PART-TIME WORK VS. FULL-TIME
WORK OF MARRIED WOMEN IN JAPAN

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ABSTRACT

In this paper, we attempt to resolve the drawbacks in previous
studies of the labor supply of women in Japan. We hypothesize here
that the response to the socioeconomic factors that influence the
decision to work varies among different groups of women, and we estimate
separately the labor supply of part-time employed, and that of full-
time employed, married women by using the 1980 Population Census
data for Japan.

The major finding is that there is a clear difference in the
labor supply behavior of women who are employed part time and those
who are employed full time. For example, the estimated elasticities
are noticeably different for the following factors: women's wages,
men's wages, the unemployment rate, the industry-mix variable, and
the provision of day-care centers and nursery schools.

Our empirical results suggest that, in public policy implementa-
tion, giving special attention to the specific characteristics of the
labor market of women in Japan would be useful and important in under-
standing the different responses to the factors influencing the deci-
sion to work among the different socioeconomic groups.

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I. INTRODUCTION

Over the two decades from the early 1960s to the present, the proportion of married women in the labor force as employees has grown conspicuously, from 32.7 percent in 1962 to 58.0 percent in 1981.[1] The 1980 Population Census of Japan reveals that approximately 50 percent of married women (with spouses present) in urban Japan were employed either part time or full time. The proportion of employed married women in urban Japan who worked part time was surprisingly large: 50 percent. For the purpose of assisting public policy implementation, it would be useful to understand the factors influencing the decision of women to join the labor market, both for part-time, and for full-time, employed married women. In this study, we hypothesize that the behavioral pattern will differ for part-time employed, and full-time employed, married women.

Among a number of the explanations for the steady increase in the labor force participation of married women in Japan is the notion that the changing industrial structure has influenced the nature of the composition of the labor force, e.g., the increasing proportion of married women as employees. The shortage of youth labor due to the unprecedented increase in the number of young people obtaining higher education compelled employers to hire married women in secondary and tertiary industries. In addition, the historic increase in women's life expectancy and the rapid decrease in marital fertility, by

increasing the number of years women can work, have made it possible for more married women to join the labor market.

In previous studies of the labor force behavior of women in Japan, the estimates of the effect of women's wage rate on their labor supply differ sharply according to the type of data on the labor supply of women used. In particular, there are three noticeable drawbacks in those studies. First, the studies do not isolate employees from self-employed and unpaid family workers, e.g., Hamilton (1979). Second, the studies do not differentiate part-time employed women from their full-time counterparts, e.g., Nagano (1980) and Shimada et al. (1981), as summarized by Hill (1982). Third, the studies do not separate married women from single women, e.g., Hill (1984).

The first drawback often results in observed negative estimates of women's wage rates in models of their labor supply. The second one indicates that the difference in the response to socioeconomic factors by part-time and full-time employed women is totally ignored. Finally, the third drawback is that the estimates obtained from the models, in which married women and single women are lumped together, produce misleading policy implications because the behavioral pattern of labor supply decisions of married women differs that of single women in response to socioeconomic factors.

The present paper specifically focuses on the difference in the behavioral response to the socioeconomic factors that affect the labor supply decision of part-time and full-time employed women. To eliminate the drawbacks arising from the previous analyses, we apply a logit

model to the labor supply of married women in urban Japan, rather than to the labor supply of part-time and full-time employed married women lumped together. The logit model with a discrete-choice variable is considered a closer approximation of the reality of the labor supply decision for married women than the models with a continuous dependent variable, e.g., working hours, in Japan (Shimada and Higuchi 1985). In other words, this study will assist in the understanding of the labor supply of married women in contrast to most previous studies, which treated married women together with single women in the labor supply models.

The organization of the subsequent sections is as follows: Section II describes our method of analysis of the labor supply of married women and briefly mentions theoretical predictions of the variables in the model. Section III reports the empirical results. Finally, Section IV gives our conclusion.

II. METHOD OF ANALYSIS

The variables in our model are cross-sectional market averages obtained from the 1980 Population Census of Japan. The units of observation are the 47 prefectures of Japan.[2] Cain and Dooley (1976) and Link and Settle (1981) discuss the advantages of models that use cross-sectional market averages [3]; variations in tastes and transitory wages within a given geographical area can be averaged out. In addition, by treating part-time and full-time employment of married women in separate models, differentiating married women from all women, and urban Japan from all of Japan, will represent a relatively homogeneous group of married women and produce consistent estimates of the structural parameters.

Our model assumes that each individual married women has a choice either to participate in the labor force as an employee or not.[4] The logit model of the labor supply of married women is defined as follows:

$$P = F(Y) = 1 / (1 + e^{-AX}), \quad \ldots \ldots \quad (1)$$

where P is the probability of participation in the labor force, $F(\cdot)$ is the cumulative logistic probability function, and X is a vector of independent variables (a subscript is omitted for brevity). P in the model is not observable and is limited between 0 and 1. The variable for P in our model uses three different measures: LFPART, the proportion of married women over age 15 who participate in the labor force as part-time employees; LFFULL, the proportion of married women over age 15 who participate in the labor force as full-time employees; and LFPR, the proportion of married women over age 15 who are either

part-time employed, full-time employed, or unemployed, married women.[5]

Our econometric model is defined as follows:

$$LF^* = g(\underset{+}{LNWOMW}, \underset{-}{LNMALW}, \underset{+}{INDMIX}, \underset{+ \text{ or } -}{UNEMPL}, \underset{-}{EDUCAT}, \underset{+}{NURSER}), \quad \ldots\ldots \quad (2)$$

where $LF^* = \log(P/(1-P))$ and the variables in equation (2) are defined in Table 3. Equation (2) is estimated with the weight, WGT = (TOTMAR x P x (1-P))$^{1/2}$ in which TOTMAR is the number of total married women, 15 years of age and over.[6]

The symbols under each variable in the model indicate the expected sign of the estimated regression coefficients. The rationale for these expected signs is well understood in the literature (e.g., Cain and Dooley 1976; Dooley 1982; Fields 1976; Long and Jones 1980; and Mincer 1962), which we may summarize briefly here. Women's market wages in a natural logarithm (LNWOMW) will have a positive effect on the participation of married women in the labor force because the higher market wages will cover more individuals with different reservation wages, ceteris paribus (Ben-Porath 1973). The expected sign of an industry-mix variable (INDMIX), which represents employment opportunities for women, is positive since the variable measures the relative importance of industries that are relatively heavy employers of women (Bowen and Finegan 1969; Fields 1976).[7] The effect of the market unemployment rate (UNEMPL) is ambiguous, although a negative discouraged worker effect seems to dominate a positive added worker effect, in Japan (Furugori 1980; Shimada and Higuchi 1985) and in the United States (Dooley 1982). The proportion of pre-school children who attend either

day-care centers or nursery schools (NURSER) will have a positive effect because of the potential opportunity for married women with pre-school children to substitute those services for their own time-inputs in child-rearing (Schultz 1978).

Now we examine the difference in the behavioral response between part-time and full-time employed married women to the socioeconomic factors affecting their labor supply decision.

III. EMPIRICAL RESULTS

We applied the logit model of the labor supply of the married women to the 1980 Population Census data for Japan by the method of generalized least squares (GLS). The empirical estimates are given in Table 1. The first column in the table reports the results for the model of the part-time labor supply of married women (LFPART), the second for the model of their full-time counterparts (LFFULL), and the third for the model of the labor force participation rate of married women (LFPR).[8] The corresponding elasticities at the sample means are reported in Table 2.

In each of the three models in Table 1, the women's wages (LNWOMW)[9] are statistically significant. We obtain the positive sign by differentiating employees from self-employed and unpaid family workers in contrast to the negative coefficients obtained by Hamilton (1979) and Umetani (1972), which treated the three groups together as the female labor supply. The estimated own-wage elasticities of the part-time employed married women (LFPART), the full-time employed married women (LFFULL), and the labor force participation rate of married women (LFPR) are 0.65, 0.15, and 0.63, respectively, as reported in Table 2. The relatively large own-wage elasticity for the part-time employed married women indicates the strong substitution between leisure, work at home, and work in the labor market, compared with the own-wage elasticity of the full-time employed married women. A recent study by Hill (1984) based on the 1970 Population Census data reports 0.44 for the own-wage elasticity of all females in all of Japan. In addition to the sample differences in time and data, the reason for the different own-wage

elasticity obtained by Hill probably comes from the fact that the part-time and full-time employed married women as well as those single women were lumped together as the female labor supply. Shimada and Higuchi (1985) report the own-wage elasticities for female labor supply in the range of 0.50 (ages 30-34) and 0.04 (ages 35-39) based on time-series quarterly data, 1967-81, while their estimates on the own-wage elasticity based on cross-sectional micro data in 1977 are negative for married women ages 25-34, but postive ranging from 0.04 to 0.22 for those married women ages 35-49 and ages 50 and older.[10]

In comparison with recent studies of the labor supply of married women with U.S. data, our estimated own-wage elasticity of LFPART is larger, and that of LFPR is generally smaller, than the corresponding own-wage elasticities of married women in the United States.[11] Long and Jones (1980) report 0.25 for the own-wage elasticity of part-time married women workers. Other studies, which do not differentiate part-time from full-time employed married women, show 1.28 for a mean of eleven studies (Keeley 1981), 2.0 (Cain and Dooley 1976), and 2.2 and 3.5 (Shapiro and Shaw 1983).

The estimated men's wage effect (LNMALW in a natural logarithm)[12] is significantly negative. The estimated elasticities at the sample means are -0.13, -1.18, and -0.70 for LFPART, LFFULL, and LFPR, respectively, as shown in Table 2. The observed elasticity of LFPR (-0.70) conceals the clear difference in the response to LNMALW between the part-time and full-time employed married women. Nagano (1980), using 1977 prefectural data, and Shimada et al. (1981) and Shimada and Higuchi (1985), using 1977 micro data, report the various men's wage

elasticities for different age groups ranging from -0.38 to -0.72, from -0.02 to -0.31, and from -0.02 to -0.40, respectively. Since these studies do not differentiate part-time from full-time female employment, the ranges of their estimated elsticities will vary on a larger scale than their findings if each group of employment was separately estimated.

The predominantly negative sign of the unemployment coefficient (UNEMPL) for LFPR in the third column in Table 1 reflects the fact that a discouraged worker effect considerably outweighs an added worker effect for married women in Japan. This finding based on the cross-sectional data of the 1980 Population Census supports the previous time-series studies of female labor force by Furugori (1980) and Shimada and Higuchi (1985). However, our finding shows that the dominant discouraged worker effect is pertinent to the part-time employed married women (LFPART) rather than to the full-time employed married women (LFFULL). That is, part-time employees are more vulnerable to the business cycle than their full-time counterparts. The elasticity of the part-time employed married women is -0.25 at the sample means (See the first column under LFPART in Table 2).

The effect of the industry-mix variable (INDMIX) is significantly positive for part-time employed married women while it is negative for their full-time counterparts. The seemingly "wrong" sign for the full-time employed married women might reflect the particular labor market for them after the 1979 oil crisis in Japan. The uncertain economic enviroment and prospect in 1980 right after the oil crisis likely

induced employers to avoid hiring full-time employed married women with high quasi-fixed costs, and to substitute part-time employees with the relatively lower costs. (See the significantly positive coefficient of INDMIX for the part-time employed married women under LFPART in Table 1).

The results of the estimated coefficients of female education (EDUCAT) are significant for LFPART (-1.03) and LFPR (-1.22), but not for LFFULL (0.26). The negative effect of EDUCAT is prevalent in the studies of female labor supply in Japan, e.g., Umetani (1972), Nagano (1980), and Hill (1984). The negative coefficient for LFPART in our study indicates that an increase in female education incurs higher opportunity costs for married women to stay in low-wage-paid jobs such as part-time employment. Therefore, married women with more education tend to avoid joining the part-time labor markets, which are largely manual jobs in Japan (Japan, Department of Labor 1982).[13]

The enrollment of pre-school children in either day-care centers or nursery schools (NURSER) is statistically significant for LFPART (0.62), LFFULL (1.59), and LFPR (2.05) and the sign is as hypothesized. The estimated elasticities for part-time and full-time employed married women are 0.32 and 0.80, respectively (See Table 2). The relatively large elasticity of the full-time employed married women shows that the recent increase in the number of day-care centers and nursery schools in Japan has made it easier for married women to obtain full-time employment than part-time employment jobs. However, with a higher participation of married women with pre-school children in the labor force, the demand for day-care centers and nursery schools will increase. Therefore, the causality between NURSER and LFFULL (and/or LFPART) may be dual.

TABLE 1

Empirical Results for the Labor Supply of
Married Women in Urban Japan:

Part-Time Employment, Full-Time Employment,
and Labor Force Participation Rate

Independent Variable	LFPART[a] part-time	LFFULL[b] full-time	LFPR[c]
Intercept	-0.84 (-0.81)	2.04* (1.84)	1.91* (1.75)
LNWOMW	0.84** (2.63)	0.20*** (2.85)	1.21* (2.01)
LNMALW	-0.17* (-1.89)	-1.57*** (-4.75)	-1.34*** (-3.31)
UNEMPL	-10.73*** (-4.68)	-5.09 (-1.62)	-12.01*** (-5.58)
INDMIX	0.05* (1.81)	-0.14*** (-3.65)	-0.05 (-1.67)
EDUCAT	-1.03*** (-3.12)	0.26 (0.45)	-1.22*** (-2.96)
NURSER	0.62** (2.41)	1.59*** (3.69)	2.05*** (8.04)
F-statistic	13.18	36.77	51.85
N	47	47	47

Note. Logit coefficients are reported. To recover partial
derivatives at the sample mean, one may multiply each
logit coefficient by a) 0.177 (=0.23x(1-0.23)), b) 0.188
(=0.25x(1-0.25)), and c) 0.250 (=0.48x(1-0.48)).
Asymptotic t-statistics are reported in parentheses.
The F-statistics are significant at the 1 percent level
for each equation.
*** Significant at a = 1%
** Significant at a = 5%
* Significant at a = 10%

TABLE 2

Estimated Elasticities of the Labor
Supply of Married Women in Urban Japan[a]

With respect to	LFPART part-time	LFFULL full-time	LFPR
Women's wages	0.65**	0.15***	0.63*
Men's wages	-0.13*	-1.18***	-0.70***
Unemployment rate	-0.25***	-0.11	-0.19***
Industry-mix	1.28*	-3.49***	-0.86
Female education	-0.40***	0.10	-0.32***
Day-care and Nursery	0.32**	0.80***	0.71***

a These elasticities are evaluated at the sample means, based
on the estimated regression coefficients reported in Table 1.
*** Significant at a = 1%
** Significant at a = 5%
* Significant at a = 10%

TABLE 3

Definitions of Variables[a]

Variable Names	Definition
LFPART	Proportion of married women, 15 years of age and over, with spouse present, whose employment status was "worked beside doing housework", in cities, in 1980.
LFFULL	Proportion of married women, 15 years of age and over, with spouse present, whose employment status was "mostly worked", in cities, in 1980.
LFPR	Proportion of married women, 15 years of age and over, with spouse present, whose employment status was either "worked beside doing housework", "mostly worked", or "unemployed", in cities, in 1980.
TOTMAR	Number of married women, 15 years of age and over, with spouse present, in cities, in 1980.
PARTWG	Women's part-timer's average normal cash earnings per hour for all sizes of enterprise, in 1,000 yen, deflated by the cost-of-living in cities, in 1980.
WIFEWG	Average monthly wife's income, in cities, in 1,000 yen, deflated by the cost-of-living in cities, in 1980.
FEMAWG	Average hourly contractual cash earnings by women, 15 years of age and over, in 1,000 yen, deflated by the cost-of-living in cities, for all sizes of enterprise, in 1980.
MALFIN	Average monthly family receipts other than monthly wife's income, in cities, in 1,000 yen, deflated by the cost-of-living in cities, in 1980.
MALCIN	Average hourly contractual cash earnings by men, 15 years of age and over, in 1,000 yen, deflated by the cost-of-living in cities, for all sizes of enterprise, in 1980.
UNEMPL	Proportion of total unemployment, 15 years of age and over, in cities, in 1980.
INDMIX	Index of industrial structure, defined as $\sum K_i IND_i$, where K_i is the proportion of female employees of industry i, in all cities, in Japan, and IND_i is the percentage of employees in industry i, in all cities, in a prefecture, in 1980.
EDUCAT	Proportion of females, 15 years of age and over, in cities, who had completed at least high school, as of 1980.
NURSER	Proportion of children, aged between 3 and 5, who attended either day-care centers or nursery schools, in cities, in 1980.

a The statistics and source are available on request.

IV. CONCLUSION

In this paper, we have attempted to resolve the drawbacks in previous studies of the labor supply of women in Japan. The three noticeable drawbacks were: first, employees, self-employed workers, and unpaid family workers are often lumped together in measuring the labor supply of women; second, part-time and full-time employees are treated together; and third, the labor supply of single and married women are estimated together.

We hypothesized that the response to the socioeconomic factors that influence the decision to work varies among different groups of of women. Because of the importance of the growing number of employed married women, we focused separately on part-time and full-time employed married women, using the 1980 Population Census data for Japan.

The major finding is that there is a clear behavioral difference for married women in the decision to work either part time or full time. The relatively large own-wage elasticity for the part-time employed married women, compared with their full-time counterparts, indicates the strong substitution among leisure, work at home, and work in the labor force. The effect of men's wages on the labor supply of married women varies for the part-time and full-time employees very strongly. The part-time employed married women are more vulnerable to the business cycle than their full-time counterparts. The changing industrial structure has helped married women to work part time in manufacturing, wholesale and retail trade, and the service industries. Finally, the recent increase in the number of day-care

centers and nursery schools has made it easier for married women to choose full-time jobs rather than part-time jobs.

To assist public policy implementation, the above empirical results suggest that special attention to the specific characteristics of the labor market of women in Japan would be useful and important in understanding the difference in the response to the factors influencing the decision to work among the different socioeconomic groups.

NOTES

1. Japan, Department of Labor, <u>Actual Conditions of Women's Labor</u> (<u>Fujin Roudo No Jitsujou</u> in Japanese), 1982.

2. In Japan, there are 47 prefectures (legislative units), each of which has rural and urban areas. In this study, we used the grouped data for urban areas.

3. By using micro data, the recent theoretical and empirical works of labor supply can be found in Gronau (1974), Heckman (1974 and 1979), Hill (1983), and Smith (1980).

4. Shimada and Higuchi (1985) point out that "analysis of aggregate female labor force data is misleading since these data include hetero-geneous groups of the self-employed, unpaid family workers, and paid employees, whose behaviors are quite different. The analysis of paid employees alone,..., provided reasonable results, comparable with recent experiences of other advanced economies (p.372)."

5. LFPR is not exactly comparable to the standard definition of labor force participation rate because self-employed and unpaid family workers of married women are not included in the numerator of LFPR.

6. P in the model is substituted by LFPART for part-time employees, LFFULL for full-time employees, and LFPR for employees and unemployed married women.

7. The industry-mix variable is constructed by using the following industries: agriculture, forestry and hunting, fishery and aquaculture, mining, construction, manufacturing, wholesale and retail trade, finance and insurance, real estate, transportation and communication, utilities (electricity, water, and steam), services, and government.

8. We used a dichotomous choice model for each of LFPART, LFFULL, and LFPR since our cross-sectional data are market averages. In micro data analysis, a trichotomous choice model (part-time, full-time, and not in the labor force) of the labor supply is, however, more suitable than the dichotomous choice model. The trichotomous choice model normalizes the parameters of independent variables such as $\sum_j B_j = 0$, where B represents the parameters of a given independent variable in the model and "j" represents part-time, full-time, and not in the labor force.

9. LNWOMW is a natural logarithm of PARTWG for LFPART, that of WIFEWG for LFFULL, and that of a weighted average of FEMAWG and PARTWG weighted by the respective fractions of full-time and part-time employees for LFPR.

10. The unsatisfactory results for married women ages 25-34 in addition to those of the relatively small own-wage elasticities may indicate that their model is inadequately specified, e.g., errors in measurement or omission of relevant variables. For example, they did not correct sample selection bias in their micro data analysis.

11. Needless to say, a comparison of the own-wage elasticity for married women in Japan and those in the United States should require cautious interpretation since specification in the models differs beside the difference in the labor market structures.

12. LNMALW is a natural logarithm of MALFIN, rather than MALCIN, for LFPART because of strong multicollinearity between PARTWG and MALCIN. A nutural logarithm of MALCIN is used to represent LNMALW for LFFULL and LFPR.

13. Female education may reflect their tastes for market work and/or access to jobs with nonpecuniary benefits (Cain and Dooly 1976). Also, their education may have a nonneutral effect on the productivity of time in the labor market than that of time spent in household production (Leibowitz 1974). These hypotheses predict a positive effect of female education on their labor supply.

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