

# THE ECONOMIC VALUE OF CHILDREN IN VIETNAM

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Vietnam has some of the highest land densities in the world, and its population is still growing. This paper studies the causes of population growth with a focus on the economic value of children. I develop a model of household demand for children that emphasizes the allocation of children's time across productive activities: work on the farm, in the labor market, and going to school. Demand for child labor on the farm and in the family enterprise, school attendance, and mother's schooling are estimated to have a large effect on family size. Child mortality, son preference, and access to contraceptives also affect family size but the magnitude of the effect is small. The results suggest that the government's focus on contraceptive delivery to reduce Vietnam's population growth should be complemented by policies that affect the economic motives for having children.

## Introduction

Population growth is a fundamental concern for Vietnam. Among the poorest countries in the world, Vietnam is the thirteenth most populous, with 74 million people (Banister, 1993, p. 86). The Red River Delta may have the highest population density on agricultural land anywhere in the world (Feeney and Xenos, 1992). In many northern villages, there is barely enough land for subsistence. In the mountainous regions, rapid population growth has contributed to severe environmental problems. The population of the whole country continues to grow at close to 2% per year.

The government of Vietnam is committed to reducing population growth. Over the past twenty years, it has developed an extensive system of contraceptive distribution through village clinics. Contraceptives are free and available in or near almost every village. Government promotion of family planning is long-standing, with intensive publicity and village outreach programs. The government's strategy has been to try to convince couples of the benefits of few children and give them access to contraceptives.<sup>1</sup> The persistence of high fertility in the agricultural regions of Vietnam suggests that many couples are not convinced. They may have important economic reasons for wanting many children, to help work on the farm, for the family enterprise, or insure the parents in their old age.

The premises of most family planning programs are that the cost of contraception is prohibitively high (in money or effort) or couples don't know how to limit their fertility. The persistence of large families in Vietnam despite the extensive family planning effort has caused many Vietnamese demographers to speculate about the importance of economic motives for having children, but there has been no quantitative research on the topic.

There is a large body of research on the economic motives for having children growing out of the household production economics literature (Becker 1960, contributions to the volume edited by T.W. Schultz 1973, Rand research reports, many of which are summarized in T.P. Schultz 1973, and much of Gary Becker's and Mark Rosenzweig's work) Most of the research focuses on issues of greatest importance in industrialized countries: the trade-off between women raising children and working, the effect of household income on the desire for children, and the choice between the quantity and "quality" of children. There has been very little economic research which considers the relationship between fertility and children's contributions to household production (exceptions are Rosenzweig & Evenson 1977, Rosenzweig 1977, 1982, 1990, and Levy 1985, all using aggregate data). Nor has there been much research on the importance of the cost of contraceptives relative to other child costs and benefits in determining family size (Pritchett 1994, uses international comparisons to address this).

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<sup>1</sup>In some locations, sanctions are used as well. Government workers can be fined and miss out on promotions if they have more than two children, and some villages impose fines on families who have more than two children.

## Population and Family Planning in Vietnam

Accurate information about the population of Vietnam has only become available since the first national censuses conducted in 1979 and 1989. The 1979 census had a number of statistical flaws. The census data have recently been supplemented by sample surveys. The population growth rate from 1979 to 1989 was 2.2% (slightly adjusted for problems in the 1979 census by Banister, 1993, p. 19), and estimated to be 1.7% in 1995 (Banister, 1993, p.86). The 1989 population of Vietnam was about 66 million (Banister, 1993, p. 18). Several estimates of fertility are presented in Table 1. The Total Fertility Rate (TFR) is the average number of children a woman would bear if the age-specific fertility rates do not change over time, and the Average Ideal Number of Children (AINC) is the average number of children each woman says she would like.

TABLE 1: FERTILITY RATE ESTIMATES

	TFR	AINC
1969	~6 <sup>a</sup>	
1979	4.8 <sup>b</sup>	
1980	5.3 <sup>c</sup>	
1987-88	4.0 <sup>d</sup>	2.6 <sup>e</sup>
1989	3.8 <sup>f</sup>	
1993	3.1 <sup>g</sup>	2.8 <sup>g</sup>
1993	3.5 <sup>f</sup>	

<sup>a</sup> Estimated from the 1979 Census, Nhan, 1990, p. 148.

<sup>b</sup> 1979 Census, Nhan, 1993, p. 10.

<sup>c</sup> Estimated by Banister, 1993, p. 86.

<sup>d</sup> Vietnam, 1990, p.28 (DHS)

<sup>e</sup> Vietnam, 1990, p. 50. (DHS)

<sup>f</sup> Vietnam, 1991, p. 90. (1989 Census)

<sup>g</sup> Vietnam, 1995, p. 84. (ICDS)

<sup>f</sup> GSO & NCPFP, 1995, p. 27.

Clearly, estimating fertility rates is not an exact science, but the trend of the estimates is a substantial fall in fertility. Many Vietnamese demographers feel that the 1993 ICDS estimate of the TFR is too low because of the anomalous regional distribution of the estimated fertility. The estimate of the desired number of children, AINC, in 1987-88 appears to show that women wanted fewer children than they had. However, the AINC “has a number of serious drawbacks” (Pritchett, 1994, p. 8) being subject to inaccuracies due to child mortality, sex preferences, and non-numerical responses. The large number of women saying they want exactly two

children, 70.3% (Vietnam, 1995, p.82), makes it likely that a portion of them are repeating what they know the government wants to hear. Everyone knows the government slogan “Each couple only has 1 or 2 children” (“10 or 20 children” as kids scrawled on one village wall). Farmers’ concern about what the government wanted to hear would surely have been greater in 1987-88 than in 1993 because of the political changes in the late 1980s. The 1993 AINC is higher than the 1988-89 estimate and close to the TFR estimate.

If fertility is falling, why is population growth a concern? Because Vietnam has such extraordinary population densities, and the population is still growing at 1.5% to 2% a year. At this rate, the population will double in 35 to 45 years. Vietnam’s population density for the whole country is not extraordinarily high compared to other countries, but this does not take into account Vietnam’s geography. More than three-quarters of the land area is mountainous or jungles, which neither can nor does support much of the population (ICDS, 1995, p.1). The two river deltas support two-thirds of the population on about 15% of the land area. The Red River Delta in the north may have the highest

population density in the world, higher than Java, Bengal, lower Burma, and China (see Figures 1 and 2).<sup>2</sup>

Many villages in the north remain near the margin of hunger. The remarkable land densities are seen in a study of a village in Thai Binh province in the Red River Delta. Due to the density of human activity, the village had some of the lowest species diversity the researchers had seen. The draft power for some of the plowing was human rather than buffalo, not because the villagers couldn't afford more buffalo, but because they lacked the land to raise fodder for the buffaloes (Bouahom, et al. 1993, pp. 120-124). It is not clear how rural Vietnamese (80% of the population) will feed themselves as the population grows. If population growth is not reduced, hunger and poverty can only be averted by a substantial increase in agricultural output or non-agricultural employment. Neither of these is going to be easy.

Is the problem that rural Vietnamese cannot get the contraception they want? Half of Vietnamese women are within 5 kilometers of a clinic that distributes free contraception, and 98% of women are within 20 kilometers of a clinic (ESCAP, 1991, p. 34). Ninety percent of current users and 87% of non-users said contraceptive accessibility was "easy" in a recent survey (Vietnam, 1995, p. 65). In several surveys, around 95% of women know about a "modern" method of contraception (Vietnam, 1995, p. 52). A continuing problem for contraception provision is the lack of choice - many clinics provide IUDs only, partly because it is easier for government clinics to monitor the use of this method of contraception. This is hard on women who suffer health problems due to the IUD, but it is not clear it has a significant effect on fertility. Village clinics are supposed to provide pills for women who want them and increasingly pills and other contraceptives are available in the market.

The predominance of IUDs as a method of contraception in the Vietnamese Living Standards Survey (VLSS) is shown in Table 2. The IUD is by far the most common method of contraception used by women in Vietnam, having been used by close to half of ever-married women in the sample. The next three most common methods of birth control are traditional methods that require no inputs from the government's family planning program. The problem with IUDs is indicated by the 13% of ever-users who stop using IUDs due to side-effects. However, most of these women (68%) switched to other birth control methods. In total, only 1.8% of child-bearing age women in the VLSS survey stopped using birth control after suffering side effects from the use of the IUD (43.9% x 13% x 32%). This is serious issue for Vietnam's family planning program, but it will not have a large effect on Vietnamese fertility. The pill, which is the most likely alternative method for the family planning program to promote to married couples, had a remarkable 20% of ever-users in VLSS stop because of side-effects, perhaps due to poor information about the proper dosage. The problem with side-effects from the pill has an even smaller effect on fertility, though. Only 0.0006% of women in the sample stopped

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<sup>2</sup>This is not a new issue. The Population Index editors wrote in 1945, "There are few, if any, large areas in the world in which the pressure of population on the land is greater than in the delta of the Red River." (Population Index, 1945, p.74)

using birth control after experiencing side effects from the pill (3.9% x 20% x 8% of women who did not switch to a different method).

TABLE 2: THE PERCENT OF WOMEN EVER USING DIFFERENT BIRTH CONTROL METHODS

Birth Control Method	Percent
IUD	43.9
Rhythm	19.3
Withdrawal	17.1
Abstinence	13.2
Condom	5.4
Menstrual Regulation	4.1
Pill	3.9
Sterilization	3.4
Traditional Herbal Medicines	1.1
Injection	0.8
Spermicide or Foam	0.6
Diaphragm	0.1

Source: Author's calculations from VLSS. The sample consists of 3139 ever-married women aged 15 to 49. Some women have used more than one method at different times. 69.5% of the women had ever used some method of birth control.

The high prevalence of traditional methods of contraception in the face of limited “modern” contraceptive choice is an indication that couples who want to limit their fertility will find ways to do so. They are not likely to be primarily constrained by the government’s family planning program, though the government’s efforts can improve the reliability and convenience of birth control.

## Motives for having children in Vietnam

Parents in Vietnam have children for different reasons that are not perfectly distinct from one another. This section describes the main considerations related to family size from discussions with farmers in the Red River Delta in northern Vietnam.

### 1. The pleasure of children

*Có phúc thì có nhiều con*  
(Happiness is many children)

Vietnamese enjoy children. The young and the old take great pleasure in playing with children, and new babies are the focus of much socializing. It is very hard to find either men or women who do not want to have at least one child in their life. In a recent survey of over 10,000 Vietnamese women, not one said they did not want any children (ICDS, 1995, p. 82). The high value of time and busy schedules that discourage Western couples from having many children have not yet afflicted Vietnam.

### 2. The value of child labor

*Nhiều con hơn nhiều của*  
(Many children are better than many possessions)

In an agrarian society like Vietnam, it is difficult to separate the pleasure or “consumption” value of children from their productive value as workers on the farm and in the household. The folk-saying above has the ambiguous double meaning that children are more satisfying than material wealth, and that children can be relied upon to help meet the family’s needs more surely than wealth. The former suggests that parents should bear children despite the economic burden; the latter suggests parents should bear children because they are the most reliable economic asset. Children may be needed to ensure adequate labor for the household, or to insure against illness or death of one of the parents by supporting the family.

### 3. Girl’s versus boy’s labor

*Có nếp có tẻ*  
(Have both regular rice and sticky rice - i.e. both boys and girls)  
*Thị mẹt*  
(Girl’s middle name; a cheap basket - i.e. “useless girl”)

Teenage boys are thought to be more capable than teenage girls of heavy work on the farm, like plowing. However, girls are more valuable for other work, such as transplanting rice (traditionally a women’s job), and cooking, cleaning, and child care in the home. Girls are more likely to do work that helps the mother, and boys to help the father. This is also considered to be true for companionship, with girls being close to their mother and boys to their father.

#### 4. The cost of raising children

*Trời sinh voi, trời sinh cỏ*

(Heaven created the elephant, heaven created grass

i.e. if children are born into the world, there will be enough to provide for them)

The direct costs of raising children traditionally were not high in Vietnam. This was all the more true during the period of collectivization (the early 1960s until the 1980s in the north, but never really operationalized in the south). All significant child goods were provided collectively by the cooperative, so the cost of additional children in terms of goods (though not time) to the parents was almost zero. The situation has changed dramatically since the early 1980s. The twin effects of the dismantling of the cooperatives and the shift to what is effectively a fee-for-service health care and education systems has increased the money costs of children to the point that farmers often mention the costs first-off when discussing how many children they want.

A related development, full of local intricacies and ambiguities, is the change in land rights. Whereas previously under the cooperative system, the family faced a land commons, where each child was given same share of village land regardless of family size, now (generally speaking) the parents must divide only their own land share among their children. This substantially increases the cost of providing children with the means to make a living. Complicating this picture, when long-term land use rights were distributed to individual households, they were mostly distributed according to the number of adult laborers, rewarding families who earlier had ignored the exhortations to have small families (San, 1990, p.178). This may induce some families to believe that they will be similarly rewarded for large families in the future when the land use rights are redistributed, though most farmers are unsure when and if the land will be redistributed (since it is ultimately at the discretion of the village officials). Some villages have established rules to counteract this temptation by redistributing *less* land to large families.

A very direct cost of children for prolific families is a schedule of money fines and land penalties for third or higher births, which varies from one locality to the next.

#### 5. Old-age support

*Vịt trời*

(Ducks in the sky - like girls who “fly” from the family when they marry)

It is the sons' duty, especially the oldest son's, to provide for the parents when they grow old. The most important support is to live with the parents and care for them when they need it. They should also help the parents financially if they have unexpected problems, such as illness. Hence sons play a dual role of retirement savings and insurance. A daughter's first duty after she marries is to help her husband's parents, not her own.

## 6. Son preference

Parents need a son for the continuation of the ancestral line (*nóí dđi*), since it only passes from father to son. This is particularly important if the father is himself the eldest son. With no son, the parents will have no one to pray for them in future generations. Giving birth to a son is often important for the status of the mother in the extended family.

As noted above, it is also important to have a son for old-age support. Farmers in the Red River Delta, though, say in interviews that the restriction on daughters helping their own parents is breaking down as families become smaller. Parents with no sons can usually get permission to live with one of their sons-in-law. Sons may also be preferred to daughters for economic reasons if the constraint on farm production is heavy labor. Finally, farmers like to have sons to back them up in case they get in violent disputes with their neighbors.

To know the effect of son preference on fertility, one must know *how many* sons are needed. Even if parents just require one good son, there are at least two reasons to bear more than one son. Loi (1991, p.152) notes that a majority of respondents in Quyet Tien commune in the Red River Delta agreed a couple should have two sons to make sure at least one of them survives to adulthood (this is not an abstract concern given the recent history of Vietnam). The other reason is also to avoid risk, and perhaps strategic. In the author's interviews in the Red River Delta, farmers say that two sons reduce the risk that both are *hur* (rotten, disrespectful), and may provide the incentive to each other to stay in good favor with their parents.

## 7. Other factors

In other countries infant and child mortality has a consistent, though small, effect on fertility (e.g. references in Hashimoto and Hongladarom, 1981). Parents have more children to make up for the children who have died, and may also have more children in anticipation of child mortality before they know if the children will die. This sort of "hoarding" may be influenced in Vietnam by the massive deaths during the wars of the past several generations.

The choice of contraception is affected by its cost in terms of money, time, inconvenience. Means of averting births are also affected by the related health problems and the reliability of the method.

The education of children is a direct cost of raising children, but more than the other costs, it can have a direct future payoffs for the child and the parents in higher earnings for the child, especially if the child moves to the town or city. Families investing more heavily in their children's human capital will tend to have fewer children because they are more expensive.

## A Model of Farm Household Fertility Decisions

A formal model of the trade-offs between the reasons for having children in the previous section provides a framework for the estimation of their effects on fertility in Vietnam. A model of farmers' decisions about family size should incorporate the trade-off between the enjoyment of children and children's productive contribution on the farm on the one hand, and their cost on the other. The farmer must weigh the value of educating those children against the cost of education and the loss of the child's time working on the farm. The model should also incorporate the cost of contraception (the cost of averting a birth) to evaluate its importance relative to other factors in the fertility decision.

The structure of the model derives from the household production model (Becker 1965, Lancaster 1966). In the model, the family does not derive its utility directly from purchased goods, but instead the family combines purchased goods with the time of family members to produce the "goods" actually desired, e.g. health and leisure. In this farm household model, the goods from which the family derives utility are somewhat more tangible, but they are still not goods purchased on the market: children are "produced" with mother's time, education is "produced" with the child's time, and agricultural output is produced with the time of all family members. In traditional economic models of fertility, (e.g. Willis, 1973) the focus is on the labor-leisure trade-off and the competing demands on the mother's time. This model focuses on alternative uses of the child's time, not the mother's, although it also incorporates the trade-off between the mother's time spent caring for children and her time spent doing other work. The organization of work in farm households in developing countries and the presence of an extended family mean that there is not necessarily a conflict between mother's work outside the house and child care as there is in industrialized countries. Concern for women's and children's leisure is less likely to be an important element of household decisions about how many children to raise. Rural Vietnamese women have few waking hours when they are not involved in productive activities, on the farm, in the market, or in the home. Leisure is even thought to be a bad thing for women—a sign of laziness. A child's role is to be respectful and to help the family, not to use the family's resources for his or her leisure.

This model has much in common with the agricultural household model (Barnum and Strauss, 1979, and Singh, Squire, and Strauss, 1986) because of the central role of household agricultural production and the family's labor contribution to it.

Let farm output,  $q$ , be produced with labor  $\mathbf{l}$  and fixed factors  $z_q$ :

$$q = \phi(\mathbf{l}; z_q) \quad (1a)$$

$\mathbf{l} \equiv (l_m, l_f, l_c)$  is a vector of the labor of adult males,  $l_m$ , adult females,  $l_f$ , and children,  $l_c$ .

Children,  $c$ , are “produced” (or limited) with inputs of contraception,  $k$ , women’s time,  $f_c$ , and fixed factors  $z_c$

$$c = \theta(k, f_c; z_c) \quad (1b)$$

The education of children,  $e$ , is “produced” with inputs of children’s time,  $c_e$ , and fixed factors,  $z_e$

$$e = \gamma(c_e; z_e) \quad (1c)$$

The labor used on the farm,  $\mathbf{l}$ , is split between household labor and hired labor

$$l_m = m_q + h_m \quad (2a)$$

$$l_f = f_q + h_f \quad (2b)$$

$$l_c = c_q + h_c. \quad (2c)$$

$m_q, f_q$ , and  $c_q$  are the time spent on agricultural production by the adult males, adult females, and children, respectively, in the family.  $h_m, h_f$ , and  $h_c$  are hired males, females, and children, respectively.

The family’s time is split between working on the farm and hiring themselves out, as well as taking care of children for women, and being educated for children

$$\bar{m} = m_q + m_h \quad (3a)$$

$$\bar{f} = f_q + f_h + f_c \quad (3b)$$

$$c = c_q + c_h + c_e. \quad (3c)$$

$\bar{m}$  and  $\bar{f}$  are the given amounts of adult male and female time, respectively, in the household.  $c$  is the amount of child time (i.e. the number of children) in the household.  $m_h, f_h$ , and  $c_h$  are the time men, women, and children, respectively hire themselves out for wage labor.

The family’s objective is to maximize its utility by enjoying a consumption good,  $s$ , children,  $c$ , and education of children,  $e$ , given fixed factors  $z_u$ .<sup>3</sup> The family maximizes utility with respect to the number of children, their education level, amount of labor used on the farm, hired labor, and family consumption of goods

$$\max_{s, c, e, k, \mathbf{l}, \mathbf{h}} u(s, c, e; z_u) \quad (4)$$

where  $\mathbf{h} \equiv (h_m, h_f, h_c)$ . The family utility is constrained by its full income budget: the family’s money income plus the value of their time must be less than or equal to the cost of purchased goods plus the value of time used in home production.

$$p_q q - \mathbf{w}'\mathbf{l} + w_m \bar{m} + w_f \bar{f} + w_c c = w_f f_c + w_c c_e + p_s s + p_c c + p_e e + p_k k \quad (5)$$

where  $p_q, p_s, p_c, p_e$ , and  $p_k$  are the prices of agricultural output ( $q$ ), adult family member’s consumption ( $s$ ), children’s consumption ( $c$ ), education ( $e$ ), and contraceptives ( $k$ ), respectively.  $\mathbf{w} \equiv (w_m, w_f, w_c)$  is the vector of wages of men, women, and children, respectively. Let

$$p_s = 1 \quad (6)$$

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<sup>3</sup>Samuelson (1956) discusses the conditions under which the family utility function is plausible.

be the price of the consumption good. Maximizing utility in (4) subject to (1a)-(1c), (2a)-(2c), (3a)-(3c), (5), and (6) provides a demand function for children

$$c^* = c(\mathbf{w}, p_q, \mathbf{p}, z_q, \mathbf{z}, \bar{m}, \bar{f}) \quad (7)$$

where  $\mathbf{p} \equiv (p_c, p_e, p_k)$  and  $\mathbf{z} \equiv (z_c, z_e, z_u)$ .

With an interior solution, several of the variables,  $p_q, w_m, \bar{m}, \bar{f}$ , and  $z_q$  only affect the demand for children through their effects on family income. If money income is

$$\pi \equiv p_q q - \mathbf{w}'\mathbf{l} + w_m \bar{m} + w_f f_q + w_f f_h, \quad (8)$$

then demand for children can be rewritten as

$$c^* = c(\pi, w_c, w_f, \mathbf{p}, \mathbf{z}). \quad (7')$$

The behavior of the demand function in (7') cannot be determined analytically, like all but the simplest economic models of fertility, but it provides the theoretical structure to estimate the influence of factors affecting family size. The assumption of smoothly functioning labor markets in the model (labor can be hired in to work on the farm and family members can hire themselves out at a single market wage) has clear and testable implications. Farmers have no need for children to meet their labor needs on the farm. Small families with abundant land can hire in the labor they need and large land-poor families can hire themselves out, since hired and family labor are perfectly substitutable. The value of children's labor on the farm is equal to the children's market wage so there is no advantage to the family to have them work on the family's farm. It is unlikely in most locations that a market for child labor will be smoothly functioning, but if the labor of adult men and women are close substitutes for child labor (though receiving a higher wage for their higher productivity per person) then there need not be a child labor market for the same conclusion to hold: farmers don't need child labor.<sup>4</sup>

When farmers cannot hire the labor they need, there is a motive to have large families to meet their labor needs.<sup>5</sup> This is true in the model above when hired labor is a binding constraint:  $\mathbf{h} < \bar{\mathbf{h}}$  for some fixed  $\bar{\mathbf{h}}$ . The constraint on hired labor causes the shadow wage of family members to rise. The vector of shadow wages,  $\omega$ , is a function of the fixed factors in the farm production function,  $z_q$ , and how much family labor is available:  $\omega = g(\mathbf{w}, z_q, \bar{m}, \bar{f}, c)$ . If the farmer has extensive land but cannot hire much labor, for instance, this makes family labor especially valuable. When hired labor is constrained, the demand for children is also a function of available family labor and farm production fixed factors since these determine the child's and the mother's shadow wage

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<sup>4</sup>The absence of child labor market also prevents children in the family from hiring themselves out, but if adult labor is a close substitute, the children can work the farm, and the adults in the family can hire themselves out.

<sup>5</sup>Note that forming an extended family household can also meet labor needs for a couple with abundant land without the couple needing many children of their own. However the traditions and interests governing the formation of extended families are not likely to be sufficiently flexible to closely fit the labor needs on the farm. Farmers with large farms are also likely to have relatives with large farms.

$$c^{**} = c(\pi, w_c, w_f, \mathbf{p}, \mathbf{z}, z_q, \bar{m}, \bar{f}) \quad (9)$$

A test for the smooth functioning of the labor market and its impact on demand for children is thus to test for a significant influence of  $z_q$ ,  $\bar{m}$ , and  $\bar{f}$  on demand for children, once family income has already been controlled for.

## Estimating Household Demand for Children

The demand for children derived in the previous section provides the theoretical structure to assess the importance of the different motives for having children. A national survey of Vietnamese households provides the data to estimate the effect of household income, the value of child labor, son preference, education, etc., on the size of the family. The estimation addresses several questions: Does poverty induce high fertility? Are Vietnamese having large families because child labor is valuable? Will intensified family planning programs reduce fertility? Do women's labor market opportunities reduce the number of children they bear? Are rising school fees forcing parents to have fewer children? Are the desire for sons and high infant mortality keeping fertility high?

I estimate two sets of regressions. The first set uses the number of dependents in the household rather than the number children born to a particular mother or father. This captures the motives for household formation since much of the economic activity in Vietnam takes place in the context of an extended rather than a nuclear family. The second set of regressions uses a fertility history taken from one woman in the household to consider the effects of mother's health, infant mortality, and son preference on the number of children born to the mother, since these effects cannot be estimated with the household data. The parameterization of the demand for children in Equation 9 has the simplest of functional forms: demand is a linear function of the explanatory variables.

### The data

The data used to analyze the economic value of children were collected in the Vietnam Living Standards Survey (VLSS). 4,800 households were surveyed between October 1992 and October 1993 by the Vietnamese State Planning Committee and the General Statistical Office using a questionnaire based on the World Bank's Living Standards Measurement Surveys. The surveyors randomly selected 150 villages or city districts (*xã* or *phố*) across the country, within them randomly selected 2 hamlets or blocks (*thôn* or *cõm dũn cõ*), and from them chose 16 households each. The survey collected extensive information on the economic activities of the household, characteristics of household members, and a fertility history on one woman aged 15 to 49 randomly chosen in each household. More detailed explanation and summary tables are found in Vietnam (1994).

Household income is calculated from a number of sources. The main ones are wage income of family members, net revenue from the farm, and net revenue from the family enterprise(s). Minor additions were rental earnings from property, machinery and draft animals, pensions, interest, and remittances. The measure of household income does not include the proceeds from sales of major investment items, like houses, land, and motor vehicles because they are too lumpy to give a good indication of the family's permanent income.

Several of the variables of interest could not be observed directly for all the people in the survey. The potential wages of children and mothers were only observed for those

employed in wage labor. The effect of wages is captured with the average wage in each of the 150 villages. This avoids most of the problems of endogenous selection of which children and mothers chose to enter the labor force. With only 4% of children engaging in wage labor, 19 of the villages were deleted from the sample (608 of the 4800 households) because they had no children working for wages. The average wage of dependents is slightly higher than for adult women because the wage of boys aged 16 to 20 is 33% higher than wages of adult women.

School fees can only be observed for those children being sent to school, and the years of schooling the children will complete is not known for children still in school. Since data on child's schooling is more plentiful than child's wages, hamlet averages for all 300 hamlets were used to represent potential school fees and the probable level of schooling attained by the children. Data on the time cost (and money cost) of contraception is similarly limited to those women using contraception. The potential time cost is represented by the hamlet average time it takes the women using contraception to get to the providers of contraception. Those hamlets where none of the women in the survey used contraception (most likely because it is hard to get) were indicated with a dummy variable. The money cost of contraception is ignored since only 199 of the 3140 women interviewed about birth control (6%) had purchased contraceptives in the previous year. Ninety per cent of the contraceptives used were obtained free from government clinics.

Dependents are defined as persons aged 20 or younger who have never married and are not the head of household. They include the children of the head of household as well as the children of other household members. A minority person is defined as anyone who is not ethnically *Kinh*, mostly comprising mountain people and a few ethnic Chinese. A household business is any commercial activity besides farming. Forty-five per cent of the households surveyed had some kind of business.

An important issue to address is the relationship between the age of the parents and the number of children, many of the young parents have not yet completed their fertility at the time of the survey. This "censoring" of the ultimate completed family size is dealt with in a simple way. The number of children born is very close to a quadratic function of the age of the mother (see Figure 4). The relationship between age of the household head and the number of dependents in the household faces a double censoring problem. When the household head is young the number of dependents increases with age, since he or she has not yet had all of his or her children, but after the household head reaches a certain age, the number of dependents begins to decline as dependents leave the household to start their own families. This pattern of censoring approximates a piecewise linear trend with a peak in household size when the head is about age 40 (see Figure 5). The number of dependents in the household was fit with a linear spline with a knot at age 40.

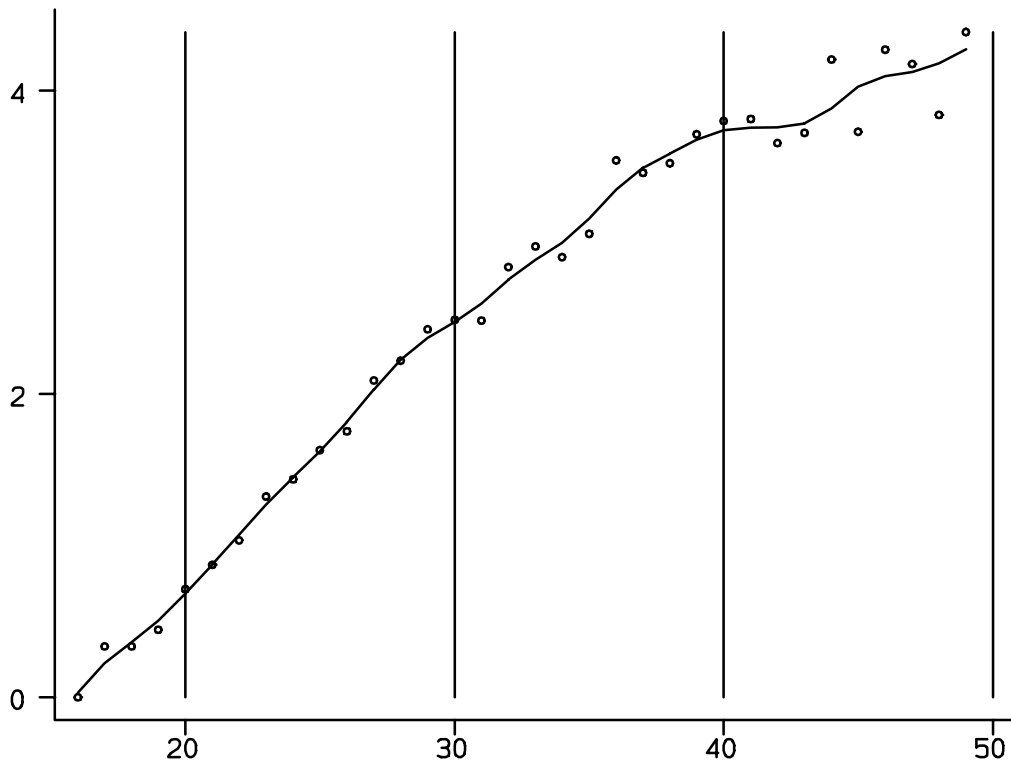


FIGURE 4: AVERAGE NUMBER OF LIVING CHILDREN BY AGE OF MOTHER  
 Source: Author's calculations from VLSS; trend is a nonlinear median smoother.

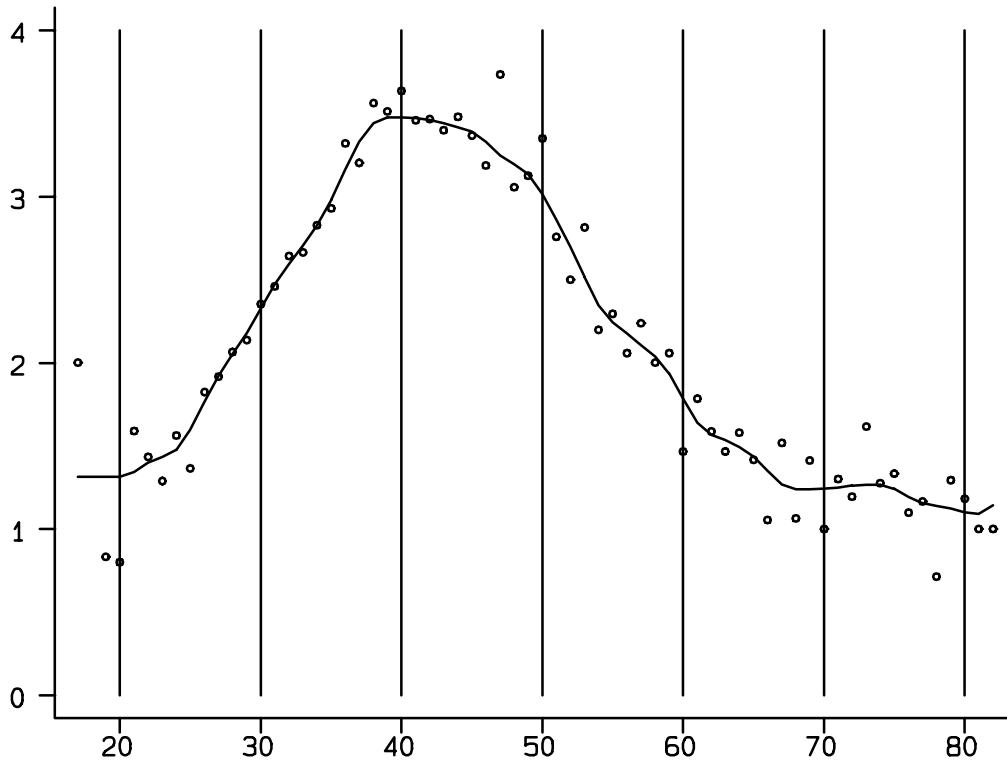


FIGURE 5: AVERAGE NUMBER OF DEPENDENTS IN HOUSEHOLD BY AGE OF HOUSEHOLD HEAD  
 Source: Author's calculations from VLSS; trend is a nonlinear median smoother.

## The results

Are the poor having the large families? According to the first regression in Table 2, there is no significant relationship between the household's per capita income<sup>6</sup> and the number of dependents. The coefficient on income is negative, suggesting that higher income households want fewer, higher "quality" children, but the magnitude is negligible, indicating that income would have to increase more than 1000 times before the number of dependents per household would drop by one.

The potential wages of children has a small positive correlation with the number of dependents in the household, but it is not statistically significant. The weak relationship may be because average village wages for children are not measured very precisely in the villages where few children work for a wage.

The relationship between women's labor market work and children in the household does not fit the pattern of Western industrialized economies, where women with children work less in the market due to the competing demands on their time. Large families seem slightly *more* likely in villages where women have high wages, perhaps due to the income effect. With the extended family in or near the household, substitutes for the mother's child care are not difficult to find.

School fees seem to have a slight discouraging effect on large families, but again the magnitude is small and not significant. Couples deciding to have children some years in the past may not have anticipated the recent rises in school fees in Vietnam. The average years of schooling for children in the hamlet does have a strong correlation with large families. Average school attainment reflects the taste for education in the community ( $z_u$ ) and perhaps the quality of the education offered ( $z_e$ ). In places where children are less likely to go to school or stay in school, families have more children. Children who don't go to school are less expensive and available to do more work on the farm.

The cost of contraception, proxied by the average time required to get from the hamlet to the source of contraceptives, has a significant but very small effect on family size, despite taking on average a half an hour to get contraceptives. It suggests this cost is still small compared to the costs of having more children than are wanted. Living in a hamlet where none of the surveyed women have used contraception in the past year (including traditional methods) has a large and significant effect on the household size. In this five per cent of hamlets couples probably lack knowledge of or access to contraception, so they are not able to control their fertility as they would like.

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<sup>6</sup>"Income per adult" is the household income less the wage income of dependents divided by the number of non-dependents.

TABLE 2: CORRELATES OF NUMBER OF DEPENDENTS IN THE HOUSEHOLD

		Dependents	Dependents	Children of Head	Means	Units
$\pi$	Income per adult <sup>a</sup>	-0.0004 0.53	-0.0001 0.09	-0.0007 0.87	2.48	Million dong/year
$w_c$	Children's wage in village	0.025 0.69	-0.000 0.00	0.076 1.98*	0.896	'000 dong/hour
$w_f$	Women's wage in village	0.004 0.08	-0.041 0.89	0.050 1.00	0.876	'000 dong/hour
$p_e$	Average hamlet school fees	-0.0002 0.54	-0.0002 0.79	-0.0003 0.87	101.3	'000 dong/year
$z_w, z_e$	Average hamlet school years	-0.069 3.95**	0.000 0.02	-0.053 2.80**	4.33	years
$p_c$	Time to nearest contraceptives	0.0016 2.11*	0.0004 0.56	0.0024 2.92**	29.0	minutes
$z_w, z_c$	No contraceptives used in hamlet	0.363 3.74**	0.059 0.62	0.332 3.17**	0.050	
	Mothers' years of school	-0.068 10.05**	-0.058 8.80**	-0.065 8.88**	6.80	years
$z_c$	Age of household head	0.119 26.02**	0.115 25.72**	0.135 27.18**	45.7	years
	Age spline > age 40	-0.169 28.33**	-0.162 27.82**	-0.234 36.24**	9.03	years
	Mothers in household	1.106 19.24**	1.017 18.95**		0.836	persons
	Fathers in household	0.888 17.17**	0.827 16.37**		0.733	persons
$z_q$	Household has a business	0.210 5.30**	0.163 4.21**	0.279 6.56**	0.475	
	Land: Irrigated annual crops	0.267 4.69**	0.264 4.76**	0.456 7.47**	0.163	hectares
	Unirrigated annual crops	0.249 5.89**	0.216 5.24**	0.300 6.58**	0.194	hectares
	Perennial crops	0.286 3.25**	0.181 2.10*	0.294 3.10**	0.069	hectares
	Forest	0.036 0.33	0.064 0.60	0.144 1.22	0.024	hectares
	Water surface	-0.050 0.30	-0.120 0.74	0.058 0.32	0.009	hectares
$m$	Men in household (not fathers)	0.038 1.22	0.022 0.74	0.049 1.24	0.442	persons
$f$	Women in household (not mothers)	0.037 1.22	0.040 1.35	-0.063 1.81	0.568	persons
$c$	Dependents (not children of hhold head)			-0.254 9.15**	0.310	persons
$z_u$	Average dependents/hhold in hamlet		0.554 15.25**		2.48	persons
	Ethnic minority	0.119 1.74	0.030 0.47	0.153 2.08*	0.121	
	Rural	0.172 2.66**	0.131 1.97*	0.271 3.89**	0.771	
	Region: Northern mountains	0.241 3.47**	-0.023 0.33	0.313 4.18**	0.145	
	North central	0.378 5.21**	0.181 2.53*	0.385 4.93**	0.107	
	Central coast	0.407 5.71**	0.126 1.75	0.374 4.86**	0.122	
	Central highlands	0.650 4.91**	0.220 1.67	0.674 4.73**	0.031	
	Southeast	0.362 4.27**	0.116 1.37	0.268 2.93**	0.130	
	Mekong Delta	0.237 3.42**	0.003 0.04	0.125 1.67	0.237	
	Constant	-2.920 13.87**	-3.987 18.41**	-2.010 8.94**	1	
	Means of dependent variable	2.47	2.47	2.17		
	Adjusted R <sup>2</sup>	0.50	0.52	0.44		
	Sample size	4192	4192	4192		

Absolute value of  $t$ -statistics are below the coefficients; \*\* significant at 1%; \* significant at 5%

<sup>a</sup> This is the income per capita of non-dependents in the two dependents regressions, and income per capita of non-children of the household head in the third regression. The mean value is for income of non-dependents.

As elsewhere in the world, increasing women's education reduces fertility, probably because education changes the tastes and outlook of women ( $z_u$ ) and improves their ability to control their fertility ( $z_c$ ). The effect is substantial, as big as the effect of children's schooling on household size.

The spline in the age of the household head closely fits the data. The effect of age is a compendium of several factors. The biological production of children inevitably takes time ( $z_c$ ), so any desired family size can only be attained over the course of years. The number of mothers and fathers in the household scales up or down the number of children that can be born in a given time period. The intentional spacing of children as well as the biological constraints determine the birth of children over time. If children are spaced equally over the span of childbearing years, the number of children born will be a linear function of age. Age also captures the changing fertility behavior of successive cohorts. If older couples desired more children than younger couples do, family size will increase even faster with age. In the case of the number of dependents living in the household, the age of the household head is positively correlated with the departure of mature dependents to their own households, as mentioned above. The simple age spline used here cannot distinguish between the different effects of age, but it keeps age effects from confounding the influence of other variables on household size.

Are Vietnamese having large families because their children's labor is valuable? There are several indications of this. The household owning a business is a strong predictor of the number of dependents, suggesting that children are particularly valuable in household enterprises. Children working in family enterprises has become much more common since the free-market reforms in the mid 1980s in Vietnam. The number of dependents increases significantly with the first three measures of agricultural land indicating children are also valuable on the farm. Children don't seem to be so important for cultivation of forest and water products. Additional family members in the household, men and women who are not fathers and mothers, has a weak positive correlation with the number of dependents. This is not the sign expected if adults are substitutes for child labor on the farm and in the family business.

The strong effect of farm land and a family business on family size indicate that the value of child labor is greater to the family than the potential wage the child could earn in the labor market. Hired labor does not provide a good substitute for children's labor, either because there is not enough available at the right times, or because it is different from children's labor. This is despite the fact that 32% of the farm households in the survey hired labor in the previous year. The positive correlation between adult family labor and number of dependents suggests that adult family labor is not a good substitute for children's labor either.

Ethnic minorities and households in rural areas have some tendency to have more children even when other factors have been accounted for, and there is a strong and predictable regional pattern. The excluded region is the Red River Delta including Hanoi,

which has the lowest fertility levels. The largest household sizes are in the Central Highlands, where much of the population is made up of ethnic minorities.

The second regression in Table 2 is distinguished by the inclusion of a measure of average hamlet fertility in the second regression. The results are similar with the following exceptions. Including the average number of dependents in the households of neighbors is meant to capture effect of local social norms or the interdependence of fertility decisions in a community. Fertility is influenced by what is thought to be normal and acceptable by those nearby because of its consequences for social interaction with others. When average hamlet family size is included in the regression, the main consequence is to dominate the other indicators of local characteristics: none of the variables that are village or hamlet averages have much of an effect on household size. In particular the effect of average schooling, the time cost of contraceptives, and no contraceptive use all disappear. Living in one region rather than another have no significant effect on family size except the North Central region if the family size of neighbors is taken into account. In other words, the fertility behavior of the hamlet captures the influence of the locality on the fertility decisions of the family. The influence is dramatic, with families on average having 0.6 more children for every extra child per neighbor in the hamlet. It suggests that the influence of local circumstances, like school attendance and contraceptive availability, does not fall directly on the behavior of the individual household, but puts pressure on the community norms through the marginal responses of households, and the households respond to the changes in the notion of a reasonable family size. This feedback makes it likely that introducing new practices could rapidly change community behavior.

The independent variable in the third regression is the children of the head of household rather than all dependents in the household. The regression looks for differences in the influence of explanatory variables on the household heads' decisions about their *own* children as opposed to other relative's children in the family. The differences might occur for two reasons. The first is that the household head may have a closer relationship with his or her own children which could make the children more valuable for the household. The second is that forming a large extended family may occur because of its economic usefulness. Living jointly with the extended family could be a substitute for having many children of one's own for economic reasons.

The measures of the economic value of children have a stronger effect on the number of the household head's own children than they do on all dependents in the household. The effect of the average children's wage in the village becomes significantly positive for own children, and the family business and farm land effect number of own children more than they do the number of dependents. Household heads seem to get more benefit from their own children than other dependents, perhaps because they have a closer working relationship with their own children on the farm and in the family business.

Non-children dependents ( $\bar{c}$ ) are the only family members to influence the number of own children. This indicates that other dependents are a partial substitute for own

children in family work making the extended family a substitute for having many offspring of one's own. It lends credence to the idea that adult labor is not a good substitute for child labor because other children affect the need for own children, but other adults in the household do not.

There are a number of factors that may be important for explaining fertility that cannot be considered without a complete birth history of the mother. For this, we turn to the fertility history of one randomly chosen woman in each sampled household. This group is limited to ever-married women, and when looking for sex preferences, to women who have had at least one child.

Table 3 presents regressions for the number of children ever born to mothers in order to look at the influence of mother's health, child mortality, and son preference while including most of the correlates of family size from the previous regressions. The first regression is for the sample of mothers with at least one child to assess the effect of the sex of the first born on subsequent childbearing, and the second regression is limited to mothers with at least two children to look at the effect of the sex of the second born.

Mother's health is captured by the dummy variable "Mother ill in last year" which includes illnesses that are likely to have serious health consequences, and persist over time.<sup>7</sup> Although illness is correlated with fewer children in the first regression in Table 3, it is not significantly different from zero. This may be because the illnesses reported over the past year started too recently to affect childbearing.

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<sup>7</sup>The illnesses are malaria, tuberculosis, dengue fever, inflammation of the liver, tetanus, poliomyelitis, bubonic plague, goiter, rheumatism, asthma, encephalitis, diphtheria, leprosy, and injury.

TABLE 3: CORRELATES OF NUMBER OF CHILDREN BORN TO MOTHER (LIVING OR DEAD)

		Mothers with ≥ 1 child	Mothers with ≥ 2 children	Means <sup>a</sup>	Units
$\pi$	Income per adult	-0.0009 1.07	-0.0009 1.12	1.97	Million dong/year
$w_c$	Children's wage in village	0.055 1.11	0.081 1.49	0.878	'000 dong/hour
$w_f$	Women's wage in village	0.044 0.66	-0.022 0.30	0.868	'000 dong/hour
$p_e$	Average hamlet school fees	-0.0005 1.02	-0.0005 0.03	98.6	'000 dong/year
$z_w, z_e$	Average hamlet school years	-0.091 3.65**	-0.101 3.72**	4.23	years
$p_c$	Time to nearest contraceptives	0.0020 1.91	0.0020 1.86	29.3	minutes
$z_w, z_c$	No contraceptives used in hamlet	0.344 2.44*	0.444 3.03**	0.042	
	Mothers' years of school	-0.084 9.78**	-0.082 8.91**	6.82	years
	Mother ill in last year	-0.150 1.70	-0.122 1.32	0.097	
	Death rate of children in family	0.027 12.43**	0.039 14.86**	4.32	deaths/100 children
	First child is a boy	-0.050 0.98	-0.017 0.32	0.520	
	Second child is a boy		-0.149 2.75**	0.543	
$z_c$	Age of mother	0.305 9.73**	0.223 5.45**	32.9	years
	Age of mother squared	-0.0026 5.71**	-0.0015 2.66**	1132.1	years
$z_q$	Household has a business	0.259 4.84**	0.204 3.63**	0.490	
	Land: Irrigated annual crops	0.385 4.68**	0.273 3.36**	0.154	hectares
	Unirrigated annual crops	0.298 4.78**	0.266 4.19**	0.191	hectares
	Perennial crops	0.152 1.33	0.290 2.29*	0.067	hectares
	Forest	0.297 2.40*	0.165 1.41	0.030	hectares
	Water surface	-0.261 0.81	0.924 1.90	0.009	hectares
$m$	Men in household (not fathers)	0.199 3.20**	0.224 3.12**	0.197	persons
$f$	Women in household (not mothers)	-0.078 1.48	0.043 0.72	0.319	persons
$c$	Dependents (not children of hhold head)	-0.194 4.30**	-0.138 2.17*	0.170	persons
$z_u$	Ethnic minority	-0.050 0.54	-0.020 0.21	0.129	
	Rural and region dummies ...	Most significantly different from 0 at the 1% level			
	Means of dependent variable	3.02	3.53		
	Adjusted R <sup>2</sup>	0.47	0.46		
	Sample size	2571	2027		

Absolute value of *t*-statistics are below the coefficients; \*\* significant at 1%; \* significant at 5%

<sup>a</sup> The means, except for "Second child is a boy", are for the sample of women with one or more children.

The effect of mortality on fertility takes several forms. Olsen (1983) identifies three types of response to infant and child mortality: direct replacement, breastfeeding effect, and “hoarding”. The breastfeeding effect is the shortening of the mother’s period of sterility after birth because of the end of breastfeeding when the baby dies. Hoarding refers to couples who decide to have more children in anticipation of possible child deaths. Simple use of the death rate of children in the family can capture the direct replacement and breastfeeding effect, but not the hoarding effect since subsequent mortality has no effect on the *ex ante* anticipation of mortality by the parents. Hoarding behavior should be more prevalent in a high mortality and high fertility environment, since mothers with a large target family size may not have the opportunity to replace dead children before menopause. Note that it is not appropriate to include the number of dead children as a regressor since families with more births will have more deaths because they have more children at risk, whether or not they try to replace children who die. The child death rate in the family has a statistically significant effect on family size, but not one that will have a major impact on future fertility decline. If the death rate halved to 2.15%, the average mother would have only 0.06 children less. In a country like Vietnam that already has a low infant mortality rate for its income level, 41 per 1000 (World Bank, 1995), there is not much room for affecting fertility.

Son preference is a difficult influence to gauge on fertility. For example, if the preference is for a sex balance as well as a minimum of one of the other sex, the stopping patterns of childbearing couples will be difficult to infer. Nevertheless, it is the main means to assess the impact of the need of old age support on fertility decisions. I include a simple indicator of the desire for sons: the effect of the sex of the first or second child on subsequent births. Any measure of sons that depends on their number will be correlated with the total number of children. If, for example, each family requires exactly one son, bearing a son as the first child will result in a smaller family. If the parents require exactly two sons, then bearing a son as the first child will also result in a smaller family.

In the two regressions, a male first child has a negative but insignificant effect on family size. A male second child has a negative significant effect. It is difficult to see what pattern of sex preference would cause the sex of the second child to affect total fertility, but not the sex of the first. In any case, the overall effect is small and difficult to influence through policy.<sup>8</sup> Having a male second child reduces the average family size by less than the effect of giving up a family business. Houghton and Houghton (1994, p. 32), after an exhaustive battery of tests for son preference using the same VLSS sample conclude “[i]n the end it is economic and other variables which dominate fertility decisions, and not son preference.”

The relative effect of certain variables on household size is considered in Table 4. The variables are either halved or doubled to see the predicted effect on the number of

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<sup>8</sup>China, with characteristic thoroughness, is considering replacing the patriarchal Chinese family name system with a matriarchal system from the distant past as a way of reducing the desire for sons (Vietnam News, May 24, 1995, p. 4b from Reuters).

dependents per household using the predicted coefficients in the first regression in Table 2. Changes of this size are unlikely in the short term and the predictions of their effect should not be treated as accurate, but the table illustrates the relative magnitude of changing different variables.

Vietnam's current population policy is to intensify its provision of contraception and system of home visits by family planning workers, so all the changes are compared to a halving of the time it takes to get to the nearest family planning clinic. This represents both lower costs of obtaining contraception and greater information and attention from family planning workers, perhaps requiring a doubling of material and human resources for the family planning program. Many of the variables have a predicted impact on family size that is many times greater than this reduction in the time costs of contraception. Simply halving the number of villages with no contraception use from five per cent to 2.5 per cent has a predicted impact of more than a third of improving the general access to family planning clinics. The really big predicted effects come from schooling, though. Since doubling average years of schooling completed would both affect families directly in their fertility decisions and double the schooling of future mothers, this has a combined effect 33 times that of halving the time to contraception access, reducing average fertility by three-quarters of a child.

TABLE 4: PREDICTED EFFECT ON HOUSEHOLD SIZE OF HALVING OR DOUBLING SELECTED VARIABLES

Variable	----- Change -----		Predicted change in dependents /household	Ratio to first row
Time to nearest contraceptives	halve	-14.5 minutes	-0.023	1.00
No contraceptives used in hamlet	halve	-2.5 %	-0.009	0.39
Income per adult	double	2.48 Million dong/year	-0.001	0.04
Children's wage in village	halve	-0.449 '000 dong/hour	-0.011	0.48
Average hamlet school fees	double	101.3 '000 dong/year	-0.020	0.86
Average hamlet school years	double	4.33 years	-0.298	12.96
Mothers' years of school	double	6.80 years	-0.462	20.09
Household has a business	halve	-23.7 %	-0.049	2.13
Rural	halve	-38.5 %	-0.066	2.87
Land <sup>a</sup>	halve	-0.221 hectares	-0.079	3.43

<sup>a</sup> Each of the five kinds of farm land is halved.

## Conclusion

There are strong economic motives for having children in Vietnam. Children's wages, household business activity, and farm land owned, and little schooling are all strongly correlated with many children. Other factors, such as child mortality, mother's health, and son preference also affect family size, but the magnitude of the effect is small. The effect of the time required to obtain contraceptives is small despite an average required time of half an hour. The effect of no one in the village using contraception (probably because it is not readily available) is significant though, both statistically and in magnitude. For the villages where this occurs (five per cent of the VLSS sample), providing family planning services could have a beneficial impact, though this is a small part of the Vietnamese population. The really big changes in family size come from raising education levels, both because it makes children expensive and unavailable for other work, and because it increases the education of mothers in the next generation.

Since economic conditions are often more easily influenced by government policy than many other factors affecting couples' childbearing decisions, future reductions in Vietnam's population growth may be most effectively addressed by trying to change the economic benefits of children. For example, it may be more effective to try to promote rural school attendance while trying to limit the labor market participation of children. Vietnam's focus on contraception delivery to influence population growth could be complemented by policies which affect economic motives for having children.

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