The Impact of Married Women's Labor Supply on the Distribution of Family Income in Japan

Naohiro Ogawa
John Bauer

NUPRI Research Paper Series No.66

February 1999

Naohiro Ogawa

Professor
College of Economics
and
Deputy Director
Population Research Institute
Nihon University
Tokyo, Japan

John Bauer

Research Specialist
State of Washington
Administrator for the Courts
Washington, USA

CONTENTS

TABLES

I. Introduction

Two decades ago, Mincer (1974) was among the first to examine, using U.S. data, the impact of married women's earnings on the distribution of family income, and concluded that their earnings improved the distribution of married American couples' earnings. Thurow (1975) speculated, however, that secularly increased labor force participation of married American women might increase household income inequality. In recent years, a number of empirical studies have been undertaken to address this issue, drawing upon different methodologies and data sets, and have shown a remarkable consensus about the equalizing effect of married U.S. women's earnings (Danziger, 1980; Horvath, 1980; Lehrer and Nerlove, 1981; Betson and Van der Gaag, 1984; Shaw, 1989). In addition, numerous studies have recently been conducted to investigate this effect for other countries such as Britain (Layard and Zabalza, 1979), Israel (Gronau, 1982), Taiwan (Liu and Chang, 1987), and Hong Kong (Pong, 1991), and have all confirmed the equalizing effect of the earnings of married women upon the distribution of family income.

Japan is considered to have a very equal income distribution, and the distribution has been fairly stable over the past few decades (Economic Planning Agency, 1989). For these reasons, there has been considerable interest in Japan's income distribution in recent years (Bauer and Mason, 1992). Moreover, there have been substantial changes in the female labor market in postwar Japan. One of the salient changes in the female labor market, for instance, is a rapid rise in the proportion of women who enter paid employment since the early 1960s (Ogawa and Clark, 1995; Ogawa and Ermisch, 1996). This rise has been offset by declines in the labor force participation rates of women in agricultural households and in self-employment. Along with these female labor market changes, the sex differential in hourly earnings has been gradually narrowing (Ermisch and Ogawa, 1994; Ogawa and Ermisch, 1996).

Despite such increased interest in Japan's income distribution and the remarkable shifts in the female labor market, only limited research has been

previously undertaken with regard to the impact of married Japanese women's increased participation in paid employment upon the distribution of household income. The unavailability of micro-level data is one of the obvious reasons for the paucity of research in this field.

This paper analyzes, heavily drawing upon micro-level data gathered from the 1994 round of the National Survey on Family Planning, the changing pattern of employment of married Japanese women and the impact of their earnings on family income inequality. The next section of the paper describes (i) how Japanese married women have changed their labor supply and work status over time, and (ii) to what extent their earnings have improved relative to their male counterparts in recent years. Section III deals with a brief description of the source of data and the methodology to be used. Section IV discusses (i) the extent to which Japanese wives' earnings have an equalizing effect on the distribution of family income, as viewed from their life-cycle stages, and (ii) the factors which affect the impact of women's earnings on income distribution. The final section summarizes major findings and examines potential future trends.

I. Changing Labor Supply and Earnings Power of Married Japanese Women

In most developed nations, women's labor force participation rates grew substantially in the postwar period, but the time path of Japanese women's rates differs markedly from that of other industrialized countries. The overall level of female labor force participation in Japan has shown no sharp or consistent rise in recent decades. In 1960, women's labor force participation rate stood at 54.5 per cent, but in 1995, it was actually lower at 50.0 per cent. In the interim, it followed a U-shaped pattern, falling through the mid-1970s before rising again (Ogawa and Clark, 1995).

The absence of any pronounced trend in the level of female labor force participation in Japan during the past few decades is primarily due to the consequence of offsetting trends in different categories of female employment. As in most other advanced countries, there has been a fast rise in the proportion of women who enter paid employment. This rise has been considerably offset by declines in the proportion of women participating in the labor force as family workers.

These marked temporal shifts of employment categories have also been observed among married women of childbearing age, as displayed in Table 1.[1] The overall labor force participation rate of married Japanese women at ages below 50 rose from 51.5 per cent in 1979 to 65.7 per cent in 1994. The proportion of married women in paid employment increased from 27.9 to 45.7 per cent during the same time period (Population Problems Research Council, 1994). In sharp contrast, the proportion of wives working as family workers fell from 16.4 to 11.9 per cent over the corresponding period. Accompanying the decline in family workers has been a minor fluctuation of the proportion of self-employed women such as small shop-owners.[2] The fact that a sizable proportion of Japanese married women are still employed in the traditional sector sets Japan apart from the industrialized nations of North America and Western Europe (Hill, 1989; Ogawa and Retherford, 1993; Ogawa and Hodge, 1994).

Table 1. Changing Work Status of Married Japanese Women of Childbearing Age, 1979-1994

(unit: per cent)

Year	Work Status				
	Housewife	Full-time paid employee	Part-time paid employee	Family worker	Others
1979	48.3	16.6	11.2	16.4	7.5
1981	43.8	17.0	13.8	18.9	6.5
1984	38.9	19.3	16.5	17.2	8.1
1986	42.0	16.8	17.1	17.8	6.3
1988	39.1	19.4	20.9	13.7	6.9
1990	37.7	19.8	22.1	11.0	9.4
1992	38.3	21.0	21.8	10.1	8.8
1994	34.3	23.5	21.7	11.9	8.6

Source: Calculated from the 15th (1979), 16th (1981), 17th (1984), 18th (1986), 19th (1988), 20th (1990), 21st (1992) and 22nd (1994) rounds of the National Survey on Family Planning.

One additional vital point which emerges from Table 1 is a fast increase in the share of part-time jobs in paid employment.[3] The proportion of wives holding part-time jobs doubled from 1979 to 1994, in contrast to a gradual rise in full-time paid employment. Wives working as part-time paid employees are subject to short-run economic fluctuations. For example, during the recent recession, which started in mid-1991, the proportion of married women holding part-time jobs slightly declined, as shown in Table 1. This is in line with the frequently heard claim that Japanese women are marginal workers (Ogawa, 1987; Ogawa and Hodge, 1994). In addition, part-time employees receive a considerably lower hourly wage than their counterparts in the female labor market. In 1994, the average hourly wage for part-time paid

employees corresponds to 43 per cent of that for full-time paid employees and is 36 per cent lower than that for traditional sector workers.

It is also important to observe that at present, approximately 70 per cent of married women working as part-time paid employees earn less than one million yen a year, which corresponds to the income tax threshold, modified in 1990.[4] Those who earn more than this threshold lose their dependent status in their husbands' payroll and social security programs. Furthermore, although full-time paid employees are entitled to receive substantial bonuses (equivalent to about three months' salary in recent years), only a handful of part-time workers enjoy such benefits (Ogawa and Hodge, 1994).

These changes in employment status among married Japanese women of reproductive age have occurred in parallel with a remarkable improvement of their educational attainment. From 1979 to 1994, the proportion of wives with tertiary education (junior colleges and universities) more than tripled; in 1979, 10.3 per cent of wives below age 50 had some college education, but the corresponding figure for 1994 was 34.9 per cent. Furthermore, the tempo of improvements of educational attainment for married women is considerably faster than that for their husbands.[5]

Ogawa and Ermisch (1996) have shown that the effect of wife's education upon earnings is substantial in the case of full-time paid employment. Moreover, Ogawa and Clark (1995) have demonstrated, using time-series cell-level tabulated data collected from various rounds of the Basic Survey on Wage Structure (BSWS) undertaken by the Ministry of Labor, that the payoff for additional education was substantially greater for women than for men over the period 1976-1986, and that this pattern had remained relatively stable during this time period.

Because of the decreased gender differentials in education as well as women's higher return to education than men's, the sex disparities in earnings power have been diminishing. Although there is no time-series data pertaining to the differentials in earnings power between husbands and wives, wage data gleaned from the BSWS show that the ratio of women's to men's hourly wages for full-time paid employees has been

rising since the early 1970s; it was 0.55 in 1970, but it rose to 0.63 in 1994. Due to the Equal Employment Opportunity Law implemented in 1986, it is anticipated that the sex differential in hourly earnings will continue to shrink in the years ahead.

Marriage and the presence of preschoolers significantly inhibit Japanese women's entry into the work force (Ogawa and Ermisch, 1996). For these reasons, Japan is unique among industrialized nations in still having an M-shaped pattern of female labor force participation by age. In hopes of making the dip in the pattern shallower and raising marital fertility, therefore, the Japanese government implemented a one-year leave for child-rearing scheme for working men and women in 1992.[6] Although this scheme is expected to facilitate Japanese women's career development, no impact study has been conducted yet.

As presented earlier in Table 1, married women's increased participation in the work force has contributed to such pronounced growth of the female labor supply in the 1980s. Furthermore, data reported in Table 2 indicate that the proportion of wives of childbearing age who participated in the labor force increased considerably from 1979 to 1994, regardless of their husbands' educational attainment.[7] Because the husband's education is closely connected with his annual earnings (Clark and Ogawa, 1992), it may be reasonable to infer that larger numbers of wives from both lower and higher income families have been entering the labor market in recent years.

Then, how and to what extent does such increased labor force participation among Japanese married women affect the distribution of family income? In his widely-cited empirical work based upon the Family Income and Expenditure Survey (FIES) in 1954, Arisawa (1956) found a strong negative correlation between the labor force participation of wives and the earnings of their husbands. This finding suggests that working wives moved the aggregate family earnings distribution towards greater equality in the early part of Japan's postwar development. Moreover, subsequent studies (Higuchi, 1981) demonstrated that Arisawa's observation was applicable to Japan in the 1960s.

Table 2. Changing Labor Force Participation Rates of Married Japanese Women of Childbearing Age, by Husband's Educational Attainment, 1979-1994

(unit: per cent)

Year	Husband's educational attainment		
	Senior high school	Junior college	University
1979	51.2	41.4	33.7
1981	57.4	48.2	39.5
1984	63.2	58.2	44.0
1986	60.6	55.3	44.2
1988	64.0	58.3	45.7
1990	65.9	60.9	45.7
1992	64.9	60.8	52.3
1994	71.6	68.8	52.0

Source: Same as Table 1.

Nevertheless, according to an annual report prepared by the Economic Planning Agency of the Japanese Government (1989), the Gini coefficient of employees' household income distribution has been slowly rising since the late 1970s.[8] The report indicates that this rise in the Gini coefficient has been attributed partly to an increase in the proportion of two-earner families as well as in the wife's earnings power. The analysis developed in this government report is, however, rather sketchy and of a preliminary nature. It should also be noted that by drawing upon cell-level data gathered in the 1985 round of FIES, Yoshida and Mizuno (1987) have computed Lorenz curves. Their results have shown that the wife's annual earnings tend to

expand income inequality among employees' households.

In the next section, therefore, we examine in greater detail the extent to which married Japanese women's increased labor supply and earnings power constitute a disequalizing force on the distribution of family earnings.

III. Data and Methodology

A. Data Source and Limitations

Our analysis of the impact of Japanese married women's earnings on the distribution of family income draws on nationally representative survey data from the 1994 round of the National Survey on Family Planning. Since 1950, this sample survey has been conducted approximately every other year by the Population Problems Research Council of the Mainichi Newspapers of Japan. Like previous rounds, the 1994 round was based upon a stratified multi-stage cluster sample (Population Problems Research Council, 1994). Cities, towns and villages throughout Japan were first stratified on the basis of population and other characteristics. Respondents were then randomly chosen from the basic resident registers in each primary sampling unit. Although the target population of the earlier rounds was currently married women of reproductive age (less than 50 years old), the 1994 round gathered information from all women aged 16-49. A total of 3,995 questionnaires were distributed and 2,772 completed, thus yielding a response rate of 69 per cent. Because we are primarily interested in examining whether or not wives' earnings equalize the distribution of Japanese couples' income, our analysis considers only currently married women in the 1994 round.

In the present analysis, both the wife's and husband's annual earnings are the two principal variables. In the 1994 round of the National Survey on Family Planning, however, data on these two key variables are reported in 10 grouped intervals. We have coded each of these variables according to the midpoints of the class intervals in which it was reported, with the exception of the lowest and highest categories.[9] In addition, cross-checking with data from the BSWS suggests that the computed values may be regarded as reasonably comparable.[10] Nonetheless, due to these data limitations, the relative dispersion in both male and female earnings is likely to be biased downward. For this reason, caution should be exercised in interpreting

the size of variances in the husband's and wife's annual earnings.

It is also important to bear in mind that although various government surveys have gathered data on husbands' and wives' earnings in the past, access to micro-level data to such surveys has been severely restricted (Bauer and Ogawa, 1996). In view of this restriction, data gleaned from the 1994 round of the National Survey on Family Planning provide a useful base for a micro-level analysis of wives' contribution to the distribution of household income.

B. Methodology

Studies of the impact of female earnings on household income distribution have adopted different measures of inequality. We follow Gronau (1982) and Lehrer and Nerlove (1981) and use the coefficient of variation (i.e., the standard deviation divided by the mean). This statistic is especially useful for our purposes because it can be decomposed in a way which reveals much about the nature of the impact of female earnings on income distribution.[11]

Total household earnings (Y_T) is the sum of male earnings (Y_M) and female earnings (Y_F). The squared coefficient of variation of household earnings can be expressed as follows:

$$C_T^2 = \alpha^2 C_M^2 + \beta^2 C_F^2 + 2\alpha\beta r C_M C_F$$

where,

C_T , C_M , C_F = coefficients of variation of total, male and female earnings, respectively

r = correlation coefficient between spouses' earnings

$\alpha = \overline{Y_M} / \overline{Y_T}$

$\beta = \overline{Y_F} / \overline{Y_T}$.

The impact of female earnings is measured by comparing the coefficients of variation for total household and male earnings. If household earnings have a smaller coefficient of variation than male earnings, then female earnings have an equalizing effect on income distribution. Gronau (1982) summarizes this impact by calculating the ratio of these coefficients of variation, or "relative inequality" ($R = C_T/C_M$). An R of less than one indicates an equalizing impact of female earnings.

The magnitude of R depends on three factors: the relative variations of husbands' and wives' earnings, the correlation between spouses' earnings (r), and the share parameter (α). The impact of female earnings is more likely to be equalizing if C_F is low relative to C_M. The variance of married women's earnings depends on the variance in the subset of working women, on their mean earnings, and on the participation rate (Gronau, 1982, p.122).

Female earnings also tend to have a more equalizing impact the smaller the correlation coefficient for spouses' earnings is. This correlation depends upon the covariance between the husbands' earnings and wives' wages and the covariance between the husbands' earnings and wives' hours of work (Lehrer and Nerlove, 1981, p.425).

Gronau also shows that given the relative variability of male and female earnings, the larger the contribution of married women to household income (i.e., the smaller α is), the smaller R is likely to be. However, he demonstrates that the impact of α on R is not necessarily monotonic.

Lehrer and Nerlove (1981) found that the impact of female earnings on household income distribution varies over the family "life cycle" because of the marked life-cycle variations in female labor supply behavior. They examined three life-cycle stages: (i) before child-rearing, (ii) child-rearing, and (iii) post child-rearing. Because the labor supply behavior of Japanese women is extremely sensitive to the presence of young children, we also adopt a life-cycle approach.

IV. Empirical Results

Table 3 summarizes the impact of married women's earnings upon the distribution of household income. The overall impact of female earnings on the household income distribution is minor, as indicated by the estimated R, 0.99.[12] However, the impact varies across the three life-cycle stages: (i) before first birth (households having no child), (ii) child-rearing (households having at least one preschool child), and (iii) post child-rearing (households whose youngest child is 6 years old and over). At the first and third life-cycle stages, female earnings tend to have a slight equalizing effect on the income distribution.

Among the child-rearing households, on the other hand, female earnings actually increase income inequality as is indicated by the R of 1.05. The correlation coefficient for the husband's and wife's earnings, which is represented by r, is relatively low for these households. This would tend to make female earnings have an equalizing effect. However, the low r value is more than offset by the especially high C_F value measuring the variation in female earnings.

Table 3. Decomposition of the Squared Coefficients of Variation for Household Income in Japan, 1994

	$R(C_T/C_M)$	C_T	C_M	C_F	r	α	β	N
All women	0.99	0.504	0.508	1.408	0.093	0.83	0.17	1508
Life cycle:								
Before 1st birth	0.97	0.490	0.504	1.107	0.112	0.76	0.24	148
Child-rearing	1.05	0.461	0.441	1.885	0.050	0.88	0.12	458
Post child-rearing	0.96	0.490	0.508	1.287	0.066	0.82	0.18	902

Source: Computed from the 1994 round of the National Survey on Family Planning.

It is obviously difficult to compare income distribution analyses across different countries. However, it is useful to compare our results with the Lehrer-Nerlove findings for Whites in the United States, presented in Table 4.[13] The overall equalizing impact of female earnings is larger in the United States than in Japan, particularly for households at the first two life-cycle stages. The smaller impact in Japan is primarily due to the fact that the variation in wives' earnings is large relative to the variation in husbands' earnings. In the United States, the coefficient of variation for wives' earnings is larger than that for husbands' earnings. In Japan, where male earnings are quite equally distributed, this is even more the case. The large C_F relative to C_M moderates the equalizing impact of female earnings on household income distribution.

Table 4. Decomposition of the Squared Coefficients of Variation for U.S., White Families, 1973

	$R(C_T/C_M)$	C_T	C_M	C_F	r	α	β
Life cycle:							
Before 1st birth	0.86	0.621	0.724	0.789	0.316	0.68	0.32
Child-rearing	0.96	0.641	0.669	2.117	0.020	0.91	0.09
Post child-rearing	0.93	0.604	0.650	1.407	0.061	0.85	0.15

Source: Lehrer and Nerlove (1981).

The correlation coefficient for the husband's and wife's earnings is generally low in Japan, but not especially so relative to the United States,[14] except for households at the first life cycle stage where the correlation coefficient is much smaller in Japan. (Factors affecting this correlation are discussed below.) The female

share of household income is also relatively small for Japanese women in the first life-cycle stage.

The above analyses show that female earnings in Japan have a relatively moderate impact on household income distribution, despite the relatively low correlation between husbands' and wives' earnings. The reason is the relatively high variation in female earnings, which sets Japan apart from the United States. The high variation in married women's earnings in Japan results from the unique nature of female labor force participation and employment.

An important factor determining the variation in female earnings is the extent of female labor force participation. Lower participation rates would increase variations in earnings. For instance, in 1994, the coefficient of variation in earnings among working Japanese women is 0.98. However, the corresponding figure for all women is 1.41.

Data reported in Table 5 show striking differences in the female labor force participation rates between Japan and the United States. Whereas the overall labor force participation rates are similar between the two countries, Japanese women with young children are much less likely to be in the labor market. Japanese women are more likely than American women to withdraw from the work force upon marriage and/or giving first birth. Data gathered from the 1994 round of the National Survey on Family Planning show that 56 per cent of women married in 1992 quit their jobs at the time of marriage. The corresponding figure for 1970 was 68 per cent. Although the proportion has been on a downward trend, the present level is still surprisingly high.

Not only is the pattern of female labor force participation different in Japan, but there is a greater diversity of work statuses. Table 6 summarizes the work status of married women at various life-cycle stages in 1994. Japan is set apart from other industrialized countries, as was discussed in Section II, by the very high incidence of family work and part-time employment among married women. A relatively low percentage of Japanese women, as a result, are full-time employees.[15]

Table 5. Labor Force Participation Rates for Wives, the United States and Japan

(unit: per cent)

	U.S. (1994)	Japan (1994)
Total	60.6	65.5
With children:		
under 18	69.0	64.0
under 6	61.7	45.5
under 3	59.7	34.4
1 year or under	58.8	27.3

Sources: U.S. Department of Commerce (1996), Statistical Abstract of the United States 1995, and the 1994 round of the National Survey on Family Planning.

Table 6. Labor Force Status of Married Japanese Women by Life-cycle Stage, 1994

(unit: per cent)

	Life-cycle stage			
Work status	No children	Preschoolers	Age of youngest child 6+	Total**
Housewife	34.2	54.5	24.0	34.1
Family worker	7.3	9.7	14.2	12.2
Full-time worker	37.2	15.7	24.6	23.2
Part-time worker	15.2	13.7	26.4	21.5
Self-employed	2.4	3.2	5.8	4.7
Professional	1.2	0.8	0.5	0.7
Others*	2.4	2.4	4.4	3.6
Total	100.0	100.0	100.0	100.0
Number of cases	164	503	1012	1679

Note: *Including 'Student' and 'Not working.' **Due to missing cases, the total percentage distribution is slightly different from that shown in Table 1.
Source: Same as Table 3.

About 12 per cent of married Japanese women were family workers in 1994. In the United States, for comparison, only one per cent of the female labor force in 1984 were family workers (Hill, 1989). The prevalence of family workers in Japan affects the impact of female participation on household income distribution. First of all, the variation in earnings among female family workers is relatively large, and this could contribute to an increase in the overall variation in women's earnings.[16]

What seems to be more important, however, is that the high incidence of family workers tends to increase the correlation between husbands' and wives' earnings, thereby moderating the overall equalizing impact of female labor force participation on household income.[17] The correlation coefficient for spouses' earnings among all married women in our sample is 0.09. When households where wives are family workers are dropped from the sample, the correlation declines to only 0.002, thus lowering the value of relative inequality (R) from 0.99 to 0.97. In other words, if the incidence of family work among Japanese women were to decline in the future, this should substantially reduce the correlation between spouses' earnings and make the impact of female participation on family income distribution more equalizing.

In order to further examine the effect of family work on the household income distribution, we have conducted the decomposition analysis for the three life-cycle stages, excluding family workers from the sample. The computed results (relevant tables omitted) show that although the values of relative inequality (R) for the first two life-cycle stages are virtually the same as those reported in Table 3, the R value for the third life-cycle stage is 0.93, which is considerably smaller than 0.96 indicated in Table 3. More importantly, the computed value of 0.93 is the same as the corresponding figure for the United States presented in Table 4. This suggests that when Japan's traditional sector is excluded from the analysis, married Japanese and American women at the post child-rearing stage contribute to the family income distribution to a comparable extent. This finding provides additional evidence that family work is a very unique aspect of female labor supply in contemporary Japan.

We also examined the effect of the high incidence of part-time female

employment on the family income distribution. As discussed in Section II, a large segment of the female labor force in Japan is constituted by part-time workers, which distinguishes Japan from the United States and many other industrialized countries. Twenty-two per cent of married women work part-time, roughly the same percentage as those working full-time, as presented in Tables 2 and 6. In fact, married women whose youngest child is older than 5 are more likely to be part-time workers than full-time workers or housewives. Heavy household responsibilities contribute to the prevalence of part-time workers. Ogawa and Hodge (1994) note that older women returning to work after child-rearing may not be able to take full-time employment, because they must be home in time to take care of their children after school. Also, many Japanese mothers spend considerable time helping children with their homework (Ogawa and Retherford, 1993).

To assess the effects of the high incidence of part-time work and nonparticipation (housewives) on the family income distribution, we estimated, using the sample without family workers, both full-time and part-time earnings equations, on the basis of the theoretical considerations incorporated in a number of previous empirical analyses (Heckman, 1980; Ogawa and Hodge, 1994).[18] Table 7 shows the estimates of these earnings equations. These parameter estimates are used to compute the potential earnings of each woman in full-time and part-time jobs. Then, we calculated the value of relative inequality (R) for the following three cases: (1) assigning the full-time predicted earnings to all full-time workers and the predicted part-time earnings to part-time workers; (2) assigning the full-time predicted earnings to both full-time and part-time workers; and (3) assigning the full-time predicted earnings to all women, including housewives. Table 8 summarizes the decomposition of potential household income for these three cases.

A comparison of cases (1) and (2) provides some insight into how the incidence of part-time work affects R. Assigning part-time workers the imputed full-time wage has only a marginal impact on relative inequality. R falls only from 0.89 to 0.88. The reason is that the decline in variation in female earnings (C_F) tends to be offset by an increase in the correlation of spouses' earnings (r).

Table 7. Estimated Earnings Equations for Married Japanese Women, 1994

Explanatory variables	Full-time	Part-time
Constant	-0.2051 (-0.801)	0.0664 (0.234)
EXPER	0.0830 (2.745)	0.0088 (0.313)
EXPER2	-0.0016 (-1.947)	-0.0005 (-0.701)
CHILD05	-0.1204 (-1.568)	-0.0476 (-0.630)
CHILD617	-0.2372 (-5.224)	-0.0610 (-1.732)
CHILD18P	-0.1310 (-1.973)	0.0865 (1.581)
WEH	0.2694 (2.097)	-0.1635 (-1.604)
WEJ	0.4605 (3.155)	-0.2267 (-1.871)
WEU	0.9583 (5.478)	0.1075 (0.644)
λ	0.1183 (1.051)	-0.1198 (-1.125)
Number of cases	363	324
Adj.R^2	0.146	0.041

Note: T-ratios are noted in parentheses under the estimated regression coefficients. WEH=1: senior high school education, WEJ=1: junior college education, WEU=1: university education, EXPER: age *minus* years of education *minus* 6, EXPER2: EXPER squared, CHILD05: number of children at ages 0-5, CHILD617: those aged 6-17, CHILD18P: those aged 18 and over.

Source: Same as Table 3.

Table 8. Decomposition of Potential Household Income in Japan, 1994

	$R(C_T/C_M)$	C_T	C_M	C_F	r	α	β	N
CASE 1	0.89	0.430	0.483	1.121	-0.096	0.86	0.14	1229
CASE 2	0.88	0.430	0.487	0.916	-0.011	0.81	0.19	1293
CASE 3	0.79	0.384	0.488	0.317	0.276	0.72	0.28	1291

Note: Potential household income is estimated by using predicted earnings for wives and the observed earnings for husbands.
Predicted earnings for wives are assigned in the three cases as given below.

	Full-time female employees	Part-time female employees	Housewives
CASE 1	Predicted full-time earnings	Predicted part-time earnings	No earnings
CASE 2	Predicted full-time earnings	Predicted full-time earnings	No earnings
CASE 3	Predicted full-time earnings	Predicted full-time earnings	Predicted full-time earnings

Source: Same as Table 3.

Note that in case (3), however, the low value for R (0.79) suggests that if more Japanese housewives of reproductive age became full-time employees, their increased earnings would likely generate a substantial equalizing effect on the family income distribution. Whereas r increases when we assign the full-time predicted earnings to housewives, the value of C_F declines. Although these forces offset each other, the latter effect dominates, and the degree of relative inequality (R) falls substantially. This result substantiates the importance of the M-shaped pattern of female labor force participation in determining the effect of married women's earnings on family income distribution.

The analysis presented above highlights the importance of the correlation in spouses' earnings. There are two important factors which interact to determine r in

Japan: positive assortative mating and the impact of husbands' income on female supply behavior. Positive assortative mating is strong in Japan. Highly educated men, for example, tend to marry highly educated women (Hodge and Ogawa, 1991). The correlation coefficient for wives' and husbands' educational attainment in our sample is 0.52. Positive assortative mating would tend to make the correlation between spouses' earnings high, since high-earning men tend to marry women with high-earning potentials.

The participation behavior of Japanese women, however, acts to reduce the correlation in spouses' earnings. Note that in our sample the correlation between spouses' earnings among households with working wives is 0.213. The observed correlation for all households is only 0.093. The lower correlation among all households is largely due to the effect of husbands' earnings on female labor supply. There is a very strong negative income effect on female labor force participation in Japan. Ogawa and Ermisch (1996) find that increases in husbands' earnings substantially reduce the probability that married women will work.[19] Husbands' income has an especially strong negative effect on the probability that wives become full-time employees.

We expect, however, that the negative impact of male earnings on female participation will moderate in the future. In view of anticipated long-term labor market changes in Japan, which will be discussed in the ensuing section, the scenario embodied in case (3) is plausible.

V. Concluding Remarks

In this paper, we have found, using micro-level data gathered from the 1994 round of the National Survey on Family Planning, that although the overall impact of female earnings on the family income distribution is minor in Japan, the impact varies over the life-cycle stages. For couples who have not yet had children and for couples whose children are in school, female earnings have an equalizing effect. Female earnings actually increase income inequality, however, among households with preschoolers. This is attributable largely to the fact that a sizable proportion of married Japanese women withdraw from the labor force upon giving birth, thus forming a distinctively M-shaped pattern of female labor force participation.

A careful comparison of these results with those for the United States has revealed that although female earnings, especially for couples without preschoolers, act to reduce inequality in household income, the impact is smaller in Japan than in the U.S. This reflects the fact that although spouses' earnings have a considerably lower correlation in Japan than in the United States, variation in female earnings is greater in Japan, and this tends to moderate their equalizing impact.

We have also examined the effect of the high incidence of family work and part-time paid employment among married Japanese women upon the family income distribution. The computed results show that whereas family work is an important source of relative inequality, the wide prevalence of part-time work plays virtually no significant role in determining the household income distribution. Moreover, we have also found that when family workers are excluded from the sample, married women at the post child-rearing stage in both Japan and the United States contribute to the family income distribution to a comparable degree.

Our estimates suggest that if more housewives were to participate in the work force as full-time paid employees, the overall income distribution would improve dramatically. The feasibility of this scenario depends upon a number of factors. Labor scarcity should draw more women into the labor market. Primarily due to a secular decline of fertility, the total labor supply is projected to begin diminishing from the year 2001 (Ogawa, 1993). In addition, the total hours worked have been on a

downward trend in recent years, and this trend is expected to continue in the years to come (Ogawa and Retherford, 1993). For these reasons, the total effective supply of labor is anticipated to decrease considerably over the next few decades. In response to these changes, Japan's labor market has already undergone numerous institutional adjustments including employment and wage practices (Martin, 1989; Clark and Ogawa, 1992). Coupled with these adjustments, employment opportunities for women are likely to improve continuously. Moreover, as a consequence of the secular rise in women's educational attainment, married Japanese women's human capital is expected to increase continuously, so that greater proportions of them are likely to meet full-time job requirements. Furthermore, the Equal Employment Opportunity Law promulgated in 1986 may further reduce gender differences in wages, thus inducing more housewives into full-time paid employment.

As opposed to these adjustments in the labor market facilitating women's full-time paid employment, the demand for in-home care provided by the middle-aged women for their frail parents is expected to rise at an alarming rate over the next few decades. As documented elsewhere (Martin, 1989; Ogawa, 1994), Japan's population aging has been unprecedentedly rapid, and its tempo is expected to accelerate further in the early part of the next century (Martin, 1989; Ogawa and Retherford, 1996; Clark and Ogawa, 1996). At present, approximately one out of every 15 housewives aged 40-49 assumes responsibility for taking care of one infirm elderly person who is bedridden or suffering from senile dementia. One recent projection shows that if the current pattern of caregiving by adult children for their aged parents persists, almost 50 per cent of housewives of this age group is likely to provide in-home care to elderly patients in 2025 (Ogawa, 1993).

The degree to which care for the elderly patients is internalized through Japan's traditional familial support network is not only contingent upon the magnitude of the future demand for female labor force but also upon the commitment of future cohorts of women to care for elderly kin with serious infirmity or illness at home. In view of the rapid filial normative shift in recent years (Retherford, Ogawa, and Sakamoto, 1996), the manpower outlook for providing care to Japanese frail elderly is rather gloomy.

Notes

[1] Data shown in Table 1 are gathered from various rounds of the National Survey on Family Planning undertaken by the Population Problems Research Council of the Mainichi Newspapers. Further discussion of this data source follows.

[2] Although the "self-employed" category includes married women who are "professionals" such as lawyers and medical doctors, they are virtually negligible.

[3] At present, a variety of definitions are available with regard to part-time paid employment. Data reported in Table 1 are based upon self-declared information. In most cases, however, part-time employees work less than 35 hours a week.

[4] In response to inflation and an acute labor shortage, these tax rules have been periodically revised upward to encourage part-time paid employees to work for a longer period of time.

[5] During the same time period, the proportion of husbands with tertiary education doubled from 21.4 to 41.9 per cent. It is also worth noting that time-series data collected by the Ministry of Education (1995) indicate that the sex differentials in enrollment for junior colleges and universities have rapidly diminished in recent years. In 1979, 41.5 per cent of men of the relevant age enrolled in either junior college or university, but the proportion had slightly declined to 40.9 per cent by 1994. The enrollment rate of women has risen from 33.1 to 45.9 per cent during the period in question, thus exceeding that of men by a considerable margin. These changes in the differentials in enrollment into tertiary education between men and women suggest that the trend in decreasing differentials in human capital between husbands and wives will continue to persist in the years ahead.

[6] Unlike the case of the well-known Swedish programs, however, no income is provided to parents during the leave, and no penalties are imposed for noncompliance.

[7] Although the 1994 round of the National Survey on Family Planning collected data on the husband's annual income, this information was not gathered in the 1979

round. For this reason, a cross-tabular analysis of intertemporal changes in the proportion of wives participating in the labor force by their husband's income is not feasible.

[8] In Japan, the value of the Gini coefficient dropped substantially in the 1960s. Since then, despite a number of fluctuations primarily owing to business cycles, it has been gradually creeping up. In 1986, the Gini coefficient of the distribution of household income rose to 0.277, but it was still considerably low, compared with 0.380 for Britain and 0.366 for the United States (Economic Planning Agency, 1989).

[9] Although 10 grouped intervals were precoded in the questionnaire, they were slightly different between the wife's and husband's earnings. Because the wife's annual earnings are generally lower than her husband's, the former ranges from "less than 0.5 million yen" to "more than 8 million yen", while the latter from "less than 1 million yen" to "more than 12 million yen." In the case of the wife's annual earnings, the category of "less than 0.5 million yen" was scored 0.3 million yen and the open-ended upper category of "more than 10 million yen" was scored 10 million yen. Note that less than one per cent of married women fall into this open-ended upper category. As regards their husbands' annual income, the lower interval of less than 1 million yen per annum is coded 0.8 million yen and the open-ended upper level interval of 12 million yen or more is assigned a value of 15 million yen.

[10] The calculated results show that in the case of the BSWS data, average hourly earnings of full-time and part-time female employees are 1,562 and 899 yen per hour respectively, compared with 1,282 and 618 yen from the 1994 round. As the BSWS data were collected only from employers with 10 or more employees, and the 1994 round covered small business firms of the cottage-industry type as well, it is reasonable to expect these differentials in average hourly pay. These results are consistent with those obtained in the previous study (Ogawa and Ermisch, 1996).

[11] See Gronau (1982) and Lehrer and Nerlove (1981) for a discussion of inequality measures, for the derivation of the coefficient of variation's decomposition, and for additional references.

[12] We conducted the same analysis, using the 1990 round of the National Survey on Family Planning. The computed results were virtually the same as those obtained from the 1994 round.

[13] We used the same methodological approach as did Lehrer and Nerlove. However, our data for Japan were gathered in 1994, and the U.S. data were collected in 1973. Also, the National Survey on Family Planning includes only data on women aged less than 50, and the U.S. data covered married women at all ages. Despite these differences, the comparison does help us interpret the results for Japan.

[14] Our estimated value of r for all women is 0.09. This is remarkably close to Gronau's estimate of 0.10 for Israeli women.

[15] In Japan, only 32 per cent of the women at ages 25-54 in our sample were full-time employees in 1994. In the United States, according to Bureau of Labor Statistics data, roughly 57 per cent of women in this age group were full-time employees.

[16] The within group coefficients of variation for women's earnings are 0.632 for full-time workers, 0.525 for part-time workers, and 1.234 for family workers. However, it is not clear that the high incidence of family workers substantially increases the overall coefficient of variation for female earnings. The coefficient of variation for earnings of all women is 1.408. When family workers are excluded from the sample, the coefficient actually rises to 1.474.

[17] The correlation of spouses' earnings is 0.213 among all households with working women. In households where the wife is a family worker, the correlation is 0.490.

[18] We include the usual human capital variables in the earnings equations. We also include numbers of children of various ages to proxy for lost work experience due to childrearing responsibilities. We correct for selectivity using a multinomial logit criterion equation as suggested by Lee, Maddala and Trost (1980).

[19] Ogawa and Ermisch (1996) estimate that a one standard deviation in husbands' income reduces the probability that wives work by 31 per cent.

Acknowledgements

The authors are grateful to the Population Problems Research Council of the Mainichi Newspapers of Japan for making available data from the 1994 round of the National Survey on Family Planning. They thank Rikiya Matsukura and Mitsuharu Akiba for computer programming assistance. This work was supported by a research grant from AFLAC Japan (American Family Life Assurance Company of Japan).

References

Arisawa, H. (1956): "Chinginkozo to Keizaikozo (Wage Structure and Economic Structure)" in I. Nakayama ed., Chingin Kihon Chosa (Basic Survey on Wages), Tokyo: Toyo Keizai Shinposha.

Bauer, J., and A. Mason (1992): "The Distribution of Income and Wealth in Japan," Review of Income and Wealth, 38 (4), pp. 403-428.

Bauer, J., and N. Ogawa (1996): "Population Aging and Japan's Seniority-Wage System," unpublished manuscript.

Betson, D., and J. Van der Gaag (1984): "Working Married Women and the Distribution of Income," Journal of Human Resources, 19, pp. 532-543.

Clark, R.L., and N. Ogawa (1992): "Employment Tenure and Earnings Profiles in Japan and the United States: Comments," American Economic Review, 82, pp. 336-345.

Danziger, S. (1980): "Do Working Wives Increase Family Income Inequality?" Journal of Human Resources, 15, pp. 452-456.

Economic Planning Agency (1989): Annual Report on the National Life for Fiscal Year 1988, Tokyo: Government Printing Office.

Gronau, R. (1982): "Inequality of Family Income: Do Wives' Earnings Matter?" Population and Development Review, 8 (supplement), pp. 119-136.

Heckman, J. (1980): "Sample Selection Bias As a Specification Error," in J. Smith ed., Female Labor Supply: Theory and Estimation, Princeton: Princeton University Press.

Higuchi, Y. (1981): "Joshi Rodokyokyu Bunseki no Tembo (Review of Analyses on Female Labor Supply)," Mita Shogaku Kenkyu (Keio Business Review), 23(6), pp. 46-72.

Hill, M. (1989): "Female Labor Supply in Japan: Implications of the Informal Sector for Labor Force Participation and Hours of Work," Journal of Human Resources, 24, pp. 143-161.

Hodge, R.W., and N. Ogawa (1991): Fertility Change in Contemporary Japan, Chicago: University of Chicago Press.

Horvath, F.W. (1980). "Working Wives Reduce Inequality in Distribution of Family Earnings," Monthly Labor Review, 103, pp. 51-53.

Layard, R., and A. Zabalza (1979): "Family Income Distribution: Explanation and Policy Evaluation," Journal of Political Economy, 87, pp. S133-S161.

Lee, L.F., G.S. Maddala, and R.P. Trost (1980): "Asymptotic Covariance Matrices of Two-Stage Probit and Two-Stage Tobit Methods for Simultaneous Equations Models with Selectivity," Econometrica, 48, pp. 491-503.

Lehrer, E., and M. Nerlove (1981): "The Impact of Female Work on Family Income Distribution in the United States: Black-White Differentials," Review of Income and Wealth, 27, pp. 423-431.

Liu, Y.C., and C.H. Chang (1987): "The Impact of Wives' Earnings on Family Income Inequality: The Case of Taiwan," Economic Essays, 15, pp. 509-533.

Martin, L.G. (1989): "The Graying of Japan," Population Bulletin, 44, pp. 1-42.

Mincer, J. (1974): Schooling, Experience and Earnings, New York and London: Columbia University Press.

Ministry of Education (1995): Statistical Bulletin of Education, Tokyo: Daiichi Hoki Shuppan.

Ogawa, N. (1987): "Sex Differentials in Labour Force Participation and Earnings in Japan," in UN-ESCAP ed., Women's Economic Participation in Asia and the Pacific, Bangkok: United Nations ESCAP.

Ogawa, N. (1993): "Impact of Changes in Population and Household Structure upon the Allocation of Medical Resources in Japan," Japan and the World Economy, 5, pp. 137-156.

Ogawa, N. (1994): "Economic and Social Implications of Population Aging in Japan," in Japan Aging Research Center ed., Aging in Japan, Tokyo: Japan Aging Research Center.

Ogawa, N., and R.L. Clark (1995): "Earnings Patterns of Japanese Women: 1976-1988," Economic Development and Cultural Change, 43, pp. 293-313.

Ogawa, N., and J.F. Ermisch (1994): "Women's Career Development and Divorce Risk in Japan," Labour, 8, pp. 193-219.

Ogawa, N., and J.F. Ermisch (1996): "Family Structure, Home Time Demands and the Employment Patterns of Japanese Married Women," Journal of Labor Economics, 14, pp. 677-702.

Ogawa, N., and R.W. Hodge (1994): "Patrilocality, Childbearing, and Labour Supply and Earning Power of Married Japanese Women," in J.F. Ermisch and N. Ogawa eds., The Family, the Market, and the State in Ageing Societies, Oxford: Clarendon Press.

Ogawa, N., and R.D. Retherford (1993): "The Resumption of Fertility Decline in Japan: 1973-92," Population and Development Review, 19, pp. 703-741.

Ogawa, N., and R.D. Retherford (1996): "Shifting Costs of Caring for the Elderly Back to Families in Japan: Will it Work?" Population and Development Review, 23, pp. 59-94.

Pong, S.L. (1991): "The Effect of Women's Labor on Family Income Inequality: The Case of Hong Kong," Economic Development and Cultural Change, 40, pp. 131-152.

Population Problems Research Council (1994): Summary of Twenty-second National Survey on Family Planning, Tokyo: Mainichi Newspapers.

Retherford, R.D., N. Ogawa, and S. Sakamoto (1996): "Values and Fertility Change in Japan," Population Studies, 50, pp. 5-25.

Shaw, K.L. (1989): "Intertemporal Labor Supply and the Distribution of Family Income," Review of Economics and Statistics, 71, pp. 196-205.

Thurow, L. (1975): "Lessening Inequality in the Distribution of Earnings and Wealth," paper presented for the Institute of Advanced Study, Princeton, New Jersey.

Yoshida, Y., and A. Mizuno (1987): "Joshi Rodo no Zoodai, Chingin Hendo narabini Shotoku Bunpai (Increase in Female Labor Supply, Wage Changes, and Income Share)," in Koyo Shokugyo Sogo Kenkyu Jo ed., Joshi Rodo no Shinjidai (A New Era of Female Labor), Tokyo: University of Tokyo Press.