Effects of Husband's Education and Family Structure on Labor Force Participation and Married Japanese Women's Earnings

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Abstract

This paper investigates the effects of a husband's education, family structure, co-residence with parents or in-laws, and childcare, on labor supply and earnings among married Japanese women between 2000 and 2002.   Whereas educated husbands reduce the labor supply of wives, they tend to improve productivity and earnings of the wives once they participate in the labor market.   Moreover, our analysis provides evidence of specific division of labor within a household, through which a wife's mother or mother-in-law helps her participate in the labor market, while her father or father-in-law does not affect her labor participation.   (95 words)

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1. Introduction

According to Shimada and Higuchi (1985), Japan has experienced the fastest growth among the many developed countries that have observed a rapid increase in the labor supply of married women in the post-war economy (Killingsworth and Heckman, 1986). However, according to the most recent Population Census of Japan (Japan, Ministry of Internal Affairs and Communications, 2005), 48 percent of married Japanese women participated in the labor force in 2005. This, in a sense, suggests that a considerable proportion of married women remained at home and engaged in non-market work despite the growing labor market opportunities and their rapidly improved educational achievements (Godo and Hayami, 2002).

Mincer's seminal work (1962) has triggered a large number of studies on the labor supply of married women; it is now well understood that their labor force participation is determined by their diverse socio-economic environments as well as by their own human capital characteristics.[1] The sexual division of labor within the unit of a married couple predicts that a man with higher earnings will allow his wife to reduce her market work and to focus more on housework (Becker, 1991), which has been supported by empirical studies (see, for instance, Devereux, 2004; Kalenkoski *et al*., 2009). In line with this argument, childcare is considered effort-intensive and is one of the important reasons for women suspending their careers or even withdrawing from the labor market (Ribar, 1992, 1995; Angrist and Evans, 1998). Furthermore, co-residence with parents or in-laws, as in Japan's unique family structure, reduces

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[1] For an overview of labor supply among women, see Killingsworth and Heckman (1986) and Blundell and MaCurdy (1999).

housework for married women, thereby freeing up their time for labor force participation (Hill, 1984; Yamada, Yamada, and Chaloupka, 1987; Ogawa and Ermisch, 1996).[2]   More precisely, a woman's mother or mother-in-law helps her participate in the labor force by shouldering the burden of her housework.   This is because her mother or mother-in-law is likely to be less educated and to consequently have fewer opportunities in the labor market; her father or father-in-law usually does not share in the housework (Juster and Stafford, 1991; Kamo, 1994; Hakim, 1996; Strober and Chan, 1998).   To our knowledge, however, no existing studies have quantitatively investigated this specific sexual division of labor among co-residing parents or in-laws. Our dataset, however, is rich enough to separately measure the effects of co-residence with the mother or mother-in-law and co-residence with the father or her father-in-law on a married woman's labor force participation.

In addition to the importance of Japan's specific family structure in the labor force participation of married women, we are also intrigued by the effect of a more universal factor—their husbands' human capital—on the labor supply and productivity of married women.   Although, as discussed above, the husbands' human capital has been examined as one of the most significant determinants of the labor supply of

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[2] Sasaki (2002) addresses the endogeneity of family structure, in which a married woman may choose to co-reside with parents or with in-laws in an attempt to reduce her housework and to consequently participate in the labor force.   His results suggest that the effect of co-residence with parents or in-laws on the labor supply of married women only marginally changes when the endogeneity of family structure is taken into account. Therefore, in this study, we will treat family structure as exogenous.

married women, its effect on human capital and earnings of wives has been largely neglected. Huang *et al*. (2009), as an exception, have conducted a study of this. By contrast, there is much literature that investigates the effect of the *wife*'s human capital on *a man's* earnings (see, e.g., Benham, 1974; Scully, 1979; Kenny, 1983; Wong, 1986; Lam and Schoeni, 1993; Jepsen, 2005; Lefgren and McIntyre, 2006; Huang *et al*., 2009).[3] For instance, using Japan's individual-level data, which has also been used in this paper, Yamamura and Mano (2010) find evidence that suggests that educated women improve the human capital and productivity of their husbands within marriage; this is the so-called "cross-productivity effect within marriage" (see, e.g., Benham, 1974; Scully, 1979; Kenny, 1983; Wong, 1986; Lam and Schoeni, 1993; Lefgren and McIntyre, 2006; Huang *et al*., 2009), which occurs in addition to the assortative mating effect (Welch, 1974; Liu and Zhang, 1999; Lefgren and McIntyre, 2006; Huang *et al*., 2009).

The main purpose of the current paper is, therefore, to examine the mechanism of labor force participation and the determinants of earnings among married Japanese women. We will pay particular attention to the effect of their husbands' schooling on the earnings and labor supply of married women, as well as the effect of co-residence with the mother or mother-in-law on a woman's labor force participation. These analyses will provide evidence that an educated husband tends to allow his wife to focus

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[3] It is widely observed that a married woman's human capital increases her husband's earnings; for instance, in Israel (Neuman and Ziderman, 1992), Iran (Scully, 1979), the Philippines (Boulier and Rosenzweig, 1984), Malaysia (Amin and Jepsen, L., 2005), and Brazil (Lam and Shoeni, 1993, 1994; Tiefenthaler, 1997).

on housework, whereas he improves his wife's productivity when she participates in the labor market. The analyses will also show that co-residence with the mother or mother-in-law significantly increases the labor supply of women whereas co-residence with the father or father-in-law does not affect this labor supply. These findings will significantly deepen our understanding of the important determinants of the labor supply and earnings of married Japanese women. Evidently, the role of the husband's human capital has a universal implication while the effect of co-residence with the mother or mother-in-law suggests the importance of family structure that is specific to each economy in the analysis of the labor supply and earnings of married women.

The rest of this paper is organized as follows. In the following section we will extend the conceptual framework discussed here and set out our estimation strategy. Section 3 contains a description of the dataset and some descriptive statistics. Estimation results are presented in Section 4. Finally, Section 5 concludes this paper.

2. Conceptual framework and estimation strategy

To explore the mechanism of labor force participation and earnings among married Japanese women, we will estimate a Type 2 Tobit model (Amemiya, 1986), using the FIML method instead of Heckman's (1976) two-step procedure to gain higher efficiency.

Labor participation equation

The first equation models the labor supply decision among married women, which can be expressed as follows:

$$y_{1i}{}^* = x_i{}'\alpha_1 + z_i{}'\beta + u_{1i}, \text{ for } i = 1, \ldots, n, \hspace{2cm} \text{(I)}$$

where it is assumed that only the sign of $y_{1i}{}^*$ is observed, it is positive if and only if married woman i participates in the labor market, and n denotes the number of observations. The first vector of explanatory variables, x_i, consists of years of own and spousal schooling, own and spousal ages and their squared terms, size dummies for the city of residence, and year dummies. We expect that an educated wife, expecting a higher market wage, is more likely to participate in the labor market, while an educated husband receives higher earnings and allows his wife to stay at home, which can be considered as division of labor within a household (Becker, 1991). These considerations lead to the following hypothesis:

Hypothesis 1:   An educated wife tends to participate in the labor force, while an educated husband tends to reduce his wife's labor force participation.

This labor supply model incorporates another set of explanatory variables, z_i, consisting of the number of children under age six, which supposedly measures the burden of childcare, and four dummy variables, each indicating co-residence with own or spousal fathers and mothers, respectively. Childcare is time-consuming and takes up much of the mother's time, especially when the children are young. In consequence, we expect that married women with more young children tend to stay at home and not participate in the labor force (Ribar, 1992, 1995; Angrist and Evans, 1998). Thus, we postulate the following:

Hypothesis 2:   As the number of young children that a wife raises increases, she tends to reduce her labor force participation.

Moreover, we are particularly intrigued by the effects of co-residence with the mother or the mother-in-law on the wife's labor force participation; these effects will be compared with the corresponding effects of co-residence with the father or the father-in-law.   Existing studies only look at the effects of co-residence with one's parents or in-laws as a whole (Hill, 1984; Yamada, Yamada, and Chaloupka, 1987; Ogawa and Ermisch, 1996; Sasaki, 2002).   However, there is reason to expect that the effect on the labor supply of co-residence with one's own or spousal mother will be different from the effect of co-residence with own or spousal father.   In many societies, women are responsible for a greater portion of the housework (Becker, 1991); this is the case in the traditional sexual division of labor in a Japanese household (Juster and Stafford, 1991; Kamo, 1994; Hakim, 1996; Strober and Chan, 1998).   Therefore, in a typical situation, own or spousal mothers are expected to facilitate their married daughters or daughters-in-law in working outside the home by reducing their burden of household work; own or spousal fathers do not share housework and thus do not affect the labor supply of daughters or daughters-in-law.   To substantiate these arguments, we would like to postulate the following hypothesis:

Hypothesis 3:   Co-residence with her mother or mother-in-law increases a wife's labor participation, whereas co-residence with her father or her father-in-law does not affect it.

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As it will be clear shortly, this second set of explanatory variables, z_i, will be excluded from the corresponding earnings equation for married women self-selecting into the labor market. This is based on the assumption that these factors do not directly affect these women's productivity and earnings in the labor market.

Earnings equation

Based on the assumptions that the number of young children and co-residence with own or spousal parents affect the earnings of a married woman through their influences on the labor force participation decision, these covariates will be excluded from the following earnings equation for married women:

$$y_{2i}^* = x_i{}'\alpha_2 + u_{2i}, \text{ for } i = 1, \ldots, n, \tag{II}$$

where $\{u_{1i}, u_{2i}\}$ are i.i.d. drawings from a bivariate normal distribution, y_{2i}^* is observed only when $y_{1i}^* > 0$, and the vector of explanatory variables x_i is the same as in the labor force participation model expressed by equation (I). In addition to analyzing the effect of a married woman's education on her labor earnings, our main focus here is to examine the effect of her husband's years of schooling on her earnings. In spite of a large number of studies on the labor supply of married women and the effect of a woman's human capital on her husband's earnings, few studies have examined the effect of a man's human capital on his wife's earnings (Huang *et al*., 2009). In fact, Huang *et al*. are the exception, having found a significant cross-productivity effect in China, in which an educated man increases his wife's earnings, after controlling for the

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assortative mating effect.   To see if this cross-productivity mechanism is not a phenomenon unique to China, we will attempt to examine whether an educated man improves his wife's productivity and earnings in Japan, too.   These considerations lead to the following hypothesis:

Hypothesis 4:   The education of a man, in addition to that of his wife, is positively associated with his wife's productivity and earnings in the labor market.

We will test these hypotheses by estimating our model of labor supply and earnings among married women, expressed by the system of equations (I) and (II), using unique individual-level data.   The next section will describe this dataset in detail; basic statistics will document the situation of the labor supply and earnings of married Japanese women.

3.   Data and descriptive statistics

This paper uses Japanese General Social Survey (hereafter, JGSS) data.[4]   These surveys adopted a two-step stratified sampling method and were conducted throughout Japan between 2000 and 2002.   They asked standard questions about an individual and

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[4] Data for this secondary analysis, "Japanese General Social Surveys (JGSS), Ichiro Tanioka," were provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, University of Tokyo.

his/her family characteristics, through face-to-face interviews. These data included information on marital and demographic (such as age and gender) status, annual earnings, years of schooling, age, and size of residential area. Importantly, the spouses' socioeconomic information was also collected and made available for analysis.

Table 1 presents the average characteristics of the sampled married couples in our study by the labor participation status of the wives; the number of observations—that is, the size of the sample of married couples—is 3500. We can observe the annual earnings only for the working wives; the sample average is 2 million yen, which is around 20,000 USD.[5,6] The working wives and the housewives are remarkably similar to each other in terms of their human capital characteristics. They both are aged around 46 years and have 12.3 years of schooling. By contrast, we find that the husbands of the housewives are significantly younger and more educated than the husbands of the working wives, which is consistent with the second part of Hypothesis 1. In particular, the fact that housewives tend to have more educated husbands is consistent with our hypothesis regarding the determinants of the labor supply of married women.

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[5] In the original dataset, annual earnings are grouped into 19 categories; we assumed that everyone in each category earned the midpoint value.   For the top category of "23 million yen and above," we assumed that everybody earned 23 million yen.   Since only a single observation was in this category, the top-coding problem should not be serious here.

[6] For comparison, the husbands in our sample earned over 5.6 million yen on average, regardless of their wives' labor force participation status (Yamamura and Mano, 2010).

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The household characteristics are also consistent with our argument. The number of children under age six is significantly smaller among the working wives, which provides supportive evidence for Hypothesis 2. Further, the working wives reside with their mothers or mothers-in-law significantly more often than the housewives do, which is consistent with Hypothesis 3. The frequency of co-residence with their fathers-in-law is also higher among the working wives, but the significance of this is lesser than that of wives' co-residence with their mothers or mothers-in-law. Moreover, these descriptive statistics clearly indicate that married couples tend to live with the husbands' parents more often than with the wives' parents, reflecting the traditional family structure in Japan. Over all, these observations are consistent with the results of Ogawa and Ermisch (1996), which used a survey conducted by the Mainichi newspapers in June 1990. These were also consistent with the results of Sasaki (2002), which used another Japanese micro-level dataset, the Panel Study on Consumption and Living, 1993 (*Shohi Seikatsu ni kansusru Paneru Chousa*), conducted by the Institute for Household Economy (Kakei Keizai Kenkyujo). This indicates the representativeness of our dataset and of the following analysis of the labor supply among married Japanese women, which is based on this dataset.

We will next look at the effects of a woman's education and that of her husband on the annual earnings of the sample working wives. The results of this have been reported in the matrix presented in Table 2. As expected, the analysis provides evidence that the husband's education as well as that of the wife is positively associated with the wife's annual earnings. Column (1) in Table 2 presents the labor earnings among wives with less than 12 years of schooling, while Column (2) presents the labor earnings of wives with 12 or more years of schooling. Similarly, Row (i) presents the

labor earnings of wives whose husbands have less than 12 years of schooling, while Row (ii) presents that of wives whose husbands have 12 or more years of schooling. Both wife and husband have less than 12 years of schooling among 210 couples; the wives in these couples earned 1.57 million yen on average, as indicated by the cell in Row (i) and Column (1)   Analogously, the cell in Row (i) and Column (2) presents the average earnings (1.64 million yen) of the wives in 136 couples in which the wife has 12 or more years for schooling and the husband has less than 12 years of schooling.   A comparison of the wives' average earnings between Columns (1) and (2) in each row suggests that a more educated wife tends to receive higher earnings than a less educated wife.   We can see from this table, from a comparison between Columns (1) and (2) along Row (ii), that the wife's education is positively and significantly correlated to her earnings when her husband is educated; also, based on a comparison between Rows (i) and (ii) along Column (2), a man's education is positively and significantly correlated to his wife's earnings when she is educated.   In short, an educated man, in conjunction with his wife's own education, seems to improve his wife's productivity and earnings.   This is consistent with Hypothesis 4.

To highlight the importance of controlling for a married woman's self-selection into the labor force, we simply estimate the earnings equation (II) by using the OLS before we estimate the entire model consisting of both equations (I) and (II) presented above.   Table 3 presents this estimation result; Column (1) reports a simple Mincer-type earnings equation for working wives in our sample.   We can see that an additional year of schooling increases the wife's annual earnings by 10.5 percentage points, which is economically as well as statistically significant.   However, it is

important to keep in mind that this estimated effect of the wife's schooling may be biased upward by the self-selection mechanism. By contrast, a wife's work experience (using her age as a proxy) does not reveal any significant effect on earnings, though there is an indication of a concave-shape effect; that is, the coefficient of the squared term is negative. Although we cannot directly examine this due to the limitation of our data, a possible explanation for this is that the wife's age does not accurately reflect her work experience. For instance, even though these wives are currently part of the labor force, they may have reduced their working hours or entirely withdrawn from the labor market at some point when they were taking care of their young children.

The regression specification presented in Column (2) of Table 3 drops the wife's education from the covariates; the husband's education is controlled for instead. The estimation result indicates that an additional year of the husband's schooling significantly increases his wife's earnings by 5.5 percentage points, which supports Hypothesis 4. This positive effect can be explained by both the assortative mating effect (in which the husband's education variable picks up the effect of his wife's human capital, which is omitted from the regression) and the cross-productivity effect (in which an educated husband improves his wife's productivity). Furthermore, Column (3) controls for both a woman's and her husband's educations; we find that the effect of a wife's education on her earnings is marginally lower in its magnitude than it is in Column (1), but it still is significantly positive. By contrast, the effect of her husband's education becomes insignificant. We suspect that this estimation result reflects a composite effect of the husband's education, which acts negatively on his wife's labor force participation and positively on her productivity and earnings. To disentangle these effects, we will estimate the entire model, expressed by equations (1)

and (2), in the next section.

4. Estimation results

In order to deepen our understanding of the mechanism of the labor supply and
earnings of married women, we estimate the model represented by the system of
equations (I) and (II), with special attention to the effect of the husbands' education.
We also attempt to measure the effect of co-residence with her mother or mother-in-law
as well as the number of young children on a married woman's labor force participation.
Table 4 presents the estimation results, in which three sets of estimated models, (1), (2),
and (3), are reported.   Model (1) in Table 4 includes only the wife's years of schooling
but not the husband's, Model (2) includes only the husband's years of schooling but not
the wife's, and Model (3) incorporates both the wife's and the husband's education.
Columns (1-a), (2-a), and (3-a) are the estimated labor participation equations within the
three models, respectively; while Columns (1-b), (2-b), and (3-b) are the estimated labor
earnings equations, controlling for a possible self-selection into the labor force.   In fact,
the estimated coefficient of the inverse mill's ratio is statistically significant across the
models, which indicates that a married woman self-selects into the labor market and that
our estimation strategy attempts to properly control for the selection problem.

Most importantly, we find that although the husband's education decreases the
wife's labor force participation, which supports Hypothesis 1, it improves the wife's
productivity and earnings once she decides to participate in the labor market, which is
consistent with Hypothesis 4 (Model 3).   To promote our understanding of this result,
it may be productive to examine the estimation results for the simpler models before we

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analyze the full model.

When the regression model includes only the wife's years of schooling and not the husband's (Model 1), the coefficient of the wife's education is negative and insignificant in the labor participation equation but significantly positive in the earnings equation.   Although the positive effect of the wife's education on her labor earnings is readily understandable, interpreting its negative effect on her labor supply may require some thought.   It is important to note that the model omits the education and earnings of the husbands, which reduce the labor supply of wives through the sexual division of labor within the household, as suggested by the descriptive statistics in Table 1. Moreover, the assortative mating mechanism suggests that the wife's education is likely to be positively correlated to the husband's education or earnings, and, in consequence, the coefficient of the wife's education is underestimated due to the omitted variable bias. Even though the estimated coefficient turns out to be insignificant, its negative sign indicates that the negative effect of the education of the husbands on the labor supply of the wives marginally exceeds the positive effects of the wives' own education.   We next consider the estimation result of Model (2), which omits the wife's education and including the husband's.   The estimation result of this model provides supportive evidence that educated husbands reduce the labor supply of wives but improve their earnings once they participate in the labor market.

We now synthesize all these considerations to examine the mechanism that determines a married woman's labor force participation and earnings by incorporating the wife's education as well as her husband's (Model 3).   As expected, the estimation result provides evidence that the wives' education increases their labor supply and earnings, whereas the husbands' education reduces the labor supply of wives but

increases the earnings of wives in the labor market. These results entirely support Hypotheses 1 and 4 and help us understand why the OLS estimate of the effect of the husband's education on the wife's earnings is insignificant in Table 3. More importantly, when the self-selection of a wife's labor participation is controlled, the magnitude of the effect of her husband's education on her earnings is found to be economically significant and one-fourth of that of her own education. While an additional year of schooling of the wife increases her earnings by 9.1 percentage points, an additional year of the husband's schooling increases her earnings by 2.3 percentage points, which seems too large to ignore, as previous studies have done.

On closer examination, the estimated coefficients of the variables other than the wife's and the husband's educations do not vary significantly across the three models. Most importantly, the estimation results provide remarkable evidence that co-residence with the mother-in-law increases the labor supply of the wife, and that co-residence with the mother increases the labor supply of the wife even more significantly. By contrast, co-residence with the father or the father-in-law does not have any significant effect on the wife's labor participation. These results strongly support Hypothesis 3. Another estimation result suggests that the labor supply of married women initially increases as they get older but starts to decline beyond a certain age. Moreover, Hypothesis 2 is also supported by the result that the more young children a woman raises, the more likely she is to stay at home, just as we expected.

4. Conclusion

This paper attempted to extend our understanding of the mechanism determining the

labor supply and labor earnings of married Japanese women, with special emphasis on the effect of their husbands' human capital and the traditional family structure in Japan. Consistent with a number of existing studies in this literature, the result of our analysis, which is based on recent individual-level data, provides evidence that the education of the married women tends to increase their labor supply and earnings. Moreover, raising young children takes up a significant amount of a mother's time and discourages her from participating in the labor force. This study is the first attempt of its kind to examine the specific effect of co-residence of women with their mothers or mothers-in-law on their labor supply separately from the effect of co-residence with their fathers or fathers-in-law, although previous studies have analyzed the combined effects of their co-residence with parents and parents-in-law.

We found that the wife's mother or mother-in-law helps her participate in the labor force, whereas her father or father in-law does not affect her labor participation. In all likelihood, a married woman's co-residence with her mother or mother-in-law reduces her housework and childcare responsibilities, but that with her father or father-in-law does not help her in this regard. This is consistent with the traditional family structure and sexual division of labor in Japanese households. We will have to use more detailed data to confirm this argument. Our analysis also revealed that the husbands' education reduces the labor supply of wives but significantly improves their productivity and earnings, conditional on their labor participation. To the best of our knowledge, Huang *et al*. (2009) is the only other study on the effect of a husband's education on a wife's earnings. More precisely, while their study takes a reduced-form approach, we controlled for the self-selection of wives into the labor force and examined the separate effects of their husbands' education on their labor supply and

earnings.

Our study suggests that it is important to examine the labor supply among married women with due attention to their interaction with the people around them. In particular, the influence of their husbands' human capital on their productivity and earnings, as well as their labor participation decision, is not negligible and should be properly taken into account. Our results also indicate the importance of considering the effect of family structure on the wife's labor force participation. Whether or not this specific effect of family structure is unique to Japan may be examined in future work.

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Table 1. Average Characteristics of the Sample of Married Couples by Wife's Labor Participation.

	Working wife	Housewife	p-value for t-test with H_0: (1)–(2)=0
	(1)	(2)	
Wife's annual labor income (in ten thousand yen)	203.1	---	---
Human capital characteristics			
Wife's age	46.9	46.3	0.144
Husband's age	49.6	48.8	0.057*
Wife's years of schooling	12.3	12.3	0.803
Husband's years of schooling	12.7	13.0	0.0003***
Household characteristics			
No. of children aged under age six	0.14	0.38	0.000***
Percentage of couples living with wife's mother	5.7	3.3	0.001***
Percentage of couples living with wife's father	2.8	2.1	0.181
Percentage of couples living with husband's mother	20.2	14.0	0.000***
Percentage of couples living with husband's father	11.0	8.5	0.014**
No. of obs.	1862	1638	---

Note. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels, respectively.

Table 2. Wife's annual earnings by couple's educational level (in ten thousand yen).

		Wife with low education	Wife with high education	p-value for t-test with H_0: (1)–(2)=0
		(1)	(2)	
Husband with low education	(i)	156.6	164.4	0.656
		(n = 210)	(n = 136)	
Husband with high education	(ii)	151.9	216.8	0.005***
		(n = 89)	(n = 1427)	
p-value for t-test with H_0: (i)–(ii) = 0		0.805	0.006***	

Note. The number of observations is 1862. *** indicates statistical significance at 1 percent level. Low education means years of schooling below 12, while high education indicates years of schooling above 12.

Table 3. Estimated models of wife's earnings equation. (OLS)

	(1)	(2)	(3)
Wife's years of schooling	0.105***	---	0.096***
	(9.22)		(6.90)
Husband's years of schooling	---	0.055***	0.013
		(6.16)	(1.26)
Wife's age	0.011	0.014	0.010
	(0.79)	(1.02)	(0.74)
Wife's age squared	−0.0001	−0.0001	−0.0001
	(−0.54)	(−1.03)	(−0.47)
Constant	3.270***	3.889***	3.226***
	(9.55)	(11.62)	(9.38)
R-squared	0.049	0.025	0.050

Note. The number of observations is 1862. *** indicates statistical significance at the 1 percent level. Although not reported here, large and medium-sized city, and year dummies are also controlled for.

Table 4. Estimated models of wife's labor force participation and earnings (Type 2 Tobit by FIML)

	(1)		(2)		(3)	
	(1-a)	(1-b)	(2-a)	(2-b)	(3-a)	(3-b)
	Labor supply	ln(Earnings)	Labor supply	Ln(Earnings)	Labor supply	ln(Earnings)
Wife's education	–0.017	0.108***	---	---	0.030*	0.091***
	(–1.38)	(9.28)	---	---	(1.98)	(6.43)
Husband's education	---	---	–0.047***	0.061***	–0.060***	0.023**
	---	---	(–5.12)	(6.54)	(–5.31)	(2.00)
Wife's age	0.064**	–0.017	0.069**	–0.011	0.062***	–0.016
	(2.25)	(–1.02)	(2.42)	(–0.66)	(2.23)	(–0.97)
Wife's age squared	–0.001***	0.0002	–0.001***	0.0001	–0.001***	0.0002
	(–2.62)	(1.24)	(–2.86)	(0.69)	(–2.64)	(1.20)
Husband's age	0.022	---	0.024	---	0.028	---
	(0.83)	---	(0.89)	---	(1.04)	---
Husband's age squared	–0.0003	---	–0.0003	---	–0.0003	---
	(–1.00)	---	(–1.08)	---	(–1.20)	---
Children under age six	–0.580***	---	–0.588***	---	–0.587***	---
	(–11.09)	---	(–11.22)	---	(–11.18)	---
Wife's father	–0.146	---	–0.178	---	–0.179	---
	(–0.83)	---	(–1.01)	---	(–1.02)	---
Wife's mother	0.446***	---	0.449***	---	0.439***	---
	(3.35)	---	(3.33)	---	(3.27)	---
Husband's father	–0.022	---	–0.005	---	–0.001	---
	(–0.24)	---	(–0.05)	---	(–0.01)	---
Husband's mother	0.216***	---	0.203***	---	0.206***	---
	(2.95)	---	(2.75)	---	(2.81)	---
Constant	–1.358***	4.082***	–1.037***	4.546***	–1.236***	3.952***
	(–3.60)	(9.08)	(–2.84)	(10.62)	(–3.27)	(8.85)
Self-selection bias for	–0.336***		–0.289***		–0.310***	
the working wife (rho)	(–3.03)		(–2.60)		(–2.72)	
Log likelihood	–4659.3		–4670.1		–4644.4	
p-value for Wald test	0.000***		0.000***		0.000***	
No. of obs.	3500	1862	3500	1862	3500	1862

Notes. Numbers in parentheses are z-statistics obtained by robust standard errors. *,
** and *** indicate statistical significance at the 10, 5, and 1 percent levels,

respectively. Although not reported here, large- and medium-sized cities and year dummies are also controlled for.