# Intergenerational Links in Female Labor Force Participation

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**Abstract**

Fernandez, Fogli, and Olivetti (2004) introduce an innovative model of how the experiences of one generation of women affect the behavior of the next generation of women via their sons/husbands. Empirically they find that a woman is more likely to work if her mother-in-law worked, but there is no relationship between the labor supply choices of a woman and her own mother. We show that this latter finding in Fernandez et al. is not robust and establish that there is indeed a link between the labor force participation choices of mothers and daughters. Further, in an alternative theoretical model we show that the relationship between the labor force participation of mothers-in-law and daughters-in-law may be due instead to a woman's own preferences formed before selecting a spouse. Interestingly, the model demonstrates that the correlation in labor force status may be stronger for a mother-in-law/daughter-in-law pair than a mother/daughter pair, even if the preference formation channel is solely from mothers to daughters.

The intergenerational link between a mother's labor force participation and that of her daughter is an important component to understanding both the causes and consequences of the rise in female labor force participation over the latter half of the twentieth century. In an interesting and innovative paper, Fernandez, Fogli, and Olivetti (2004) find that a woman's labor force participation is correlated with the labor supply of her husband's mother while he was growing up. What makes this result all the more fascinating is that they find a woman's labor supply not to be correlated with her own mother's working status. Our paper uses larger and varied data sets to test the robustness of Fernandez et al's empirical findings. The key distinction between our estimates and those presented in Fernandez *et al.* is that we find a

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significant and robust non-zero correlation between the labor supply choices of a mother and her daughter.

Our empirical results support a surprising finding from Fernandez *et al.*: a woman's labor force participation is at least as strongly correlated with her mother-in-law's as with her own mother's. Our second contribution is to provide an explanation of why the mother-in-law/daughter-in-law link might not be due to mothers-in-law influencing daughters-in-law. Fernandez *et al.* present two models that explain how the link between the labor supply choices of a woman and her mother-in-law might be a causal relationship. In their "preference channel," a man receives disutility from his wife working but this disutility is less if his mother worked than if she did not. When a woman makes her decision to acquire skills to increase her working productivity, she weighs the benefit of increasing her wage to the increased probability that she will be rejected if the man prefers a woman who does not work. Therefore, if a man's mother worked, his wife is more likely to have worked because he was less likely to reject her. In Fernandez et al. "technology channel" men whose mothers worked have a greater degree of household skill than men whose mothers did not work. Therefore, a woman who marries a man whose mother worked has more time to work herself (alternatively, it is less costly for her to work). Therefore, if a woman's mother-in-law worked, she will be more likely to work herself.

We provide an alternative, non-causal explanation for this relationship. A woman may have a statistically stronger but non-causal relationship with her mother-in-law due to assortative mating. This is similar to the idea presented in Lam and Schoeni (1993). A key difference between our approach and theirs is that we model the assortative mating directly. We develop a formal model in section 3; but the following example provides the intuition for the explanation. Suppose there is a causal relationship between a woman's decision to work and the decision of her daughter. Specifically, 75 percent of daughters make the same choice as their mother. Suppose 50 percent of mothers work. Therefore, the probability a daughter works is 50 percent ($\frac{1}{2} \cdot \frac{3}{4} + \frac{1}{2} \cdot \frac{1}{4}$). For simplicity, in this example assume the population of mothers, daughters, and sons is the same size. Since the percentage of working women is unchanged, it is possible for each working daughter to be matched to a husband with a working mother. That is what we refer to as assortative mating: each man is identical except for his mother's working status, so matching a woman and a man based on similar characteristics consists of matching a daughter to a mother-in-law based on working status. If perfect matching occurs then there is a 100 percent correlation between mother-in-law and daughter-in-law and only a 75 percent correlation between mother

and daughter. This simple example shows it is possible to observe a causal relationship between a woman and her mother and a statistically stronger but non-causal relationship between a woman and her mother-in-law.

In many ways, our model is complementary to Fernandez et al. All of the reasons for why a man whose mother worked may prefer a working wife can also be used to explain why a woman may prefer a man whose mother worked. A woman may prefer a mother-in-law she identifies with or whose views on gender roles coincide with her own. Alternatively, it is reasonable to assume a man with better household skills should be more desirable to a woman who will need her spouse to share in the household chores. The key difference is that in Fernandez et al.'s model, the intergenerational preference formation is from mothers to the sons, while we focus on the link between mothers and daughters. The women in their model choose to work in order to be successful in the marriage market, while the women in our model form preferences and then select an appropriate spouse. Our model explains why a woman making decisions solely based on her own preferences may appear to have been influenced, *ex post*, by her mother-in-law.

# 1 Background on Intergenerational Links in Labor Force Participation

Interest in intergenerational correlations in labor market outcomes has a long history. Black and Devereux (2010) provides an excellent review of this literature.[1] While this literature has sought to understand the intergenerational mobility in occupations and earnings, a related line of work has focused on how the preferences and culture that are transmitted between generations shape labor market outcomes. A long history in Sociology measures how children's attitudes and behavior are shaped by parents (e.g., Thornton, Alwin, and Camburn, 1983; Mayer, Duncan, and Kalil, 2004). Economists have primarily focused on how these links translate into labor

[1] Although that literature has mostly focused on the mobility in occupations between fathers and sons (see, e.g., Solon, 1999, 2004, and references therein), newer studies have tried to estimate similar models for women (e.g., Raaum et al., 2007). However, one complication with measuring income elasticities between fathers and daughters is that a woman's own earnings may not accurately represent her family's socioeconomic status (Chadwick and Solon, 2002). Hellerstein and Morrill (2011) argue that as women have become increasingly likely to participate in the labor market, there has been an rise, in turn, of the transmission of job-specific human capital from fathers to daughters.

supply choices. For example, using data on Italian couples, Del Boca, Locatelli, and Pasqua (2000) study how the employment decisions of married women are influenced by the employment status of their husbands. Del Boca et al. describe the labor force experience of a couple's parents as a proxy for the couple's attitude towards a woman working. As part of their analysis they highlight that a woman's labor force participation is correlated with both the labor supply of her mother and her mother-in-law.

Our paper directly addresses Fernandez, Fogli, and Olivetti (2004), which focuses on this particular finding in Del Boca, Locatelli, and Pasqua (2000). Fernandez et al. posit a model that suggests women's labor supply is influenced by the preferences men develop from having a working mother. Although they find a link between a woman's mother-in-law's labor force participation rate and her own labor supply, unlike Del Boca et al. they do not find a similar link between a woman and her own mother. Farre and Vella (2007) explicitly test this "intergenerational cultural link" by using data on women's attitudes towards gender roles. They find that a woman's opinions regarding the role of women in the family and labor market are correlated with her own daughter's and her daughter-in-law's (son's wife's) labor force participation. Their findings are again distinct from Fernandez et al. in that a woman and her own daughter are shown to have a link in gender attitudes (and labor supply), as we also find in our results below.

In this paper we provide empirical evidence that supports the existence of a link between the labor supply choices of a woman and her own mother. We then present a model which suggests that the intergenerational link between a woman and her mother-in-law need not be causal to create the empirical patterns documented in this paper and in the prior work described above.

# 2 Empirical Findings

We seek to establish whether there is in fact a link between the labor force participation decision of a mother and her daughter. We do find evidence of such a link, but both this relationship and the link between the labor force participation choices of mothers-in-law and daughters-in-law are somewhat sensitive to sample and specification. Although Fernandez et al. find a significant relationship between the labor force participation of mothers-in-law and daughters-in-law, their empirical results suggest no similar link between the labor supply of mothers and daughters. This key finding affects their interpretation of the dynamic effects of a shock to maternal employment. Our empirical results provide an alternative explanation for this dynamic phenomenon.

Fernandez et al. present three sets of results that support their model. First, the General Social Survey (GSS) is used to show a conditional correlation between the working behavior of men's mothers and that of their wives.[2] However, while Fernandez et al. correctly describe that the GSS data only include the working behavior of the respondent's mother and contain no mother-in-law labor force information, they do not present a parallel set of regressions using female respondents and the working behavior of wives' mothers. In addition, Fernandez et al. only use data from 1988 and 1994, when a particular variable on mother's work was collected. However, similar variables were collected in other years. An expanded analysis of the GSS confirms a significant conditional correlation between mother-in-law and daughter-in-law work experience. Importantly, the conditional correlation between mother's and daughter's work experience is similar in magnitude and is also statistically significant. This result is contrary to Fernandez et al.'s main findings. This additional intergenerational link suggests an alternative theoretical model may be more appropriate.

The second set of results that Fernandez et al. present uses data from the Female Labor Force Participation and Marital Instability survey (FLFPMI).[3] The data allow the authors to include the working behavior of both the husbands and wives' mothers in the regression on the wives' labor force participation. We confirm that in the specifications Fernandez et al. present there is a significant relationship between mother-in-law and daughter-in-law work behavior and, once the work behavior of the spouse's mother is included in the regression, there is no conditional correlation between mother and daughter work behavior.[4] We demonstrate that these results are sensitive to specification. Still, we confirm that in this particular data set there is no significant relationship between the labor force participation of mothers and daughters.

Because we find a relationship between mothers and daughters in the GSS but not in the FLFMPI, we next turn to a much larger dataset, the Survey of Income and Program Participation (SIPP). Here we find significant and robust relationships between the labor force participation choices of both mothers-in-law and daughters-in-law and mothers and daughters. Interestingly, we find that the mother-in-law/daughter-in-law link is qualitatively larger, al-

[2]We were able to closely match the original specifications in Fernandez et al., but could not exactly replicate the results. See Morrill (2008) for details.

[3]The FLFPMI is the first wave of a six wave survey by Booth, Johnson, Amato, and Rogers that is generally referred to as the "Marital Instability over the Life Course" or "Work and Family Life" surveys. See Booth, et al. (2001).

[4]Note that we were able to exactly replicate the first part of the FLFMPI results, but not those with extensive controls. Full results are available upon request or see Morrill (2008).

though the difference is not statistically significant.

The final evidence Fernandez et al. present leverages PUMS data to test the dynamic implications of their male preference formation model. Their results show that in regions where more mothers work due to an exogenous shock (variation in mobilization rates during World War II) the next generation of women are more likely to work. Similarly, in states where the average fertility rate of working mothers compared with non-working mothers is higher, their model predicts that the next generation will have higher female labor supply, since relatively more children are raised by working mothers. While this is interpreted as an effect of the preferences of men in Fernandez et al., it may also be seen as evidence supporting the intergenerational effect of mothers' work experience on their own daughters. Fernandez et al. refute this competing explanation by highlighting their cross sectional evidence showing a zero marginal effect of own mother's work behavior on daughter's labor force participation. Our results, present below, indicate a significant relationship between the labor supply of mothers and daughters, which suggests that this finding may be due, at least in part and perhaps entirely, to the intergenerational effects of mothers on daughters.

In the empirical results that follow, we apply the following sample selection criteria in each dataset. First, we restrict only to married men and/or women. Although it is interesting to consider the intergenerational links for all women, this study is concerned with the relative influence of mothers versus mothers-in-law. We also only consider white respondents (households), since the labor market experiences of minority workers in the United States were quite different. Finally, we consider only couples where both the husband and wife were between ages 25 and 64. Our intention is to consider couples where the majority of schooling is completed and the husband is less likely to have retired. We present sensitivity analysis for a subsample where the wives are between ages 30 and 50. This age group is likely more tied to the labor market than the youngest and oldest women in the sample. We test for sensitivity to how the labor force participation choices of the mothers and mothers-in-law are defined.

## 2.1 General Social Survey (GSS)

Our first empirical exercise is conducted with the General Social Survey (GSS) dataset. The GSS is a household survey where the respondent is chosen from among all adults living in the household according to a random sampling procedure so that there are approximately equal

numbers of male and female respondents. The series of questions regarding mothers' employment only ask about the respondents' own mothers. As a result, in these data we are able to observe the work status of only the wife's own mother (for female respondents) or the wife's mother-in-law (for male respondents). In the regressions presented below, we include specifications for male and female respondents. In Fernandez *et al.*'s original work only regressions for male respondents (wife's mother-in-law) are included.[5] The empirical findings provide evidence of a link between a woman's labor supply and that of her own mother. This contradicts the conclusion in Fernandez et al., based on evidence from the smaller FLFMPI, that there is no statistically significant relationship between the work behavior of mothers and daughters.

In Fernandez et al.'s analysis using the GSS, the key variable, MAWORKH, is defined from the survey question "Did your mother ever work for pay for as long as one year after you were born and before you were 14?" Fernandez et al. used data from 1988 and 1994, although this question was also subsequently added to the 2002 survey. The full sample of the GSS contains six separate variables that describe the working behavior of the respondent's mother: that the mother worked for as long as a year (1) while the respondent was growing up, (2) after the respondent was born and before the respondent was age 14, (3) after the respondent's mother was married, (4) before the respondent was in first grade, (5) after the respondent was born and before he/she was in first grade, and (6) when the respondent was around age 16. Each variable was only collected in a subset of the survey years, as shown in Table 1. Table 1 also provides the sample sizes and the means of the mother's work variables (the sample is restricted to having the other regression variables present). The fraction of mothers and mothers-in-law reported working varies due to both the stringency of the variable definition (more women "work at all after married" versus "after born and before first grade") and the survey years, since female labor force participation is rising over time (see, e.g., Goldin, 1991).

Table 2 presents our main results using the GSS data. The top portion of the table is the men's sample, where we observe the labor force choice of the husband's mother (the woman's

[5]In the survey, the respondent is asked to identify who he (she) considers the household head and his (her) relationship to that head. In order to ensure that the observation is for the core family in the household, we restrict the sample to heads of households and their spouses. Though most male respondents report that they are the head of the household, around 8 percent (over 600) of the male respondents in the sample responded that they are the spouse of the household head. Likewise, around 11 percent of female respondents in the married sample report that they are the household head. Fernandez et al. restrict their attention to "male heads of households." For our analysis, we include both household heads and spouses of household heads in the male respondent and female respondent samples.

mother-in-law). The bottom of Table 2 presents results for the women's sample, where we observe the labor force participation of the woman's own mother. In each specification the dependent variable is whether the wife worked.[6] The key explanatory variable is whether the respondent's mother worked while the respondent was growing up (the first column of Table 1. This variable was collected biannually from 1994 through 2008. The sample is restricted to men or women who are married, white, and both husband and wife are between the ages of 25 and 64.[7] In all columns the regression specifications include controls for husband and wife's age, year fixed effects, and husband's years of schooling.

Column 1 of Table 2 confirms that the labor supply of the husband's mother (the woman's mother-in-law) is indeed positively and significantly related to the wife's labor supply. The effect size is quite a bit smaller than that reported in Fernandez et al. using a different measure of mothers' labor supply and indicates that having a mother-in-law that worked is associated with a 4.1 percentage point increase in a woman's probability of working (approximately a 5 percent increase off of a mean labor force participation rate of 76.7 percent). Interestingly, in the bottom panel we see that in the preferred specification in Column 1 having a mother that worked is associated with a larger 7.4 percentage point (10 percent) increase in the probability a woman works.

To test the sensitivity of these results, Columns 2 and 3 include additional covariates. Column 2 of Table 2 adds controls for the wife's years of schooling, the number of children under six in the household and the total number of children the respondent ever had. In Column 3 we include a full set of covariates that describe the respondent's family when the respondent was age 16 including mother's and father's years of schooling, region of residence, religion, and income. Although we present the full set of covariates, our preferred specification is the parsimonious model in Column 1. In the survey the respondent is asked about his or her own

[6] The primary definition of whether the woman worked is taken from the work status variable for self (female respondents) or spouse (male respondents). The possible categories are: (1) working full time, (2) working part time, (3) with a job but not at work, (4) unemployed, laid off or looking for work, (5) retired, (6) in school, (7) keeping house, (8) other, (9) no answer. The primary definition of whether the woman "worked" is equal to one for codes 1-3 (with a job), zero for code 7 (keeping house), and missing for codes 4-6 and 8-9 (unemployed, retired, in school, or other).

[7] There are two race variables present in the years prior to 2002, individual and household race. Though around 5 percent of the sample reports their individual race to be non-white and their household race to be white, these variables agree for just less than 80 percent of the sample. We restricted to respondents who answered white for both individual and household race, though the results are not sensitive to this decision.

parents' education and contribution to household income, but no parallel spousal information was gathered. Therefore, it is not possible to include the same set of parental controls when considering the men's versus women's sample. Other potential covariates include household or individual income. All of these variables are potentially endogenous and may mediate the intergenerational effects from mothers and mothers-in-law to a woman's labor supply choices. Still, it is important to note that the coefficient on the mothers' work status does not change substantially with the inclusion of these variables, except that the coefficient reported in Column 3 for the men's sample is no longer statistically significant.

Table 2 Column 4 uses the preferred empirical model from Column 1 but restricts the sample to women ages 30 to 50, which is the sample restriction that Fernandez et al. apply in their work with the GSS. This group of women is more tied to the labor market, although comparing the means shows only slightly higher fraction of women working in the sample in Column 4 compared with Column 1. Again the results are robust and demonstrate a slightly larger effect for mothers than mothers-in-law. These results indicate that there is, in fact, a strong link between the labor force participation choices of a woman and her own mother.

Next, Table 3 presents regressions for the other five alternative definitions of mothers' labor force participation. The sample and specification mirror that in Table 2 Column 1, repeated in Column 1 of Table 3 for reference. Here each variable is defined over different sample years as indicated; hence the sample sizes and mean labor force participation rates of mothers and women/wives vary between the columns. Note that mean of the mothers' work variable reflects both the restrictiveness of how "worked" is defined and cohort/time differences resulting from large increases in female labor supply over the latter half of the twentieth century.[8] Again the top panel of Table 3 presents results for the sample of men, where the variable of interest is the work experience of the man's mother (the wife's mother-in-law) and the bottom panel is the women's sample where the key explanatory variable is the labor force choice of the woman's own mother.

In Column 2 we see no statistically significant relationships. Note that this definition of

[8]It is also interesting to note that men report their mothers having had slightly lower labor force participation than women report of their own mothers on some of the measures. This may be due to differences in responses by gender or it may indicate either a "son preference" or a greater need for mothers of sons to spend more time on caretaking activities. To our knowledge previous literature on son preference has not considered the extensive margin but has only documented no rise in hours worked or weeks worked by child's gender (Pabilonia and Ward-Batts, 2007).

mothers' work, after the child was born and before age 14, is that used in Fernandez et al.'s original work. Using our preferred specification we do not find any significant results for this definition of mothers' work.[9]

The third column shows results for the largest sample, where working is defined as whether or not the mother worked for as long as a year after she was married. Not surprisingly, this broad of a definition does not yield statistically significant results. However, it is important to note that just 60 percent of mothers worked, even under this less restrictive definition. In the next column we see that having a mother-in-law that worked for at least a year before her son entered first grade is associated with a 6.0 percentage point (11 percent) higher probability that the wife participates in the labor force. The result is nearly identical to the relationship between a woman's labor force participation and that of her own mother. When mothers' labor supply is defined as working after the respondent was born and before he/she entered first grade the relationships are not statistically significant, although the patterns are similar. Finally, in Column 6 when mothers' work is defined as working around age 16, we again have statistically significant results that suggest the relationship between mothers-in-law and daughters-in-law is similar to that between mothers and daughters, with a nearly 5 percentage point (10 percent) higher probability of the daughter/daughter-in-law working. Note that the variables in Columns 4 and 6 are defined for the same set of years, 1975-1983.

Although our empirical results using the GSS data are somewhat mixed, we clearly see that the relationship between a woman's and her own mother's labor supply is similar to the link between the labor force choices of a woman and her mother-in-law.

## 2.2 The Female Labor Force Participation and Marital Instability (FLFPMI) Dataset

We next turn to the Female Labor Force Participation and Marital Instability Survey (FLFMPI). We find similar results to Fernandez et al., but demonstrate that the findings using this small

[9]Fernandez et al. did not use the 2002 data and included many of the covariates we chose to exclude over concerns of endogeneity. While we were not able to exactly replicate the results in Fernandez et al., we were able to get very similar coefficients. Full results available upon request or see Morrill (2008). Fernandez et al. discuss sensitivity analysis on the GSS results on pages 1270-1272. They acknowledge that using MAWORK or MAWKBORN to define the mother's work variables make the coefficient on mother's work insignificant. Fernandez et al. argue that this suggests sons preferences are formed later in their childhood (and that the "after marriage" variable is too vague to use).

data source are not robust.[10] The FLFPMI is the first wave of the Marital Instability over the Life Course survey.[11] This survey of married persons was conducted in 1980 by telephone interviews. The respondent was chosen to be the husband or wife depending on the last digit of the telephone number (even for wife, odd for husband). After restricting the sample to married white couples, there are nearly 1,800 observations. However, there is significant item non-response, so some regression specifications have nearly half that sample size.

As above, we consider alternate definitions of mothers' work status. In the FLFPMI analysis the main identifying variables, MAWORKH and MAWORKW, are defined from the variables labeled "Time Mother Worked When Respondent (Spouse) Grew Up." There are five possible responses to each of these questions: (1) All the Time, (2) Most of the Time, (3) About Half, (4) Less than Half, or (5) Never. Fernandez et al. define MAWORKH/W as equal to 1 if the respondent answered "(1) All the time" and zero otherwise.[12] Our main results are reported in Table 4, while Table 5 presents the preferred specification for several alternative definitions of mothers' work.

In Table 4 we define the key explanatory variables, mother-in-law and mother work status, as dichotomous indicators of whether the mother worked at all. In other words, mother/mother-in-law working corresponds to the respondent answering the survey question above as either "(1) All the Time," "(2) Most of the Time," "(3) About Half," or "(4) Less than Half the Time." This definition most closely resembles that used in our other analyses. Table 4 first begins with the inclusion of the labor force participation of the mother and the mother-in-law separately. The preferred specification which includes both key explanatory variables is presented in Column 3. We see that, similar to the results in Fernandez et al., the coefficient on the labor force participation of mother-in-law is unchanged when a woman's own mother's labor force participation is included in the model. This is surprising given that we expect that the labor force participation of mothers and mothers-in-law are correlated. While the coefficient on the labor supply of mother-in-law is always positive (and is similar to that found using the GSS

[10]To conserve space we do not present a full replication, but we were able to almost exactly replicate the sample and findings, with the exception of some covariates used in the sensitivity analysis. Full results available upon request or see Morrill (2008).

[11]See Booth, et al. (2001).

[12]Questions about own and spouse's mother are asked of both male and female respondents, which are then combined and recoded as husband and wife variables. We find some evidence that men and women respond to the mother's labor supply questions differently, but it does not appear that this has an impact on the estimated marginal effects.

above), it is only statistically significant in the small sample when parents' education variables are available and included as covariates. The coefficient on the labor force participation of the woman's own mother, on the other hand, is small, negative and statistically insignificant in the preferred specification.

Table 5 replicates the specification in Table 4 Column 3 using the four alternate, sequential definitions of mothers' labor supply. The first presented in Column 1 of Table 5 is that used in Fernandez et al., the mother worked all the time. Column 2 then includes the second category, so in that regression the mother/mother-in-law worked variable equals 1 if the mother worked all or most of the time. The third category presented in Column 3 indicates whether the mother worked all, most, or about half the time. And the final category that used in Table 4 is repeated in Column 4 of Table 5 for reference. Recall that in this column the key explanatory variables are zero if the mother never worked and 1 if the mother worked at all. The largest coefficient is found in Column 1, indicating that having a mother-in-law that worked is associated with a 12 percentage point rise in the probability the wife worked. This is nearly twice the size as that found in the GSS. The coefficient on a woman's own mother is again negative, although not statistically significant. Using the second definition of mothers' work, reported in Column 2 of Table 5, shows no significant relationship between the work behavior of the mother or mother-in-law on the woman's labor force participation.[13] In Column 3 of Table 5 we see that the estimated relationship between a woman and her mother-in-law's work status is similar to that estimated using the GSS, but that the link between a woman and her own mother's labor supply is again negative and statistically insignificant.

In summary, we find that the results using the FLFPMI dataset are not robust across specification or alternative definitions. Still, as in Fernandez et al., we do not find any evidence of a link between the labor supply of a woman and her own mother. This may be due to insufficient sample size or power in the FLFMPI data, particularly given the strong and reasonably robust findings in the GSS. Next we turn to a larger dataset.

[13]Fernandez et al. describe their findings under this test:

> "If we use as an indicator of the husband's mother's working history not whether she worked "all the time" while her son was growing up, but instead whether she worked "most of the time," the mother's working behavior still enters positively and significantly in determining the probability that the son's wife works, but its marginal effect is about 11 percentage points." (Fernandez, Fogli, and Olivetti, 2004, page 1276).

## 2.3 The Survey of Income and Program Participation (SIPP)

Because the General Social Survey (GSS) includes only information on the woman's mother or mother-in-law, depending on the gender of the household respondent, and because of the small sample size in both the GSS and FLFMPI surveys, we turn next to the Survey of Income and Program Participation (SIPP). Although the SIPP does not directly report mother's work intensity, questions were asked about the occupation of the respondent's mother and work behavior can be inferred. The parental occupation questions were asked in the Family Background Topical Module conducted as part of Wave II of the 1986, 1987, and 1988 surveys. The data are therefore a pooled sample from these three cross-sections. The survey is answered by all members of the household (and proxy response is allowed), so we have data for both the mother and mother-in-law as reported by the husband and wife.

For these results we again include white couples where both the husband and wife are between ages 25 and 64. Table 6 presents the SIPP results using an indicator of whether the woman works (WIFEWORK) as the dependent variable.[14] The means of the key explanatory variables are presented. Note that 41.3 percent of women's mothers worked while only 38.0 percent of men's mothers worked.[15] The format of Table 6 is parallel to that of Table 4. The first two columns of Table 6 show the relationship between the mothers' and the wife's labor supply when entered independently, while the latter four columns include both own and spouse's mothers' work variables. All specifications include a quadratic term in husband's and wife's age, and husband's years of schooling. Our preferred specification is Column 3. Columns 4 and 5 include controls for the wife's education and the number of children. As discussed above, we are concerned that educational attainment and fertility may be endogenous and may mediate the relationship between preferences for working and labor market participation, so we view these results as a sensitivity test. The fifth column includes controls for parental education (modeled linearly). The sixth column of Table 6 includes only women ages 30-50, who are likely more strongly attached to the labor market.

[14]The primary definition of whether the woman worked is taken from the employment status recode for month 4 of the reference period. The primary definition of "worked" is equal to one for codes 1-5 (with a job at least part of the month), missing for codes 6-7 (no job and looking or on layoff), and zero for code 8 (no job and no time looking or on layoff).

[15]As discussed in footnote 8, this may be due to differences in how men and women respond to retrospective questions or may be due to real differences in labor supply behavior of mothers of sons relative to daughters.

Interestingly, although we see that the coefficient on husband's mother's labor supply is slightly larger than that of the wife's mother's labor supply, in the specifications reported in Columns 3 - 6 the differences between the two coefficients are not statistically significant. Notice that the magnitudes of the coefficients on the labor supply of mothers and mothers-in-law decrease only slightly when both are included. There may be some collinearity, but on the whole it is surprising that the measured relationships do not change substantially when both the labor supply of mothers and mothers-in-law are included. Note that 65 percent of women in the sample worked. Therefore, the coefficients in Column 3 can be interpreted to suggest that a woman whose mother worked is 2.4 percentage points (or 3.7 percent) more likely to work herself and a woman whose mother-in-law worked is 3.5 percentage points (or 5.4 percent) more likely to work. Note that the magnitude of these coefficients is quite similar to that found in the GSS. These results support the hypothesis that both mother and mother-in-law work experience is significantly related to a woman's own labor supply choices.

# 3 Model of Intergenerational Matching

As described in our empirical findings, a woman's mother-in-law is just as good (if not better) of a predictor of her working status than her own mother. This result is consistent with the findings of Fernandez et al. who introduce a model to explain how this intriguing relationship might be due to mothers-in-law influencing daughters-in-law through their sons' preferences. In this section, we provide an alternative model to explain how this relationship may not be causal but instead an artifact of how people match. In other words, this statistical relationship may be due to assortative mating.

Fernandez et al. point out that a man with a working mother may differ from a man with a non-working mother in a number of ways. He may have a greater preference for a working wife, or, even if he has the same preferences, he may have greater household skills which make it less costly for his wife to work. Fernandez et al. illustrate that if the daughter-in-law chooses to work in order to increase her probability of marrying such a man or if her husband's household skills enable her to choose to work, then this may create a causal link between a mother-in-law's working status and her daughter-in-law's decision to work.

However, the same two channels, the preferences and skills of a man whose mother works, may explain why this statistical relationship is not due to that causal chain at all. Suppose that

a woman decides whether or not she wants to work first and whom she wishes to marry second. A working woman may prefer a man who supports her decision to work both emotionally and physically. If a man with a working mother is both more accepting of working women and more efficient at household tasks, then he is likely more desirable to a woman who wants to work. Therefore, we should expect them to match at a greater rate. Similarly, if men prefer women who are similar to their mothers, then there should be a higher probability that a working woman marries a man with a working mother than she marries a man with a non-working mother.

To illustrate this, we introduce a simple overlapping-generations style model. In each period there are two generations of women, elder and younger. In each period $t$, the elder women have a daughter (and a son). Each daughter is born either type $W$, a worker, or type $NW$, a non-worker. In period $t$ she is born and marries. In period $t+1$, she has children of her own and then dies. For simplicity, we assume the population size is constant in each period. For each time $t$, let $WE_t$, $NWE_t$, $WY_t$, and $NWY_t$ denote the number of working elders, non-working elders, working youngers, and non-working youngers respectively at time $t$. In this model, the sole causal determinant of a woman's working status is the working status of her mother. Specifically, if a woman works, her daughter will work with probability $\rho$. If a woman does not work, then her daughter will not work with probability $\phi$. This defines a Markov process with transition matrix:

$$\begin{pmatrix} \rho & 1-\phi \\ 1-\rho & \phi \end{pmatrix}$$

$WE_t$, $NWE_t$, $WY_t$, and $NWY_t$ are related by the following two equations:

$$\rho \times WE_t + (1-\phi) \times NWE_t = WY_t \tag{1}$$

$$(1-\rho) \times WE_t + \phi \times NWE_t = NWY_t \tag{2}$$

In the limit, the number of mothers that work equals the number of daughters that work. We denote the steady state number of mothers that works and don't work by $WM$ and $NWM$, respectively. It is straightforward to show that steady state number of woman that work each period is:

$$\frac{(1-\phi)}{(1-\rho)+(1-\phi)} \times N \tag{3}$$

The men in this model are homogeneous except for the working status of their mothers. Therefore, we define a man to have type $W$ if his mother has type $W$. Type $NW$ is defined analogously.

In this model, assortative mating is the probability that a woman marries a man of the same type. This is equivalent to the probability a woman is of the same type as her mother-in-law. Define $\lambda_W^t$ to be the probability that a man of type W marries a woman of type W. It is entirely possible that $\lambda_W^t > \rho$. This is precisely the situation where a mother-in-law is a better predictor of a woman's working status than her own mother even though there is no direct causal link from mothers-in-law to daughters-in-law.

Since all women marry, $\lambda_W^t$ completely determines $\lambda_{NW}^t$, the probability a man of type $NW$ marries a woman of type $NW$. In particular, for every period $t$, it must be that:

$$\lambda_W^t \times WY_t + (1 - \lambda_{NW}^t) \times NWY_t = WE_t \tag{4}$$

Note that in a steady state it is possible for there to be perfect assortative mating ($\lambda_W^t = \lambda_{NW}^t = 1$) since the number of working (respectively non-working) daughters equals the number of working (respectively non-working) mother-in-laws. However, in a steady state $\lambda_W^t$ and $\lambda_{NW}^t$ are restricted by the population sizes being matched. For example, if 80 percent of women work, then the minimum probability that a working woman's daughter-in-law works is 75 percent. Otherwise, even if every non-working mother's daughter works, it will not be possible to have 80 percent of daughters working.

Equation 4 motivates a second alternative explanation. The way mothers-in-law and daughters match is a dependent system of equations, so it is not possible for a pattern to exist among one type without it affecting the correlation of the other types. In our two-generation model, as in any data set, the population of mothers and daughters at a given time is fixed. The conditional probability that a daughter works given that her mother works is the cardinality of the set of working daughters with working mothers divided by the cardinality of the set of daughters of working mothers. Similarly, the conditional probability that the a daughter-in-law works given that her mother-in-law works is the cardinality of the set of working daughter-in-laws with working mother-in-laws divided by the cardinality of the set of daughter-in-laws of working mother-in-laws. Since every woman has both a daughter and daughter-in-law, the set of working mothers coincides exactly with the set of working mothers-in-law and the set of daughters of working mothers has the same cardinality as the set of daughters-in-law of working mothers-in-law. Therefore, the statement there is a higher probability that a woman works if her mother-in-law works than if her mother works is equivalent to the statement that the cardinality

of the set of working daughters with working mothers is less than the cardinality of the set of working daughters-in-law with working mothers-in-law.

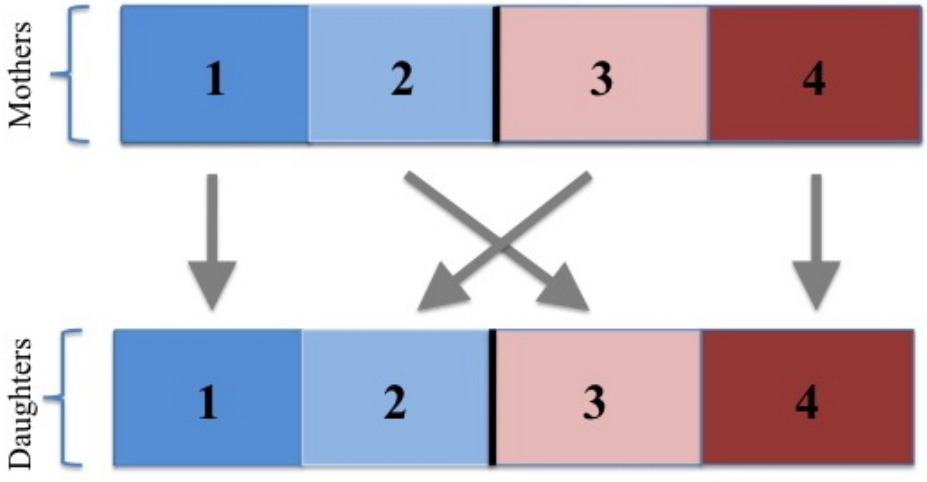
The key point is that the cardinality of the sets of working and non-working mothers, daughters, and in-laws forms a dependent system of equations since the set of mothers and mothers-in-law is one and the same. Therefore, it is impossible to have a relationship between one type of woman without implying a complementary relationship with the other type. As a result, our observed relationship between a working woman and her mother-in-law may actually be the biproduct of the relationship between non-working women and their mother-in-law.

To illustrate this, we abstract away from the working and non-working types and show that for arbitrary types, a relationship between any two types completely defines the relationship between all types. In the present context, we think of the types as working and non-working women, but the results would be true for any groups. We consider two generations, mothers and daughters, two relationships, in-laws or direct relatives, and two types, A and B. Using this convention, we denote the set of mothers who are type A and have a daughter of type B by *MDAB*. The set of daughter-in-laws who are type A but whose mother-in-law is of type B is denoted *DIBA*

In general, we label each set $XYWZ$ where:

- $X$ is a $M$ if the woman is a mother and a $D$ if the woman is a daughter.
- $Y$ is an $I$ if we are considering in-laws and a $D$ if we are considering direct family members.
- $W$ is the type of the mother or mother-in-law.
- $Z$ is the type of the daughter or daughter-in-law.

Every person is in exactly two sets. For example a woman of type A whose daughter is of type A and whose daughter-in-law is of type B is in both the sets $MDAA$ and $MIAB$.




The number of mothers and daughters of each type is fixed. Moreover, each mother (respectively daughter) is matched to exactly one daughter and daughter-in-law (respectively mother and mother-in-law). Therefore, the following relationships hold:

$$|MDAA| + |MDAB| = |MIAA| + |MIAB| \tag{5}$$

$$|MDBA| + |MDBB| = |MIBA| + |MIBB| \tag{6}$$

$$|DDAB| + |DDBB| = |DIAB| + |DIBB| \tag{7}$$

$$|DDAA| + |DDBA| = |DIAA| + |DIBA| \tag{8}$$

Moreover, each mother (respectively daughter) is matched to exactly one daughter and daughter-in-law (respectively mother and mother-in-law). Therefore, the following relationships hold:

$$|MXYZ| = |DXYZ| \text{ for all } X \in \{D, I\}, Y \in \{A, B\}, Z \in \{A, B\} \tag{9}$$

Combining these yields the following relationships:

$$|MDAA| + |MDBA| = |MIAA| + |MIBA| \tag{10}$$

$$|MDAB| + |MDBB| = |MIAB| + |MIBB| \tag{11}$$

For example, Eq. 10 follows from:

$$\begin{aligned} |MDAA| + |MDBA| &= |DDAA| + |DDBA| \\ &= |DIAA| + |DIBA| \\ &= |MIAA| + |MIBA| \end{aligned}$$

Suppose, for example, that $|MDAA| < |MIAA|$. This is equivalent to the statement if a woman's mother-in-law is of type A, she is more likely to be of type A than if her own mother is of type A. Since $|MDAA| + |MDBA| = |MIAA| + |MIBA|$ (Eq. 10), it necessarily follows that $|MDBA| > |MIBA|$. Since $|MDBA| + |MDBB| = |MIBA| + |MIBB|$, Eq. 11, and $|MDBA| > |MIBA|$, it necessarily follows that $|MDBB| < |MIBB|$.

Therefore, if $|MDAA| < |MIAA|$, mechanically it must be true that $|MDBB| < |MIBB|$ as well. As a result, there is a limit to the patterns we may see in the data. For example, if a working mother-in-law is a better predictor of whether or not a daughter-in-law works than a working mother, it must also be true that a non-working mother is a better predictor and vice versa. Therefore, when we observe such a pattern in the data, it is impossible to tell if this is a function of the way working women match with a mother-in-law or the way non-working women match.

# 4 Discussion and Conclusion

Fernandez, Fogli, and Olivetti (2004) find that a woman's labor force participation is correlated with the labor supply of her husband's mother while he was growing up. Contrary to other work in this area, they find no relationship between a woman's labor supply and that of her own mother while she was young. We do confirm the lack of a relationship in the comparatively small data set, Female Labor Force Participation and Marital Instability (FLFPMI) survey. However, using data from the larger Survey of Income and Program Participation (SIPP) and from the General Social Survey (GSS), we demonstrate a significant and robust correlation between a woman's labor supply behavior and that of her own mother. We further show that the original empirical results using the FLFPMI are fragile.

Our results suggest that the working behaviors of women and their own mothers are correlated. In light of this, the intergenerational effects posited in Section III of Fernandez et al.

must be reinterpreted as including the effect of intergenerational transmission from mothers to daughters in addition to that from mothers to sons.

Our empirical results do confirm a surprising finding of Fernandez et al.: a woman's mother-in-law is just as good, if not better, of a predictor of her working status than her own mother. We present a model that describes how a link between a mother-in-law's and daughter-in-law's labor supply behavior need not be due to a mother-in-law directly influencing a daughter-in-law. On the contrary, a woman could form preferences for working based solely on the labor force participation of her own mother, but then choose to assortatively mate with a man whose mother worked. Although the only direct link is from mothers to daughters, the matching of men and women could lead to a stronger correlation of labor force participation choices between mothers-in-law and daughters-in-law relative to mothers and daughters.

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Table 1: GSS: All Mothers' Work Variables

| **YEAR** | **MAWRK GRW** | **MAWORK 14** | **MAWORK** | **MAWK BABY** | **MAWK BORN** | **MAWK 16** |
|---|---|---|---|---|---|---|
| | While Growing Up | After Born and Before Age 14 | After Married | Before 1st Grade | After Born and Before 1st Grade | Around Age 16 |
| **1975** | | | X | X | | X |
| **1976** | | | X | X | | X |
| **1977** | | | X | X | | X |
| **1978** | | | X | X | | X |
| **1980** | | | X | X | | X |
| **1982** | | | X | X | | X |
| **1983** | | | X | X | | X |
| **1984** | | | X | | | |
| **1985** | | | X | | | |
| **1986** | | | X | | | |
| **1987** | | | X | | X | |
| **1988** | | X | X | | X | |
| **1989** | | | X | | X | |
| **1990** | | | X | | X | |
| **1991** | | | X | | X | |
| **1993** | | | X | | X | |
| **1994** | X | X | | | X | |
| **1996** | X | | | | | |
| **1998** | X | | | | | |
| **2000** | X | | | | | |
| **2002** | X | X | | | | |
| **2004** | X | | | | | |
| **2006** | X | | | | | |
| **2008** | X | | | | | |
| *Men Sample (Mothers-in-Law)* | | | | | | |
| Labor Supply of Mothers-in-Law | 0.646 | 0.544 | 0.616 | 0.184 | 0.252 | 0.329 |
| Sample Size | 2,490 | 480 | 3,287 | 1,418 | 1,370 | 1,449 |
| *Women Sample (Mothers)* | | | | | | |
| Labor Supply of Mothers | 0.666 | 0.547 | 0.655 | 0.201 | 0.217 | 0.397 |
| Sample Size | 2,944 | 616 | 3,843 | 1,670 | 1,605 | 1,699 |

Notes: This table shows the years when each labor force participation variable was collected.

Table 2: GSS: Labor Force Participation of Mothers and Mothers-in-Law

**MEN SAMPLE (Mothers-in-law)**

| | Preferred Specification (1) | Wife's Vars (2) | Respondent Background (3) | Age 30-50 (4) |
|---|---|---|---|---|
| **Mother-in-Law Worked** | 0.041** | 0.035* | 0.046* | 0.037* |
| | (.018) | (.018) | (.028) | (.022) |
| Num. of Children & Babies, Wife's Education | | X | X | |
| Husband's Age 16 Vars | | | X | |
| Observations | 2,490 | 2,461 | 1,071 | 1,651 |
| Mean Wife Works | 0.767 | 0.769 | 0.782 | 0.775 |
| Mean Mother Worked | 0.646 | 0.645 | 0.645 | 0.660 |

**WOMEN SAMPLE (Mothers)**

| | Preferred Specification (1) | Wife's Vars (2) | Respondent Background (3) | Age 30-50 (4) |
|---|---|---|---|---|
| **Mother Worked** | 0.074*** | 0.071*** | 0.077*** | 0.086*** |
| | (.018) | (.018) | (.026) | (.022) |
| Num. of Children & Babies, Wife's Education | | X | X | |
| Wife's Age 16 Vars | | | X | |
| Observations | 2,944 | 2,918 | 1,180 | 1,974 |
| Mean Wife Works | 0.745 | 0.746 | 0.801 | 0.758 |
| Mean Mother Worked | 0.666 | 0.665 | 0.681 | 0.689 |

Mothers' work variable is whether the mother worked for pay while the child was growing up. Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Marginal effects from probit models are reported. The dependent variable is whether the wife participated in the labor force. Each specification includes year fixed effects, a quadratic in both husband's and wife's age, and the husband's years of schooling (linear). Babies is the number of children under age six in the household and children is the total number of children. Variables measured at age 16 are mother's and father's years of schooling, religion, income, residence, and region.

Table 3: GSS: All Alternative Work Variables

| | **MAWRK GRW** | **MAWORK14** | **MAWORK** | **MAWK BABY** | **MAWK BORN** | **MAWK16** |
|---|---|---|---|---|---|---|
| | While Growing Up 1994-2008 | After Born and Before Age 14 1988 1994 2002 | After Married 1975-1993 | Before 1st Grade 1975-1983 | After Born and Before 1st Grade 1987-1994 | Around Age 16 1975-1983 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | | **MEN SAMPLE (Mothers-in-law)** | | | |
| **Husband's Mother Worked** | 0.041** | 0.041 | 0.008 | 0.059* | 0.035 | 0.049* |
| | (.018) | (.043) | (.019) | (.035) | (.028) | (.030) |
| Observations | 2,490 | 480 | 3,287 | 1,418 | 1,370 | 1,449 |
| Mean Wife Works | 0.767 | 0.708 | 0.613 | 0.524 | 0.723 | 0.523 |
| Mean Mother Worked | 0.646 | 0.544 | 0.616 | 0.184 | 0.252 | 0.329 |
| | | | **WOMEN SAMPLE (Mothers)** | | | |
| **Wife's Mother Worked** | 0.074*** | 0.015 | 0.025 | 0.061* | 0.023 | 0.047* |
| | (.018) | (.038) | (.018) | (.031) | (.028) | (.026) |
| Observations | 2,944 | 616 | 3,843 | 1,670 | 1,605 | 1,699 |
| Mean Wife Works | 0.745 | 0.712 | 0.597 | 0.516 | 0.700 | 0.514 |
| Mean Mother Worked | 0.666 | 0.547 | 0.655 | 0.201 | 0.217 | 0.397 |

Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Marginal effects from probit models are reported. The dependent variable is whether the wife worked. The specification mirrors Column 1 of Table 2 and includes year fixed effects, a quadratic in husband's and wife's age, and husband's years of schooling. The key explanatory variables are described in Table 1.

Table 4: FLFMPI: Labor Force Participation of Mothers and Mothers-in-law

*Dependent Variable: Whether the wife works*

| | Mother-in-Law Only (1) | Mother Only (2) | Preferred Specification (3) | Wife's Vars (4) | Parents' Education (5) | Wife Age 30-50 (6) |
|---|---|---|---|---|---|---|
| **Mother-in-Law Worked** | 0.040 | | 0.040 | 0.039 | 0.059* | 0.033 |
| | (.025) | | (.025) | (.025) | (.030) | (.032) |
| **Mother Worked** | | -0.0004 | -0.002 | 0.002 | 0.025 | -0.020 |
| | | (.025) | (.025) | (.025) | (.031) | (.032) |
| Num. of Children & Babies, Wife's Education | | | | X | X | |
| Parents' Education | | | | | X | |
| Difference | | | 0.042 | 0.037 | 0.034 | 0.053 |
| | | | (.035) | (.036) | (.044) | (.046) |
| Observations | 1,515 | 1,515 | 1,515 | 1,510 | 1,008 | 919 |
| Mean Wife Works | 0.662 | 0.662 | 0.662 | 0.662 | 0.663 | 0.661 |
| Mean Mother-in-Law Worked | 0.483 | 0.483 | 0.483 | 0.483 | 0.478 | 0.440 |
| Mean Mother Worked | 0.506 | 0.506 | 0.506 | 0.505 | 0.489 | 0.478 |

Notes: Robust standard errors are in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Marginal effects from probit models are reported. The dependent variable is whether the wife worked. All specifications includes a quadratic in both husband's and wife's age and the husband's years of schooling (linear).

Table 5: FLFMPI: Different Definitions of Mothers' Labor Force Participation

*Dependent Variable: Whether the wife works*

| | Mother Worked: | | | |
|---|---|---|---|---|
| | All of the Time | All or Most of the Time | All, Most, or Half the Time | Worked at All |
| | (1) | (2) | (3) | (4) |
| **Mother-in-Law Worked** | 0.119*** | 0.033 | 0.060** | 0.040 |
| | (.034) | (.028) | (.025) | (.025) |
| **Mother Worked** | -0.045 | -0.025 | -0.031 | -0.002 |
| | (.041) | (.029) | (.026) | (.025) |
| Difference | 0.172*** | 0.059 | 0.092** | 0.042 |
| | (.057) | (.041) | (.037) | (.035) |
| Observations | 1,515 | 1,515 | 1,515 | 1,515 |
| Mean Wife Works | 0.662 | 0.662 | 0.662 | 0.662 |
| Mean Mother-in-Law Worked | 0.122 | 0.234 | 0.345 | 0.483 |
| Mean Mother Worked | 0.104 | 0.235 | 0.343 | 0.506 |

Notes: Robust standard errors are in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. Marginal effects from probit models are reported. The dependent variable is whether the wife worked. The definition of "mother worked" varies by column as indicated.

Table 6: SIPP: Labor Force Participation of Mothers and Mothers-in-Law

*Dependent Variable: Whether the wife works*

| | Mother-in-Law Only (1) | Mother Only (2) | Preferred Specification (3) | Wife's Vars (4) | Parents' Education (5) | Wife Age 30-50 (6) |
|---|---|---|---|---|---|---|
| **Mother-in-Law Worked** | 0.038*** | | 0.035*** | 0.032*** | 0.034*** | 0.038*** |
| | (.009) | | (.009) | (.009) | (.010) | (.011) |
| **Mother Worked** | | 0.028*** | 0.024*** | 0.025*** | 0.029*** | 0.023** |
| | | (.009) | (.009) | (.009) | (.010) | (.010) |
| Children, Wife's Ed | | | | X | X | |
| Mothers' and Fathers' Ed | | | | | X | |
| Difference | | | 0.011 | 0.007 | 0.005 | 0.016 |
| | | | (.013) | (.013) | (.015) | (.016) |
| Observations | 12,869 | 12,869 | 12,869 | 12,869 | 12,869 | 8,122 |
| Mean Wife Works | 0.648 | 0.648 | 0.648 | 0.648 | 0.648 | 0.693 |
| Mean Mother-in-Law Worked | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 | 0.397 |
| Mean Mother Worked | 0.413 | 0.413 | 0.413 | 0.413 | 0.413 | 0.434 |

Robust standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1% Marginal effects of the probit model are presented. The dependent variable is WIFEWORK, as described in the text. Controls for year, husband's and wife's age (quadratic) and husband's years of schooling are included in all specifications. Columns 1-5 include couples where the husband and wife are between ages 25 and 64. Column 6 restricts the sample to women aged 30-50.