The Effect of Having Children on Women's Marital Status: Evidence from Vietnam

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Abstract

In many developing societies, women living without a husband can face significant social stigma and economic hardship. Previous evidence suggests that teenagers in poor countries are willing to get pregnant in hopes to get married with the fathers. In this paper, we study the relationship between having children and women marriage outcomes more generally. Using Vietnam Census data and employing twins as an instrument, we find that having more children indeed reduces the probability of staying unmarried. Further, more children also help reducing divorce risk but only for women with better education. This effect is reversed for women with low education, implying the toll of raising children on their marriage. Intriguingly, more children also reduce the widow status reported, perhaps suggesting that children also increase the likelihood of getting remarried for widows.

JEL Classification: J12, J13, I12.

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I. Introduction

In a poor country such as Niger or Afghanistan today, a woman on average has more than seven children, while in wealthy countries such as Singapore or Germany it is well under 1.5 (UN 2013). This stark difference has serious implications for investment in children, women well-being and persistent poverty in the developing world. A number of studies have tried to understand why families in developing countries tend to have so many children, even after the decline of child mortality and improvement of living standards. Proposed answers include lack of women autonomy (Abadian 1996), women education (Angeles et al 2005, Kim 2010), female employment opportunities outside home (Murthi et al 1995, Dasgupta 1995), access to contraceptive methods (Birdsall 1988, Sinha 2005, McKelvey et al 2012), health programs (Lucas 2013), old age security for parents (Nugent 1985, Hoddinott 1992), child labor demand (Levy 1985, Baland and Robinson 2000) and norms for large family (Caldwell and Caldwell 1990, Friedlander et al 1991).

A recent study by Duflo, Dupas and Kremer (2012) points to another cause of having children among adolescent girls: to get a husband. They show that teenagers in Kenya are willing to have unprotected sex with older men due to a belief that having children makes the fathers more obliged to marry them. This evidence is supported by several theories. For example, Koo and Suchindran (1980) argue that women with children have a stronger motivation to marry to reduce the burden of raising children. They will gain more from remarriage than women without children. Becker et al. (1977) also postulate that women who become pregnant accidentally before marriage may be more motivated to get married since they want to "legitimize" their children.

While such behavior is found among adolescent girls in Duflo, Dupas and Kremer (2012), it leads to a number of questions about the relationship between having children and marriage in general. For example, does having children help women of other ages to secure marriage? After getting married, do children still help reducing divorce risk? How does women education affect this relationship? Does this relationship hold in contexts beyond Kenya and Africa? Our paper is an attempt to address these questions. Using data from the Vietnamese Population Census, we estimate the effect of the number of children of a women on her marital status, i.e. whether she is married, divorced or widowed.

Currently, social science theories do not provide a clear prediction for the effect of children on marriage. In economics, the Becker framework (Becker, 1974, Becker et al. 1977) views children as marital-specific investments that may increase each parent' utility if they are married. Without the cooperation of a marriage, parents tend to spend less time and money on the children. In addition, parents who do not stay with the children tend also to receive less benefit from their children's consumption and invest less in children. As a result, children may increase the probability that parents get married and reduce the risk of divorce afterwards. Some sociologists also argue for a negative relationship between children and parental divorce. Parents can choose to postpone divorce when they are aware of the adverse impact of divorce on their children's development (Levinger, 1965; Thornton, 1977). Children also increase happiness and marital satisfaction for parents (Thornton, 1977). Through raising children, parents share common financial, emotional, and other activities, and as a result ties between parents are strengthened (Morgan et al., 1988; Waite and Lillard, 1991).

However, several theories point out that the presence of children may decrease available time and income of couples and therefore reduce marital probability and stability (Waite and Lillard, 1991). Children can interfere with the marital activities of parents and reduce the happiness and satisfaction of parents (Glenn and McLanahan, 1982). Children can be a major source of stress for parents (Aneshensel, 1992; Crnic and Acevedo 1995) and can increase marital dissolution risk (Thornton, 1977). Further, parents not only perceive utility from the number of children but also from children's quality. An increase in number of children might reduce child's quality which might reduce the value of marriage. A reason for the disagreement of these theories on the relationship between children and divorce is the many complicated channels through which children can affect the marital well-being of their parents. Children can influence many aspects of a family including income, consumption, leisure, and other economic and social activities, and these aspects can affect the probability of marriage and divorce. For example, children can put stress on their family's income, which increases the probability that parents may choose to migrate or work far from home to meet their economic needs.[4] Geographical distance between spouses can increase the risk of marital instability.

The current empirical evidence is not consistent in regard to the effect of children on marital outcomes of parents. A negative correlation between the presence of children and parental divorce are found in many studies such as Renne (1970), Becker et al., (1977), Waite et al. (1986), Lillard and Waite (1993), Berrington and Diamond (1999). Other studies find the opposite effect. For example, Thornton (1977) and Clarke and Berrington (1999) finds a U-shaped relationship between the number of children and the risk of parental divorce. Couples with a large number of children are more likely to end their marriage than those with a low number of children. No effects of the number of children on marital stability are documented in Jensen and Smith (1990). One difficulty in estimating the causal effect of children on the probability of divorce is the endogeneity of children in the equation of marital dissolution. Couples who expect low gains from marriage or high probability of divorce are more likely to avoid having children (Becker et al., 1977). In addition, there are possible unobserved variables that affect both children and the divorce risk. For example, parents who prefer children tend to have more children and at the same time try to maintain marriage to avoid the harmful effects of divorce on their children.

To tackle this endogeneity problem, our paper uses the presence of multiple births as an instrument to estimate the effect of the number of children on mothers' marital status. The multiple-birth approach was first employed by Rosenzweig and Wolpin (1980) to estimate the impact of children on women's labor supply in the US. Using a similar approach, Duflo studies the impact on child mortality in Indonesia. Cáceres-Delpiano (2006) studies private schooling and mother's career in the US. Black, Devereux, and Salvanes (2005) study family earnings and children education in Norway. Rosenzweig and Zhang (2009) study schooling progress, grades in school and health of children in China. Angrist, Lavy and Schlosser (2010) study a wide range of child outcomes in Israel. Most recently, Cáceres-Delpiano (2012) estimate the impact on children on family outcomes in 43 developing countries and find that children reduce women's likelihood of being married or having a spouse living at home.

Vietnam is an interesting case to look at for several reasons. First, Vietnam has historically been a traditional society with one of the lowest divorce rates in the world. Like other developing countries, the recent period of urbanization and economic development has

brought sweeping changes to its social and family structures. The divorce rate in Vietnam, for example, has tripled from 1989 to 2006.[5] Second, besides the rising divorce rate (Lam and Mai, 2008), Vietnam also has an increasing proportion of unmarried women who have children. Although there have been no quantitative studies on the effect of unmarried status of women, mass media often claim the adverse effects of unmarried status on economic well-being and psychology of both women and children in Vietnam - a developing country with Asian culture (e.g., Hoang, 2012; Vu, 2013). Third, Vietnam is a country with a high population growth rate. The population increased by from 76 million to 86 million people during the period from 1999 to 2009 (Cam, 2009). These conditions provide an relevant setting to study the effect of children on marital status of women in a developing society, with implication for population growth.

Our analysis yields three results. First, we find that having more children reduces the probability of women staying unmarried. This result extends the pattern that Duflo, Dupas and Kremer (2012) found among Kenyan adolescents to the whole population of women in a different culture. Second, after getting married, having more children seems to help women with better education to maintain their marriage. For women with lower education, having more children actually increases the divorce rate. This heterogeneous effect point to the cost and benefit of having children, which vary across different families. Third, having more children reduce the probability of the mother being widowed. One interpretation is that children increase fathers' mortality. Another interpretation is that widows with more children are more likely to get remarried. We think the latter is more likely.

The paper is organized into five sections, this first section being the introduction. The second section describes data from the 2009 Population and Housing Census which is used in this study. This section also presents the descriptive statistics of fertility and marital status of women in Vietnam. The third section presents the estimation method. Next the fourth section presents empirical findings on the impact of the number and gender of children on the marital status of women. Finally, conclusions are presented in the fifth section.

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II. Data set and descriptive analysis

B. The 15-percent sample of the Population and Housing Census (PHC) of Vietnam in 2009

The main data used in this study are from the 15-percent sample of the Population and Housing Census (PHC) of Vietnam in 2009 (abbreviated as the 2009 VPHC in this paper). The census was conducted by the General Statistics Office (GSO) of Vietnam in April 2009. Technical support on the design of the sample, census instruments such as questionnaires, and data collection monitoring were provided by the United Nations Population Fund (UNFPA).

In 2009, there are 684 districts in Vietnam. Each district is divided into enumeration areas, which are communes hamlets (or villages) in rural areas and wards in urban areas. Depending on the population size of a district and the average population of the numeration areas in this district, a number of numeration areas were randomly selected for the 2009 VPHC. All of the households in the selected numeration areas were surveyed. The 15-percent sample is designed so that data can be representative at the district level. The sample size is 3,692,042 households with 14,177,590 individuals.

The 15-percent sample of the 2009 PHC contains data on characteristics of individuals including basic demographics (month and year of birth, and gender), education, employment. The 2009 PHC also contains information on households including durable ownership and housing.

This study limits the analysis of the sample to women who have at least one child since we are examining the effect of the number of children on women's marital statuses. In the 2009 VPHC, women from ages 15 to 49 were asked about their total number of biological children. There are both questions on month and year of birth of all individuals. We define twin or multiple children as those who have the same month and year of birth. We noted this issues the revised paper. The number of women used this study is 2,101,703.

B. Children and the Marital Status of Women in Vietnam

Vietnam is a country with a high rate of population growth. The average annual growth rate was around 1.2 percent during the period 1999-2009 (GSO, 2010). The population increased from 76 million in 1999 to nearly 86 million in 2009. Limited knowledge of family planning and the societal preference for male children are among the possible explanations for the high growth of population in Vietnam. In our sample of women aged from 15 to 49, around 30 percent have one child, 46 percent have two children, 16 percent have three children, and the remaining 8 percent have more than three children. The average number of children per woman is 2.04. Ethnic minority women tend to have more children than Kinh women (Table A.2 in Appendix).[6] The education level of women is negatively correlated with the number of children they have.

The divorce rate in Vietnam is relatively low compared with other countries (United Nations, 2006). However, the divorce rate has been increasing in Vietnam (Lam and Mai, 2008). Table 1 presents the distribution of women from 15 to 49 years old by marital status and the number and gender of their children. Among the sample of women who have at least one child, 0.3 percent are not married (unmarried women are those who have never been married), 94.5 percent are married and living with their husband, 3.4 percent are widowed, 1.3 percent and 0.5 percent are divorced and separated, respectively. Women with less children, especially with only one child are more likely to be unmarried, divorced or separated than women with more children.

Our analysis of Vietnam Census data suggests that the number of children increases the likelihood that their fathers stay away from home to work.

[6] In Vietnam, there are 54 ethnic groups. Kinh (Vietnamese) is the major group which account for around 85 percent of the population. Compared with other ethnic minorities, Kinh people tend to live in delta and have higher living standards.

III. Estimation Method

To measure the effect of the number of children on their mothers' marital status, we use the following simple model:

$$Y_i = \alpha + X_i\beta + C_i\gamma + \varepsilon_i, \quad (1)$$

In this model, Y_i is a categorical variable of the marital status of woman i (unmarried, divorced and separated, or widowed), X_i is a vector of control variables, C_i is the number of children of woman i.

The control variables include the age, ethnicity, and education of women, and regional dummies. We choose these control variables because they tend to be exogenous and not affected by the number or gender of children (Heckman et al., 1999; Angrist and Pischke, 2008). The summary statistics of variables are presented in Table A.1 in the Appendix.

There are two problems in this estimating model. The first problem is the endogeneity of the number of children. For example, women who pay more attention to the quality of life of their children might be less likely to have many children and be divorced. The endogeneity can also arise because of reverse causality: divorced and single women are less likely to have children than married ones.Although randomization of a treatment would be the most valid method to measure the effect of the treatment, it is impossible to conduct a randomization of the number of children. In this study, we use instrumental variable regression to measure the effect of the number of children. Finding valid instruments that cause the treatment but not outcomes is always challenging. In empirical studies on the effect of children or family size, twins are often used as the exogenous instrument for the number of children (e.g., Rosenzweig and Wolpin 1980; Schultz, 2005; Cáceres-Delpiano 2005; Black et al. 2005; Angrist et al. 2010). In our study, we use the presence of first-born twins as the instrument for the number of children of women. In our study, the term 'twins' includes all children of multiple births such as triplets and so on. We define twin children as those who have the same month and year of birth. In the 2009 VHPC, there are both questions on month and year of birth of all individuals. Having twins is almost random. Although fertility techniques such as artificial insemination and in-vitro maturation can lead to the presence of twins, these techniques are expensive and not popular in Vietnam.

The second problem is the difficulty in estimating a model of a multiple response dependent variable with endogenous regressors (Wooldridge, 2007). Since women's choice of marital status is a categorical variable, a multinomial response model such as a multinomial logit model would be most appropriate. However, there are no available estimators for a multinomial response model with discontinuous endogenous regressors.[7] Even nonlinear estimators for a binary response model with discontinuous endogenous regressors are not available.[8] Instead, 2SLS is widely used for models of a binary dependent variable with discontinuous endogenous regressors (e.g., see Angrist 2001; Angrist and Krueger 2001; Cáceres-Delpiano 2005; Angrist et al. 2010). Therefore, in this study we estimate the effect of the number of children on women's marital status by a series of 2SLS linear probability models. The first stage is linear regressions in which the dependent variable is the number of children, and the explanatory variables are the instrumental variable and control variables *X*. In the second stage, we estimate linear probability models as the equation (1) in which the dummy dependent variables are the statuses 'divorced or separated', 'unmarried', and 'widowed'. We combine the divorced and separated in one category and label it as divorced.

IV. The Impact of Children on the Marital Status of Women

A. The Impact of Children on Unmarried Status of Woman

As mentioned in the introduction section, having children can encourage women to get married, either to reduce the cost of children Koo and Suchindran (1980) or to "legitimize" their children (Becker et al., 1977). We test this hypothesis in Vietnam by running 2SLS regressions of the unmarried status of women on their children.

The first-stage regressions of the number of children are reported in Table A.2 in the Appendix. The effects of instrumental variables on endogenous variables are strongly significant. Having twins increases the number of children The Cragg-Donald weak

[7] If the endogenous variable in a multinomial response model is continuous, one can use the control function approach of Rivers and Vuong (1988). However, in our case, the endogenous variables are the number of children and the presence of at least one boy, which are not continuous.

[8] There are maximum likelihood and control function estimators available for a binary response model with continuous endogenous regressors.

identification test of the instruments produces a very high statistic, indicating that the instruments are very strong.[9]

In Table 2, we present the models with and without control variables. Both OLS and 2SLS regressions with and without control variables show that the number of children reduces the probability of being unmarried in Vietnam. This implies that having more children helps women increase the probability of getting married. This evidence is similar to those found in Kenya by Duflo, Dupas and Kremer (2012). The point estimates of the effect of children on women's unmarried status in the 2SLS regressions are lower than those in the OLS regressions, but they are not statistically different. The point estimates of the effect of children in the 2SLS regressions with and without control variables are -0.0021 and -0.0017, respectively. These estimated effects are large since the proportion of women with unmarried status is around 0.32%.

The last two columns of Table 2 presents the reduced-form regressions of the unmarried status on the presence of first-born twins. Having twins reduces the probability of being unmarried. It implies having twins can increase the probability of getting married for women.

Table 2 also reveals the association between unmarried status and other explanatory variables. Older women are more likely to be unmarried than young women. Put differently, they find it difficult to get married. Women with more education are less likely to unmarried. Kinh women, who are concentrated in delta and urban areas, tend to be unmarried than ethnic minority women, who mainly live in rural mountain and highland areas.

In Table 3, we examine the effect of children on unmarried status of women in the samples of women with two or more children, and three or more children, and the instrument for the number of children in these sample are the presence of second-born twins and third-born twins, respectively. The estimates have the negative sign, but are not statistically significant. Possibly, the marginal effect of having an additional child decrease. The number of observations in these samples is also small, especially the number of unmarried women and the number of unmarried women having twin children.

[9] As a rule of thumb, if a F- statistic is under 10, the instruments might be weak (Staiger and Stock 1997).

In Table 4, interactions between the number of children and age, education and ethnicity of women are included to examine the heterogeneous effect across demographic variables of women. Instrumental variables for the interactions between 'the number of children' and an explanatory variable such as age and education of women are interactions between the presence of twins (first-born, second-born or third-born depending on the samples) with the explanatory variable. The first-stage of the 2SLS regressions with interactions is presented in Table A.5 in Appendix. Table 4 shows that these interactions are not significant, suggesting that the effect of children on the probability of being unmarried does not differ largely across the demographic characteristics of women.

B. The Impact of Children on Divorce of Woman

This section presents estimation of the effect of children on women's probability of divorce. It should be noted that divorced and separated women are combined into the 'divorced' group since they both reflect marital dissolution.[10] Table 5 presents the linear probability regressions of women's divorce on their number of children using the sample of women with at least a child. Although the OLS regressions presents a negative association between the number of children and women's divorces, the 2SLS regressions shows no statistically significant effects of the number of children on women's divorces. The point estimates from the 2SLS regressions are also negative but remarkably lower the point estimates from the OLS regressions. The last two columns of Table 2 presents the reduced-form regressions of divorce on the presence of first-born twins. Having twins does not significant affect the divorce of women.

Table 5 presents the association between divorce and other explanatory variables. Older women tend to be divorced more often than young women.[12] This finding seems to contradict the prediction by theory that the risk of divorce decreases as the duration of marriage increases (Becker et al., 1977). One possible explanation is that younger women are

[10] We tried to estimate the effect of children on the probability of divorce and the probability of separation, and the effect on divorce is very similar to the effect on separation.
[12] We tried the age and age squared in the regressions, but the age squared is not statistically significant.

more likely to remarry after divorce than older women. In our data set, we do not know how many times a woman has been divorced or married.

In both theories and empirical findings, the effect of women's education on the likelihood of becoming divorced is ambiguous (e.g., Becker et al., 1977; Clarke and Berrington, 1999). In this study, education is negatively associated with the probability of divorce (education can be endogenous). Women with higher education are more likely to marry with men of higher education. Couples with more education can have better labor division within the family and reduce the divorce risk (Becker, 1977). Women in ethnic minorities are less likely to be divorced. This may be because people in these areas have more traditional attitudes about divorce. Divorce is traditionally considered to be undesirable, and the cost of divorce for ethnic minority people is higher than that for Kinh (Vietnamese) people.

Table 5 examines whether the effect of children on women's divorce rates varies across several characteristics by including interactions between the total number of children, the age and education of women, and ethnic minority dummy.

We do not find a heterogeneous effect of the number of children on women's probability of divorce across age and ethnicity of women. Regarding education, we find that the effect of the number of children on women's divorce varies across education of women. Having more children can cause women with low education be more likely to get divorced, but can cause women with high education be less likely to get divorced. However, this finding should be interpreted with caution, since education can be endogenous and as a result instrument for the interaction between children and women's education, i.e., the interaction between the presence of twins and education, might not satisfy the exclusion condition.

In Table 6, we examine the effect of children on divorce of women in the samples of women with two or more children, and three or more children. We find that having more children can cause women less divorced in the sample of women with at least two children. However, the sample of women with at least three children, there is no statistically significant effect of the number of children on women's divorce.

C. The Impact of Children on Widowed Status of Woman

In addition to the risk of unmarried and divorced statuses, we also examine the effect of children on the probability of the 'widowed' status for women. Having children can increase stress for parents, thereby causing health problems for them (Aneshensel, 1992; Crnic and Acevedo 1995). However, whether the cost of children is so high that it can increase the probability of death for parents is not clear. In the 2009 VHPC, there are no data on expected ages to test this hypothesis. Instead, we interpret the effect of children on the 'widowed' status as an indication of the effect on re-marriage of widowed women.

As mentioned, women with children are more motivated to get married to reduce the burden of raising children. However, Becker (1974) and Becker et al. (1977) argue that children from previous marriages will increase the cost of the new marriage and can decrease the probability of remarriage. Women who are widowed but have children are less likely to remarry. Thus, children may increase the probability of 'widowed' statuses in a sense that children reduce the probability of remarriage of women after their husband died.

Tables 7 and 8 present the effect of the number of children on widowhood. In the sample of women with at least one child and at least two children, there are no statistically significant effects of children on women's widowhood. However, in the sample of women with at least three children, having more children reduce the probability of being widowed. This implies that having children would increase the probability of widowed women to get re-marriage.

Finally, Tables 7 and 8 also shows several interesting findings on other characteristics associated with the probability of being widowed. Older women are more likely to be unmarried and widowed, probably because it is harder for them to remarry. Education helps women increase the probability of remarriage, thereby reducing the risk of being widowed. Kinh women are less likely to be widowed than ethnic minority women, possibly because the expected age of Kinh is higher than that of ethnic minorities or Kinh women have more chance to get re-marriage than ethnic minority women.

V. Conclusions

Having children and being married are two important parts of the family life of almost every women. This is particularly true in developing societies where there are social and economic conditions against women who live without a husband or children. Our paper studies the relationship between these two parts, conceivably with some implications for population growth. If having more children leads to a higher likelihood of being married then this will motivate (at least some) women to have more children, suggesting a new cause for population growth. Our first result supports this view: we find that having more children reduces the probability of staying unmarried or widowed for women in Vietnam. In this case, programs supporting unmarried and widowed women may reduce the incentive to have children among these women. The free uniform program to keep girls at school in Kenya is a good example for such programs. However, such intervention may not travel well to divorced women, as our second result suggests. We only find a negative effect of having children on divorce for women with better education, who are in less need for support programs. Among women with lower education, children in fact increase their divorce risk. If women in such condition are aware of this risk themselves, they have less incentive to have children, indicating that an intervention is less mandatory.

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List of Tables

Table 1: Women by marital status and the number of children

The number of children	Marital status of women					
	Unmarried	Married	Widowed	Divorced	Separated	Total
1	0.87	91.15	4.43	2.70	0.86	100
	(0.02)	(0.05)	(0.04)	(0.03)	(0.02)	
2	0.10	95.98	2.74	0.84	0.35	100
	(0.00)	(0.03)	(0.02)	(0.01)	(0.01)	
3	0.04	95.98	3.15	0.57	0.26	100
	(0.00)	(0.04)	(0.04)	(0.02)	(0.01)	
4	0.02	95.75	3.55	0.41	0.27	100
	(0.00)	(0.08)	(0.07)	(0.03)	(0.02)	
5 and above	0.01	95.81	3.73	0.22	0.24	100
	(0.00)	(0.12)	(0.11)	(0.03)	(0.03)	
Total	0.32	94.49	3.37	1.33	0.48	100
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	

Standard errors of means in parentheses.
Source: Authors' estimation from the 2009 PHC.

Table 2. Regressions of 'unmarried': the sample of women with one or more children

Explanatory variables	Dependent variable is being unmarried (yes=1, no=0)					
	OLS	OLS	2SLS	2SLS	OLS	OLS
The number of children	-0.00284***	-0.00408***	-0.00209*	-0.00168*		
	(0.00004)	(0.00006)	(0.00108)	(0.00100)		
Age		0.00030***		0.00024***		0.00019***
		(0.00001)		(0.00003)		(0.00001)
Completed education grade		-0.00061***		-0.00043***		-0.00031***
		(0.00001)		(0.00007)		(0.00001)
Kinh majority		0.00228***		0.00274***		0.00306***
		(0.00014)		(0.00024)		(0.00014)
Northern Mountain	Based					
	Omitted					
Red River Delta		-0.00068***		-0.00096***		-0.00115***
		(0.00017)		(0.00020)		(0.00017)
Central Coast		0.00104***		0.00042		-0.00001
		(0.00016)		(0.00030)		(0.00016)
Central Highlands		-0.00216***		-0.00312***		-0.00380***
		(0.00013)		(0.00042)		(0.00014)
South East		-0.00523***		-0.00531***		-0.00536***
		(0.00014)		(0.00015)		(0.00015)
Mekong River Delta		-0.00691***		-0.00660***		-0.00639***
		(0.00015)		(0.00019)		(0.00014)
Having first-born twin children					-0.00101*	-0.00087*
					(0.00052)	(0.00052)
Constant	0.00918***	0.00501***	0.00762***	0.00122	0.00333***	-0.00143***
	(0.00012)	(0.00021)	(0.00222)	(0.00159)	(0.00004)	(0.00020)
Observations	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703
R-squared	0.002	0.007	0.002	0.005	0.000	0.002

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of firstborn twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table 3. Regressions of 'unmarried': the sample of women with two/three or more children

Explanatory variables	Dependent variable is being unmarried (yes=1, no=0)					
	Sample of women with two or more children			Sample of women with three or more children		
	OLS	2SLS	OLS	OLS	2SLS	OLS
The number of children	-0.00065***	-0.00033		-0.00020***	-0.00001	
	(0.00003)	(0.00034)		(0.00003)	(0.00045)	
Age	0.00007***	0.00006***	0.00005***	0.00002***	0.00002	0.00002***
	(0.00000)	(0.00001)	(0.00000)	(0.00000)	(0.00001)	(0.00000)
Completed education grade	-0.00013***	-0.00011***	-0.00009***	-0.00004***	-0.00002	-0.00002**
	(0.00001)	(0.00002)	(0.00001)	(0.00001)	(0.00003)	(0.00001)
Kinh majority	0.00066***	0.00072***	0.00079***	0.00011	0.00015	0.00015*
	(0.00008)	(0.00011)	(0.00008)	(0.00009)	(0.00014)	(0.00009)
Northern Mountain	Based					
	Omitted					
Red River Delta	-0.00036***	-0.00039***	-0.00041***	-0.00008	-0.00009	-0.00009
	(0.00009)	(0.00009)	(0.00009)	(0.00009)	(0.00009)	(0.00009)
Central Coast	0.00069***	0.00061***	0.00053***	0.00042***	0.00039***	0.00039***
	(0.00009)	(0.00012)	(0.00009)	(0.00010)	(0.00012)	(0.00010)
Central Highlands	-0.00051***	-0.00064***	-0.00078***	-0.00017***	-0.00024	-0.00024***
	(0.00007)	(0.00016)	(0.00008)	(0.00006)	(0.00017)	(0.00006)
South East	-0.00097***	-0.00100***	-0.00103***	-0.00019**	-0.00021**	-0.00021**
	(0.00009)	(0.00009)	(0.00009)	(0.00010)	(0.00011)	(0.00010)
Mekong River Delta	-0.00143***	-0.00141***	-0.00139***	-0.00036***	-0.00035***	-0.00035***
	(0.00008)	(0.00008)	(0.00008)	(0.00009)	(0.00009)	(0.00009)
Having second-born twin children			-0.00027			
			(0.00027)			
Having third-born twin children						-0.00001
						(0.00036)
Constant	0.00065***	0.00004	-0.00058***	0.00032**	-0.00022	-0.00024
	(0.00013)	(0.00066)	(0.00013)	(0.00016)	(0.00128)	(0.00016)
Observations	1,475,224	1,475,224	1,475,224	506,384	506,384	506,384
R-squared	0.001	0.001	0.001	0.000	0.000	0.000

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of second-born twins or third-born twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table 4. 2SLS regressions of marital statuses of women with interactions: sample of women with one or more children

Explanatory variables	Dependent variable is being unmarried (yes=1, no=0)			Dependent variable is being divorced (yes=1, no=0)			Dependent variable is being widowed (yes=1, no=0)		
The number of children	-0.00380**	-0.00381	-0.00239	0.00229	-0.01258	0.02192***	0.00053	0.01098	-0.00903
	(0.00151)	(0.00434)	(0.00247)	(0.00627)	(0.01060)	(0.00805)	(0.01010)	(0.01520)	(0.00953)
Kinh * The number of children	0.00253			-0.00366			-0.00324		
	(0.00193)			(0.00703)			(0.01099)		
Age * The number of children		0.00006			0.00033			-0.00037	
		(0.00014)			(0.00033)			(0.00049)	
Completed education grade * The number of children			0.00009			-0.00302***			0.00091
			(0.00027)			(0.00089)			(0.00105)
Age	0.00025***	0.00012	0.00024***	0.00083***	0.00023	0.00072***	0.00323***	0.00394***	0.00328***
	(0.00003)	(0.00029)	(0.00003)	(0.00008)	(0.00066)	(0.00010)	(0.00013)	(0.00099)	(0.00013)
Completed education grade	-0.00049***	-0.00043***	-0.00063	0.00000	-0.00005	0.00627***	-0.00209***	-0.00219***	-0.00407*
	(0.00007)	(0.00008)	(0.00059)	(0.00024)	(0.00021)	(0.00195)	(0.00037)	(0.00030)	(0.00229)
Kinh majority	-0.00296	0.00279***	0.00254***	0.01459	0.00661***	0.01259***	0.01055	0.00292***	0.00135
	(0.00428)	(0.00033)	(0.00065)	(0.01584)	(0.00076)	(0.00211)	(0.02486)	(0.00112)	(0.00249)
Northern Mountain	Based			Omitted					
	Omitted								
Red River Delta	-0.00077***	-0.00096***	-0.00095***	-0.00604***	-0.00579***	-0.00591***	-0.00075	-0.00046	-0.00046
	(0.00022)	(0.00021)	(0.00020)	(0.00068)	(0.00047)	(0.00047)	(0.00105)	(0.00064)	(0.00063)
Central Coast	0.00042	0.00035	0.00042	-0.00591***	-0.00634***	-0.00580***	0.00783***	0.00830***	0.00779***
	(0.00030)	(0.00043)	(0.00030)	(0.00075)	(0.00102)	(0.00074)	(0.00103)	(0.00150)	(0.00102)
Central Highlands	-0.00271***	-0.00323***	-0.00303***	-0.00218	-0.00216	-0.00442***	0.00555**	0.00673***	0.00694***
	(0.00042)	(0.00062)	(0.00054)	(0.00155)	(0.00152)	(0.00163)	(0.00245)	(0.00222)	(0.00205)
South East	-0.00522***	-0.00538***	-0.00531***	0.00721***	0.00692***	0.00739***	-0.00237***	-0.00180**	-0.00228***
	(0.00015)	(0.00025)	(0.00015)	(0.00052)	(0.00065)	(0.00046)	(0.00066)	(0.00088)	(0.00054)
Mekong River Delta	-0.00664***	-0.00665***	-0.00666***	-0.00352***	-0.00381***	-0.00178**	-0.01323***	-0.01302***	-0.01382***
	(0.00019)	(0.00017)	(0.00027)	(0.00050)	(0.00046)	(0.00081)	(0.00068)	(0.00057)	(0.00098)
Constant	0.00596*	0.00505	0.00283	-0.02070	0.00740	-0.06527***	-0.07091***	-0.08852***	-0.04931**
	(0.00332)	(0.00795)	(0.00522)	(0.01353)	(0.01929)	(0.01715)	(0.02173)	(0.02780)	(0.02018)
Observations	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703
R-squared	0.005	0.005	0.005	0.004	0.003	-0.010	0.021	0.022	0.022

Note: This table reports 2SLS estimations of the effect of 'the number of children' on women's marital statuses using the sample of women with one or more children. The instrumental variable is 'the presence of first born twins'. Instrumental variables for interactions between 'the number of children' and an explanatory variable such as age and education of women are interactions between the presence of twins with the explanatory variable.
Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Authors' estimation from the 2009 PHC.

Table 5. Regressions of 'divorced': the sample of women with one or more children

Explanatory variables	Dependent variable is being divorced (yes=1, no=0)					
	OLS	OLS	2SLS	2SLS	OLS	OLS
The number of children	-0.00888***	-0.01162***	-0.00017	-0.00078		
	(0.00008)	(0.00010)	(0.00290)	(0.00268)		
Age		0.00117***		0.00085***		0.00083***
		(0.00001)		(0.00008)		(0.00001)
Completed education grade		-0.00087***		-0.00008		-0.00002
		(0.00003)		(0.00020)		(0.00003)
Kinh majority		0.00424***		0.00633***		0.00648***
		(0.00028)		(0.00059)		(0.00028)
Northern Mountain	Based					
	Omitted					
Red River Delta		-0.00450***		-0.00576***		-0.00585***
		(0.00033)		(0.00045)		(0.00033)
Central Coast		-0.00314***		-0.00592***		-0.00612***
		(0.00029)		(0.00074)		(0.00029)
Central Highlands		0.00279***		-0.00158		-0.00189***
		(0.00037)		(0.00114)		(0.00036)
South East		0.00771***		0.00733***		0.00731***
		(0.00045)		(0.00046)		(0.00045)
Mekong River Delta		-0.00498***		-0.00358***		-0.00348***
		(0.00035)		(0.00049)		(0.00035)
Having first-born twin children					-0.00008	-0.00041
					(0.00140)	(0.00140)
Constant	0.03543***	0.00329***	0.01750***	-0.01384***	0.01715***	-0.01507***
	(0.00023)	(0.00045)	(0.00598)	(0.00426)	(0.00009)	(0.00044)
Observations	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703
R-squared	0.005	0.010	0.000	0.005	0.000	0.004

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of firstborn twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table 6. Regressions of 'divorced': the sample of women with two/three or more children

Explanatory variables	Dependent variable is being divorced (yes=1, no=0)					
	Sample of women with two or more children			Sample of women with three or more children		
	OLS	2SLS	OLS	OLS	2SLS	OLS
The number of children	-0.00431***	-0.00224*		-0.00210***	0.00128	
	(0.00009)	(0.00133)		(0.00012)	(0.00216)	
Age	0.00072***	0.00066***	0.00060***	0.00040***	0.00031***	0.00034***
	(0.00001)	(0.00004)	(0.00001)	(0.00002)	(0.00006)	(0.00002)
Completed education grade	-0.00048***	-0.00035***	-0.00020***	-0.00023***	-0.00004	-0.00011**
	(0.00003)	(0.00009)	(0.00003)	(0.00005)	(0.00013)	(0.00004)
Kinh majority	0.00215***	0.00258***	0.00304***	0.00043	0.00118*	0.00089**
	(0.00027)	(0.00038)	(0.00027)	(0.00039)	(0.00063)	(0.00039)
Northern Mountain	Based					
	Omitted					
Red River Delta	-0.00291***	-0.00309***	-0.00327***	-0.00162***	-0.00182***	-0.00175***
	(0.00028)	(0.00030)	(0.00028)	(0.00041)	(0.00044)	(0.00041)
Central Coast	-0.00090***	-0.00140***	-0.00195***	0.00052	-0.00003	0.00018
	(0.00026)	(0.00041)	(0.00026)	(0.00037)	(0.00051)	(0.00037)
Central Highlands	0.00401***	0.00315***	0.00222***	0.00450***	0.00333***	0.00377***
	(0.00035)	(0.00064)	(0.00034)	(0.00045)	(0.00087)	(0.00044)
South East	0.00911***	0.00894***	0.00875***	0.00935***	0.00904***	0.00915***
	(0.00045)	(0.00046)	(0.00045)	(0.00068)	(0.00071)	(0.00068)
Mekong River Delta	-0.00061*	-0.00048	-0.00035	0.00328***	0.00345***	0.00338***
	(0.00033)	(0.00034)	(0.00033)	(0.00051)	(0.00052)	(0.00051)
Having second-born twin children			-0.00179*			
			(0.00106)			
Having third-born twin children						0.00102
						(0.00172)
Constant	-0.00465***	-0.00854***	-0.01274***	-0.00190**	-0.01139*	-0.00780***
	(0.00046)	(0.00254)	(0.00045)	(0.00077)	(0.00611)	(0.00072)
Observations	1,475,224	1,475,224	1,475,224	506,384	506,384	506,384
R-squared	0.004	0.004	0.003	0.002	0.001	0.002

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of second-born twins or third-born twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table 7. Regressions of 'widowed'

Explanatory variables	Dependent variable is being widowed (yes=1, no=0)					
	OLS	OLS	2SLS	2SLS	OLS	OLS
The number of children	-0.00364***	-0.01386***	-0.00382	-0.00218		
	(0.00013)	(0.00016)	(0.00401)	(0.00368)		
Age		0.00358***		0.00324***		0.00318***
		(0.00002)		(0.00011)		(0.00002)
Completed education grade		-0.00301***		-0.00216***		-0.00200***
		(0.00004)		(0.00027)		(0.00004)
Kinh majority		0.00099**		0.00324***		0.00366***
		(0.00042)		(0.00082)		(0.00042)
Northern Mountain	Based					
	Omitted					
Red River Delta		0.00086*		-0.00050		-0.00076*
		(0.00044)		(0.00061)		(0.00044)
Central Coast		0.01081***		0.00782***		0.00726***
		(0.00042)		(0.00103)		(0.00042)
Central Highlands		0.01079***		0.00608***		0.00520***
		(0.00053)		(0.00157)		(0.00053)
South East		-0.00186***		-0.00226***		-0.00233***
		(0.00053)		(0.00054)		(0.00053)
Mekong River Delta		-0.01479***		-0.01328***		-0.01300***
		(0.00045)		(0.00065)		(0.00045)
Having first-born twin children					-0.00184	-0.00114
					(0.00193)	(0.00191)
Constant	0.04241***	-0.04637***	0.04278***	-0.06483***	0.03494***	-0.06828***
	(0.00031)	(0.00062)	(0.00826)	(0.00584)	(0.00013)	(0.00061)
Observations	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703
R-squared	0.000	0.025	0.000	0.021	0.000	0.020

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of firstborn twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table 8. Regressions of 'widowed': the sample of women with two/three or more children

Explanatory variables	Dependent variable is being widowed (yes=1, no=0)					
	Sample of women with two or more children			Sample of women with three or more children		
	OLS	2SLS	OLS	OLS	2SLS	OLS
The number of children	-0.00692***	-0.00273		-0.00591***	-0.00878**	
	(0.00019)	(0.00238)		(0.00032)	(0.00385)	
Age	0.00331***	0.00319***	0.00311***	0.00357***	0.00365***	0.00342***
	(0.00002)	(0.00007)	(0.00002)	(0.00004)	(0.00011)	(0.00004)
Completed education grade	-0.00229***	-0.00203***	-0.00185***	-0.00227***	-0.00243***	-0.00194***
	(0.00005)	(0.00016)	(0.00004)	(0.00009)	(0.00023)	(0.00009)
Kinh majority	-0.00084*	0.00002	0.00058	-0.00293***	-0.00357***	-0.00161*
	(0.00047)	(0.00068)	(0.00047)	(0.00084)	(0.00120)	(0.00084)
Northern Mountain	Based					
	Omitted					
Red River Delta	0.00128***	0.00093*	0.00070	0.00450***	0.00467***	0.00415***
	(0.00049)	(0.00053)	(0.00049)	(0.00098)	(0.00102)	(0.00098)
Central Coast	0.00784***	0.00682***	0.00616***	0.01173***	0.01221***	0.01077***
	(0.00047)	(0.00074)	(0.00047)	(0.00085)	(0.00106)	(0.00085)
Central Highlands	0.00930***	0.00756***	0.00643***	0.01410***	0.01509***	0.01207***
	(0.00059)	(0.00115)	(0.00059)	(0.00095)	(0.00164)	(0.00094)
South East	0.00080	0.00044	0.00022	0.01088***	0.01115***	0.01035***
	(0.00062)	(0.00065)	(0.00062)	(0.00121)	(0.00127)	(0.00121)
Mekong River Delta	-0.01074***	-0.01049***	-0.01032***	-0.00444***	-0.00458***	-0.00415***
	(0.00051)	(0.00053)	(0.00051)	(0.00098)	(0.00099)	(0.00098)
Having second-born twin children			-0.00217			
			(0.00190)			
Having third-born twin children						-0.00701**
						(0.00307)
Constant	-0.05997***	-0.06785***	-0.07296***	-0.07694***	-0.06890***	-0.09349***
	(0.00081)	(0.00452)	(0.00077)	(0.00171)	(0.01089)	(0.00154)
Observations	1,475,224	1,475,224	1,475,224	506,384	506,384	506,384
R-squared	0.018	0.018	0.017	0.015	0.015	0.015

Note: In 2SLS regressions, the endogenous variable is 'the number of children'. The instrumental variable for this endogenous variable is the presence of second-born twins or third-born twins.

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Appendix

Table A.1. Variable description: sample of women with at least one child

Explanatory variables	Type	Mean	Std. Dev.	Min	Max
Divorce (or separated) (yes=1, no=0)	Binary	0.018	0.133	0	1
Single (yes=1, no=0)	Binary	0.003	0.057	0	1
Married (yes=1, no=0)	Binary	0.945	0.228	0	1
Widowed (yes=1, no=0)	Binary	0.034	0.181	0	1
Having first-born twin children	Binary	0.004	0.065	0	1
The number of children	Discrete	2.015	0.950	1	15
Age	Discrete	36.417	7.590	16	49
Completed education grade	Discrete	7.527	3.736	0	16
Kinh (Kinh=1; ethnic minorities=0)	Binary	0.862	0.344	0	1
Urban (urban = 1; rural = 0)	Binary	0.271	0.444	0	1
Northern Mountain	Binary	0.146	0.353	0	1
Red River Delta	Binary	0.238	0.426	0	1
Central Coast	Binary	0.220	0.414	0	1
Central Highlands	Binary	0.066	0.248	0	1
South East	Binary	0.146	0.353	0	1
Mekong River Delta	Binary	0.185	0.388	0	1
Number of observations		2,101,703			

Source: Authors' estimation from the 2009 PHC.

Table A.2. Variable description: sample of women with at least two children

Explanatory variables	Type	Mean	Std. Dev.	Min	Max
Divorce (or separated) (yes=1, no=0)	Binary	0.011	0.102	0	1
Single (yes=1, no=0)	Binary	0.001	0.028	0	1
Married (yes=1, no=0)	Binary	0.960	0.197	0	1
Widowed (yes=1, no=0)	Binary	0.029	0.168	0	1
Having second-born twin children	Binary	0.005	0.072	0	1
The number of children	Discrete	2.460	0.806	2	15
Age	Discrete	37.152	6.745	17	49
Completed education grade	Discrete	7.181	3.701	0	16
Kinh (Kinh=1; ethnic minorities=0)	Binary	0.848	0.359	0	1
Urban (urban = 1; rural = 0)	Binary	0.246	0.431	0	1
Northern Mountain	Binary	0.148	0.355	0	1
Red River Delta	Binary	0.236	0.425	0	1
Central Coast	Binary	0.236	0.425	0	1
Central Highlands	Binary	0.071	0.257	0	1
South East	Binary	0.133	0.340	0	1
Mekong River Delta	Binary	0.175	0.380	0	1
Number of observations		1,475,224			

Source: Authors' estimation from the 2009 PHC.

Table A.3. Variable description: sample of women with at least three children

Explanatory variables	Type	Mean	Std. Dev.	Min	Max
Divorce (or separated) (yes=1, no=0)	Binary	0.008	0.087	0	1
Single (yes=1, no=0)	Binary	0.000	0.018	0	1
Married (yes=1, no=0)	Binary	0.959	0.198	0	1
Widowed (yes=1, no=0)	Binary	0.033	0.178	0	1
Having third-born twin children	Binary	0.006	0.075	0	1
The number of children	Discrete	3.427	0.799	3	15
Age	Discrete	39.148	6.001	18	49
Completed education grade	Discrete	5.850	3.547	0	16
Kinh (Kinh=1; ethnic minorities=0)	Binary	0.777	0.417	0	1
Urban (urban = 1; rural = 0)	Binary	0.172	0.377	0	1
Northern Mountain	Binary	0.146	0.353	0	1
Red River Delta	Binary	0.165	0.372	0	1
Central Coast	Binary	0.301	0.459	0	1
Central Highlands	Binary	0.104	0.305	0	1
South East	Binary	0.122	0.327	0	1
Mekong River Delta	Binary	0.163	0.369	0	1
Number of observations		506,384			

Source: Authors' estimation from the 2009 PHC.

Table A.4. OLS first-stage regressions of 'the number of children'

Explanatory variables	Dependent variable is 'the number of children'			
	Sample of women with one or more children	Sample of women with one or more children	Sample of women with two or more children	Sample of women with three or more children
Having twins at the first birth	0.48172***	0.52036***		
	(0.00929)	(0.00857)		
Having twins at the second birth			0.79760***	
			(0.00744)	
Having twins at the third birth				0.79786***
				(0.01267)
Age		0.02896***	0.02986***	0.02604***
		(0.00008)	(0.00009)	(0.00018)
Completed education grade		-0.07279***	-0.06377***	-0.05497***
		(0.00019)	(0.00020)	(0.00038)
Kinh majority		-0.19297***	-0.20556***	-0.22361***
		(0.00212)	(0.00220)	(0.00363)
Northern Mountain	Based			
	Omitted			
Red River Delta		0.11628***	0.08388***	0.06016***
		(0.00202)	(0.00203)	(0.00404)
Central Coast		0.25556***	0.24309***	0.16303***
		(0.00208)	(0.00216)	(0.00393)
Central Highlands		0.40248***	0.41478***	0.34398***
		(0.00316)	(0.00334)	(0.00519)
South East		0.03387***	0.08414***	0.09136***
		(0.00258)	(0.00270)	(0.00505)
Mekong River Delta		-0.12985***	-0.06139***	-0.04891***
		(0.00226)	(0.00234)	(0.00442)
Constant	2.05608***	1.57887***	1.87334***	2.80027***
	(0.00069)	(0.00327)	(0.00351)	(0.00686)
Cragg-Donald Wald F statistic of weak instrument	1994	2785	7683	2750
Observations	2,101,703	2,101,703	1,475,224	506,384
R-squared	0.001	0.166	0.184	0.135

Note: Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.

Table A.5. OLS first-stage regressions in the models with interaction between children and demographic variables

Explanatory variables	Model with interaction between children and Kinh majority		Model with interaction between children and women's age		Model with interaction between children and women's education garde	
	Dependent variable is the number of children	Dependent variable is the number of children * Kinh majority	Dependent variable is the number of children	Dependent variable is the number of children * Age	Dependent variable is the number of children	Dependent variable is the number of children * Completed education grade
The presence of first-born twins	0.4983***	0.0034	0.7677***	6.1474***	0.4394***	-0.0251
	(0.0296)	(0.0066)	(0.0365)	(1.4786)	(0.0243)	(0.0928)
Kinh * presence of first-born twins	0.0263	0.5144***				
	(0.0308)	(0.0107)				
Age * presence of first-born twins			-0.0068***	0.3406***		
			(0.0011)	(0.0459)		
Completed education grade * presence of first-born twins					0.0108***	0.5240***
					(0.0025)	(0.0133)
Kinh majority	-0.1931***	2.0929***	-0.1930***	-7.7021***	-0.1929***	0.6241***
	(0.0021)	(0.0013)	(0.0021)	(0.0840)	(0.0021)	(0.0128)
Age	0.0290***	0.0186***	0.0290***	2.8902***	0.0290***	0.1747***
	(0.0001)	(0.0001)	(0.0001)	(0.0035)	(0.0001)	(0.0006)
Completed education grade	-0.0728***	-0.0393***	-0.0728***	-2.6623***	-0.0728***	1.5539***
	(0.0002)	(0.0001)	(0.0002)	(0.0075)	(0.0002)	(0.0014)
Northern Mountain	Based					
	Omitted					
Red River Delta	0.1163***	0.0219***	0.1163***	4.2300***	0.1163***	0.8255***
	(0.0020)	(0.0016)	(0.0020)	(0.0794)	(0.0020)	(0.0152)
Central Coast	0.2556***	0.2172***	0.2556***	10.3471***	0.2556***	1.9589***
	(0.0021)	(0.0014)	(0.0021)	(0.0816)	(0.0021)	(0.0136)
Central Highlands	0.4025***	0.1741***	0.4025***	16.0339***	0.4025***	2.0854***
	(0.0032)	(0.0019)	(0.0032)	(0.1246)	(0.0032)	(0.0184)
South East	0.0339***	-0.0052**	0.0339***	2.4474***	0.0339***	0.2750***
	(0.0026)	(0.0022)	(0.0026)	(0.1022)	(0.0026)	(0.0179)
Mekong River Delta	-0.1298***	-0.0928***	-0.1298***	-3.9142***	-0.1298***	-0.3806***
	(0.0023)	(0.0017)	(0.0023)	(0.0894)	(0.0023)	(0.0141)
Constant	1.5789***	-0.5509***	1.5779***	-7.7910***	1.5791***	-5.1514***
	(0.0033)	(0.0024)	(0.0033)	(0.1219)	(0.0033)	(0.0211)
Observations	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703	2,101,703
R-squared	0.166	0.559	0.166	0.331	0.166	0.522

Note: Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation from the 2009 PHC.