ABSTRACT

Title of thesis: WOMEN'S WORK AND TIMING OF SECOND BIRTH IN THE PHILIPPINES

Shuang Luo, Master of Arts, 2004

Thesis directed by: Professor Laurie F. DeRose
Department of Sociology

This thesis examines how women's work in the period after first birth affects the timing of their next birth using work history and birth history data from the 1993 Philippine Demographic and Health Survey. It thereby overcomes some of the kinds of data and methodological problems that commonly contribute to doubt regarding whether work has a causal effect on fertility outcomes. The relationship between work and birth spacing in these data can provide us some insight regarding the role compatibility of work and childbearing in a setting with a high total fertility rate, low rates of modern sector employment for women, and low modern contraception use. The results show that women's work delays the occurrence of second birth. However, quick return to paid work is related to a higher hazard of second birth, and doing paid work is found to have a non-proportional effect at around sixteen month postpartum.

WOMEN'S WORK AND TIMING OF SECOND BIRTH
IN THE PHILIPPINES

By

Shuang Luo

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Advisory Committee:

      Professor Laurie DeRose
      Professor Sonalde Desai
      Professor Steven Martin

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Chapter I Literature Review

It is widely recognized that women's work and fertility are interdependent, both emerging from a family decision-making process that encompasses a number of goals, but both also reacting and interacting in response to a common set of social and economic forces, as well as to unfolding events over the life circle. The attainment of such basic individual and family goals as security and mobility (Greenhalgh 1988) depends on a society's opportunity structures and on how these impinge differentially on men and women. Key features of these structures, according to Lloyd (1991), include: (1) access to and rewards from market employment; (2) access to and rights over land; (3) access to and rewards from education; and (4) access to family planning. Because children absorb mother's time and also require other resources, a mother's work represents both a constraint on their rearing and a productive resource for their support.

Whether women's participation in economic activity increases or decreases with the arrival of additional children will, therefore, depends on the particular mix of opportunities available (Mason and Palan 1981). For example, in market economies where wage employment is accessible to women but educational opportunities are still limited for children, having additional children may lead women to greater participation in economic activity to secure added income for their children's support, and at the same time, children can fill in for domestic work, freeing the woman for market work. In more traditional settings where market opportunities are less available for women, land is plentiful, and children play a productive role in the household, women's work

activity is less likely to be affected by their family size; on the other hand, when children, especially girls, have access to education, mothers find it more difficult to work away from home and to rear preschool-age children.

Despite recent findings suggesting a weakening link between fertility and female employment in some developed countries for the past two decades (Brewster and Rindfuss 2000; Rindfuss et al. 2000; Rindfuss and Brewster 1996; Engelhardt et al. 2002), many years of research on the relationship between women's economic activity and fertility in developed country settings have yielded convincing evidence of their negative association (Lloyd 1991). Underlying causes, according to Lloyd (1991), include improvements in life expectancy, the rise in the real market wage, the spread of mass education, and the development of the welfare state. These factors leading to (1) a rise in the cost of childrearing to families; (2) a reduction in families' dependency on women's home work and on children's contribution to their parents as adults; (3) an increase in the productivity of women's time in the paid labor market; and (4) changing values, including a rise in individualism and secularism.

For developing countries, when a negative relationship is observed between women's work and fertility, explanations include worker-childrearing conflict, income and price effects of female wage, and availability of childcare, and attitudes toward childcare (Connelly 1996) as well as women's work commitment (DeRose 2002). Although variations in the association between fertility decline and women's work opportunities exist, the negative relationship between fertility and women's labor force participation, especially in the modern sector of economy, has been generally acknowledged by the literature.

<u>Women's Work, Child Spacing, and Fertility</u>

The most important factor mediating the relationship between female labor force participation and fertility is believed to be the degree of role conflict for women between traditional wife/mother obligations and alternative non-household opportunities that result from urbanization, industrialization and the changing character of societies during socioeconomic development. Incompatibility between the mother and worker roles in modern economies is presumed to stem from the separation of home and workplace, the nature of work tasks, and social norms prescribing mothers as the most appropriate providers of childcare (Mason and Plan 1981). According to the 'Maternal Role Incompatibility' (MRI) hypothesis, both women's fertility and their labor force participation affect each other reciprocally because of the strain between the roles of mother and employee. Women both reduce their work because of childrearing demands and reduce their childbearing because of work demands. At the individual level, numerous studies have shown a negative association between fertility and female labor force participation.

Despite some variations in the social organization of work and of childcare across advanced industrial economies, the dominant sociological hypothesis of role incompatibility is generally sufficient to explain the relationship between work and fertility in the developed world. Several recent studies have suggested a weakening link between fertility and female employment due to greater availability of market childcare, family policies and changing attitudes towards working mothers (Rindfuss and Brewster 1996; Engelhardt et al. 2002). It is argued that change in the institutional context at the

macro-level must have enabled women in some countries to better combine work and childrearing. Some studies even predicted an upward trend in fertility in many industrialized countries as a result of the labor market offering more accommodation to childrearing needs (cited in Connelly 1996).

In the developing world, there is greater variation in the nexus of social and economic forces that determine the strength and direction of work/fertility relationship, and thus the degree of compatibility is more variable. While the developed-country literature provides strong evidence of negative relationship between the presence of small children and female labor supply, the results for developing countries are less conclusive (Donahoe 1999). Some developing-country studies also find a negative relationship between young children and women's labor force supply, while others found no significant relationship or even positive between the two (Standing 1978; Lloyd 1991).

The difference between developed and developing countries in the effects of children on female labor supply is explained in some studies by the effect of at-home work, i.e., the great majority of women who participated in the labor market in the developed countries work away from home, while most women in developing countries who participate in the market work at or near home (Smith 1981). Also, for many women in developing countries, time costs of childrearing are minimized by the availability of substitute labor from older children and grandparents. Besides, degree of work continuity may condition the relationship, and cultural factors may influence whether women simply maintain incompatible roles despite the stress involved: For instance, there may indeed be conflict between the worker and mother roles, but the

expected inverse relationship will not be seen if women lack the authority to make time-use adjustments (Isvan 1991; DeRose 2002).

Apart from the issue of role compatibility, women's work may influence fertility through increasing women's economic independence and thus their decision-making autonomy. Work may provide alternative sources of social identity and economic support, and may thus expand women's social horizons, help them resist pronatalist pressures, lead to delayed marriage, provide incentive to space and limit births, and contribute to greater sexual and reproductive autonomy (Mason 1987; Dixon-Muller 1989).

The relationship between women's work and autonomy is a controversial issue though. Some authors argue that the level of female wage employment is irrelevant to women's position unless it is contrasted with men's, others argue that absolute level of employment is itself indicative of the autonomy or dependency that women are likely to enjoy in relation to men; still other authors argue that employment is not a direct indicator of female status or autonomy, regardless of whether it is measured in absolute terms or in comparison with men (cited in Mason 1987). Furthermore, the work/fertility relationship is weak in certain contexts, as women's economic autonomy may not correlate with or confer reproductive autonomy (cited in DeRose 2002).

A theme in the literature on work/fertility relationship in developing countries is the mediating role of the nature and conditions of work on women's fertility and fertility control (Doan and Brewster 1998; Donahoe 1999). However the absolute effect of the characteristics of work alone is far from conclusive and seems to be conditional on circumstances. Whether women's economic independence has a positive or negative

impact on the perceived labor value of children is likely to vary by economic class and with the nature of employment: The more heavily women are involved in productive work, the less they will value children as sources of support because of their ability to support themselves (Germain 1975). This idea seems plausible for women whose employment provides a relatively good income. It is less plausible for poor women, however, whose work often requires the assistance of children, whether on the job or in the home (Bunster B.1983; Merrick and Schmink 1983).

Besides influencing perceived value of children, the nature and conditions of work may also influence women's handling of role incompatibility, leading to different fertility decisions. For example, using a 1993 survey from Egypt, Donahoe (1999) found no negative association between work and having a young child, except for those self-employed in non-family enterprises. This is counterintuitive given that informal and flexible nature of self-employment might suggest role compatibility between work and childcare. The author explained that their more informal work activities can be undertaken when convenient or necessary, and therefore they can give up their work when having children, while employees face job loss if they compromise their work to care for young children. As a result, employees have to remain in the working and maternal roles at the same time while the self-employed do not have to, unless there are severe economic constraints.

An important reflection of the degree of role incompatibility is child spacing. Demographic research has placed a heavy emphasis on the number of children women have or want to have. This emphasis is useful, of course, as one characterization of the level of fertility, but the implied theoretical model is most appropriate if family-building

'plans' are established early and executed efficiently over the course of marriage. While it has heuristic value, the accuracy of such a model is debatable for low-fertility societies, and even less certain for high-fertility or transitional societies (Namboodiri 1974; Ryder and Westoff 1977).

The timing and number components of fertility are in fact complexly interrelated, and measured relationships between women's work and fertility are likely to vary at different stages of life cycle (Lloyd 1991). At the lower parities, which virtually all women attain, the measured differences reflect primarily the timing of fertility. For higher parities, the proportion having another birth by any given duration reflects both the timing of those who will complete the transition and the proportion who will eventually do so. Therefore, the determinants of the fertility process can be better understood if the focus is on its sequential nature rather than on its cumulative outcome (Bumpass et al. 1982). The occurrence of recent births is likely to discourage economic activity in the short run, particularly if childcare is not readily available or is of less than the desired quality. At a later stage of the life cycle, however, a large family size may lead a mother to return to work to meet growing income demands, and there is a greater likelihood of alternative caregivers being available in the household.

In low-fertility societies, women's labor force participation may well be affected by child spacing. A study based on US data (Wineberg and McCarthy 1989) suggested a desire on the part of women with the greatest opportunities in the labor market to concentrate childbearing and child rearing in a relatively short period, in order to minimize their time out of the labor force. Also, job context is found to influence the timing of work exits and reentrance among first-time mothers in the US, depending in

part on job characteristics indicative of the ease with which work and motherhood can be combined (Desai and Waite 1991). Even in less developed countries, women may attempt to space their births closely in order to have a longer working life after completing childbearing (Fong 1976; Richter et al. 1992).

Therefore, the issue of the effect of work on birth spacing in developing countries is worth further exploration. Unfortunately, most of the existing literature approaches the issue by examining children ever born, which does not capture sequential fertility decision-making, nor does it relate work and fertility temporally. Furthermore, comparisons have been hampered by lack of comparable data, particularly the data on women's economic activity, which varies widely in its inclusiveness from country to country. The definition of 'work' as employed in different contexts, especially the informal structure of the market for labor outside the home in developing countries, contributes to variable findings on the fertility and work relationship.

Women's Work, Fertility, and Child Spacing in The Philippines

The demographic experience in the Philippines has been one of high population growth in contrast to rapid declines in the rate of growth in other Southeast Asian countries. In 1990 the total fertility rate in the Philippines was estimated at 4.3, considerably higher than those in Singapore (1.8), Thailand (2.6), and Indonesia (3.4), and slightly higher than those in Burma and Malaysi (4.0) and Vietnam (4.1) (Rele and Alam 1993). Results from 1993 Philippine National Demographic Survey showed a total fertility rate for of 4.1. As in many countries, fertility varied widely among regions—from a low of 2.8 in the capital Manila region to a high of 5.9 in the

northeastern coastal Bicol region[1]. Although the fertility transition was well underway by the mid-1970s, the pace of fertility decline waned with political turmoil, a slowing economy, and the lack of enthusiasm for family planning at the national level. The majority of the Philippine population is Roman Catholic, although there are small Protestant and Muslim minorities. High birth rates have been sustained by traditional women's roles and pronatalist views associated with religious traditions, poverty, and limited economic opportunity.

Philippine culture has long recognized the independent economic role of women. Traditionally, women not only worked in the fields and raised livestock, but also handled most of the trade. This tradition of women traders continues in the present day, with women in control of retail sales in market stalls and small shops. Also, the Philippines is unique among developing countries in having an educational system modeled on that of the United States, resulting in a generally open system of education and a higher educational level of women. Public education for both boys and girls was introduced during the American colonization from 1898 to 1946. Educational attainment for the two sexes has been approximately equal since 1970s (Mangahas 1976). Moreover, one of the responses in the rural Philippines to the dilemma of reduced landholdings has been to leave land to sons but to provide education—and thus enhanced employment opportunities—to daughters. The result has been relatively high levels of educational attainment for young women. On the whole, women are thus likely to possess the minimum human capital characteristics necessary for entry into the urban labor markets, but the economic and political environment they face appear insufficient

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[1] According to 1993 National Demographic Survey, late marriage helped account for the low fertility in Manila, while Bicol had the lowest infecundity rate of any region for whatever reason (Westley 1996).

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to support or sustain severance of social and economic ties with their rural families. Women maintain strong devotion to their families and display considerable willingness to abide by the decisions of their parents (Lauby and Stark 1988).

Studies on women's work and fertility in the Philippines have produced contradictory findings. Several early studies in the 1960s and 1970s found no fertility differentials (cited in Peek 1975; Engracia 1981) or only a weak negative effect of work (Rosenzweig 1976). For example, having an infant does not decrease mother's employment in the modern sector if there was another adult in the household besides the father to help with childcare (Peek 1975).

Another early study (Herrin 1979) based on a rural province in the 1970s also supports a lack of relationship between female labor force participation and fertility from a broader perspective of context variables. Female employment and fertility decisions were modeled as jointly determined by biological, sociological, economic, and demographic factors that determine the circumstances of individual woman, families, and the labor market. The author found that increases in the male wage rate reduce female employment and current fertility; in contrast, change in female wage rates increased the percent of time spent in paid employment, but had no significant effect on fertility. Fertility seems to have curtailed work for some women: those who perceived that children interfere with work were more likely to bear a child in the study period and less likely to participate in the labor force. However, women who played a major role in household decision-making had both increased labor force participation and increased fertility.

More recent findings from the Philippines show that income, women's labor force participation, and fertility are jointly determined, and income conditions the work/fertility association. Those who worked and who stopped childbearing had more substantial increases in earnings than those that worked and continued to bear children (FHI 1998). Childbearing significantly reduced the likelihood that women would work for pay. However, for those whose household income is below the median, having a small child increases mothers' likelihood of working outside the home (Doan and Popkin 1993).

Literature on the Philippines also supports the hypothesis that it is the nature of work, and not employment in wage work per se, that is associated with fertility reduction. For example, Doan and Brewster's study (1998) of the urban Philippines found that women who are self-employed are more likely than are unemployed women to be using contraceptives. However, while work in while-collar positions is positively related to contraceptive use, work for wages in blue-collar or service positions had no impact. That blue-collar wage work does not show effects similar to those of white-collar work accords with the argument that blue-collar workers have less autonomy at work than women in white-collar positions, less control over other areas of their lives, and, therefore, face more unmet need in contraceptive use.

Chapter II Theoretical Framework

Research findings and historical interpretations have raised the expectations and hopes that exposing women to opportunities for paid work would contribute to fertility decline in today's developing countries. These hopes and expectations were based on the Western experience that was conditioned by the structure of important social institutions, and by a particular division of labor and distribution of resource ownership and control. The socioeconomic context determines the work/fertility interrelation, and in developing countries there are as many examples of positive relationships between women's economic activity and fertility as the reverse.

Recent literature on fertility/employment interaction supports the conclusion that while fertility affects employment in the short run, employment affects fertility in the long run (Cramer 1980; Rosenfeld 1996; Rindfuss and Brewster 1996; Macunovich 1996; Connelly 1996). Inherent in this statement are two major theoretical and methodological and issues that confound the work/fertility relationship, namely, sequential decision-making and reverse causality.

The sequential decision-making framework posits that the cost of a woman of having an additional child, in terms of foregone market earnings, will change over the life cycle. Current decisions regarding whether to have additional children and whether or not to enter the labor market may be jointly influenced by both the number of children already born and the amount of human capital accumulated by women. Consequently, early fertility behavior is shaped by somewhat different determinants than fertility at older ages. According to Hirschman and Guest (1990), at younger ages,

variation in fertility is heavily influenced by the timing of marriage and the postponement of the first birth (and the intervals between early births); for older women, fertility decisions center on the completion of childbearing or stopping behavior. Also, at younger ages, many women are exposed to non-household opportunities competing with the traditional role obligations of being a young wife and mother; at later stages of the family building career, reciprocal influences may be present, and women may be influenced to work for pay by the presence of many children and an inadequate income (Rosenzweig 1976; Hirschman 1985; Lloyd 1991).

The question of causal direction is another major problem in the study of the fertility/work relationship. Many early studies indicate that a wife's childbearing responsibilities constrain her labor force activity; on the other hand, wife's labor force activity or plans often are found to be good predictors of her expected fertility (cited in Cramer 1980). Besides the common issues that confront all sociological models of reciprocal casual relationships, such as multicollinearity, model specification, attitudes and behavior, and static and dynamic models, one factor specific to the work and fertility relationship is the measurement of work. For example, work can be differentiated by type and location of employment, can be measured either by a single indicator of whether or not a woman worked or not, the percentage of the interval that the woman worked, or more detailed information like when during the interval the work occurred, which is superior to all other approaches (DeRose 1996).

In the widely-used Easterlin supply-demand framework for the determinants of fertility, contraceptive behavior is jointly determined by the motivation to practice contraception versus costs of contraception (Easterlin 1985). The relative weight of

demand and supply factors in determining contraceptive behavior has been a dominant issue in fertility research. "Demand" refers to the motivation to space or limit births (determined by an array of economic, social and cultural factors), while "supply" refers to the accessibility and quality of family planning services. In application to the work/fertility relationship, when a woman's work commitment is strong enough and she wants to limit births to facilitate work, longer birth intervals may result even if she faces a relatively low supply of modern contraceptives. On the other hand, in the absence of strongly held fertility preference or motivation for birth spacing, the limitation of effective contraception (supply) may be severe enough to lead to higher fertility even in case of incompatibility between child rearing and market employment.

However, the "demand" itself is complicated and changing with time, depending on the opportunity cost of waged work, the relative value of children, social norms, and availability of alternative childcare. Thus, the extent and under what circumstances having preschool children influences the mother's employment may not be straightforward. There is some evidence that women in resource-poor households may be compelled to work for pay to meet the needs of their young children. Specifically, women's work commitment seems matter a great deal, and even in the case of role incompatibility, they may simply maintain incompatible roles (Isvan 1991; DeRose 2002).

The Philippines provides a good case to study: on the one hand, women's higher educational attainment and paid employment may lead to a demand to limit births; on the other hand, alternative childcare is ample due to the prevalence of extended families. More importantly, poverty, traditional women's roles and pronatalist views

associated with religious traditions, and a low level of modern contraception knowledge prevalence cause obstacle on fertility control. Filipino couples have a good appreciation of the age-associated risks of childbearing, but not of those associated with closely spaced births (Perea 1995). This study contributes to understanding of how women's work in the first postpartum period affects the timing of a subsequent birth among Filipino women. Early birth spacing is an important part of the sequential decision-making process, and I focus on it here. Lloyd (1991) suggests that early work experience, particularly in the modern wage sector, may be expected to raise the opportunity costs of children and reduce lifetime fertility.

During the period covered by my data, the Philippines was still largely an agricultural and traditional-sector country. Women's paid labor force participation was low. At the time of interview, 30% reported working for cash, including paid employees (17.5 %) and self-employed (12.5%); the rest were either doing non-paid work or not working. Mothers are primary caregivers for newborns in the Philippines, and Filipino mothers, on average, decrease labor market time immediately after birth, though labor market hours increase quickly over the first year postpartum (Tiefenthaler 1997).

Since this study involves mothers at their early stages of childbearing, their decisions on the spacing of births might be relatively unaffected by perceptions of children's roles. Rather, it is the cost of childbearing that is more crucial to their decision about the timing of a second birth, and those with higher time costs of an extra birth would be expected to postpone second births.

Women in modern sectors of work face greater challenge combining mother and employee roles, have little control over the scheduling and pace of their work, and

therefore may be most actively seeking contraceptive use and have longer birth intervals. For those self-employed or home workers having children may nonetheless hamper their work, especially those not old enough to help with their work. Although they can withdraw from the labor force for a while for childcare, they may quickly return to work. This can also lead to longer birth intervals as work of any kind makes them aware of the opportunity cost of childbearing, especially closely spaced births.

Therefore, I expect that work affects the timing of the second birth. More specifically, I expect: (1) Work during birth interval, irrespective of types or location of employment, results in longer intervals. (2) The negative effect of work on fertility is stronger for those doing paid work, which is more likely to be in the modern sector. (3) For working women whose work curtails breastfeeding, the negative relationship between work and child spacing may be dampened.

Chapter III Data and Methods

<u>DHS</u>

The data is from the 1993 Philippines Demographic and Health Survey. DHS are nationally representative household surveys with large sample sizes of between 5,000 and 30,000 households. DHS surveys provide data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition.

The core questionnaire for MEASURE *DHS+* emphasizes basic indicators. DHS also allows for the addition of special modules so that questionnaires can be tailored to meet host-country and USAID data needs. The standard DHS survey consists of a household questionnaire and a women's questionnaire. A nationally representative sample of women ages 15-49 are interviewed.

The household questionnaire contains information on the following topics: Household listing—For every usual member of the household and visitor, information is collected about age, sex, relationship to the head of the household, education, parental survivorship, and whether the interview was in their usual residence; Household characteristics—Questions ask about the source of drinking water, toilet facilities, cooking fuel, assets of the household, and the use of bednets; Nutritional status and anemia of women age 15-49 and nutritional status of young children—Height and weight are measured to assess nutritional status, and the level of hemoglobin in the blood is measured to assess anemia.

The women's questionnaire contains information on the following topics: Background characteristics—Questions on age, marital status, education, employment,

and place of residence provide information on characteristics likely to influence demographic and health behavior; Reproductive behavior and intentions—Questions cover dates and survival status of all births, pregnancies that did not end in a live birth, current pregnancy status, fertility preferences, and future childbearing intentions of each woman; Contraception—Questions cover knowledge and use of specific contraceptive methods, source of contraceptive methods, and exposure to family planning messages. For women not using contraception, questions are included on knowledge of a source of contraception and intentions about future use. Antenatal, delivery, and postpartum care—The questionnaire collects information on antenatal and postpartum care, place of delivery, who attended the delivery, birth weight, and the nature of complications during pregnancy for recent births. Breastfeeding and nutrition—Questions cover feeding practices, the length of breastfeeding, and children's consumption of liquids and solid food. Children's health—Questions examine immunization coverage, vitamin A supplementation, recent occurrences of diarrhea, fever, and cough for young children and treatment of childhood diseases; AIDS and other sexually transmitted infections—Questions assess women's knowledge of AIDS and other sexually transmitted infections, the sources of their knowledge about AIDS, knowledge about ways to avoid getting AIDS, and high-risk sexual behavior; Husband's background—Currently married women are asked about the age, education, and occupation of their husbands.

The 1993 Philippine Demographic and Health Survey is unique in that it added a calendar module for each month from January 1988 to the month of the survey (65 to 67 months depending on the date of interview for different respondents). The calendar is

split into columns, each containing a single character variable for each month in the time period. The columns are as follows: 1. Births, pregnancies and contraceptive use. 2. Reasons for discontinuation of contraceptive use. 3. Duration of post-partum abstinence. 4. Duration of post-partum abstinence. 5. Duration of breastfeeding. 6. Marital union status. 7. Moves and types of communities. 8. Type of employment. The data are stored as single variables of 80 characters, allowing for up to 80 months to be represented in the calendar. As retrospective data, the record is in reverse order. The first character in each variable represents the most recent point in time while the 80th character position represents data for January 1988 when the calendar started. The calendars are fixed at the 80th character position, such that the first few entries in the calendar represent points in time after the date of interview, and are consequently left bank.

The total sample of women age 15-49 is over 15,049. These data enable us to temporally associate work with fertility and fertility-related behavior.

Estimation Methods

Determinants of birth spacing include parents' desired spacing; biological factors which may cause desired spacing not to be achieved such as sub-fecundity related to poor health and nutritional status; periods of abstinence because of separation; and contraception, abortion, and breastfeeding. Women's work is related to volitional fertility limitation by affecting desired spacing as expressed through contraception and abortion.

As stated before, many earlier analyses of fertility behavior have been static and retrospective in nature, relating cumulative fertility or past contraceptive use to current explanatory variables (cited in Degraff et al. 1997). Such retrospective data does not reveal compatibility or lack of compatibility between work and childbearing. Moreover, the assumption under which reverse causation would be of greatest concern is when women's takes place at the end of their birth intervals, because women might not return to work if they become pregnant early, and that women who are less fertile are thus more likely to work during an interval simply because their intervals are longer (DeRose 1996). Including the timing of work helps minimize this problem.

Furthermore, behavior may change over time, and analysis that relates behavior and fertility-related choices temporally is more informative. In the case of work and birth intervals, however, we need to be aware that women may stop working at later stages of pregnancy, in which case it is fertility (pregnancy) affects work instead of the other way around. To avoid this particular source of reverse causation bias, I lagged the record of work to seven months before second birth. Therefore, while keeping the time varying covariates of work in first months of pregnancy and thus making full use of available data, the effect of pregnancy to cause termination of work is minimized. By using the monthly record of women's work activity in the period after first birth to examine the effect of work on birth seven months later, I have overcome some of the data and methodological problems that contribute to doubt about whether work has a causal effect on fertility outcomes.

As the calendar contains monthly record of pregnancy as well as birth, there is the option of using the month of birth or the month of conception. I decided to model

the occurrence of live births because conceptions would not include volitional

pregnancy termination which may be related to work status[2]. The analysis is limited to

those who had first birth within the calendar period so as to examine the relation

between work and fertility between the births of first and second child.

The reason to choose the second birth interval (between the first and second

births) is that the firstborn children cost significantly more in terms of additional

mother's time than children of higher birth orders (Holmes and Tiefenthaler 1997), and

the presence of a child age one or younger most affects mother's propensity to work

(Ho 1979; Duleep and Sanders 1994). Moreover, the early postpartum period has

historically been a relatively susceptible one for Philippine women (Bumpass et al.

1982)[3]. Besides, the restriction to second birth interval limits the analysis to relatively

young women who are still in their early stages of reproductive career. This offers a

more valid test of role compatibility than using all intervals irrespective of parity, since,

as Hirschman (1985) pointed out, social change is most likely to pose role conflicts at

the initial stage of family formation. There seems to be sufficient ground to assume that

the degree of role compatibility is more salient at the initial stage of family building

career. At later stages of the family building career, however, women's decision to

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[2] The Philippine official policy has general prohibition on abortion, but it may be interpreted to permit abortion to save the life of a pregnant woman, and in fact abortion appears to be widely practiced for the past few decades (Singh et al. 1997).

[3] Bumpass et al's comparative study (1982) using 1973 Philippine National Demographic Survey and 1974 Korean World Fertility evidenced the higher fertility in the Philippines in the early period of exposure after an interval is initiated. For example, the proportion with a second birth with the first 20 months since the first birth is 42 percent in the Philippines, compared to 21 percent in Korea; after the second birth the percentages are 31 and 10 respectively. However, the faster pace of fertility in the Philippines is confined to the first two years of exposure for the second and third intervals, and the pace of fertility is faster in Korea than in the Philippines for later durations of the second and third intervals. The authors suggested a number of intermediate variables which might cause this difference, such as breastfeeding practices and coital frequency.

return to work after birth may be more influenced by the need to support many children or the availability of alternative childcare from older children. In either case, later fertility decisions are less likely to be predominantly influenced by the need for infant care.

Of the 15,049 women interviewed by the 1993 Philippine DHS, 1856 had a non-twin first birth in the five years prior to interview. As the chance of second birth is zero for those who had the first birth within 9 months at the time of interview, I restricted the analysis to those whose first birth occurred at least 9 months before. In addition, those having twins for their first births were eliminated from the analysis as the extra costs for the bearing and rearing twins may constitute a heterogeneity bias. This subset constitutes the analytic sample of 1799 mothers. Those not having a second birth in the period covered by the work calendar are included as censored observations.

Among the 1799 women, 1055 actually had second birth while 41% cases are right-censored. Since the censoring is due to a single termination time (time of interview) and the entry time (month of first birth) varies randomly across individuals, this is *noninformative* random censoring and thus appropriate for the use of event-history analysis. As the time of second birth is measured at each of 64 months, in the descriptive procedure, the Kaplan-Meier method is used to find the probability of second birth at the beginning of each observed month, and the life-table method is used to group event times into intervals (month 0-8, 9-16, 17-24, and 25-32, 33-40, 41-48, 49-56, and 57-64).

Since the focus is on the effect of work on the occurrence of second birth instead of the dependence of the hazard on time, and since there seems no q priori reason in our

analysis here to choose any one of particular form of hazard function in the multivariate

analysis, Cox's nonparametric proportional hazards model can be considerably more

robust than parametric models. The proportional hazards model assumes that

differences in hazard rates remain proportional for each subgroup delineated by values

of the independent variables. The most significant advantage of the Cox's method is

that models can assume time dependence without specifying its form. A parametric

characterization for time dependence may lead to a poor fit of the model, hence it is

reasonable to assume that the time dependence can be more adequately characterized

non-parametrically than by a specific function having a few parameters. In addition,

Cox's regression more easily incorporates interaction effects of individual

characteristics with time, as this study involves.

Under Cox's proportional methods, there is choice between discrete-time

approach and continuous-time approach. In discrete-time model, duration is broken into

discrete segments of time. It is used when the underlying process in really discrete in

time, i.e., the events happen at separate time points. Continuous-time models, on the

other hand, assume that events can happen at any point of time, and there is no separate

time point. In our current analysis, second birth is measured by the month in which they

occur. This is a crude measurement since births can happen at any time within the same

month. From this point of view, a continuous-time approach that assumes a true but

unknown ordering for the tied event times seems most suitable.

The discrete method assumes that the tied events really occurred at exactly the

same time. It can be used to approximate continuous-time models when the conditional

probabilities of having the event at discrete time points, given that the event does not

occur before each time point, become small (Yamaguchi 1991). On the other hand, discrete-time models have an advantage over continuous-time models in the handling of ties. Though the underlying continuous-time process has a zero probability of tied events, ties can occur in the data because events are measured at discrete time points. The presence of many ties can lead to a serious bias in parameter estimates when using Cox's method for proportional hazards models.

Exploratory analysis found the tied events (birth occurring) at any given month is no more than 5%, not numerous enough to cause serious bias in the estimation of continuous models. Therefore, I choose to use continuous time method for reasons stated above. Fortunately, the SAS 'Proc Phreg' procedure for estimating Cox's regression model has the advantage of allowing the treatment of tied data in both continuous and discrete approach, providing us a chance to test the difference in the results of the two[4]. I tried both discrete and continuous approach, and the coefficients are very similar, furthering verifying the legitimacy of Cox's continuous-time model used here. Based on descriptive statistics from life tables showing the lowest survival rate associated with paid work within 16 months postpartum, I use a time dummy of 'time' (less than 16 months) to interact with the time-dependent variables of three types of work to allow for non-proportionality.

Under Cox's proportional hazards model,

$$\ln [h(t)] = \ln [h_0(t)] + \Sigma_k b_k X_k$$

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[4] Other logit models for discrete time can group months into intervals and produce separate covariates for each time period. Yet they produces similar estimates for the effects of other explanatory variables as employed in the discrete approach in handling ties in 'Proc Phreg' procedure, since they are simply alternative ways of estimating the same model. Therefore, a comparison between the results between continuous and discrete approach in handling tied data within Cox's proportional models seems sufficient to justify the choice of continuous time models here.

The dependent variable is the risk of second birth, i.e., the hazard rate at any given time t. The rate is modeled by a baseline hazard rate h_0, the value of which changes over time, and baseline function h_0 is not reported. Emphasis is on the difference in rates corresponding to values of independent variables. The exponent of the coefficient is reported, therefore showing the change in probability of birth associated with a change in the independent variable. Although the baseline hazard changes over time and is not specified parametrically, it changes differently over time according to work status; this is captured by the interaction terms between work types and time less than 16 months.

Variable Selection and Measurement

Dependent variable

The dependent variable is the occurrence of second birth (or not) at any given month. Using birth records in the calendar allows linking the position of birth precisely to the work and breastfeeding records in the same calendar, in a way that records on work and breastfeeding during the second birth interval can be extracted according to the position of the two births. Since the records in the calendar were documented at the same time of interview, the use of birth record in the calendar may render more consistent results than using dates reported retrospectively outside the calendar. Second birth intervals calculated from the calendar are pretty similar to those calculated from the standard birth history. This is reassuring as it confirms a satisfactory level of the precision about information on the calendars I am using.

Independent variables

In the employment record in the calendar, work status is distinguished according to whether did paid employment, whether worked away from home, and whether self-employed. This results in seven categories of the recorded work status: 'did not work', 'paid employee, away from home', 'paid employee, at home', 'self-employed, away from home', 'self-employed, at home', 'unpaid worker, away from home', and 'unpaid worker, at home'. I tested three ways of differentiating work in the analysis: whether *any* kind of work affects fertility, whether paid work matters differently from unpaid work and self-employment, and whether work away from home matters differently from work at home.

Work status is interacted with a dichotomous variable of 'time' (whether less than 16 months postpartum or not). This is because analysis of survival function across single months revealed different patterns across the 'threshold' of sixteen months postpartum in the way work related to occurrence of second birth.

Control variables:

Woman's education: The relationship between education and length of the interval has been inconsistent in past analyses, with negative effects (Valera 1984) and non-significant effects (Trussell et al. 1985) both documented. Education has also been found to effect interval lengths only at the higher birth orders (Rindfuss et al. 1983; Guilkey et al. 1988). In 1993 Philippine DHS, educational attainment is reported as "no education", "incomplete primary", "complete primary", "incomplete secondary", "complete secondary", and "higher". I grouped them into four categories: "without primary", "primary", "secondary", and "above secondary".

Household socioeconomic status: DHS did not ask direct questions about household income or consumption expenditure, but I was able to create a socioeconomic status index based on nine dummy variables: source of drinking water (whether piped into residence), time to get to water source (whether more than 30 minutes), type of toilet facility (whether has own flush toilet), whether has electricity, television, refrigerator, bicycle, motorcycle, and car. Principle components analysis detected the sufficiency of factor 1, the score of which is used as the index for socioeconomic status. As Montgomery et al. (2000) argued, such an index based on household assets is as reliable as expenditure data when testing the effect of income on behavior.

Urban residence and ethnicity: It is assumed that urban culture creates pressure to limit family size (Macisco 1970; Hiday 1978). Also, ethnicity is related to child spacing for the Philippines (Trussell et al. 1985). In the analysis, urban residence is based on the information given as time of interview. Six ethnicity variables (Tagalog, Cebuano, Ilocano, Ilonggo, Bicolano, and Waray) are tested. Only Tagalog ethnicity turns out to have a significant association with birth interval length.

Age at first birth: Age has been found to have negative association with length of second birth interval while age at first birth has been found to be positively related to it (Hirschman 1985). However, given that the sample is constrained to women with a recent first birth, all these women have very similar age, the effect of age is likely to be minimal.

Mortality of first birth: Another factor related to birth intervals is infant mortality. The death of previous child significantly shortens the length of any given

interval in the Philippines (Valera 1984). Therefore a dummy variable whether first child is dead or alive is included in the models.

Coresidence with husband: Infecundity may appear high if spouses are physically separated for long periods due to work or other causes. This residence pattern tends to be important in the Philippines and probably varies among regions (Westley 1996)[5]. The data here contains information on whether husband lives with the woman or lives elsewhere at the time of interview, not during birth interval. Therefore, there may be considerable measurement error on this variable. However, I still choose to use it as it is likely to be indicative of coresidence during the birth interval.

Intermediate Variables:

Breastfeeding and contraceptive use: An essential feature of the opportunity structure for women in terms of the relationship between work and fertility is access to family planning, particularly when childbearing requires increased adult supervision and women's opportunities for employment expand. While work opportunities can improve women's status and create the motivation for lower fertility, effective fertility control is essential for women to take full advantage of available market opportunities (Birdsall and Chester 1987). Where fertility control is effective, work is likely to curtail childbearing and where fertility control is ineffective, childbearing is likely to curtail work (Stycos and Weller 1967).

Breastfeeding and use of contraception within the interval play a significant role in delaying the occurrence of the next birth. In non-contracepting populations, the

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[5] Of the 1799 sampled women, 1771 reported age at first marriage, suggesting a negligible amount of extramarital births in the Philippines during that time period. Also divorce rate was low in the Philippines at that time period. Therefore those not coresiding with partners are more likely be due to other reasons rather than not married.

incidence, duration, and intensity of breastfeeding can strongly influence the supply of children and hence fertility (Bongaarts 1982). Work, even in traditional sector, is found to affect the intensity of breastfeeding enough to compromise its effectiveness in promoting fertility control (Nag 1983; DeRose 2002).

The calendar contains monthly records of whether breastfed and whether used contraception, and if yes, the method used. I created two dummy variables on monthly use of modern contraception and traditional contraception separately. Pill, IUD, injections, diaphragm/foam/jelly, condom, female sterilization, and male sterilization are coded as modern contraceptive use; while periodic abstinence/rhythm and withdrawal are treated as traditional contraceptive use. Consistent with previous studies on contraceptive use in the Philippines (Casterline et al. 1997; Westely et al. 1996), the preliminary analysis found that only modern contraceptive use is associated with delaying second birth while traditional contraceptive use almost has no effect. So only modern contraceptive use is included in the model.

A 12-month lag before birth is used in the multivariate analysis to allow for an average waiting time to conception among non-users of contraception. Breastfeeding is also used as time-varying covariate based on the monthly records. A 9-month lag before birth is used for breastfeeding, as the contraceptive effect of breastfeeding only matters before conception.

Chapter IV Results

Descriptive Statistics

For the sampled women, average age 25.6, only a small percentage (19%) were paid employees, though 30% of the total sample reported doing 'cash work' at interview. Those working in modern sectors account for 14% of the total sample. The level of self-employment and unpaid work are also low, 12% and 2.5% respectively. The educational level of the sampled women is relatively high: 69% completed secondary education. Those who did paid work for more than half of the intervals have higher educational attainment, with an average of between secondary to higher, and those who never worked have lower educational attainment, with an average below secondary education.

Figure 1 shows the result from survival function analysis of the probability of giving second birth by work status during birth interval. Based on whether the woman did each type of work for more than 50% of the interval, I stratified working women into five sub-samples—doing paid work, doing unpaid work, self-employment, work away from home, and work at home. The first three subgroups are mutually exclusive and so are the last two. If a woman engaged in paid employment for over half of the interval, she is counted as doing paid work even if she was self-employed for a smaller fraction of the months. Similarly, a woman working 60% of the interval at home and 40% away from home is classified as working at home in the descriptive analysis. To facilitate comparison of the intensity of work, I further stratified the whole sample into 'never worked', 'worked part of the interval (less than half)' and 'worked most of the interval (more than half)'. Here work is not differentiated by type or location.

By the close of the observation period of 64 months, the overall sample has a failure rate of .84, meaning that if all the women were exposed to 64 months of risk at the prevailing hazard rates, 84% of them would have a second birth within that period. Those who never worked during the birth interval had a higher failure rate (.90) than those who ever worked (.74). When comparing failure rates by intensity of work, type of work, and location of work, however, the results are somewhat unexpected. Those who worked most of the interval have a higher failure rate than those who worked less than half of the interval (.76 vs. .59), but the difference is not significant. Other contrasts are illustrated by the difference in failure rates among doing paid work (.81) and doing unpaid work (.70) and self-employed (.71), and among those working away from home (.79) and those working at home (.67). Among these subgroups, the failure rates for doing paid work and working away from home are not significantly different (at $p \leq .05$) from that of nonworking, while doing unpaid work, self-employed and working at home are associated with statistically significant lower failure rates than nonworking.

The difference between failure rates of working and non-working women is statistically significant at $p \leq .05$. This indicates that working women may have taken deliberate control over birth spacing, and they are less likely to have a baby in the first five postpartum years. None of the differences among subgroups of working women are significant. This might be due to small sample sizes for some of the subgroups (see table 3). However, all the former categories (working most of the intervals, doing paid work, and working away from home) have higher failure rates than the latter categories (working part of the interval, doing unpaid work, self-employed, and working at home).

This is because members within each of the categories overlap a lot. Paid employment, which is more likely to be in the modern sector, tends to be away from home, and women in such settings also do not have the flexibility to quit their work for childcare. As a result, they tend to be those who worked most of the interval. On the other hand, unpaid work and self-employed are more likely to be at home, which give women flexibility in adjusting their work schedule, and these women tend to work only part of the interval.

The survival distribution functions at all stages are demonstrated in Figures 2-4. Figure 2 shows that those working part of the interval have the highest survival rate at all stages of postpartum, those who never worked in the interval have lowest survival rate at all stages of postpartum, while those who worked most of the interval falls in between. Specifically, the gap between the survival rate for those working part of the interval and all sampled women is much larger than the gap between the rest of two groups and the sample total. This indicates that women who worked less than half of the interval during the first five postpartum years are much less likely to give birth at all postpartum stages.

An interesting pattern emerges when comparing doing paid work, doing unpaid work and self-employment for most of the interval (Figure 3). At the beginning of second stage (16 month postpartum), those who did paid work most of the interval have the lowest survival rate, even as low as those who never worked. Those who did unpaid work have the highest survival rate while those self-employed fall in between. This suggests that for the first 16 months postpartum, those in paid employment are as likely to have a second birth as those who did not work, and those who did unpaid work are

least likely to have a baby. Survival rates for paid workers fall much more slowly than for the other categories of women between 16 and 40 months, creating a sizable gap in the probability of birth between paid workers and non-working women that did not existed in the early postpartum period. This gap closes somewhat by the end of observation at 64 months, but paid workers still have lower survival rates than unpaid or self-employed workers. A similar pattern emerges when comparing working away from home and working at home (Figure 4), as the former group is associated with working for pay, and the latter group is associated more with unpaid work. Such results indicate that among working women, although those who did paid work and who worked away from home are less likely to give birth during the middle stages of postpartum months (17 to 48 month), they tend to catch up later on, and are more likely to give a second birth within five postpartum years than other groups of workers.

Table 2 displays the median month of second birth, with a 95-percent confidence interval. The median is used instead of the mean because it is usually a much preferred measure of central tendency for censored survival data (Allison 1995)[6]. The higher failure rates for those working most of the interval, doing paid work and working away from home in Figures 2-4 seem puzzling. However, when we look at the median month of second birth in Table 2, we see that doing paid work and working away from home are still associated with slightly later occurrence of second births than doing unpaid work and working at home, though the confidence interval for the latter groups are larger. This is due in part to the small sample sizes for the latter (see Table

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[6] According to Allison (1995), when there are censoring times greater than the largest even time, the mean is biased downward. Even when this is not the case, the upper tail of the distribution will be poorly estimated when a substantial number of the cases are censored, and this can greatly affect estimates of the mean.

3). More importantly, however, the survival curves show a non-proportional effect of doing paid work at around sixteen months of postpartum: working later than that is associated with longer birth intervals while before this threshold, it is associated with shorter birth intervals.

These descriptive results should be interpreted with caution, as the grouping of work is a based on whether work in certain category occurred for more than half of the interval instead of precise information on when the work happens, and therefore the results may be biased. Also, the difference in failure rates among working and non-working women may be caused by differences in other factors related to work status. For example, if better-educated women are more likely to work, but would have longer birthspacing even in the absence of work, the effect of work in delaying birth is overestimated without a control for education. To get a clearer picture of the effect of work and tease out the effect of control variables, I turn to multivariate analysis.

Multivariate Results

Table 4 displays multivariate results from five models with work modeled as a time-varying covariate. They all include controls for age at first birth, education, socioeconomic status, urban residence, mortality of first birth, co-residence with husband, and Tagalog ethnicity. Model 1 is simply a test of the effect of any work on birth interval length. Model 2 and model 3 are a comparison of the effects of different locations of work and types of work during the interval. Model 4 adds the interaction term between three types of work and the dichotomous variable of whether the interval is less than sixteen months, i.e., the effect of work status on fertility in first eight

postpartum months is examined due to the seven-month lag used in the models.[7] The purpose of the interaction terms is to test the effect of early return to work on fertility. Model 5 incorporates breastfeeding and modern contraceptive use to explore how much of the effect of work operates through these two intermediate variables.

The overall pattern in the models confirms a consistent negative effect of work in the risk of second birth. Hypothesis 1 is therefore confirmed. Work of all types during birth interval is associated with .763 hazard ratio of giving second birth (Model 1), meaning that the hazard of second birth for those who worked during the interval is only about 76.3% of the hazard for those who did not work (controlling for other covariates). Therefore, working women are less likely to have a second child within five years.

However, doing paid work is associated with .843 hazard ratio of giving second birth, higher than the hazard ratio of .604 for unpaid work and .720 for self-employed (Model 3). Such a higher hazard ratio associated with doing paid work is explained in Model 4 when the interaction terms with time are added: Those who did paid work in the first eight months postpartum were nearly twice as likely to give a second birth than those who worked for pay only in later durations of the interval. The net effect of paid work during this early postpartum period[8] is a hazard rate of 1.349, suggesting that if a woman did paid work only in first eight postpartum months, she is about 1.3 times more likely to give birth than those not working at all. In contrast, the hazard ratio for doing

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[7] Because Cox models do not estimate the dependence of the hazard on time, the effects of interaction terms with time could be biased in cases where there is a general relationship between time and the dependent variable, but considerable heterogeneity in the effects of time between adjacent periods. Therefore I also estimated logit models with controls for the main effect of time. The estimates of interaction terms are consistent with that from Cox model, confirming that it is not biased by noisiness in the baseline hazard.

paid work only in the later months is .697, indicating the significant non-proportional effects of paid work based on the time it happens. So hypothesis 2, that the negative effect on fertility is stronger for those in paid work is not supported. Doing paid work reduces the probability of birth only when it happens after eight months postpartum.

The effect of unpaid work, while largest in its magnitude (Model 3), remains significant when interaction terms are included in Model 4. This demonstrates a strong negative effect of women's unpaid work on the risk of birth in early postpartum period. Compared with doing unpaid work in later durations of the interval, doing unpaid work in the first eight months postpartum is associated with only a 12.7% risk of a second birth. The net effect of paid work during this early postpartum period is a hazard rate of .0939[9], suggesting that if a woman did unpaid work in first eight postpartum months, her risk of second birth is only about 9.4% of non-working women.

The hazard ratio for working away from home and working at home most of the interval are similar (Model 2), both at around .77, though the latter is not significant at .05 level due to small sample size. The fact that the hazard ratios of birth for these two categories fall in between that of doing paid work and unpaid work indicates variation within the two broader categories. Those who work away from home and at home include both those doing paid work and unpaid work, though working for pay and working away from home are strongly associated (96.6% of women worked for paid most of the interval also worked away from home most of the interval).

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[8] The estimated effect of doing paid work for the first eight months is the sum of coefficients for the interaction term 'paid work * time' (0.6602) and 'paid work' (-0.3608) exponentiated. $e^{0.299} = 1.349$.
[9] The estimated effect of doing unpaid work for the first eight months is the sum of coefficients for the interaction term 'unpaid work * time' (-2.0634) and 'unpaid work' (-0.3022) exponentiated: $e^{-2.370} = .0939$.

When breastfeeding and modern contraceptive use are incorporated into the analysis (Model 5), the effect of unpaid work and self-employment are no longer significant at the .05 level, but the negative effect of paid work retained significance at $p \leq .01$[10]. The strong effect of doing paid work on the delaying of second birth persists. This suggests either measurement error or that paid work affects fertility through intermediate variables other than breastfeeding and contraception.

The effects of the interaction terms for unpaid work and self-employment are also no longer significant after such intermediate variables are taken into account, while the positive effect of interaction between paid work and time dropped slightly in magnitude and significance. The change in effects of interaction terms before and after controlling for contraception and breastfeeding suggests that breastfeeding mediates the effect of work on fertility in early postpartum months. Women's unpaid work does not interfere with breastfeeding and it reduces the risk of birth, while paid employment curtails breastfeeding and thus ends up in higher risk of birth. Hypothesis 3 is therefore confirmed. Though working women practice contraception to a greater extent than non-working women[11], the fertility of paid workers is higher in the early postpartum period because they do not have the contraceptive effect from breastfeeding that non-workers and unpaid workers have[12]. However, this interpretation only explains part of the story

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[10] Model 5 includes slightly smaller sample size (only those with intervals > 12 months). But even when running the model with the restricted sample, estimates are similar (results not shown here). So these changes concerning effects of work from Model 4 to Model 5 are not driven by the omission of missing cases. The improvement in the model fit, however, is overestimated since the model does not fit the shortest intervals as well.

[11] At time of interview, the proportion practicing contraception is 39% among working women, 41% among paid employees, and 34% among non-working women.

[12] Based on work status during birth interval (whether did certain type of work more than half of the interval), 56% of non-workers breastfed for at least eight months, 19% of paid employees breastfed for at least eight months, and 79% of unpaid employees breastfed at least eight months.

as the significant effect of paid work in early postpartum persists after intermediate variables are controlled.

Among control variables, age at first birth has consistent hazard ratio of about .90 throughout the models. This is in agreement with previous findings, i.e., those who gave first birth late also tend to have longer birth interval for the second birth. Women who live with their husbands have twice the likelihood of second birth in all the models. Death of the previous child doubles the probability of subsequent birth, except in the last model, when intermediate variables are taken into account. This demonstrates that child death likely motivates contraceptive discontinuation, irrespective of work status. It might also indicate that child death shortens birth intervals by truncating breastfeeding. "Tagalog" ethnicity is found to have a consistent negative relationship to the risk of second birth, but it is only significant at $p \leq .10$ level except in Model 5 where intermediate variables are controlled. Education is associated with a slightly lower risk of second birth while urban residence is associated with a slightly higher risk, but neither of these effects is statistically significant.

Consistent with findings from existing literature, household socioeconomic status is associated with lower hazard ratio of second birth, indicating that women in resource-rich household tend to have longer birth intervals. However, the magnitude of the effect of socioeconomic status is small and is not significant in the first four models. Interestingly, when intermediate variables are included, it achieves significance at .01 (Model 5), and the magnitude of its effect also improved, from about .93 risk of birth to about .87 risk of birth. Such results suggest that among both users and non-users of modern contraception, those with higher socio-economic status have significantly

longer birth intervals. This is puzzling, since in many other settings the effect of social and economic status on fertility operates through contraceptive use, and controlling for intermediate variables would weaken the impact of social-economic status.

The effects of intermediate variables in Model 5 are also as expected. Those using modern contraception are only 33% as likely to give birth twelve months later. And those breastfeeding have only 28% of the risk of second birth nine months later compared with those who stopped breastfeeding or did not breastfeed. Modern contraceptive use and breastfeeding also play a significant role in absorbing the effects of work, as several covariates associated with work in Model 4 lost statistical significance after these intermediate variables were included. However, we need to notice that paid work matters net of these important intermediate variables. The negative effect of paid work may operate through frequency of intercourse, traditional contraception, miscarriage, abortion, or fecundity, topics beyond the scope of this paper.

Chapter V Discussion and Conclusions

The findings provide strong evidence that work in general is associated with lower risk of second birth. Using lagged monthly records of work in the birth interval minimized reverse causation bias, suggesting that work is likely to affect fertility. Contrary to the belief that only modern sector of work is related to fertility control, the results demonstrate that even work at home, self-employment, and unpaid work all cause longer birth intervals, indicating the existence of role incompatibility.

This study also points to the importance of looking more closely at how different dimensions of work affect the balancing of productive and reproductive roles. Although work in general is related to longer birth spacing and thus likely lowers number of total births, doing paid work in early postpartum months is associated with higher risk of birth than not working, while in later postpartum period it is associated with lower risk of birth. In contrast, unpaid work, while its effect not significant in late postpartum period, is associated with lower risk of birth in early postpartum months.

The fact that working part of the interval delays second births more than working most of the interval is unexpected because women who work continuously may experience the greatest role incompatibility. A tentative explanation is selection bias: women who worked part of the interval are likely to be those who work later in interval, as a result of non-fecundability. Also, it is possible that those who worked most of the interval are more likely to be in the labor force out of necessity instead of volition. They may face higher risk of pregnancy due to less intensive breastfeeding and less effective contraceptive use. Consequently, their work has a smaller effect on fertility compared

with those who have more control over their work, do not have to work immediately

postpartum, and better able to exercise fertility control. Such variation of the effects

associated with different intensity of work is supported by examining the effect of quick

return to work: paid work in eight months postpartum causes higher risk of second

birth. It is likely that those who work immediately postpartum tend to be those who

work most of the interval.

What deserves attention is that even after breastfeeding and modern

contraceptive use are controlled, the effect of doing paid work in early postpartum

months on probability of second birth remains positive. As stated above, the reason

might be that the *intensity* of breastfeeding and level of contraceptive use may vary,

though both are measured monthly. In fact, according to Popkin et al. (1993), Filipino

women may be more likely than women in other parts of the world to conceive while

still breast-feeding. Therefore, those who have to juggle mother and worker roles may

suffer from less intensive breastfeeding as well as less effective contraceptive use, and

ended up with shorter birth intervals and unwanted fertility. How the effect of

breastfeeding and contraceptive use are different for working women than non-working

women is beyond the scope of this paper.

To sum up, in this study modernization factors associated with work don't seem

to be as important as structural factors. This is as would be expected for a society in the

midst of fertility transition. On the one hand, paid employment (often in the modern

sector) is associated with an inverse relationship to fertility; on the other hand, quick

return to work that is often required in the modern sector dampens the negative effect of

modern employment. When the negative relationship between paid employment and

fertility is still not strong enough to counteract increased risk of pregnancy, we cannot assume an inverse relationship between modernization and fertility to occur by itself. Paid work would be expected to result in lower fertility all else being equal, but women in paid work tend to be those who work most intensively during the interval and who work early postpartum. As a result, they are more likely to be exposed to the risk of pregnancy due to less intensive breastfeeding.

While early studies (Hendershot 1971; Hiday 1978; Rindfuss et al. 1983) documented the negative effect of urban residence on fertility for the Philippines, this study found a non-significant but positive effect of urban residence on the risk of second birth. This is unexpected, since urban residence is associated with modern employment and more awareness of the cost of childrearing, and thus a depressing effect on fertility. It might be that although urban women want fewer children, because of the rigid form of employment, they have to intentionally space their births closely in order to get the most intense periods of maternal role incompatibility over with.

Education is linked closely to income in some early studies in the Philippines (Encarnacion 1978; Valera 1984). However, while the effect of education on the birth hazard is generally negative, it varies in different countries and model specifications, and often is not statistically significant (Rindfuss et al. 1984; Trussell et al. 1985; Guilkey et al. 1988). The lack of significant relationship between education and birth spacing in this study may be due to the same reason as urban residence discussed above: i.e., its effect is on total births rather than spacing of early births. At early stages of reproductive life women's fertility behavior may be more affected by their work and their handling of role incompatibility. Also, it may be that especially in the Philippines

where women's educational level are relatively high, fertility tends to be more responsive to modern sector employment than the educational dimension of women's status (Hirschman and Guest 1990; Williams et al. 2000), and education does not necessarily propel Philippine women into the labor force (Doan and Popkin 1993). As fertility transition progresses, behavior is more responsive to perceptions of modern sector economic opportunities, which may be incompatible with childbearing.

The most important finding in this study is that work is likely to lead to longer second birth intervals. However, the non-proportional effect of doing paid work suggests that the impact of improved labor force prospects will not be felt equally by all women in the Philippines. That women do not shift work roles (strong work commitment and close child spacing) does not imply that there is no hardship in the in the simultaneous undertaking of childrearing and employment. Rather, it suggest that women are willing to tolerate a good deal of inconvenience to remain at their jobs or that they do not have the luxury of leaving their employment should they prefer to do so.

From the point of view of economic theory, fertility and female employment are simultaneously determined by the same basic economic variables. Female labor market participation and fertility are both choice variables which households choose simultaneously given their exogenous constraints. If both variables fluctuate to some extent synchronously, then this may be caused by external variables that determine both variables exogenously, such as real female and male wages and social norms. For the Philippines in that period of demographic transition, there may be two types of women who participated in paid work: one group chooses to postpone second birth due to their

work commitment, and they can manage to successfully control the pace of their second birth; the other group, out of economic necessity, are forced into the simultaneous undertaking of childrearing and employment and have less effective fertility control.

If such heterogeneity exists, then the impact of labor force factors might negatively affect the fertility of only a subgroup of women—those who are better able to take effective fertility control. The incompatibility of productive and reproductive roles does not automatically imply fertility decline in response to intensified female employment. Those who do not shift work roles and have a closely spaced second birth, may end up with higher fertility over their whole reproductive life.

More importantly, working mothers who continue childbearing, particularly those whose first two births are closely spaced, have poorer educational and economic outcomes than those who delay subsequent childbearing. For example, the 1993 Philippines National Demographic Survey (PNDS) found that more than one-third of all second and subsequent births in the Philippines occur less than two years after a previous birth, and such children are up to twice as likely to die during infancy or childhood as children born after a longer interval (Kantner 1998). Children born within 15 months of a preceding birth are 60 to 80% more likely than other children to die in the first two years of life, once the confounding effects of prematurity are removed (Miller et al. 1992).

Such maternal outcomes assume additional significance because they define the socioeconomic context in which the children of these mothers are raised. The group of women who engage in both intense productive and reproductive work deserve attention as they may experience severe hardship.

Chapter VI Suggestions for Further Study

Although this study minimized the reverse causation between work and fertility and confirmed that work lengthened birth intervals, the possibility of jointly determined fertility and work decisions, as well as how work influences fertility attitudes and behavior remain to be explored.

In the Philippines during the period covered by these data, not only there may be apparent conflict between demand and supply for fertility control, but also the level of demand may vary between individual women. Questions remain on whether there is demand for birth spacing due to incompatibility between women's work and childbearing, and for those facing conflicting demand and supply of fertility control, whether and how work commitment can overcome the shortage of supply. For example, for those working women with short birth intervals in this study, we do not know whether they were not aware of the harmful effect of short child spacing on women and infants' health, intentionally wanted short intervals so as to end reproductive life earlier to focus on their work, or they suffer from unmet need in fertility control.

One constraint on this study is that the indicators of work activity are not refined enough. Modern sector of employment is reported at time of interview, not during birth interval. Though paid work and unpaid work are differentiated, we do not know details about work context such as unpaid domestic labor, subsistence production, family farm work, informal income-generating activities, and whether work is part-time or full-time. The traditional maternal role incompatibility hypothesis requires relatively precise measurement of the role incompatibility conditions women face and statistical controls

for variation in socioeconomic status or aspirations. More detailed information on work sectors, differences in job environment and work-related autonomy may give us a better idea of the degree of the effect of women's employment on fertility.

Figure 1 Estimated Probability of Second Birth by The End of Observation Period

Legend:
- all women
- never worked in the interval
- work part of the inteval
- work most of the interval
- paid work most of the interval
- unpaid work most of the interval
- self-employed most of the interval
- work away from home most of the interval
- work at home most of the interval

Values: 0.84, 0.90, 0.59, 0.76, 0.81, 0.70, 0.71, 0.79, 0.67
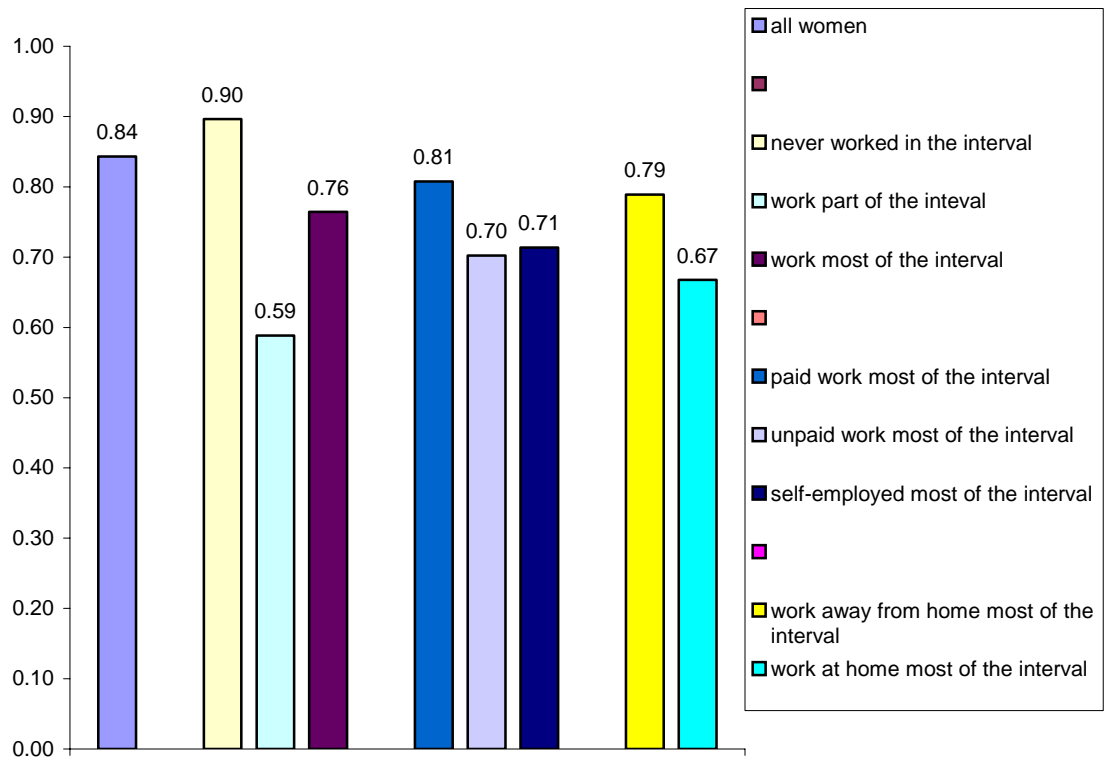
Figure 2 Survival Distribution Function by Work Status in The Interval

Legend:
- all women
- work most of the interval
- work part of the interval
- never worked during the interval

X-axis (Month): 0-8, 9-16, 17-24, 25-32, 33-40, 41-48, 49-56, 57-64
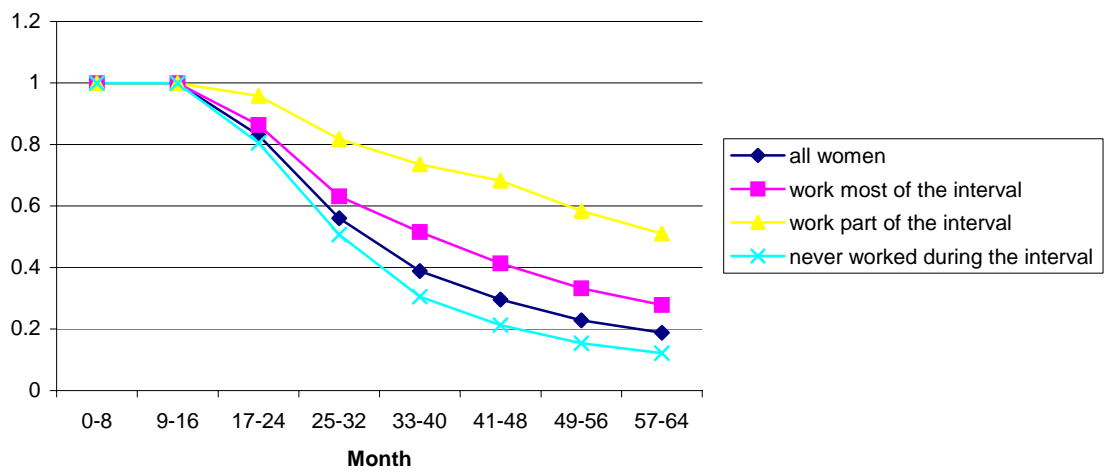
Figure 3 Survival Distribution Function by Types of Work in The Interval

Legend:
- paid work
- unpaid work
- self-employed
- never worked during the interval

X-axis (Month): 0-8, 9-16, 17-24, 25-32, 33-40, 41-48, 49-56, 57-64
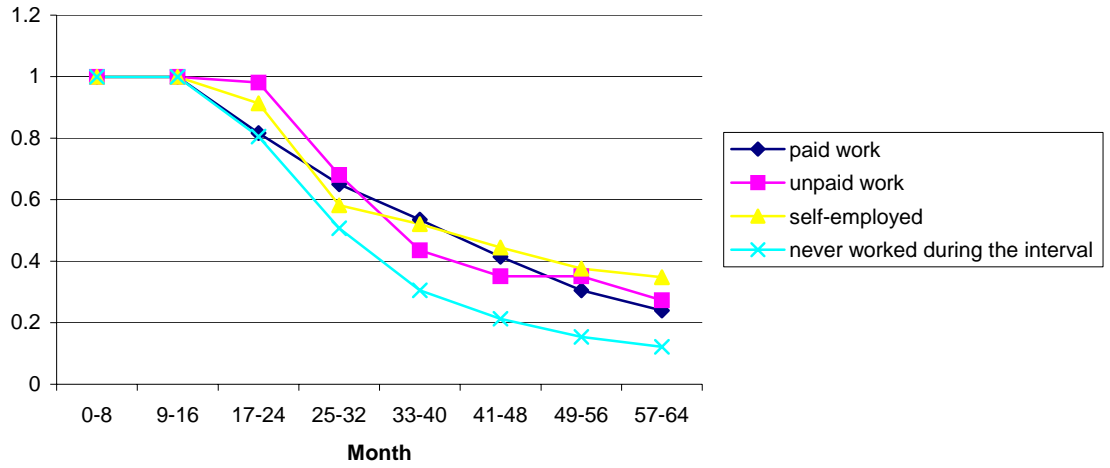
Figure 4 Survival Distribution Function by Location of Work in The Interval

Legend:
- work away from home
- work at home
- never worked during the interval
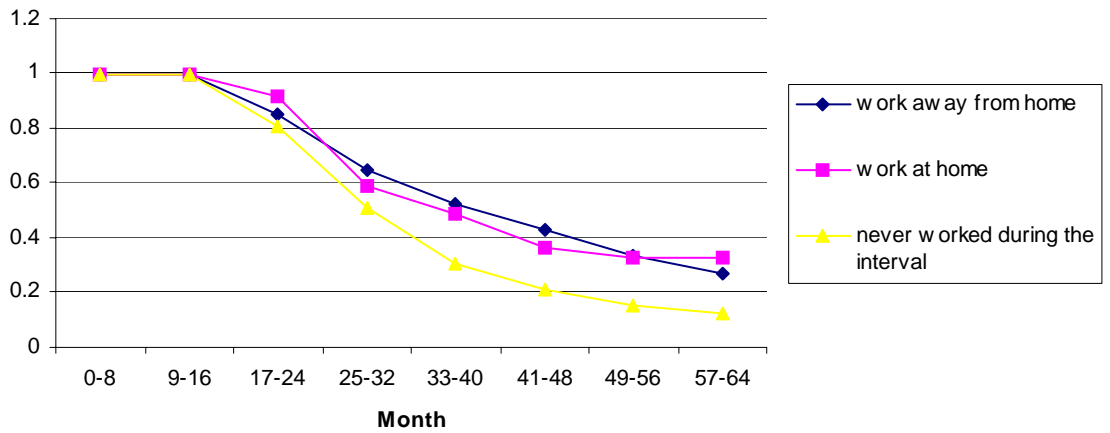
X-axis (Month): 0-8, 9-16, 17-24, 25-32, 33-40, 41-48, 49-56, 57-64

Table 1 Factors Affecting Child Spacing Considered in The Analysis

Variable	Description	Weighted mean /percentage of "yes"
Doing any work during the interval*	Doing any type of work (both paid and unpaid, both away from home and at home, both self-employed and employee) =1; else=0	29.17%
Doing paid work during the interval*	Paid employee (away from or at home) in the month=1; else=0	18.13%
Doing unpaid work during the interval*	Unpaid worker (away from or at home) in the month=1; else=0	2.8%
Self-employed during the interval*	Self-employed (away from or at home) in the month=1; else=0	8.24%
Work away from home during the interval*	Working away from home (paid employee, self-employed or unpaid worker) in the month=1; else=0	23.73%
Work at home during the interval*	Working at home (paid employee, self-employed or unpaid worker) in the month=1; else=0	5.44%
Woman's education	Without primary=1, primary=2, secondary=3, above secondary=4	2.77 (s.d. = 1.02)
Household socio-economic status	Factor score compiled from information on source of drinking water, Time to get to water source, type of toilet facility, whether has electricity, television, refrigerator, bicycle, motorcycle, and car.	7.11E-16 (s.d. = 1.00)
Urban residence	If reported urban residence=1; otherwise=0	54.13%
Age at first birth	Age when having first birth	22.56 (s.d. = 4.60)
Mortality of first birth	If first child died=1; otherwise=0	2.99%
Husband coresidence	If husband coresident=1; otherwise=0	88.44%
Length of breastfeeding	Number of months during the interval when mother breastfed	7.75 (s.d. = 7.70)
Modern contraception*	If used modern methods of contraception in the month=1; otherwise=0	12.48%
Tagalog	If of Tagalog ethnicity=1; otherwise=0	20.51%

*time-varying variable. The percentage given in the percent of months (about 60 per woman) where the specified behavior was practiced.

Table 2 Median Month of Second Birth

	Median month of second birth	95% confidence interval (lower)	95% confidence interval (higher)
All women	26	25	27
Never worked in the interval	24	23	25
Worked part of the interval	60	45	n/a
Worked most of the interval	32	29	36
Paid work most of the interval	34	30	38
Unpaid work most of the interval	31	27	48
Self-employed most of the interval	34	23	44
Worked away from home most of the interval	34	29	38
Worked at home most of the interval	31	23	37

Table 3 Summary of the Number of Censored and Uncensored Values

	Total number of women	Number of mothers who had second birth	Percent censored
All women	1799	1055	41.36
Never worked in the interval	1203	776	35.49
Worked part of the interval	100	32	68.00
Worked most of the interval	496	249	50.20
Paid work most of the interval	291	146	49.83
Unpaid work most of the interval	53	31	41.51
Self-employed most of the interval	151	69	54.3
Worked away from home most of the interval	397	198	50.13
Worked at home most of the interval	98	48	51.02

Table 4 Hazard Ratio of Second Birth

	Model 1 (N=1799)	Model 2 (N=1799)	Model 3 (N=1799)	Model 4 (N=1799)	Model 5 (N=1548)
Any work during interval	0.763***				
Paid work during interval			0.843	0.697**	0.707**
Unpaid work during interval			0.604**	0.739	0.697
Self-employment during interval			0.720**	0.750*	0.787
Work away from home during interval		0.758***			
Work at home during interval		0.782			
Paid work * time (<16 month)				1.935***	1.925**
Unpaid work * time (<16 month)				0.127*	0.247
Self-employment * time (<16 month)				0.785	0.922
Breastfeeding					0.659***
Modern contraceptive use					0.416***
Husband coresidence	2.070***	2.070***	2.083***	2.071***	2.265***
Age at first birth	0.982*	0.982*	0.981*	0.981*	0.970***
Education	0.982	0.982	0.977	0.978	0.938
Socioeconomic status	0.934	0.935	0.927	0.926	0.906
Urban residence	1.124	1.125	1.114	1.110	1.113
Mortality of first birth	1.989***	1.991***	1.973***	2.019***	1.249
Tagalog ethnicity	0.852	0.852	0.848	0.851	0.788**
-2 Log Likelihood	8567.74	8567.71	8564.59	8542.88	7232.91
Likelihood ratio chi-square	121.32	121.35	124.47	146.18	210.15
Degree of freedom	8	9	10	13	15

*p<.05   **p<.01   ***p<.001
p<.0001 for Chi-Square

*Model 5 includes only intervals larger than 12 months due to the 12-month lag used for contraceptive use.

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