

Institute of Economic Development and Research
SCHOOL OF ECONOMICS
University of the Philippines

Discussion Paper No. 76-12 July, 1976
(Revised August, 1976)

THE ROLE OF THE RURAL FILIPINO MOTHER IN THE
DETERMINATION OF CHILD CARE AND BREAST-FEEDING BEHAVIOR

by 

BARRY M. POPKIN

NOTE: IEDR Discussion Papers are preliminary versions circulated privately to elicit critical comments. References in publications to Discussion Papers should be cleared with the author(s).

THE ROLE OF THE RURAL FILIPINO MOTHER IN THE
PRODUCTION OF CHILD CARE TIME ^{1/}

Barry M. Popkin

University of the Philippines, School of Economics

I. Introduction

The enhanced market labor force participation of women is a key development goal. Most women who play an active role in the household's economic life are also expected to maintain major household roles. When the woman has this dual role as mother/housewife and market participant, tradeoffs between child care or other home-related issues and these market activities are bound to occur. In more traditional societies and in poorer households, child care and homekeeping require significant time inputs. Child welfare may suffer in the absence of significant maternal inputs unless either other persons are available to substitute for the mother or the mother's economic role is compatible with her child care needs so she can both work and take care of her children. There is also an important qualitative dimension to these intrahousehold substitutions and it is possible that child welfare will suffer even if the total child care time remains constant when older children substitute for the mother's time.

This study explores the ways the market and non-market roles of the rural Filipino mother and her various characteristics can affect total child care time inputs and breast-feeding behavior. An analysis of the determinants of the total child care time for pre-school children by the mother, the father and older children explores the variety of allocative effects and intrahousehold substitutions which take place.

This child care time analysis, in turn, is used to explain possible causal relationships behind the variations in breast-feeding behavioral patterns. Breast-feeding is one of the more time-intensive

maternal activities. Also, there are no possible intra-household substitutions for the mother's breast-feeding time in the Filipino family as other persons are very rarely used to breast-feed the infant. Breast-feeding is an important aspect of child care which has critical health, nutritional and fertility implications (e.g., Jelliffe and Jelliffe, 1975; Rosa 1975; Popkin and de Jesus). The declining rates of breast-feeding reported in many low-income nations have drawn our attention to the need to understand the determinants of both the extent and duration of breast-feeding.

There are important tradeoffs between short-run and long-run welfare considerations. On the other hand, it has been shown that child welfare may suffer when the mother has market employment, especially in a job incompatible with child care (Popkin and Solon, Popkin, Hart and Solon). Also, incompatible jobs could lead to reductions in breast-feeding which might lead to increased fertility levels unless there are rapid increases in contraceptive usage rates.^{2/} On the other hand, there is evidence that jobs which are incompatible with child care may have a large negative impact on fertility levels. One example is a recent Thai study which showed that female market employment in jobs incompatible with child care explained much more of the differences in fertility levels than female employment alone (Nihhon). Lowered fertility, in turn, is expected to be associated with long-run increases in the welfare of children.

II. Conceptual Framework

Following the general New Home Economics framework, the household utility function has as its arguments a variety of consumables which are produced by combining the time of household members and market purchased goods. Human capital of household members and household physical capital act to shift these production relationships.

$$Z_i = f(X_i, T_{ij}, HK_m, HH_k)$$

where: Z_i = the welfare of child i (i = child 1 — n) (1)

X_i = are the goods inputs into child i ,

(2) T_{ij} = are the time inputs into child i by person j ,
(j = mother, father, older children),

HK_m = household human capital characteristics, and

HH_k = household physical capital

In the above model, examples of Z_i are child nutritional status and intellectual development. We achieve an important simplification by assuming that the number of household members is fixed. We solve the model with a set of equations which relates the amount of time of each family member in each activity as a function of the price of market goods, wage rates, the human and physical capital shift factors, the parameters of the specific activity's production process, and household size and age/sex composition variables. A number of critical exogenous parameters including seasonality, class, labor and commodity market considerations can be brought into this framework.

The above derivation can be readily used to analyze the determinants of time inputs into child welfare. We examine total child care time inputs for all pre-school children by person j , T_{cj} .

The following system is used to clarify our objectives:

$$T_{cj} = A_{0j} + A_{1j}\pi_m + A_{2j}HK_m + A_{3j}\pi_f \quad (2)$$

where

π_m, π_f = value of time of the mother and the father,
--respectively, and

T_{cj} = total child care time inputs by person j .
(j = mother (M), father (F), older children (C))

We take the derivative of these three equations:

$$dT_{cj} = \frac{\partial T_{cj}}{\partial \pi_m} d\pi_m + \frac{\partial T_{cj}}{\partial HK_m} dHK_m + \frac{\partial T_{cj}}{\partial \pi_f} d\pi_f \quad (3)$$

To analyze the impact of changes in the value of time of the mother, $d\pi_m$, we must know $\frac{\partial T_{cm}}{\partial \pi_m}$ and any cross effects $(\frac{\partial T_{cf}}{\partial \pi_m}, \frac{\partial T_{cc}}{\partial \pi_m})$.

It is difficult to predict the total effect of $d\pi_m$. If the value of the mother's time increases and the mother's substitution effect dominated her income effect, the mother's direct effect on T_{cm} may be negative. However, if this mother could get the father or children to replace her home activities, the total child welfare time effect $(\sum_j \frac{\partial T_{cj}}{\partial \pi_m} d\pi_m)$ may be positive.

The relationship is more complicated since the mother may reduce her leisure or non-child care home production time rather than her child care time.

Changes in the mother's human capital stock will also have the same type of direct and indirect effects on child care time. The indirect effects are the ability of the mother to reallocate the child care time inputs of other household members. Our human capital vector

includes both educational and health elements. The other key mother effect depends on the compatibility of her job with child care.

III. The Household Production Process

The child care time equation has the following determinants:

$$T_{cj} = f(\pi_j, A, P_z, JOB, HKM, HHK, \text{age/sex/size}) \quad (5)$$

The factors are: π_j , the estimated value of time of person j ; A , returns from non-labor income or wealth; P_z , the price vector of the goods inputs into child welfare; JOB , the compatibility of the mother's job with child care; the human capital of the mother (HKM); physical capital of the household (HHK); and the demographic vector which stands for the competing needs and substitutions of others in the household. Each factor is discussed next.

III. 1. Human Capital Characteristics of the Mother

The formal education level and nutritional status of the mother are examined in the analysis of T_{cj} . In the breast-feeding analysis, a belief patterns variable is introduced. At the beginning of the breast-feeding section, there will be a brief description of each of the specific adjustments in equation (5) for the breast-feeding element of our T_{cm} vector. Following the work of Leibowitz and Welch, we expect changes in the mother's education to have both efficiency and allocative effects (Welch, Leibowitz, 1974). Nutritional status improvements can enhance the mother's capacity to work over a long term period, her work intensity at a specific time, and her total time at work (Popkin, 1976 a). The nutritional status parameter used is the percentage of the mother's weight as the percentage of a standard weight for her height (Jelliffe, 1966). This is a useful measure of energy capacity.

Overall, we would predict if nutritional status improvements have a neutral productivity effect, they should increase the mother's home production time. If the change in improved human capital increases home productivity relative to market productivity effect, working women will spend more time in home production and non-working women could either increase their leisure (income effect) or home production (substitution effect). The direction of the allocation effects of dHKm on the father and children's time are a combination of taste and relative productivity relationships and cannot be predicted. We expect that the supervisory or allocative skills of the mother may be positively correlated to her education.

III. 2. Compatibility of the Mother's Job with Child Care

One of the more interesting differences between industrialized and lower income less industrialized areas is the greater prevalence of jobs which allow the mother to be more responsive to child rearing needs in the lower income areas. Hours may be less rigid; the job may be located in the house; or there may be greater possibility that the child can accompany the mother to the work site. It may be possible as some anthropologists say that the mother selects market-related jobs which are compatible with child care (e.g., Brown). Other anthropologists feel child-rearing practices are adopted to the requirements of market labor (S. Nerlove). The effect of the location of the job in relation to the house, travel time, and the possibility of allowing the child to accompany the mother to her work site have been examined.

III. 3. Value of Time of the Mother

The value of the mother's time is a critical factor in this analysis. While household income will play a key role in determining

the amount of time in market work, the division between home production, leisure and the market depends on the market value of each person's time, the productivity of each in the home, and the availability and cost of substitutes for each person's labor in the home. We use the predicted wage in market activities for the working mother since it is much more difficult to value the mother's role in the household. For non-working women, we do not attempt to include a wage parameter.

Rich and poor women are expected to respond differently to wage changes. For rich working women, a market wage increase is expected to be linked with increases in working time (Encarnación). Working women from poor households are more likely to view work as a necessity to provide a subsistence income level. They may have a negative market work response to wage increases. For the non-working mothers, education is often used as a proxy for the value of their marginal product. Given the greater time constraints and subsistence pressures of the poor, we also examine the education effect of the poor and rich non-working mothers separately.

One reason the effects of a wage increase on child care time are difficult to predict is that both the mother and father's wages contain income and substitution effects. Productive wealth can be used to represent the return from non-labor income and could be viewed as a pure income effect. We include also non-productive wealth (house, consumer durables, etc.) in our wealth parameter to control for household capital which are not included in the household capital vector.

III. 4. Household Sex and Age Composition

Children are the key substitutes for the mother's time and also often provide significant additional time inputs. Older children can either release the mother from home needs so she can work or replace the mother in the market by working themselves.

The effect of additional children of different age-sex cohorts will vary significantly with the number of other available siblings.^{5/} This analysis concentrates on the sex and age relationships. A separate parameter is used to examine the effect of other household members (servants, grandparents, other residents and relatives). Since child care organization is somewhat dependent on the wealth status of the household, the impact of additional older girls is examined separately for rich and poor households. Given the economic constraint faced by the poor, we feel it is more likely that the time allocation of poor households will be more responsive to additional older siblings. Rich households are more likely to place a higher priority on keeping their children in school.

III. 5. Household Physical Capital

Household capital such as electric irons and stoves can improve home productivity while other aspects such as electricity can increase the time available for home production. The presence of electricity, gas, kerosene or electric stoves and private water systems adjacent to the household are three types of capital which may have important effects on household time allocation. For instance, the sample households with private water systems required 8.4 minutes per day to obtain water versus 27.4 minutes for those with no water system ($p < .05$). Moreover, they had to travel only 8 meters to obtain this water versus 131 meters for the others. We do not attempt to analyze the variations in technology embodied in household capital. Various types of stoves, water systems, pots and pans, and so forth may have important differential impacts on home productivity. The presence of electricity will be the only household capital variable examined here.

III. 6. Stratification by Employment Status of the Mother

The sample is stratified according to the mother's market labor force participation. The working-non-working separation

allows a clearer analysis of the job compatibility factor. Moreover, this stratification may separate women with different attitudes toward child rearing and child welfare. Women may work because they do not like child care or other household activities or because their productivity in the home is lower than that in the market. Clearly all mothers work and the term "working" is used for convenience only. Work is defined to include market and income-related activities which include gardening and the tending of livestock and poultry.

IV. Empirical Analysis

The child care time data were based on the recall method but the preliminary comparison of those recall data with observation data from a small subsample suggest that these recall data are quite accurate. The child care time parameter represents the aggregate input into the feeding, bathing, cuddling and watching of children aged 0-6.^{6/} The predicted hourly market wage was estimated from an earning function based on the wage rate of working mothers.^{7/}

The job compatibility parameter was based on discussions this author held with project field personnel. Each job which normally allowed children to accompany their mothers to their work site was classified as being a compatible job. Compatible jobs included being a lavandera (washing woman) and running a sari-sari shop, and incompatible jobs included being an itinerant saleswoman and a farm laborer. Other compatibility parameters such as the location of the job in relation to the home and the time used to travel to work by the mother produced similar though less significant effects. Table 2 describes the dependent and independent variables.

Wealth is used to divide the households into rich and poor groups. Wealth represents both permanent income flow from non-labor income (production assets) and access to many services (class relationships). The lower three wealth quartiles are termed the "poor" and the upper wealth quartile, the "rich."

The square root of the mother's nutritional status is used to capture the "diminishing returns to nutritional improvements" relationship, although that is minimal evidence of this relationship.

In Table 1, the difference in time allocation between household members where the mother works and does not work are pointed out. Home production encompasses washing, cooking, cleaning and other non-market home activities. Leisure-rest is a residual which includes time for consumption, personal and sleep. The father's time allocation is somewhat invariant to the mother's working status. The working mothers are the ones most affected as they have significantly less leisure than the non-working mothers. Children appear to act as substitutes for the child care time of their working mothers. Because of the role of children and other household members, the per capita child care time of households with non-working mothers is not much greater than that of households of working mothers. There are, of course, numerous demographic and socio-economic differences between these two groups and Table 1 serves only as an indicator of some of the relationships analyzed next.

IV. 1. Determinants of Child Care Time

The most important effects aside from the demographic parameters and characteristics of the mother are the effects of changes in her human capital and the compatibility of her job with child care. Tables

3 and 4 contain the regression results for the total child care inputs of the mother, father and older children and the per child care time of the mother.

Increases in the mother's education level, ceteris paribus, was associated with increased maternal per capita child care time in the non-working poor and working groups. This education effect could relate either to the greater productivity of educated women in child care or the lower substitution elasticity of an educated women's time for other person's time. The changes in child care time associated with increases in maternal nutritional status were small and insignificant.

The job compatibility relationship was important. Having a job compatible with child care allowed them to reduce the child care time inputs by the father and increase the older children's time inputs. The latter may relate to a management effect in the sense that the mother was more available to tell her older children to watch the younger children.^{8/} The net impact of having a compatible job was a raise in child care time of about 2.7 hours.

Changes in the predicted wage of the mother have an insignificant and small impact on child care time but the effects fit our hypothesis. The rich working mothers reduced their total and per capita time while the poor working mothers increased their total and per capita child care time as their wage rate increased. The reduced child care time inputs for the rich mother is indicative of a positive market labor supply response while the increased child care time inputs for the poor fits the target income hypothesis proposed for poor working women.

Changes in the father's wage conform to what would be expected. As the father's wage increased, working mothers increased their child care time. The effects were significant for the working mothers for both her total and per capita time inputs into child care.

An important demographic issue is the question of who substitutes for the mother's child care time. In Table 5, we can see that girls aged 7-15 and boys aged 7-12 may act as mother substitutes. By this, it is meant that the addition of children in these age-sex cohorts are associated both with the reduction of maternal time inputs and the increase of the older children's child care time inputs. The stratified multivariate results do not provide a clear picture of these substitution processes.

Girls in the 7-15 year age group significantly substitute for the non-child care home production of the mother (Boulier). They also add important amounts of child care time themselves as we saw in Table 5, but their effect on the non-child care home production time means that they will not necessarily reduce the child care time of the mother, ceteris paribus. Older girls in poor households appear to substitute for the working mother's child care time and their net impact on child care time inputs is slightly negative. The addition of a younger girl (7-12) in poor working mother households also add significantly to the older children's child care time but does not reduce the mother's time input. The relationships in rich households are insignificant. Other household residents (others) have been shown to reduce the home production time of these working mothers; thus, it is not surprising that they are associated with increased child care time inputs by the mother (cf. Boulier).

Among the non-working poor, the addition of girls in the 13-15 age group is associated with significant increases in child care time by older children. Among rich households, additional girls aged 7-12 have a positive effect on the child care inputs of the non-working mothers.

It is important to note that additional infants are associated with reduced child care time by older children while additional children aged 1-6 increased it. Earlier work showed this pattern is much stronger in poor households while in rich households older children are more likely to provide child care time to infants (Popkin, 1976a). This should mean it is more likely that older children will affect the breast-feeding practices of rich women.

As is expected, the addition of pre-school children are associated with increases in child care time inputs of all mothers. In general, the mother's marginal productivity at home relative to market production will increase as additional young children are present and a positive relationship between extra pre-school children and additional time inputs is expected. Boulier has shown that the addition of an infant reduces the working mother's market labor time by about 5 hours and increases her home production time by about 3 hours. Surprisingly, the addition of children aged 1-6 does not reduce her market time. It is interesting to note that only husbands of working mothers significantly increase their child care time inputs with each additional pre-school child.

The presence of electricity in the household appears to be a meaningful household physical capital parameter. Working mothers and their husbands increased child care time (insignificantly) when electricity was present. This probably represents the impact of electricity in lengthening the effective working day of the mother and father.

IV. 2. Determinants of Breast-Feeding Practices ^{12/}

Many of the relationships found in the previous section become much clearer when the determinants of the extent and duration of breast-feeding are analyzed. It is often felt that breast-feeding may repre-

sent more pleasure than work and it should be included in the leisure rather than home production category. In this section, it is shown that the breast-feeding behavioral responses to changes in the characteristics of the mother, the nature of her job, and household composition are very similar to those reported in the child care section. For these reason, we hypothesize that it is unlikely that breast-feeding should be treated that as an aspect of leisure or consumption.

Three new independent variables are used. One is visits by milk companies. Visitation by milk companies to households and other types of advertisement have often been represented as having a critical effect on the decline of breast-feeding practices in low-income nations (Dwyer, Greiner). These effects are felt to be much more pronounced in urban areas, so results which do not verify this effect do not negate the potential negative impact of the large milk companies. These data, unfortunately, are available only for a limited subsample. Second is the belief that breast milk is best. This belief may not only enhance the mother's understanding of the value of breast milk but it may also affect her decision to stay with the infant rather than join the market labor force. Thus, we expect it to be more important for its impact on the behavior of the non-working woman. The formal education level of the mother was unrelated to this belief parameter and had a less significant impact on breast-feeding practices. Third is the age the child is fed supplementary foods. Ingestion of other foods will limit the infants ability to consume breast milk. This will affect the duration of feeding only.

The major factors significantly associated with breast-feeding behavioral changes are the belief, wage, and girls aged 13-15 variables. Overall, it is the better educated and lower income persons who are more likely to breast-feed their children. Among the 314 sample children, 93% were breast-fed. At the aged of 4-6 months, 88% were still being breast-fed and by the age of 12 months, 77% continued to be breast fed. In Table 6, the sample is split into those mothers who

did and did not breast-feed their children to provide some background characteristics. The income and educational differences between the two groups are significant. Regression results are presented for groupings of working and non-working mothers in Table 7.^{10/} Table 8 presents regressions for all sample households for whom nutritional status and milk company visit data are available.

The decision to work may be often jointly determined with child care decisions. Since there are no breast-feeding substitutes in Filipino households for the mother, this is much more crucial in the analysis of breast-feeding behavior. Determinants of breast-feeding such as the belief variable may be important in the mother's decision whether or not to work. Use of a predicted mothers wage variables does not eliminate this problem. Consequently, stratification by the mother's working status will lower the explanatory power of certain variables. For example, in the total sample, positive belief are associated with a .30 greater probability of breast-feeding (Table 8, column 17). Among working women, however, the belief variable has a small insignificant regression coefficient. We have some interest in determining the factors which affect the working women's decision to breast-feed. Moreover, there are certain empirical difficulties in analyzing all the women together. One problem is the lack of a meaningful value of time parameter for non-working women. In Table 8, the predicted wage rate is used as a proxy variable.

In the overall sample, the belief, wage and demographic variables play key roles in determining who does and does not breast-feed (Table 8). Women who feel breast-milk is best have a much higher participation level. Among the poor households, increases in the mother's predicted wage and additional daughters aged 13-15 are both significantly associated with reduced participation. Additional pre-school children increase the probability of breast-feeding.

The belief and older daughters in poor households variables have a similar effect on the duration of breast-feeding. The wage variables are associated with increased duration as is the wealth variable and additional younger daughters aged 7-12.

When the sample is stratified, the breast-feeding participation of the mother is only significantly and strongly associated with the availability of substitutes for her time. The child care analysis showed that girls aged 13-15 were associated both with reduced child care time among mothers in poor households and increased child care time by the older children in these households. Clearly, the negative impact of additional older girls in these poor households on breast-feeding participation is linked up with their role as mother substitutes. The wage of poor mothers has a negative but insignificant coefficient as does the compatible job variable. The duration of breast-feeding among these working women is largely explained by the wage, demographic and belief variables. The belief coefficient is strong and significant. The wage effect is positive for the poor as would be expected but it is also positive and significant for the rich. Since the rich mothers reduce their overall child care time as their wage increases, an increase in the duration of breast-feeding is indicative of a high degree of substitution of breast-feeding for other child care activities among these women.

The age and sex composition effects are expected. Younger girls aged 7-12 are associated with reduced maternal home production time and increased child care time. Thus, it would be expected that additional daughters aged 7-12 would be associated with a longer duration of breast-feeding. The negative older poor household's daughter relationship was discussed above.

Among non-working women, beliefs are a key determinant. Increases in the husband's wage rate are often used as indication of an increased value of time or as changes in preferences toward goods-intensive activities relative to time-intensive activities. As such, the negative significant effect of increases in the husband's wage rate on breast-feeding participation is expected. The addition of pre-school children increase the productivity of the mother in time-intensive child care activities, and raises the probability and duration of breast-feeding. The non-working mother may be able to exchange child care for non-child care activities and also to both breast-feed and watch her other children. To the extent the trade-off is dependent on her overall productivity in child care activities or that joint production takes place, we would expect this significant pre-school child effect.

The nutritional status of the mother parameters have a positive but insignificant effect on breast-feeding behavior. This nutritional effect is not only an energy effect but it also is indicative of the ability of the mother to breast-feed without depleting greatly her nutritional stores and other biological effects (Popkin and de Jesus).

The positive association between the age the child is fed supplementary food and his duration of breast-feeding is expected. We would expect that as children are fed food at a later age, they would continue to breast-feed with more vigor and make it more likely that the mother would be able to continue to lactate. This variable is an ideal rather than the actual age. It was not correlated with the other independent variables.

The only surprising result is the positive significant association between the milk company visit variable (*VIS MILK*) and the duration of breast-feeding. This may represent some spurious relationship and it is quite possible that there are other negative breast-feeding effects associated with milk companies.^{11/}

V. Discussion

There are a number of meaningful conclusions to be drawn from this study. First, it is clear that the indirect cross-effects related to changes in the mother's human capital, job and wage characteristics on the time contributions of the father and older children are as important if not more important than the direct effects. For example, while the increased education of the non-working poor mother led to a 1.84 hour increase in child care time by the mother, it also was associated with decreased time inputs by the father and the older children. A second example is the allocative effect of the compatible job. Working mothers with a compatible job increased the child care time inputs of older children much more than they reduced the time inputs of the father or increased their own time inputs. These conclusions are based on Table 9 in which the time inputs of the mother, father and older children are estimated from the regression equations in Tables 3 and 4. The predicted values are based on an average household from each of the regressions. Table 10 reports the same predicted values for some of the breast-feeding regressions.

Second, a number of conclusions can be drawn from Table 9 and 10. The impact of increases in the mother's predicted wage are small while the human capital effects are larger. Higher education levels have a larger effect on the non-working poor. Another issue is the compatibility of the mother's job with child care. It has its strongest effect on the child care inputs of other children and consequently is associated with negative but insignificant breast-feeding behavioral changes. The significant education and belief variables and the less significant nutritional status effects are indicative of important inter-generational transfers of human capital.

The demographic and household capital effects are large. In working mother households, the addition of younger daughters have a large positive impact on child care time while older daughters and sons have a negative effect. The addition of other non-nuclear family household members may be important. There were only a couple of households with servants but it is quite likely that these households have relatives and other residents perform many of the services normally attributed to servants. It is possible that they are provided in-kind room and board for such services. This is an issue for further research. It is interesting to note that a national survey conducted in 1973 found that only 2% of the Filipino household had resident domestic helpers (Castillo, p. 210). The positive impact of electricity on working households is indicative of the potential effect electricity may have on households motivated to derive benefits from it.

The main demographic effects related to the addition of daughters. Given their role as substitutes for their mothers' child care time, it was not surprising that extra girls aged 13-15 in poor households were associated with reduced breast-feeding behavior.

A third issue relates to the net impact of the mother's working status on child care time inputs. Working women put less time into child care than do non-working women. Their older children contribute much more than do the older children of non-working women but their husbands contribute very little. Thus, the net impact on child care time is a negative 2 hours (Table 9, column 1). When infants are present, working women significantly increase their time inputs as do their husbands and older children so that the total inputs into child care time inputs of working families would be greater (column 13). This is indicative of the high value these sample mothers must place on the care of infants relative to older pre-school children.

In Table 10, working women are associated with a lower extent and length of breast-feeding. Most of the significant changes in the independent variables would enhance this relationship except for the beliefs variables. Important results from Table 10 include the following:

- a. The 10% increase in the mother's wage rate has a very small impact on breast-feeding practices even if this impact is significant among poor households;
- b. The belief impact is very large, especially for the total sample;
- c. The addition of daughters aged 13-15 in poor working mother's households has a large effect;
- d. The addition of other pre-school children has a strong positive effect on the non-working mothers;
- e. The compatible job effect is the same as that found in the time analysis and has a negative but insignificant impact on breast-feeding behavior.

Fourth is the use of the child care time analysis for understanding breast-feeding behavior. The effect of additional children aged 1-6, girls aged 7-12 and 13-15 in poor households, wage increases in poor households (duration only), and having a compatible job were some of the notable similarities. One interesting difference was the effect of a predicted wage increase in the child care time and duration of breast-feeding of a rich working mother.

Overall, we find the human capital changes appear to be a relevant policy parameter. The only way to compare the benefits to be gained by economic and education programs is to compare the benefits with costs for specific programs. If we are only concerned with breast-feeding effects or child care time inputs in general, programs which attempt to enhance the wage of the mother or the father appear very expensive and not as useful as programs oriented toward preference pattern changes. However, economic change provides many other benefits which certainly should not be ignored.

Another potential program is related to the creation of jobs which would allow breast-feeding practices to continue while the mother is working. This analysis indicates that jobs compatible with child care would not necessarily lead to meaningful increases in breast-feeding as was found in earlier work (Popkin and Solon). Here we found that working mothers with compatible jobs are able to get their older children to take over more child care activities which must include infant-feeding activities. This substitution process, especially of older girls' time for the mother's child care time, is expected to be most important in the low-wealth households.

An analysis of the urban relationships and a comparison of these Laguna findings with similar research from other regions in the Philippines are necessary before we can have more faith in the applicability of these results. Many differences in behavior will be clarified when this is done. Also, the analysis is based on a small sample size so we must be careful in interpreting these relationships.

Overall, we feel this study has moved us closer toward an understanding of the relative impact that marginal increases in economic, demographic, educational and other improvements may have on Filipino child time inputs. We must understand how these time effects are translated into a welfare impact before we can jump to the conclusion that a compatible job or more education do or do not provide meaningful answers. This means that the relationships between differential time inputs of the mother, father, older children and others and household and child welfare must be determined.

FOOTNOTES

1/ The author wishes to thank Bryan L. Boulier for his substantive comments during the preparation of this study. Bob Evenson, Bruce Johnston, Harry T. Oshima, and Monica Yamamoto are thanked for their comments on earlier drafts of either the model or the actual paper. This study utilizes data from the Laguna rural households study. Funding for this Laguna study has come from the Agricultural Development Council, Inc., the Population Center Foundation and the Interdisciplinary Communications Program of the Smithsonian Institution. The project working group was composed of Robert E. Evenson, Teresa Jayme-Ho, Enriqueta Torres, Bryan Boulier, Cecilia Florencio and this author. The author especially wishes to thank the Laguna project staff especially the research, programming and administrative groups for their help during the preparation of this paper. The author is a visiting associate professor, University of the Philippines School of Economics.

2/ Breast-feeding has been shown to have an important effect on the period of infecundity of the mother. Breast-feeding stimulates the prolactin hormonal secretion process which is felt to be responsible for the increase in postpartum amenorrhea associated with lactation (Rosa; Osteria, Jelliffe and Jelliffe, 1975). The research on the child spacing effects of this infecundity period are not as complete as are those on postpartum amenorrhea but the spacing effects appear to be quite significant (Rosa).

3/ The total child care time is not examined as the residual child care time inputs by other household members are left out as the quality of these data were felt to be bad. Also, we do not estimate the total time allocation of each person and impose cross-equation restrictions. It would be better to do this and then use the child care time equations from those constrained systems for this analysis.

4/ In the ensuing discussion of the parameters affecting this household production process, data collected in a survey of 573 households in 34 barrios in the province of Laguna are utilized. Detailed cross-sectional information was collected on economic, demographic and nutritional factors during 5 visits to each house during May-June, 1975 period. Data were collected on the nature of the production process and the nature and extent of female labor force participation and other household factors to meet the demands of this study, inter-alia. The 34 barrios were selected to be representative of the major rural economic groupings of Laguna; fishing, lowland and upland farming; and semi-urban, industrialized barrios. Household listings for each barrio were made and random number tables were used to select households from each barrio.

Most households were interviewed during the May-June busy season. Since the ecological conditions vary widely among this sample, it is possible that seasonal conditions varied for the sample. Moreover, we have no way to verify if we surveyed the peak work period as desired without having time allocation data for this sample for an entire year.

Additional data has been collected by revisiting 99 households in three separate visits. These revisits occurred about four, six and eight months after completion of the original survey of the 573 households. During these three visits, actual behavior was observed for one to two days. The breast-feeding section uses data collected during these revisits.

5/ Lindert has noted that sibling position and various other demographic parameters play a key role in explaining the time inputs by the mother and other household members. This analysis will control for some of these parameters but its focus is different and we do not pay detailed attention to these parameters (Lindert, 1974). His study showed the important size interaction as did Popkin's earlier study on child care time (Popkin, 1976b). Boulier also found important size-composition relationships but he did not find significant Chow tests between equations run for small and large families separately (Boulier).

6/ Data collected separately for infants and pre-school children were aggregated for this analysis. The key reason for aggregation is that many mothers gave the same answer for both groups which would have led to a type of double counting. It was simpler to eliminate this double counting and then aggregate the data than it would have been to separate such answers.

No distinction was made between primary and secondary (joint) activities. Also, we did not attempt to place an intensity or any other qualitative measure on the time inputs. Lindert has presented a number of valid reasons for excluding secondary activities but we felt this would be an impossible task when time data are collected in low-income nations (Lindert). Our experience in a subsequent intensive phase in which households were observed leads me to believe such a separation is possible but otherwise relevant data may be lost if this separation is done. It should be noted that child care activities are more likely to be a secondary activity than are many other aspects of home production (Jayne-Ho).

7/ The working mother's predicted wage was based on an estimation of the following equation for working mothers:

$$\text{Log Wage Mother} = -.81 + .018 \text{ per capita income others}/100 + .47 \text{ Pich Households} \\ (2.24) \quad (.261) \\ \text{holds } (0-1)$$

$-.20$ crop households (0-1) + $.53$ livestock households (0-1)
 (1.11) (2.34)
 $+ .009$ age mother/100 + $.0097$ age² mother/10,000
 (0) $(.27)$
 $-.22$ EDUC + $.062$ EDUC $\times$ age mother/100
 (1.16) (1.66)
 $-.0009$ WEALTH/1000
 $(.15)$ $R^2 = .08$
 $F = 3.2$
 (t-value in parentheses)

The rice, crop and livestock variables help to adjust for some wage measurement differences and also help to stratify the labor market,

8/ It might also be a measurement question. The mother with a compatible job may know more about the activities of her older children and be able to provide more detailed answers.

9/ These results are based on a study done by this author with the assistance of Ms. Susan de Jesus. The data used are a subsample of Laguna households who had children in the 0-3 age group. The file has been set up such that most of the independent and dependent variables are contemporaneous. One factor often mentioned by other scholars as an important determinant of breast-feeding practices, the pregnancy status of the mother has been left out as it was found to play an insignificant role in this sample. See Popkin and De Jesus for a more detailed discussion of these breast-feeding determinants.

10/ When a 0-1 dependent variable is used, certain statistical problems can occur. First, the coefficients of the independent parameters can lead to interpretations outside the 0-1 range of the participation dependent variable. Second, the residual may exhibit heteroskedasticity and the standard T-ratio may be incorrect (Theil). Studies have shown that ordinary least squares regressions can be used without these effects occurring (Gundersen). Since our results in Tables 7 and 9 appear well-behaved, we do not use alternate and more cumbersome estimation procedures here. An alternate probit model is very expensive to run and cumbersome to interpret. In a few instances the predicted value for this study's regressions fall outside the 0-1 probability range.

11/ The direct impact of milk company workers and advertising on breast-feeding is only one aspect of the milk company effect. Another is the impact on the attitudes and behavior of doctors, nurses and other professionals who, in turn, influence the beliefs and behavior of the mother (Gréiner). The beliefs parameter may capture part of this effect. Dr. Florentino S. Solon is thanked for reminding the author of this point.

REFERENCES

Boulier, Bryan. "Children and Household Economic Activity in Laguna, Philippines." Discussion Paper 76-19, University of the Philippines, School of Economics, July, 1976.

Brown, Judith. "A Note on the Division of Labor by Sex." American Anthropologist 72 October, 1970: 1073-78.

Castillo, Gelia T. The Filipino Woman as Manpower: The Image and the Empirical Reality (Laguna, Philippines: University of the Philippines at Los Baños) March, 1976.

Dwyer, Johanna T. "The Demise of Breast-feeding: Sales, Sloth or Society?" in Priorities in Child Health, Vol. II (Cambridge, Massachusetts; Harvard School of Public Health) 1975.

Encarnación, José, Jr. "Fertility and Labor Force Participation: Philippines, 1968" The Philippine Review of Business and Economics. XI, December, 1974: 113-144.

Greiner, Ted. "The Promotion of Bottle-feeding by Multinational Corporations: How Advertising and the Health Professors Have Contributed" International Nutrition Monograph Series Number 2 (Ithaca, New York; Cornell University Division of Nutritional Sciences) 1975.

Gundersen, Morley. "Statistical Models for Dichotomous Dependent Variables." Working Paper. Center for Industrial Relations, University of Toronto, 1972.

Hart, Gillian. "Labor Allocation, Income and Consumption in a Javanese Coastal Village" (Unpublished Study) April, 1976.

Jayne-Ho, Teresa. "Time Allocation, Home Production and Labor Force Participation of Married Women: An Exploratory Survey" Discussion Paper 76-8, School of Economics, University of the Philippines, June, 1976.

Jelliffe, D.B. The Assessment of Nutritional Status of the Community. WHO Monograph Series No. 53, Geneva: World Health Organization, 1966.

Jelliffe, D.B. and E.F. P. Jelliffe, "Human Milk, Nutrition and the World Resource Crisis" Science 183 May 1975: 557-561.

Leibowitz, Arleen. "Education and Home Production" American Economic Review 64 May, 1974: 243-250.

Lindert, Peter A. "Family Inputs and Inequality Among Children" Discussion Paper 218-94, Institute for Research on Poverty, University of Wisconsin, 1974.

Nerlove, Sara B. "Women's Workload and Infant Feeding Practices: A Relationship with Demographic Implications" Ethnology 13, 1974: 207-214.

Nibhon, Delavalaya "A Study of Female Labor Force Participation and Fertility In Thailand." Presented at the CANS-ODA Seminar on Labor Supply, Makati, Philippines, June 1976.

Osteria, Trinidad S. "Lactation and Post-partum Amenorrhea in a Rural Community" Acta Medica Philippina 9, October-December, 1973: 144-151.

Popkin, Barry M. "Human Resource Development and Productivity: The Role of Nutrition," Economics and Finance in Indonesia 3 September, 1976.

Popkin, Barry M. "The Production of Child Welfare in Rural Filipino Households: The Impact of the Mother." Paper presented at CANS-ODA-Conferences (Manila-June, 1976b).

Popkin, Barry M., with the assistance of Ms. Susan de Jesus. "Determinants of Breast-feeding Behavior Among Rural Filipino Households." (Unpublished, June 1976).

Popkin B., G. Hart and F.S. Solon "Some Relationships Between the Labor Force Activity of Rural Filipino Mothers and the Nutritional Status of Their Children" (Unpublished).

Popkin, Barry M. and Florentino Solon "Income, Time, the Working Mother and Child Nutrition" Journal of Tropical Pediatrics and Environmental Child Health (Forthcoming)

Rosa, Franz "Breast-feeding in Family Planning" PAG Bulletin V September, 1975: 5-10.

Rosa, Franz "Hormone Contraception and Lactation" (Unpublished, American University: Beirut)

Rosa, Franz "The Links Between Breast-feeding, Fertility and Nutrition" People Winter 1975.

Rosa, Franz W. "The Setting for Population/Family Planning Activities in Sub Sahara Africa" (Forthcoming Family Planning Studies)

Theil, Henri Principles of Econometrics. New York: John Wiley and Sons, Inc. 1971.

Welch, F. "Education in Production" Journal of Political Economy 78 January/February, 1970: 35-59.

TABLE 1 RELATIONSHIP BETWEEN WEALTH STATUS, WORKING STATUS
AND TIME ALLOCATION TO CHILD CARE

Time Allocation Category	Families Having Children Aged 0-6		Total All Households (3)
	Non-working Mother (1)	Working Mother (2)	
(Hours Per Week)			
Mother's Time			
a. Market Labor	0.0	25.6	16.9
b. Home Production			
Child Care	18.7	15.6	10.0
Non-child care	43.4	47.0	41.5
Subtotal	<u>62.1</u>	<u>62.6</u>	<u>51.5</u>
Child care per pre-school child	(11.1)	(8.3)	(5.5)
c. Leisure/rest	105.9	79.7	99.5
d. TOTAL	168	168	168
Father's Time			
a. Market Labor	53.8	54.8	49.4
b. Home Production			
Child Care	1.6	.7	0.6
Non-child care	2.7	3.0	2.8
Subtotal	<u>4.2</u>	<u>3.7</u>	<u>3.5</u>
Child care per pre-school child	(0.9)	(.4)	(0.3)
c. Leisure	109.9	109.5	115.1
Child's Time (age 6 plus)			
Child Care	4.0	7.6	3.8
Child care per pre-school child	(1.8)	(4.2)	(1.9)
Total Child Care			
Time (all persons including others)	24.5	24.5	14.6
Total Child care per pre-school child (all persons)	(13.8)	(13.1)	(7.9)
Number of Households	132	197	573

UNITED STATES DEPARTMENT OF AGRICULTURE

CROP SPECIES	PLANTING DATE	HARVESTING DATE	YIELD (LBS./AC.)	TOTAL PRODUCTION (LBS.)
WHEAT	1960-1961	1961-1962	1,200	120,000
BARLEY	1960-1961	1961-1962	800	80,000
OATS	1960-1961	1961-1962	600	60,000
RYE	1960-1961	1961-1962	400	40,000
BUCKWHEAT	1960-1961	1961-1962	200	20,000
MILLET	1960-1961	1961-1962	100	10,000
SORGHUM	1960-1961	1961-1962	300	30,000
MAIZE	1960-1961	1961-1962	500	50,000
RICE	1960-1961	1961-1962	700	70,000
CORN	1960-1961	1961-1962	900	90,000
SUGAR BEET	1960-1961	1961-1962	1,500	150,000
POTATO	1960-1961	1961-1962	1,100	110,000
CASSAVA	1960-1961	1961-1962	800	80,000
MANGROVE	1960-1961	1961-1962	600	60,000
COCOA	1960-1961	1961-1962	400	40,000
PEPPER	1960-1961	1961-1962	300	30,000
CLOVE	1960-1961	1961-1962	200	20,000
NUTMEG	1960-1961	1961-1962	100	10,000
GINGER	1960-1961	1961-1962	500	50,000
VANILLA	1960-1961	1961-1962	300	30,000
CINNAMON	1960-1961	1961-1962	200	20,000
CARDAMOM	1960-1961	1961-1962	100	10,000
PEACH	1960-1961	1961-1962	700	70,000
APPLE	1960-1961	1961-1962	600	60,000
ORANGE	1960-1961	1961-1962	500	50,000
LIME	1960-1961	1961-1962	400	40,000
MANGO	1960-1961	1961-1962	300	30,000
GUAVA	1960-1961	1961-1962	200	20,000
PINEAPPLE	1960-1961	1961-1962	100	10,000
CUSTARD APPLE	1960-1961	1961-1962	500	50,000
JACKFRUIT	1960-1961	1961-1962	400	40,000
MANGOSTINE	1960-1961	1961-1962	300	30,000
LITCHI	1960-1961	1961-1962	200	20,000
POMELO	1960-1961	1961-1962	100	10,000
CITRUS	1960-1961	1961-1962	500	50,000
MELON	1960-1961	1961-1962	400	40,000
CUCURBIT	1960-1961	1961-1962	300	30,000
PUMPKIN	1960-1961	1961-1962	200	20,000

TABLE 2 LIST OF VARIABLES USED IN REGRESSION

Dependent Variables	Definition
TCHILDM (-F, -CC)	Child care time (hours over 7-day period by mother (father, all children)
TCHDCAPM	Child care time per pre-school child by mother
BFPART	Breast-feeding participation (0=No) (1=Yes)
DURATION	Number of months the child is breast-fed
<u>Independent Variables</u> ^{1/}	
PLMHRBB (P) (R)	Predicted market wage of mother - based on regression average wage of working mothers (₦/hour) (P= wage rate in poor households) (R= wage in rich households)
PAHRWF1	Predicted wage for non-working fathers, actual wage for working fathers (₦/hour)
WEALTHIH	Total household wealth (₦1000 units)
C715MW	No. of boys aged 7-15 living in household during past week.
C712FWP (R)	No. of girls age 7-12 living in poor (rich) household during past week.
C1315FWP (R)	No. of girls 13-15 living in poor (rich) households during past week.
OTHERS	No. of relatives, grandparents, residents servants living in household.
C01TTW	No. of kids aged 0-1 living in household in past week.
C16TTW	No. of kids in 1-6, 7-12, 13-15 age group living in household in previous week

^{1/} ₦7.4 = U.S. \$1.00

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

... ..
... ..
... ..
... ..
... ..

TABLE 2

Page 2

	Definition
EDUCM (P) (R)	Education level of mother (0-9 range) (P= in poor households) (R= in rich households)
ANEMDUM	Anemia status (No anemia = 1) (present = 0)
S&WHTMI	Square root of mother's weight for height as percentage of international weight for height standard (Jelliffe)
DECLITE	(1=presence of electricity) (0=otherwise)
GOODJOB	(1=job compatible with child care) (0=otherwise)
BELFBFO	Belief breast milk is best (Yes=1) (bottle is best = 0)
VISMILK	Household was visited by a sales person promoting bottled milk or a formula (Yes = 1) (No = 0)
AGEFEDFC	Age the infant is fed other foods (months)
<u>Stratification</u>	
Working	Any female labor force participation in <i>market activities</i>
Non-working	No female labor force participation in market activities

NON-WORKING MOTHERS

DOC	TCHDCAPM (4)	TCHILDM (5)	TCHILDF (6)	TCHILDOC (7)	TCHDCAPM (8)
	.35	6.03	.46	.76	5.04
7)	.76 (2.99)*	1.18 (1.61)***-0.06 (.24)	-0.21 (.55)	-0.21 (.55)	1.30 (2.13)**
7)	-0.19 (.60)	-0.24 (.31)	-0.08 (.31)	-0.11 (.27)	-0.15 (.24)
)	.49 (.39)	-	-	-	-
)	-1.09 (.92)	-	-	-	-
***	.82 (.89)	-	-	-	-
	.56 (2.08)**	-0.33 (.94)	-0.07 (.58)	.04 (.21)	-0.13 (.46)
	-0.001 (.09)	-0.04 (.76)	-0.004 (.21)	-0.001 (.03)	-0.07 (1.53)**
	.30 (.30)	-4.77 (1.68)**	-0.21 (.21)	-0.58 (.39)	-3.70 (1.56)**
	6.64 (4.62)*	11.25 (3.39)*	-0.11 (.09)	-1.30 (.75)	5.52 (3.99)**
	1.76 (4.23)*	5.86 (4.53)*	.57 (1.26)	3.13 (4.69)*	1.25 (1.16)
	.06 (.13)	-0.98 (.77)	-0.37 (.84)	-0.13 (.19)	-0.57 (.54)
	.51 (.77)	-2.44 (1.06)	2.09 (2.62)*	-0.64 (.54)	-2.46 (1.23)
	-1.04 (.92)	9.80 (2.72)*	-0.09 (.07)	-0.93 (.5)	6.28 (2.09)*
	-1.91 (1.62)***	.20 (.05)	3.12 (2.46)*	4.98 (2.66)*	1.75 (.57)
	-0.71 (.49)	.04 (.00)	.24 (.15)	-0.05 (.03)	3.60 (.97)
	.66 (1.16)	.37 (.24)	1.06 (2.05)**	.06 (.07)	.25 (.21)
	.23	.24	.11	.16	.11
	.19	.20	.05	.11	.06
	6.13	4.73	1.80	2.83	1.89
155		206	206	206	206

*=5%. *** = 10%.

TABLE 4 REGRESSION: FACTORS ASSOCIATED WITH CHILD CARE TIME

	NON-WORKING MOTHER							
	TCHILD1 (9)		TCHILDF (10)		TCHILDOC (11)		TCHDCAPM (12)	
Constant	3.26		.73		1.02		2.81	
EDUCMP	1.84	(2.30)*	-0.13	(.45)	-0.27	(.65)	1.83	(2.74)*
EDUCMR	-0.05	(.04)	.05	(.16)	-0.10	(.19)	.32	(.39)
S&WITMI	-0.07	(.08)	-0.10	(.37)	-0.12	(.30)	-0.01	(.03)
PAHREF1	-0.25	(.70)	-0.08	(.64)	.03	(.17)	-0.07	(.26)
DECLITE	-3.72	(1.30)***	-0.31	(.30)	-0.68	(.45)	-2.86	(1.19)
OTHERS	.35	(.23)	1.06	(2.05)**	.06	(.07)	.25	(.20)
WEALTHTH	-0.01	(.17)	-0.007	(.36)	-0.004	(.12)	-0.04	(.93)
C01TT	10.36	(3.12)*	-0.03	(.03)	-1.22	(.70)	4.81	(1.73)**
C16TT	5.86	(4.56)*	.57	(1.25)	3.13	(4.68)*	1.26	(1.17)
C715MW	-0.80	(.64)	-0.39	(.87)	-0.14	(.21)	-0.43	(.40)
C712FWR	10.59	(2.94)*	-0.16	(.13)	-1.004	(.53)	6.92	(2.30)**
C712FWP	-3.20	(1.38)***	2.17	(2.66)*	-0.57	(.47)	-3.07	(1.59)***
C1315FWR	.47	(.10)	.20	(.13)	-0.09	(.04)	3.92	(1.07)
C1315FWP	-0.27	(.07)	3.16	(2.49)	5.03	(2.67)*	1.37	(.45)
R ²	.26		.11		.16		.13	
$\bar{R}^2$	.21		.05		.10		.07	
F	4.74		1.69		2.62		2.03	
N	206		206		206		206	

T-values are in parenthesis.

Level of significance: * = 1%, **=5%, *** = 10%.

TABLE 5 EFFECT OF CHILD AGE COMPOSITION ON PRESCHOOL CHILD CARE
TIME FOR FAMILIES WITH CHILDREN AGED 0-6 YEARS

(Hours Per Week)

SAMPLE GROUP	Preschool Childcare Time			Total	No. of Cases
	By Mother	By Father	By older Children		
<u>Children Aged 7-12</u>					
a) Total					
None	22*	1	4*	28**	117
One or More	14	1	8	23	212
b) Females					
None	19**	1	5**	25	188
One plus	14	1	8	24	144
c) Boys					
None	22*	1	5	27**	180
One plus	14	1	7	21	149
<u>Children Aged 13-15</u>					
a) Total					
None	18***	1	6	25	222
One or more	14	2	7	23	107
b) Girls					
None	18***	1***	5**	24	280
One or more	12	3	10	24	49
c) Boys					
None	17	1	6	25	260
One or more	16	1	6	23	69
<u>Child Aged 16-19</u>					
a) Total					
None	35***	2	12	49	287
One or more	25	6	13	43	42
b) Girls					
None	17	1*	6	24	289
One plus	15	3	7	25	40
c) Boys					
None	18*	1**	6	25***	286
One plus	10	3	6	18	43

Number of Cases = 329

* T-test significant at 1% level
 ** T-test significant at 5% level
 *** T-test significant at 10% level

TABLE 6 FACTORS ASSOCIATED WITH BREAST-FEEDING
PARTICIPATION OF THE MOTHER

	Did not breast- feed	Did Breast- feed	Total	T-test level of Significance 2-tail probability Pooled Variance
1. Total Household Income	₦9387	₦4351	₦4720	.001
2. Income per capita of other household members (excluding mother's income)	₦1563	₦565	₦638	.002
3. Weekly value of per capita Household Expenditures	₦28	₦19	₦20	.000
4. Total Household Wealth	₦7699	₦6017	₦6140	.558
5. Average imputed weekly wage rate of mother	₦29	₦21	₦22	.123
6. Average Household Size	5.7	6.4	6.3	.163
7. Education of Mother	2.6 yrs.	3.2 yrs.	3.1	.084
8. Percentage of Anemic Mothers	5.3%	7.1%	6.9%	.768
Number of Cases	23	291	314	

TABLE 7 Regression: FACTORS ASSOCIATED WITH BREAST-FEEDING PARTICIPATION AND DURATION

	BFPART (13) WORKING MOTHER	(14) NON-WORKING MOTHER	DURATION (15) WORKING MOTHER	(16) NON-WORKING MOTHER
CONSTANT	1.03	0.47	2.13	1.47
BELEFBC	-0.03 (-0.35)	0.32 (3.06)*	5.35 (1.68)**	5.64 (2.08)**
PLMHBBP	-0.01 (-0.77)	—	0.63 (1.15)	—
PJMHBBR	0.001 (0.03)	—	1.56 (2.49)*	—
GOODJOB	-0.04 (-1.09)	—	-1.30 (-1.04)	—
PAHRWF1	0.0004 (0.03)	-0.02 (-2.10)**	-0.09 (-0.30)	-0.19 (-0.92)
WEALTHTH	0.0001 (0.05)	-0.002 (-1.03)	-0.01 (-0.09)	0.09 (2.10)**
C16TT	0.003 (0.19)	0.09 (3.09)*	0.29 (0.53)	1.94 (2.67)*
C715MW	0.01 (0.35)	-0.01 (-0.51)	0.29 (0.51)	0.50 (0.88)
C712FWP	0.01 (0.23)	-0.02 (-0.35)	1.88 (2.20)**	-0.61 (-0.52)
C712FWR	0.002 (0.07)	0.01 (0.09)	-0.67 (-0.66)	-1.05 (-0.60)
C1315FVP	-0.21 (-5.66)*	0.07 (0.88)	-3.17 (-2.45)*	0.99 (0.49)
C1315FWR	0.01 (0.08)	0.05 (0.42)	-2.01 (-0.73)	-2.18 (-0.72)
OTHERS	0.02 (0.96)	0.02 (0.86)	-0.20 (-0.28)	-0.70 (-0.96)
AGEFEFC	—	—	0.31 (1.65)**	0.21 (1.27)
R ²	.23	.16	.16	.17
R ²	.17	.10	.09	.11
F	3.29	2.48	2.00	2.37
N	158	140	158	140

T-values are in parenthesis.

Level of significance:

* = 1%

** = 5%

*** = 10%

TABLE 8 Regression: FACTORS ASSOCIATED WITH BREAST-FEEDING PARTICIPATION AND DURATION

	BFPART (17)	(18)	DURATION (19)	(20)
CONSTANT	0,52	0,91	-3,41	1,42
BELEFBO	0,30 (3,28) *	0,10 (0,84)	7,46 (3,26) *	4,02 (1,28)
PLMHRBBR	-0,05 (-2,36) *	-0,06 (-3,65) *	0,27 (0,56)	-0,53 (-1,19)
PLMHRBBP	0,01 (0,34)	-0,01 (-0,38)	1,00 (1,95) **	1,00 (1,48) ***
ANEMDUM	0,09 (1,24)	—	1,52 (0,81)	—
%WITHIMI	0,001 (0,57)	—	0,02 (0,40)	—
GOODJOB	-0,05 (-0,91)	-0,06 (-0,82)	-1,25 (-0,94)	2,65 (1,32)
PAHRWF1	-0,01 (-0,92)	0,004 (0,24)	-0,37 (-1,60) ***	0,14 (0,32)
WEALTHIH	-0,0003 (-0,22)	0,001 (0,51)	0,11 (2,96) *	0,11 (2,42) *
C16TT	0,05 (2,19) **	0,01 (0,27)	0,81 (1,50) ***	-0,90 (-1,22)
C715MW	0,02 (0,98)	-0,01 (-0,27)	1,19 (2,55) ***	0,81 (1,23)
C712FWP	-0,03 (-0,98)	0,02 (0,41)	1,44 (1,91) **	2,36 (2,29) **
C712FWR	0,06 (1,50) ***	0,06 (1,02)	0,45 (0,46)	2,32 (1,50) ***
C1315FWP	-0,17 (-3,67) *	0,04 (0,43)	-2,79 (-2,49) *	-2,83 (-1,22)
C1315FWR	0,06 (0,57)	0,06 (0,53)	-0,91 (-0,35)	-6,00 (-1,85) **
OTHERS	0,03 (1,09)	0,01 (0,27)	-0,59 (-0,87)	-0,18 (-0,24)
AGEFEDEF		—	0,44 (2,65) *	0,43 (1,98) **
VISMILK	--	0,06 (0,78)	—	3,90 (1,71) **
R ²	0,21	0,19	0,25	0,24
R ²	0,15	0,10	0,19	0,15
F	3,24	1,92	3,82	2,39
N	199	130	199	130

T-values are in parenthesis.

Level of significance: * = 1%, ** = 5%, *** = 10%.

TABLE 9

THE EFFECTS OF SIMULATED CHANGES IN ECONOMIC, DEMOGRAPHIC AND OTHER VARIABLES

ON PREDICTED CHILD CARE TIME^{1/}
(Hours and Changes in Hours)

SAMPLE GROUP	Pre-dicted value hours (1)	10% increase in mother's wage pool (2)	10% increase predicted (3)	1 year increase EDUC (4)	10% increase in-crease S ⁸ TIME (6)	Add 1 daughter age 13-15 Poor (7)	Add 1 son 7-15 Rich (8)	Add 1 other house-hold member (10)	Add elect-ricity (11)	Change to compa-tible Job (12)	Predicted Value with Infant Added (13)	
Working Mothers												
WCHILDM	8.85	.12	-.16	.52***	.30	-1.79	-1.05	1.13***	1.80	1.28	22.92	
WCHILDF	0.39	-.002	-.07	.08	-.06	-.019	-.013	-.019***	-0.18	0.30	-0.40***	1.51
WCHILDOC	4.37	+0.07	.03	-.17	.27	1.76	-.0.87	0.61	-0.63	1.30***	4.68	
Subtotal	13.61	0.19	-.20	0.43	-.03	-.22	-.2.05	1.56	1.47	2.68	29.11	
WCHDCAPM	4.49	.04	-.22	2.28*	-.19	-1.91***	-.0.71	0.66	0.30	0.82	11.13	
Non-working Mothers												
NCHILDM	12.24	--	--	1.84*	-.07	-0.27	0.47	-0.80	0.35	-3.72***	22.6	
NCHILDF	1.01	--	--	-0.13	-.10	3.16*	0.20	-0.39	1.06**	-0.31	.98	
NCHILDOC	2.49	--	--	-0.27	-.12	5.03*	-0.09	-0.14	0.06	-0.68	1.27	
Subtotal	15.74	-	-	1.44	-.29	7.92	0.58	-1.33	1.47	-4.71	24.85	
NCHDCAPM	7.36	-	-	1.83*	-.01	1.37	3.92	-0.43	0.25	-2.86	12.17	

^{1/} Predicted values are based on household means for each regression from Table 3 (1-4) and Table 4 (9-12).

(statistical significance of t-values from regressions. * = 1%, ** = 5%, *** = 10%)

TABLE 10 THE EFFECTS OF SIMULATED CHANGES IN ECONOMIC, DEMOGRAPHIC
AND OTHER VARIABLES ON PREDICTED BREAST-FEEDING BEHAVIOR ^{1/}

	Pre- dicted value	10% in- crease in mother's wage Poor Rich	BELBFO= 0	Add 1 daughter age 13-15 Poor Rich	Add 1 son 7-15	Add 1 other house- hold member	change to compa- tible Job	Add 1 extra child age 1-6		
PART										
Non-working	.96	-	-	-0.32*	0.07	0.05	-0.01	0.02	-	0.09*
Working	.89	-0.001	0.0001	+0.03	-0.21*	0.01	0.01	0.02	-0.04	0.003
DURATION										
Non-working	11.11mos.	-	-	-5.64**	0.99	-2.18	0.50	-0.70	-	1.94*
Working	11.78 mos	0.06	0.16*	-5.35**	-3.17*	-2.01	0.29	-0.20	-1.30	0.29
total Sample										
BFPART	0.86	0.001	-0.01*	-0.30*	-0.17*	0.06	0.02	0.03	-0.05	0.05*
DURATION	10 mos.	0.08**	0.05	-7.46*	-2.79*	-0.91	1.19***	-0.59	-1.25	0.81*

The predicted values are based on the coefficients from Table 7 (13-16) and Table 8 (17 and 19) for an average household.

(statistical significance of t-values from regressions in Table 7 and 8:
*=1%, **=5%, ***=10%)

