Married Women's Labor Supply Decision and Husband's Work Status: The Experience of Taiwan

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Female labor force participation rate has increased from 36% in the 1960s to 46% in 2000 and this sharp increase has been due to married women. At the same time, the proportion of wage-employed (employee) workers is increasing while the proportion of non-wage-employed (mainly self-employed) workers is declining. Employee workers have relatively more secure and stable salary income compared to non-employee worker facing more volatile income due to the risks of running business. Employee workers and non-employee workers differ in their job stability. The purpose of this study is to investigate empirically the effect of husband′s employee/non-employee work status on married women′s labor supply decision based on the data drawn from the 1979 to 2000 Manpower Survey and the supplement of Women′s Marriage, Fertility and Employment Survey. Our empirical results indicate that compared to married women whose husbands were employee workers, women whose husbands were non-employee workers or non-workers were more likely to participate in the labor market. Moreover, the effects of husband′s employee/non-employee status on married women′s labor force participation differ at various economic development stage.

Keywords: Female Labor Force Participation, Husband′s Working Status, Logit Model, Women′s Marriage, Fertility and Employment Survey

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I. INTRODUCTION

Female labor force participation rate has increased from 36% in the 1960s to 46% in 2000 and this sharp increase has been due to married women. At the same time, we observed a change in the distribution of the employment status for males. That is, the proportion of wage-employed (employee) workers is increasing while the proportion of non-wage-employed (mainly self-employed) workers is declining. This change in distribution of labor force working status was attributed mainly to changes in industrial composition. In 1950s and 1960s, the employment population in primary industry, agriculture, accounted for half of the entire employment population. After 1960s, the secondary industry gradually replaced primary industry and the population employed in the secondary industry became dominant by 1978. Meanwhile, the tertiary industry was growing. In 1986, the employment population in the tertiary industry (41.4%) caught up with the level in the secondary industry (41.6%). From late 1980s, the employment population in the tertiary industry gradually became the majority. By 1995, the population in the tertiary industry reached the half of the entire employment population.

As the changes in industrial composition and distribution of labor by industry, the distribution of labor by employment status varied. During the period when the secondary industry (particularly in manufacturing industry) was growing since 1960s, small business was highly encouraged by the government and therefore many people run small factories and were self-employed. In recent years, when the economic development became more stable, people tend to be employed by the public or private sectors. According to Manpower Survey Report, the proportion of non-employee workers has declined from 37.7% in 1978 to 27.9% in February 2003. It decreased by approximately 10%. Meanwhile, the proportion of workers who were employees (wage-employed) was increasing.

A common finding in the literature of female labor supply shows that married women′s labor supply decision is affected by their husbands′ employment. Therefore, change in the distribution of male work status certainly has some influence on married women′s labor supply decision. For example, Lo (1986) showed that the choice for work type

of a married woman was highly correlated with her husband's work type, particularly when her husband was self-employed. San (1988) derived the interrelation of the husband's and wife's labor supply function based on the joint utility model for a nuclear family.

Generally, the wife's labor force decision depends on her husband's labor force decision (since the husband is usually the main worker in a family.) It is found that the wife's labor supply is negatively related to the husband's income level. Many studies have largely centered on the influence of husbands' income levels on married women's labor force participation. The higher the husband's income is, the lower is the likelihood of his wife being in the labor force. However, even though the correlation of the husband's work type and the wife's work choice has been shown, there are not many studies focused on how the husband's work type affects the wife's labor force decision. The purpose of this study is to investigate empirically the effect of husband′s work status on married women′s labor supply decision based on the data drawn from the 1979 to 2000 Manpower Survey and the supplement of Women′s Marriage, Fertility and Employment Survey. The focus will be on the effects of husbands' employee/non-employee work status on married women's labor force decisions over time. Five years of the data (1979, 1986, 1990, 1993, and 2000) are chosen to examine the effect of husband′s work status on married women′s labor supply decision at different stages of economic development in Taiwan.

The next section sets up the conceptual framework and the empirical model of this study. The description of our data set is presented in section III. Section IV reports and discusses the empirical results for different sub-samples of age cohort. The final section concludes our analysis by comparing the predicted and observed probability of labor force participation for married women.

II. CONCEPTUAL AND EMPIRICAL FRAMEWORK

A. Conceptual Framework

Married women′s labor supply is commonly set up within the paradigm of family behavior. Joint utility model, "traditional family" model and bargaining model are the three most widely adopted modeling approach in the literature of empirical studies on married women′s labor supply. In the context of the joint utility model, the typical reduced form labor supply function for married women derived from the conditional

leisure demand can be specified as the following:

$$H_w = f\,(W_w, H_h, I + W_h H_h) \qquad (1)$$

where H_w represents hours worked by the married women, H_h hours worked by the husband, W_w and $W_h$are their respective wage rates, and I is family nonlabor income. Since the work hours of married men are treated as independent of the behavior of their wives in the traditional family model, the husband′s behavior is exogeneous with respect to the married women′s work decision. Therefore, H_h will be excluded from the specification of equation (1) for married women under the traditional family model. The bargaining model treats the allocation decision of a married couple as a two-person cooperative game and leads a more sophisticated model for the labor supply of married women. (See Manser and Brown 1980, McElroy and Horney 1981 for examples).

In this study, we focus on the correlation between the married women's labor force participation and their husbands' work status. In a family, the husband and wife usually make decisions of labor supply jointly. Therefore, we adopt the joint utility model of family labor supply and set up our empirical model based on equation (1). That is, not only the husband's income but also the husband's work hours are included as variables in the wife's labor supply function. Higher non-labor income ($I + W_h H_h$) is supposed to decrease the labor supply of the woman. Hourly wage rate (W_w) will increase the labor supply of the woman if the income effect exceeds the substitution effect and will decrease the labor supply if the substitution effect dominates. The effect of the husband's work hours depends on the husband's wage rate. Based on the wife's labor supply function (1), we will empirically examine how the labor force participation decision of married women is determined, particularly by their husbands' employee-non-employee work status.

B. Empirical Specification

The focus in our study is the labor force participation of married women. By definition, a person "in the labor force" means she is either employed or unemployed (on temporary lay off or actively looking for work). Otherwise, she is "not in the labor force." Based on the labor supply function of married women (1), we will use married women's labor force participation status to represent their labor supply decisions. Therefore, the empirical model adopted in our analysis is the logit model. The labor force participation of married women is treated as the explained variable, taking the

value of “1” for “in the labor force” and “0” for “not in the labor force.” Based on the supply function (1), whether a married woman participates in the labor market mainly depends on three determinants --- the woman’s hourly wage rate, her husband’s work hours and her non-labor income. To proxy these three determinants, we include three sets of explanatory variables.

First, to proxy the hourly wage rate of married women (W_w), we include a set of explanatory variables that are found to affect the labor force participation of married women through the wage rate in the literature. The set includes age, education, area of residence, past work experience (before getting married), number of children and childcare cost. Area of residence, past work experience and childcare are defined as dummy variables. These variables are set to “1” when the woman lived in the urban area (Taipei City, Taichung City, Kaohsiung City), when the woman had had a job before getting married, and when the childcare of the youngest child under age 3 was provided by family members or relatives for free (which means no childcare cost). Secondly, we use husbands’ work hours (H_h) directly as our explanatory variable.

Finally, to predict married women’s non-labor income ($I + W_hH_h$), we include husbands’ income and husbands’ work status. The former one (husbands’ income) is usually discussed in related studies. The husbands’ income was found to have negative influence on the labor force participation of married women. We first define the husbands’ income as dummy variables. We pick up the most popular income level (NT Dollars 20,000~30,000) as the reference group and set two dummy variables, lower income and higher income. The lower income variable is set to “1” when the husbands had income less than 20,000 dollars. The higher income takes the value of “1” when husbands had income higher than 30,000 dollars. The latter one variable, husbands’ work status, is the explanatory variable we are trying to examine. We expect husbands’ work status has some influence on their work stability and therefore affect married women’s non-labor income. Here we consider three types of employment status, including wage-employed (employee workers), not wage-employed (non-employee workers) and not working (non-workers). To compare the effects of the three employment status, the most popular group, employee workers (see Table B), are taken as the reference group. The other two, non-employee workers and non-workers, are taken as dummy explanatory variables.

However, due to the incomplete questionnaires of WMFES at the earlier stage,

husbands' income is not included in the data of year 1979 and 1986. Therefore, we first omit the husbands' income variable to conduct the analysis for the five years (1979, 1986, 1990, 1993 and 2000) and then include this variable into the analysis of the last three years (1990, 1993 and 2000).

By using logit model, we investigate the labor force participation status of married women across age groups, across time points and to examine the effect of husbands' work status. We conduct two ways of comparison. Firstly, we separate women into two age groups in each year (1979, 1986, 1990, 1993 and 2000, respectively), and compare the labor force participation of women in same age group across the five years. That is, married women aged 35 and under 35, and aged 36-50 are chosen as two separate groups. In the younger group, most women were just married and faced responsibilities of childcare. In the elder group, women had relatively less childcare responsibilities and may re-enter the labor market. By comparing the results of each age group across the five years chosen from 1979 to 2000, we can observe the difference of the influence of the explanatory variables on married women's labor force participation over time. The other comparison is to incorporate all married women aged 65 and under 65 into one year and to see, likewise, the differences of the influence of the explanatory variables on married women's labor force participation across the five years. In this comparison, the data of each year are composed of married women in all age levels under 65, including women in the younger and the elder groups. We include two cohort variables here, aged under 35 (cohort 1) and aged 36-50 (cohort 2), as explanatory variables. The two cohort variables are dummy variables, taking the value of "1" when the woman belongs to that cohort. In this way, the cohort effects can be analyzed in each year.

Based on the two ways of comparison, the socioeconomic characteristics of married women across years are shown in the tables of means of independent variables (Table 1-1, 1-2, 1-3). From late 1970s to 2000, education was getting common, especially high education since the government encouraged the establishment of colleges. Educational attainment of women was getting higher. From Table 1-1 to Table 1-3, we can see that years of schooling (education) of women were increasing over time. Due to higher degree owned by women, there were more job opportunities for women. Female labor force participation rate increased from 39.13% in 1978 to 47.14% in 2003. Women tended to participate in the labor market and got married at an elder age. Accordingly, the proportions of married women who had work experiences before getting married were increasing and number of children was decreasing. As the labor force participation

rate of women was increasing, the rate of men was decreasing. Male labor force participation declined from 77.96% in 1978 to 67.69% in 2003. From the tables, it shows that husbands' work hours were decreasing. On the other hand, the employment population in the tertiary industry exceeded the secondary industry to become dominate after the middle 1980s. The industrial development tended to be stable. The proportion of small business and self-employed workers was decreasing. From the tables, the main variables (the husbands' work status) reveal that the proportions of husbands who were self-employed (non-employee variable) were decreasing in both younger and elder group.

III. DATA

The data used in this study are drawn from the Manpower Survey Report and its supplementary survey, "Women's Marriage, Fertility and Employment Survey (WMFES)." The WMFES was conducted annually beginning from 1978. The eligible interviewees for this survey are civilian women with citizenship, aged above 15, participate economic activities at their own will and live in ordinary households or institutional units in Taiwan.

Based on the changes in distribution of labor force working status and industrial development, we pick up the data of five important time points as comparison. There were some important turning points of industrial development in Taiwan: The population employed in the secondary industry became dominant in 1978. The employment population in the tertiary industry approximated to the population in the secondary industry in 1986 and from then on the tertiary industry gradually became dominant. Therefore the data of 1979 (the questionnaire in 1978, the beginning year of survey, was incomplete) and 1986 were chosen. In addition, from the late 1980s to the early 1990s, the economic growth was in a very high rate. After that period, the economic growth in Taiwan slowed down. Therefore we picked up the data of the year 1990 and 1993. Finally, the data of the most recent year, 2000, was chosen for comparison.

According to the Manpower Survey Report, by workers' main work status, workers are separated into five types --- (1) employer, (2) self-employment worker, (3) worker employed by the government, (4) worker employed by private sectors and (5) no-paid home worker. Furthermore, we separate these five work status into "employee worker" and "non-employee worker." Employee workers are workers employed and paid by the

government or private sectors, including the third and forth work status above. In contrast, non-employee workers are workers other than wage-based employed workers, including employers, self-employment workers and no-paid home workers.

The data in each year include answers to questionnaires of more than 20,000 female interviewees and their spouses' answers to basic questionnaires (if applicable). In our studies, we only include women who have spouses and who are no elder than 65 years old. Based on the criteria, we get 13522, 15941, 15623, 16737 and 15652 couples for the different five years mentioned above respectively. The distribution of husbands in these married couples across five different work status is as follows:

Table A

Percentage of Each Work Status, by Years **%**

Husbands' Work Status	**1979**	**1986**	**1990**	**1993**	**2000**
Employer	6.45	6.30	6.91	6.73	7.53
Self-Employment Worker	30.34	28.39	26.26	25.20	23.28
Worker Employed by the Government	12.14	12.33	11.94	11.64	8.84
Worker Employed by Private Sectors	33.33	35.87	36.76	37.65	37.44
No-Paid Home Worker	2.96	2.58	1.91	2.13	1.88
Non-Workers	14.78	14.53	16.21	16.65	21.03

If we categorize them into "employee worker" and "non-employee worker," we get the following distribution:

Table B

Percentage of Each Employment Status, by Years **%**

	1979	**1986**	**1990**	**1993**	**2000**
Employee Worker	45.47	48.20	48.70	49.29	46.28
Non-Employee Worker	39.75	37.27	35.08	34.06	32.69
Non-Worker	14.78	14.53	16.21	16.65	21.03

It is noticed that the proportion of married, male workers who were non-employees was decreasing from 39.8% in 1979 to 32.7% in 2000 and there was only a slight change in the percentage of employee workers.

Table C

Percentage of Each Employment Status

By Years and by Wives' LFP Status **%**

	1979		1986		1990		1993		2000	
Labor Force Participation Status / Husbands' Work Status	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Employee Worker	33	67	45	55	45	55	49	51	53	47
Non-Employee Worker	41	59	55	46	55	45	58	42	58	42
Non-Worker	29	71	27	73	32	68	32	68	30	70

The distribution of the husbands' employment status across their wives' LFP status and across five years is presented in Table C. It shows that women whose husbands were employee workers and women whose husbands were non-workers had higher proportion of not being in the labor force. Women whose husbands were non-employee workers had higher proportion of being in the labor market except 1979.

IV. ESTIMATION RESULTS

Our estimation results are presented in two sub-sections for the model without husband's income variable and the model with husband income variable respectively. We estimate each model for three sample groups—younger group for women with age under 35, elder group for women with age 36 to 50 and the total group for all women with age under 65.

A. Estimation Results without Husband's Income Variable (Table 2-1 to Table 2-3)

Based on our model, we can group the explanatory into three category: variables that proxy the hourly wage rate of married women (W_w), variables indicating their husbands' work hours (H_h), and variables related to their non-labor income ($I + W_h H_h$). We will discuss the estimation results accordingly as the following.

Women's Wage Rate Related Variables

This set of variables includes age, education, number of children, childcare, past work experience and area of residence. In the younger group (see Table 2-1), the first set of variables that proxy the hourly wage rate are significant in explaining the likelihood of labor force participation (LFP) for most part. We can observe that the variables that are positively related to women's wage rates (age, education, free childcare and past work

experiences) in the literature are positively related to the likelihood of labor force participation. Variables that are negatively related to women's wage rates (number of children) are negatively related to the possibilities of labor force participation. However, area of residence is inconsistent with the literature. Women who live in the urban area are supposed to have more job opportunities and therefore have higher odds of being in the labor market. Unexpectedly, the coefficient of area of residence is negatively to the labor force participation and significant in explaining the LFP of women.

In the elder group (see Table 2-2), married women aged 36-50 had fewer childcare responsibilities and may have chances to re-enter the labor market. Free childcare, past work experiences and area of residence variables act in the same way as those for the younger group. Age, education and number of children, however, act in the different ways. Age is not positively associated with the labor force participation in the elder group, since the productivity of a person will go down as getting elder. Education is still positively associated with the labor force participation but only significant in the last three years. The insignificance of coefficients in the first two years (1979 and 1986) can be explained by the fact that women born before 1960s generally attained less education and therefore education was not very important in determining the labor force participation among that cohort. Number of children is still negatively related to the labor force participation for most parts but only significant in the last two years. We expected that women in the elder group faced fewer childcare responsibilities and therefore number of children should not be very important in determining the labor force participation. The insignificant coefficients in the first three years are consistent with our expectation. The coefficients in the last two years are significant, which are inconsistent with our expectation. A possible explanation is that women got married at elder ages in recent years. Therefore women faced childcare responsibilities at elder ages.

When including all married women aged under 65 (see Table2-3), this set of variables has the same signs of coefficients as those coefficients in the younger groups and they are significant in explaining the likelihood of labor force participation for most part.

Husbands' Work Hours

The effect of husbands' work hours on married women's labor force participation depends on whether the husbands' work hours and wives' work hours are substitutes or complements. If the husbands' and wives' work hours are substitutes, women whose

husbands have higher work hours are less likely to participate in the labor market. In contrast, if the husbands' and wives' work hours are complements, higher husbands' work hours will increase the possibility of wives being in the labor market. From the three tables (Table 2-1, 2-2 and 2-3), we can see that husbands' work hour is positively related to the women's LFP and is significant for most part. It suggests that the work hours of husbands and wives were complementary in the five years. In the younger group, the coefficient is not significant in 1990 and 1993. In the elder group, the coefficient is not significant only in 1990. When all married women are included, the coefficient is insignificant only in 1990. The year of 1990 and 1993 are in the period when the tertiary industry was becoming dominant (from the late 1980s to the early 1990s) and the economic development reached the peak. Business was booming in this period. After this period, the economic development started to slow down (in 1995). Therefore, the influence of husbands' work hour on the LFP of married women was not significant in the prosperous economic condition.

Proxy Variables of Non-Labor Income for Married Women

The variables we focus in our research are husbands' work status, which proxy the married women's non-labor income. We expected that the stability of husbands' work arisen from husbands' work status would have influences on married women's labor force participation. From both Table 2-1 and Table 2-2, non-employee and non-worker are positively related to the LFP and significant in explaining the LFP. It infers that compared to the women whose husbands were employed by the public or private sectors (having constant and stable salaries, without taking risk of running business), women whose husbands were non-employee workers and women whose husbands did not even have jobs were more likely to participate in the labor force.

When all married women included, non-employee variable is still positively related to the LFP and significant in determining the LFP. The coefficients of non-worker are only positive in the first four years and only significant in the first two years. The negative sign of coefficient in the 2000 may be due to global recession around 2000. In a recession, the unemployment rate was high and it was very difficult to find jobs. The married women whose husbands did not have jobs might not participate in the labor market.

B. Estimation with husbands' income variable (Table 3-1 to Table 3-3)

We next include husbands' income variable as an explanatory variable that can proxy

the non-labor income of married women ($I + W_hH_h$).

Women's Wage Rate Related Variables

In the younger group (see Table 3-1), the implication of this set of variables (age, education, number of children, free childcare, past work experience, and area of residence) are similar to the results for the younger group in the model without husband's income variable (Table 2-1). The variables that are positively related to women's wage rates (age, education, free childcare and past work experiences) are positively related to the likelihood of labor force participation. Variables that are negatively related to women's wage rates (number of children) are negatively related to the possibilities of labor force participation. Area of residence is still not consistent with our expectation.

In the elder group (see Table 3-2), education, free childcare and past work experience are still positively related to the LFP and significant in explaining the odds of LFP. Area of residence is still negatively related to the LFP, which is not consistent with our expectation. Age and number of children act in the different way from the two variables in the younger group. Age is not positively associated with the LFP in 1990 and 1993, since the productivity of a person will go down as getting elder. Age is still positively related to the LFP in 2000. It is because women got higher degrees recently and entered the labor force at elder ages. In the group where women aged 36-50, the productivity of women in 2000 had not shrunk. Number of children is negatively related to the LFP only in 1990 and 2000, and important in determining the LFP only in 1993 and 2000. We expected that women in the elder group faced fewer childcare responsibilities and therefore number of children should not be very important in determining the labor force participation. The insignificant coefficient in the first year is consistent with our expectation. The coefficients in the last two years are significant, which are inconsistent with our expectation. It is owing to that women got married at elder ages in recent years. Therefore women faced childcare responsibilities at elder ages. When all women are included in our analysis (see Table 3-3), the signs and significance of these controlled variables are almost the same as those in the younger group (Table 3-1).

Husband's Work Hours

In tables 3-1, 3-2 and 3-3, it shows that husband's work hour is positively related to the LFP. It indicates the relation between the husband's work hour and wife's LFP were complementary.

Proxy Variables of Non-Labor Income for Married Women

(1) Husbands' Income

Higher non-labor income is supposed to decrease the possibility of women being in the labor market. We expect that compared with women whose husbands' income were 20,000~30,000 dollars, the women whose husbands had lower income were more likely to participate in the labor market and the women whose husbands had higher income were less likely to participate in the labor market. In the younger group (see Table 3-1), the coefficient estimates show that the higher income is negatively related to the labor force participation of married women, but only significant in 2000. The signs of coefficients are consistent with our expectation. The estimates also show that the coefficients of lower income are positive in 1990, negative in 1993 and 2000, and only significant in 2000. Although the signs of coefficients of lower income variables are not significantly different from those of higher income variable, we can find that the coefficients of both lower income and higher income in 2000 are negative and significant. It infers that during a recession, the effect of husbands' income is more significant in determining the LFP of married women. Married women would withdraw from the labor market by higher and lower husbands' income.

In both Table 3-2 and Table 3-3, higher income is negatively related to the LFP and significant in determining married women's LFP. It is consistent with our expectation. It reveals that compared with women whose husbands had medium income levels, women whose husbands had higher income level were less likely to participate in the labor market. High non-labor decreased the likelihood of women being in the labor force. Also, the coefficients of lower income are negative in 2000 and significant in both tables. During a recession, both lower income and higher income decreased the possibility of women being in the labor force.

(2) Husbands' work status

Husbands' work status variables (non-employee and non-worker) are positive and significant in both younger and elder groups. It infers that compared to the women whose husbands were employed by the public or private sectors, women whose husbands were non-employee workers and women whose husbands did not have jobs were more likely to participate in the labor market.

In Table 3-3, where all married women aged 65 and under are included, non-employee

is still positively related to the LFP and significant in explaining the women's LFP. Non-worker variable, however, is negatively but insignificantly related to women's labor force participation.

Marginal Effects on the Probability of Labor Force Participation

The estimates of marginal effects are presented in Table 4-1, Table 4-2 and Table 4-3. In this part, we will focus on the effects of husbands' work status (non-employee and non-worker) on the probability of being in the labor market across the five years.

In the younger group, where women aged 35 and below 35 (see Table 4-1), both of non-employee and non-worker have the predicted positive effects on the probability of being in the labor market. In 1979, women whose husbands were non-employees were associated with an increase of 7.1 percentage points in the probability of being in the labor market while women whose husbands did not have jobs were associated with an increase of 13.2 percentage points in the probability of participating in the labor market. It indicates that women whose husbands did not have jobs have higher probability of being in the labor market than women whose husbands were non-employee workers. The effect of non-worker is larger than that of non-employee in 1979 and 1986, but the effect of non-employee is larger than that of non-worker in 1990 and 1993. The effects of both non-employee and non-worker are almost the same in 2000. In 1979 and 1986, women whose husbands did not have jobs have higher probability of being in the labor market than women whose husbands were non-employee workers.

Generally speaking, compared with women whose husbands did not have income, women whose husbands were non-employee workers had higher non-labor income. The higher non-labor income decreased the probability of being in the labor market. However, in 1990 and 1993, when the economic growth was in a very high rate from the late 1980s to the early 1990s, due to the income effect, women whose husbands were non-employee had higher probabilities of being in the labor market. In 2000, when the economic growth in Taiwan slowed down and the global economy entered into a recession, the effects of non-employee and non-worker were the same.

In the elder group (see Table 4-2), the positive effect of non-employee is also smaller than the effect of non-worker in 1979, 1986, and also larger in 1990. The differences from the younger group are that in the elder group, the effect of non-worker is a little larger than the effect of non-employee in 1993 and the effect of non-employee is much

larger than that of non-worker in 2000.

To sum up (see Table 4-3), the effect of non-employee is larger than the effect of non-worker across the five years except 1979 and the effect of non-employee is more significant. It reveals that generally women whose husbands were non-employee worker were more likely than women whose husbands did not have jobs to participate in the labor market by income effect.

V. CONCLUSION

Female labor force participation rate has increased from 36% in the 1960s to 46% in 2000 and this sharp increase has been due to married women. At the same time, we observed a change in the distribution of the employment status for males. That is, the proportion of wage-employed (employee) workers is increasing while the proportion of non-wage-employed (mainly self-employed) workers is declining. A common finding in the literature of female labor supply shows that married women's labor supply decision is affected by their husbands' employment. Therefore, change in the distribution of male work status certainly has some influence on married women's labor supply decision. The purpose of this study is to investigate empirically the effect of husband's work status on married women's labor supply decision based on the data drawn from the 1979 to 2000 Manpower Survey and the supplement of Women's Marriage, Fertility and Employment Survey.

Five years of the data (1979, 1986, 1990, 1993, and 2000) are chosen to examine the effect of husband's work status on married women's labor supply decision at different stages of economic development in Taiwan. The statistical analysis of the data indicates that the proportion of married women with non-employee husbands has declined from 40% in 1979 to 33% in 2000, and the proportion of married women with employee husbands has increased from 45% in 1979 to 49% in 1993 and then decreased to 46% in 2000. Our empirical results indicate that compared to married women whose husbands were employee workers, women whose husbands were non-employee workers or non-workers were more likely to participate in the labor market. Moreover, the effects of husband′s employee/non-employee status on married women′s labor force participation differ at various economic development stage.

Table 1-1 Characteristics of Married Women, Aged 35 and Under 35, by Year

Independent Variable	1979	1986	1990	1993	2000
Age	27.416	28.728	29.281	29.463	29.772
Education (Years of schooling)	7.091	8.649	9.728	10.395	11.599
Number of children	2.333	2.141	1.972	1.868	1.761
Childcare (Provided by family members for free, Yes=1; No=0)	0.139	0.204	0.231	0.224	0.269
Past Work Experience (Yes=1; No=o)	0.626	0.795	0.831	0.855	0.865
Area of Residence (Urban=1; Rural=0)	0.237	0.208	0.208	0.195	0.165
Husbands' Work Hours	45.608	46.089	44.820	44.369	41.837
Husbands' Work Status:					
Non-Employee (Yes=1; No=0)	0.326	0.327	0.318	0.297	0.267
Non-Worker (Yes=1; No=0)	0.098	0.066	0.075	0.076	0.089

Table 1-2 Characteristics of Married Women, Aged 36-50, by Year

Independent Variables	1979	1986	1990	1993	2000
Age	42.574	42.726	42.153	41.967	42.620
Education (Years of schooling)	4.334	5.528	7.020	7.930	9.318
Number of Children	4.249	3.491	3.073	2.902	2.560
Childcare (Provided by family members for free, Yes=1; No=0)	0.125	0.170	0.212	0.178	0.199
Past Work Experience (Yes=1; No=o)	0.509	0.651	0.709	0.781	0.851
Area of Residence (Urban=1; Rural=0)	0.244	0.232	0.258	0.241	0.225
Husbands' Work Hours	43.671	43.029	41.077	41.343	39.349
Husbands' Work Status:					
Non-Employee (Yes=1; No=0)	0.476	0.424	0.367	0.357	0.367
Non-Worker (Yes=1; No=0)	0.097	0.109	0.121	0.117	0.127

Table 1-3 Characteristics of Married Women, Aged 65 and Under 65, by Year

Independent Variable	1979	1986	1990	1993	2000
Age	38.346	39.107	40.290	40.850	42.797
Cohort 1 (Aged under 35) (Yes=1; No=0)	0.447	0.463	0.400	0.374	0.288
Cohort 2 (Aged 36-50) (Yes=1; No=0)	0.373	0.335	0.380	0.393	0.454
Education (Years of schooling)	5.261	6.521	7.481	8.008	8.882
Numbers of child	3.609	3.128	2.895	2.724	2.527
Childcare (Provided by family members for free, Yes=1; No=0)	0.122	0.178	0.205	0.179	0.195
Past Work Experience (Yes=1; No=o)	0.544	0.684	0.711	0.759	0.796
Area of Residence (Urban=1; Rural=0)	0.238	0.213	0.227	0.209	0.203
Husbands' Work Hours	41.660	41.230	39.418	38.973	35.549
Husbands' Work Status:					
Non-Employee (Yes=1; No=0)	0.397	0.373	0.351	0.341	0.327
Non-Worker (Yes=1; No=0)	0.148	0.145	0.162	0.167	0.210

Table 2-1 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 35 and Under 35)

Independent Variable	1979	1986	1990	1993	2000
Age	0.087***	0.082***	0.077***	0.097***	0.072***
	(9.897)	(11.035)	(9.497)	(11.676)	(7.367)
Education	0.043***	0.016*	0.060***	0.061***	0.137***
(Years of schooling)	(4.258)	(1.884)	(5.573)	(5.413)	(8.300)
Number of children	-0.094***	-0.182***	-0.222***	-0.296***	-0.360***
	(-3.233)	(-6.721)	(-7.251)	(-9.082)	(-9.122)
Childcare	2.233***	1.903***	1.769***	2.496***	2.836***
(Provided by family members	(23.504)	(25.699)	(23.830)	(27.618)	(25.104)
for free, Yes=1; No=0)					
Past Work Experience	1.216***	1.147***	1.136***	0.690***	0.809***
(Yes=1; No=o)	(17.073)	(16.417)	(13.642)	(8.069)	(7.368)
Area of Residence	-0.439***	-0.344***	-0.304***	-0.210***	-0.013
(Urban=1; Rural=0)	(-5.734)	(-5.301)	(-4.303)	(-2.824)	(-0.134)
Husbands' Work Hours	0.006**	0.008***	0.003	0.003	0.009***
	(2.030)	(3.349)	(1.131)	(1.126)	(2.959)
Husbands' Work Status:					
Non-Employee	0.337***	0.381***	0.443***	0.446***	0.368***
(Yes=1; No=0)	(4.957)	(6.639)	(7.027)	(6.901)	(4.469)
Non-Worker	0.621***	0.488***	0.435***	0.308*	0.372**
(Yes=1; No=0)	(3.436)	(3.215)	(2.590)	(1.799)	(1.996)
Constant	-4.703***	-3.927***	-4.071***	-4.228***	-4.697***
	(-16.940)	(-15.952)	(-13.903)	(-14.080)	(-13.055)
Chi-squared	1390.408	1434.268	1199.140	1491.477	1396.148

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 2-2 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 36-50)

Independent Variables	1979	1986	1990	1993	2000
Age	-0.018**	-0.016**	-0.014*	-0.013*	0.007
	(-2.240)	(-2.289)	(-1.951)	(-1.880)	(1.056)
Education	0.008	0.004	0.019**	0.045***	0.063***
(Years of schooling)	(0.855)	(0.443)	(2.236)	(5.346)	(7.559)
Number of Children	-0.021	-0.009	-0.021	0.069***	-0.060**
	(-1.054)	(-0.357)	(-0.816)	(2.608)	(-2.423)
Childcare	1.639***	1.259***	1.506***	1.561***	1.649***
(Provided by family members	(14.351)	(13.273)	(18.250)	(17.929)	(20.396)
for free, Yes=1; No=0)					
Past Work Experience	1.418***	1.354***	1.183***	0.703***	0.733***
(Yes=1; No=o)	(21.837)	(20.628)	(17.833)	(10.819)	(10.127)
Area of Residence	-0.919***	-0.586***	-0.597***	-0.499***	-0.152**
(Urban=1; Rural=0)	(-11.120)	(-7.930)	(-8.797)	(-7.837)	(-2.378)
Husbands' Work Hours	0.009***	0.015***	0.001	0.008***	0.004**
	(3.212)	(6.017)	(0.219)	(3.281)	(2.151)
Husbands' Work Status:					
Non-Employee	0.261***	0.552***	0.623***	0.544***	0.437***
(Yes=1; No=0)	(3.773)	(8.275)	(9.555)	(9.138)	(7.584)
Non-Worker	0.974***	0.709***	0.445***	0.553***	0.156
(Yes=1; No=0)	(5.697)	(4.508)	(3.136)	(4.091)	(1.312)
Constant	-0.758**	-1.034***	-0.653*	-0.956***	-1.592***
	(-2.041)	(-2.883)	(-1.882)	(-2.711)	(-4.832)
		1072.883	1141.873	814.8299	883.3965

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 2-3 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 65 and Under 65)

Independent Variable	1979	1986	1990	1993	2000
Age	0.014***	0.014**	0.008*	0.006	0.008*
	(2.834)	(2.979)	(1.765)	(1.468)	(1.681)
Cohort 1 (Aged under 35)	0.315**	0.506***	0.181	0.186	0.332***
(Yes=1; No=0)	(2.079)	(3.951)	(1.411)	(1.498)	(2.589)
Cohort 2 (Aged 36-50)	0.972***	0.962***	0.649***	0.699***	0.702***
(Yes=1; No=0)	(10.603)	(12.066)	(7.988)	(8.950)	(8.963)
Education	0.030***	0.014***	0.032***	0.040***	0.053***
(Years of schooling)	(4.976)	(2.644)	(5.684)	(7.315)	(9.052)
Numbers of children	-0.029**	-0.052***	-0.070***	-0.044**	-0.094***
	(-2.278)	(-3.716)	(-4.589)	(-2.950)	(-5.782)
Childcare	1.848***	1.488***	1.543***	1.822***	1.868***
(Provided by family members	(27.939)	(29.173)	(31.662)	(34.204)	(34.266)
for free, Yes=1; No=0)					
Past Work Experience	1.393***	1.332***	1.246***	0.782***	0.791***
(Yes=1; No=o)	(31.913)	(31.397)	(28.097)	(18.322)	(16.320)
Area of Residence	-0.620***	-0.427***	-0.463***	-0.387***	-0.160***
(Urban=1; Rural=0)	(-11.952)	(-9.455)	(-10.355)	(-8.890)	(-3.442)
Husbands' Work Hours	0.007***	0.011***	0.002	0.006***	0.007***
	(3.720)	(6.895)	(1.320)	(3.896)	(4.553)
Husbands' Work Status:					
Non-Employee	0.355***	0.521***	0.634***	0.588***	0.512***
(Yes=1; No=0)	(7.839)	(13.014)	(15.288)	(14.957)	(12.079)
Non-Worker	0.381***	0.203**	0.037	0.048	-0.099
(Yes=1; No=0)	(3.533)	(2.199)	(0.407)	(0.543)	(-1.178)
Constant	-3.120***	-2.965***	-2.264***	-2.110***	-2.318***
	(-10.626)	(-11.148)	(-8.224)	(-7.882)	(-8.342)
Chi-squared	3112.489	3495.210	3383.170	3123.670	3454.675

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 3-1 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 35 and Under 35)

Independent Variable	1990	1993	2000	2000 (Husband's income in real term)
Age	0.079***	0.098***	0.073***	0.071***
	(9.550)	(11.679)	(7.425)	(7.134)
Education	0.062***	0.063***	0.142***	0.132***
(Years of schooling)	(5.628)	(5.468)	(8.513)	(7.823)
Number of children	-0.222***	-0.296***	-0.361***	-0.361***
	(-7.261)	(-9.059)	(-9.141)	(-9.132)
Childcare	1.768***	2.495***	2.840***	2.840***
(Provided by family members for free, Yes=1; No=0)	(23.811)	(27.595)	(25.099)	(25.128)
Past Work Experience	1.141***	0.693***	0.811***	0.805***
(Yes=1; No=o)	(13.675)	(8.081)	(7.374)	(7.332)
Area of Residence	-0.291***	-0.204***	0.002	-0.027
(Urban=1; Rural=0)	(-4.068)	(-2.726)	(0.016)	(-0.282)
Husband's Income ($)				**Husband's Income ($)**
Lower Income (1~20,000)	0.087	-0.017	-0.480***	0.00000251
	(1.205)	(-0.163)	(-3.152)	(1.311)
Higher Income (>30,000)	-0.012	-0.055	-0.294***	
	(-0.161)	(-0.792)	(-2.690)	
Husbands' Work Hours	0.004	0.003	0.008**	0.008**
	(1.363)	(1.173)	(2.457)	(2.569)
Husbands' Work Status:				
Non-Employee	0.432***	0.445***	0.397***	0.374***
(Yes=1; No=0)	(6.681)	(6.603)	(4.705)	(4.530)
Non-Worker	0.421**	0.305*	0.429**	0.383**
(Yes=1; No=0)	(2.502)	(1.765)	(2.274)	(2.056)
Constant	-4.190***	-4.242***	-4.481***	-4.636***
	(-13.645)	(-13.799)	(-12.164)	(-12.793)
Chi-squared	1200.915	1492.147	1407.244	1397.907

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 3-2 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 36-50)

Independent Variable	1990	1993	2000	2000 (Husband's income in real term)
Age	-0.016**	-0.013*	0.007	0.008
	(-2.260)	(-1.926)	(1.055)	(1.244)
Education	0.034***	0.056***	0.069***	0.068***
(Years of schooling)	(3.910)	(6.340)	(8.116)	(7.950)
Number of children	-0.026	0.066**	-0.061 **	-0.060**
	(-1.026)	(2.512)	(-2.458)	(-2.438)
Childcare	1.507***	1.561***	1.650***	1.654***
(Provided by family members for free, Yes=1; No=0)	(18.193)	(17.908)	(20.383)	(20.432)
Past Work Experience	1.213***	0.715***	0.737***	0.732***
(Yes=1; No=o)	(18.120)	(10.968)	(10.156)	(10.103)
Area of Residence	-0.517***	-0.465***	-0.136**	-0.133**
(Urban=1; Rural=0)	(-7.453)	(-7.257)	(-2.121)	(-2.078)
Husband's Income ($)				**Husband's Income ($)**
Lower Income (1~20,000)	0.421***	0.089	-0.183*	0.00000209**
	(5.487)	(0.937)	(-1.697)	(-2.549)
Higher Income (>30,000)	-0.148**	-0.244***	-0.311***	
	(-1.968)	(-3.412)	(-3.734)	
Husbands' Work Hours	0.003	0.009***	0.006***	0.005**
	(1.019)	(3.928)	(2.618)	(2.533)
Husbands' Work Status:				
Non-Employee	0.567***	0.509***	0.423***	0.436***
(Yes=1; No=0)	(8.536)	(8.292)	(7.246)	(7.567)
Non-Worker	0.254*	0.475***	0.161	0.132
(Yes=1; No=0)	(1.757)	(3.442)	(1.320)	(1.110)
Constant	-0.832**	-0.956***	-1.451***	-1.648***
	(-2.376)	(-2.689)	(-4.343)	(-4.989)
Chi-squared	1191.312	837.1467	898.0164	889.9842

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 3-3 Logit Coefficient Estimate of Married Women Labor Force Participation (Married Women Aged 65 and Under 65)

Independent Variable	1990	1993	2000	2000
Age	0.009*	0.007	0.009*	0.008*
	(1.918)	(1.521)	(1.936)	(1.776)
Cohort 1 (Aged under 35)	0.223*	0.209*	0.344***	0.337***
(Yes=1; No=0)	(1.730)	(1.681)	(2.674)	(2.624)
Cohort 2 (Aged 36-50)	0.700***	0.731***	0.709***	0.711***
(Yes=1; No=0)	(8.548)	(9.305)	(9.008)	(9.052)
Education	0.039***	0.046***	0.057***	0.556***
(Years of schooling)	(6.746)	(8.053)	(9.514)	(9.196)
Numbers of children	-0.070***	-0.043***	-0.095***	-0.094***
	(-4.636)	(-2.898)	(-5.838)	(-5.779)
Childcare	1.541***	1.822***	1.866***	1.868***
(Provided by family members for free, Yes=1; No=0)	(31.579)	(34.175)	(34.212)	(34.272)
Past Work Experience	1.258***	0.790***	0.797***	0.792***
(Yes=1; No=o)	(28.263)	(18.463)	(16.394)	(16.335)
Area of Residence	-0.422***	-0.364***	-0.146***	-0.151***
(Urban=1; Rural=0)	(-9.281)	(-8.315)	(-3.135)	(-3.238)
Husband's Income ($)				
Lower Income (1~20,000)	0.231***	0.078	-0.317***	-0.00000120*
	(4.794)	(1.301)	(-4.350)	(-1.729)
Higher Income (>30,000)	-0.059	-0.125***	-0.299***	
	(-1.205)	(-2.734)	(-5.137)	
Husbands' Work Hours	0.004**	0.007***	0.007***	0.007***
	(2.181)	(4.535)	(4.314)	(4.781)
Husbands' Work Status:				
Non-Employee	0.597***	0.556***	0.516***	0.510***
(Yes=1; No=0)	(14.080)	(13.589)	(11.933)	(12.014)
Non-Worker	-0.036	-0.002	-0.051	-0.114
(Yes=1; No=0)	(-0.388)	(-0.026)	(-0.598)	(-1.355)
Constant	-2.513***	-2.181***	-2.156***	-2.342***
	(-9.002)	(-8.090)	(-7.690)	(-8.416)
Chi-squared	3416.939	3141.104	3483.679	3457.644

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 4-1 Marginal Effects on the Probability of Labor Force Participation (Married Women Aged 35 and Under 35)

Independent Variable	1979	1986	1990	1993	2000
Age	0.019***	0.020***	0.019***	0.024***	0.017***
	(9.942)	(11.036)	(9.497)	(11.674)	(7.357)
Education	0.009***	0.004*	0.015***	0.015***	0.033***
(Years of schooling)	(4.259)	(1.884)	(5.572)	(5.414)	(8.297)
Number of children	-0.020***	-0.045***	-0.055***	-0.074***	-0.087***
	(-3.235)	(-6.721)	(-7.252)	(-9.080)	(-9.103)
Childcare	0.474***	0.475***	0.442***	0.622***	0.863***
(Provided by family members	(22.327)	(25.561)	(23.751)	(27.987)	(26.881)
for free, Yes=1; No=0)					
Past Work Experience	0.258***	0.286***	0.284***	0.172***	0.195***
(Yes=1; No=o)	(17.589)	(16.448)	(13.661)	(8.065)	(7.350)
Area of Residence	-0.093***	-0.086***	-0.076***	-0.052***	-0.003
(Urban=1; Rural=0)	(-5.747)	(-5.301)	(-4.303)	(-2.824)	(-0.134)
Husbands' Work Hours	0.001**	0.002***	0.001	0.001	0.002***
	(2.030)	(3.349)	(1.131)	(1.126)	(2.959)
Husbands' Work Status:					
Non-Employee	0.071***	0.095***	0.111***	0.111***	0.089***
(Yes=1; No=0)	(4.964)	(6.639)	(7.028)	(6.900)	(4.467)
Non-Worker	0.132***	0.122***	0.109***	0.077*	0.090**
(Yes=1; No=0)	(3.439)	(3.215)	(2.590)	(1.799)	(1.996)
Constant	-0.997***	-0.980***	-1.017***	-1.054***	-1.132***
	(-17.496)	(-15.989)	(-13.924)	(-14.049)	(-12.921)

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 4-2 Marginal Effects on the Probability of Labor Force Participation (Married Women Aged 36-50)

Independent Variables	1979	1986	1990	1993	2000
Age	-0.004**	-0.004**	-0.003*	-0.003*	0.002
	(-2.241)	(-2.289)	(-1.951)	(-1.880)	(1.056)
Education	0.002	0.001	0.005**	0.011***	0.015***
(Years of schooling)	(0.855)	(0.443)	(2.235)	(5.347)	(7.562)
Number of Children	-0.005	-0.002	-0.005	0.017***	-0.014**
	(-1.054)	(-0.357)	(-0.816)	(2.608)	(-2.423)
Childcare	0.402***	0.312***	0.374***	0.379***	0.396***
(Provided by family members	(14.197)	(13.342)	(18.375)	(18.217)	(20.856)
for free, Yes=1; No=0)					
Past Work Experience	0.348***	0.336***	0.294***	0.171***	0.176***
(Yes=1; No=o)	(21.955)	(20.563)	(17.783)	(10.807)	(10.109)
Area of Residence	-0.226***	-0.145***	-0.148***	-0.121***	-0.036**
(Urban=1; Rural=0)	(-11.155)	(-7.926)	(-8.795)	(-7.837)	(-2.378)
Husbands' Work Hours	0.002***	0.004***	0.000	0.002***	0.001**
	(3.212)	(6.018)	(0.219)	(3.281)	(2.151)
Husbands' Work Status:					
Non-Employee	0.064***	0.137***	0.155***	0.132***	0.105***
(Yes=1; No=0)	(3.773)	(8.277)	(9.556)	(9.143)	(7.587)
Non-Worker	0.239***	0.176***	0.111***	0.134***	0.037
(Yes=1; No=0)	(5.699)	(4.508)	(3.136)	(4.091)	(1.312)
Constant	-0.186**	-0.257***	-0.162*	-0.232***	-0.383***
	(-2.042)	(-2.881)	(-1.881)	(-2.708)	(-4.824)

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

Table 4-3 Marginal Effects on the Probability of Labor Force Participation (Married Women Aged 65 and Under 65)

Independent Variable	1979	1986	1990	1993	2000
Age	0.003***	0.003**	0.002*	0.002	0.002*
	(2.834)	(2.979)	(1.766)	(1.468)	(1.681)
Cohort 1 (Aged under 35)	0.070**	0.125***	0.045	0.046	0.083***
(Yes=1; No=0)	(2.079)	(3.952)	(1.411)	(1.498)	(2.589)
Cohort 2 (Aged 36-50)	0.215***	0.238***	0.161***	0.175***	0.176***
(Yes=1; No=0)	(10.628)	(12.073)	(7.990)	(8.950)	(8.963)
Education	0.007***	0.003***	0.008***	0.010***	0.013***
(Years of schooling)	(4.979)	(2.644)	(5.684)	(7.315)	(9.052)
Numbers of children	-0.006**	-0.013***	-0.017***	-0.011**	-0.023***
	(-2.278)	(-3.716)	(-4.589)	(-2.950)	(-5.782)
Childcare	0.408***	0.368***	0.383***	0.456***	0.467***
(Provided by family members for free, Yes=1; No=0)	(27.124)	(28.973)	(31.446)	(34.177)	(34.286)
Past Work Experience	0.308***	0.329***	0.309***	0.196***	0.198***
(Yes=1; No=o)	(32.743)	(31.590)	(28.235)	(18.325)	(16.319)
Area of Residence	-0.137***	-0.106***	-0.115***	-0.097***	-0.040***
(Urban=1; Rural=0)	(-11.997)	(-9.458)	(-10.358)	(-8.890)	(-3.442)
Husbands' Work Hours	0.001***	0.003***	0.001	0.002***	0.002***
	(3.720)	(6.895)	(1.320)	(3.896)	(4.553)
Husbands' Work Status:					
Non-Employee	0.078***	0.129***	0.157***	0.147***	0.128***
(Yes=1; No=0)	(7.843)	(13.014)	(15.289)	(14.957)	(12.079)
Non-Worker	0.084***	0.050**	0.009	0.012	-0.025
(Yes=1; No=0)	(3.533)	(2.199)	(0.407)	(0.543)	(-1.178)
Constant	-0.689***	-0.733***	-0.562***	-0.527***	-0.579***
	(-10.691)	(-11.165)	(-8.232)	(-7.882)	(-8.342)

Note – t-statistics are in parentheses. *Significant at 10%, **Significant at 5%, ***Significant at 1%.

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