

Determinants of Female Labor Force Participation and Family Size in Mexico City*

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I. Introduction

Developments in economic theory over the last 20 years have placed decisions regarding female labor force participation (FLFP) and fertility within a model of household decision making (HDM).¹ In this one period, static model utility is a function of child services (including both number and quality of children), market goods and services, and leisure. At the outset of their marriage a husband and wife adopt a utility-maximizing lifetime plan of fertility, market work, nonmarket activities, and consumption of goods and services, subject to income and time constraints. The income constraint requires that total lifetime expenditures on goods and services be equal to total lifetime income; the time constraint requires that the lifespan after marriage be divided between market work and nonmarket activities. It is assumed that couples exactly achieve their desired family size, tastes remain constant over time, children make no contribution to family income, and the structure of relative market prices remains constant. In addition, it is generally assumed that time spent in child care is largely (or totally) the wife's time.

* An earlier version of this paper was presented at the annual meeting of the Population Association of America, Atlanta, 1978. The author is grateful to Eva Mueller, Ronald Lee, David Goldberg, and Peter Heller for valuable contributions during the early stages of this study, and to David Denslow, Larry Kenny, and two referees for useful comments during the later stages.

¹ Major contributions toward the development of this theory include Gary S. Becker, "An Economic Analysis of Fertility," in *Demographic and Economic Change in Developed Countries* (Princeton, N.J.: Princeton University Press, for the National Bureau of Economic Research, 1960); Jacob Mincer, "Market Prices, Opportunity Costs and Income Effects," in *Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld*, ed. Carl F. Christ et al. (Stanford, Calif.: Stanford University Press, 1963); and Robert J. Willis, "A New Approach to the Economic Theory of Fertility Behavior," *Journal of Political Economy* 81, no. 2, pt. 2 (March/April 1973): S14-S65.

This model is subject to a number of criticisms.² It is a static model, while household decision making may be a dynamic, sequential process. It ignores the interaction of husband and wife (and children) in the decision-making process. It largely ignores the roles played by social, psychological, and cultural variables. Furthermore, the analogy of children to consumer goods can itself be questioned. The formulation of the model in terms of household production of commodities depends crucially on assumptions of constant returns to scale and no joint production. Particularly in less developed countries, the assumptions regarding perfect foresight and control over family size are questionable.

While these are all valid criticisms, the HDM model does provide a tractable theoretical framework that yields empirically testable hypotheses. A number of studies using this general model have investigated the determinants of FLFP and fertility in more developed countries. Much less work has been done with data from less developed countries. The primary objective of the present study is to investigate the effects of several explanatory variables on family size and FLFP in Mexico City. Particular emphasis will be placed on the effect of the wife's potential wage on FLFP and family size. This study will go beyond previous empirical work in an attempt to deal with several of the criticisms mentioned above.

The effect of social, psychological, and cultural factors on household decision making can be easily accommodated in the HDM model. These factors determine a couple's indifference map and directly interact with household production functions and/or budget constraints to determine utility-maximizing behavior. Unfortunately, these factors are generally omitted from economists' studies of FLFP and fertility. This omission not only precludes the investigation of potentially interesting results but also introduces the possibility of omitted variables bias into the empirical analysis. A second objective of this study is to develop several measures of cultural variables and investigate their effects on FLFP and family size.

In the HDM model the cost of children includes an opportunity cost equal to the wife's potential wage times her time spent caring for children. This opportunity cost affects both family size and FLFP de-

² For more extensive comments see Judith Blake, "Are Babies Consumer Durables? Critique of the Economic Theory of Reproductive Motivation," *Population Studies* 22 (March 1968): 5-25; N. K. Namboodiri, "Some Observations on the Economic Framework for Fertility Analysis," *Population Studies* 26 (July 1972): 185-206; Harvey Leibenstein, "An Interpretation of the Economic Theory of Fertility: Promising Path or Blind Alley?" *Journal of Economic Literature* 13 (June 1974): 457-79; and Robert Pollak and Michael Wachter, "The Relevance of the Household Production Function and Its Implications for the Allocation of Time," *Journal of Political Economy* 83 (April 1975): 255-77.

cisions. The relevance of the opportunity cost, however, is based on the assumption that market work and child care cannot be performed simultaneously. In more developed countries this is a reasonable assumption: virtually all market work is performed in settings in which work and child care are competing uses of time and cannot be carried out simultaneously. In less developed countries, however, this is not necessarily the case. There is a broad spectrum of potential work-child care combinations. Some types of work (such as tending a small store in the home) can be performed simultaneously with child care with little loss in productivity. Other types of work (such as working on a factory assembly line) cannot. Since some types of work can be performed simultaneously with child care in less developed countries, the opportunity cost of children may be something less than the wife's potential wage times her time spent caring for children. In fact, if a woman could command the same wage while working and caring for children as she could while only working, the opportunity cost of children in terms of foregone wages would be zero. Consequently the negative relationship between FLFP and family size found in more developed countries may not be found in less developed countries.³ A third objective of this study is to develop measures of the degree to which market work and child care can be performed simultaneously and investigate how the effects of the determinants of FLFP vary when different measures of FLFP are used.

The HDM model is a one-period model in which it is assumed that FLFP and family-size decisions are made at the time of marriage and do not change thereafter. Family size and FLFP are the joint outcomes of a single decision-making process and have no direct causal relationship with each other. If a household's preferences change over time, however, or actual events turn out to be different from those that were planned, then the assumption of noncausality in the FLFP-fertility relationship no longer holds. Since fertility control is quite imperfect (particularly in less developed countries) it is likely that deviations from planned behavior will occur in the area of family size. Rather than being the outcome of the decision-making process, these deviations from planned fertility behavior are exogenous and have a direct effect on family decision making. A final objective of this study is to separate planned from unplanned fertility and investigate the effect of unplanned fertility of FLFP, paying special attention to the degree to which child care and various types of market work can be performed simultaneously.

³ This possibility is considered in some detail in Stanley K. Smith, "Women's Work, Fertility and Competing Time Use in Mexico City," in *Research in Population Economics*, ed. Julian Simon and Peter Lindert (Greenwich, Conn.: JAI Press, 1981), 3:167-88.

II. Data

A sample survey from Mexico City is used for the empirical investigation. Mexico City was chosen because good data were available, showing large variations in fertility and great diversity in occupational opportunities. The data were drawn from a multistage, stratified, clustered probability sample of married women living in the Mexico City metropolitan area in early 1971. All women were living with their husbands at the time of the interview. Sample size was 798, representing a response rate of 96%. The sample was stratified by measures of household monthly income and quality of the housing unit. The data have been weighted to account for inequalities in the probability of selection of individual women.⁴

III. Variables

Family Size

Four measures of family size are used. Children ever born (CEB) is the number of live births a woman had prior to the time of the interview. This is a measure of cumulative past fertility but does not take into account child mortality. Since a great deal of evidence suggests that parents respond to child mortality by having additional births,⁵ a second measure was constructed which accounts for child mortality. Current family size (CFS) is the number of surviving children a woman had at the time of the interview. Both CEB and CFS are strongly affected by age and marriage duration or by a woman's stage in the life cycle. A third measure adjusts for life-cycle differences by focusing on expectations. Expected family size (EFS) is the number of children a woman expects to have when she has completed childbearing. It is the sum of current family size and expected future fertility. These three family-size measures are used as dependent variables in the empirical analysis. A final variable, the change in expected family size since marriage (CHEFS), is used as an explanatory variable to investigate the effects of unplanned fertility on FLFP. This variable is described more fully in Section IV.

Female Labor Force Participation

Several measures of the wife's work experience are employed. Ever worked since marriage (EWSM) is a 0-1 variable coded one if a woman has ever performed market work since marriage, whether at home or away from home, part time or full time, at any type of occupation, and

⁴ This survey was conducted under the supervision of David Goldberg, Population Studies Center, University of Michigan. I am grateful for permission to use the data from this survey.

⁵ This evidence is reviewed in T. Paul Schultz, "Interrelationships between Mortality and Fertility," in *Population and Development*, ed. Ronald Ridker (Baltimore: Johns Hopkins Press, 1976).

for any length of time. This measure simply separates workers from nonworkers and takes no account of the degree to which work and child care can be performed simultaneously.⁶

A number of different measures of FLFP are found in the literature. Those most commonly used are work at home versus away from home, rural versus urban, part time versus full time, and white collar versus blue collar.⁷ None of these are completely satisfactory as measures of the degree to which work and child care can be carried out simultaneously. Work at home may be carried out simultaneously with child care, but it does not follow from this that work away from home cannot be. Rural work may more often be carried out simultaneously with child care than urban work, but within both the urban and rural sectors there are some jobs that can be done while caring for children and some that cannot. Part-time work cannot necessarily be performed simultaneously with child care more easily than full-time work; it depends on the nature of the specific part-time and full-time jobs involved. The same holds for white and blue collar jobs. In addition, the white versus blue collar dichotomy is strongly correlated with socioeconomic status, adding differences in income and education to differences in the degree to which work and child care can be performed simultaneously.

A measure is needed that directly addresses the issue of whether work and child care can be performed simultaneously. This measure must be based on the time-use characteristics of each occupation in which women are employed. Ideally these characteristics would be estimated from a direct survey of time use in various occupations.⁸ Unfortunately, such data are not available for the present sample. The time-use characteristics of various occupations must therefore be estimated in accordance with somewhat more informal criteria.

A variable is constructed that divides market work by sector. Occupations in which hours and location of work are flexible, re-

⁶ To simplify terminology, women in the labor force are referred to as "workers" while those not in the labor force are referred to as "nonworkers." This, of course, is not meant to imply that women outside the labor force do not work.

⁷ Such measures have been used by A. J. Jaffe and K. Azumi, "The Birth Rate and Cottage Industries in Underdeveloped Countries," *Economic Development and Cultural Change* 9 (October 1960): 52-63; Robert Weller, "The Employment of Wives, Role Incompatibility and Fertility," *Milbank Memorial Fund Quarterly* 46 (October 1968): 507-26; Paula Hass, "Maternal Role Incompatibility and Fertility in Urban Latin America," *Journal of Social Issues* 28, no. 2 (April 1972): 111-27; and Aziz Bindary, Colin Baxter, and T. H. Hollingsworth, "Urban-Rural Differences in the Relationship between Women's Employment and Fertility: A Preliminary Study," *Journal of Bio-Social Science* 5 (April 1973): 159-66.

⁸ This direct approach was taken by Julie DaVanzo and Donald Lye Po Lee, "The Compatibility of Child Care with Labor Force Participation and Nonmarket Activities: Preliminary Evidence from Malaysian Time Budget Data" (Working Paper no. P-6126, Rand Corporation, July 1978).

relationships between employer and employee or proprietor and customer are informal, and work duties are not expected to require full-time attention are classified as traditional sector jobs. In the traditional sector, work and child care are not necessarily competing uses of time; it is possible that work and child care might be performed simultaneously. Occupations in which hours and location are rigid, work relationships are formal, and work duties are expected to require full-time attention are classified as modern sector jobs. In the modern sector, work and child care most likely cannot be performed simultaneously. They are, rather, totally competing uses of time.

The classification of occupation by sector is shown in table 1. This classification was based on the consensus of several researchers familiar with employment characteristics in less developed countries and particularly in Mexico City. Although some disagreement may exist regarding the classification of a few occupations, in most cases the choice is fairly obvious. All market work performed at home is classified in the traditional sector. When more than one job has been held since marriage, the classification by sector is based on the primary job held.

A number of FLFP measures rely on this division of occupations into sectors. The variable EW-MOD is a 0-1 variable coded one if a woman has ever worked since marriage in the modern sector; EW-TRAD is coded one if a woman has ever worked since marriage in the traditional sector; and PT-TRAD is coded one if a woman has worked only part time in the traditional sector since marriage. It is assumed that work and child care are most likely to be competing uses of time for EW-MOD, less likely for EW-TRAD, and least likely for PT-TRAD. The variables %YWSM-MOD and %YWSM-TRAD are the number of years worked since marriage in the modern and traditional sectors, respectively, as a percentage of total years married. These are continuous variables whose values range from zero to 100. It is assumed that the larger the percentage of married life spent working, the greater the degree to which FLFP and child care are competing uses of time.

Economic Variables

The economic variables that affect family decision making are prices of goods and services, potential wages of family members, and nonwage income. In this study only the husband's potential wage (H-PW) and wife's potential wage (W-PW) are considered. These are estimates of the average monthly wages that could be earned if the husband and wife worked full time for their highest possible wages. They are expressed in units of 100 pesos per month. Nonwage income is not included because it was found to represent an extremely small proportion

TABLE 1
WIFE'S OCCUPATION, BY SECTOR

	N	N
Modern sector:		
Doctor, dentist	1	
Teacher	14	
Certified public accountant	1	
Nurse, medical technician	7	
Chemist, physicist, geologist, etc.	4	
Artist, musician, writer (firm)	5	
Self-employed business person	8	
Business manager (firm)	1	
Other proprietor	1	
Secretary	29	
Bookkeeper	4	
Other office worker	13	
Salesworker, nonfood store	12	
Factory worker	22	
Barber, hairdresser (shop)	1	
Total	123	
Traditional sector:		
Farm worker	3	
Foodstore, small restaurant owner	11	
Salesworker, foodstore	6	
Street vendor	10	
Traditional craft: baker, tailor, etc.	34	
Business manager (home)	2	
Artist, musician, writer (home)	2	
Barber, hairdresser (home)	1	
Cook, waitress	17	
Maid, servant, laundress	49	
Janitor	4	
Other service worker	10	
Urban laborer, unspecified	1	
Total	150	

of total income in the present sample. Prices of goods and services are not included because they are presumed to be the same for all households in the sample; all respondents lived in the Mexico City metropolitan area and had access to the same markets.

The variables H-PW and W-PW are measures of potential rather than actual wages. In a one-period, lifetime model it is the maximum potential stream of earnings perceived at the time of marriage that is relevant for decision making, not the actual wage received at the time of marriage or at some point in time after marriage. Potential wages are exogenous to the model because they are largely determined prior to the time of marriage. While it is true that postmarital work experience affects the actual wage received after marriage, it has no effect on the potential wage as viewed from marriage because the potential wage is an estimate of a person's maximum potential earning power. It already includes the growth in wages that would accompany work experience if a person worked full time. The opportunity cost of not working includes not only foregone current wages but foregone wage increases as well.

Potential wages are estimated by regressing the natural logarithm of current monthly income for full-time workers on a set of background characteristics and applying the resulting regression coefficients to the background characteristics of all persons. For W-PW a subsample was chosen of all women working at the time of the interview who had incomes during the past year and had worked full time in the modern sector at some time since marriage. This subsample is intended to isolate those women who were most nearly earning their maximum potential wages. The natural logarithm of income was regressed on education, rural background, migration status (not born in Mexico City), length of residence in Mexico City, and husband's occupational status (white collar worker). The results of this regression are shown in table 2. All variables except rural background are significant at .05.

The variable H-PW was estimated in a similar manner. A subsample of men aged 35–39 who worked full time during the past year was chosen. Men of the same age group were used to control for the effects of age and work experience on income. Age was found to have a small, insignificant effect on income for women and was therefore not included in the estimation of W-PW. The natural logarithm of income was regressed on education, rural background, migration status (not born in Mexico City), and length of residence in Mexico City. The results of this regression are shown in table 2. All variables except rural background are significant at .05.

Changes in potential wages have both income and substitution effects on FLFP and family-size decisions. Income effects are expected to be negative for FLFP because the demand for leisure in-

TABLE 2

OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF INDEPENDENT
VARIABLES ON NATURAL LOGARITHM OF WIFE'S INCOME AND
HUSBAND'S INCOME

	Wife's Income	Husband's Income
Education .....	.100 (4.78)*	.083 (7.09)*
Rural background	-.053 (-.21)	-.319 (-1.91)
Length of residence .....	.020 (2.08)*	.024 (2.34)*
Migration status .....	.500 (2.06)*	.524 (2.81)*
Husband-WC .....	.476 (2.83)*	
Intercept	5.439 (14.50)*	6.155 (21.34)*
R ² .....	.482	.500
N	56	101

NOTE.—*t*-values in parentheses.

* Significant at .05.

creases with income. Income effects for family size, however, are ambiguous. While increases in income are expected to increase the demand for child services (*C*), it is not clear from the theoretical model whether this is accomplished through larger numbers of children (*N*) or greater expenditures on child quality (*Q*). Substitution effects from changes in W-PW are negative for family size and positive for FLFP because a higher potential wage makes both children and leisure relatively more expensive. For a model in which it is assumed that the husband does not participate in household production, the substitution effects of changes in H-PW on FLFP and family size are zero. If the husband does participate in household production, the substitution effects of changes in H-PW on FLFP and family size are negative.

Given these income and substitution effects, W-PW is expected to have a positive effect on FLFP and a negative effect on family size because the substitution effect is expected to outweigh the income effect in the demand for both leisure and children. The variable H-PW is expected to have a negative effect on FLFP, but the effect of H-PW on family size cannot be predicted because of opposite income and substitution effects and the ambiguous relationship between child services (*C*) and number of children (*N*). These effects have been discussed more fully elsewhere.⁹

Similar approaches to estimating potential wages have been used before.¹⁰ They are subject to several weaknesses, however, as pointed

⁹ E.g., Willis, pp. S43–S46.

¹⁰ Reuben Gronau, "The Effect of Children on the Housewife's Value of Time," *Journal of Political Economy* 81, no. 2, pt. 2 (March/April 1973): S168–S199; E. R. Berndt and T. J. Wales, "Labor Supply and Fertility Behavior of Married Women: An Empirical Analysis" (Discussion Paper 74-27, University of British Columbia, December 1974); James McCabe and Mark Rosenzweig, "Female Employment Creation and Family Size," in Ridker, ed.

out by Gronau, Heckman, and others.¹¹ They are based on incomplete information regarding work duration and exact pay scales. They are based on samples in which not all have worked continuously since marriage, and thus may be affected by work-experience biases. They may also be subject to selectivity biases: since persons in the labor force may differ substantially from those not in the labor force with respect to such characteristics as intelligence, diligence, or quality of schooling, the potential wages imputed to nonworkers may be biased. In spite of these weaknesses H-PW and W-PW have two important advantages over other measures of wages: they refer to potential rather than current earnings and provide estimates of earning power for persons not in the labor force. I believe the advantages of these measures outweigh the disadvantages.

Attitude Variables

"Tastes" is the term used in the theoretical model to describe such factors as likes and dislikes, selfishness, altruism, compromises between the conflicting wishes of husband and wife, and so forth. Tastes enter the decision-making process through the utility function, which shows the ranking of a couple's priorities and the strength of their preferences for one variable over another. Tastes are formed by social norms, cultural patterns, and family and peer influence, as well as by the individual characteristics of each couple. While measures of tastes are often excluded from economic models, they are included here because I believe they are important determinants of household decision making. Furthermore, their inclusion requires no alteration of the underlying theoretical model. Tastes are taken as exogenous in the present model.

There is no unique variable "tastes" that can be exactly isolated and measured. Rather there are many indicators of the taste for one thing or another; the problem in this study is to choose the ones that best approximate the preferences for FLFP and family size. Three variables have been constructed to measure these preferences. First is an index of traditional attitudes (TRADATT) composed from answers to questions regarding male and female roles and behavior. Second is an index of husband dominance (H-DOM) composed from answers to questions about which spouse has more influence in making decisions affecting the family's social and economic life. Third is an index of religious devotion (RELDEV) based on frequency of mass attendance, communion, and prayer outside the church. A more complete description of these indexes can be found in an earlier study.¹² It is

¹¹ Gronau, pp. S177-S182; James Heckman, "Shadow Prices, Market Wages and Labor Supply," *Econometrica* 42 (July 1974): 679-84.

¹² Stanley K. Smith, "Women's Work and Fertility in Mexico City" (Ph.D. diss., University of Michigan, 1976), pp. 89-95, 191-92.

hypothesized that highly traditional attitudes, male dominance in family decision making, and strong religious devotion will promote larger family size and lower rates of FLFP. These hypotheses have been developed more fully elsewhere.¹³

Demographic Variables

Several demographic variables are included to control for differing stages in the woman's life cycle. Marriage duration (MARDUR) is the number of years since first marriage, MARDUR2 is the square of marriage duration, and AGEMAR is the age at first marriage. These variables are expected to have a strong, significant impact on family size simply because fertility is positively correlated with years of exposure to risk of pregnancy. Thus MARDUR is expected to have a positive but diminishing effect on family size and AGEMAR a negative effect. The effects of the demographic variables on FLFP are not as clear. The variable AGEMAR is expected to have a positive effect on FLFP because it is positively correlated with premarital work experience. The effect of MARDUR, however, cannot be predicted a priori and may well differ for different measures of FLFP.

IV. Empirical Analysis

Determinants of Family Size

Ordinary least-squares regression analysis was used to investigate the effects of the independent variables on family size. These results are shown in the first column of tables 3, 4, and 5. The demographic variables have large consistent effects. Age at marriage has a significant negative effect on all three measures of family size while marriage duration has a significant positive nonlinear effect, as shown by the large positive coefficient for MARDUR and the small negative coefficient for MARDUR2. This reflects the fact that childbearing is concentrated in the early years of married life. The effects of the demographic variables on family size are exactly as expected: the younger the age at marriage and the greater the number of years married, the larger the current and expected family size.

Some of the hypotheses regarding effects of the attitude variables on family size are supported, others are not. The variable TRADATT has a significant positive effect on all three family-size measures (only

¹³ Maria del Carmen Elu de Leñero, *Hacia donde va la mujer mexicana?* (Mexico: Instituto Mexicano de Estudios Sociales, 1969), pp. 137 ff.; Noel F. McGinn, "Marriage and Family in Middle Class Mexico," *Journal of Marriage and the Family* 28 (November 1966): 307-8; Bernard C. Rosen and Alan B. Simmons, "Industrialization, Family and Fertility: A Structural-Psychological Analysis of the Brazilian Case," *Demography* 8 (February 1971): 49-69, esp. 61; J. M. Stycos, *Human Fertility in Latin America* (Ithaca, N.Y.: Cornell University Press, 1968), pp. 171 ff.; Robert Weller, "The Employment of Wives, Dominance and Fertility," *Journal of Marriage and the Family* 30 (August 1968): 439-42.

at .10 for CFS, however), supporting the hypothesis that the more a couple clings to traditional value systems regarding male and female roles, the higher its current and expected family size. The hypotheses regarding the effects of husband-wife equality and religious devotion, however, are not supported. The variable H-DOM has a small, insignificant negative effect on family size, and RELDEV, while having the expected positive effect, is not statistically significant.

TABLE 3
OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF INDEPENDENT
VARIABLES ON CEB

	(1)	(2)	(3)
H-PW	-.008 (-1.06)	-.038 (-2.80)*	-.007 (-.94)
W-PW	-.111 (-6.31)*	-.186 (-5.58)*	-.110 (-4.27)*
TRADATT .....	.098 (2.52)*	.090 (2.34)*	.097 (2.48)*
H-DOM	-.011 (-.44)	-.012 (-.48)	-.011 (-.44)
RELDEV .....	.030 (.91)	.035 (1.04)	.031 (.91)
AGEMAR	-.073 (-3.78)*	-.070 (-3.61)*	-.073 (-3.76)*
MARDUR .....	.391 (17.19)*	.391 (17.28)*	.390 (16.61)*
MARDUR2	-.006(-10.72)*	-.006(-10.76)*	-.006(-10.69)*
H-PW*W-PW .....	...	.003 (2.63)*	...
W-EDUC .....	...	...	-.003 (-.08)
Intercept	2.650 (3.52)*	3.361 (4.21)*	2.657 (3.50)*
R ² .....	.476	.481	.476

NOTE.—*N* = 798; *t*-values in parentheses.

* Significant at .05.

TABLE 4
OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF INDEPENDENT
VARIABLES ON CFS

	(1)	(2)	(3)
H-PW	-.004 (-.070)	-.016 (-1.41)	-.005 (-.75)
W-PW	-.079 (-5.38)*	-.108 (-3.89)*	-.083 (-3.89)*
TRADATT .....	.055 (1.70)	.052 (1.61)	.056 (1.72)
H-DOM	-.012 (-.58)	-.012 (-.60)	-.012 (-.057)
RELDEV .....	.013 (.047)	.015 (.53)	.012 (.43)
AGEMAR	-.071 (-4.43)*	-.070 (-4.53)*	-.071 (-4.37)*
MARDUR .....	.338 (17.89)*	.338 (17.90)*	.340 (17.37)*
MARDUR2	-.006(-12.34)*	-.006(-12.34)*	-.006(-12.32)*
H-PW*W-PW .....	...	.001 (1.23)	...
W-EDUC .....	...	...	.010 (.28)
Intercept	2.764 (4.41)*	3.041 (4.57)*	2.743 (4.34)*
R ² .....	.445	.446	.445

NOTE.—*N* = 798; *t*-values in parentheses.

* Significant at .05.

TABLE 5
OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF INDEPENDENT
VARIABLES ON EFS

	(1)	(2)	(3)
H-PW	-.019 (-2.70)*	-.045 (-3.42)*	-.016 (-2.11)*
W-PW	-.094 (-5.48)*	-.159 (-4.89)*	-.079 (-3.14)*
TRADATT .....	.090 (2.37)	.083 (2.21)*	.085 (2.22)*
H-DOM	-.007 (-.29)	-.008 (-.32)	-.008 (-.33)
RELDEV .....	.016 (.50)	.020 (.61)	.020 (.59)
AGEMAR	-.147 (-7.81)*	-.144 (-7.66)*	-.149 (-7.85)*
MARDUR .....	.152 (6.84)*	.152 (6.88)*	.147 (6.41)*
MARDUR2	-.003 (-6.08)*	-.003 (-6.09)*	-.003 (-6.01)*
H-PW*W-PW .....	...	.002 (2.34)*	...
W-EDUC .....	...	...	.036 (-.85)
Intercept	7.951 (10.80)*	8.570 (10.99)*	8.028 (10.82)*
R ² .....	.262	.267	.262

NOTE.— $N = 798$; t -values in parentheses.

* Significant at .05.

The hypothesis that increases in the husband's potential wage lead to larger family size is not supported. The variable H/PW has small negative effects on all three family-size measures. The hypothesis that increases in the wife's potential wage lead to decreases in family size, however, is strongly supported. Increases in W-PW of 1,000 pesos per month lowers CEB, CFS, and EFS by approximately one child, other things remaining constant. The regression coefficients are highly significant for all three measures of family size. These results provide strong evidence that the market value of a woman's time is an important determinant of family size even in a less developed country.

It is quite possible that W-PW has a different effect on family size for women whose husbands have low wages than for women whose husbands have high wages. Such an interaction can be investigated by multiplying H-PW by W-PW and adding this variable to the model. The partial derivative of family size (N) with respect to W-PW then has an additional term reflecting the interaction effect: $dN/dW-PW = a + b(H-PW)$ where a is the coefficient for W-PW and b is the coefficient for the interaction term.

The second column of tables 3, 4, and 5 shows the regression coefficients when an interaction term is added to the regressions. Although the coefficients for the other six variables are largely unaffected, the coefficients for H-PW and W-PW become considerably more negative. Since the coefficient for the interaction term is positive, it is clear that the effect of W-PW on family size becomes less negative as H-PW increases. An example may illustrate this effect. Let H-PW = 800. This is a fairly low value, as only 13% of the men in the sample had

incomes less than 800 pesos per month. For CEB, $dN/dW-PW = -.186 + .003(8) = -.162$. Now let $H-PW = 5,000$. This is a fairly high value, as only 12% had incomes greater than 5,000 pesos per month. Now $dN/dW-PW = -.186 + .003(50) = -.036$. The negative effect of the wife's potential wage on CEB is over four times greater for women whose husbands earn 800 pesos than for those whose husbands earn 5,000. It is clear that both the wife's potential wage and her relative contribution to family income have important effects on CEB. Similar results are found for CFS and EFS, although the interaction effect is not quite as strong.

The same type of analysis can be done for H-PW, showing the effect of H-PW on family size to become larger as W-PW rises. For example, when W-PW reaches 1,267 pesos per month the effect of H-PW on CEB becomes positive. A positive effect of the husband's potential wage on family size is thus found when the wife has a relatively high potential wage and interaction effects are considered.

Female education is often included in analyses of fertility but is difficult to interpret because it picks up so many different effects (e.g., potential earning power, preferences for FLFP and family size, and efficiency in household production). In addition, education is often highly correlated with other independent variables, making estimates of regression coefficients highly imprecise. For purposes of comparison, however, the regressions were run with an additional variable measuring the wife's number of years of schooling (W-EDUC). These results are shown in the third column of tables 3, 4, and 5. The variable W-EDUC has a very small, insignificant effect on all three family-size variables, and its inclusion has very little effect on the coefficients of the other independent variables. It is particularly interesting to note that the W-PW coefficients change very little when W-EDUC is included in the equation. It appears that the effects of the wife's education on family size are being picked up by the wage and attitude variables in this model.¹⁴

To test for interaction effects related to stage in the life cycle, the family-size regressions were run for three different age groups. These results are shown in table 6. Most of the variables show no consistent relationship with age, but several do. The results are particularly interesting for TRADATT and W-PW. The effect of TRADATT becomes

¹⁴ The family-size regressions were also run using the other four background variables shown in table 2, in addition to the economic, attitude, and demographic variables. All the background variables were insignificant except H-WC, which had a significant negative effect on CEB and EFS. The coefficients of the original explanatory variables were affected very little by the inclusion of the background variables, and the explanatory power of the equations was not increased significantly. I believe this shows that the effects of the background variables on family size are being picked up by the economic and attitude variables which directly affect household decision making in this model.

larger and more significant with age. This may be picking up a cohort effect: earlier cohorts may have been much more affected by the types of attitudes measured in the TRADATT index than are more recent cohorts. An alternate explanation is that the attitudes measured in the TRADATT index affect decisions regarding completed family size but do not affect the timing of births. Thus the effect of TRADATT is greater for women who have nearly completed childbearing than for those just starting out. It is impossible to determine from the present analysis which explanation is more likely.

TABLE 6

OLS REGRESSION COEFFICIENTS FOR FAMILY SIZE BY AGE OF WOMAN

Wife's Age and Variables	CEB	CFS	EFS
Less than 30 (<i>N</i> = 287):			
H-PW	-.002 (-.40)	.000 (.05)	-.010 (-1.12)
W-PW	-.030 (-1.64)	-.021 (-1.20)	-.075 (-2.43)*
TRADATT .....	.009 (.27)	-.017 (-.59)	.085 (1.63)
H-DOM .....	.031 (1.57)	.041 (2.24)*	.032 (.99)
RELDEV .....	.053 (2.11)*	.042 (1.81)	.045 (1.10)
AGEMAR	-.006 (-.23)	-.007 (-.27)	-.031 (-.72)
MARDUR .....	.588 (11.43)*	.515 (10.77)*	.090 (1.07)
MARDUR2	-.018 (-4.47)*	-.016 (-4.21)*	.007 (1.04)
Intercept	-.307 (-.41)	-.272 (-.39)	4.317 (3.51)*
<i>R</i> ² .....	.656	.625	.258
30-39 (<i>N</i> = 238):			
H-PW	-.018 (-1.49)	-.016 (-1.56)	-.038 (-2.86)*
W-PW	-.106 (-3.22)*	-.076 (-2.71)*	-.111 (-3.12)*
TRADATT .....	.082 (1.19)	.025 (.43)	.056 (.75)
H-DOM .....	.008 (.19)	.007 (.20)	.031 (.65)
RELDEV	-.004 (-.07)	-.065 (-1.16)	-.086 (-1.20)
AGEMAR .....	.077 (1.25)	.008 (.15)	-.096 (-1.44)
MARDUR .....	.372 (2.75)*	.210 (1.82)	.070 (.48)
MARDUR2	-.003 (-.73)	-.0004 (-.10)	-.0002 (-.04)
Intercept	-.146 (-.06)	2.946 (1.44)	8.770 (3.38)*
<i>R</i> ² .....	.339	.303	.274
40+ (<i>N</i> = 273):			
H-PW	-.033 (-1.85)	-.018 (-1.27)	-.018 (-1.19)
W-PW	-.116 (-3.56)*	-.082 (-3.08)*	-.095 (-3.47)*
TRADATT .....	.175 (2.13)*	.130 (1.93)	.133 (1.93)
H-DOM	-.034 (-.66)	-.059 (-1.39)	-.079 (-1.80)
RELDEV .....	.040 (.54)	.039 (.65)	.051 (.83)
AGEMAR	-.194 (-4.40)*	-.164 (-4.56)*	-.188 (-5.07)*
MARDUR .....	.219 (2.22)*	.196 (2.44)*	.151 (1.82)
MARDUR2	-.003 (-2.14)*	-.003 (-2.63)*	-.003 (-2.23)*
Intercept	8.208 (3.30)*	7.072 (3.49)*	8.973 (4.29)*
<i>R</i> ² .....	.323	.285	.292

NOTE.—*t*-values in parentheses.

* Significant at .05.

The wife's potential wage also shows a consistent relationship with age. As age increases, the negative effect of W-PW on family size becomes larger and more significant. This relationship is much stronger for the two measures of current family size than for expected family size, however. For women under age 30, W-PW has small insignificant effects on CEB and CFS but a large significant effect on EFS. For women over age 30, W-PW has a significant negative effect on all three measures. The wife's potential wage thus has a significant effect on expected family size at all ages but a significant effect on actual family size only in the older age groups. The implication seems to be that the wife's potential wage affects completed family size much more than it affects fertility behavior in the early years of marriage.

Determinants of FLFP

Table 7 shows the effects of the independent variables on various measures of FLFP.¹⁵ The first column refers to EWSM, the probability of having performed any type of market work since marriage. The variable H-PW has a significant negative effect on EWSM, while W-PW has a positive but insignificant effect. The three attitude variables have the expected negative effects on EWSM but are significant only for H-DOM and RELDEV. The variable AGEMAR has a small but significant positive effect and MARDUR a large nonlinear positive effect. These results are generally as expected.

When FLFP is considered by sector some interesting differences emerge, as shown in the last four columns of table 7. The husband's potential wage has a significant negative effect on traditional sector work but virtually no effect on modern sector work. This may suggest that traditional sector work is valued primarily for the income it provides while modern sector work is valued for status, self-fulfillment, and other nonpecuniary benefits as well as income. The negative income effect on a less-valued activity (traditional sector work) is thus much stronger than the effect on a more-valued activity (modern sector work).

The wife's potential wage has significant negative effects on traditional sector work and significant positive effects on modern sector work. The positive effect of W-PW on EW-MOD shows that higher potential wages raise the probability that a woman has worked in the modern sector at some time since marriage, while the positive effect on %YWSM-MOD shows that higher potential wages raise the percentage of time spent working in that sector as well. The negative effects of

¹⁵ The dichotomous form of the dependent variables dictated the use of the logit transformation of the regression equation as well as OLS. The results of the logit analysis were very similar to the OLS results (Smith, "Women's Work and Fertility in Mexico City," p. 193). Only the OLS results are shown here.

TABLE 7
OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF INDEPENDENT VARIABLES ON FIVE FLFP MEASURES

	EWSM	EW-TRAD	EW-MOD	%YWSM-TRAD	%YWSM-MOD
H-PW	-.005 (-3.71)*	-.005 (-4.45)*	.000 (.13)	-.21 (-2.45)*	.06 (.83)
W-PW .....	.005 (1.50)	-.011 (-3.90)*	.015 (6.17)*	-.32 (-1.51)	.46 (2.55)*
TRADATT	-.009 (-1.25)	.005 (.91)	-.014 (-2.51)*	.61 (1.30)	-1.54 (-3.89)*
H-DOM	-.026 (-5.76)*	-.020 (-5.26)*	-.007 (-1.99)*	-.69 (-2.33)*	-.35 (-1.40)
RELDEV	-.018 (-2.83)*	.002 (.37)	-.019 (-4.09)*	.16 (.38)	-.93 (-2.71)*
AGEMAR .....	.009 (2.10)*	.002 (.77)	.007 (2.43)*	.70 (3.00)*	.70 (3.53)*
MARDUR .....	.016 (3.83)*	.015 (4.29)*	.003 (.84)	-.18 (-.65)	-1.02 (-4.37)*
MARDUR2	-.0004 (-3.66)*	-.0002 (-2.95)*	-.0002 (-1.97)*	.002 (.31)	.01 (2.64)*
Intercept .....	.795 (5.64)*	.498 (4.87)*	.265 (2.33)*	8.80 (1.07)	22.88 (2.82)*
R ² .....	.108	.128	.167	.034	.154

NOTE.—N = 798; t-values in parentheses.
* Significant at .05.

W-PW on EW-TRAD and %YWSM-TRAD show that higher potential wages lower the probability that a woman has worked in the traditional sector at some time since marriage and also lower the percentage of time worked in the traditional sector. Since actual wages are higher in the modern than the traditional sector, it is not surprising that women with higher earning potential prefer modern sector work: higher potential wages can more easily be realized in the modern than the traditional sector. The positive effect of W-PW on EWSM is the result of the positive effect on modern sector work outweighing the negative effect on traditional sector work.

Some of the effects of the attitude variables are also changed. The variations are due to imperfect fertility control rather than to choice and are randomly distributed throughout the population, they can be taken decision making lowers FLFP. However, TRADATT and RELDEV have significant negative effects only for modern sector work. The hypotheses that traditional attitudes and high levels of religious devotion will lower FLFP are therefore upheld only for work in the modern sector. Several plausible explanations for this result come to mind, but one in particular is consistent with a theoretical model in which FLFP and family size are the joint outcomes of a single decision-making process. Work and child care are competing uses of time in the modern sector; choosing to work in that sector implies giving up some child care time. In the traditional sector, however, a woman may be able to work and care for her children simultaneously. Therefore, TRADATT and RELDEV have significant negative effects only on work in the modern sector because it is only in the modern sector that work cannot be performed simultaneously with child care. According to this explanation the effects of TRADATT and RELDEV on FLFP are determined by work-child care compatibility rather than by some other characteristic of modern and traditional sector work.

Excess Fertility and FLFP

The model of household decision making implies that, if a couple makes lifetime FLFP and family-size choices at marriage and exactly achieves these choices, no causal relationship exists between FLFP and family size. Rather, both are determined by a common set of wage, price, income, taste, technology, and time variables. If a couple cannot exactly fulfill its plans, however, the implication of noncausality no longer holds. Family size can have a direct effect on FLFP independent of changes in wages, prices, income, or tastes. Fecundity impairments can prevent a couple from having as many children as they would like, or unexpected pregnancies can result in more children than a couple had planned. These deviations from desired family size alter the

framework in which decisions are made by interjecting a new variable into the decision-making process.

Isolating the direct effect of such deviations on FLFP is not easy. Since FLFP and family size are jointly determined by a common set of explanatory variables, FLFP is correlated with the error term in the family-size equation, and family size is correlated with the error term in the FLFP equation. The inclusion of family size as an explanatory variable in the FLFP equation, therefore, violates the assumption of independence, and OLS regression analysis produces biased, inconsistent parameter estimates. Simultaneity problems can often be dealt with by using such methods as two-stage least-squares or limited-information maximum-likelihood estimation. In the present case these methods cannot solve the problem. Since FLFP and family size are jointly determined by a common set of variables, there are no exogenous variables that affect family size but do not affect FLFP. The equations are always underidentified and the usual methods for dealing with simultaneity are inapplicable. Statistical problems thus preclude the direct inclusion of CEB, CFS, or EFS in the FLFP equations.

What is needed is a measure of the unplanned deviations from desired family size that have occurred since marriage. If these deviations are due to imperfect fertility control rather than to choice and are randomly distributed throughout the population, they can be taken as exogenous to the system and OLS regression analysis can be used without violating any statistical assumptions. The change in expected family size since marriage (CHEFS) is used as a measure of such unplanned deviations. The variable CHEFS is the difference between the completed family size expected at the time of the interview and the family size wanted at marriage. It is a measure of the changes in family-size expectations that have occurred since marriage. This change could be either positive or negative. In the present sample it is distinctly positive: the average value of CHEFS for all women is 1.66, indicating a substantial increase in family-size expectations since marriage.¹⁶

This positive value for CHEFS could be caused by either of two factors: an increase in desired family size since marriage or the birth of more children than were originally planned. If the former were true, one would expect current family-size ideals to be greater than the family size wanted at marriage. The data, however, show that current

¹⁶ The variable CHEFS is not completely free from the effects of the other independent variables. However, numerous regressions have shown that a considerably smaller proportion of the variation in CHEFS can be explained by the independent variables than is the case for CEB, CFS, and EFS. I believe that CHEFS is a better measure of excess fertility than any of the other family-size measures.

family-size ideals are very similar to the family size wanted at marriage, even for women who have experienced large changes in expected family size since marriage. It thus appears that desired family size has not increased appreciably since marriage. Therefore, CHEFS must represent excess, or unplanned, fertility.

The effect of excess fertility on FLFP is expected to vary with the degree to which work and child care are competing uses of time. The variable CHEFS is expected to have a negative effect on work that cannot be done simultaneously with child care because excess fertility implies additional time inputs into child services and fewer time inputs into other activities. The effect of CHEFS on work that can be done simultaneously with child care, however, cannot be predicted *a priori*. It could conceivably be positive. A larger-than-expected family size may put such a strain on the budget that a woman is forced to work in order to supplement family income. In such an instance she must find someone else to care for her children or find work that can be done while caring for children.¹⁷ Since alternative child care arrangements are apt to be unacceptable or too expensive, it follows that excess fertility may lead to greater participation in jobs that can be performed simultaneously with child care.

Even if CHEFS is unaffected by the economic and attitude variables in the model, it is certainly affected by marriage duration, or the length of time a woman is exposed to the risk of unplanned births. The analysis of the effect of excess fertility on FLFP must therefore be restricted to women who have been married for approximately the same number of years. A sample was chosen of all women married 15–19 years.¹⁸ Table 8 shows the results when CHEFS is used as an explanatory variable in the FLFP equations. The variable CHEFS has no significant effect on EWSM, showing that, when all types of work are lumped together, excess fertility has no independent effect on the probability of working. When work is broken down by sector, however, some interesting results emerge. The variable CHEFS has a negative but insignificant effect on EW-MOD, the FLFP classification in which work and child care are most likely to be competing uses of time. It has a small but marginally significant positive effect on EW-TRAD, the FLFP classification in which work and child care are less likely to be competing uses of time. For PT-TRAD, the FLFP

¹⁷ It is frequently suggested that nonparental child care is more readily available for couples living in extended families than for those living in nuclear families. Empirical studies have sometimes found such variables to have positive effects on fertility and FLFP, other times found no effects. Previous work from the present data set showed that living in an extended rather than nuclear family had no significant effect on nuclear family size or FLFP (Smith, "Woman's Work and Fertility in Mexico City," pp. 135, 152).

¹⁸ Several other marriage duration samples were tried as well, with little significant impact on the empirical results.

TABLE 8
OLS REGRESSION COEFFICIENTS SHOWING EFFECTS OF CHEFS AND INDEPENDENT VARIABLES
ON FOUR FLFP MEASURES, FOR WOMEN MARRIED 15-19 YEARS

	EWSM	EW-MOD	EW-TRAD	PT-TRAD
H-PW	-.007 (-1.74)	.003 (.99)	-.010 (-2.81)*	-.003 (-.92)
W-PW	-.006 (-.58)	.013 (1.85)	-.019 (-2.20)*	-.009 (-1.21)
TRADATT	-.019 (-.96)	-.025 (-1.67)	.005 (.29)	.029 (1.82)
H-DOM	-.041 (-3.64)*	-.005 (-.58)	-.036 (-3.70)*	-.014 (-1.61)
RELDEV	-.003 (-.18)	-.016 (-1.20)	.013 (.79)	.023 (1.59)
AGEMAR .....	.020 (1.62)	-.000 (-.02)	.020 (1.88)	.019 (1.92)
CHEFS .....	.007 (.68)	-.007 (-.93)	.015 (1.55)	.027 (3.17)*
Intercept	1.152 (2.92)*	.398 (1.40)	.753 (2.19)*	-.265 (-.85)
R ² .....	.206	.239	.318	.252

NOTE.—N = 112; t-values are in parentheses.
* Significant at .05.

classification in which work and child care are least likely to be competing uses of time, CHEFS has a large significant positive effect.

Excess fertility thus has a negative effect on FLFP in jobs that cannot be done simultaneously with child care and a positive effect on FLFP in jobs that can be. It appears that having more children than originally planned induces some women to leave the labor force, others to enter. Those who enter, however, tend to choose jobs in which work and child care can most easily be done simultaneously. While these empirical results can only be termed suggestive rather than definitive because of the statistical problems involved, they are consistent with the findings of some previous research.¹⁹

V. Conclusions

The effect of the wife's potential wage on FLFP and family size is of particular interest in this study. The wife's potential wage is found to have a significant negative effect on work that can be done simultaneously with child care (traditional sector), a significant positive effect on work that cannot be (modern sector), and a significant negative effect on family size. When FLFP and family-size decisions are viewed as the joint outcome of a single decision-making process, the implication is that increases in the wife's potential wage simultaneously promote greater participation in modern sector work and smaller family size. Since wages are higher in the modern than the traditional sector (particularly for women with higher levels of market skills), actual wages are more likely to equal or approach potential wages for work in the modern sector than in the traditional sector. In the modern sector, however, child care cannot be performed while working. In the traditional sector child care can be performed while working, but actual wages are likely to be lower than potential wages. A choice must therefore be made between the higher wages of the modern sector and the child care potential of the traditional sector. Household decision making regarding FLFP and fertility in less developed countries is not a two-way choice between family size and market work but a three-way choice among family size, work that can be done while caring for children, and work that cannot be.

The existence of both modern and traditional sector work in less developed countries means that the opportunity cost of children is not simply the wife's potential wage multiplied by her time spent caring for children. The opportunity cost is rather determined by the difference between the potential wage and the wage that could be obtained if a woman were to work and care for children simultaneously. If little

¹⁹ Donald Snyder, "Economic Determinants of Family Size in West Africa," *Demography* 11, no. 4 (November 1974): 613-27.

modern sector work is open to women or if most women do not have the skills needed to perform modern sector work, then most women can command their full potential wages while working in the traditional sector. Since work and child care can often be carried out simultaneously in the traditional sector, the opportunity cost of children is quite low. Women do not have to choose between working and raising a family; they can do both. The negative relationship between FLFP and family size so commonly found in more developed countries is therefore likely to be absent in settings in which a large proportion of female work can be done while caring for children.

The expansion of female employment is often suggested as a means of lowering fertility rates in less developed countries. The results of this study suggest that such a policy may be unsuccessful. The crucial factor is not the increase in female employment per se but rather the type of employment involved and the means used to promote it. If an employment policy is not directed toward raising the opportunity cost of children, it is not likely to have a significant negative effect on fertility, at least in the short run. Attempts to affect fertility rates through female employment in less developed countries must take into account not only target levels of female employment but the nature of that employment as well, namely, the degree to which work and child care can be performed simultaneously.

Traditional sector employment is common in less developed countries, uncommon in more developed countries. The disappearance of traditional sector employment opportunities as modernization occurs is caused by increasing levels of human capital and the greater use of physical capital. As traditional sector employment declines, opportunities to work while caring for children decline as well. The opportunity cost of children thus increases as higher levels of economic development are attained not only because female wages increase but also because caring for children while working becomes less and less of an option. The decline in traditional sector employment opportunities as modernization occurs is one of the factors leading to the fertility declines presently occurring in many less developed countries.

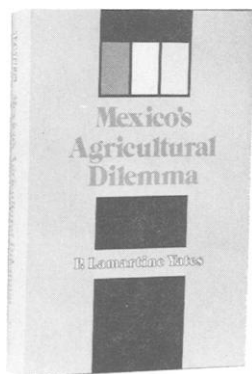
Appendix

Summary of Variables

- CEB = children ever born,
- CFS = current family size,
- EFS = expected family size,
- CHEFS = change in expected family size since marriage,
- EWSM = ever worked since marriage,
- EW-MOD = ever worked in modern sector since marriage,

- EW-TRAD = ever worked in traditional sector since marriage,
 PT-TRAD = part-time work in traditional sector since marriage,
 %YWSM-MOD = years worked in modern sector since marriage as proportion of years married,
 %YWSM-TRAD = years worked in traditional sector since marriage as proportion of years married,
 H-PW = husband's potential wage,
 W-PW = wife's potential wage,
 TRADATT = index of traditional attitudes,
 H-DOM = index of husband dominance,
 RELDEV = index of religious devotion,
 W-EDUC = wife's years of schooling,
 MARDUR = marriage duration,
 MARDUR2 = square of marriage duration, and
 AGEMAR = age at first marriage.

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