The Reaction of Japanese Wives’ Labor Supply to Husbands’ Job Loss

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Abstract

This paper examines how Japanese wives react to their husbands’ involuntary job loss, and tests the existence of complementarity of a wife’s labor supply to her husband’s. Utilizing panel data on Japanese households from 1993 to 2004, we found that wives’ labor supply is stimulated when husbands suffer involuntary job loss. The detailed statistics show that not only do working wives raise their labor hours but also nonworking wives begin to participate in the labor market. The added worker effect is evident during the period of job insecurity in Japan following the mid-1990s.

Key Words: Added worker effects, Intrahousehold risk-sharing, Female labor supply, Unemployment shocks

JEL Classification Number: D12, J22, E21, C23

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1 Introduction

Unemployment rates in Japan have skyrocketed since the mid-1990s. Both young unskilled workers and middle-aged male workers have been laid off. How have Japanese households reacted to these changes? This paper examines their reactions to husbands’ involuntary job loss, focusing on wives’ labor supply.

When a household’s main income earner, usually the husband, loses his job, other household members, especially the wife, might supply more labor either sequentially or simultaneously to compensate for the husband’s job loss. Figure 1 shows changes in husbands’ and wives’ employment rates in Japan, calculated from the data used in this paper. Husbands’ and wives’ employment rates move in opposite directions, suggesting the possibility that wives’ labor supply is complementary to husbands’ job losses. This is called the "added worker effect" and has been examined in several countries. Heckman and MacCurdy (1985) use data from the Panel Study of Income Dynamics for 1968 to 1975 to show that the wife participates more in labor markets when the husband is unemployed. In contrast, Lundberg (1985) and Cullen and Gruber (2000) show that the added worker effect may exist but is quite small in the United States. Bingley and Walker (2001) solve the endogeneity problem of the husband’s unemployment and the wife’s labor supply,
and show that the added worker effect is small but that it becomes large when the husband’s unemployment period is long. Stephens (2002) emphasizes the use of involuntary job loss as an exogenous employment shock and shows that the wife’s labor supply does not react promptly to the husband’s involuntary job loss.

As for Japanese households, an explicit test of the added worker effect has not been conducted so far, although there is research examining the relationship between the wife’s labor force participation and the husband’s income. For example, Higuchi (2001) shows that a wife’s labor supply increases as her husband’s moving average income over the previous three years decreases. Kawaguchi (2002) gives a comprehensive survey of the empirical results on this topic in Japan. It is important to examine the existence of the added worker effect in Japan for three reasons. First, Japan has experienced a sharp rise in unemployment and a dramatic change in employment atmosphere in the past decade, which provides us with a suitable example to examine the changes in households’ economic behavior such as labor supply and consumption. We can add another result to the existing arguments on the added worker effect.

Second, Japan is famous for having a large proportion of women who are housewives, especially among wealthy households. Many women be-
come housewives after marriage or at least after having a child. It is interesting to observe how Japanese labor-risk-sharing within a household has changed (or not changed) after about three percentage point rise in middle-aged male unemployment. Third, Japan is known for its households’ high saving rates. As drawing down savings could be one way to cope with the main earner’s job loss, the amount of savings can make a difference to a household’s labor-risk-sharing. The Japanese data may reveal interesting differences from other countries’ results. Consideration of household savings as well as of wives’ labor supply is important also because these two decisions are inseparable in consumer utility maximization.

The present paper examines how Japanese wives’ labor supply responds to their husbands’ involuntary job loss, considering the possibility that endogenous saving behaviors affect a wife’s labor supply. The analysis requires us to control for household characteristics, which are seldom observed or available. We utilize panel data containing extensive household information. Furthermore, our sample period (1993–2004) includes the period when Japan’s unemployment rate increased dramatically. Conducting an empirical investigation controlling for endogenous savings, we find that a wife’s labor supply is actually stimulated by her husband’s involuntary job loss. The detailed statistics suggest that not
only did working wives raise their work hours, but also nonworking wives came to participate in the labor market. Moreover, nonworking wives started seeking work when their husbands lost their jobs. The added worker effect does exist during the high unemployment period in Japan following the mid-1990s. The effect could become large if we counted potential labor supply.

The rest of the paper consists of four sections. Section 2 explains the empirical model. Section 3 introduces the data used in the empirical analysis. Section 4 presents the estimation results. The final section concludes the paper.

2 The Estimation Model

We test the existence of the wife’s added worker effect in response to the husband’s involuntary job loss. Denoting $i$ as household and $t$ as survey year ($i = 1, \ldots N, t = 1, \ldots, T_i$), the estimated equation is

$$Wfl_{it} = \alpha HU_{it} + \beta Wfl_{it-1} + \gamma S_{it} + X\delta + \varepsilon_{it},$$

(1)

where $Wfl$ is the wife’s paid labor hours, $HU$ is whether or not the husband is unemployed involuntarily, $S$ is the amount of financial assets at a survey point, and $X$ is a matrix of the household’s other characteristics.

We write the error components as $\varepsilon_{it} = \mu_i + u_{it}$, where $\mu_i \sim IID(0, \sigma^2_{\mu})$, \n
\( u_{it} \sim IID(0, \sigma^2_u) \). \( E(\mu_i u_{is}) = 0 \) \( \forall \ i \) and \( t \), \( E(u_{it} u_{is}) = 0 \) for \( t \neq s \), and \( u_{it} \) is uncorrelated to all the explanatory variables in the equation (1).

We assume parameters, \( \alpha, \beta, \gamma, \delta \) are identical among households. The wife’s previous year’s labor hours are included in explanatory variables, because it may have durability, a correlation between two sequential time periods. Following Arellano and Bond (1991), we first take the first-difference to remove individual fixed effects,

\[
\Delta Wfl_{it} = \alpha \Delta HU_{it} + \beta \Delta Wfl_{it-1} + \gamma \Delta S_{it} + \Delta X_{it} \delta + \Delta \varepsilon_{it},
\]

(2)

and then conduct GMM estimation using appropriate instruments of \( Z = [Z'_1, Z'_2, \ldots, Z'_N]' \) where \( E(Z'_i \Delta \varepsilon_i) = 0 \). The possible instruments are \( W fl_{i1}, \ldots, W fl_{it-2}, S_{i1}, \ldots, S_{it}, x'_{i1}, \ldots, x'_{it} \) for \( \Delta Wfl_{it-1} \), where \( x_i \) is a vector of all the exogenous variables in \( X_{it} \). If the added worker effect exists, we should find a positive \( \alpha \).

In this specification, the amount of savings, \( S_{it} \), might be endogenous: \( E(S_{it} \varepsilon_{is}) \neq 0 \) \( \forall \ s \leq t \). The wife’s labor decisions may affect the household saving decisions, or unobserved components in the error term may be correlated with amounts of savings. In this case, the instruments are \( W fl_{i1}, \ldots, W fl_{it-2}, S_{i1}, \ldots, S_{it-2}, x'_{i1}, \ldots, x'_{it} \) for \( \Delta Wfl_{it-1} \).

Households’ precautionary behaviors may differ, which affects wives’ reaction to husbands’ employment shocks. For example, precautionary
savings may play an important role in wives’ labor supply decisions. To take this into account, we use another specification including the previous year’s amounts of savings ($S_{it-1}$) as an additional explanatory variable into (1). Controlled variables in $X_{it}$ are mostly based on the past literature testing an added worker effect, such as family needs and a wife’s age. Time-invariant variables are dropped by the first-difference operation. The interaction terms with a wife’s educational attainments are included, as educational attainments may be essential in the Japanese household’s economic decisions\footnote{The difference in income risks among households can be partly controlled by income or consumption variances within a household. We estimated the specification including income or consumption variances, but the following results are unchanged.}.

As the past literature suggests, there may be another endogeneity problem between the wife’s labor supply and the husband’s job loss. The more hours the wife works, the more easily the husband may choose to quit a job. As is dealt with in Stephens (2002), we use involuntary job loss but not job quit to pick up exogenous employment shocks.

3 The Data

The present paper uses the *Japanese Panel Survey of Consumption* (JPSC, hereafter) conducted by the Institute for Household Economy in Japan. The survey questions women aged between 24 and 34 in the starting year of 1993. The women are asked about their families...
and themselves in regard to labor status including questions about job
change, income, occupation and labor hours, consumption and saving
behavior, and asset holdings.

The survey collects detailed information on job changes by the hus-
band during the previous year. Using the survey information, we can
identify those husbands who quit their jobs at least once during the pre-
vious year. We can further distinguish whether or not the job quit was
involuntary by looking at the reasons for it. Involuntary reasons include
being laid off, the plant closing, or bankruptcy.

The JSPC asks respondents separate questions about their paid reg-
ular working hours, their paid overtime working hours, and their unpaid
overtime working hours. We sum paid regular and overtime working
hours because we are interested in looking at whether the wife com-
penates for the husband’s income loss. As expected, however, factors
other than complementarity with the husband’s income could also cause
an increase in the wife’s labor supply. For example, if the wife’s firm
is growing or if she is promoted as her job tenure increases, her work-
ing hours may increase regardless of whether her labor supply and her
husband’s labor supply are complementary. To control for these effects,
we exclude unpaid overtime working hours and define this as the wife’s
working hours. This is zero for nonworkers.
Regarding household saving, the survey collects data on the stock of saving (the outstanding balance of savings accounts and holdings of securities) at each survey point. Other controlled variables are the wife’s age, its interaction with a high school graduate dummy, the wife’s number of children, and its interaction with the high school graduate dummy. As mentioned, time-invariant variables are dropped by the first-difference operation.

Twelve waves of the JPSC, from 1993 till 2004, are available, but our estimation uses (at most) nine differenced periods from 1995–96 to 2003–04. This is because two-year lagged information is needed to instrument for the first-differenced transformation of one-year lagged wife’s labor hours. The sample is also limited to married women, to a nonself-employed sample, and to the sample containing sufficient variables required in the regressions. The total observation number is 5079 (995 households) for the estimation under an assumption of exogenous financial assets, and 4860 (975 households) under an assumption of endogenous financial assets. The descriptive statistics are summarized in Table 1.

Before introducing the estimation results, we first overview households’ reactions to unemployment shocks using this data set. Panel A in Table 2 shows how many households face the "husband’s involuntary
job loss" as defined above. About 1.8% of the households experienced the husband’s involuntary job loss between 1993 and 2004. The JPSC further asks about income sources when the husband was laid off. Although 40% do not have unemployment periods, a quite high percentage answers "wife’s or parent’s income". The wife’s labor may be an important candidate to complement the husband’s labor.

The JPSC further ask wives about what happened to family members apart from herself in the previous year. As in Panel B of Table 2, the observations answering "retirement, laid off, job quit, plant closed, or bankruptcy" total 4.47% out of 9406 observations. The respondents are also asked about how they managed the situation. Although the highest response is "take no special action", the second highest is "draw down money", which is higher than the cases that received any kind of insurance. Savings may be an important source for unemployed households. In the following regressions, we estimate the effect of the husband’s involuntary job loss on the wife’s labor supply controlling for household savings. Note that our estimation uses the husband’s involuntary job loss defined in Panel A as a proxy for the husband’s involuntary job loss, because the information on "family’s job loss" in Panel B includes the nonmain-earner’s job losses and voluntary job losses.
4 Results

Table 3 summarizes the results of the reaction of a wife’s labor supply to her husband’s involuntary job loss. Financial assets are assumed as exogenous in Columns (1) and (2), and endogenous in (3) and (4). The previous year’s financial assets are included in Columns (2) and (4). In either specification, there is no second-order serial correlation for the disturbances of the first-differenced equation \( E(\Delta u_{it}\Delta u_{it-2}) = 0 \), which satisfies the assumption for a consistent GMM estimator. A chi-squared test (Sargan–Hansen test of overidentifying restrictions) accepts the assumption of no correlation between instruments and the error terms of structural equations in the case of endogenous financial assets but not in the case of exogenous financial assets. This suggests that financial assets should be treated as an endogenous variable.

The coefficient on the husband’s involuntary job loss is positive and significant at the 1% significance level in either specification. The husband’s job loss increases the wife’s paid labor hours by about eight hours per week. As our estimation is derived from about 1000 households over a maximum of nine years, an Arellano–Bond GMM estimator may have a finite-sample downward bias, as is usually criticized. So, we conducted one-step GMM estimation and found similar results: the coefficients on the husband’s job loss are 9.016, 8.750, 9.105, and 8.774, and their ro-
bust standard errors are 2.762, 2.726, 2.735, and 2.707, respectively, for Column (1), (2), (3), and (4) specifications in Table 3. That is, the wife raises her labor hours in response to her husband’s involuntary job loss.

The coefficient on the wife’s previous year’s labor hours is positive and significant at the 1% level, which implies the existence of durability in her labor hours. The coefficient on financial assets is negative and significant at least at the 10% level even after controlling for its endogeneity. That is, labor supply and savings are substitutes, and more saving (less consuming) households supply less labor (more leisure). Although the previous year’s savings are thought to be important in consideration of the existence of precautionary savings, the coefficients on the previous year’s financial assets are insignificant in either exogenous or endogenous specifications. Note, however, that this does not deny the importance of precautionary behavior. The previous year’s financial assets may not be a good proxy for precautionary behavior, or the first-differenced transformation may remove the household’s time-invariant precautionary behavior. As for other significant variables, households with more children decrease the wife’s labor hours. This is a natural result for mothers’ labor supply.

There are two possibilities when the wife reacts to the husband’s job loss: working wives raise their labor hours or nonworking wives start
working. Which happened in Japan? Table 4 summarizes the percentage of working wives and nonworking wives who reacted to the husband’s job loss. Although we do not have a big enough sample to examine empirically the changes in nonworking wives’ job status, the table shows an interesting apparent feature. Wives who had worked in the previous year and experienced the husband’s involuntary job loss raised their paid working hours much more than the wives who did not experience that. At the same time, wives who had not worked before the husband’s job loss and experienced the event started working more frequently than did those who did not have that experience. Furthermore, previously nonworking wives who faced a husband’s job loss started seeking work more frequently than those who did not. The percentage of wives who started working or seeking jobs is more than twice that of those with a husband’s involuntary job loss. Not only working wives but also nonworking wives reacted to their husbands’ job loss.

Thus, Japanese wives’ labor supply is complementary to their husbands’ job loss. During the high unemployment period following the mid-1990s, there exists an added worker effect not only for the working wives’ labor hours but also for nonworking wives’ new labor supply. The added worker effect could be greater, including a larger potential labor supply in the market.
5 Conclusion

In this paper, we examined how a wife’s labor supply responded to her husband’s involuntary job loss following the mid-1990s. We utilized panel data containing extensive household information, which are seldom observed or available but are indispensable for our analysis. This makes it possible for us to investigate wives’ leisure decisions, controlling for the effect of endogenous household savings on their leisure decisions. Furthermore, our sample period (1993–2004) included the period when Japan’s unemployment rates were very high and growing, which was advantageous when analyzing behavioral responses to changed economic conditions.

We found that a wife’s labor supply was actually stimulated by her husband’s involuntary job loss. The additional statistics indicate that not only working wives raised their labor hours but also nonworking wives began to participate in the labor market. In addition, nonworking wives started looking for jobs in response to their husband’s job loss. There exists an added worker effect during a period of job insecurity in Japan following the mid-1990s, and the effect would be larger if we included potential labor supply.
References


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# 日本の経済

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<td>日本の経済の状況を表す指標。GDPは、国民総生産の略称で、一定期間の間に生産される総合的な製品とサービスの現物価額を表します。</td>
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<td>日本の通貨は日本円と呼ばれます。</td>
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<tr>
<td>家計財産</td>
<td>家計の財産を表す指標。</td>
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<tr>
<td>人口</td>
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日本の経済は、経済成長の観点からも重要であり、国際的な観点からも注目されています。
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**Note:**

The table above shows the structured data related to various categories. Each row represents different entries, with columns denoting specific details or values associated with each entry.