is a role orientation emphasizing individual accomplishment and de-emphasizing familism.

Some evidences from previous studies in Thailand. Using data from a one percent sample of the 1960 Thai census, Goldstein (1972:10-14) found that for the kingdom as a whole, the fertility level of women in the labor force in 1960 was 15% higher than that of women classified as housewives. When standardized for age differentials, higher fertility continues to characterize the labor force participants, but the magnitude of the differences was somewhat smaller. Examination of age specific and rural urban patterns may point to some of the reasons. The age specific data suggest that the relation between labor force participation and fertility may operate differentially for the various age segments of the population. Among the three youngest groups, between ages 13 and 29, the fertility levels of the housewives exceed those of the economically active women, but the differentials decrease with increasing age. By age 30, the pattern changes; higher fertility characterizes the labor force participants, and the degree of difference tends to increase with increasing age. The higher fertility levels of older employed women compared to the housewives may reflect several situations: 1) higher cumulative fertility may force women to work to increase family income; 2) the availability in the household of older children who are able to care for the younger may facilitate participation in the labor force; 3) for women aged 45 and over, the end of child-bearing may also facilitate labor force participation. The higher fertility characterizing the economically active women in the

kingdom as a whole does not extend uniformly to all residence categories, but shows a clearcut pattern in relation to urban-rural status. That is, in Bangkok, the most urbanized area, fertility of employed women is lower than that of housewives. In rural, agricultural places, the fertility of employed women is higher, although minimally so. This pattern suggests that the greater separation of work and family roles among employed women in the urban center lowers the fertility of urban working women, whereas the general absence of such conflict in rural society results in a minimum effect of labor force participation on fertility. Debavalya (1975:224), in his study of female labor force participation and fertility in Thailand, concludes that it appears that a negative relationship between work force participation and fertility is evident in urban as well as in rural areas, but the effect is not a very sharp one. Themajority of urban and rural female workers in Thailand are engaged in sales work and farming, respectively, occupations in which, in general, their status is that of own account or unpaid family workers. This type of employment and the conditions surrounding it leads to the compatibility of the roles of mother and worker. Herein may lie the reason why the relationship between labor force participation and fertility is less clearcut than exptected. However, when working women are divided into two groups, own account and paid family workers, on one hand, and employers and employees on the other, the pattern of fertility differentials is uniform in all residential areas. As demonstrated elsewhere, the cumulative fertility of working women engaged as unpaid workers is about the same as, in many cases higher than, that of women not in the labor force. In contrast, working women who are employees have a lower

fertility level. This consistent pattern is more pronounced in urban than in rural areas. The results from tabulation data of the Survey of Fertility in Thailand/World Fertility Survey (1977) showed that currently working women have the highest fertility (4.2 live births per currently married women), women who worked before marriage have the lowest fertility, with only 3.2 live births. Women who worked both before and after marriage, after marriage only, and never worked have the intermediate position, that is 3.9, 3.7 and 3.6 respectively. However, this pattern of relationship is not consistent when years since woman's first marriage is controlled. The relationship between fertility and women's portion of time worked since their first marriage is positive one, that is, women who worked for less than .25 have only 3.1 live births compared to 4.4 among those whose portion is .75 or more. This still holds for the shorter duration of marriage (14 years or less), while for the longer duration the relationships are inconsistent.

Fertility and Materials (Modern) Possession Score (MPS)

Study of the relationship between fertility and MPS has rarely been done, especially in developed societies where these materials (i.e. radio, television, refrigerator, etc.) are common commodities for most households. However, owning these materials in the developing societies can be used as an index of wealth and modernity. Khalifa (1973:432-436) who studied married women in Greater Cairo, Egypt, found that women who owned more modern durable goods (i.e. rice cooker, electric iron, etc.) wanted fewer and especially expected to have fewer children. This was still true when women were divided into two

age groups--wives under 45 and wives 45 or more. The only exception is that women under 45 who were high on ownership of modern durables desired more children than women in the other categories. Using data from Taiwan, Deborah Freedman (1970:25-48) has shown that families who were more modern in consumption, defined as possessing certain modern consumer durables, were more modern oriented in their behavior in general (e.g. in economic actions, education, use of family planning, engaging in more modern occupations, as well as having higher levels of family income).

In Thailand, there are a few studies which have analyzed this relationship. Using data from the Potharam Study on ownership of fourteen different items, to each of which is arbitrarily assigned a weight more or less representative of its cost or importance, Hawley and Prachuabmoh (1966:523-544 and 1966(a):319-331) called these scales "modernization scales" and related them to fertility. The results from both the 1964 and 1965 surveys did not provide a clear pattern, except that women in the highest scale tended to have less live births than women in other categories, and this held true for most age groups. The highest number of live births distributed unsystematically among other scales and age groups. Similar scales were constructed and called the "material possession score" in the Bangkhen Study (1968:5-6) where it was found that among married women aged 15-44 and 20-44, women on the lowest scale have the highest number of live births, while women on the highest scale have the lowest number of live births. For the intermediate categories, the number of live births fluctuated unsystematically. Using the Longitudinal Studies Round One, Knodel and Prachuabmoh (1973:51-54)

applied a similar technique as used in previous studies and found that differences in cumulative fertility were somewhat more pronounced and more uniform in the three age groups of women in the urban sample than in the rural sample. No consistent pattern of fertility differentials emerges among rural women. For example, women in rural households with the highest MPS had approximately average fertility among the younger, well below average fertility among the woemn 30-44, and well above average fertility among the older women. Women in urban households with the highest MPS consistently had the lowest fertility for all three age groups although the difference between the lowest and the highest MPS categories was minimal for wives aged 45 and over. In addition, in all three urban age groups, the mean number of children ever born followed a curvilinear path by rising and then falling as they passed from the lowest MPS category to the highest.

Fertility and Income

Analysis of the long-term trends in fertility has shown that from the beginning of the industrial revolution to the Second World War the secular rise in income level was associated with a secular decline in fertility. However, also in this period, short-term changes of income level connected with business cycles tended to be positively correlated to fertility. After the Second World War the long-term tendency for the decline in fertility to be associated with the rise in income level seemed to have changed in the economically most developed societies, as fertility rose, then remained more or less stable parallel with the continuous rise in the level of per capita income. The decline in fertility in the second half of the 1960's, however,

seem to reverse again the long term tendency. This recent decline can be interpreted either as a return to normal association of socio-economic development with a declining fertility, or as a consequence of economic insecurity and a slow rise of income level in the economically most developed countries (Andorka 1978:234).

Some evidence from developing societies. Mkangi (1977:176-177) studied the relationship between poverty and fertility among the Wataita of Kenya and found that as the annual per capita income increases, the average number of dependent children decreases, except for the household with the highest income, in which fertility is higher than in the group just below them. Driver (1963:95-97) studied fertility of women in Central India and found women's fertility differed by their husband's annual income but there is no regular pattern of this relationship. Women whose husband's earning is in an intermediate level had the highest fertility, while women whose husbands earned the lowest and highest income had the same number of children ever born. Khalifa studies (1973:432-37) of the couples in Greater Cairo, Egypt, found that among wives aged 45 or more, the relationship between ideal, completed fertility and income clearly inverse. However, for wives aged under 45, the relationship pattern changed, that is, women with medium (family) income have the lowest ideal, and expected completed fertility, instead of the high income group. A study of ever-married men age 21 to 60 in Monterrey, Mexico, found a negative association between weekly per capita family income and mean number of live births, whether or not the factor of age is controlled. The differences in mean number of live births between the lowest and highest income groups was more than 2.5 children. When the mean

number of live births is standardized for age, the inverse association becomes even more pronounced. In terms of the difference in mean number of live births between the extreme categories, the income differential is substantially larger than either the occupational or the educational differential (Zarate 1967:102-103). On the basis of a more detailed analysis of Santiago data, Tabah and Samuel (1962:281) suggest that fertility may be more closely associated with income than with education. Using aggregate cross-national data, Friedlander and Silver (1967:30-70) divided nations into developed (N = 18), intermediately developed (N = 20), and underdeveloped (N = 85) categories, they found a positive relationship of per capita income to crude birth rate for the developed countries, a fluctuating and non-significant relationship for intermediate countries, and negative relationship for underdeveloped countries. The results of a community study in Central Java, Indonesia indicated that the relation between measure of income and average number of children ever born and still living for ever-married women in each age group is consistently positive. In the later age group there was an average difference of between one and two children between women in the upper and the lower income group. In addition to this, it is interesting to add that percent of women in the upper income level who had ideal family size larger than actual family size was much smaller than women in the lower income group (24 vs 64). Conversely, 48% of women in upper income level wanted an ideal family size smaller than their actual family as compared to only 8% among women in the lower income group (Hull and Hull, 1977).

Some evidences from developed societies. Edin and Hutchinson

combined individual data from the 1920 census and from the vital statistics of 1910-20 of Stockholm with data on income of husbands and their occupation. Unstandardized number of births per 1,000 married-women-years showed a U-shaped relation. When the data were standardized for marriage duration and age of parents, the relation became more clearly positive (in Andorka 1978:237-8). Moors (1974:73-4) studied cohorts of Dutch women who married in 1958, 1963 and 1968 and found the relationship between the prosperity score (as an index for income differential) difficult to interpret in the case of the 1958 and 1963 cohorts. However, everything seems to point in the direction of a positive association for the 1968 cohorts. The American Survey of fertility has also dealt with the relation of fertility to income. The original results of the Indianapolis survey showed a negative relation of fertility to income with a slight rise in the fertility of the highest income group as compared to the second highest (Kiser and Whelpton 1953:376). Godlberg (1960:23-36) and Duncan (1965), in re-analyzing the results, found that if couples with farm backgrounds are neglected, a clear positive correlation of fertility to income appears. D.S. Freedman (1963:414-26) re-analyzed the data of the GAF by taking into consideration the following economic variables: husband's absolute income, his relative income, wife's income, years the wife worked since marriage, wife's labor status, wife's future work expectation. Couples married for five to nine years and married for ten and more years were analyzed separately. In the former group neither absolute nor relative income of the husband showed any significant correlation to fertility. However, in the latter group, i.e. those married for ten or more years, absolute income level showed a

weak negative correlation, while relative income level of the husband was rather strongly positively correlated to fertility. Using the 1960 fertility study, Whelpton and others (1966:103-106) found that within most of the socio-economic classes differentiated in (their) study a slight inverse relationship betwee wives' family size expectation and their husbands' income. When wives are classified on the basis of the family's income instead of the husband's income alone, we find that the relationship between fertility expectations and income is stronger, although the pattern of association is still irregular. The difference between the average most likely expected numbers of births for the highest and lowest income groups is 0.4 when family income is used as compared with only 0.1 when husband's income is used. Powers (1965-66: 474-76), using data from the 1960 census of the United States, found that fertility of married women (both white and non-white) aged 35-44 was inversely related with family income, except for the white women in the highest income group who had slightly higher number of children as compared to the second highest group. Ritchey and Stokes (1971:369-377), using data from 1967 Survey of Economic Opportunity, found that regardless of the status indicator used (family income, education of husband, and occupation), cumulative fertility was inversely associated with the status in the total rural population. On each of the status factors, the lowest fertility was found in the highest categories. Conversely, the highest rates located in the lowest category on each factor. The overall relationship was clearly inverse, although some fluctuations were found in the intermediate categories on the status of ranking. For the urban women, age 35-44, fertility is inversely related to socio-economic status on all three indicators.

In the lowest income levels, fertility rates were comparatively high (3,297 and 3,559 respectively), while in the higher income ranges they are considerably lower. Cho (1968:198-211) using the 1960 census on own children, summarized that he found three differentials in fertility by income. First, in family income for native white women who were not in the labor force, fertility differentials were very small, and there was no definite pattern of differentials. This was the case, moreover, in the urbanized areas and in rural areas. For Negroes, however, there was very sharp inverse relationship between family income and fertility. This relationship was weaker in urbanized than in rural areas. Native white women in the labor force, except those in the three highest income brackets who were less fertile, showed negligible difference in fertility. However, for Negroes, the relationship between family income and fertility tend to be a simple inverse one, and this relationship was weaker in urbanized areas. Second, for income of husband for native white women, although fertility differentials were small, there was a visible relationship between income of husband and fertility, and this was somewhat stronger in urbanized than in rural areas. For Negro women, however, there was an inverse relationship, and the fertility differentials were smaller in urbanized than in rural areas. Third, for income of employed women for native whites as well as Negroes, women in both ends of the income scales showed higher fertility than did those in the middle, to form a roughtly U-shaped curve. Finally, Cho concluded that the traditional inverse relationship between income and birth rate no longer held among whites, and that even among Negroes, the previously well-established inverse relationship seemed to be heading toward some

modification. A recent comparative study of fertility and family planning of twelve national surveys by the United Nations (1976:51-2), with some qualifications, found the following emerge:

> As a rule, a strong positive correlation is found between income and fertility in families with relatively high educational attainment...In Belgium, this pattern applies also to other educational levels; but in other countries, no clear pattern emerges...

Some evidences from previous studies in Thailand. Using the data from the Survey of Fertility in Thailand (1977:134), it is found that fertility (number of births in the past five years) is inversely related to the level of family income. This is still true for most age groups, except women in age group 20-24, where the relationship seems to be a positive one.

Fertility and Socio-Economic Status (Multiple Variable Index)

The relationship between socio-economic status (SES) and fertility has been noted so frequently in both the writing of demographers and the discussion of laymen, it hardly seems possible that there could be any further discussion of the issue. "As SES increases, the level of fertility decreases," is simply the scientist's way of expressing the old cliche that ends, "and the poor get children." The scientific and the popular statement are partially valid, but they must be qualified (Kammeyer 1971:105-106). Notestein (1953:271) stated: "True, in every age of human history, students have observed the failure of the 'upper classes' to reproduce as rapidly as the 'lower classes.'"

Some evidences from developing societies. It has been argued that an exception to the usual inverse relationship between fertility and

status may be found in developing societies, where numerous progeny are seen as good. For example, the study of social class and preferred family size of currently mated women in Lima, Peru found that women in class A (considered as the highest SES) preferred the highest number (4.6 children) and women in class D (considered as the lowest SES) preferred the lowest number (4.0). Women in classes B and C preferred 4.3 and 4.1 children respectively. Stycos concluded that lower-class Lima women desire fewer children and are more sensitive to the economic implications of additional children than are upper-class women with the same number of children (1968:147-161). Davis (1951:78) reported in his analysis of the Indian population that a study was conducted among an exclusively rural sample of 275 Punjab villages, and that there was some tendency for the higher-status villagers in agriculture to have higher fertility. However, the fertility of school teachers, priests, clerks and menials did not conform to this pattern, but showed the more familiar relationship between high status and low fertility. Using caste as the basis for class in India, Rele (1963:184-185) divided the couples in the sample into four classes--Class I to Class IV, and found that the social classes differed in their fertility performance. However, fertility differentials are almost absent for marriage duration up to 15 years. But, for later durations (15 years and over) the differentials are rather marked. Fertility is the lowest in Class I, rises progressively through Classes II and III, and is highest in Class IV. Hull and Hull (1977) used 1971 census data, 1973 Fertility-Mortality Sample Survey, and a Community Study in Central Java, Indonesia and concluded that both the Census and

Fertility-Mortality Survey provide substantial prima facie evidence supporting the hypothesis that the well-to-do in Indonesia exhibit higher fertility than the poor. For the Community Study they stated that once again a positive relation was found, with the characteristic that the fertility rates of women in the lower income groups have a lower peak, and fall off faster, than those of women in the upper income group. This positive relationship still remains, even controlling for stability of union. Khalifa (1973:431-442) studied women in Greater Cairo, Egypt, concluding that socio-economic status and modernization prove to be very good predictors of fertility.

While a positive association between economic status and fertility may prevail in some traditional peasant societies, there is also evidence that the opposite occurs. For example, the Nambudiri Brahmins, a rich, land owning caste in Southern India, have exercised great control over the number of their offspring. Large numbers of children would force them to divide their estate, causing them to lose some of their economic and social advantage. To avoid this result they restrict fertility severely, and when necessary, resort to infanticide (Douglas 1966:271). Rizk studied fertility trends and differentials in Jordan, divided SES into three classes--class one being the highest and class three, the lowest. He found that following the first duration of marriage, the data showed a definite inverse relation between the average number of live births and the status of the women. This relationship is pronounced between class one and the other two classes, but unimportant between class two and class three. Toward the end of reproductive life (duration 25 to 29 years), the average

fertility per woman is 6.4 live births for class one, 8.7 for class two and 9.0 for class three (1978:121-22).

Some evidences from developed societies. A considerable amount of demographic literature has been devoted to the study of the relationship between socio-economic status (SES) and fertility of developed societies (i.e. Westoff et. al., 1963; Kiser et. al., 1968). Various studies have shown that the traditional inverse association between SES and fertility, in existence for many years in the United States, has diminished considerably since the 1930's. Mayer (1959:605-628) has considered this contraction to be symptomatic of the general narrowing in class differences as a result of the universal adoption of middle class small family values. Describing the relationship in historical perspective, Wrong (1958:216-229) reviewed the experiences of several Western European countries, plus Australiz, Canada, and the United States, and concluded that the year 1910 was a significant historical turning point in the relationship between social class and fertility, while there had been a long-term tendency for the lower social classes to have higher fertility than the higher social classes, the trend changed. It was not until the beginning of a rapid decline in fertility in about the year 1870 to 1880 that the relationship became pronounced. The inverse correlation of fertility and socio-economic status (higher class--lower fertility) was probably more marked in the period between 1870-1910 than it has evern been before or since in Western civilization. After 1910 there was much less uniform pattern in the relationship between class and fertility. Wrong (1960:40-45) used the 1951 census of England and Wales and grouped women into five social classes and mentioned that the bar

diagram showed class fertility differentials increasing with increasing marriage duration, and also indicated a more marked and regular inverse relationship between fertility and class at the two longest durations. Clifford, II (1971:44), studying 275 women in Lexington, Kentucky, classified the women into three categories of SES--low, medium and high--and summarized that the number of children the wives considered ideal for the average American family, the number they actually wanted to have at the time of interview, and the number expected, all tended to be higher for the lower status wives than for those with a higher status. The differences between high and medium status wives, although not as clear, tended to be in the expected direction. In addition to this, the higher status couples were found to have a smaller proportion of unplanned births than lower status couples. Kupinsky (1971:358-59) analyzed data from the 1/1,000 sample from the 1960 United States Census and the 1960 Growth of American Family Study, and found the association between the multivariable index of SES and fertility is clearly negative, both for the GAF and Census sample. This inverse pattern is evident within each age distribution of both samples, with the only exception occurring among those 18-19 of the GAF sample, in which there are too few cases among those of high SES to discern a definite pattern. Using data on occupation, education, and income of the 1960 U.S. Census, Power (1965-66: 475) constructed a multivariable socio-economic score and then related them to fertility. She found that the number of children per thousand married women (aged 35-44) varied inversely with socio-economic status level as measured by the socio-economic status. Women in the lowest fifth of the range of SES score had almost twice as many children as

those in the top fifth, 4,205 per thousand, compared with 2,367. However, very little variation in chlidlessness by SES level was found.

Previous studies in Thailand. Even though a single-variable SES index (i.e. education, etc.) and fertility have already been studied, the relationship between composite SES index and fertility have rarely been studied, because it is difficult to construct a satisfactory index. Using the data from Longitudinal Studies Round One, Pitaktepsombati (1974) used a subjective index of SES to relate to fertility, and found an inverse relationship. However, there were some irregularities.

Hypotheses

Based on the review of literature, the following specific hypotheses are formulated for testing.

1. Women or couples with certain background characteristics--younger age, married later, shorter duration of marriage--should have fewer live births than women who are older, married at a younger age, and have longer duration of marriage.

2. Women or couples with certain background characteristics--higher education, Thai ethnic--should have fewer live births than women who have lower education, belong to other ethnic groups.

3. Women with certain background characteristics--were born in urban areas, ever lived in, or lived in urban areas longer--should have fewer live births than those women who were born in rural areas, or never lived in urban areas.

4. Women with certain background characteristics--better occupation

higher income, possess more modern items, higher socio-economic status--should have fewer live births than women with lower occupation, income and socio-economic status, and women who possess modern items less.

5. Women with higher numbers of infant deaths should have more live births than those with fewer numbers of infant deaths.

6. Women who ever worked for a wage before and/or after marriage should have fewer live births than those who never worked or worked without a wage.

7. Women with more modern values, attitudes and practices--want their daughters to choose their own mates, want to deliver baby or usually deliver babies at modern facilities, know more about contraceptive methods, have a positive attitude toward family planning, talk about family planning with husband more often, are exposed to mass media more often--should have fewer live births than those with traditional values, attitudes and practice.

8. Women whose husbands have changed occupations should have fewer live births than women whose husbands have never changed their occupation.

9. Women or couples who are in favor of small families (2 children) or not in favor of large families (5 or more children) or generally desire fewer children, should have fewer live births than women who are not in favor of small families or are in favor of large families or who desire a larger number of children.

10. Women who want to depend on their children at old age should have more live births than women who do not want to depend on their children.

11. Women who ever practiced or are practicing family planning should have more live births than those who never practice it at all.

CHAPTER III

DATA METHODS AND HYPOTHESES

Data Sources

The present study is based on the data collected from the Longitudinal Study of Social, Economic and Demographic Change in Thailand, Round Two, from both rural and urban samples conducted in Summer (April-May) 1972 and 1973 respectively. These two surveys were the follow-up surveys of the first round surveys which were conducted in Summer 1969 and 1970. The second round samples consist of the following: 1) All former respondents who could be found, 2) new respondents in households which had been part of the first surveys as long as they qualified for inclusion, using the same criteria as were used in the first round, 3) appropriate residents of a supplemental sample of new addresses chosen from the list of houses (rural) or block map (urban) used to select the first round samples. In the rural sample, about 1,448 households were selected for interviewing, and approximately 2,153 females and males were interviewed, directly or indirectly. In 1973, about 1,585 households in urban areas were selected and about 3,153 females and males were interviewed.

The interview schedules used in the 1972 and 1973 surveys were modified versions of the questionnaire used in the first round surveys. Although most questions were retained, some were excluded either because they were judged to be unsuccessful or they referred to permanent characteristics.

The second round samples, of both rural and urban survyes, consist of all appropriate residents of households included in the first round, plus residents of houses selected to be part of the sample of new houses (for a full description of the Longitudinal Study see Prachuabmoh et. al. 1971; Prachuabmoh et. al., 1973; Goldstein, 1978).

The Distinction Between Rural and Urban*

In the present study, considerable emphasis will be given to rural-urban comparisons of fertility patterns in Thailand. The Longitudinal Study has been especially designed to facilitate such a comparison. Previous reports based on data from the first round Longitudinal Study (e.g. Prachuabmoh, et.al, 1972; Knoedel and Pitaktepsombati, 1973) or from the 1960 census (e.g. Goldstein, 1972a) have shown that substantial differences exist between the rural and urban populations in Thailand with respect both to fertility and to the social, economic and cultural factors which are commonly thought to influence fertility. It has long been recognized that the socio-economic forces at work within an urban setting differ sufficiently from those operating within a rural context to result in observably different ways of life. In addition, the interaction among these forces may differ in rural and urban environments. Nevertheless, it is important to bear in mind that rural and urban populations do not live in complete isolation from one another, and in any given society there are a large number of values, customs and living conditions which they share in common. In most instances it is probably more correct to speak of differences in degree rather than kind. As a result, any operational definition

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*This selection draws from Knodel and Prachuabmoh (1973).

designed to distinguish rural from urban must to some extent be artificial. In this study the distinction is made primarily for heuristic purposes and is not intended to imply that a completely cut and dried division of the Thai society exists in reality. Furthermore the emphasis on rural-urban contrasts should not obscure the fact that Thailand is a predominantly rural country. The vest majority of the population lived in the countryside at the time of the survey and will continue to live there for some years to come. The process of rapid urbanization which is clearly underway, however, suggests that the patterns of fertility behavior of the urban population today may well indicate the directions towards which an increasing proportion of the rural population will change in the coming decades.

No single definition of rural and urban, for statistical purposes, can satisfy all the needs of the social scientists. International comparisons of rural and urban populations have constantly been plagued by uncertainties stemming from definitional differences, and even within the same country it is often doubtful whether a particular criterion has the same meaning in different regions. In Thailand certain localities are legally designated as municipal areas on the basis of population size, density, revenue capabilities and ability to perform certain governmental administrative functions. However, since every province must have at least one municipal area, the provincial capital is designated as a municipality regardless of the normal population requirements, although at present the large majority of provincial seats have a population size larger than the minimum otherwise required by law. A more detailed description of the legal definition of municipal areas in Thailand is presented in a previous report

(Prachuabmoh, et. al., 1972, Appendix B).

Although all municipal areas have at least some characteristics which might generally be considered as urban, they still vary considerably with respect to just how urban they actually are. Some are quite rural in character. Others have boundaries which extend far beyond the built-up area normally associated with a town or city, and thus incorporate a sizable proportion of effectively rural dwellers. In addition, the rurality of the population living outside of municipal areas varies as well. Most real towns are designated as municipal areas and very little, if any, of the non-municipal area can be considered suburban in the modern sense. However, there are some areas, in particular those designated as "sanitary districts", that are not designated as municipalities which are perhaps more urban in nature than some of the official municipal areas. Also, the proximity of a rural area to an urban center very likely exerts some influence on its way of life and hence rural areas which are particularly close to the Bangkok-Thonburi metropolis are probably substantially different from the more remote rural hinterland. In general, however, municipalities defined as such legally are probably largely the same ones that would be defined as urban places using most academic definitions. For convenience sake, in this study, we will consider as the urban population as all residents of municipal areas. The remainder of the population will be considered rural.

Operationalization of Variables

A. The dependet variable--the measure of fertility--will be represented by the number of live births (children ever born) to women.

Level of fertility will be treated as both interval and ordinal levels. It will be used as an interval level by deleting all numerical answers in the crossbreak and regression analysis. It will be used as an ordinal in cross-tabulation analysis.

B. The independent variables used in the analyses include the following groups of variables.

1. Background variables consist of the following variables.

Age is the age at the last birthday.

Age at first marriage is the age when women first married.

Total duration of marriage is number of years women spent in marital union.

Education is the highest grade attained. It will be classified according to conventional names, including no or little education (0-3 yrs.), primary education 4-6 yrs.), secondary school 7-11 yrs.), high school education (12 yrs.), and college 1 yr. or more. Numbers in parenthesis indicate approximate years of schooling.

Ethnicity will be classified as Thai, Chinese, Thai-Chinese, other, don't know.

Place of birth will be dichotomized into rural and urban.

Experience living in urban areas will be based on questions: Have you ever been in an urban area and for how long? The categories used in the tables are: Yes or No; less than 1 yr., 1-4 yrs., 5-9 yrs., 10 yrs. or more and don't know.

Husband's occupation is the main occupation of a woman's husband. It will be represented by types of occupation and types of employment. Types of occupation will be classified as manual, non-manual, craftmanship, farm related occupations, other and not working. Type of

employment will be divided into self-employed, family employed, private and governmental employed, other and not working.

Ownership of modern items will be based on the question: Do you have these items (20 items)? In crossbreak analysis, the responses will be divided into owning 1, 2, 3, 4, 5-9, 10 or more items. In addition, each item will be assigned a score and then added together to get a total material possession score. The score will range from 0-9, 10-19, 20-29, 30-39, 40-49, to 50 or more.

Income is based on the direct question: What is your monthly income? It will be categorized as following: less than ฿1,000, ฿1,000-1,999, ฿2,000 or more, don't know. (approximately ฿20 = $1)

Socio-economic status of the household will be based on the judgment of the interviewer, who not only asked a series of socio-economic questions, but also observed household environment. It will be classified as very poor, poor, average, and rich.

2. Infant mortality is the number of children who died before age one. It will be categorized into 0, 1, 2 or more, or 2, 3 or more.

3. Women's labor force participation will be based on the question: Did you ever work for wage or salary before or after marriage? The responses will be classified into yes vs. no or yes with a wage, yes without a wage, never worked. In addition, place of work--home, outside home--will also be considered.

4. Modernity will be represented by several questions, those are:

Exposure to mass media--reading a newspaper and listening to the radio--the responses will be classified as: often, not often, never.

Number of contraceptive methods known by women. Responses will be classified as 0, 1, 2, 3 or more in rural analysis and as 0, 1-2, 3-4, 5 or more in urban analysis.

Attitude toward family planning is the response to two types of questions: 1) Indirect question--If you knew a simple and harmless method of preventing too frequent pregnancies or having more children than are wanted, would you approve or disapprove of a couple using that method. 2) Direct question--Do you approve of family planning? The responses to these questions will be classified as: Approve, disapprove, depends, don't know, no answer and do not understand "family planning".

Regarding talking about family planning with their husbands, women were asked if they ever talk about family planning with their husbands and how often? The responses will be classified as often, not often, never talked.

Regarding mate selection for their daughters, women were asked: Suppose their daughter was going to marry, who would choose a mate for them? The responses to this question will be classified as: by parent, by daughter alone, by daughter with parent's consent, and by parent with daughter's consent.

Place and by whom women usually delivered their babies. Women were asked: Where do you usually deliver your babies? and usually by whom? The responses to where will be classified into two groups--home as compared to a health center, hospital or clinic. The responses to "by whom" will be classified as follows: themselves, midwife, public-health midwife, nurse, doctor. In addition, questions on desired place and by whom were asked; similar categories of responses will be applied.

5. Change in occupation of husbands since they were 25 years old was assessed by comparing husbands' occupations when they were 25 years old and their present occupations. Responses will be classified as from agriculture to non-agriculture, from non-agriculture to agriculture, from either occupation to not working now, not working when age 25 to working now, never changed occupation.

6. Regarding old age support, women were asked: Do you think you can be supported by your children in your old age? If yes, do you want to be supported? Among women who responded "yes" to the former question, their second responses will be classified as follows: yes, no, don't know, not sure, depends on children.

7. Regarding attitude toward a few or many children, women and men were asked about their attitude toward having few (2) and many (5 and more) children. The responses will be classified as advantageous, disadvantageous, both, neither, don't know, no answer.

8. Desired number of children. This will be based on this question: If you could choose the number of children you want, how many would you want? The responses will be classified as: 0-2, 3-4, 5-6, 7 or more, don't know, no answer and non-numerical answer.

9. Contraceptive practice, responses will be grouped as currently practicing, ever practiced, never practiced.

C. The controlled variable. The relationship between live births and the independent variables will be measured by controlling women's total duration of marriage. The reason for using women's duration of marriage as a controlled variable is because in societies where practicing of birth control was not prevalent, especially in rural areas, universally marry, marry at early age and a few incidences of marital

dissolution (Prachuabmoh et. al. 1973), women's duration of marriage should play very significant part in their fertility. Since duration of marriage is the product of current age and age at first marriage, controlling by duration of marriage may equal to controlling by current age and age at first marriage simultaneously.

Methods of Analysis

In analyses of the data, these techniques will be adopted.

1. In order to assess the relationship between socio-demographic and economic factors and fertility, the cross-break technique, which provides an arithmetic mean of live births, will be used as the main instrument. Cross tabulation will be used to provide statistics--chi-square and gamma. Both statistics are appropriate since gamma provides information on the strength of relationship and X^2-test indicates the significance of the relationship.

2. In developing a regression model, the results from the cross break and cross-tabulation analyses earlier will help in choosing what variables (only those significantly related to fertility) to be put in the multiple regression equation in order to assess the "total effect" (R^2) and the effect of each variable (by regression coefficient- b or B) on fertility.

CHAPTER IV

ANALYSIS OF DATA

This chapter contains two major sections. The first section is a descriptive study of the relationship between socio-demographic and economic variables and fertility. Specifically, it will consist of a series of tables of the mean number of live births related to the one or two independent variables, with a woman's total duration of marriage as the controlled variable. Two statistics, X^2-test and gamma, will be used to show the significance and the strength of the relationship between the independent variable(s) and live births. A gamma of 0.15 will be used as the criterion for selecting independent variables. These selected variables will be analyzed in the second section. The second section is the quantitative study of the effect of socio-demographic and economic variables on live births.

Analysis of the Relationship Between Socio-Demographic, Economic Variables and Fertility: A Descriptive Analysis

The major aim of this section is to analyze the relationship between independent variables and live births descriptively. The variable(s) which are significantly related to fertility will be analyzed in the second section. In addition, a general comparison between the results of this study and the 1969 and 1970 round one surveys will be made.

Age, duration of marriage and live births. Each ever-married woman interviewed in the Longitudinal Study was asked in detail about

her pregnancy history. From this information a number of measures of fertility could be constructed, i.e., number of children ever born, number of living children and other measures.

Table 4 demonstrates a relationship between age and live births, duration of marriage and live births. Analysis shows that age and the duration of marriage on the one hand, and live births on the other have a strong, positive and linear relationship. Specifically, when the age of women increased, the number of live births borne by those women increased sharply in both rural and the urban samples. This is strongly substantiated by gammas of 0.64 and 0.57 in the rural and urban samples, respectively. The gammas indicate a stronger influence of age on live births for the rural areas as compared to the urban areas. Likewise, duration of marriage inserted influence on live births in the same manner as age did. The duration of marriage seems to bear stronger influence on live births than age. This is evident from gammas of 0.77 and 0.74 in the rural and urban samples. Women who didn't know their duration of marriage (because no information on age at first marriage was available) produced a number of live births in between those of women with a duration of 5-9 years and 10 or more years. The mean number of live births for rural women is 5.08 compared to the mean number of live births for urban women of 3.97. Thus, rural women, 1.11 children or 28% more live births than urban women. The difference in live births among women who were in the earliest period of their reproductive lives (aged 15-24) as compared to those who were in the latest period of their reproductive lives (aged 45 or more) is much wider among rural women (7.00-1.30 = 5.70) than among urban women, (3.97-1.28 = 1.69). That is, in rural areas, number of

Table 4. Mean number of live births by age group and total duration of marriage--ever-married women.

Age	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
15-24	0.96 (212)	2.37 (63)	* (2)	* (1)	1.30 (278)
25-34	1.41 (64)	3.19 (167)	4.66 (217)	* (4)	3.65 (452)
35-44	1.27 (11)	3.92 (13)	6.47 (459)	* (9)	6.24 (492)
45 or more	* (2)	* (8)	7.22 (516)	5.70 (61)	7.00 (587)
Total	1.11 (289)	3.02 (251)	6.46(1194)	5.37 (75)	5.08(1809)
Urban					
15-24	0.97 (234)	2.53 (59)	* (1)	* (2)	1.28 (296)
25-34	1.21 (163)	2.63 (248)	3.99 (231)	2.73 (11)	2.76 (653)
35-44	1.52 (23)	2.65 (51)	5.12 (547)	3.75 (20)	4.75 (641)
45 or more	* (8)	2.58 (12)	5.80 (577)	5.25 (60)	5.64 (657)
Total	1.10 (428)	2.62 (370)	5.21(1356)	4.54 (93)	3.97(2247)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between age and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between age and live births) 0.64 (rural)
0.56 (urban)

X^2-test (between total duration and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between total duration and live births)
0.77 (rural)
0.74 (urban)

live births for women aged 45 or more were 5.4 times higher than for women aged 15-24 as compared to 3.1 times in urban areas. The similar relationship holds for comparisons in duration of marriage. That is, the live births of women with the longest duration of marriage (10 years or more) were 5.8 times the live births of women with the shortest duration (less than 5 years) in rural areas, as compared to the 4.7 times more in urban areas.

The original relationship between age and live births, when duration of marriage is controlled, is generally maintained. That is, in each duration of marriage, the number of live births increases by age. One exception is among rural women aged 35-44 years, whose duration is less than 5 years. For this group, live births decreased instead of increased with age. This may be due to the combination of marriage at a later age and the complications of pregnancy at that age, i.e., initial conception and carrying to term, particularly because facilities to help rural women to cope with these problems are insufficient.

Finally, the positive relationship between age and live births and that of duration of marriage and live births as found by the present study is the same as the results of the 1969 and 1970 surveys. It also confirms the hypothesis. That is, the results of both rounds of surveys found a linear, positive and strong relationship between age and live births and duration of marriage and live births.

Age at first marriage and live births. It is generally known that men and women marry later in the city than in rural areas. This is also true for Thailand. The average age at first marriage of rural women is about 20.6 years compared to 21.7 years among women who live in Bangkok-Thouburi. This may reflect a whole complex of

social and cultural differences. Certainly one factor that plays a role is the tendency among urban dwellers to seek higher education. It may also reflect an attitude within certain sectors of the urban population thatmarriage should be postponed until one has sufficient financial or professional security, or at least favorable prospects. Whether this is consciously intended or not, the extra years used for work or study prior to marriage and raising family surely have an effect on fertility for the individual involved.

Results from Table 5 show a steady decline in the number of live births when age at first marriage of women increases in both rural and urban areas. The declining of live births according to the rising of age at first marriage of women is quite significant. For example, the difference of live births between the earliest and the latest age of marriage for rural women is about 2.7 children or 46% (5.9 - 3.2 = 2.7). This declining rate is even faster--57%--in urban areas. This conclusion is supported by a gamma of -0.30 in urban areas and -0.18 in rural areas. The relationship between these two variables is significant at the 0.00 level for both samples. Among women who were the same age at first marriage, those in rural areas still generally had higher live births than urban women. For example, among women who married at age 30 years or later, rural women had 2.3 live births, compared to only 2.1 live births among urban women.

When duration of marriage is taken into account, the following findings are noted in contrasting live births among rural and urban women. For those who have been married less than five years there is no significant difference in live births due to age. For example, both rural and urban women who married at an age of less than 20 years

Table 5. Mean number of live births by age at first marriage and total duration of marriage--ever married women.

Age at First Marriage	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Lt 20	1.2 (143)	3.0 (139)	3.8 (646)	6.6 (30)	5.4 (958)
20-24	1.0 (109)	3.1 (87)	6.4 (456)	4.7 (26)	5.0 (678)
25-29	1.0 (25)	2.9 (24)	5.0 (75)	* (2)	3.8 (126)
30 or more	1.2 (13)	* (7)	3.6 (22)	* (3)	2.4 (45)
Total	1.1 (290)	3.0 (257)	6.5(1199)	5.3 (61)	5.1(1807)
Urban					
Lt 20	1.2 (133)	2.7 (132)	5.8 (624)	5.2 (37)	4.7 (926)
20-24	1.1 (181)	2.7 (141)	5.1 (533)	4.0 (35)	3.9 (890)
25-29	1.1 (89)	2.5 (74)	3.8 (155)	* (7)	2.7 (325)
30 or more	1.0 (25)	2.3 (24)	2.6 (46)	* (2)	2.1 (97)
Total	1.1 (428)	2.6 (371)	5.2(1358)	4.5 (81)	4.0(2238)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between age at first marriage and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between age at first marriage and live birth) -0.18 (rural)
-0.30 (urban)

have a mean of 1.2 live births compared to 1.0 (rural) and 1.2 (urban) live births for women who married at an age of 29-29 years. The similarities may be due to the fact that women, regardless of their age at first marriage, tend not to avoid pregnancy in the earlier life of their marriage. However, a negative relationship was found between age at first marriage and the number of live births for marriages of the longer duration periods of 5-9 years and 10 years or more. The partial relationships generally conform to the origianl one. The results of this study also confirm the hypothesis of negative effect of age at first marriage on live births. It should be interesting to combine the effect of age at first marriage of women (wives) and men (husbands) on women's fertility. Results from Table 6 seem to again confirm the hypothesis. That is, couples with the lowest age (less than 20 years) at first marriage have the highest number of live births-6.1 children for rural couples and 5.2 children for urban couples. Conversely, couples with the highest age at first marriage (aged 30 years or more) had the lowest live births--2.7 children for rural couples and 2.2 children for urban couples. The number of live births decline sharply and regularly when age at first marriage increases. Other interesting points provided by the data include the following: 1) In rural areas, the age at first marriage for both husbands and wives has a stronger combined effect on reducing live births than the effect of wives age at first marriage alone. As mentioned earlier (from Table 5), wives' age at first marriage, from the lowest to the highest duration of marriage, reduced live births by about 46%. When the wife's and husband's age at first marriage are combined, it reduces live births by about 55%. This indicates the additional

Table 6. Mean number of live births by wife's and husband's ages at first marriage.

Husband's Age at First Marriage	Wife's Age at First Marriage				Total
	Lt 20	20-24	25-29	30 or more	
Rural					
Lt 20	6.1 (124)	5.5 (32)	4.8 (10)	* (2)	5.9 (168)
20-24	5.9 (382)	5.4 (285)	3.4 (25)	* (7)	5.6 (699)
25-29	5.9 (130)	5.2 (161)	4.4 (49)	2.8 (12)	5.4 (352)
30 or more	5.8 (49)	5.7 (49)	4.2 (26)	2.7 (19)	5.1 (143)
Total	5.9 (685)	5.4 (527)	4.2(110)	3.6 (40)	5.5(1371)
Urban					
Lt 20	5.2 (226)	5.2 (18)	* (4)	* (3)	5.1 (251)
20-24	5.0 (312)	4.2 (357)	2.7 (28)	* (4)	4.5 (701)
25-29	4.6 (185)	3.7 (259)	3.0(156)	2.8 (12)	3.8 (612)
30 or more	5.0 (61)	3.7 (105)	2.9 (93)	2.2 (65)	3.4 (324)
Total	5.0 (784	4.0 (379)	2.9(281)	2.3 (84)	4.2(1889)

effect of husbands' age at first marriage. 2) In urban areas, husband's age at first marriage does not provide any additional influence on reducing fertility. The percent reduction in live births (from 5.2 to 2.2 live births) in Table 6 is only 58% compared with 57% (in Table 5). With the same age at first marriage, the women had less live births than the wives of the men. This indicates women's age at first marriage has more negative effect on live births than men's age at first marriage. There are other data to support this. For example, if women married at an age less than 20 years and their husbands' age at first marriage was 20-24 years, these women had 5.9 live births. However, when the ages were reversed, that is, the women married at aged 20-24 years and their husbands married at an age less than 20 years, these women had fewer live births--only 5.5 children. See Table 6.

Finally, the relationship between women's age at first marriage and fertility determined by the present study confirm the linear and reverse relationship found by the 1969 and 1970 surveys.

Education and live births. Educational attainment of the population in rural and urban areas based on the Longitudinal Study clearly indicated that the urban population receives substantially more schooling than the rural population, males receive more schooling than females, and the younger generation is receiving more schooling than their elders did (Prachuabmoh et. al., 1973). The relationship between the educational level attained by ever-married women and their live births is presented in Table 7.

Results from Table 7 confirm the hypothesis of reverse, linear relationship between these two variables. That is, in both rural

Table 7. Mean number of live births by education and total duration of marriage--ever-married women.

Education	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
No, Lt. Primary	1.1 (32)	3.4 (61)	6.8 (658)	5.5 (59)	6.2 (810)
Primary	1.1 (236)	2.9 (185)	6.1 (516)	4.4 (14)	4.2 (951)
Secondary or more	1.0 (19)	3.1 (10)	5.3 (17)	* (0)	3.0 (46)
Total	1.1 (287)	3.0 (256)	6.5(1196)	5.3 (73)	5.1(1807)
Urban					
No, Lt. Primary	1.2 (39)	3.2 (56)	5.9 (562)	4.9 (58)	5.4 (715)
Primary	1.1 (233)	2.6 (195)	5.0 (594)	4.3 (30)	3.7(1052)
Secondary	1.1 (102)	2.4 (76)	4.1 (144)	* (6)	2.7 (328)
High school	1.0 (32)	2.4 (20)	3.1 (28)	* (0)	2.1 (80)
College	1.0 (21)	2.3 (24)	2.3 (28)	* (1)	1.9 (74)
Total	1.1 (427)	2.6 (371)	5.2(1356)	4.5 (95)	4.0(2249)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between education and fertility)
sig. at 0.00 (rural)
0.00 (urban)

Gamma (between education and fertility) = -0.41 (rural)
-0.46 (urban)

and urban samples, women with less education had a higher number of live births than women with higher education. For example, rural women who had no education or less than primary education had 6.2 live births compared with urban women of 5.4 children. In contrast, women with the highest level of education in rural areas (secondary or higher) had only 3.0 live births, whereas in urban areas women (college or higher) had only 1.9 live births. The difference between the highest and the lowest fertility groups is 3.2 live births (6.2 - 3.0 = 3.2) in the rural sample, and 3.5 live births in the urban sample. Women in the urban sample generally had lower live births than women with the same education level in the rural sample. For example, at the same lowest educational level--no education or less than primary education--women in rural areas had fertility 15% higher than women in urban areas (6.2 children vs. 5.4 children). If we use the difference in live births between the lowest and the highest groups as an indicator of the effect of education in reducing fertility, education in urban areas would have reduced fertility by about 65% (from 5.4 to 1.9 live births). And in rural areas, education, from the lowest to the highest level would have reduced fertility about 52% (from 6.2 to 3.0). Thus, continuous higher education, in both areas, substantially reduced live births. The strong relationship between educational level attained and live births, in both areas, is indicated by a gamma of -0.41 in rural areas and -0.46 in urban areas.

For both samples, when the total duration of women's marriage is controlled, education had very little effect on fertility among women who had been married less than 5 years. For example, in urban areas, women with no education or less than primary education, had 1.2

live births while women with college education had 1.0 live births. This may be due to the fact that women, regardless of their education, tend to not inhibit pregnancy when first married. However, for the longer duration of marriage, 5-9 years and 10 years or more, education seems to insert more influence on fertility, that is, education differentiates fertility among women more clearly. For example, among women who had been married 10 years or more, women with college education had only 2.3 live births, compared with 5.9 live births among those who had no or very little education. Generally, the partial relationships are similar to the original relationships. See Table 7.

It should be interesting to compare the effect of women's (wives) education and men's (husbands') education on their fertility, or the fertility of their wives, as well as the combined effect of their education on fertility. Results from Tables 8 and 9 generally indicate that among the lower educated women or men, regardless of their spouse's education, have similar levels of fertility. For example, among women or men with no or little education, women produced 6.3 live births while men's wives produced 6.2 for the rural areas and 5.6 and 5.5 respectively, in the urban areas. However, with rising education, women had fewer live births than the wives of men of the same educational attainments. For example, in rural areas, women with secondary or higher education had 3.9 live births while the wives of men with the same education, produced 4.5 live births, which is 0.6 live births greater. The data show that education of women reduces fertility (from the highest to the lowest level) more efficiently than does men's education. For example, in rural areas, women's education reduced fertility by 39% (from 6.3 to 3.9 live births) while men's education

Table 8. Mean number of live births by wife's and husband's education, rural only.

Wife's Education	Husband's Education			Total
	No, or less Than primary	Primary	Secondary Or Higher	
No, or less than primary	6.3 (407)	6.4 (299)	4.3 (11)	6.3 (717)
Primary	5.7 (108)	4.6 (612)	4.8 (40)	4.8 (760)
Secondary or higher	* (1)	* (8)	4.2 (24)	3.9 (33)
Total	6.2 (516)	5.2 (919)	4.5 (75)	5.5(1510)

*Mean not calculated when number of respondents is less than 10.

Table 9. Mean number of live births by wife's and husband's education, urban only.

Wife's Education	Husband's Education					Total
	No, or Less than Primary	Primary	Secondary	High School	College	
No, or less than primary	5.8(359)	52.(182)	4.8 (51)	* (3)	* (5)	5.6 (600)
Primary	4.5 (96)	4.0(513)	3.7(218)	3.8 (38)	3.2 (18)	3.9 (883)
Secondary	3.5 (15)	2.8 (47)	3.1(126)	2.7 (42)	2.6 (41)	2.9 (271)
High school	* (3)	* (0)	1.6 (14)	2.1 (27)	2.4 (26)	2.2 (70)
College	* (0)	* (1)	* (6)	* (8)	1.8 (49)	2.0 (64)
Total	5.5(473)	4.2(743)	3.6(415)	2.9(118)	2.5(139)	4.2(1888)

reduced the fertility of their wives only 27% (from 6.2 to 4.5 live births). For urban areas, the reduction rate is 64% (from 5.6 to 2.0) and 54% (from 5.5 to 2.5) for women and men, respectively, which is even more influential than in rural areas. In addition, in rural areas, women with no or little education but whose husbands have higher education (primary education) had 6.3 live births, whereas, when the educational attainments were reversed, women had only 5.7 live births. Similarly, in urban areas, women with no or little education, but whose husbands had primary education, produced 5.2 live births. Again, when education is reversed, women produced only 4.5 live births. This also holds true for higher education categories. Thus, it is clear that women's education and the combination of education and urban environment exerts more influence on women's fertility than men's education (on their wives' fertility) and the combination of education in rural environments.

Since both husbands' and wives' education have negative effect on fertility, it would also be expected that couples with higher education should also have fewer live births than couples with lower education. This hypothesis is strongly confirmed in both rural and urban samples. For example, couples with the lowest education in rural areas had 6.3 live births, compared with only 4.2 live births among couples in which both had the highest level of education. In urban areas, couples with no education or very little education had 5.8 live births, while couples with college education had only 1.8 live births, or 4 fewer live births. See Tables 8 and 9.

Finally, the results of the present study confirm the linear, reverse relationship found in the results of the 1969 and 1970 surveys.

Ethnicity and live births. Several approaches were used in the Longitudinal Study to determine the ethnic composition of the Thai population. Direct questions on place of birth of the respondent and the respondent's parents were asked. In addition, the interviewers were instructed to observe and record the presence of certain items in the house which were considered indicators of Chinese ethnicity (the largest and most economically important ethnic minority). Also, the language spoken in the household was recorded and finally first and family name were identified as Thai, Chinese, or other. All this information was used to assign a respondent an ethnic group. In the present study, Chinese ethnic women are hypothesized to have higher live births than Thai or other ethnic groups, because of their regard for children as helpers in their business. In addition, they are able to support a bigger family because of their better economic status.

Results from Table 10 generally indicate that women with Chinese ethnicity have a larger number of live births, especially in urban areas. In rural areas, Chinese women havelive births almost as high as other ethnic groups. Thai ethnic women had the lowest live births among those three groups. One factor no doubt contributing to the higher fertility of the ethnic Chinese is their strong desire to have a male offspring. Previous analysis of the Longitudinal Study data indicated that son-preference was considerably more pronounced among ethnic Chinese than among ethnic Thai. In addition, preference for sons appeared to affect both the desire to have additional children and the likelihood of practicing family planning among ethnic Chinese but not among ethnic Thai (Prachuabmoh, Knodel and Adlers, 1973). However, the fertility of women with Chinese or other non-Thai ethnicity

Table 10. Mean number of live births by ethnicity and total duration of marriage--ever-married women.

Ethnicity	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Thai	1.1 (276)	3.0 (241)	6.4(1117)	4.9 (65)	5.0(1699)
Chinese	* (6)	* (3)	6.7 (30)	* (1)	5.6 (40)
Other	* (9)	2.6 (13)	6.8 (51)	* (9)	5.7 (82)
Total	1.1 (291)	3.0 (257)	6.5(1198)	5.4 (75)	5.1(1821)
Urban					
Thai	1.1 (329)	2.5 (288)	5.0 (878)	4.6 (66)	3.7(1561)
Chinese	1.1 (76)	3.1 (71)	5.7 (392)	4.5 (26)	4.7 (565)
Other	1.0 (23)	2.3 (12)	5.1 (84)	* (3)	4.0 (122)
Total	1.1 (428)	2.6 (371)	5.2(1354)	4.5 (95)	4.0(2248)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between ethnicity and live births)
sig. at 0.05 (rural)
0.00 (urban)

Gamma (between ethnicity and live births) = 0.02 (rural)
-0.21 (urban)

in the urban sample is still lower than among women with Thai ethnicity in rural areas. This shows that the influence of residence is stronger than ethnicity. Ethnicity in urban areas seem to have a stronger influence on live births than in rural areas as is indicated by a gamma of -0.21 in urban areas compared to only 0.02 in rural areas. It is interesting to compare the difference in live births between ethnic Thai and ethnic Chinese women. In the rural sample the difference in live births between these two groups is 0.6 or 11%. In the urban sample, the difference is 1 live birth or 21%. The smaller difference in fertility in rural areas among the two ethnic groups may be due to the assimilation and acculturation by Chinese women of the overwhelming ethnic Thai environment, while in urban areas, ethnic Chinese women are still able to live more cohesively among themselves.

When duration of marriage of women is controlled, the original relationship is still maintained in all duration categories.

Finally, the results of the present study confirm the hypothesis of fewer live births among ethnic Thai women than other ethnic groups. In addition, the results of the present study are almost exactly the same as the results found in the 1970 urban surveys (only the results of the urban sample were tabulated) in both the level and pattern of relationship.

Place of birth, number of years lived in urban areas and live births. It is apparent from the earlier analysis that current residence at the time of interview--rural or urban--asserted strong influence on fertility. That is, women in rural areas generally had more live births than those in urban areas, all characteristics considered.

Thus, it should be interesting to investigate how women's place of birth and urban living experience affect their fertility.

Table 11 shows the relationship between women's place of birth and number of live births. In the rural sample, women who didn't know whether they came from rural or urban areas and women who immigrated from other countries were the ones who had the highest number of live births--6.5 children. It appears that place of birth--whether women were born in rural or urban areas--had no bearing on the number of live births of women who were currently living in rural areas. Among the urban sample, however, place of birth seems to have some effect on live births. For example, women who were born in rural areas but were living in urban areas at the time of the interview had slightly fewer live births than the native urban dwellers. As in the case of rural dwellers, women who didn't know whether they came from rural or urban areas and women who immigrated from other countries had the highest number of live births. The relationship between these two variables is rather weak, as is indicated by gamma of 0.04 in the rural sample and 0.09 in the urban sample.

When duration of marriage is controlled, the number of women who were born elsewhere but were currently living in rural areas at the time of the interview was too small to make a meaningful comparison. Except for the women with a marriage duration of 10 years or more, the women had almost the same number of live births, regardless of their place of birth. In urban areas, women who were married less than 5 years, had the same number of live births, regardless of their place of birth. Among women who were married for 5-9 years, women who were born in rural areas had more live births than women who were born in

Table 11. Mean number of live births by place of birth and total duration of marriage--ever-married women.

Place of Birth	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Rural	1.2 (154)	3.1 (206)	6.5(1084)	5.4 (51)	5.4(1495)
Urban	* (4)	* (3)	6.4 (22)	* (1)	5.4 (30)
Don't know foreign	* (0)	* (0)	6.5 (13)	* (2)	6.5 (15)
Total	1.3 (158)	3.0 (209)	6.5(1119)	5.6 (54)	5.5(1540)
Urban					
Rural	1.1 (198)	2.8 (186)	5.0 (502)	4.5 (39)	3.7 (925)
Urban	1.1 (226)	2.4 (176)	5.2 (684)	4.7 (47)	3.9(1133)
Don't know foreign	* (3)	* (6)	6.0 (161)	* (9)	5.7 (179)
Total	1.1 (427)	2.6 (368)	5.2(1347)	4.5 (95)	4.0(2237)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between place of birth and live births) not significant (rural)
sig. at 0.00 (urban)

Gamma (between place of birth and live births) = 0.04 (rural)
0.09 (urban)

urban areas. Conversely, among women who were married 10 years or more, women who were born in urban areas had slightly morelive births than women who were born in rural areas. Women from other countries still produced more live births than those two groups. It should also be noted that current place of residence seems to have stronger influence on live births than does place of birth. This is evident from the fewer live births of women who were born in a rural area but resided in an urban area than of those women who resided in rural areas regardless of their place of birth. The only exception was the unusually high fertility level among those who didn't know whether they came from a rural or urban area and those immigrated from other countries. See Table 11.

The place of birth does not seem to have a significant affect on live births especially in the rural sample. On the other hand, it is known that current residence, whether rural or urban, has considerable effect on fertility. Thus, it should be interesting to investigate whether experience in urban living (duration) will have a significant effect on fertility. Table 12 attempts to assess that effect.

Results from Table 12, where rural women were classified as "ever lived" or "never lived" in urban areas, shows a large difference in live births (5.5 - 4.4 = 1.1) between these two groups. The gamma between these two variables is 0.23 and their relationship is significant. In urban samples where the analysis can be classified in more detail, the results show that the longer they had lived in an urban setting, the higher their live births. This is rather unexpected result, because the more that rural women are exposed to urban living, the more they should accept the urban ways of life; one aspect of the

Table 12. Mean number of live births by experience living in urban and total duration of marriage--ever-married women.

Living in Urban area	Duration of Marriage: Lt 5	5-9	10 or more	Don't know	Total
Rural					
Ever lived	1.6 (12)	2.3 (16)	5.5 (59)	* (2)	4.4 (89)
Never lived	1.2 (146)	3.1 (192)	6.6(1043)	5.5 (48)	5.5(1429)
Total	1.3 (158)	3.0 (208)	6.5(1102)	5.6 (50)	5.4(1518)
Urban					
Lt 1 yr	0.6 (20)	* (8)	5.1 (15)	* (3)	2.4 (46)
1-4 yrs	1.2 (67)	2.8 (20)	5.3 (26)	* (2)	2.5 (115)
5-9 yrs	1.0 (54)	2.6 (77)	4.5 (50)	* (6)	2.7 (187)
10 or more don't know	1.1 (285)	2.6(260)	5.3(1201)	4.6 (71)	4.2(1817)
Total	1.1 (426)	2.6(365)	5.2(1292)	4.6 (82)	4.0(2165)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between exposure to urban living and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma(between exposure to urban living and live births) = 0.23 (rural)
0.41 (urban)

urban way of life is having fewer live births. One possible explanation is that the women who havelived in an urban setting for a shorter period may be a group of younger women who just arrived and only lived in urban areas recently. Thus, they have fewer live births. The length of time that women may have lived in an urban area seems to have quite a high effect on their live births as is indicated by a gamma of 0.41.

When the duration of marriage is controlled, among rural samples, for women who have been married less than 5 years, it is found that women who ever lived in an urban area have a higher fertility than those who have never lived in an urban area, 1.6 compared with 1.2 live births. In other categories of marriage duration, the relationship between these two variables is similar to the original relationship. In urban areas, the partial relationship changes according to the duration of marriage. For example, where duration of marriage was less than 5 years or 5-9 years, women who had been living in an urban setting for 1-4 years had the highest number of live births. They also shared the highest number of live births with women who had been living in urban areas for 10 or more years. See Table 12.

Finally the results of the present study confirm the pypothesis that in general rural women who ever lived in an urban setting have fewer live births than those who never lived in an urban setting. However, the hypothesis on the place of birth is not confirmed by the data. In addition, the results of this study contrast with the hypothesis on the effects that length lived in an urban area would have. That is, women who lived in urban areas longer, instead of having fewer

live births, as hypothesized, had more live births than those who lived for a shorter period in the urban setting.

Infant mortality and live births. From the pregnancy histories data collected in the Longitudinal Study, both the number of children ever born alive and the number of these children that died before passing through infancy or childhood can be calculated. It is well known that rates of infant or childhood mortality calculated directly from pregnancy histories, as reported in retrospective surveys, tend to be underestimated because of poor reporting of infant deaths (Bogue and Bogue, 1970). Despite this, a comparison of the infant mortality for couples with differeing numbers of children ever born can be informative.

Table 13 presents the relationship between the number of infant deaths and live births. In both rural and urban samples, the association between the number of infant deaths and live births is apparent. In rural areas, the number of live births increased sharply from 4.2 live births among women who had no infant deaths to 6.0, 7.7 and 10.1 live births among women who had lost 1, 2, 3 or more children before they reached their first birthday. Women who had 3 or more infant deaths had 2.4 times as many live births as women who lost none of their children. Thus, the replacement effect seems to play a significant role in increasing the number of live births. The relationship between the number of infant deaths and the number of live births is a very strong one as is indicated by a gamma of 0.59. In urban areas, where the mortality rate is generally lower than in rural areas, the association between these two variables is very similar to the results of the rural sample. That is, women who lost two children or more had

Table 13. Mean number of live births by number of infant deaths and total duration of marriage--ever-married women.

Infant deaths	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
0	1.1 (271)	2.8 (207)	5.7 (734)	4.8 (56)	4.2 (1268)
1	1.8 (18)	3.5 (39)	6.7 (261)	* (5)	6.0 (323)
2	* (2)	* (8)	8.1 (126)	* (7)	7.7 (143)
3 or more	* (0)	* (3)	10.4 (78)	* (7)	10.1 (88)
Total	1.1 (291)	3.0 (257)	6.5(1199)	5.4 (75)	5.1 (1822)
Urban					
0	1.1 (412)	2.5 (339)	4.5(1016)	3.6 (72)	3.4 (1839)
1	1.9 (13)	3.4 (28)	6.6 (203)	6.5 (13)	6.0 (257)
2 or more	* (2)	* (3)	8.6 (76)	* (5)	8.4 (86)
Total	1.1 (427)	2.6 (370)	5.1(1295)	4.4 (90)	4.0 (2182)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between infant deaths and live births)
sig. at 0.00 (rural)
0.00 (urban)

Gamma (between infant deaths and live births) = 0.59 (rural)
0.70 (urban)

2.5 times more live births than women who lost none of their children. The relationship between these two variables is very strong, indicated by a gamma value of 0.70. It is also stronger than the relationship in the rural sample.

When the duration of marriage is controlled, the partial relationships in both the rural and urban samples are exactly the same as the original relationship.

Finally, the results of the present study confirm the hypothesis stated earlier and are highly consistent with the findings of the 1969 and 1970 surveys.

Types of occupation and employment of husband and live births. Occupation has been a prominent variable in both theoretical considerations and empirical investigations of fertility behavior. It is frequently argued that the middle and the upper class couples were the first to reduce their family size during the transition from high to low fertility and that only after some time did the small family norm and an acceptance of family limitation spread to the lower classes (e.g. Gank, 1954; Besher, 1967). It is interesting to examine the extent to which similar differentials along this pattern have already developed in Thailand.

Table 14 presents the mean number of live births to wives according to the husband's occupation. The main difference in the rural and urban occupational structure is the proportion of the population which is engaged in farming. Farming is, of course, predominate among the rural labor force but constitutes only a small minority of the urban labor force (Prachuabmoh, et. al., 1972:24-26). In rural areas, women whose husbands' occupation was classified as "other" or "not working

Table 14. Mean number of live births by husbands' occupation and total duration of marriage--currently married women.

Husband's Occupation	Wife's Duration of Marriage: Lt 5	5-9	10 or more	Don't know	Total
Rural					
Farming	1.2 (109)	3.1 (153)	6.6 (768)	5.1 (22)	5.5 (1052)
Manual	* (9)	2.7 (26)	6.6 (71)	* (1)	5.2 (107)
Craftsman	* (6)	* (4)	6.2 (18)	* (1)	5.1 (29)
Non-manual	1.5 (17)	2.8 (21)	5.9 (147)	* (2)	5.2 (187)
Other, not working	* (0)	* (2)	6.7 (46)	* (2)	6.4 (50)
Total	1.3 (141)	3.0 (206)	6.5(1050)	5.4 (28)	5.5 (1425)
Urban					
Farming	* (9)	* (5)	6.7 (65)	* (2)	5.7 (81)
Manual	1.1 (111)	2.4 (107)	5.3 (352)	4.1 (16)	3.9 (586)
Craftsman	1.2 (37)	2.7 (51)	4.9 (129)	* (4)	3.7 (221)
Non-manual	1.1 (72)	2.5 (79)	4.2 (261)	* (5)	3.4 (417)
Merchant, small business	1.2 (52)	3.2 (60)	5.8 (287)	4.8 (21)	4.8 (420)
Other, not working	* (9)	2.3 (12)	5.6 (134)	5.6 (21)	5.2 (176)
Total	1.1 (290)	2.6 (314)	5.3(1228)	4.7 (69)	4.2 (1901)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between husband's occupation and live births) not significant (rural)
not significant (urban)

Gamma (between husbands' occupation and live births) = -0.11 (rural)
0.04 (urban)

now" had the most live births. This may be because this group is mainly composed of women whose husbands are of retirement age. Likewise, this implies a higher age for the women. Thus, this group is likely to have a higher number of live births. Women whose husbands' occupation was farming or an agriculturally related occupation had the second highest number of live births. The remaining occupational groups--manual, non-manual, and craftsmen--had no significant variance in the number of live births.

In urban areas where occupation is more diversified, a small number of families still earn their living through farming or agriculturally related occupations. Women whose husband's occupation was farming had the highest number of live births--5.7 children. Women whose husbands' occupation was classified as "other" or "not working" had the second highest number of live births--5.2 children. Women whose husbands' occupation was classified as non-manual had a slightly lower live birth than the rest of the groups. Nevertheless, the husband's occupation seems to have little effect on a wife's fertility as is indicated by a gamma of 0.11 in the rural sample and 0.04 in the urban sample.

When a woman's duration of marriage is controlled, occupational differentials in fertility in both areas are neither pronounced nor uniform. This applies to all categories of duration of marriage. See Table 14.

The occupational scheme of coding in the present study varies slightly from the schemes in the round one studies. However, it is still useful to make a rough comparison. In the round one studies, in rural areas the non-manual group (i.e. government officials, managers,

professionals, clerks, merchants) had a slightly higher number of live births (5.5), while the manual (laborer) and farming groups had 5.14 and 5.32. This may be due to the slight variance in coding or recoding in the analysis. In the round one study, for urban areas, it is the women whose husbands' occupation was classified as "other" or "farming," who had the most live births, whereas the non-manual groups had the lowest fertility. This is confirmed by the present study.

Since the type of occupation does not have a significant effect on fertility, it should be interesting to investigate how another dimension of occupation--type of employment--affects fertility. Restuls from Table 15 show that women whose husbands' occupation was classified as "self-employed" had the most live births in both rural and urban areas. The lowest live births were found among women whose husbands were employed by their own family. Women whose husbands' were employed by the private sector or government were in between the other two groups. Conversely, in urban areas, women whose husbands were employed by the private sector and government had the lowest fertility. The relationship between these two variables is much stronger in urban areas than in rural areas as is indicated by gammas of -0.27 for the urban sample and only -0.11 for the rural sample. This may be die to the fact that the nature of employment in urban areas is more business-like, i.e. regimented, heirarchical, than it is in rural areas.

In rural areas, when women's duration of marriage is controlled, wives of self-employed persons still have the highest fertility in all duration categories. Wives of family-employed persons had the lowest

Table 15. Mean number of live births by husband's type of employment and women's total duration of marriage.

Husband's Type of Employment	Wife's Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Self-employed	1.3 (81)	3.1 (128)	6.5 (800)	5.2 (34)	5.6 (1043)
Family-employed	0.9 (35)	3.1 (32)	6.2 (90)	* (2)	4.4 (159)
Private, government-employed	1.2 (20)	2.7 (27)	6.4 (121)	8 (2)	5.3 (170)
Total	1.2 (136)	3.1 (187)	6.4(1011)	5.3 (38)	5.4 (1372)
Urban					
Self-employed	1.2 (85)	2.9 (98)	5.6 (513)	4.2 (32)	4.6 (728)
Family-employed	1.3 (10)	* (9)	5.9 (20)	* (0)	4.1 (39)
Private, government-employed	1.1 (186)	2.5 (200)	4.8 (557)	4.3 (13)	3.6 (956)
Total	1.1 (281)	2.6 (307)	5.2(1090)	4.2 (45)	4.0 (1723)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between type of employment and live births) sig. at 0.00 (rural) 0.00 (urban)

Gamma (between type of employment and live births = -0.11 (rural) -0.27 (urban)

number of live births in the duration of less than 5 years and of 10 years or more categories, while the wives of private or government employed persons had the lowest fertility among women who had been married 5-9 years. In urban areas, the partial relationships alternated from the original relationship. For example, among women who had been married 10 years or more, the wives of family-employed persons had the highest live births, rather than the women whose husbands were self-employed. See Table 15.

Finally, the results of the present study do little to support the hypothesis of "the better the occupation of their husbands, the fewer the live births women will have". However, for urban areas, the relationship seems to conform more to the hypothesis.

Income and live births. Household heads, in the second round rural survey, were asked what their monthly income was during the previous year. This seems to be a simple question but it is difficult to get an accurate response, especially among farmers, who are in the majority. The economy of the rural population in Thailand is in between subsistence and a money economy. People still eat what they grow or raise, and they may have something left to be sold. Occasionally, though rarely, they may be able to find a job. Since money received is in small quantities and rather irregular, it is difficult to keep records. Thus the interviewer may receive an estimate that is too low if the respondents forgot about the occasional cash received, or, on the other hand, it may be intentionally inflated so as to impress the interviewer. Either of these circumstances would create an unreal picture of the relationship between income and fertility.

Table 16 presents the relationship between a husband's monthly income and a woman's live births in rural areas. Women whose husbands had the highest income (2,000 baht (฿) or more) had the lowest fertility, but only slightly lower than those with the lowest income. Women whose husbands had a middle income (฿1-1,999) had the highest number of live births. The relationship between those two variables is very weak, as indicated by a gamma of 0.01.

When the duration of women's marriage is controlled, it is women whose husbands had the least income who tended to have higher live births in all three categories of duration of marriage. This result does not confirm the hypothesis set earlier. See Table 16.

Table 16. Mean number of live births by household income (monthly) by total duration of marriage--currently married women, rural only.

Income	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Lt ฿1,000[1]	1.2 (109)	3.2 (166)	6.5 (833)	5.2 (30)	5.5 (1138)
1-1,999	* (9)	2.6 (11)	6.5 (99)	* (5)	5.8 (124)
2,000 or more	* (7)	* (8)	6.2 (53)	* (0)	5.3 (68)
Don't know	0.9 (13)	* (9)	7.1 (56)	* (7)	5.5 (85)
Total	1.2 (138)	3.1 (194)	6.5(1041)	5.4 (42)	5.5 (1415)

*Mean not calculated when the number of respondents is less than 10.

[1]฿20 (20 baht) = U.S. $1.

X^2-test (between household income and live births) not significant.

Gamma = 0.01.

Possession of modern items and live births. As already mentioned, there are some flaws in asking direct questions on income in order to assess the economic status of the family. Social researchers have developed an indirect way to measure the household well-being, economically. This is done by determining whether the respondents own specific items deemed to be the indicators of well-being and sometimes of modernity. These items are usually owned by a majority of households in the Western world. In the Longitudinal Study of rural round two, the respondents were asked whether they owned 20 specific items. The items range from subscriptions to newspapers to owning an automobile. After the tally, each item is given a score in order to combine the total score of all items possessed by each household which is usually called material possession score--MPS. The previous studies in Thailand mentioned earlier used "MPS" as indicators of modernity. However, it may also be a good index of economic well being.

Table 17 shows the relationship between the numbers of items owned by the household and live births. Women whose family owned none of these 20 items were obviously of a very low economic status and had the lowest number of live births--4.8 children. The number of live births increased as the number of items owned increased. Yet, conversely, the number of live births decreased among women whose family owned the most items. However, the relationship between these two variables is rather weak as is indicated by a gamma of 0.04.

When the duration of marriage is controlled, the women whose family owned none of these items still tneded to have fewer live births in all categories of duration of marriage. Generally the partial relationship is very similar to the original relationship. See Table 17.

Table 17. Mean number of live births by number of modern items possessed and total duration of marriage--ever married women, rural only.

No. of Items	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
None	* (4)	2.9 (15)	5.8 (49)	* (5)	4.8 (73)
1-4	1.1 (93)	3.1 (123)	6.5 (627)	6.0 (35)	5.4 (878)
5-9	1.3 (38)	3.2 (55)	6.7 (342)	* (8)	5.8 (443)
10+	* (7)	* (7)	6.2 (49)	* (0)	5.2 (63)
Total	1.2 (142)	3.1 (200)	6.5(1067)	5.3 (48)	5.5(1457)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between number of items and live births) not significant.

Gamma = 0.04.

Using the number of items owned presents some difficulties in that one family may own several small items which may cost much less than one of the large items. To resolve this difficulty, a score was assigned to each item according to its importance, regardless of its market price. For example, a radio was assigned a score of 1 while a truck was assigned a score of 13. Thus, this score may better represent modernity than economic well-being. Table 18 shows the relationship between the material possession score and live births. Women whose family had the lowest score (0-9) and the highest score (20 or more) had the highest live births. And, women whose family had the score in between (10-19) had the lowest live births. This is rather in contrast to the findings in Table 17 where the middle categories (1-4 items and 5-9 items) had higher number of live births. However, the relationship between these two variables is rather weak as indicated by a gamma of 0.07.

Table 18. Mean number of live births by material possession score and total durtaion of marriage--ever married women, rural only.

Total Scores	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
0-9	1.2 (95)	3.1 (141)	6.6 (690)	5.5 (39)	5.6 (965)
10-19	1.0 (28)	3.1 (39)	6.1 (222)	* (7)	5.2 (296)
20 or more	1.6 (19)	2.8 (20)	6.4 (157)	* (2)	5.6 (198)
Total	1.2 (142)	3.1 (200)	6.5 (1069)	5.3 (48)	5.5 (1459)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between total score and live births) not significant.

Gamma = 0.07.

When the duration of marriage is controlled, the partial relationship is still similar to the original relationship. For example, among women who had been married 10 years or more, a woman whose material possession score 10-19 had the lowest fertility--6.1 children. See Table 17.

Finally, the results of the rural survey round one classified material possession score into five categories--lowest, low, middle, high and highest. The highest number of live births was found among women with the highest score. These five categories were reclassified into three groups, low, middle, high, to make it comparable with the result of the present study. The low, middle, and high groups had about 5.0, 5.4 and 5.6 live births. The relationship is a positive and linear one, while the present study reveals a U-curve relationship. This may be due to the score assigned to the categories of items owned. As a result, they may not be comparable in some ways. For example, the middle group in the first round survey may not all equal

the category for that group of score of 10-19 used in the present study. Thus, it may be misleading to make the comparison.

Finally, the result of the present study seems to present a contrast to the hypothesis of the more items or the higher the score and the lower the fertility.

Household socio-economic status and live births. In the Longitudinal Studies of both surveys in 1972 and 1973, the respondents were asked several questions on social economic variables such as education, income, occupation, saving, borrowing and modern items possessed. After asking these questions, the interviewers were instructed to evaluate the socio-economic status of that family by using their own judgment and to assign a socio-economic position to that family. This was in relation to all other households in the country. Some precautions have to be taken when interpreting the results of this variable in comparing it to fertility. This is because the index is subjective and the standard of judgment of each interviewer may not be the same. For example, the poor in the urban areas may not be as poor as the poor in the rural areas. However, the present study attempts to use it as a crude index of socio-economic status of the respondents. Table 19 presents the relationship between this multivariables-index of socio-economic status and live births.

In rural areas, it is the women whose family is considered as "rich" that have the highest number of live births--5.8 children. Women whose families are considered as "very poor", "poor" and "average" have almost an identical number of live births--5.5 children. The difference in live births between these latter three groups and the

Table 19. Mean number of live births by household's socioeconomic status and total duration of marriage--ever married women.

SES	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Very poor	1.1 (16)	2.9 (31)	6.6 (135)	5.9 (12)	5.5 (194)
Poor	1.1 (77)	3.2 (116)	6.5 (567)	5.0 (23)	5.4 (783)
Average	1.3 (45)	3.1 (42)	6.5 (290)	5.0 (10)	5.5 (387)
Rich	2.0 (10)	* (6)	6.6 (80)	* (0)	5.8 (96)
Total	1.2 (148)	3.1 (195)	6.5(1072)	5.2 (45)	5.5(1460)
Urban					
Very poor	* (4)	* (3)	4.9 (21)	* (4)	4.1 (32)
Poor	1.3 (81)	2.6 (96)	5.4 (343)	5.6 (20)	4.3 (540)
Average	1.0 (148)	2.7 (158)	5.5 (633)	4.6 (34)	4.3 (973)
Rich	1.2 (51)	2.5 (52)	4.3 (208)	* (9)	3.5 (320)
Total	1.1 (284)	2.6 (309)	5.2(1205)	4.7 (67)	4.2(1865)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between SES and live births) not significant (rural)
sig. at 0.00 (urban)

Gamma (between SES and live births) = 0.02 (rural)
0.08 (urban)

"rich" group is rather small, that is, only 0.3-0.4. Thus, socio-economic status in rural areas does not provide a strong differential for women in terms of their live births. This is confirmed by a weak gamma of 0.02. In urban areas, the relationship between these two variables is different from the results of the rural sample. Thatis, instead of having the highest number of live births, the rich women had the lowest number of live births--3.5 children. The very poor women have the second lowest live birth of 4.1 children. The "poor" and the "average" women have a slightly higher live birth of 4.3 children. The difference in live births between the lowest and the highest economic group is more significant--0.6-0.8. This implies a stronger effect of SES on fertility in urban areas than in rural areas. This is demonstrated by comparing the gamma of 0.08 in the urban sample with only 0.02 in the rural sample. However, the relationship between the two variables is rather weak.

When the duration of marriage is controlled, in rural areas, for all categories of duration of marriage, the rich women maintained their position of having the most live births, especially among the group whose marriage duration was less than 5 years. In the category of 5-9 years, the very poor women had the lowest number of live births (2.9), while the poor and the average women had a very similar number of live births--3.2 and 3.1 respectively. In the category for duration of 10 years or more, the women from different SES had almost the same number of live births. Thus, the SES does differentiate the live births of the rich and the other groups, at the earliest period of marriage (less than 5 years). However, it does not seem to have an influence on live births for the latest period of marriage (10 years

or more). In urban areas, SES seems to affect live births differently than in rural areas. That is, in the duration of less than 5 years group, or in the 5-9 years group, there was very little difference in live births among women from different SES. But at the duration of 10 years or more, the rich women have only 4.3 live births compared to the 4.9, 5.4 and 5.5 among the very poor, the poor and the average women, respectively.

It is interesting to note that the high number of live births among the poor and the average women in urban areas is still lower than the number of live births of any group in the rural area. The contrasting position in fertility of the rich women in rural and urban areas is an interesting one. Some plausible explanations are that the rich women or family in the rural area still view children as an asset--they can help in household chores and farming. They also hope that the children will take care of them when they are old. In conjunction with these perceived benefits, they can also afford to have more children. In addition, there was and is no cheap, convenient family planning service available. In contrast, in urban areas where higher education is considered important, there was information and service in family planning available. Women from the rich or the upper class family have closer contact with western culture and technology. They were thus the first to accept the norm of a smaller family and western technology. Thus, they are the group with the lowest number of live births.

Results of the present study especially among women in the urban sample are consistent with the hypothesis stated earlier. In the rural sample, the result not only does not confirm the hypothesis,

but the rich women, instead of having the lowest number of live births, had the highest number of live births.

Women's experience in working before and after marriage and live births. In the search for ways to encourage low fertility, increasing female labor force participation, particularly in the monetary sector of the economy, has often been mentioned. This is under the rationale that occupational roles can serve as an alternative to the familial and maternal role.

The Longitudinal Study of both rural and urban surveys round two asked all ever-married women the same question on experience in working for wage or salary. However, the coding schemes of both surveys vary slightly as shown in Table 20.

Table 20 presents the relationship between a woman's experience in working for wage or salary before marriage. It is evident that women who had worked for a wage or salary had fewer live births than those who had never worked for wage or who had ever worked but not for a wage. The latter two groups of women had very similar levels of fertility--4.5 and 4.6 live births. Rural women who had worked for a wage had live births of 0.9 or 17% (5.3-4.4) less than those who had never worked at all. Thus, working seems to insert an influence on a woman's live births. The relationship between these two variables, though not large, is significant, as is indicated by a gamma of 0.19. In the urban samples, women who had worked for a wage before they married had 23% less live births than women who had never worked for a wage. This indicates that working for a wage in urban areas inserts a stronger influence than in rural areas. This

Table 20. Mean number of live births by working for wage before marriage and total duration of marriage--ever-married women.

Working Before Marriage	Duration of marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Yes	1.1 (104)	2.8 (70)	6.1 (248)	5.7 (17)	4.4 (439)
Never	1.1 (184)	3.0 (185)	6.6 (947)	5.2 (57)	5.3(1373)
Total	1.1 (288)	3.0 (255)	6.5(1195)	5.3 (74)	5.1(1812)
Urban					
Yes, for wage	1.0 (243)	2.4 (201)	4.5 (401)	4.9 (32)	3.1 (877)
Yes, without wage	1.2 (80)	2.9 (56)	5.5 (405)	4.7 (26)	4.6 (567)
Never	1.1 (105)	2.8 (114)	5.5 (551)	4.0 (37)	4.5 (807)
Total	1.1 (428)	2.6 (371)	5.2(1357)	4.5 (95)	4.0(2251)

Mean not calculated when the number of respondents is less than 10.

X^2-test (between working before marriage and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between working before marriage and live births) = 0.19 (rural)
0.26 (urban)

is confirmed by comparing the gamma of 0.26 in the urban sample with only 0.19 in the rural sample.

When the duration of marriage is controlled, the effect of working for a wage did not show a strong impact on live births for women who have been married less than 5 years for both areas. In the 5-9 years and 10 years or more duration groups, women who worked for a wage had fewer live births than those who had never worked for a wage. Also, it is interesting to point out that among women who did not know their duration of marriage, the working experiences before marriage affected their fertility differently from those women who knew their duration of marriage. That is, women who had worked for a wage and did not know their duration of marriage had more live births than those who had never worked--5.7 and 5.2 live births respectively. See Table 20.

The results from Table 20 confirm the hypothesis that women who worked for a wage should have fewer live births than those who had never worked. And it is also consistent with the findings of the 1969 and 1970 surveys which found that women, in both rural and urban areas, who had worked for a wage before marriage had fewer live births than women who had never worked for a wage.

After a series of questions on working for a wage before marriage, the respondents were further asked about working for a wage after or since marriage. Results from Table 21 present the association between working experience after marriage and live births. It is quite evident that women who had worked for a wage, in both areas, had fewer live births than those who never worked for a wage. In rural areas, the difference in live births between the two groups of women was 0.4 live births, instead of 0.9 live births, as found in Table 20. The

Table 21. Mean number of live births by working for wage after marriage and total duration of marriage--ever-married women.

Working After Marriage	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Yes	1.1 (52)	2.7 (60)	6.0 (229)	5.9 (18)	4.8 (359)
No	1.1 (235)	3.1 (195)	6.6 (964)	5.1 (56)	5.2(1450)
Total	1.1 (287)	3.0 (255)	6.5(1193)	5.3 (74)	5.1(1809)
Urban					
Yes, for wage	1.0 (186)	2.5 (142)	4.8 (510)	3.8(442)	3.6 (882)
Yes, without wage	1.1 (58)	2.8 (75)	5.7 (402)	5.0 (25)	4.8 (560)
Never	1.2 (184)	2.7 (154)	5.3 (445)	5.2 (26)	3.9 (809)
Total	1.1 (428)	2.6 (371)	5.2(1357)	4.5 (95)	4.0(2251)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between working after marriage and live births) not sig. (rural)
sig. at 0.00 (urban)

Gamma (between working after marriage and live births = 0.09 (rural)
0.06 (urban)

effect of working for a wage after marriage shows less influence on fertility when compared with the effect of working for a wage before marriage. This is supported by the smaller gamma of 0.09. In urban areas, there was some change in the pattern of fertility from that which was found in Table 20, that is, women who had never worked had a number of live births that was closer to that of women who had worked for a wage than to that of those women who had worked, but not for a wage. The relationship between working experience after marriage and live births also became weaker as is indicated by a gamma of 0.06.

The effect of the working experience on fertility among women who were married for less than 5 years was insignificant. That is, these women, whether they worked or not, had almost the same number of live births. However, work had a significant effect on live births among women who had been married for 5-9 years, and 10 years or more. Interestingly, among women who didn't know their duration of marriage, the working experience after marriage had an opposite effect on the live births of the two samples. That is, in the rural areas, women who had worked for a wage had more live births than those who had never worked for a wage. In opposition, in the urban areas, women who worked for a wage had fewer live births than those who never worked. The plausible explanation for this contradictory result is that out of the 18 rural women (in Table 21), a majority may have married early, and therefore had no opportunity to join the work force. However, with the consequent birth of many children, it became economically necessary for them to join the work force in order to support the family. In the urban sample, out of 442 women, the majority may

have consisted of those who had worked before marriage and continued working even after marriage. See Table 21.

Finally, the findings of this study also support the hypothesis of "the lower fertility among women who worked for wages", and it also confirms the finding of the 1969 and 1970 surveys.

The results of the statistical analysis of Tables 20 and 21 indicate that working for wages before marriage tends to have stronger influence on the number of live births than working for wages after marriage. To clarify this preliminary finding, and to assess the combined effect of working experience on fertility, Tables 22 and 23 attempt to assess the individual and combined effects of working experiences on fertility.

Results from the rural sample demonstrate clearly that work experience before marriage (only) has stronger influence on live births than work experience after marriage (only), with live births of 4.0 and 4.9 for those women respectively. The number of live births to women who had worked for a wage both before and after marriage was in between the two groups mentioned above, but closer to the group who worked only after marriage. Women who had never worked before or after marriage had the highest fertility--5.3 live births. In the urban sample, women who had worked for a wage both before and after marriage had the fewest live births--2.9, and women who had never worked before marriage but worked without wages after marriage had the most live births--5.3. Women who had worked for wages before marriage and did not work after marriage had the second lowest number of live births--3.1. Women who had never worked or had never worked for wages but worked after marriage had 4.4 and 4.5 live births respectively.

Table 22. Mean number of live births by working for wages before and after marriage--ever-married women, rural only.

Working Before Marriage	Working after marriage		Total
	Yes	No	
Yes	4.7 (242)	4.0 (197)	4.4 (439)
No	4.9 (118)	5.3(1258)	5.3(1376)
Total	4.8 (360)	5.2(1455)	5.1(1815)

Table 23. Mean number of live births by working before and after marriage--ever-married women, urban only.

Working Before Marriage	Working after marriage			Total
	Yes, w/wage	Yes, wo/wage	Never	
Yes, w/wage	2.9 (510)	3.8 (91)	3.1 (276)	3.1 (877)
Yes, wo/wage	4.5 (140)	4.8 (318)	4.2 (109)	4.6 (567)
Never worked	4.4 (233)	5.3 (151)	4.3 (425)	4.5 (809)
Total	3.6 (883)	4.8 (560)	3.9 (810)	4.0(2253)

The interacting effect on urban women of working for wages both before and after marriage suppresses fertility to the lowest level. In addition, working for wages before marriage alone seems to have more effect on fertility than working for wages after marriage alone. See Tables 22 and 23.

As has already been stated in the literature review, the probability of observing a negative relationship between female employment and fertility is high if the wife works for pay rather than as an unpaid or self-employed worker or if she works away from home rather than at home. Table 24 is an attempt to investigate the relationship between place of work and fertility. It is quite apparent that women who had worked away from home for wages both before and after marriage had fewer live births than those who had worked at home. For example, live births of women who had worked before marriage, worked for wages, and worked away from home is 2.9 as compared to 3.7 among those who had worked at home. This is also true for those who had worked for wages after marriage, except that the difference in their live births decreased. One interesting point that should be noted is that among women who had worked but without wages, women who had worked away from home tended to have more or slightly more live births than those who had worked at home. Thus, place of work has a positive effect, instead of a negative one, on women's live births. See Table 24.

As was concluded by Jaffe, the combined influence of increasing education and increasing participation of women in modern economic enterprise is likely to be more effective than either fact by itself (1959, 196-197). It should be interesting to assess the combined effect of women working for wages and their education on their number

Table 24. Mean number of live births by women experience in working for wage and place of work--ever-married women, urban only.

Working Experience	Place of Work: Home	Place of Work: Outside Home	Place of Work: Never Worked	Total
Before marriage				
Yes, w/wage	3.7 (173)	2.9 (701)	* (0)	3.1 (874)
Yes, wo/wage	4.6 (210)	4.7 (352)	* (0)	4.6 (562)
Never	* (0)	* (0)	4.5 (809)	4.5 (809)
Total	4.2 (383)		4.5 (809)	4.0(2245)
After marriage				
Yew, w/wage	3.8 (271)	3.4 (608)	* (0)	3.6 (879)
Yes, wo/wage	4.6 (265)	5.0 (295)	* (0)	4.8 (560)
Never	4.2 (536)	4.0 (903)	3.9 (810)	4.0(2249)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between place of working before marriage and live births) sig. at 0.00 (rural) 0.00 (urban)

Gamma (between place of working before marriage and live births) = 0.11 (rural) 0.11 (urban)

of live births. From the earlier analyses, it already is apparent that both education attainment and women's working for wages have a negative effect on live births. Results from Tables 25 and 26 show that live births of women who had worked or had never worked for wages decreased when their education increased. Among the women with the highest education, those who had never worked for wages before or after marriage had fewer live births (in the rural sample) or almost the same number of live births (in the urban sample) as those who had ever worked. This indicates a stronger effect of education on live births than of working on live births. In addition, the difference in live births between women who had the lowest and the highest education and had worked before or after marriage was smaller than among women who had never worked. For example, the difference between women who had worked for wages before marriage was 2.4 (5.7 - 3.3 = 2.4) and for those who had never worked was 3.7 (6.4 - 2.7 = 3.7), for the rural sample. This holds true for the urban sample. This evidence also supports the statement that education had a stronger influence than working for wages. Among women with the same level of education, those who had worked for wages before or after marriage had fewer live births than those who had never worked. Except among the highest educated, women, those who never worked had fewer live births than those who worked in the rural sample or almost the same number in the urban sample. See Tables 25 and 26.

Change in occupation of husband and live births. Male household head respondents in the Longitudinal Study were asked about the occupation they held at age 25 and their current occupation. The occupations held at the two dates were compared. The coding schemes presented in

Table 25. Mean number of live births by women's working for wages before, or after marriage and education and total duration of marriage of ever-married women, rural only.

Working For wage	Education			Total
	No, Lt Primary	Primary	Secondary Or higher	
Before marriage				
Yes	5.7 (198)	3.3 (213)	3.3 (27)	4.4 (438)
No	6.4 (608)	4.5 (742)	2.7 (19)	5.3(1369)
After marriage				
Yes	5.7	3.7 (152)	3.7 (20)	4.8 (197)
No	6.3	4.3 (803)	2.6 (26)	5.1(1448)

Table 26. Mean number of live births by women's working for wages before or after marriage and education and total duration of marriage of ever-married women, urban only.

Working For wage	Education				Total
	No, Lt. Pri.	Primary	Secondary	High school Or higher	
Before marriage					
Yes, w/wage	4.4 (193)	3.1 (384)	2.4 (169)	2.0 (131)	3.1 (877)
Yes, wo/wage	5.7 (232)	4.0 (294)	3.0 (36)	* (4)	4.6 (566)
Never	5.8 (290)	4.1 (375)	3.1 (123)	2.1 (19)	4.5 (807)
After marriage					
Yes, w/wage	5.1 (238)	3.5 (374)	2.6 (148)	2.0 (123)	3.6 (883)
Yes wo/wage	5.9 (209)	4.3 (296)	3.2 (45)	* (7)	4.8 (557)
Never	5.2 (268)	3.4 (383)	2.8 (135)	2.0 (24)	3.9 (810)

Table 27 are broad and do not consider a multiple change, if it exists. However, since a vast majority of the rural population depends on agriculture and they have only compulsory education, it would be reasonable to assume that changes or multiple change would occur only to a small portion of the population. Table 27 is an attempt to determine whether a husband's change of occupations affected his wife's live births. If the change of occupation from "agriculture" to "non-agriculture" or from "not working" to "working now" is considered as "upward", and likewise, if change of occupation from "non-agriculture" to "agriculture" or from "working" to "not working" is considered as "downward change", the vareage live births among women whose husbands occupational change was "upward" was 4.9, as compared to 6.0 live births among wives whose husband's occupation change was "downward". The live births among women whose husbands never changed occupation was 5.7. Thus, using this rather crude indices, a husband's upward change in occupation had a negative effect on the wifes' fertility, and, conversely, the downward change in occupation had a positive effect on the wife's fertility.

When the duration of marriage is controlled, a partial relationship in the duration of marriage of 10 years or more was similar to the original relationship.

Finally, the hypothesis, women whose husbands had changed occupations should have fewer live births than those whose husbands never changed their occupation, was partially true. The nature, or context of change, has to be taken into account to make the hypothesis more meaningful. See Table 27.

Table 27. Mean number of live births by husband's change in occupation since age 25 and women's total duration of marriage, rural only.

Change in Occupation	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Agriculture to Nonagri.	* (2)	* (9)	5.6 (47)	* (0)	5.0 (58)
Nonagricul. to Agri.	* (3)	2.8 (14)	7.0 (41)	* (3)	5.5 (61)
Working to Not Working	* (0)	* (0)	7.2 (31)	* (6)	6.8 (37)
Not working to Working	* (5)	* (7)	5.9 (17)	* (0)	4.6 (29)
Never Changed	1.3 (64)	3.2 (136)	6.6 (792)	5.4 (20)	5.7(1012)
Total	1.3 (74)	3.1 (166)	6.5 (928)	4.9 (29)	5.7(1197)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between change in occupation and live births) not significant

Gamma (between change in occupation and live births = 0.06

Knowledge of contraceptive methods and live births. All currently married women were asked if they knew any ways to prevent having too many children. If they said yes, the interviewer attempted to determine their knowledge of contraceptive methods and which methods were used. Table 28 presents the relationship between knowledge of contraception and the number of live births.

In both rural and urban areas, women who had the least knowledge of contraception had the highest fertility. However, the variance was not strong. For example, in the rural areas, the highest number of births, 4.9, existed among women who knew only one contraceptive method. Those with more knowledge had only an insignificant decrease in live births. For urban women, the highest number of live births, 4.0, existed also among women who knew only one method of contraception. When that knowledge increased from 1 to 2 methods or from 2 to 3 or more, the number of live births decreased from 4.0 to 3.5 and from 3.5 to 3.4, respectively. Women with no knowledge of contraception had a number of live births in between those who knew only one method and those who knew more methods. Knowledge of contraceptive methods did not seem to affect, or had very little and unsystematic effect, on live births. This is indicated by a very weak gamma of 0.06 and 0.05 in the rural and urban sample, respectively.

When the duration of marriage is controlled, for both rural and urban samples, the number of live births increases with an increase in knowledge. For example, in the rural samples, women with no knowledge at all had 0.8 live births. For those who knew 1, 2, or 3 methods, the live births increased to 0.9, 1.3, 1.6, respectively. This pattern was also true among urban women who had been married 5

Table 28. Mean number of live births by number of contraceptive Methods known (by women) and total duration of marriage currently married women aged 15-49.

Number of Methods Known	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
None	0.8 (100)	2.9 (70)	6.0 (274)	6.0 (11)	4.4 (455)
1	0.9 (56)	3.1 (69)	6.5 (219)	* (1)	4.9 (345)
2	1.3 (50)	3.2 (43)	6.2 (152)	* (0)	4.7 (245)
3 or more	1.6 (49)	2.9 (58)	6.3 (166)	* (3)	4.7 (276)
Total	1.1 (255)	3.0 (240)	6.2 (811)	5.5 (15)	4.6(1321)
Urban					
None	0.7 (60)	2.3 (30)	5.4 (136)	* (2)	3.7 (228)
1	0.9 (69)	2.9 (57)	5.3 (200)	* (7)	4.0 (333)
2	1.2 (97)	2.6 (64)	4.9 (194)	* (2)	3.5 (357)
3 or more	1.2 (162)	2.6 (192)	4.8 (345)	* (4)	3.4 (703)
Total	1.1 (388)	2.6 (343)	5.0 (875)	4.2 (15)	3.6(1621)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between knowledge in contraceptive methods and live births) sig. at 0.00 (rural)

Gamma (between knowledge in contraceptive methods and live births) = 0.06 (rural)
0.05 (urban)

years or less. Among rural women with a duration of marriage of 5-9 years and 10 years or more and urban women with a duration of marriage of 5-9 years, women with no knowledge had the lowest fertility. See Table 28.

Attitude toward family planning and live births. In the Longitudinal Study of both rural and urban surveys, ever-married women were asked indirectly about their opinion on "family planning". The question was "If you knew a simple and harmless method for preventing too many pregnancies or having more children than are wanted, would you approve or disapprove of using that method?" In addition to this question, women in urban areas were asked an additional direct question on family planning. The question was "Do you approve or disapprove of family planning?" Table 29 is an attempt to assess how women's attitudes as reflected in their answers, affected their fertility.

Results from Table 29 generally show that women who were in favor of family planning and approved the use of a simple and harmless contraceptive method, had fewer live births than women who disapproved and women with other opinions. In the rural sample, women who approved of a couple using the method had 4.8 live births compared with 5.3 live births among those who disapproved. Women whose opinions depended on special conditions had the same level of live births as those who approved the use of contraceptive methods. Women who had no answer for the question had the most live births--5.8. The association between women's attitudes and live births is weak as is indicated by a gamma of only 0.09. In the urban sample, women who approved using contraceptive methods also had the fewest (3.6) live births. Women who disapproved of using contraceptive methods had the most live births--

Table 29. Mean number of live births by attitude toward family planning (indirect question) and total duration of marriage--ever married women.

Attitude	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Approve	1.2 (158)	3.0 (171)	6.4 (559)	5.7 (16)	4.8 (904)
Disapprove	1.1 (81)	3.1 (60)	6.4 (426)	5.8 (35)	5.3 (602)
Depends	1.0 (18)	* (9)	6.6 (53)	* (3)	4.8 (83)
Don't know	1.0 (26)	2.5 (12)	6.7 (111)	4.6 (15)	5.3 (164)
No answer	* (5)	* (4)	6.8 (44)	* (6)	5.8 (59)
Total	1.1 (288)	3.0 (256)	6.5(1193)	5.4 (75)	5.1(1812)
Urban					
Approve	1.1 (340)	2.6 (302)	5.0 (839)	4.2 (44)	3.6(1525)
Disapprove	1.0 (42)	2.6 (27)	5.9 (250)	4.1 (14)	4.9 (333)
Depends	1.1 (21)	2.7 (15)	5.0 (112)	5.5 (10)	4.3 (158)
Don't know	0.9 (23)	2.9 (22)	5.7 (125)	5.2 (18)	4.8 (188)
Total	1.1 (426)	2.6 (366)	5.2(1326)	4.6 (86)	4.0(2204)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between attitude and live births) sig. at 0.01 (rural)
0.00 (urban)

Gamma (between attitude and live births) = 0.09 (rural)
0.22 (urban)

4.9. The difference between these two groups of women is wider in the urban than in the rural areas--1.3 live births as compared to only 0.5 live births. This indicates a stronger effect of attitude on fertility. This is also supported by a stronger gamma of 0.22. Women who had no specific attitude or opinion--depends, don't know--had a number of live births between that of the approving and disapproving groups. It is interesting to note that women who disapproved of the use of contraceptives in the urban sample had almost the same live birth rate as rural women who approved the use of a contraceptive method.

When the duration of marriage is controlled, in the rural sample, women with a specific attitude, approved or disapproved, showed little differentiation in live births. In the urban sample, the specific attitude also had very little effect on the number of live births of women who had been married less than 5 years or 5-9 years. However, it made a significant difference in live births among women who had been married 10 years or more. That is, live births among women who approved using the method in that group was 5.0 while among women who disapproved it was 5.9. Women who didn't know how long they had been married had almost the same number of live births, regardless of their attitude. See Table 29.

It will be interesting to see how a direct question on family planning affects fertility. There should be a stronger relationship to fertility than found in the responses to an indirect question because it is directly to the respondents.

Results from Table 30 seem to support the speculation above. For example, women who approved family planning in an indirect question

Table 30. Mean number of live births by attitude toward family planning (direct question) and total duration of marriage--ever married women, urban only.

Women's Attitude Toward Family Planning	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Approve	1.0 (301)	2.6 (260)	4.7 (621)	4.5 (27)	3.3(1209)
Disapprove	1.3 (20)	2.6 (14)	5.5 (54)	* (3)	4.1 (91)
Depends	* (3)	* (9)	4.6 (29)	* (4)	3.9 (45)
Don't know	1.0 (49)	2.9 (36)	5.8 (308)	4.5 (28)	4.9 (421)
Don't understand "family planning"	1.2 (46)	2.6 (47)	5.6 (314)	4.7 (29)	4.8 (436)
Total	1.1 (419)	2.6 (366)	5.2(1326)	4.5 (91)	4.0(2202)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between women's attitude and live births) sig. at 0.00

Gamma (between women's attitude and live births) = 0.28

had 3.6 live births while women who approved family planning in a direct question had 3.3 live births. This is also true for those who disapproved of family planning in both questions. Women who didn't understand "family planning" and who had no specific attitude (depends, don't know), had approximately the same number of live births, 4.8. The association between these two variables is strong, as is indicated by a gamma of 0.28, which is stronger than this relationship based on the indirect question.

When duration of marriage is controlled, urban women who disapproved of family planning generally had more live births than those who approved, except in the 5-9 years duration, where fertility of these two groups was equal (2.6 and 2.6 live births). Women who had no specific attitude or didn't understand the words "family planning" still had the most live births. Thus, overall, the partial relationship still maintains the original relationship. See Table 30.

Since it is already known that the attitude of wives about contraception and family planning affected their fertility, it should be interesting to see how husbands' attitudes toward family planning affect their wives' fertility. The attitude of the husbands in the rural sample was derived from asking the wife whether she ever talked about family planning with her husband and what his opinion was. In the urban sample, the male household head was asked "Do you approve or disapprove of family planning?"

Results from Table 31 indicate that the husbands' attitudes had an effect similar to that of the wives' on their wives' fertility. For example, in the rural sample, wives whose husbands approved of

Table 31. Mean number of live births by husband's attitude toward family planning and total duration of marriage.

Husband's Attitude Toward Family Planning	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Approve	1.2 (65)	3.0 (102)	6.1 (207)	* (0)	4.4 (374)
Disapprove	1.3 (20)	3.2 (17)	6.6 (65)	* (0)	5.0 (102)
Don't know	* (5)	* (1)	6.1 (16)	* (1)	4.9 (23)
Never talked	1.0 (162)	2.9 (113)	6.2 (495)	5.7 (13)	4.6 (783)
Total	1.1 (252)	3.0 (233)	6.2 (783)	5.8 (14)	4.6(1282)
Urban					
Approve	1.1 (142)	2.7 (182)	4.7 (452)	* (5)	3.6 (781)
Disapprove	* (9)	2.9 (13)	6.0 (37)	* (2)	4.5 (61)
Depends	1.3 (12)	* (2)	5.5 (22)	* (0)	3.9 (36)
Don't Understand "family planning"	1.2 (31)	2.3 (22)	6.2 (181)	* (6)	5.2 (240)
Total	1.1 (194)	2.6 (219)	5.2 (692)	4.8 (13)	4.0(1118)

*Mean not calculated when the number of respondents in less than 10.

X^2-test (between husband's attitude and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between husband's attitude and live births) = 0.08 (rural)
0.33 (urban)

family planning had 5.0 live births. This is also true for the urban sample. One interesting point is that husbands' attitudes in rural areas tended to have more negative effect on their wives' fertility than did the women's attitudes. This can be seen by comparing live births of men (of their wives) and of women with the same attitude. For example, wives of men who disapproved of family planning had 5.0 and 4.5 live births for the rural and urban samples, respectively. Women who had the same attitude had 5.3 and 4.9 live births (in Tables 29 and 30). This is also supported by the gamma, especially in the urban sample, where the gamma was 0.33. See Table 31.

Since it is already known that husbands' and wives' attitudes towards family planning in urban areas affected fertility significantly, it should be interesting to see how their combined attitudes affected their fertility. Table 32 attempts to assess that effect. Results show that couples in which both approved of family planning had the lowest number of live births, 3.2, and the couples who both said "don't know" had the highest number of live births, 5.9. The couples who both disapproved had live births in between the two groups just mentioned.

Talking about family planning with husband and live births. Currently married women in the Longitudinal Study were asked whether they ever talked about family planning with their husbands and how often. Table 33 shows the association between talking about family planning with the husband and live births. The number of live births among women who talked about family planning frequently with their husbands and the number of live births among women who never talked about it was almost the same in both rural and urban--4.8 and 4.6,

Table 32. Mean number of live births by wife's and husband's attitude toward family planning (direct question), urban only.

Men's Attitude	Women's Attitude: Approve	Disapprove	Depends	DU FP[1]	DK[2]	Total
Approve	3.2 (583)	4.0 (25)	3.5 (14)	4.6 (95)	4.7 (83)	3.5 (800)
Disapprove	4.5 (24)	* (3)	* (2)	* (8)	6.8 (13)	5.4 (50)
Depends	5.3 (10)	* (0)	* (2)	* (5)	* (3)	5.3 (20)
DU FP	5.2 (69)	4.9 (14)	* (4)	5.2 (91)	5.3 (63)	5.1 (241)
DK	4.5 (61)	4.6 (10)	* (2)	5.5 (41)	5.9 (77)	5.3 (191)
Total	3.5 (747)	4.5 (52)	3.7 (24)	5.0(240)	5.4(239)	4.2(1302)

*Mean not calculated when the number of respondents is less than 10.

[1]DU FP = Don't understand "family planning".

[2]DK = don't know.

3.7 and 3.7 respectively, each of which figures represents the highest number of live births.

Women who ever talked, but not often, had the lowest fertility. The relationship between these two variables is weak, as is indicated by a gamma of -0.06 and -0.02 in rural and urban areas. When the duration of marriage is controlled, women who most frequently talked about family planning with their husbands, in both areas, had the highest number of live births for all durations of marriage groups. They were followed by women who never talked, or talked, but not often. Generally, the partial relationship is very similar to the original relationship. See Table 33.

Places, persons to deliver baby and live births. As part of the pregnancy and birth history, ever-married women were asked to indicate where and by whom, if they were to have a baby, they would want it to be delivered? In addition, women were also asked where each child birth had occurred and who had delivered the child. The "usual

Table 33. Mean number of live births by talking about family planning with husband and total duration of marriage, currently married women.

Talking About Family Planning	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Often	1.3 (56)	3.1 (85)	6.3 (224)	* (1)	4.8 (366)
Not often	1.0 (37)	3.0 (41)	6.2 (93)	* (0)	4.3 (171)
Never talked	1.0 (162)	2.9 (113	6.2 (493)	5.7 (13)	4.6 (781)
Total	1.1 (255)	3.0 (239)	6.2 (810)	5.8 (14)	4.6(1318)
Urban					
Often	1.2 (117)	2.7 (115)	5.3 (243)	* (3)	3.7 (478)
Not often	1.2 (104)	2.7 (87)	4.7 (146)	* (3)	3.1 (340)
Never talked	0.9 (165)	2.5 (138)	5.0 (481)	* (8)	3.7 (792)
Total	1.1 (386)	2.6 (340)	5.0 (870)	4.1 (14)	3.6(1610)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between talking about family planning and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between talking about family planning and live births) = -0.06 (rural)
-0.02 (urban)

place" was the place where the majority of deliveries occurred and the usual person was the person who delivered the majority of births. The categories presented in Tables 34 and 35 (from top to bottom), degree of modernity is from least to most, or degree of traditionalism is from most to least. Thus, it can be expected that women who want to deliver, or usually deliver, babies at a hospital or clinic should have fewer live births than those who want to deliver or usually deliver at health stations or at home. Similarly, women with more modern values or practices, i.e., want their babies to be delivered or usually deliver their babies by a doctor, should have lower fertility than women with other values, or practicies.

Results from Table 34 clearly demonstrate the effect of modern values on live births. That is, women with more modern values, i.e. want to deliver their babies at a hospital or clinic, had only 4.2 live births, compared with 5.4 among women with less modern values, i.e. want to deliver their babies at home. Also, women who want to have their babies delivered by a doctor, or by a nurse or public health midwife, had live births of 4.3 and 4.6 respectively. Women with more traditional values, i.e. want their babies to be delivered by a granny midwife, or by self or others, had higher live births, 5.4 and 5.6 respectively. Thus, it seems thatmodernity as here measured had some effect on women's live births. This is confirmed by a high gamma of -0.24 and -0.21 in the rural and urban samples, respectively.

When duration of marriage is controlled, women who want to deliver their babies at a more modern place, by more modern medical personnel, had lower fertility than women with other values, in all

Table 34. Mean number of live births by desired place of birth delivery, desired person to deliver baby, and total duration of marriage, ever-married women, rural only.

Desired Place & Person	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Desired place					
Home	1.2 (171)	3.2 (163)	6.7 (827)	5.9 (53)	5.4 (1214)
Health station	0.5 (15)	3.1 (13)	6.5 (61)	* (1)	5.0 (90)
Hospital, Clinic	1.1 (100)	2.6 (79)	5.8 (295)	3.9 (20)	4.2 (494)
Total	1.1 (286)	3.0 (255)	6.5(1183)	5.3 (74)	5.1 (1798)
Desired Person					
Self & other	1.0 (40)	3.3 (35)	6.9 (180)	6.4 (13)	5.6 (268)
Granny midwife	1.3 (115)	3.1 (116)	6.7 (598)	5.8 (36)	5.4 (865)
Public health, midwife, nurse	1.0 (34)	2.8 (29)	5.9 (143)	* (4)	4.6 (210)
Doctor	1.0 (97)	2.7 (76)	6.0 (267)	4.3 (20)	4.3 (460)
Total	1.1 (286)	3.0 (256)	6.5(1188)	5.3 (73)	5.1 (1803)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between desired place and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between desired place and live births) = -0.24 (rural)
-0.17 (urban)

Table 35. Mean number of live births by usual places of delivery and usual person who delivered baby and total duration of marriage, ever-married women, rural only.

Usual Place & Person	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Place					
Home & other	1.6 (151)	3.2 (213)	6.8 (1096)	5.6 (70)	5.7 (1530)
Health station, hospital, clinic	1.4 (52)	2.4 (34)	4.6 (58)	* (1)	2.9 (145)
Total	1.6 (203)	3.1 (247)	6.7 (1154)	5.5 (71)	5.5 (1675)
Person					
Self, other	1.5 (36)	3.1 (51)	7.1 (198)	6.0 (23)	5.7 (308)
Granny midwife	1.6 (104)	3.2 (153)	6.7 (844)	5.4 (45)	5.7 (1146)
Public health midwife, nurse	1.5 (24)	3.2 (13)	5.9 (57)	* (2)	4.4 (96)
Doctor	1.4 (39)	2.3 (30)	5.1 (57)	* (1)	3.3 (127)
Total	1.6 (203)	3.1 (247)	6.7 (1156)	5.5 (71)	5.5 (1677)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between place usually deliver baby and live births) sig. at 0.00.

Gamma = -0.66

X^2-test (between person usually deliver baby and live births) sig. at 0.00.

Gamma = -0.25.

durations of marriage categories. That is, the partial relationship is the same as the original relationship. See Table 34.

In rural Thailand, where modern medical facilities are not widely available, the desired value or practice may not be consistent with the actual practice. Thus, it would be interesting to investigate their actual practice in order to see how differently it might affect fertility. Table 35 is an attempt to ascertain that.

Results from Table 35 show that women who usually (majority of the time) delivered their babies at a less modern facility, e.g. home, have live births of almost two times higher than those who usually used modern facilities (5.7 compared with 2.9 live births). The association between places where babies were usually delivered and live births is very strong, as is indicated by a gamma of -0.66, which is stronger than the association between desired place to deliver baby and live births (in Table 34). Similarly, women who usually have their babies delivered by more modern medical personnel, i.e. doctor, nurse, public health midwife, had significantly lower live births than women who had their babies delivered by themselves, or granny midwives. The association between this variable and live births is quite strong as is indicated by a gamma of -0.25.

When duration of marriage is controlled, the original relationship of the more modern the practice, the fewer the number of live births, is still maintained in all categories of duration. See Table 35.

<u>Women's opinions about mate selection for their daughter and live births.</u> As part of the marital histories of ever-married female respondents, in both the rural and urban samples, additional questions

were asked about whether the respondent's daughters or sons were of marriageable age, and what her opinion was about who would choose their mate? The present study will select only the opinions related to daughters, because Thai parents seem to be more concerned about a daughter's marriage than a son's, since divorce is still regarded as undesirable for a daughter. One possible reason for expecting a relationship between live births and opinion about the marriage custom of mate selection rests on the assumptions that opinion with regard to the latter can help distinguish between more modern and more traditionally oriented women and that a modern orientation is associated with lower fertility. If it is reasonable to assume that a woman who wants their daughter to select her own mate reflects more modern behavior or values, and that other arrangements for mate selection reflect more traditional values, then lower fertility can be expected among women who want their daughters to select their own mates than among women who turn to other arrangements for mate selection.

Results from Table 36 show that women with more modern values about selection of a mate for their daughters had the same number of live births as women who wanted to choose mates for their daughters. However, women with more modern values had slightly lower live births than women who wanted another traditional arrangement. The association between these two variables is rather weak, as is indicated by a gamma of only 0.08.

When duration of marriage is controlled, modern and traditional values differentiate women's live births, but not significantly, among women who had been married less than 5 years or 5-9 years. Among

Table 36. Mean number of live births by mate selection for daughter and total duration of marriage, ever-married women, rural only.

Mage Selection for Daughter	Duration of marriage				Total
	Lt 5	5-9	10 or more	Don't know	

*Mean not calculated when the number of respondentsis less than 10.

X^2-test (between mate selection and live births) sig. at 0.02.

Gamma = 0.08.

women who had been married less than 5 years or 5-9 years. Among women who had been married for 10 years or more, women with more modern values had higher live births than the two groups of women with more traditional values--6.8 and 6.4. Among women who did not know their duration of marriage, women with traditional values about choosing their daughter's mate had much higher live births than women with more modern values--5.9 compared with only 3.9 live births. Thus, the effect on fertility of opinion about choosing a daughter's mate depends on duration of marriage. See Table 36.

Exposure to mass media and live births. Every ever-married woman interviewed was asked about her exposure to mass media, including the frequency with which she read the newspaper and listened to the radio. Reading the newspaper is not a common practice among the Thai population, even in urban areas. For example, only one-third of the Bangkok-Thonburi sample read the newspaper every day or almost every day. The radio on the other hand, is clearly a mass medium to which most people are exposed often. Radio listening is slightly more common in rural areas than in urban areas. The reason for this may be

due to the nature of the work in urban areas and the much greater frequency with which they view television than their rural counterparts (Prachuabmoh et. al., 1972).

Table 37 presents the relationship between newspaper reading and listening to the radio on the one hand, and live births of urban women on the other. Results from Table 37 show a strong linear and negative relation of reading a newspaper and listening to radio on live births. The difference in live births between those who read the newspaper often and those who never read it was equal to two live births (5.2 - 3.2 = 2.0). Similarly the difference between those who listened to the radio often and never listened was 1.1 live births (4.8 - 3.7 = 1.1). This further indicates that reading the newspaper has a stronger effect on live births than does listening to the radio. This is supported by a strong gamma of relationship between these two variables with live births which is equal to 0.34 for reading the newspaper and 0.19 for listening to the radio. Women who read the newspaper, but not often, and those who listened to the radio, but not often, had fertility which was in between these two groups.

When duration of marriage is controlled, generally the original relationship is retained in the partial relationship, especially among the longer duration samples (5-9, 10 years or more). One exception is among those who didn't know their duration of marriage; women in this group who never listened to the radio had the lowest live births and, conversely, women in this group who listened often to the radio had the highest fertility. This is in contrast to the original relationship. See Table 37.

Table 37. Mean number of live births by exposure to mass media (newspaper and radio) and total duration of marriage, ever-married women, urban only.

Exposure	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Reading newspaper					
Often	1.0 (198)	2.4 (163)	4.4 (474)	3.9 (23)	3.2 (858)
Not often	1.2 (154)	2.7 (135)	5.0 (323)	3.4 (20)	3.5 (632)
Never	1.2 (75)	2.9 (73)	6.0 (557)	5.2 (52)	5.2 (757)
Total	1.1 (427)	2.6 (371)	5.2(1354)	4.6 (95)	4.0(2247)
Listening to radio					
Often	1.0 (278)	2.5 (232)	4.9 (752)	4.8 (51)	3.7(1313)
Not often	1.2 (117)	2.8 (101)	5.5 (412)	4.5 (27)	4.2 (657)
Never	1.5 (32)	3.2 (36)	5.8 (189)	3.8 (16)	4.8 (273)
Total	1.1 (427)	2.6 (369)	5.2(1353)	4.5 (94)	4.0(2243)

X^2-test (between reading newspaper and live births) sig. at 0.00

Gamma (between reading newspaper and live births) = 0.32

X^2-test (between listening to radio and live births) sig. at 0.00

Gamma (between listening to radio and live births) = 0.19

Finally, results of the present study confirm the reverse relationship hypothesis stated earlier. The results of the present study (for urban women) are quite different from the results of the 1969 rural round one survey where the husband's exposure to mass media (reading newspaper and listening to radio) and a women's live births bore no consistent relationship with fertility. Only among the youngest women did live births increase as the husband's frequency of reading the newspaper decreased (similar to results of the present study).

Attitude toward having "few" and "many" children and live births. Male household head respondents in the rural survey were asked about having "many" children (5 or more children) and "few" children (only two children); whether they viewed one or the other as advantageous or disadvantageous. In the urban survey, male household heads and ever-married women were also asked these questions. Relating the attitudes with fertility, it is expected that women or couples who had a positive attitude toward "few" children or negative attitude toward "many children" should have fewer live births than those who had a positive attitude toward "many children" or a negative attitude toward "few children", and also fewer than those who didn't have a specific attitude at all. Tables 38 to 41 attempt to assess the effects of these attitudes, separately and in combination, on fertility.

Results from Table 38 show the relationship between men's (husbands') attitudes toward having "few" children and their wives' live births. Women whose husbands said having two children was advantageous had 5.2 live births. Women whose husbands saw it as disadvantageous had the most live births, 6.4. Women whose husbands

Table 38. Mean number of live births by men's attitude toward having two children and wives' total duration of marriage.

Attitude	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Advantageous	1.0 (63)	2.9 (98)	6.2 (459)	5.3 (12)	5.2 (632)
Disadvantageous	1.1 (18)	3.1 (28)	7.2 (230)	7.0 (14)	6.4 (290)
Both	1.4 (21)	3.3 (39)	6.4 (220)	* (8)	5.6 (288)
Neither	1.0 (16)	* (9)	6.5 (73)	* (8)	5.3 (106)
Total	1.1 (118)	3.0 (174)	6.5 (982)	5.8 (42)	5.6(1316)
Urban					
Advantageous	1.1 (133)	2.5 (139)	5.0 (478)	4.4 (27)	3.9 (777)
Disadvantageous	1.5 (17)	2.9 (41)	5.9 (194)	6.1 (16)	5.2 (268)
Both	1.1 (54)	2.8 (65)	5.4 (253)	3.4 (10)	4.3 (382)
Neither	* (1)	* (0)	5.9 (13)	* (1)	5.5 (15)
Total	1.1 (205)	2.7 (245)	5.3 (938)	4.8 (54)	4.3(1442)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between attitude and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between attitude and live births) = 0.07 (rural)
0.14 (urban)

had no specific opinion (both, neither) had live births in between these two groups--about 5.5. However, the association between these two variables is rather low, as is indicated by a gamma of 0.07.

Table 39 presents the association between husband's attitude toward many children (5 or more children) and women's live births. The results, in both the rural and the urban samples, reverse the pattern found in Table 38. That is, women whose husbands said having many children was advantageous had the highest live births--5.7 and 5.2 for rural and urban women respectively. Of women whose husbands saw it as disadvantageous, rural women had 5.2 live births, and urban women 3.9. Women whose husbands had no specific attitude had about 5.6 live births in rural areas and 4.2 live births in urban areas. The relationship between these two variables is weak, especially in the rural sample. Gammas are 0.03 in the rural sample and .07 in the urban sample.

When duration of marriage is controlled, the partial relationship in all duration categories is very similar to the original relationship, except in rural areas, in the category of duration of 5-9 years. Here, women whose husbands had a negative attitude had slightly more live births than women whose husbands had a positive attitude. Women whose husbands had no specific attitude still maintained the middle position. See Table 39.

Table 40 represents the association between women's attitudes toward having "few" and "many" children and their live births. Women's attitudes affected their live births in the same manner as their husbands' attitudes. However, it should be noted that women who had

Table 39. Mean number of live births by men's attitude toward having 5 or more children and wives' total duration of marriage.

Attitude	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Advantageous	1.1 (37)	3.0 (51)	6.6 (351)	6.0 (15)	5.7 (454)
Disadvantageous	0.8 (27)	3.1 (41)	6.3 (186)	* (6)	5.2 (260)
Both	1.3 (41)	3.0 (79)	6.6 (413)	5.8 (14)	5.6 (547)
Neither	0.9 (11)	* (6)	7.1 (34)	* (7)	5.3 (58)
Total	1.1 (116)	3.0 (177)	6.5 (984)	5.5 (42)	5.6(1319)
Urban					
Advantageous	1.2 (16)	2.8 (25)	6.1 (143)	5.2 (12)	5.2 (196)
Disadvantageous	1.2 (85)	2.5 (118)	5.0 (362)	5.5 (20)	3.9 (585)
Both	1.1 (110)	2.7 (110)	5.3 (448)	4.6 (22)	4.2 (691)
Neither	* (3)	* (1)	* (9)	* (2)	4.4 (15)
Total	1.1 (225	2.6 (254)	5.3 (962)	4.9 (56)	4.2(1487)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between men's attitude and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between men's attitude and live births) = 0.03 (rural)
-0.07 (urban)

Table 40. Mean number of live births by attitude toward having only 2 children, and 5 or more children and total duration of marriage, ever-married women, urban only.

Attitude Toward Having	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
2 children only					
Advantageous	1.0 (222)	2.4 (176)	4.8 (527)	4.5 (45)	3.5 (970)
Disadvantageous	1.2 (62)	2.8 (76)	5.9 (328)	5.4 (17)	4.8 (483)
Both	1.1 (91)	2.8 (87)	5.1 (358)	4.1 (18)	4.0 (554)
Neither, don't know	* (7)	* (3)	6.3 (18)	* (2)	4.8 (30)
Total	1.1 (382)	2.6 (342)	5.2(1231)	4.7 (82)	4.0(2037)
5 or more children					
Advantageous	1.1 (43)	2.8 (25)	5.7 (203)	4.9 (15)	4.7 (286)
Disadvantageous	1.1 (205)	2.6 (181)	4.8 (520)	4.7 (35)	3.6 (941)
Both	1.1 (141)	2.5 (139)	5.2 (517)	4.6 (32)	4.0 (829)
Neither, don't know	* (7)	* (3)	7.3 (11)	* (1)	4.1 (22)
Total	1.1 (396)	2.6 (348)	5.2(1251)	4.7 (83)	4.0(2078)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between attitude toward having 2 children and live births) sig. at 0.00.

Gamma (between attitude toward having 2 children and live births) = 0.16.

X^2-test (between attitude toward having 5 or more children and live births) sig. at 0.00.

Gamma (between attitude toward having 5 or more children and live births) = 0.02.

no specific attitude towards having many children had the highest live births. Women's attitudes toward few children tended to have stronger effect on their fertility than the same attitude by their husbands, as is indicated by a gamma of 0.15. Women's attitudes toward having many children did not seem to affect live births at all, as is evident from its gamma of only 0.02.

When duration of marriage is controlled, in the duration of less than 5 years category, attitude did not affect women's live births. However, the longer the duration of marriage, the greater the effect of the attitude on live births. In general, the original relationship is still maintained in a partial relationship. See Table 40.

It is seen from the above analyses that both the wives' and husbands' attitudes toward a specific number of children affected fertility. Thus, it is interesting to see the effect of combined attitude of a couple on fertility. Table 41 attempts to determine that effect. Results from Table 41 indicate that couples who both had positive attitudes toward "few children" or negative attitudes toward "many children" had much fewer live births than couples who had the opposite attitude. For example, the couples who shared a positive attitude regarding the advantages of few children had 3.5 live births, compared to 5.6 births for couples who shared negative attitudes toward having few children.

Couples who shared positive attitudes about the advantages of many children had 5.2 live births, while those of shared negative attitude had 3.7 live births. Attitudes of wives toward a small family tended to have stronger influence on live births than did husbands' attitudes. For example, if wives saw it as advantageous to have few

Table 41. Mean number of live births by wife's and husband's attitude toward "small" and "large" family size, ever-married women, urban only.

Husband's Attitude	Wife's attitude			Total
	Advantageous	Disadvantageous	Both	
Small family				
Advantageous	3.5 (428)	4.6 (138)	4.0 (152)	3.9 (718)
Disadvantageous	4.4 (64)	5.6 (127)	4.9 (52)	5.2 (243)
Both	3.9 (134)	4.6 (70)	4.4 (157)	4.3 (361)
Total	3.7 (626)	5.0 (335)	4.3 (361)	4.2(1322)
Large family				
Advantageous	5.2 (67)	5.2 (59)	4.9 (50)	5.1 (176)
Disadvantageous	4.8 (51)	3.7 (338)	4.0 (167)	3.9 (556)
Both	4.8 (72)	3.7 (232)	4.4 (351)	4.2 (655)
Total	4.9 (190)	3.9 (629)	4.3 (568)	4.2(1387)

children and their husbands saw it as disadvantageous, women had only 4.4 live births. However, when the attitudes were reversed, women had 4.6 live births. In contrast, concerning the attitude toward having many children, husband's attitudes seemed to insert a stronger influence on their wives' fertility than their wives' attitudes. For example, when women said it was disadvantageous and husbands said it was advantageous to have many children, women had 5.2 live births. When attitudes were reversed, women had only 4.8 live births. See Table 41.

Desire to depend on children at old age and live births. The desire to depend on children as helping hands, for companionship, or as old age security, is one of the most frequently cited reasons why fertility level is high in less developed countries. In Thailand, children can be helpful in doing household and farming chores, especially in rural areas where farming is a labor-intensive job. Sons begin to make a useful contribution to the household and to do work in the family enterprise at an average age of 12 years, and daughters at about 11 years of age (Arnold and Pejaranonda, 1980).

Ever-married women were asked two questions related to this matter. First, "Do you think you can depend on your children in old age?" If they answered yes, they were asked a further question, "Do you think you want to depend on them?" Responses to this question are related to their live births to assess the relationship in Table 42.

Table 42 shows a significant difference in live births between women who wanted and those who did not want to depend on their children. That is, their live births were 4.7 and 3.7, respectively. Women who

Table 42. Mean number of live births by desire to depend on children at old age and total duration of marriage, ever-married women, urban only.

Desire to Depend on Children	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Yes	1.0 (115)	2.7 (95)	5.8 (521)	5.2 (38)	4.7 (770)
No	1.3 (23)	2.8 (30)	4.7 (74)	* (2)	3.7 (129)
Don't know not sure	1.4 (13)	2.8 (11)	5.4 (40)	* (1)	4.1 (65)
Don't think can depend on children	1.2 (237)	2.6 (223)	5.0 (687)	4.6 (45)	3.8(1192)
Total	1.2 (388)	2.7 (359)	5.3(1322)	4.9 (87)	4.1(2156)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between women's desire to depend on children and live births) sig. at 0.00.

Gamma = -0.16.

didn't think that they could depend on their children, in the first question, had fertility as low as those who did not want to depend on their children. A gamma of the relationship between these two variables is -0.16.

When duration of all marriage is controlled, and among women with duration of less than 5 years or 5-9 years, women who said they didn't want to depend on their children and women who said they didn't know or were not sure had slightly higher fertility than those who said they wanted to depend on their children. However, among women with duration of 10 years or more, the contrasting relationship appears and is similar to the original relationship. See Table 42.

Finally, the results of the present study do confirm the hypothesis that women who want to depend on children in old age should have more live births than those who do not want to depend on children, as was formulated earlier.

Desired number of children and live births. All currently married women aged 15-49 in the rural surveys and all ever-married women in the urban sample were asked a similar question, "If you could choose the number of children you wanted to have, how many children would you want?" The responses to this question are related to their actual fertility. When these two variables are related, some may tend to argue that the respondents may have rationalized their desired fertility by stating the number of children she they already had. Based on the Longitudinal Study of rural and urban surveys round one, Knodel and Prachuabmoh (1973) concluded that although there is evidence that some women tend to rationalize the number of children they have when stating the number they would want if they were recently married, the vast majority of respondents prefer a number which is different from the number of living children they have at the time of the interview. Thus, it is reasonable to assume that the number stated in response to the question above is the real number women wanted, not a post-rationalization.

Results from Table 43 show a linear, positive and strong association between desired number of children and live births in both rural and urban samples. For example, rural women who want 0-2 children have 3.1 live births and it increases sharply when desired number of children increases. In the rural sample, women tended to have greater

Table 43. Mean number of live births by desired number of children and total duration of marriage, currently married women (for rural) and ever-married women (for urban).

Desired No. of Children	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
0-2	0.9 (99)	2.4 (59)	4.7 (148)	4.2 (12)	3.1 (318)
3-4	1.2 (123)	3.0 (129)	6.1 (404)	5.8 (10)	4.6 (666)
5-6	1.5 (40)	3.5 (43)	6.9 (333)	4.8 (17)	6.0 (433)
7 or more	1.2 (12)	3.5 (10)	7.8 (139)	6.5 (10)	7.0 (171)
Total	1.1 (274)	3.0 (241)	6.4(1024)	5.2 (49)	5.0(1588)
Urban					
0-2	0.9 (186)	1.9 (89)	3.6 (218)	2.4 (22)	2.3 (515)
3-4	1.3 (211)	2.7 (244)	5.0 (682)	4.9 (36)	3.8(1173)
5-6	1.5 (20)	4.0 (30)	6.2 (268)	5.0 (10)	5.7 (328)
7 or more	* (1)	* (4)	7.0 (52)	* (3)	6.8 (60)
Don't know, non-numerical	0.6 (10)	* (4)	6.4 (138)	5.1 (24)	5.8 (176)
Total	1.1 (428)	2.6 (371)	5.2(1358)	4.5 (95)	4.0(2252)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between desired no. of children and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between desired no. of children and live births) = 0.40 (rural)
0.53 (urban)

actual fertility than what they desired. This is also true for women who want 0-2 children in the urban sample. However, among urban women who wanted 3-4 children, 5-6 children, and 7 children or more, actual fertility is consistent with desired fertility. This may result from the more common use of using contraceptive methods by urban women than women in rural areas, in an effort to make their fertility comparable to, or not much greater than, desired fertility. The relationship between desired number of children and live births is very strong in both areas as is indicated by gammas of 0.40 and 0.53 in rural and urban areas, respectively.

When duration of marriage is controlled, the relationship between desired number of children and actual live births in both rural and urban samples is maintained. See Table 43.

Finally, the results of the present study confirm the hypothesis of the positive relationship between desired number and actual number of children as it was stated earlier.

Contraceptive practice and live births. Probably the most important intermediate variable described by Davis and Blake (1956) in terms of accounting for the differences in the fertility of economically less developed and economically advanced countries is the use or non-use of contraception. Curiously, however, a number of studies in less developed countries have shown that contraceptors have higher fertility than non-contraceptors (Hartford, 1971:312-314: Rele and Patankar, 1971). The reasons for this seem to be that in most developing countries couples who practice family planning usually adopt their contraceptive method late in the family building process, and, in addition, are often

self-selected for higher fecundity. In Thailand, for example, a much smaller proportion of couples who have yet to achieve their stated desired number of children use contraception in comparison to the proportion of users among couples who have reached or exceeded their desired number of children (Knodel and Pitaktepsombati, 1973).

Table 44 presents the relationship between contraceptive practice and live births. In rural areas, all three groups of women (using now, used before but not now, never used) had almost the same number of live births, 4.6 and 4.8. In contrast, in the urban sample, women who were using contraceptives "now" were the ones who had the most live births, 4.0. Women who had used contraception "before but not now" had the second lowest. Women who had never used it before had the lowest live births, 3.1. This indicates that family planning among these women is for the purposes of preventing the birth of many children rather than for child-spacing. The relationship between contraceptive practice and live births is strong in the urban sample, but not in the rural sample as is indicated by a gamma of 0.29 in urban sample and of -0.05 in the rural sample.

When duration of marriage is controlled, contraceptive practice seems to have a stronger effect on live births among women with duration of marriage less than 5 years than on other duration categories, in both samples. For example, in the urban samples, women who had never used a contraceptive method had live births of 43% lower than those who were "now" using and had previously used some method, 0.8 compared with 1.4 live births. However, when the duration of marriage was 5-9 years or 10 years or more, the percent lower was

Table 44. Mean number of live births by contraceptive practice and total duration of marriage, currently married women, aged 15-49.

Practice	Duration of Marriage				Total
	Lt 5	5-9	10 or more	Don't know	
Rural					
Using now	1.7 (30)	3.2 (71)	5.7 (172)	* (0)	4.6 (273)
Used before	1.4 (15)	3.3 (16)	6.5 (44)	* (0)	4.8 (75)
Never used	1.0 (214)	2.9 (153)	6.3 (592)	5.4 (14)	4.6 (973)
Total	1.1 (259)	3.0 (240)	6.2 (592)	5.4 (14)	4.6(1321)
Urban					
Using now	1.4 (110)	2.7 (167)	5.1 (444)	* (6)	4.0 (727)
Used before	1.5 (45)	2.6 (59)	5.1 (73)	* (4)	3.4 (181)
Never used	0.8 (232)	2.4 (115)	4.9 (356)	* (5)	3.1 (708)
Total	1.1 (387)	2.6 (341)	5.0 (873)	4.2 (15)	3.6(1616)

*Mean not calculated when the number of respondents is less than 10.

X^2-test (between using contraceptive method and live births) sig. at 0.00 (rural)
0.00 (urban)

Gamma (between using contracpetive method and live births) = -0.05 (rural)
-0.29 (urban)

only 11% and 4% respectively. In addition, the original relationship was still maintained. See Table 44.

Finally, the results of the present study do confirm the hypothesis of higher live births among whoever practiced or are practicing than those who never practiced. In addition, it also confirms the results of the urban survey round one. For the rural comparison there is some slight difference between the results of both rounds. That is, in round one sample, women who had never used a contraceptive method before had much lower live births than those who were "now" using one or those who had used one before. The results of the present study found live births of the three groups of women to be almost the same. The small differences involved may have been due to the age at the time of the interview of the women included in the analysis. In the first round, only women aged 15-44 were asked questions about contraceptive practices; in the second round the age was expanded to ages 15-49. In addition, in the second round, some of the former women were lost and new women were added. Thus, the level of fertility may have thereby been affected. See Table 44.

In conclusion, among all variables which were analyzed from Table 4 to Table 44, the following variables were significantly related to fertility (gamma of 0.15 or more) and will be included for consideration in the quantitative analysis and causal analysis. In the rural sample, those variables are: 1) women's age, 2) infant mortality, 3) experience living in urban areas, 4) desired number of children, 5) women's age at first marriage, 6) place wanted to deliver baby, 7) person wanted to deliver baby, 8) place usually delivered

babies, 9) person who usually delivered babies, 10) women's education, 11) women's experience in working for wages before marriage, 12) duration of marriage. In the urban sample, the variables are: 1) women's age, 2) women's education, 3) husbands' attitudes toward family planning, 4) women's attitudes toward family planning (from direct question), 5) women's attitudes toward family planning (from indirect question), 6) infant mortality, 7) practice of contraceptive method, 8) age at first marriage, 9) husband's type of employment, 10) women's experience in working for a wage before marriage, 11) reading the newspaper, 12) listening to the radio, 13) women's attitudes toward having only 2 children, 14) women's desire to depend on children in old age, 15) desired number of children, 16) length of living in urban areas, 17 duration of marriage.

Analysis of the Realtionship Bewteen Socio-Demographic and Economic Factors and Live Births: A Quantitative Approach

The major purpose of this section is to analyze the relationship between socio-demographic and economic factors and the number of live births among rural Thai women. Specifically, variables which were significantly related to live births in the first section will be selected and incorporated into models to assess the total effect of these variables on live births. Also, the effect of each of these variables will be compared to ascertain which factor had more influence on live births than the others. These analyses will be based on eight regression analyses: rural women as a whole, rural women with a duration of marriage of between 5-9 years, rural women with a duration of marriage of 10 years or more, urban women as a whole, urban women

with a duration of marriage of less than 5 years, urban women with a duration of marriage of between 5-9 years, and urban women with a duration of marriage of 10 years or more.

As was already mentioned, there were 12 and 17 variables in the rural and urban analyses, respectively, which have to be considered for inclusion in the regression models. Not all of these variables will be included in the models because of the high multicollinearity among variables. Thus, the zero-order correlation matrix among these variables will provide a basis for selection of variables to be included in the models. Before investigating the relationship among these variables, it is necessary to provide information on how these variables are operationalized.

In the rural analysis, the 12 variables are operationalized as follows:

Variable 2, (Var. 2) or women's ages are coded in 5 year age groups from 15-19 years, to 50 or more and coded as 1 to 8. As an ordinal measurement it will be treated as an interval variable.

Var. 12, or number of live births, varying from 0 to 20, is again an interval variable.

Var. 13, or number of infant deaths. This is an interval variable which was coded as zero if there were no deaths, and as 1, 2, 3, etc. according to the number of deaths.

Var. 23 or number of years (women) ever lived in an urban area. This variable is coded in ordinal form: 0 = never lived, 1 year = 1, 2-4 years = 2, 5-9 years = 3, 10 years or more = 4. This variable will be treated as an interval variable.

Var. 39, or desired number of children. This is an interval variable.

Var. 48, or women's age at first marriage. This variable was coded in ordinal form: less than 15 years = 1, 15-19 = 2...30 or more = 5. It will be treated as an interval variable.

Var. 76, or desired place of baby delivery, is a dichotomous variable with 0 = home, 1 = modern medical facilities.

Var. 77, or desired person to deliver baby, is also a dichotomous variable with 0 = self, 1 = modern medical personnel.

Var. 80, or person who usually delivered babies, is the same as Var. 77.

Var. 81, or place usually delivered babies, is the same as Var. 76.

Var. 90, or women's education was coded in category form: no or less than primary = 1, primary = 2, secondary = 3, high school = 4, college or university = 5. It will be treated as an interval variable.

Var. 95, or women's experience in working for a wage before marriage, is a dichotomous variable, with 0 = never worked, 1 = worked.

Var. 110, or women's duration of marriage, was coded in ordinal form: 0-4 = 1, 5-9 = 2, 10 years or more = 3. However, it will be treated as an interval measurement.

In the urban analysis, the 17 variables are operationalized as follows:

Var. 2, or women's 5 year age groups was coded as 15-19 = 1... 60 and over = 11. It is an ordinal measurement, but will be treated as an interval variable.

Var. 6, or women's education, is the same as Var. 90 in the rural analysis.

Var. 11, or husband's attitude toward family planning, was coded as 0 if respondents said "disapproved and others", 1 if the respondent said "approved".

Var. 13, or women's ethnicity, was coded as 0 if the respondent was of Chinese ethnicity and other ethnic groups, 1 if the respondents were of Thai ethnicity.

Var. 15, or women's attitude toward family planning (from a direct question), is the same as Var. 11.

Var. 17, or number of live births, is an interval variable.

Var. 18, or numberof infant deaths, is the same as Var. 13 in the rural analysis.

Var. 23, or women's attitude toward family planning (from indirect question), is the same as Var. 15.

Var. 26, or women's practice of family planning was coded such that the respondents who never practiced any type of family planning were 0 and those who ever practiced or were practicing were coded as 1.

Var. 29, or women's age at first marriage, is an interval variable.

Var. 35 or husband's type of employment was coded such that the respondents who were employed by a private or government sector were 1. The rest were coded as 0.

Var. 43, or women's experience in working for wage before marriage, was coded the same as Var. 95 in the rural analysis.

Var. 47, or women's reading of a newspaper, was coded such that respondents who never read the newspaper were 0 and those who did read were 1.

Var. 48, or women's listening to the radio, was coded such that respondents who never listened to radio were 0 and those who ever listened to the radio were 1.

Var. 52, or women's opinion about having only 2 children was coded such that women who said it was advantageous were 1, the rest were 0.

Var. 54, or women's desire to depend on children in old age was coded such that the respondents who said "yes" were 1, and the rest were 0.

Var. 56, or women's duration of marriage, is an interval variable.

Var. 56, or women's desired number of children, is also an interval variable.

Var. 64, or number of years women lived in urban areas, was coded in ordinal form, but will be treated as an interval variable.

Based on these operationalizations, the zero-order correlation between these variables is presented in Tables 45 and 46.

From Table 45, the following variables are selected to be included in the quantitative and causal analysis: 1) women's age, 2) number of infant deaths, 3) number of years women lived in urban areas, 4) women's desired number of children, 5) women's age at first marriage, 6) place babies were usually delivered, 7) women's education, 8) women's experience in working for a wage before marriage. Desired place of birth delivery, desired person to deliver baby, and usual person to deliver baby are left out because of high interrelation between themselves and with usual place of delivery. In addition, all four variables represent the same concept, substantively. Usual place of delivery is

Table 45. Zero-order correlation, means and standard deviation, rural only.

	2	12	13	23	39	48	76	77	80	81	90	95	110
2	1.00	0.59	0.25	0.14	0.26	0.13	-0.05	-0.07	-0.20	-0.20	-0.47	-0.14	0.73
12		1.00	0.47	0.25	0.39	-0.17	-0.12	-0.15	-0.20	-0.25	-0.30	-0.11	0.62
13			1.00	0.16	0.12	-0.06	-0.06	-0.09	-0.12	-0.11	-0.14	-0.04	0.25
23				1.00	0.09	-0.04	-0.09	-0.13	-0.19	-0.25	-0.16	-0.05	-0.34
39					1.00	-0.10	-0.15	-0.12	-0.15	-0.17	-0.12	-0.08	0.25
48						1.00	0.09	0.08	0.16	0.17	0.05	-0.00	-0.09
76							1.00	0.69	0.32	0.34	0.13	0.04	-0.07
77								1.00	0.47	0.38	0.20	0.05	-0.09
80									1.00	0.78	0.27	0.11	-0.21
81										1.00	0.22	0.11	-0.25
90											1.00	0.05	-0.36
95												1.00	-0.13
110													1.00
$\bar{X}$	5.16	5.06	0.44	49.04	4.22	2.63	0.35	0.37	0.13	0.09	1.58	0.24	2.50
SD	2.18	3.42	0.96	36.77	1.99	0.77	0.58	0.48	0.34	0.28	0.57	0.43	0.76

2 = Woman's age group
12 = Number of live births
13 = Number of infant deaths
23 = Number of years woman lived in urban areas
39 = Woman's desired number of children
48 = Woman's age at first marriage
76 = Desired place of birth delivery
77 = Desired person to deliver baby
80 = Usual person to deliver baby
81 = Usual place of delivery
90 = Woman's education
95 = Woman's working before marriage
110 = Woman's duration of marriage

Table 46. Zero-order correlation, means and standard deviation, urban only.

	2	6	11	13	15	17	18	23	26	29	35	43	47	48	52	54	56	57	64
2	1.00	-0.27	-0.25	-0.16	-0.32	0.50	0.25	-0.29	0.02	0.11	0.01	-0.21	-0.31	-0.15	-0.11	-.12	-.86	-.26	-.31
6		1.00	0.37	0.23	0.43	-0.34	-0.14	-.27	-.10	-.27	0.00	0.31	0.49	0.18	0.13	-0.39	-0.34	-0.24	0.03
11			1.00	0.13	0.39	-0.29	-0.15	0.26	0.15	0.15	-0.03	0.22	0.33	0.12	0.11	-0.22	-0.30	-0.16	-0.02
13				1.00	-.16	-0.14	-.-3	-.18	0.07	0.01	0.09	0.12	0.22	0.24	0.20	-0.13	-0.18	-0.18	-0.16
15					1.00	-0.24	-0.13	-.40	-.21	0.10	-0.20	-.20	-.40	-.19	-.16	-0.22	-0.31	-0.25	-0.00
17						1.00	-.42	-0.18	0.14	-0.28	-0.00	-0.25	-0.30	-0.11	-0.21	-.12	-.63	-.41	-.21
18							1.00	-0.09	0.02	-0.10	-0.03	-0.10	-0.13	-0.03	-0.04	0.08	0.29	0.13	0.04
23								1.00	0.27	0.03	0.01	0.14	0.31	0.16	0.15	-0.15	-0.25	-0.19	-0.03
26									1.00	-0.06	0.00	0.06	0.12	0.07	0.06	-0.10	-0.50	-0.06	0.11
29										1.00	-0.04	0.22	0.15	0.03	0.03	-0.10	-0.21	-0.13	0.07
35											1.00	0.02	-0.04	0.01	-0.01	0.00	0.01	0.01	-0.04
43												1.00	0.19	0.10	0.08	-0.11	-0.27	-0.12	-0.00
47													1.00	0.24	0.14	-0.23	-0.33	-0.23	-0.03
48														1.00	0.07	-0.15	-0.16	-0.10	-0.02
52															1.00	-0.07	-0.16	-0.41	-0.09
54																1.00	0.11	0.11	-0.34
56																	1.00	0.33	0.28
57																		1.00	0.12
64																			1.00
$\bar{X}$	6.29	2.15	0.61	0.69	0.54	3.97	0.21	0.69	0.56	21.17	0.98	0.39	0.66	0.88	0.67	0.86	15.65	3.56	5.44
SD	2.40	1.24	0.49	0.46	0.50	2.91	0.59	0.46	0.50	4.36	0.15	0.49	0.47	0.33	0.47	0.34	11.67	1.49	1.17

2 = Woman's age group
6 = Woman's education
11 = Husband's attitude toward family planning
13 = Woman's ethnicity
15 = Women's attitude toward family planning (direct question)
17 = Number of live births
18 = Number of infant deaths
23 = Woman's attitude toward family planning (indirect question)
26 = Woman's practicing of family planning
29 = Woman's age at first marriage
35 = Husband's type of employment
43 = Woman's working before marriage
47 = Woman's reading the newspaper
48 = Woman's listening to the radio
52 = Women's attitude toward a family of 2 children
54 = Woman's desire to depend on children at old age
56 = Woman's duration of marriage
57 = Woman's desired number of children
64 = Woman's number of years lived in urban areas

selected because of the higher zero-order correlation with live births.

Var. 110 is left out because of a high correlation with Var. 2, and will be used as a control variable.

From Table 46, the following variables are selected to be included in the quantitative analysis: 1) women's age, 2) women's education, 3) women's ethnicity, 4) women's attitude towards family planning, 5) number of infant deaths, 6) women's practicing of family planning, 7) women's age at first marriage, 8) husband's type of employment, 9) women's experience in working for a wage before marriage, 10) women's reading of newspaper, 11) women's desire to depend on children at old age, 12) women's desired number of children, 13) number of years women lived in urban areas.

Even though the zero-order correlation between women's duration of marriage and live births is quite high in both the rural and urban analyses, it will not be included in the models because it is highly correlated with age. In addition, it will be used as a control variable in both the rural and urban models. (From a preliminary run of regression of live births with duration of marriage and other independent variables provided almost the same R^2 as regression of live births with age and other independent varaibles.)

In order to assess the total effect of these variables on fertility, compare the effect of each variable on fertility within the sample, two models of regression analysis are proposed.

Model 1, or model for the rural sample, will consist of eight independent variables:

1) Women's age,

2) women's age at first marriage,

3) women's education,

4) number of infant deaths,

5) number of years women lived in urban areas,

6) women's working before marriage,

7) women's desired number of children,

8) places women usually delivered babies.

The regression equation for this model is

$$Y = 1 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + e_i$$

The regression analysis for the rural sample will consist of 4 analyses: the whole sample (all women), of women with a duration of marriage of less than 5 years, of women with a duration of marriage of 5-9 years, and of women with a duration ofmarriage of 10 years or more.

Model 2, or model for the urban sample, consists of 13 independent variables, as listed before. The regression equation for this model is

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + b_{12}x_{12} + b_{13}x_{13} + e_i$$

Similarly, the regression analysis will be done for the whole sample, for women with a duration of marriage of less than 5 years, for women with a duration of marriage of 5-9 years, and for women with a duration of marriage of 10 years or more.

The regression analysis of both models will provide unstandardized

and standardized regression coefficients (b and B), and R^2. These statistics will facilitate assessment of the total effect of these variables on the number of live births, and comparison of the effect of each variable relative to that of the other variables and comparison of the effect of the same variable across duration of marriage.

Quantitative Analysis of the Effect of Socio-Demographic and Economic Factors on Live Births

Results from Table 47 present the b, B and R^2 of each regression analysis. For the whole sample, this model explains the following: 1) It was able to explain more than half of the variation in the live births of rural women (R^2 = .551). That is, about 55% of the variation in live births among rural women can be explained by these eight variables. 2) Women's ages, number of infant deaths, women's age at first marriage, and women's desired number of children are ranked from 1 to 4 in their importance in affecting fertility. Also, these four variables almost accounted for all the explained in in the model (54 out of total 55%). The effect of each of these four variables on live births is statistically significant at a .001 level. Women's education, the place women usually delivered babies, and the number of years lived in urban areas also affected their live births significantly (statistically) at the .001 level, even though they contributed proportionally very little in explaining fertility. 3) Women's experience in working for a wage was the least influential factor on their live births, and its effect is not statistically significant. 4) In the context of other variables, education in this model had a positive effect on live births.

Table 47. Regression analysis of live births of ever-married women, rural only.

Independent Variable	Duration of Marriage			
	0-4	5-9	10 or more	Total
	Standardized			
1. Women's age	1.005***	.465***	.324***	.513***
2. Number of infant deaths	.026	.310***	.371***	.313***
3. Women's age at first marriage	-.714***	-.404***	-.206***	-.215***
4. Women's desired number of children	--	.272***	.181***	.165***
5. Women's education	.211**	-.021	.052	.047*
6. Number of years women lived in urban areas	.066	-.086	-.060*	-.043*
7. Women's working before marriage	-.043	-.083	-.036	-.036
8. Place of usual delivery	-.166	-.031	-.052	-.048*
R^2	.507	.363	.379	.551
	Unstandardized			
1. Women's age	.950***	.670***	.637***	.856***
2. Number of infant deaths	.076	.682***	.979***	.967***
3. Women's age at first marriage	-.840***	-.638***	-.822***	.879***
4. Women's desired number of children	--	.218***	.266***	.266***
5. Women's education	.597**	-.046	.270	.262*
6. Number of years women lived in urban areas	.082	-.134	-.234*	-.176*
7. Women's work before marriage	-.101	-.230	-.257	-.262
8. Place of usual delivery	-.453	-.116	-.705	-.564*
Constant	.656	1.913	2.822	1.547
R^2	.507	.363	.379	.551

***p .001
**p .01
*p .05
-- = not provided because its F-level is too small

It should be interesting to see how these eight variables affect the live births of women with different durations of marriage. Therefore, the regression analysis of these eight variables on live births will be divided into three groups: for women with a duration of less than 5 years, women with a duration of marriage of 5-9 years, and women with a duration of marriage of 10 years or more.

Regression analysis of the live births of women with a duration of marriage of less than 5 years was able to explain significantly the variation in fertility among rural women. That is, 51% of the variation in their fertility was explained by these factors. Furthermore, women's age, women's age at first marriage, and women's education contributed almost the whole of the explained (48 out of 51%) for variation in fertility. Other variables, especially women's desired number of children, had very minimal effect on live births. One interesting point is that education, which did not have as strong an effect on live births in the whole sample analysis (b = .262) was the variable which did have a strong effect on live births (b = .597) in this sample. Education still had a positive effect on fertility also. In this model, only three variables--age, age at first marriage, and education--had an effect on live births (statistically significant at .001, .001 and .01 respectively.

The regression analysis of these eight independent variables on live births of rural women with a duration of marriage of 5-9 years is also presented in Table 47. These 8 variables were able to explain only 36% variation in fertility among women of this group. Women's age, women's age at first marriage, infant mortality, and women's

desired number of children were the variables which had a major effect on the live births of women in this group. The effect of each variable on live births was statistically significant at a .001 level. The effects of other variables on live births were statistically insignificant. One interesting point is that the effect of women's education became negative (b = -0.046 or B = -.021), which means that increase in educational categories results in decrease in number of live births.

The results of regression analysis of eight independent variables on live births of rural women with a duration of marriage of 10 years or more was able to explain about 38% of the variation in fertility among these women, which was comparable to the ability of this same model to explain variation in fertility among women with a duration of 5-9 years. But much lower than its ability to explain variation in fertility among women with a duration of marriage of less than 5 years. Infant mortality, women's age, women's age at first marriage, and women's desired number of children were the four major variables which contributed overwhelmingly in explaining variation in fertility (37 out of 38%). The effect of each of these four variables on fertility was statistically significant at a level of .001. In addition, women's length of living in urban areas became more significant variable when compared with other variables (B = 0.060), and its effect on fertility was significant at a .05 level. Other variables--place where babies were usually delivered, women's desired number of children and women's work experience before marriage contributed insignificantly to the explained variation in fertility. Furthermore, the effect of

each of these variables on fertility was not statistically significant. See Table 47.

It should be interesting to compare how the same variable affected the fertility of women with a different duration of marriage by comparing unstandardized regression coefficients (b). It should be noted that the effect of each variable to be mentioned is its effect on live births in the context of other variables.

1. Age of women had a positive effect on live births in all four groups. Its effect on live births in each category of duration of marriage was statistically significant at a .001 level. It operated with the strongest effect (b = .950) among women who had been married less than 5 years. This means that each (category of) age increase will increase live births for the women composing it by about .950, while increasing by only .670 and .637 the live births among women with a duration of 5-9 years, and or 10 years or more, respectively.

2. Infant mortality had a positive effect on live births in all four categories of duration of marriage. Its effect on live births was statistically significant only among women with a duration of 5-9 years, and among those with a duration of 10 years or more. It had the most effect on live births among women who had married 10 years or more, (b = .979) and the least among women with a duration of less than 5 years.

3. Women's age at first marriage had a negative effect on live births in all four groups. Its effects were statistically significant at the .001 level in all groups. However, difference in age at first marriage among women who had been married less than 5 years was more

influential than the difference among other groups. For example, by increasing one unit of age at first marriage, a decreasing in live births of .840 results, while such an increase decreases live births by only .638 and .822 among women with a duration of 5-9 years, and women with a duration of 10 years or more.

4. Women's desired number of children had a positive effect on live births in three categories of duration of marriage. Its effect on live births was statistically significant at the .001 level in all categories of duration of marriage, except among women with a duration of less than 5 years, where its effect was negligible, perhaps because most women in that group still had not given birth to their desired number of children. Its effect was strongest among women with a duration of 10 years or more.

5. Women's education had a positive effect on live births in all categories of duration of marriage, except among women with a duration of 5-9 years. Its effect on live births was statistically significant at the .01 and .05 levels only among women with a duration of less than 5 years and among women of the whole sample, respectively. Its effect on live births among women with a duration of 5-9 years, and of 10 years or more may be due to chance. Its effect on live births was strongest among women with a duration of marriage of less than 5 years (b = .597). The positive effect of education on live births among women for the whole sample was contradictory to the reverse relationship in the bivariate relationship. This may be due to the fact that the effect of education in regression analysis was considered in the context of other variables i.e., age, age at first

marriage, number of infant deaths, while in the bivariate relationship, the analysis was limited only to two variables--education and live births. The positive effect of education among women with a duration of marriage of less than 5 years does not deviate from the pattern of association in bivariate relationships, especially in the rural sample. Since, in the bivariate relationship, the difference in live births by education attainment among women with a duration of less than 5 years was so small.

6. The number of years women (ever) lived in urban areas affected live births negatively among women of the whole sample, women with a duration of 5-9 years, and women with a duration of 10 years or more. It had a positive effect on live births among women with a duration of less than 5 years. These patterns of relationships are consistent with the pattern in the descriptive analysis. However, the effect was statistically significant only among women in the whole sample and among women with a duration of 10 years and more. Its effect on live births among the other two groups may have been due to chance fluctuation.

7. The effect of working for a wage before marriage on the live births of rural women was generally a negative one. However, this effect may have been due to chance fluctuation rather than the real effect.

8. Place where women usually delivered their babies generally had a negative effect on live births. That is, the more modern facilities (as indicated by delivering babies at a hospital, clinic, or health center) used by the women, the lower the number of live

births. However, its effect was statistically significant only among women in the whole sample.

Model 2, Regression Analysis for the Urban Sample

Model 2 consists of 13 independent variables, which were considered to be significantly related to live births. Table 48 presents the effect of these 13 variables on live births. For the whole sample:

1) This model was able to explain 62% of the variation in live births of urban women. It should benoted that it was age, age at first marriage, infant deaths, practicing of family planning, and education of women which explained almost all of the proportion explained by the model (61 out of 62%).

2) As is indicated by the standardized regression coefficient, women's age was the most influential factor in affecting live births. Women's ethnicity was the variable which had the weakest effect on live births. Age at first marriage, number of infant deaths, desired number of children, practicing of family planning, all had very importnat effects on live births, and the effect of each of these variables on live births was statistically significant at the .001 level. The effect of education and of reading the newspaper on live births, even though seemingly not very strong, were also statistically significant.

3) Age, infant deaths, desired number of children, practicie of family planning, desire to depend on children, number of years lived in urban areas and ethnicity of women had positive effects on live births. That is, the change in these factors result in increasing the number of live births. In contrast, the following variables for urban women had a negative effect on live births: age at first marriage,

Table 48. Regression analysis of live births of ever-married women, urban only.

Independent Variables	Duration of Marriage			
	0-4	5-9	10 or more	Total
	Standardized			
1. Women's age	.638	.283	.338	.519
2. Women's age at first marriage	-.586	-.205	-.316	-.319
3. Number of infant deaths	.115	.240	.277	.209
4. Women's desired no. of children	.172	.423	.172	.171
5. Women's practice of family planning	.413	.118	.211	.171
6. Women's education	-.124	-.082	-.126	-.080
7. Women's reading the newspaper	-.046	-.024	-.045	-.045
8. Husband's type of employment	.066	-.025	-.033	-.033
9. Women's desire to depend on children	-.056	-.046	-.073	-.033
10. Women's attitude toward family planning	-.011	.036	-.055	-.034
11. Women's working before marriage	-.107	-.086	--	-.023
12. Women's no. of years lived in urban areas	.039	.046	.021	.022
13. Women's ethnicity	.028	.030	--	.004
	Unstandardized			
1. Women's age	.478***	.347*	.748***	.850***
2. Women's age at first marriage	-.100***	-.057	-.221***	-.200***
3. No. of infant deaths	.443	.666**	1.138***	1.084***
4. Women's desired no. of children	.129*	.435***	.292***	0.317***
5. Women's practice of family planning	.657***	.298*	1.064***	.874***

Table 48 (cont.)

Independent Variables	Duration of Marriage			
	0-5	5-9	10 or more	Total
6. Women's education	-.074	-.069	-.273**	-.156***
7. Women's reading the newspaper	-.099	-.080	-.245	-.268*
8. Husband's type of employment	-.110	-.062	-.164	-.167
9. Women's desire to depend on children	-.098	-.121	.386*	.182
10. Women's attitude toward family planning	.021	.101	-.272	-.180
11. Women's working before marriage	-.172	-.203	--	-.114
12. Women's no. of years lived in urban areas	.020	.047	.061	.048
13. Women's ethnicity	.051	.087	--	.023
Constant	1.504	1.202	3.370	2.190
R^2	.406	.323	.442	.617
Number of cases	208	246	672	1126

***p .001
**p .01
*p .05
-- = not provided because its F-level is too small

education, reading the newspaper, attitude toward family planning, husband's type of employment, and working before marriage. That is, changes within those factors result in decreasing the number of live births of the women.

For urban women with a duration of less than 5 years, the model was able to explain only 41% of the variation of live births of women of this group. This is a much smaller percent than the model was able to explain for the variation in the whole sample. However, the similarity is that it was age, age at first marriage, infant deaths, desired number of children, practice of family planning, and education which contributed overwhelmingly to the proportion of fertility explained as was the case in the whole sample. The difference is that among women with a duration of less than 5 years, practice of family planning became one of the most important factors affecting fertility. In addition working before marriage which had a very weak effect on live births among the whole sample (B = -.023) became increasing important in its effect on live births (B = -.107) in this sample. Attitude toward family planning, and ethnicity were the least influential factors.

For urban women with a duration of 5-9 years, the model was able to explain only 32% of the variation in fertility of these women. Similarly, desired number of children, infant deaths, working before marriage, practice in family planning, age, age at first marriage, and education of urban women explained almost all the variation in live births (31 out of 32%). The rest of the variables contributed insignificantly. Among this group of women, desired number of children

was the most influential factor in affecting fertility (B = .423). Their ethnicity was the least influential factor.

For urban women with a duration of 10 years or more, the model was able to explain 44% of the variation in live births among these women. It was infant deaths, age at first marriage, age, desired number of children, practice of family planning, education, which explained almost all the proportion explained by the whole model (43 out of 44%). The other variables contributed only 1% to the total proportion explained. Based on the standardized coefficient, age, age at first marriage and infant deaths were the most important factors affecting live births. The effect of practice of family planning and desired number of children and education on live births was second to the variables mentioned above. The effects of women's working before marriage and ethnicity on live births was considered negligible, or the lowest among the thirteen variables.

Based on the unstandardized regression coefficient, in Table 48, the effect of each variable on live births across duration of marriage can be compared as follows:

1. Women's age had a postive effect on live births and also affected fertility similarly in all four categories of duration of marriage. Its effect on live births was statistically significant at a level of .001 among women with a duration of less than 5 years, 10 years or more, and among women in the whole sample, and was significant at a level of .05 among women with a duration of 5-9 years. Its effect on live births was strongest among women with the longest duration of marriage and was weakest among women with a duration of 5-9 years.

2. Women's age at first marriage had a negative effect on live births for the whole sample as well as for each category of duration. Its effect on live births was statistically significant at the .001 level for the whole sample, for women with a duration of marriage of less than 5 years, and for 10 years or more. The effect of age at first marriage on live births was strongest among women with a duration of 10 years or more and was weakest among women with a duration of 5-9 years.

3. The number of infant deaths had a positive effect on live births in all categories. Its strongest effect on live births was among women with the longest duration of marriage and was weakest among women with the shortest duration of marriage. The effect of women's age at first marriage was statistically significant among women in the whole sample, women with a duration of 5-9 years, and among those with a duration of 10 years or more, but it was not significant among women with a duration of less than 5 years.

4. Women's desired number of children had a positive effect on live births in all categories. Its effect on live births was statistically significant at .001 among women of the whole sample, women with a duration of 5-9 years, and of 10 years or more. It also was statistically significant at .05 among women with a duration of less than 5 years. Its effect on live births was strongest among women with a duration of between 5-9 years and was weakest among women with a duration of less than 5 years.

5. Women's contracpetive practice had a positive effect on live births in the whole sample and in three categories of duration of marriage and was statistically significant. Positive effect of the

practice of family planning and live births means that increases in its practice results in increase in live births. This is the result of the prevalent practicing of family planning among women who already had more children than they wanted and who wanted to stop having babies. Its effect on live births was strongest among women with a duration of 10 years or more, and was weakest among women with a duration of 5-9 years.

6. Women's education had a negative effect on live births of women in the whole sample, as well as in three categories of duration, and its effect was significant at .001 and .01 for the whole sample and for those women with a duration of 10 years or more. Its effect was strongest among women with a duration of 10 years or more. The effect of education on live births was almost the same abmong women with a duration of less than 5 years and of 5-9 years ($b = -.074$ and $b = -.069$). This effect may have been due to chance fluctuation rather than being a real effect.

7. Women's reading of the newspaper had a negative effect on live births, but was statistically significant only among women of the whole sample. Its effect on live births was strongest among women with the longest duration of marriage and was weakest among women with a duration of 5-9 years.

8. Husband's type of employment had a negative effect on live births in all categories of duration of marriage. However, it was not statistically significant. Its effect was strongest among women with the longest duration of marriage and was weakest among women with a duration of 5-9 years. However, these effects may have been due to chance fluctuation more than a real effect.

9. Women's desire to depend on children had a negative effect on live births of women in the whole sample and all other duration of marriage. Its effect on live births was statistically significant only among women with a duration of 10 years or more.

The rest of the variables--women's attitude toward family planning, women's working before marriage, women's number of years lived in urban areas, and women's ethnicity--did not significantly (statistically) affect their live births. The effect as indicated by the regression coefficient may have been due to chance fluctuation.

CHAPTER V

SUMMARY AND CONCLUSIONS

Purposes of the Study

The general purpose of this study is to assess the nature and magnitude of relationship between social, demographic and economic factors on the one hand, and women's fertility on the other, in both rural and urban areas of Thailand. The present study will specifically attempt to address the following objectives:

1. To assess the nature and magnitude of fertility differentials from the 1972 and 1973 Longitudinal Study, Round Two. In addition, the results of the present study will be compared, in general, with the results of the 1969 rural and the 1970 urban surveys. This may enable one to see whether the previous findings still hold true.

2. To analyze the effects of those variables which were not analyzed in the earlier studies on fertility.

3. To quantitatively assess the effect of the social, demographic and economic variables on fertility. Specifically, this study will attempt to a) assess a total effect of the selected variables on fertility, b) compare the effect of each variable upon the selected variables, and c) compare the effect of one or the same variable across a duration of marriage.

Data Sources

The present study is based on the data collected from the Longitudinal Study of Social Economic and Demographic Change in Thailand,

Round Two, from both rural and urban samples conducted in the summers (April-May) of 1972 and 1973 respectively. Both samples are national level samples. In the rural sample, about 1448 households were selected for interviewing, and approximately 2,153 females and males were interviewed, directly or indirectly (information for certain parts were necessarily gained by asking other persons). For the urban sample, about 1,585 households were selected, and about 3,153 females and males were interviewed.

The Data

Throughout the study, the analysis consists of one dependent variable--number of live births--several independent variables, and one controlled variable--total duration of women's marriage. The independent variable is broadly classified into 8 theoretical concepts: background, infant mortality, labor force participation, modernity, change in occupation, old age security, attitude toward having "few" and "many" children, desired number of children, and contraceptive practice.

Methods of Analysis

Several techniques were utilized in the analysis:

1. Crossbreak technique was used as a main instrument. It provided an arithmetic mean of live births as presented in tables in the descriptive analysis.

2. Cross-tabulation technique was used to provide the gamma and chi-square statistic. These statistics were used as evidence of a strength and significance of relationship between independent variables and live births. In addition a gamma of 0.15 of the relationship

between live births and each independent variable was used as a criterion to select independent variables to be included in the quantitative analysis.

3. Regression analysis was used to assess the total effect of the selected variables on live births, to compare the importance of the effect of each variable, and to compare the effect of the same variable across the duration of marriage.

Results of the Study

Generally, the following was found:

1. The number of live births of urban women is lower than that of rural women, considering all variables (i.e. age, education) and almost all categories of the same variable (i.e. 15-24 years old; primary, secondary level).

2. The number of live births of those who didn't know how long they had been married was usually between the number of live births of women with duration of 5-9 years and of 10 years or more.

3. For a duration of marriage of less than 5 years, the majority of the independent variables in the analysis had no effect or very little effect on the number of live births. That is, they didn't differentiate the number of live births among women with different characteristics. The plausible reason for this is that Thai women, regardless of their socio-demographic and economic characteristics and their current residence, tend not to inhibit pregnancy in their earlier period of their marriage (as indicated by shorter duration of marriage).

4. The effect of the independent variables on the number of live births was more evident or systematic where a duration of marriage was longer--5-9 years, 10 years or more.

Other specific findings from the analyses included the following:

1. Women's age, in both samples, had a very strong, positive and linear relationship with the number of live births. The partial relationship of these variables among women with a duration of marriage of 5-9 years and 10 years or more were similar to the original relationship. The effect of women's age on the number of live births in context of other variables (7 in the rural sample and 12 in the urban sample) was the most important in both samples (B = .519 and .513 in the rural and urban samples, respectively). In addition, its effect on live births was statistically significant in all categories of duration of marriage in both samples. Women's age had the most effect on the number of live births among women with the longest duration of marriage (10 years or more) and the least effect among women with a duration of 5-9 years in the urban sample. In the rural sample, its effect on live births was strongest among women with the shortest duration and weakest among women with the longest duration of marriage.

2. In both rural and urban samples, the number of infant deaths had very strong, positive and linear relationship with the number of live births. In addition the partial relationships were the same as the original relationship, when the relationship between infant deaths and live births was controlled by women's duration of marriage.

The effect of infant deaths on the number of live births, in context of other variables, was also strong. Its effects on live births was statistically significant in all categories of duration of

marriage, except among women with a duration of less than 5 years in both samples. Its effect on live births was strongest among women with a duration of 10 years or more and weakest among women with a duration of less than 5 years, in both samples.

3. Women's age at first marriage in both samples (especially among urban women) had a strong negative and linear relationship with their live births. The original relationship was vigorously maintained in the partial relationship, when women's duration of marriage was controlled.

The effect of women's age at first marriage on the number of live births was still strong when other variables were taken into account. Its effect on live births was statistically significant in all categories of duration of marriage. It had the most effect on live births among women with a duration of less than 5 years, and the least effect among women with a duration of marriage of 10 years or more in the rural sample. In the urban sample, it had the most effect on live births among women with a duration of 10 years or more and the least effect among women with a duration of 5-9 years.

4. Desired number of children of both rural and urban women had a very strong positive and linear relationship with their live births. This original relationship was vigorously maintained in the partial relationship, when women's duration of marriage was controlled.

The effect of women's desired number of children on their number of live births was statistically significant in all categories of duration of marriage, except among rural women with a duration of marriage of less than 5 years. Its effect on live births was strongest

among women with a duration of 5-9 years, and weakest among women with a duration of less than 5 years in both samples.

5. Education of both rural and urban women had very strong negative and linear relationship with their live births. Also, the original relationship was strongly maintained in the partial relationship.

Its effect on live births was not so strong compared to those four variables mentioned above. In the rural sample, the effect of women's education on live births became a positive one and was statistically significant among women of the whole sample and women with a duration of marriage of less than 5 years. The positive effect for the whole sample may be due to the fact that the effect of education in regression analysis was considered in the context of other variables. The positive effect of education among women with a marriage duration of less than 5 years does not really deviate from the pattern of association in the bivariate relationship, where the difference in live births by educational attainment (with duration of marriage of less than 5 years) was so small. In the urban sample, women's education still had a negative effect, when other variables were taken into account, but its effect was statistically significant only among women of the whole sample and women with duration of marriage of 10 years or more. The effect of women's education of live births was strongest among women with duration of less than 5 years in the rural sample, and among women with duration of 10 years or more in the urban sample.

6. Experience living in urban areas had a negative effect on rural women's fertility. That is, rural women who had ever lived in

urban areas had fewer live births than those who had never lived in urban areas. On the contrary, in the urban sample, experience living in urban areas or number of years women had been living in an urban area, had a positive effect on their live births. The plausible reason for lower fertility among women who live in urban areas for a shorter duration is that these women were younger women who had recently come to live in the urban areas. The original relationship, when duration of marriage was controlled, was generally maintained in the partial relationship, except among rural women with a duration of marriage of less than 5 years and urban women with a duration of 5-9 years.

Experience of rural women living in urban areas, in the context of other variables, still had a negative effect on live births. However, it was statistically significant only among women in the whole sample and women with a duration of 10 years or more. The effect of the number of years urban women had been living in urban areas, when considered in context of other variables, became statistically insignificant (b or B may have been due to chance fluctuation more than a real effect).

7. Working for a wage before marriage by women in both samples had a negative effect on their live births. In the urban sample women who worked but without a wage tended to have a slightly higher number of live births than those who had never worked. When duration of women's marriage was controlled, women who worked for wages still had the lowest number of live births in all categories of marriage duration.

The effect on the number of live births of women's working for a wage before marriage in both samples became statistically insignificant, when considered in context of other variables.

8. Indicators of modernity (place and person wanted to deliver babies and place and person who usually delivered babies) in the rural sample had a negative effect on the number of live births. That is, the more modern women--those who wanted to deliver their babies at more modern medical facilities, i.e. hospital, had fewer live births. Among these four variables, place usually delivered babies had the strongest effect on the number of live births. The original relationship was maintained in the partial relationship when duration of women's marriage was controlled.

The effect of this variable, in the context of other variables, on live births was negative, and statistically significant among women of the whole sample only.

In the urban sample, women's reading of newspapers and listening to the radio and women's and husbands' attitudes toward family planning (all three variables indicating modernity), had a negative effect on their live births. That is, women who read newspapers more often and had a positive attitude toward family planning had fewer live births than women who never read or who had a negative attitude. Also the wives of men with a positive attitude toward family planning had fewer live births.

The effect of reading newspapers on live births among the urban sample, when other variables were taken into account, was negative, and was statistically significant only among women of the whole sample.

The effect of women's attitudes toward family planning, when considered in the context of other variables, was statistically insignificant.

9. In the urban sample, women who were using a contraceptive method or who had used one before had more live births than those women who had never used contraception before. This is generally true among women in all categories of duration of marriage.

In the context of the other 12 independent variables, the effect on live births of practicing contraception was statistically significant. Its effect on live births was strongest among women with a marriage duration of 10 years or more and weakest among women with a duration of 5-9 years.

10. In the urban sample, the type of husbands' employment had a negative effect on wives' live births. That is, women whose husbands were classified as "self employed" had the largest number of children, and those privately or government employed had the fewest number of children. When women's duration of marriage was controlled, the partial relationships were similar to the original one.

When the effect of this variable on live births was considered in the context of the other 12 variables, it became insignificant in affecting women's live births.

11. The ethnicity of urban women--Thai, Chinese, others--differentiated the fertility level of those three groups. Chinese women had the highest fertility, while the lowest was among Thai women. This was generally true among women with a duration of 5-9 years, and 10 years or more.

When the effect of this variable on live births was considered in the context of the 12 other variables, it became insignificant in affecting live births.

12. Women's desire to depend on children, or not to, in the urban sample influenced their number of live births. That is, urban women who wanted to depend on their children when they were old had a higher number of live births than those who did not want to depend on their children. When the duration of women's marriage was controlled, the partial relationship was similar to the original one.

When its effect on live births was considered in the context of other variables, its effect on live births was statistically significant only among women with a duration of 10 years or more.

13. In the urban sample, women's attitudes toward having only two children had a negative effect on women's live births. That is, women with a positive attitude toward a family of two children had fewer number of live births than those with a negative one. This is also true for all categories of duration of marriage.

14. All other independent variables in both samples not mentioned above, i.e. place of birth, type of occupation, income, number of contraceptive methods known, etc., were not significantly related to fertility, as is indicated by their strenth of relationship with fertility by gamma statistic.

15. Almost all hypotheses set earlier were generally supported or confirmed by the descriptive analysis. Some hypotheses such as the hypothesis of "the higher the SES, the lower the fertility" were found to be contrary to the result of the rural sample.

16. From the general comparison of the results of the surveys round one and round two of some selected variables, it was found that the results of the round two survey were similar to what were found in the round one survey, both in the rural and the urban surveys. Some inconsistencies existed, but this may be due to the difference in coding more than the real difference.

17. The regression models of the rural sample consisted of the 8 selected independent variables.

For the sample as a whole, these 8 independent variables were able to explain 55% of the variation in fertility among rural women. Among these variables, it was women's age, women's age at first marriage, women's desired number of children, and number of infant deaths which were the most important variables in explaining variation in fertility. Other variables, such as women's education, women's experience living in urban areas, place where women usually delivered babies, although statistically significant, effecting fertility, contributed very little in further explaining variation in fertility.

The regression model for rural women with a duration of marriage of less than 5 years was able to explain about 51% of the variation in fertility of women of this group. Also, women's age, women's age at first marriage, and women's education played major roles in explaining variation in their fertility levels.

The regression model for rural women with a duration of marriage of 5-9 years was able to explain only 36% of the variation in their fertility levels. Women's age, women's age at first marriage, number of infant deaths were the variables which had a major effect on the fertility of women of this group.

The regression model for rural women with a duration of marriage of 10 years or more was able to explain about 38% of the variation in fertility among these women. Infant mortality, women's age, women's age at first marriage, and women's desired number of children were the four major variables which contributed overwhelmingly in explaining variation in fertility of women of this group (37 out of total 38%).

18. The regression model of the urban sample consisted of 13 independent variables.

For the sample as a whole, these 13 variables were able to explain about 62% of the variation in live births of urban women. It was women's age, age at first marriage, infant deaths, practice of family planning, and women's education which explained almost all of the proportion explained by the model (61 out of total 62%).

For women with a duration of less than 5 years, these 13 variables were able to explain only 41% of the variation in their fertility levels. The same variables significant in the whole sample, also contributed overwhelmingly to the proportion of fertility here explained.

For women with a duration of 5-9 years, these 13 variables were able to explain only 32% of the variation in their fertility. Again, the desired number of children, infant deaths, working before marriage, practice in family planning, age, age at first marriage, and education of urban women explained almost all of the variation in live births (31 out of a total of 32%).

For urban women with a marriage duration of 10 years or more, these 13 variables were able to explain 44% of their variation in live births. Also, it was infant deaths, age at first marriage, current

age, desired number of children, practice of family planning, and education of women, which explained almost all of the proportion explained by the whole model (43 out of a total of 44%).

Finally, the results from regression analyses of both samples seemed to indicate that four variables, i.e. age, age at first marriage, infant mortality and desired number of children, play a very important role in determining fertility level among Thai women, especially among rural ones, and women who had been married longer. Among urban women, besides these four variables, education and the practice of family planning provided additional influence on their fertility.

Generally, it would be difficult to culturally effect a change in age at first marriage or desired number of children. And it takes time and money to improve educational level of a people and to lower infant mortality level. Yet these are the major variables in determining fertility level. Thus, if there is no significant increase in practice in family planning, using the result of the present study, one would objectively predict a stable or slow decrease in fertility level among Thai women, especially among those who live in rural areas. However, the results from the later surveys indicated that in the last decade Thai marital fertility has fallen by 40%, one of the sharpest declines on record. The decrease occurred in both urban and rural areas. These changes have been accompanied by dramatic increases in contraceptive knowledge and use, but without significant change in socio-demographic and economic structure, such as age at first marriage, desired number of children, occupationl compositions. It is also concluded that "The experience of Thailand suggests a high

Explain contradiction

level of development need not be reached in order for the fertility transition to begin" (Knodel and Debavalya, 1978; Knodel et. al, 1980).