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Labor Employment of Married Women in Japan: Part-Time Work vs. Full-Time Work

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Previous studies of the labor force behavior of women in Japan yield sharply different estimates of the effect of women's wage rates on their labor force participation. These differences are attributable to three factors. First, some of the studies group married and single women together in their models. The estimates obtained thus obscure behavioral differences in their patterns of labor force participation decisions. Second, some studies do not differentiate part-time working women from their full-time counterparts, e.g., Nagano (1980) and Simada, et al. (1981), as summarized by Hill (1982). As a result the difference in the response to socioeconomic factors by part-time and full-time working women is totally ignored. Finally, the studies which do not isolate employees from self-employed and unpaid family workers appear to underlie the negative coefficient of women's wage rates, e.g., Umetani (1972) and Hamilton (1979). To eliminate such shortcomings we apply in this paper a logit model to the labor force participation decisions of married women in urban Japan, treating separately part-time and full-time working married women.

Section I describes the method of analysis of the labor force participation of married women and briefly mentions theoretical predictions of the variables in the model. Section II reports the empirical results, and Section III summarizes our conclusion.

I. METHOD OF ANALYSIS

The variables in our model are cross-sectional market averages drawn primarily from the 1980 Population Census of Japan. The units of observation are the 47 prefectures of Japan.[1] Cain and Dooley (1976) and Link and Settle (1981) discuss the advantages of models that use cross-sectional market averages. They point out that variations in tastes and transitory wages within a given geographical area can be averaged out. In addition, by treating part-time and full-time working married women in separate models and by differentiating married women whose spouses are present from other women, as well as urban Japan from rural Japan, our sample represents a fairly homogeneous group of married women and produces consistent estimates of the structural parameters.[2]

Our model assumes that each individual married woman has a choice whether or not to participate in the labor force. Shimada and Higuchi (1985) suggest that the logit model with a discrete-choice variable offers a closer approximation of the reality of the labor force behavior of married women than models with a continuous dependent variable, e.g., working hours, in

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Japan. The logit model of the labor force participation of married women is defined as follows:

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

where P is the probability of participating 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).

Specifically, the form of the equation to estimate is:

$$\ln_e (P/(1 - P)) = a_o + \sum_{i=1}^{n} a_i X_i + u, \tag{2}$$

where P in the model is not observable and is limited between 0 and 1, and u is the residual term. The variable for P in our model uses three different measures: LFPART (the proportion of married women, spouse present, ages 15 and older who are part-time participants in the labor market); LFFULL (the proportion of those women who are full-time participants); and LFPR (the proportion of those women who are unemployed or participating either part time or full time in the labor market). Equation (2) is estimated with the weight, WGT = $(TOTMAR \times P \times (1 - P))^{1/2}$ in which TOTMAR is the number of total married women, spouse present, ages 15 and older.[3]

We follow previous studies for the inclusion of the independent variables in our model. Those independent variables are women's wages, men's wages, industry-mix, unemployment rate, women's education, and nurseries. The variables are defined in Table 1. The rationale for these expected signs is well explained by Cain and Dooley (1976), Dooley (1982), Fields (1976), Long and Jones (1980), and Mincer (1962).

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). Men's wages in a natural logarithm (LNMALW) is expected to have a negative effect because women's leisure hours are assumed to be a normal good.[4]

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 which heavily employ women (Bowen and Finegan, 1969; Fields, 1976).[5] The unemployment rate (UNEMPL) can have either positive or negative effects on the participation of married women in the labor force, depending on whether the added worker or discouraged worker effect dominates (Dooley, 1982; Furugori, 1980; Shimada and Higuchi, 1985).

Women's education (EDUCAT) may have a negative effect on the labor force participation of married women because of a higher reservation wage as they acquire more education (Long and Jones, 1980; Shapiro and Shaw, 1983). On the other hand, a woman's education could reflect her preference for market work and/or access to jobs with nonpecuniary benefits (Cain and Dooley, 1976), and the effect of EDUCAT can be then positive. The proportion of pre-school children in nurseries or day-care centers (NURSER) will have a positive effect due to the potential opportunity for married women with pre-school children to substitute those services for their own time-inputs for childrearing (Schultz, 1978).

II. EMPIRICAL RESULTS

The logit model of the labor force participation of married women was applied to the 1980 Population Census data for Japan by the method of generalized least squares. The empirical

TABLE 1
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 $\Sigma K_i IND_i$, 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 day-care centers or nursery schools, in cities, in 1980.

[a]The statistics and sources are available on request.

estimates are given in Table 2. The LFPART column in the table reports the results for the model of the part-time working married women, with the LFFULL column for their full-time counterparts and the LFPR for the model of the labor force participation rate of married women. The corresponding elasticities at the sample means are reported in Table 3. Table 1 reports the variable definitions.

In each of the three models in Table 2, the women's wages (LNWOMW) are statistically significant. LNWOMW1, LNWOMW2, and LNWOMW3 represent the women's wages for part-time employment, full-time employment, and labor force participation, respectively.[6] Our estimates of the coefficient on women's wages are positive in contrast to the negative coefficients reported by Hamilton (1979) and Umetani (1972).

The estimated own-wage elasticities for the part-time working married women (LFPART), the full-time working married women (LFFULL), and the labor force participa-

TABLE 2
Empirical Results for the Labor Force Participation of Married Women in Urban Japan: Part-time Work, Full-time Work, and Labor Force Participation

Independent Variable	LFPART[a] Part-Time	LFFULL[b] Full-Time	LFPR[c]
Intercept	−0.84	2.04*	1.91*
	(−0.81)	(1.84)	(1.75)
LNWOMW1	0.84**	—	—
	(2.63)		
LNWOMW2	—	0.20***	—
		(2.85)	
LNWOMW3	—	—	1.21*
			(2.01)
LNMALW	−0.17*	−1.57***	−1.34***
	(−1.89)	(−4.75)	(−3.31)
UNEMPL	−10.73***	−5.09	−12.02***
	(−4.68)	(−1.62)	(−5.58)
INDMIX	0.05*	−0.14***	−0.05
	(1.81)	(−3.65)	(−1.67)
EDUCAT	−1.03***	0.26	−1.22***
	(−3.12)	(0.45)	(−2.96)
NURSER	0.62**	1.59***	2.05***
	(2.41)	(3.69)	(8.04)
F-statistic	13.18	36.77	51.85
R^2	0.66	0.85	0.89

***indicates significant at the 1-percent level.
**indicates significant at the 5-percent level.
*indicates significant at the 10-percent level.

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

tion (LFPR) are 0.65, 0.15, 0.63, respectively, as reported in Table 3. The estimated own-wage elasticity for part-time working married women is substantially larger than that for their full-time counterparts. This indicates that married women who work part-time have stronger substitutions among leisure, work at home and work in the labor market than their full-time counterparts. Unlike the previous findings for all women in Japan of 0.44 by Hill (1984) and values ranging from 0.04 to 0.22 by Shimada and Higuchi (1985) for married women ages 35 and older, our estimates for the own-wage elasticities underline the behavioral differences between part-time and full-time working married women.

In comparison with studies of U.S. married women, we find that part-time working married in Japan are more responsive to their market wages than their U.S. counterparts, e.g.,

TABLE 3
Estimated Elasticities of the Labor Force Participation of Married Women in Urban Japan

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
Women's Education	−0.40	0.10	−0.32
Nurseries/day-care	0.32	0.80	0.71

Note: The elasticities are evaluated at the sample means.

0.25 reported by Long and Jones (1980).[7] On the other hand, when part-time and full-time working married women are lumped together, the estimated elasticities for U.S. married women are exceedingly large: 1.28 (Keeley, 1981), 2.0 (Cain and Dooley, 1976), and 2.2 and 3.5 (Shapiro and Show, 1983).

The estimated men's wage effect (LNMALW) is significantly negative.[8] 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 3. The observed elasticity of LFPR (−0.70), which does not differentiate between part-time and full-time working married women, conceals the difference in the response to men's wages (LNMALW) by part-time (LFPART) and full-time (LFFULL) working, married women. The estimated men's wage elasticities reported by previous studies in Japan vary in the ranges: −0.38 to −0.72 (Nagano, 1980); −0.02 to −0.31 (Shimada, et al., 1981); −0.52 (Hill, 1984); and −0.02 to −0.40 (Shimada and Higuchi, 1985). Since these studies group part-time and full-time working women together, the ranges of their estimated elasticities will vary on a larger scale than if each group of working women were separately estimated.

The predominantly negative sign of the estimates of the coefficient on the unemployment rate (UNEMPL) for the labor force participation of married women in the LFPR column in Table 2 reflects 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 participation by Furugori (1980) and Shimada and Higuchi (1985). However, our finding shows that the dominant discouraged worker effect is pertinent for married women working part time (LFPART) rather than for married women working full time (LFFULL); the former are more vulnerable to the business cycle than the latter.

The effect of the industry-mix variable (INDMIX) is significantly positive for part-time workers who are married women, while it is negative for their full-time counterparts. The seemingly "wrong" sign for married women working full time might reflect the particular labor market for them after the 1979 oil crisis in Japan. The uncertain economic environment and prospect in 1980 immediately after the oil crisis apparently induced employers to avoid hiring married women with high quasi-fixed costs to work full time and to substitute part-timers (see the significantly positive coefficient on INDMIX in the LFPART column in Table 2).

The results of the estimates of the coefficient on women's 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 force participation in Japan, e.g., Umetani (1972), Nagano (1980), and Hill (1984). The negative coefficient for LFPART in our study indicates that an increase in women's education causes higher opportunity costs for married women who remain in low-wage-paid jobs such as part-time employment. Therefore, married women with more education tend to avoid joining the part-time labor market, which in Japan consists largely of manual jobs (Japan, Department of Labor, 1982).

The enrollment of pre-school children in nurseries or day-care centers (NURSER) is statistically significant for LFPART (0.62), LFFULL (1.59), and LFPR (2.05), as the results were hypothesized by us. The estimated elasticities for married women working part time and full time, are 0.32 and 0.80, respectively, as shown in Table 3. The recent increase in the number of nurseries and day-care centers in Japan has helped married women to obtain both full-time and part-time employment.

III. CONCLUSION

This paper hypothesizes that socioeconomic factors influence the decisions of married women to participate in the labor market, whether part-time or full-time. Because of the importance of the growing number of part-time workers among married women, we dealt separately with part-time and full-time workers in urban area and used the 1980 Population Census data for Japan.

The major finding is that there are clear-cut behavioral differences in labor force participation among married women. The estimated own-wage elasticity for married women working part time is substantially larger than that for their full-time counterparts. The effect of men's wages on the labor force behavior of married women varies very strongly between part-time and full-time participants. Married women who work part time are more vulnerable to the business cycle than their full-time counterparts.

In an analysis of labor force behavior of Japanese married women, our findings suggest that it is inappropriate to combine part-time and full-time workers as though they constituted a homogeneous group. Thus, special attention to the specific characteristics of the labor market of married women in Japan is important.

FOOTNOTES

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1. In Japan there are 47 prefectures (legislative units), each of which has rural and urban areas.
2. See Dooley (1982) for counter-arguments to use aggregate cross-sectional data in place of micro data. The recent theoretical and empirical works, using micro data, of labor supply can be found in Gronau (1974), Heckman (1974; 1979), Hill (1983), and Smith (1980).
3. See Theil (1971), p. 635, for the weight.
4. This variable may capture the wealth effect to some extent.
5. 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.
6. LNWOMW1 is a natural logarithm of PARTWG, LNWOMW2 is that of WIFEWG, and LNWOMW3 is that of a weighted average of PARTWG and FEMAWG weighted by the respective fractions of part-time and full-time working, married women. PARTWG, WIFEWG, and FEMAWG are defined in Table 1.
7. A comparison of the own-wage elasticity for married women in Japan and those in the United States requires cautious interpretation, since specification in the models and the labor market structures differ.
8. LNMALW is a natural logarithm of MALFIN, rather than MALCIN, for LFPART because of strong multicollinearity between PARTWG and MALCIN. A natural logarithm of MALCIN is used to represent LNMALW for LFFULL and LFPR. MALFIN and MALCIN are defined in Table 1.

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