LABOR FORCE WITHDRAWAL, RE-ENTRY AND WAGES
BY EDUCATIONAL ATTANMENT IN JAPANESE WOMEN

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"Labor Force Withdrawal, Re-entry and Wages by Educational Attainment in Japanese Women"

## I. Introduction

The purpose of this paper is twofold: 1) to identify differences in work history such as withdrawal from and re-entry into the labor force among women with different educational backgrounds; and 2) to examine the mechanism which causes these differences from the perspective of the human capital theory.

In many advanced countries including the U.S., Britain, France, West Germany and Sweden, more-educated women have a higher labor force participation rate.[1] In Japan, however, a positive correlation between schooling and female labor force participation is not clear (see table 1). While a positive education-employment correlation can be easily observed among Japanese women in their 20's, this relationship is negative among women in their 30's and 40's.

A relative large proportion of Japanese women are still self-employed, working on farms, in cottage industries, or in family businesses. (1982 the share of self-employed workers among total female workers was 13.5% and that of unpaid family workers was 21.1% in Japan, compared with 5.4% and 1.1%, respectively, in the U.S. and 4.7% and 7.3% in West Germany). Since self-employment and paid employment outside the home of the husband or wife are expected to have a different level of desire for the wives to be employed referred to as labor supply mechanism (Hill (1983)), using

data which does not distinguish on the basis of job status blurs the relationship between schooling and labor supply behavior. The bottom of table 1 reviews employee labor force participation rates which are restricted to paid employees (excluding self-employed and unpaid family workers). The negative relationship between schooling and the female total participation rate disappears within this sub-category of paid employees. However, unlike in the U.S., a positive relationship still remains ambiguous in the Japanese labor market (i.e. increased school does not lead to high employee labor force participation).

Many empirical studies have indicated that married women labor supply is encouraged by their own wages (substitution effect dominates income effect) and discouraged by their husbands' income (income effect) (i.e. for a given level of husband's income, wives are more likely to work the greater their own earning power. For a given level of their own earning power, wives are less likely to work the greater their husband's income). The wages of more educated women are, on the average, higher than less-educated women and the husband of more-educated women are more likely to have high income. Consequently, the relationship between schooling and female labor force participation must be influenced by two opposite effects: the encouraging effect of their own wages and the discouraging effect of their husbands' income. The positive relationship between schooling and female labor force

participation which is observed in the U.S. and European countries reflects the fact that the substitution effect of their own wages (encouraging them to work) exceeds the (discouraging) income effect of their husbands' wages. In contrast with these countries, the negative relationship in married Japanese women implies that the income effect of their husband is more dominant than the substitution effect of their own wages.

Generally speaking, in a labor market where the male wage differential is wider than the female wage differential, the income effect of the husbands' wages is stronger than the substitution effect of the wives' own wages. But, Japanese wage statistics on workers who became employed immediately after completion of their education and who stayed at the same firm demonstrate that the male wage differential between educational levels is smaller (regardless of job tenure) than the female differential (see table 2). Let us suppose that more-educated women marry more-educated men. As long as they don't quit their jobs, the wage difference between the husband and the wife would be expected to be smaller in more-educated couples than in less-educated couples (this is consistent that the negative effect of husbands' income on female labor supply would not dominate the positive effect of the wives' own wages in more-educated couples). In spite of that, why don't more-educated married women show a higher labor force participation rate in Japan?

Japan's wage structure is often characterized by the fact that years of tenure at the current firm (internal experience) has a relatively high effect on wages, compared with work experience prior to joining the current firm (external experience). This feature suggests that separation from the company compels workers to give up the large earning capacity acquired by their internal experience. In other words, in this labor market, turnover is likely to cost workers a high penalty. Recent studies such as Kuratani (1973), Hashimoto and Raisian (1985) and this author (1986) analyzed the relationship between the Japanese wage structure and the low separation rate in terms of human capital theory. However, most of these studies concentrated on male workers. Can we observe this same large effect of job tenure on female wages?

If this feature can be observed regarding female wages, leaving the labor market obliges women to pay high costs. In an economy where technological change advances rapidly, the acquired job skills of workers might become obsolete quickly. Therefore, when women look for a new job after stopping work for child-birth and child-rearing, the wage gap between the previous job and the newly acquired job might be large in the Japanese labor market. This wage gap (called depreciation of human capital stock) is expected to discourage women from re-entering the labor market. Who has a larger gap, more-educated women or less-educated women?

While women are interrupting their careers, their husbands' wages are increasing through extended job tenure. The difference in tenure effect on wages between more-educated men and less-educated men also influences the withdrawal rate and the re-entry rate of wives. Given the fact that education does not lead to higher labor force participation among Japanese women, it might be supposed that the high wage gap suffered by well-educated women is what discourages them from returning to work.

The purpose of this paper is to shed some light on withdrawal behavior and re-entry behavior of Japanese women empirically through a comparison study between those with different educational backgrounds. The structure of the paper is as follows: In section II, we will investigate the historical changes in female labor force participation, age of marriage and age of childbirth among women of different educational attainment. Section III focuses on withdrawal rates and entry rates as well as distributions of women for different level of job tenure and of duration of labor force withdrawal by schooling. Section IV examines the effect of job experience on wages and the depreciation rate of human capital stock by schooling and the influence of these two factors on withdrawal rates and entry rates. The paper concludes with a provisional summary. The analytical statistics in this paper came from aggregate data because of the unavailability of panel micro data in Japan.

## II. Historical Changes of Female Labor Force Participation, Age of Marriage and Age of Childbirth

Reviewing the labor force participation in terms of age profile (table 3), we notice that, regardless of the year of observation, the upward slope of less-educated women from youth to old age is steeper than that of more-educated women. For instance, while the participation rate of junior college/college graduates increases by 10 percent from the trough (30-34 years old) to the peak (40-54 years old) in 1982, that of junior high school and high school graduates increases by as much as 25 percent and 15 percent respectively from the 25-29 age group to the 40-54 age group.

Next, let us refer to the shift in labor force participation by schooling over time. Over the last decade, female labor force participation rate has increased in all education groups. However, the increase in participation for different levels of schooling varies according to the age group. The increase of junior college/college graduates from 1968 to 1982 was larger in the 25-29 age group than in any other group (14.4 percent growth vs. 4.9 - 7.0 percent). In contrast, the labor force participation of junior high school/high school graduates increased more rapidly in the over-30 age groups than in the 25-29 age group (3.2 - 6.2 percent growth vs. 1.1 percent for junior high and 11.9 - 14.4 percent growth vs. 7.6 percent for high school).

The rapid increase in labor force participation of 25-29 year-old college graduates delays their age of marriage (see table 4). The median age of marriage rises most significantly among college graduates. While marital rates of junior high school and high school graduates increased in the young age group, 20-24 years old (5.1 percent and 3.0 percent, relatively, from 1970 to 1980), those of junior college and college graduates declined (-1.1 percent and -3.6 percent). Also, while fewer 25-29 years old women of all educational levels were married in 1980, the decrease in marital rates was largest among college graduates (-4.5 percent). Besides, the interval between marriage age and the initial child-birth age is longer among more-educated women (2.07 years for college grads). We might speculate that the rapid increase in the labor force participation rate of young college graduates which is observed among single women is due to later marriage and child-bearing. At the same time, we would suppose that labor force participation of junior high/high school graduates increases among married women.

III.    Women's Work History by Educational Attainment

Table 5 compares the number of years of tenure at the current job in Japan and in the U.S. by sex, age and educational attainment. These data are limited to workers who are currently employed. A job is defined as continuous employment with a single employer, even though the person may change job title within the same company.

Job tenure of Japanese male workers, known as "life-
time employment," is much longer than that of American
males. The median job tenure of Japanese male workers age
45-54 is almost twice as long as their American
counterparts. More impressive is the long job tenure of
Japanese female workers. Their median tenure is not
equivalent to that of the Japanese male, but surprisingly it
is longer than that of the American male. More interesting
is the relationship between schooling and job tenure. In
the Japanese 35-44 and 45-54 age groups, more-educated women
have significantly longer job tenure than less-educated
women. This tendency is also observed in the U.S., however,
the Japanese positive relationship between educational
attainment and job tenure is more obvious.

The strong positive correlation between schooling and
job tenure among Japanese female workers is basically caused
by the following two factors: more-educated women have a
lower separation rate from the firm and have less tendency
to re-enter the labor market after quitting the job.
Generally speaking, job tenure of male workers is closely
linked to their turn-over behavior rather than to entry and
withdrawal behavior because most of them remain in the labor
market. When analyzing job tenure of female workers,
however, we should pay more attention to their entry and
withdrawal behavior.

Figure 1 reviews annual separation rates in Japan and
the U.S. by sex and age. While male separation rates in the

U.S. are overwhelmingly higher than those in Japan, there are no big differences in female separation rates between the two countries except in the under 25 years old group. However, when the separators from their companies are decomposed into job changers and withdrawers from the labor market, their compositions are clearly different in Japan and the U.S. While 72 percent of the female separators get another job within a year in the U.S., only 30 percent are employed a year after leaving the companies in Japan. Conversely, withdrawers account for as much as 70 percent of female separators in Japan, compared with 28 percent in the U.S. The high Japanese withdrawal rates account partially for the long job tenure of the women who are employed currently.

Figure 2 shows time-series movements of a turn-over rate, a withdrawal rate, the job-stayer rate and the entry rate by educational attainment in Japanese married women aged 30-39. The turnover rate is defined as the ratio of job changers in the past 12 months to employees who worked a year ago. The withdrawal rate is the ratio of non-workers who withdrew from the labor market in the past 12 months to employees who worked a year ago. Our definition of the job-stayer rate is the ratio of employees who held the same job a year ago to employees who worked a year ago (1 - the turn-over rate - the withdrawal rate). The entry rate is the ratio of new entrants/re-entrants in the past twelve months to people who were out of the labor market a year ago.

Neither the turn-over rate nor the withdrawal rate shows a consistent trend over time. On the other hand, the entry rate is rising rapidly in every educational group through all observation periods. Because many of the entrants in the 30-39 age group are re-entrants who have worked previously, the rise of the entry rate can be interpreted as an increasing tendency to return to the labor market at a certain interval after marriage or child-bearing[2] (60 percent of entrants in the 30-39 age group are re-entrants and 40 percent of them have never worked before).

Comparing the withdrawal rate and entry rate of women with different levels of schooling in each time period, we find that the most-educated women have the lowest turnover rate and also the lowest withdrawal rate. As expected from the above definitions, their job-stayer rate is clearly higher than that of less-educated women. Results from other age groups are qualitatively similar. This feature of more-educated women can account partially for their long job tenure. On the contrary, the turnover rates and the withdrawal rates of junior high/high school graduates are relatively high.

The entry rate, another determinant of job tenure, is lower in college graduates than in junior high/high school graduates. It is apparent that, in addition to their lower job-stayer rates, the high entry rate of junior high/high school graduates reduces their median job tenure. From the

above observation, it can be concluded that, while less-educated women go in and out of the labor market frequently, more-educated women tend to stay with their company or to leave the labor market completely.

A close look at each of these rates by education suggests that the differences are consistent with the observation that the labor force participation rate among less-educated women increases more rapidly as they become older (see table 1 and 3). While the difference in entry rates between junior high school graduates and college graduates was as large as 6 percent in 1982, the difference in withdrawal rates is relatively small (3 percent). In other words, although junior high school graduates have a high withdrawal rate, their entry rate is even higher causing a large increase in the labor force participation rate as they get older. On the other hand, despite their low withdrawal rate, the entry rate of college graduates is so low that their labor force participation rate doesn't show as dramatic an increase.

Next, we should examine the differences in the duration of withdrawal between women of different educational levels, but this kind of direct information is not available in Japan now. Instead, we will examine the duration of withdrawal of women presently out of the labor force.

The percentage of these women classified by duration of withdrawal does not include those who have already resumed work. So, in order to show the percentage of women who do

not return to the labor market and who remain out of labor force, table 6 indicates ratio of non-working women classified by duration of withdrawal to the population.

First, the proportion of women who have never worked decreases in the new cohorts (those born in more recent years). The ratio of these women who never worked to the population averages 12.5 percent, 14.7 percent, 15.6 percent and 17.3 percent in the 30-34, 35-39, 40-44 and 45-49 age groups respectively. If they have the same employment pattern regardless of cohort, this ratio is expected to decrease in the older age groups because older people are supposed to have had more chances to work from completion of school up to this time, ceteris paribus. Nonetheless, the fact shown by the statistics that this ratio is higher in the older age groups reveals that the number of women who have work experience increases rapidly in the newer cohort. However, the relationship between this ratio and educational attainment is not clear.

Second, it deserves special attention that the women who remain out of the labor market for a long time account for a higher proportion in the more-educated group. For example, while the ratio of junior high school graduates who have not been employed for more than 10 years to the population is only 6.2 percent and 5.4 percent in the 40-44 and the 45-49 age groups, respectively, the counterparts of college graduates are as large as 18.6 percent and 17.3 percent. That is to say, there are many women among more-

educated groups who had a job previously but quit it and
never returned to the labor market again. In contrast to
the more-educated women, there are proportionally fewer such
women in the less-educated group. This observation
reinforces our argument that, while less-educated women tend
to go in and out of the labor market more frequently (see
the work history pattern C in figure 3), more educated women
are more likely to divide into two clear-cut groups: one is
the group of women who stay at the same firm for a long time
(the work history pattern A) and the other is the group of
women who never return to the labor market after quitting
the job (the work history pattern C).

## IV.  Job Experience Effect on Wages and Depreciation Rate of Human Capital

What causes the differences in work history patterns of
women with different educational backgrounds, which were
found in the previous section? Focusing on this question
will provide some key clues for solving the seemingly
unusual observation that women with more education don't
show a high labor force participation rate in Japan. The
question to be analyzed consists of two parts: why more-
educated women have a lower withdrawal rate, and why the
more-educated women, who once interrupted their job for
bearing and raising children, are less likely to re-enter
the labor market. Conversely, why are less-educated women
more likely to repeatedly enter and exit the labor market?

Whether a worker stays in the labor market or leaves it depends on the difference between her offer wage (W) and reservation wage (Wr: a minimum acceptance wage). If an offer wage is above her reservation wage, the worker will accept the job. The issue of having children raises the reservation wage because the value of non-market activity increases. When the wage which the company offers doesn't exceed her reservation wage, she quits the job and leaves the labor force. Other things being equal, her reservation wage falls as her children become older. If she can find a job whose offer wage exceeds her reservation wage, she will return to the labor market. Also, the fact that her husband's income influences her reservation wage negatively should be taken into account.

In the human capital model, investments in on-the-job training are considered to be critical determinants of wages (see Mincer (1974)). On-the-job training has a cost, not only to employers, but also to workers, since time spent training is considered to be time diverted from production, and the amount of product presumably determines earnings. At the same time, on-the-job training has a benefit in the form of increasing later labor productivity.

Let $E_t$ be the earning capacity in period t. $W_t$ the observed wage, $C_{t-1}$ the dollar cost of gross human-capital investment (on-the-job training) paid by the employees in period t-1[3], r the average rate of return to the investment, $k_{t-1} = C_{t-1}/E_{t-1}$, the gross investment ratio and $\delta_{t-1}$ the

depreciation rate of the stock of human capital, hence, of earning capacity $E_{t-1}$. Suppose that this employee has worked for t years without interrupting his/her work. The earnings function can be written as

(1) $E_t = E_{t-1} + rC_{t-1} - \delta_{t-1}E_{t-1}$.

Hence (2) $\dfrac{E_t}{E_{t-1}} = 1 + rk_{t-1} - \delta_{t-1}$

and (3) $\ln E_t = \ln E_0 + \sum_{i=0}^{t-1}(rk_t - \delta_t)$.

Since earnings are equal to net of investment expenditures $(W_t = E_t(1-kt))$, we have also the following wage equation:

(4) $\ln W_t = \ln E_0 + \ln(1-kt) + \sum_{i=0}^{t-1}(rk_i - \delta_i)$

In applying the analysis to women, we must take account of depreciation of human capital which may be caused by discontinuity of work experience for the purpose of child-rearing and child-care. Mincer and Polachek (1974) and Corcoran (1979) extend the human capital model to account for this possible depreciation. Equation (5) should capture the investment pattern of continuously employed workers and of workers who withdraw from the labor market for nonmarket activities.

(5) $\ln W = a + \sum_{i=1}^{N}(rk_i - \delta_i)t_i + \sum_{j=1}^{M}(rk'_j - \delta'_j)s_j$

$\qquad = a + \sum_{i=1}^{N}b_i t_i - \sum_{j=1}^{M}c_j s_j$

where N = the number of jobs which the worker has had from
       completion of school until the survey period

   M = the number of interruption periods of the worker
       from completion of school until the survey period

$t_i$ = distinct periods of work experience in the i-th

   job

$s_j$ = distinct periods in the j-th labor force

   withdrawal

$a = \ln E_0 + \ln (1-k_t)$

$b_i = rk_i - \delta_i$: the effect of job experience in the i-

   th job

$c_j = \delta'_j - rk'_j$: the net depreciation rate in the j-th

   labor force withdrawal.

In order to estimate the wage function by educational
attainment, two kinds of wage statistics are available in
the <u>Japanese Basic Survey on Wage Structure</u>. One is the
wage profiles of the workers who have never changed jobs
since completion of school to the present time. The other
is the wages of the workers who have interrupted their
employment. The wage equation of the workers who have never
changed jobs, is shown in equation (6), which is deduced
from equation (5).

   (6) $\ln W = a + b_1 T$

Table 7 shows coefficients ($b_1$) by sex, educational
attainment and job tenure which are calculated form the 1983
<u>Basic Survey on Wage Structure</u>.

Comparing these estimated coefficients by sex, we
notice that the average effects of job experience on wages
are higher in male workers than in female workers by 1 to
1.5 percent. In comparison by educational attainment, it is
shown that the more-educated workers clearly have strong

effect of job experience on wages. In particular, the differences in this effect between workers with different degree of schooling is larger in female workers. While the difference between junior high school graduates and college graduates is 1.39 percent (5.57% in college graduates vs. 4.18% in junior high school graduates) in male workers, that the difference among female workers is 1.96 percent (4.59% in college graduates vs. 2.63% in junior high school graduates).

Next, let us estimate the net depreciation rates of human capital stock by using wage data of workers who have interrupted their job history. Information on the exact duration of work experience in each job, and the exact duration of each labor force withdrawal, is not available in this wage data. Instead, we can use data on wages, total work experience in the previous jobs (X), and total duration that the worker is out of the labor force (D), segregated by job tenure at the current place of employment (T)[4]. Suppose that the effects of work experience on wages are equal in each previous job ($b_1 = b_2 = \ldots = b_{N-1}$), and that the net depreciation rate is also equal in each labor force withdrawal ($c_1 = c_2 = \ldots = c_M$). Under these assumptions, their wage equation can be written as the following:

(7) $\ln W = a + bX - cD + eT$

Since the work experience effects on wages were estimated as shown in table 7, we can apply these estimated values which

correspond to the work experience (X and T) of the worker by schooling, as the parameters b and e.[5]

Table 8 shows the average net depreciation rate calculated by using the data of 30-39 year old female workers whose tenure at current job is less than five years. It is observed that junior college/college graduates (i.e. -4.51% and -3.05% in the 30-35 age group, respectively) have a higher depreciation rate than junior high school/high school graduates (i.e. -1.35% and -2.67%). These differences in net depreciation rates are large when compared with the differences in the net effect of experience on wages among women with different educational backgrounds.

How do the effects of work experience and depreciation rates influence the withdrawal and entry rates? Let's consider the decision by workers who have never in interrupted their employment, whether to quit or stay at the company when they have children. Let $w_r$ be the logarithm of the reservation wage, $f(w_r)$ the probability density function which reflects distribution of individual taste and $w_m$ the logarithm of the offer wage. Since the workers whose $w_r$ is below the offer wage will quit the job, their withdrawal rate, $\alpha$, can be indicated by equation (8).[6]

$$(8) \quad \alpha = P(w_r > w_m) = \int_{w_r = w_m}^{\infty} f(w_r) \, dw_r$$

The work experience effect on wages, b, influences the withdrawal rate through differences in offer wages. Since the offer wage of these workers with T years of work

experience is shown by equation (6), the influence can be written as:

(9) $\dfrac{\partial \alpha}{\partial b} = -Tf(a+bT)$.

Since the right side of the equation always has a negative value, the withdrawal rate of workers who have a larger work experience effect on wage is expected to be lower. As shown in table 7, more-educated women have a larger work experience effect. Other things being equal, this implies that their withdrawal rate is lower than that of less-educated workers. This inference is consistent with our observation of differences in withdrawal rates by degree of schooling as examined in the previous section.

On the other hand, how do work experience effects on wages and net depreciation rates influence re-entry rates? Let us suppose that women remain out of the labor force for D years after X years by work experience. Their offer wage is shown as equation (10) and their re-entry rate, $\beta$, shown as equation (11).

(10)   $wm = a + bX - cD$

(11)   $\beta = F(w_r < w_m) = \displaystyle\int_{w_r\,=\,-\alpha}^{w_m} f(w_r)dw_r$

So, influences on re-entry rates of work experience effects on wage/net depreciation rates can be deduced as equation (12)/(13), respectively.

(12)   $\dfrac{\partial \beta}{\partial b} = Xf(a+bX-cD)>0$

(13)   $\dfrac{\partial \beta}{\partial c} = -Df(a+bX-cD)<0$

Our estimated results imply that more-educated women have a high work experience effect and also a high net depreciation rate. Since both influences on re-entry rates cancel out each other, we cannot judge whether, for the whole range of possible X values or D values, more-educated women have a lower or higher re-entry rate. From equation (11), the difference in re-entry rates between women with different educational backgrounds can be shown as

$$(14) \quad d\beta = \frac{\partial \beta}{\partial b} db + \frac{\partial \beta}{\partial c} dc = (Xdb - Ddc)f(a+bX-cD)$$

where $d\beta$ = the re-entry rate of more-educated women - that of less-educated women; $db$ = the work experience effect on wage of more-educated women - that of less-educated women,; $dc$ = the net depreciation rate of more-educated women - that of less-educated women. Among all women whose labor force withdrawal period, D, is longer than $\frac{db}{dc}X$, those who are more-educated women are expected to have a lower re-entry rate because equation (14) has a negative value.

Let us consider the different in re-entry rate between junior college graduates and junior high school graduates as an example. Substituting the estimated parameters shown in table 8 into the equation, we know that the value of $\frac{db}{dc}$ is 0.22. So, junior college graduates who are staying out of the labor market for longer than 0.22 times their previous period of work experience, are inferred to have a lower re-entry rate than their junior high school graduate counterparts. According to the Employment Structure Survey,

since most job-separated married women belong to this category (D>0.22X), the re-entry rate of all married women who graduated from junior college is expected to be lower than that of married junior high school graduates.

Moreover, referring to women who have no work experience after completion of school (X=0), the value of equation (14) is always negative excepting the comparison between junior college and college graduation. Consequently, these more-highly educated women are much less likely to newly enter the labor market than their less-educated counterparts. These inferences are also consistent with our observations.

The effects of husbands' income on reservation wages have not been taken into account so far. The income effect of husbands' wages on reservation wage is expected to be positive. In other words, cetris paribus the labor force participation rate of women with spouses' income being high is low. Higuchi and Hayami (1984) and Shimada and Higuchi (1985) demonstrate that, as a result of a probit analysis, the income effect in Japanese married women is much larger than that in the U.S. Figure 4 shows the relationship between the husbands' income and employee labor force participation rate of married women/withdrawal rate/entry rate/turn-over rate/job-stayer rate. As the husbands' income increases, the employee labor force participation and the entry rates of wives apparently decline and the

withdrawal rate rises. All of these factors indicate that the husbands' income raises the wives' reservation wages.

If more-educated women are assumed to have a tendency to marry men with higher income, their reservation wages must be higher. While high reservation wages have a positive effect on women's withdrawal rates, the high effect of women's work experience on their own wage has a negative impact on it. The two effects cancel out each other; however, our observation is that the negative relationship between educational attainment and withdrawal rate, suggests that the negative impact of a woman's wage on withdrawal rate is more dominant than the positive impact of her husband's income.

Contrary to what has been demonstrated with regard to withdrawal rates, a higher level of income of husbands decreases the entry rates of more-educated women, as does the high depreciation rate of human-capital stock. In other words, the negative effect of the husbands' income reinforces the negative effect of depreciation rate on entry rates and widens the difference in entry rates between women with different amounts of schooling. It is inferred that these two negative effects create the big differences in entry rates observed in figure 2.

## V.    Concluding Remarks

The analysis conducted for this paper had two objectives: The first was to identify the differences in the withdrawal rate and the entry rate between females of

varying educational attainment. Through these empirical studies, it has been demonstrated that more-educated women have a lower withdrawal and a lower entry rate compared with less-educated women. The entry rate exceeds the withdrawal rate among women in their 30's and 40's. Moreover, the difference between the entry rate and the withdrawal rate is greater in less-educated women than in more-educated women. This larger difference in less-educated women accounts for their steeper increase in labor force participation from their 20's to 30's and 40's. More-educated married Japanese women don't show a higher labor force participation than less-educated women, unlike those of other advanced countries. This apparently curious fact is caused by the lower re-entry rate of more-educated women.

The second objective of the paper was to shed some light on the wage mechanism which causes the above observation from the perspective of human capital theory. Our empirical study suggests the following: The high work experience effect on wage (net rate of return to on-the-job training times the amount of on-the-job training) of more educated women lowers their withdrawal rate. Their high net depreciation rate of on-the-job training during the period of labor force withdrawal (a high penalty for leaving the labor market) discourages more-educated women from labor force re-entry. Besides, large negative effect of husband's income on female labor supply reinforces the negative effect of net depreciation rate on re-entry rate. These two

effects result a lower re-entry rate of more-educated Japanese women.

However, one of the drawbacks of this analysis is its statistical problems. A particularly important problem is that our wage data is limited to regular employees who are employed indefinitely or under a contract for a period longer than one month, or day workers who worked more than 18 days each month in two months prior to the survey period. Therefore, the possibility that part-time workers are not included in our wage data is strong. The second problem is that some necessary information to estimate wage equations are lacking in the Basic Survey on Wage Structure and was thus compensated for by data from the Employment Structure Survey.

In addition to statistical problems, the questions of why both the work experience on wages and the net depreciation rate of more-educated women are so high have not been answered sufficiently. Together with these questions, the problem of why the husband's income effect on wife's reservation wage is so large in Japan should be investigated in future research.

# FOOTNOTES

1.  See _Trends in Women's Work, Education, and Family Building_, in _Journal of Labor Economics_, Vol. 3, No. 1, Part 2, January 1985.

2.  According to _The 1983 Survey of Employment Trends_, part-time workers account for 34.5 percent of female entrants excluding new graduates.

3.  Human-capital investment can be divided into general human-capital investment and specific human-capital investment. Kuratani (1973) shows theoretically and empirically how large portion of costs and benefits of each investment is shared by both employer and employee. In this paper, we assume that these ratios are given.

4.  The information on total work experiences in the previous jobs (X) and total duration of time spent out of the labor force (D) is not available in _the Basic Survey on Wage Structure_. This information is compensated for by use of _the Employment Structure Survey_ through the following procedure. The data on the ratio of workers who had a previous job to workers who had no previous job is available by sex, age, schooling and current job tenure for total workers. Let $\alpha$ be the ratio of workers who had no previous job before getting the current job, $(1-\alpha)$ is the ratio of workers who had a previous job. Since knowing when workers got the current job, we can easily calculate the out of labor force duration for workers who had no previous job. Let A be the number of years from completion of schooling to the survey period and T years of their current job tenure. The previous work experience $(X_1)$ for these workers should be zero, the out of labor force duration $(D_1)$ should be A-T. Also, the data on the work experience in the previous job $(X_2)$ is available for workers who had a previous job before getting the current job. Their out of labor force duration $(D_2)$ is A-T-$X_2$. Therefore, we can get the average out of labor force duration of the two groups $(D=\alpha(A-T)+(1-\alpha)(A-T-X_2))$ and the average work experience in the previous job $(X=(1-\alpha)X_2)$ by sex, age, schooling, and the current job tenure.

5.  First, we estimated all parameters of equation (7) simultaneously without giving the parameter b and e exogenously. However, we could not get stable parameters. So the 1 stimation procedure mentioned in the main was applied.

6.  Killingsworth (1983) and Heckman (1978) emphasize the importance of dynamic labor supply models which uses the multiple period or lifetime utility maximizing principle.  Our model on withdrawal behavior and re-entry behavior might need to be developed along the line of dynamic models, however, we apply a static model for the sake of simplicity and also because of the unavailability of Japanese panel micro data.  Therefore, we treat the work experience and the duration of labor force withdrawal prior to the observation period as exogenous variables.

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## Table 1

## Female Labor Force Participation Rates by Schooling in Japan and the U.S. (1980)

### Japan (Total Labor Force)

| Age | Junior High School (9 years) | High School (12 years) | Junior College/ College (14 or more years) |
|---|---|---|---|
| 20-24 | 55.7 | 74.9 | 84.2 |
| 25-29 | 44.0 | 45.8 | 55.4 |
| 30-34 | 49.1 | 44.4 | 44.2 |
| 35-39 | 60.1 | 52.7 | 47.7 |
| 40-44 | 65.7 | 58.3 | 53.8 |

### U.S.

| Age | less than 12 | 12 years | 13-15 years | 16 or more years |
|---|---|---|---|---|
| 20-24 | 46.0 | 70.3 | 68.5 | 87.0 |
| 25-29 | 46.6 | 62.5 | 71.2 | 81.7 |
| 30-34 | 50.5 | 61.9 | 66.9 | 72.3 |
| 35-39 | 53.4 | 65.0 | 68.3 | 72.5 |

### Japan (Paid Employee)

| Age | Junior High School | High School | Junior College/ College |
|---|---|---|---|
| 20-24 | 47.9 | 70.1 | 80.4 |
| 25-29 | 29.5 | 35.3 | 48.5 |
| 30-34 | 28.3 | 28.4 | 33.8 |
| 35-39 | 35.0 | 33.6 | 35.2 |
| 40-44 | 38.5 | 36.8 | 40.3 |

Source:    Japan, Population Census, Statistics Bureau, Prime
           Minister's Office
           U.S., Census of Population, Census Bureau.

## Table 2

### Wage Differential by Schooling and Job Tenure

#### (Female)

| Job Tenure (year) Education | 0 | 1-2 | 3-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30- |
|---|---|---|---|---|---|---|---|---|---|
| Jr High School | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| High School | 118.4 | 123.4 | 119.7 | 124.7 | 123.1 | 126.3 | 123.3 | 127.7 | 140.0 |
| Jr College | 133.9 | 135.9 | 134.7 | 135.4 | 140.6 | 146.4 | 145.9 | 158.3 | 176.6 |
| College | 150.6 | 151.2 | 154.3 | 164.0 | 170.6 | 199.2 | 198.5 | 197.3 | 203.7 |

#### (Male)

| Job Tenure Education | 0 | 1-2 | 3-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30- |
|---|---|---|---|---|---|---|---|---|---|
| Jr High School | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| High School | 118.5 | 131.1 | 120.0 | 103.2 | 108.5 | 113.9 | 120.4 | 123.8 | 130.9 |
| Jr College | 134.6 | 133.5 | 127.0 | 125.3 | 132.6 | 133.4 | 136.0 | 144.1 | 163.2 |
| College | 145.0 | 147.9 | 152.7 | 150.4 | 158.1 | 168.1 | 179.1 | 178.8 | 178.4 |

Source: <u>1983 Basic Survey on Wage Structure</u>, Ministry of Labor.

Note:   The numbers in this table are the ratios of monthly straight-time wage of workers by schooling with junior high school graduates set at 100. The sample is limited to the regular workers who are hired by a firm immediately upon graduating from school, and remain with the same employer. The regular workers are defined as employees who are employed indefinitely or under a contract for a period longer than one month, or who worked more than 18 days each month in two months prior to the survey period.

## Table 3

### Female Labor Force Participation Rates by Age and Schooling

| | 1968 | 1971 | (%) 1974 | 1977 | 1979 | 1982 | (% change) 1968-82 | (% change) 1974-82 |
|---|---|---|---|---|---|---|---|---|
| **Age 25-29** | | | | | | | | |
| Jr High School | 43.9 | 40.4 | 38.8 | 41.7 | 43.5 | 45.0 | +1.1 | +6.2 |
| High School | 39.4 | 37.5 | 38.6 | 42.1 | 43.4 | 47.0 | +7.6 | +8.4 |
| Jr College/ College | 43.0 | 42.5 | 44.3 | 50.1 | 52.2 | 57.4 | +14.4 | +13.1 |
| **Age 30-34** | | | | | | | | |
| Jr High School | 50.5 | 48.0 | 44.7 | 49.0 | 49.7 | 53.7 | +3.2 | +9.0 |
| High School | 36.8 | 37.4 | 36.9 | 41.4 | 44.5 | 48.7 | +11.9 | +11.8 |
| Jr College/ College | 40.9 | 36.0 | 39.3 | 40.1 | 43.4 | 47.9 | +7.0 | +8.6 |
| **Age 35-39** | | | | | | | | |
| Jr High School | 61.7 | 59.5 | 56.9 | 59.3 | 61.6 | 66.9 | +5.2 | +10.0 |
| High School | 44.1 | 43.5 | 44.7 | 49.6 | 53.5 | 58.5 | +14.4 | +13.8 |
| Jr College/ College | 45.8 | 42.1 | 44.3 | 42.2 | 45.7 | 50.7 | +4.9 | +6.4 |
| **Age 40-54** | | | | | | | | |
| Jr High School | 63.6 | 64.1 | 62.1 | 63.7 | 64.4 | 69.8 | +6.2 | +7.7 |
| High School | 49.2 | 50.2 | 51.1 | 54.6 | 56.5 | 61.9 | +12.7 | +10.8 |
| Jr College/ College | 50.0 | 51.6 | 53.8 | 56.8 | 55.4 | 57.0 | +7.0 | +3.2 |

## Table 4

### Women's Marital Rate, Median Age of Marriage, and Median Age of the First Birth by Schooling

#### Women's Marital Rate

| Age | 20-24 | | | 25-29 | | | 30-34 | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1970 | 1980 | 70-80 | 1970 | 1980 | 70-80 | 1970 | 1980 | 70-80 |
| Jr High School | 42.2 | 47.3 | +5.1 | 85.0 | 82.9 | -2.1 | 92.6 | 92.3 | -0.3 |
| High School | 25.0 | 28.0 | +3.0 | 79.8 | 79.5 | -0.3 | 91.2 | 91.8 | +0.6 |
| Junior College | 15.1 | 14.0 | -1.1 | 70.8 | 67.5 | -3.3 | 87.2 | 87.4 | +0.2 |
| College | 15.1 | 11.5 | -3.6 | 63.9 | 59.4 | -4.5 | 84.1 | 84.8 | +0.7 |

| | (A) Median Age of Marriage | (B) Median Age of the First Birth | |
|---|---|---|---|
| | (1980) | (1980) | (B)-(A) |
| Junior High School | 22.68 | 24.16 | 1.48 |
| High School | 23.83 | 25.41 | 1.58 |
| Junior College | 25.11 | 26.79 | 1.68 |
| College | 25.78 | 27.85 | 2.07 |

Source: <u>Population Census</u>, Statistics Bureau, Prime Minister's Office

## Table 5

### Median of Tenure on Current Job by Sex, Age, and Schooling

### (U.S.: 1981, Japan: 1982)

| Age 25-34 | Female | | Male | |
|---|---|---|---|---|
| | U.S. | Japan | U.S. | Japan |
| Total | 2.0 | 4.5 | 2.9 | 7.7 |
| Jr. High | 1.7 | 4.1 | 2.5 | 9.6 |
| High School | 2.0 | 4.3 | 3.3 | 8.8 |
| Jr College | 1.9 | 5.4 | 2.9 | 7.3 |
| College | 2.1 | 4.1 | 2.5 | 5.6 |

| Age 35-44 | | | | |
|---|---|---|---|---|
| Total | 3.5 | 6.8 | 6.6 | 10.5 |
| Jr. High | 3.5 | 6.8 | 4.9 | 10.5 |
| High School | 3.4 | 6.4 | 7.5 | 11.2 |
| Jr College | 3.1 | 8.3 | 6.0 | 10.5 |
| College | 4.1 | 10.8 | 6.3 | 9.0 |

| Age 45-54 | | | | |
|---|---|---|---|---|
| Total | 5.9 | 12.6 | 11.0 | 22.7 |
| Jr. High | 5.1 | 12.5 | 9.6 | 22.1 |
| High School | 6.2 | 12.1 | 12.2 | 22.8 |
| Jr College | 4.8 | 16.5 | 9.9 | 25.6 |
| College | 6.7 | 20.0 | 10.7 | 22.7 |

Data Source

U.S.: Bureau of Labor Statistics, Bulletin 2162, January 1983.

Japan: Statistics Bureau, Prime Minister's Office, 1982 Employment Status Survey, March 1984.

Note: Jr. High = 8 years or less in the U.S., Junior high school graduate in Japan
High School = 9 years through 12 years in the U.S., Senior high school graduate in Japan
Junior College = 13 years through 15 years in the U.S., Junior College graduate in Japan
College = 16 years or more in the U.S., College or University graduate including graduate school in Japan

# Table 6

**Duration of Out of Labor Force/Unemployment since Separation from the Previous Firm (currently not working women)**

| | Non-participation rate | Had a Job Previously | | | | | | Median of Duration of out Labor Force(yr) | Had No Job Previously |
|---|---|---|---|---|---|---|---|---|---|
| | | Total | less than 1 yr | 1-3 yrs | 4-6 yrs | 7-9 yrs | more than 10 yrs | | |
| **Age 30-34** | | | | | | | | | |
| Total | 50.5% | 38.0% | 3.9% | 6.1% | 9.2% | 11.6 | 7.1% | 6.42 | 12.5% |
| Jr High School | 46.3 | 30.1 | 4.1 | 5.1 | 6.0 | 7.8 | 7.3 | 6.48 | 16.2 |
| High School | 51.3 | 39.7 | 4.1 | 6.3 | 9.4 | 12.3 | 7.7 | 6.53 | 11.6 |
| Junior College | 53.3 | 41.9 | 3.3 | 6.2 | 12.2 | 14.1 | 6.0 | 6.30 | 11.4 |
| College | 49.4 | 37.5 | 3.2 | 7.4 | 11.6 | 12.6 | 2.6 | 5.58 | 11.9 |
| **Age 35-39** | | | | | | | | | |
| Total | 40.0 | 25.3 | 2.9 | 2.8 | 2.5 | 3.7 | 13.5 | 9.91 | 14.7 |
| Jr High School | 33.1 | 18.4 | 2.8 | 2.8 | 1.8 | 2.9 | 8.0 | 8.31 | 14.7 |
| High School | 41.5 | 27.4 | 2.9 | 2.8 | 2.6 | 3.7 | 15.4 | 10.24 | 14.1 |
| Junior College | 51.7 | 32.9 | 3.0 | 2.5 | 3.5 | 5.2 | 18.8 | 10.33 | 18.8 |
| College | 44.6 | 29.9 | 1.5 | 2.0 | 4.4 | 6.4 | 15.5 | 8.58 | 14.7 |
| **Age 40-44** | | | | | | | | | |
| Total | 32.4 | 16.8 | 2.4 | 2.0 | 1.1 | 1.3 | 10.1 | 12.19 | 15.6 |
| Jr High School | 27.5 | 12.5 | 2.3 | 1.9 | 1.1 | 0.9 | 6.2 | 9.50 | 15.0 |
| High School | 34.5 | 19.0 | 2.4 | 2.0 | 1.2 | 1.5 | 11.9 | 13.02 | 15.5 |
| Junior College | 45.2 | 24.3 | 2.1 | 2.5 | 1.3 | 1.3 | 16.7 | 14.29 | 20.9 |
| College | 40.3 | 25.0 | 1.6 | 0.8 | 1.6 | 1.6 | 18.6 | 14.50 | 15.3 |
| **Age 45-49** | | | | | | | | | |
| Total | 33.3 | 16.0 | 2.6 | 2.3 | 1.3 | 1.2 | 8.5 | 11.54 | 17.3 |
| Jr High School | 28.1 | 13.0 | 2.4 | 2.5 | 1.4 | 1.2 | 5.4 | 7.00 | 15.1 |
| High School | 37.6 | 18.4 | 2.8 | 2.2 | 1.3 | 1.1 | 10.9 | — | 19.2 |
| Junior College | 44.4 | 21.7 | 3.0 | 2.0 | 1.0 | 0.5 | 14.8 | — | 22.7 |
| College | 37.0 | 22.2 | 1.2 | 2.5 | 0 | 1.2 | 17.3 | — | 14.8 |

Source: The 1982 Employment Status Survey, Statistics Bureau, Prime Minister's Office

Note: The numbers in this table are the share of non-worker by duration of out of labor force in population.

## Table 7

### Effects of Job Experience on Wages by Sex and Schooling

#### Female

| Tenure | Junior High School | High School | Junior College | College |
|--------|--------------------|-------------|----------------|---------|
| 1-5 years | 4.23% | 4.49 | 4.66% | 4.69% |
| 6-10 | 3.02 | 3.94 | 4.02 | 4.74 |
| 11-15 | 1.72 | 2.79 | 4.28 | 4.79 |
| 16-20 | 3.90 | 2.99 | 3.80 | 5.63 |
| 21-25 | 3.46 | 1.51 | 7.66 | 3.98 |
| 26-30 | -0.57 | 2.69 | 2.75 | 3.70 |
| Average: | 2.63% | 3.06% | 4.53% | 4.59% |

#### Male

| Tenure | Junior High School | High School | Junior College | College |
|--------|--------------------|-------------|----------------|---------|
| 1-5 years | 6.43% | 5.10% | 4.86% | 5.73% |
| 6-10 | 4.41 | 5.41 | 6.66 | 6.26 |
| 11-15 | 4.00 | 4.50 | 3.51 | 4.89 |
| 16-20 | 5.38 | 4.96 | 4.53 | 4.73 |
| 21-25 | 2.91 | 3.60 | 3.60 | 3.64 |
| 26-30 | 1.96 | 2.45 | 2.23 | 2.75 |
| Average: | 4.18% | 4.34% | 4.23% | 5.57% |

Source:  The 1983 Basic Survey on Wage Structure, Ministry of Labor.

Note: The numbers in this table are calculated based on monthly straight time wages of regular workers who are hired by a firm immediately upon graduating from school and remain with the same employer.

## Table 8

Net Effects of Job Experience on Wages and Net Depreciation Rates by Schooling

| | Junior High School | High School | Junior College | College |
|---|---|---|---|---|
| Net Effect of Experience in the Previous Job | 3.63% | 4.22% | 4.34% | 4.72% |
| Net Effect of Experience in the Current Job | 4.23 | 4.49 | 4.66 | 4.69 |
| Age 30-34 | | | | |
| Net Depreciation Rate during Labor Force Withdrawal | -1.35 | -2.67 | -4.51 | -3.05 |
| Age 35-39 | | | | |
| Net Depreciation Rate during Labor Force Withdrawal | -3.99 | -3.26 | -5.61 | -5.35 |

Source:  The 1983 Basic Survey of Wage Structure, Ministry of Labor.

Figure 1 Age Structure of Annual Separation Rates in Japan (1982) and the U.S. (1977)
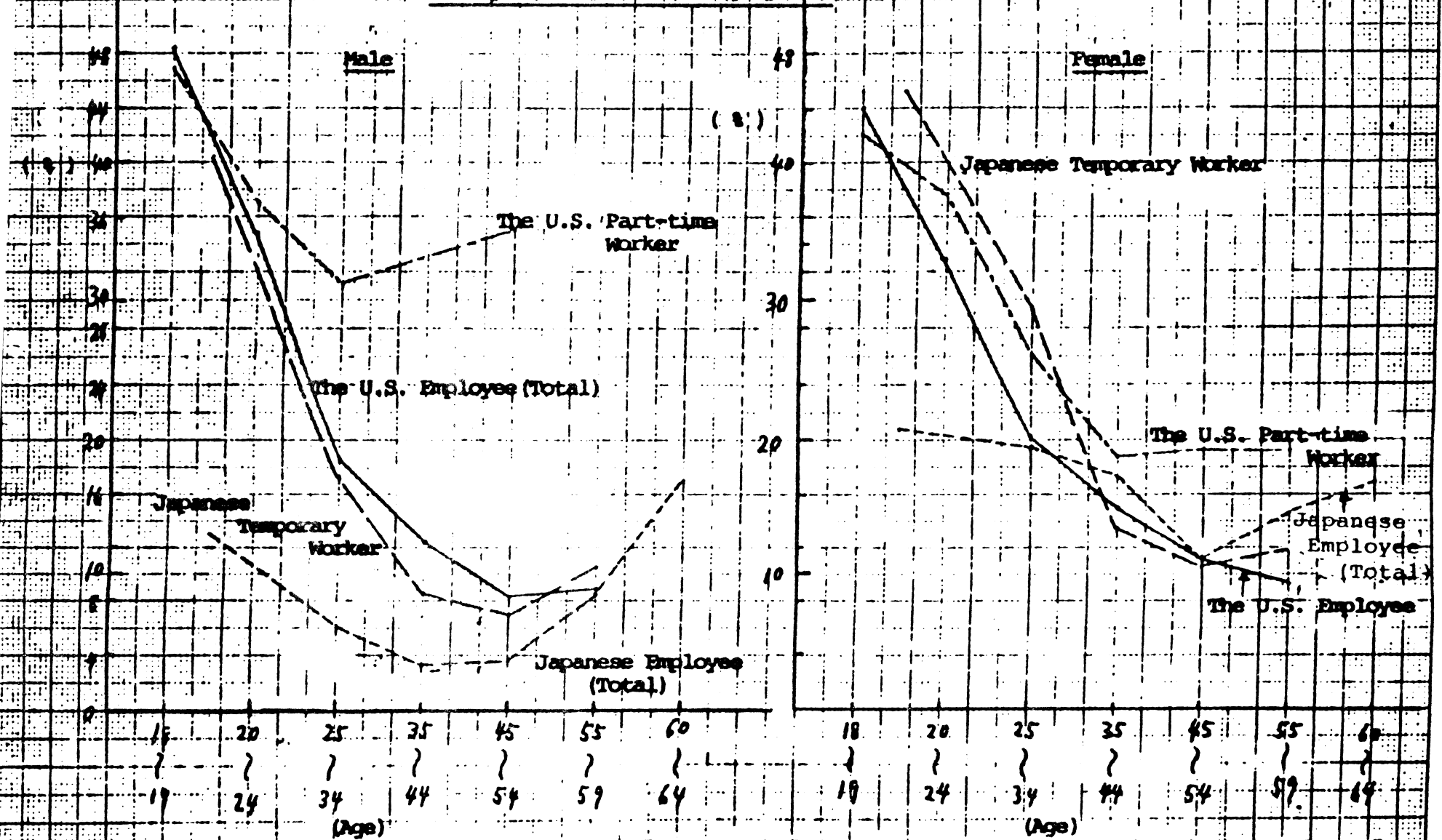
Sources : The U.S.  S. E. Haber et al. "A New Method for Estimating Job Separations by Sex and Race", Monthly Labor Review, June 1983, vol. 106 no. 6.
Japan Employment Status Survey, Statistics Bureau, Prime Minister's Office.

Note : Employee = Full-time Employee + Part-time (Temporary) Employee

Figure 2

Turnover Rate, Withdrawal Rate, Job-stayer Rate, and Entry Rate
of Married Women at the Age of 30-39 by Degree of Scooling
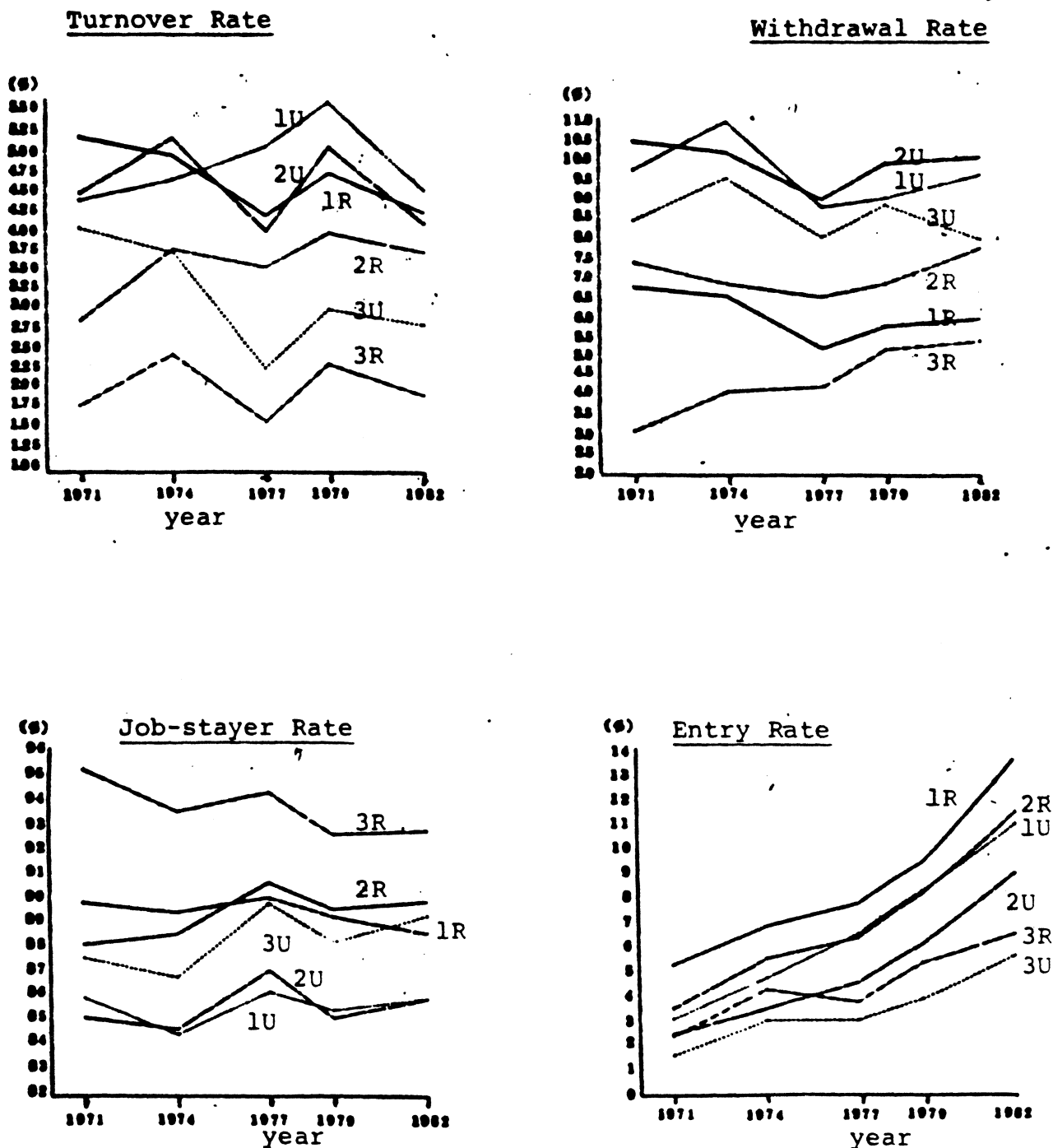
Source : The Employment Structure Survey, Statistics Bureau,
Prime Minister's Office.

Note : 1U = Junior high school grads in the four largest cities.
2U = High school grads in the four largest cities.
3U = Junior college / college grads in the four largest cities.
1R = Junior high school grads in other areas.
2R = High school grads in other areas.
3R = Junior college / college grads in other areas.
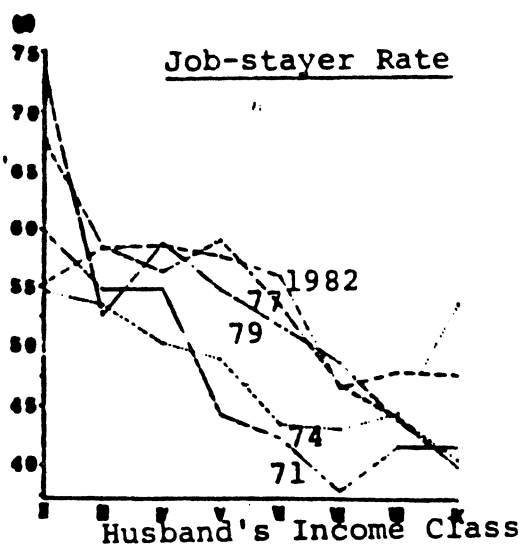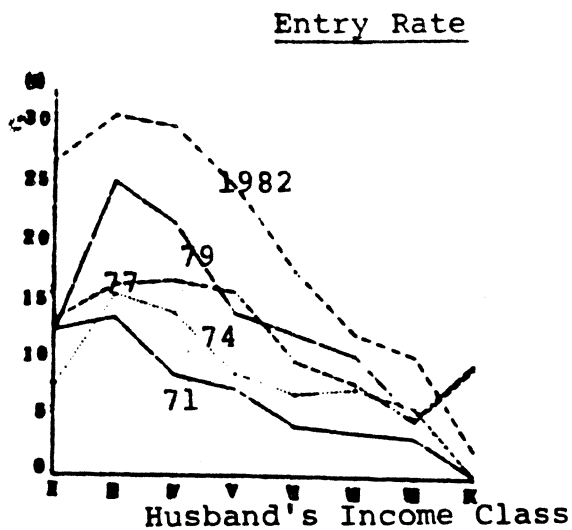
# Figure 3

## Work History Patterns of Women

Age
→

Pattern A    Work

Pattern B    Work    not Work

Pattern C    Work    not work    Work    not work

Pattern D    not Work
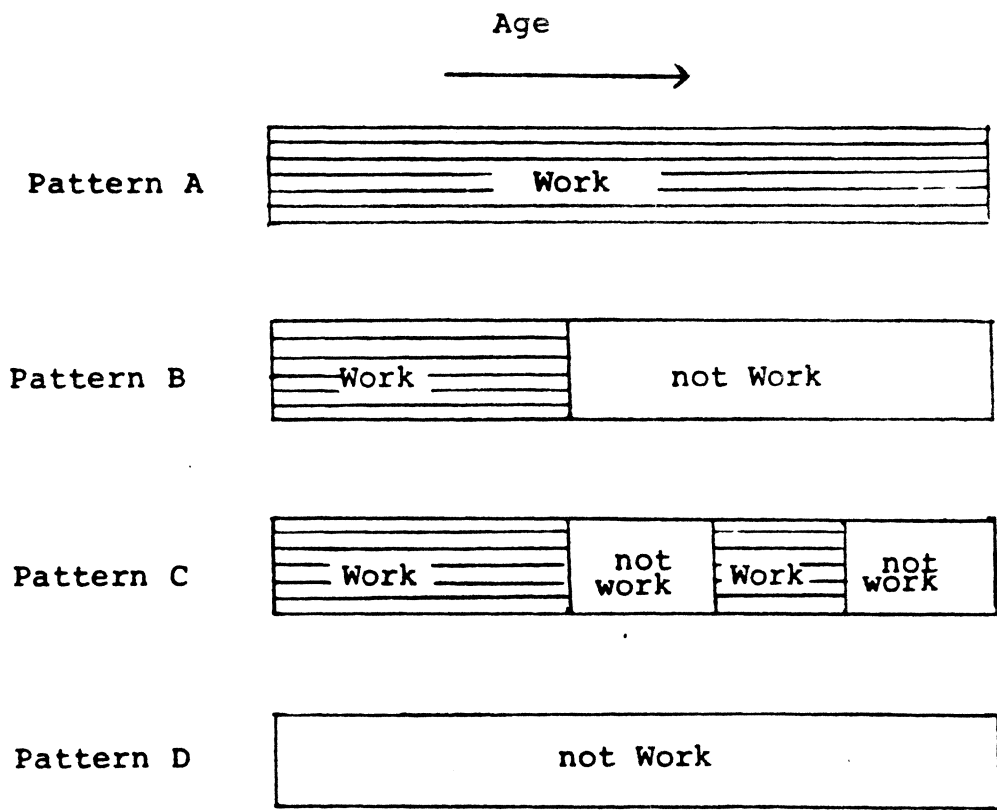
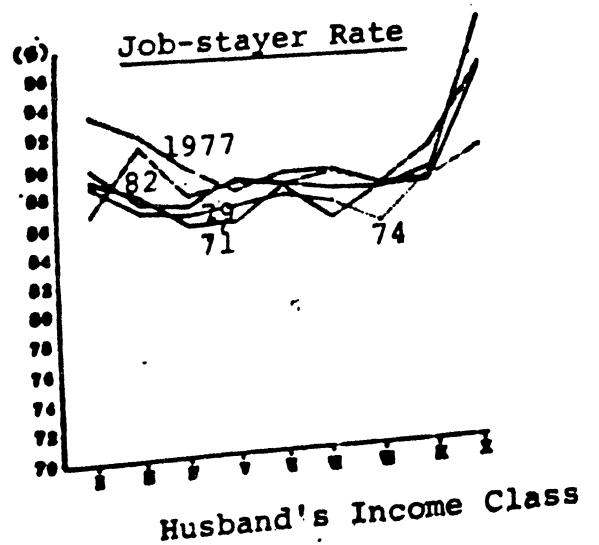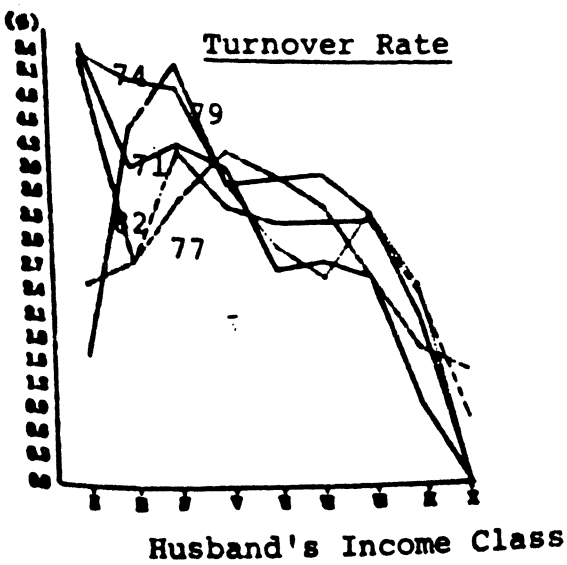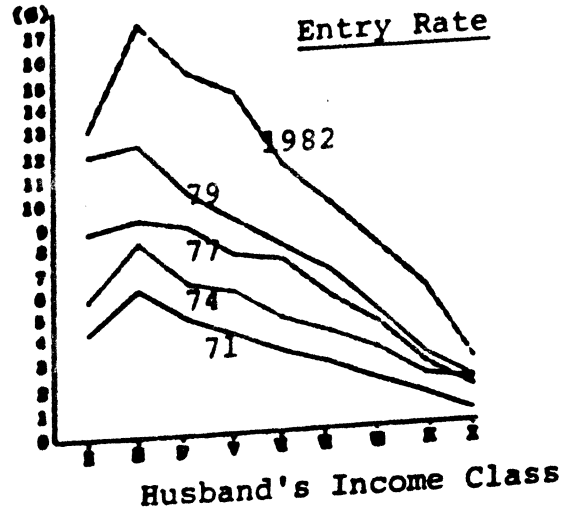# Figure 4

Employee Participation Rate, Withdrawal Rate, Entry Rate, Turnover Rate, and Job-stayer Rate of Married Women at the age 20-29 without child by husband's income
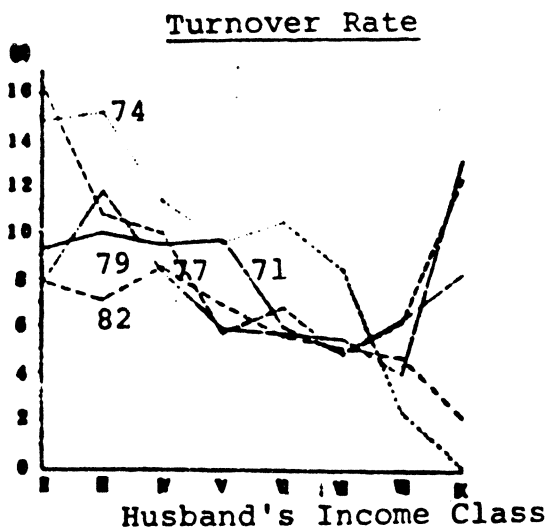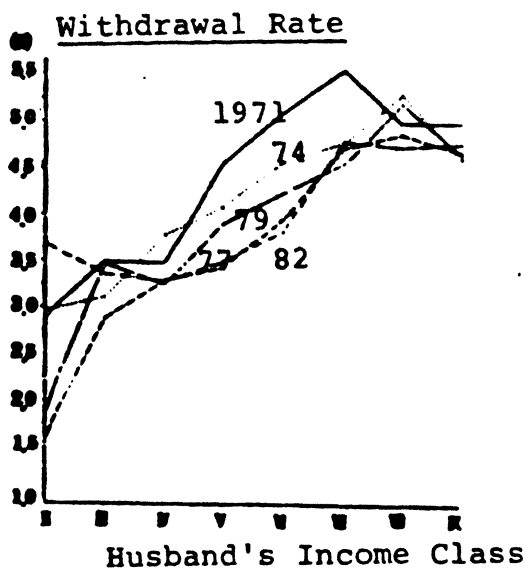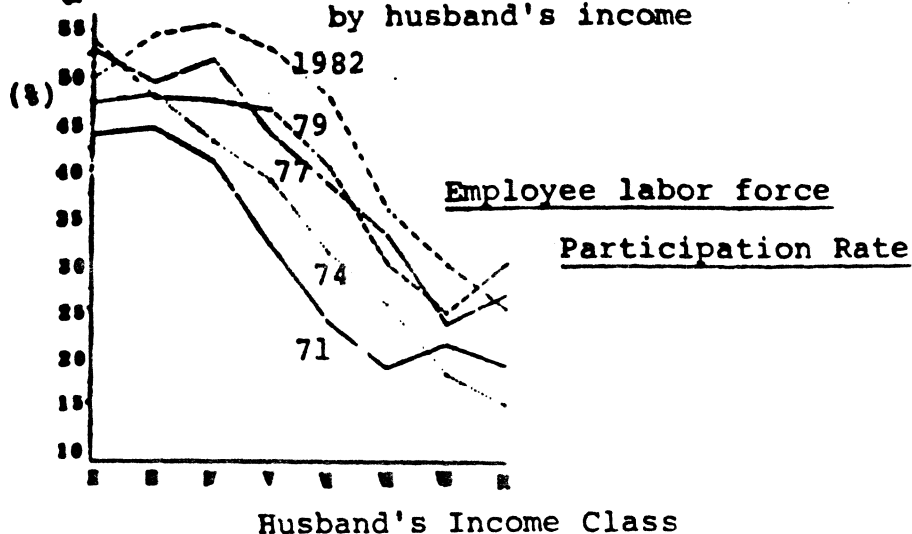


Source : The Employment Structure Survey, Statistics Bureau.

Figure 4 (continued)
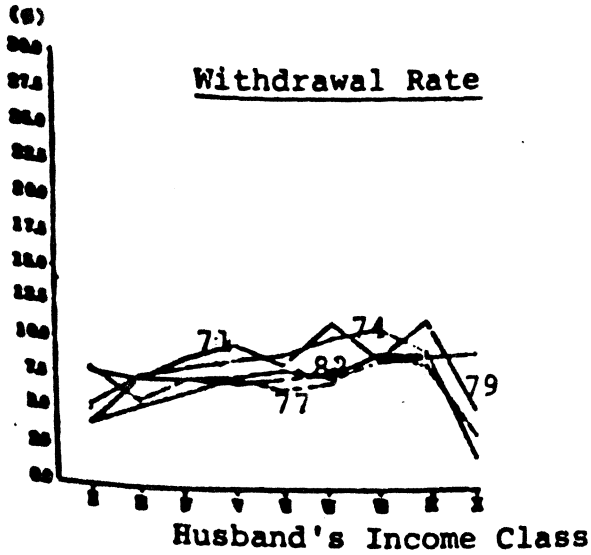
**Withdrawal Rate, Entry Rate, Turnover Rate, and Job-stayer Rate of Married Women at the Age of 30-39 with Children by Husband's Income**



Withdrawal Rate

Husband's Income Class



Entry Rate

1982
79
77
74
71

Husband's Income Class



Turnover Rate

74
79
71
82
77

Husband's Income Class



Job-stayer Rate

1977
82
71
79
74

Husband's Income Class

Note : Husband's income classes are grouped so that each income bracket has an equivalent real income across years. Nominal annual earning classifications are as follows :

| Year | Class II | III | IV | V | VI | VII | VIII | IX | X |
|------|------|------|------|------|------|------|------|------|------|
| 1981 | 20-42 | 42- 61 | 62- 82 | 83-103 | 104-124 | 125-166 | 167-208 | 209-292 | 293- |
| 1984 | 30-61 | 62- 92 | 93-123 | 124-154 | 155-186 | 187-248 | 249-310 | 311-436 | 437- |
| 1987 | 39-79 | 80-119 | 120-159 | 160-199 | 200-240 | 241-320 | 321-400 | 401-562 | 563- |
| 1989 | 43-86 | 87-129 | 130-173 | 174-216 | 217-260 | 261-347 | 348-434 | 435-608 | 609- |
| 1982 | 50-99 | 100-149 | 150-199 | 200-249 | 250-299 | 300-399 | 400-499 | 500-699 | 700- |

(in ten thousands yen)

Appendix  **TABLE 1 : Female Labor Force Participation**

**in Japan and the U.S.**

|  | Japan (1) | Japan (2) | Japan (3) | Japan (4) | U.S. (5) | U.S. (6) |
|---|---|---|---|---|---|---|
| 1955 | 56.7% | — | — | — | 34.5% | 46.1% |
| 60 | 54.5 | 21.9 | — | — | 36.5 | 48.2 |
| 65 | 50.6 | 24.3 | 49.9 | 36.0 | 38.1 | 48.6 |
| 70 | 49.9 | 27.0 | 48.3 | 39.5 | 42.6 | 49.5 |
| 75 | 45.7 | 26.9 | 45.2 | 37.2 | 45.9 | 49.4 |
| 80 | 47.6 | 29.5 | 49.2 | 41.9 | 51.2 | 53.6 |
| 83 | 49.0 | 31.3 | 51.3 | 44.8 | 52.7 | 54.4 |

Notes: Japan(1): All women in all households,
Japan(2): Paid employees in all households,
Japan(3): Married women in all households,
Japan(4): All women in employee households,

U.S.(5) : White women,
U.S.(6) : Black and other women.

Sources: Japan: The Labor Force Survey,
U.S.: The Economic Report of the President.

Appendix  **TABLE 2: Wage Ratio of Women to Men : Aggregate Data**

|      | Japan | U.S. | Britain | France | Germany | Sweden |
|------|-------|------|---------|--------|---------|--------|
| 1960 | .46   | .66  | .61     | .64    | .65     | .72    |
| 70   | .54   | .65  | .61     | .67    | .69     | .84    |
| 80   | .54   | .66  | .79     | .71    | .72     | .90    |

Notes: Japan : Hourly wage, aggregate,
       U.S.  : Hourly wage. aggregate,
       Britain: Hourly wage  manual workers,
       France: Annual  full-time workers,
       Germany: Hourly wage, aggregate,
       Sweden: Hourly wage. aggregate.

Sources· J.Mincer "Intercountry Comparison of Labor Force Trends
      and of Related Developments : An Overview", Journal of
      Labor Economics, vol.3, no.1, part 2, January 1985

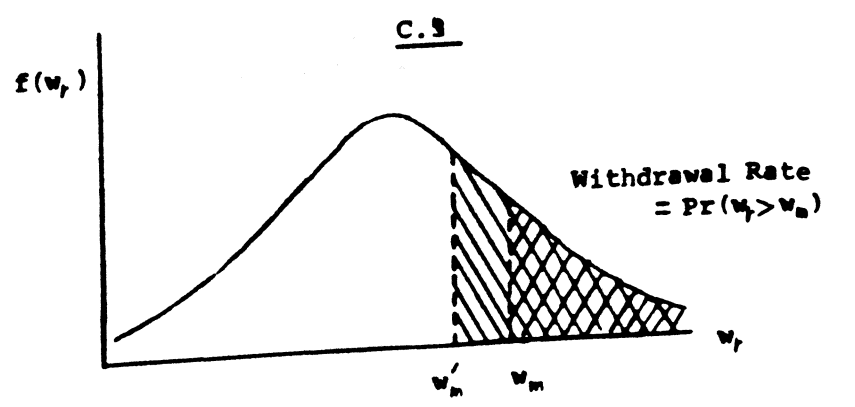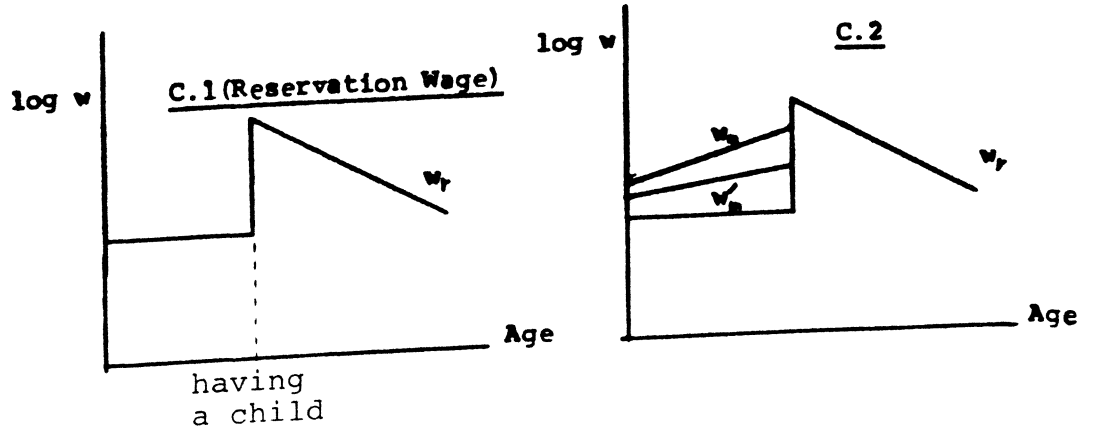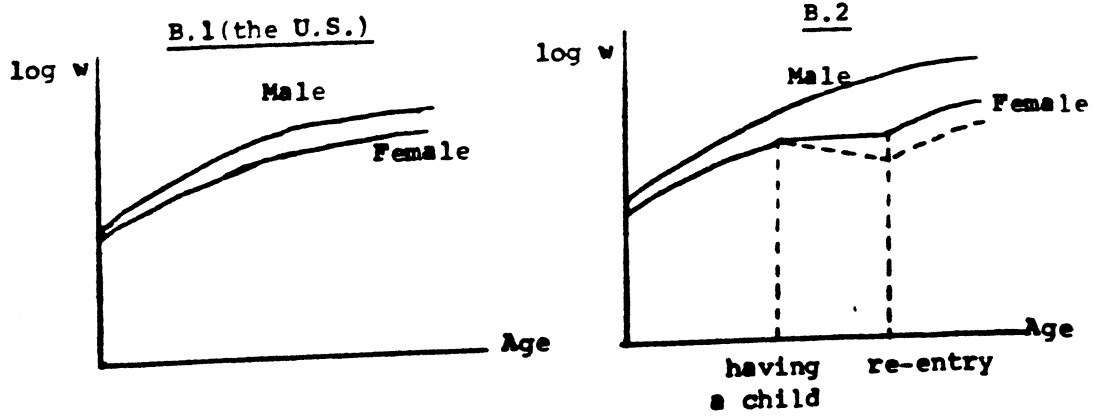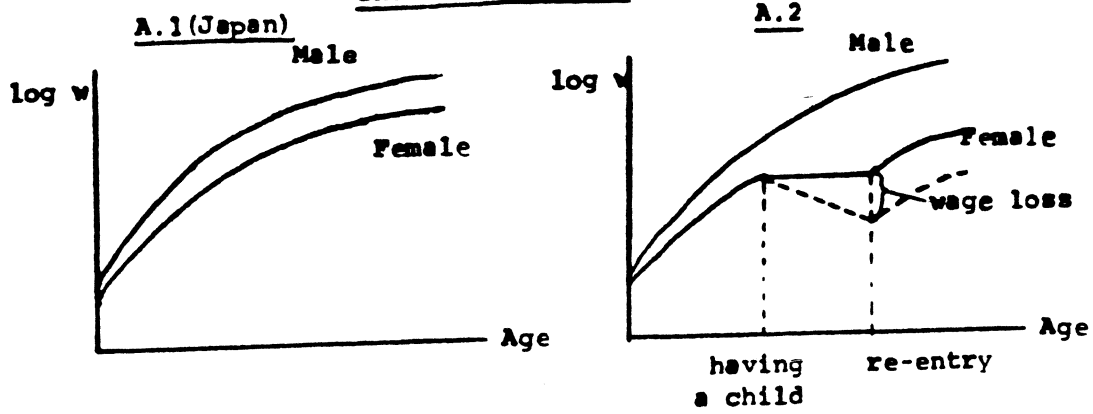Appendix  **TABLE 3 : Wage Ratio of Women to Men: Workers with the Same Tenure**

(Japan)

| Tenure | Junior High | High School | Junior College | College |
|--------|-------------|-------------|----------------|---------|
| 0 year | .94         | .93         | .95            | .96     |
| 5      | .85         | .93         | .94            | .91     |
| 10     | .78         | .85         | .83            | .87     |
| 15     | .76         | .78         | .85            | .85     |
| 2o     | .71         | .71         | .84            | .90     |

Note· The numbers in this table are the ratios of monthly straight-time
    wages of female workers to those of male workers. The sample is limited
    to the workers who are hired by a firm immediately upon graduating from
    school, and remain with the same employer.

Source· The 1983 Basic Survey of Wage Structure.

## Illustration for Wage. Reservation Wage , Withdrawal Rate and Re-entry Rate

**A.1(Japan)**

log w

Male

Female

Age

**A.2**

log w

Male

Female

wage loss

Age

having a child    re-entry

**B.1(the U.S.)**

log w

Male

Female

Age

**B.2**

log w

Male

Female

Age

having a child    re-entry

**C.1(Reservation Wage)**

log w

$w_r$

Age

having a child

**C.2**

log w

$w_m$

$w_m$

$w_r$

Age

**C.3**

$f(w_r)$

Withdrawal Rate
$= Pr(w_r > w_m)$

$w_m'$    $w_m$

$w_r$

Illustration for Wage, Reservation wage, Withdrawal Rate, and Re-entry Rate



D.1(More-educated women)

D.2(Less-educated women)

E.1(More-educated women)

rise in reservation wage (by increase of husband's income)

E.2(Less-educated women)

F.1(More-educated women)

F.2(Less-educated women)