

AN ABSTRACT OF THE THESIS OF

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Geraldine I. Olson

The purpose of this study was to construct a measure of labor force attachment of Corvallis women, age 30-45, and to investigate its determinants. From a random sample drawn from the 1978-79 Corvallis telephone directory, 100 women age 30-45 were identified as sample participants. Personal interviews with each of the women were conducted by the researcher to obtain information on work histories, and personal and family characteristics.

The labor force participation rate for the sample was 63 percent. The mean labor force attachment score, calculated as a ratio of months worked since leaving school to months since leaving school, and multiplied by 100, was 48.85, with a standard deviation of 29. Scores ranged from 0 to 99. A score of 60 was considered strong attachment. Thirty-seven percent of the women had scores of 60 or above and 63 percent had scores below 60.

The following variables were significant determinants of attachment scores in regression analysis: years married,

age, education, years in which children under six were present in the household, the difference between husband's and wife's education, whether or not the wife worked any of the first three years of marriage, and whether or not a woman had ever been divorced.

Years married had a negative influence on attachment scores. It was assumed that years married was a proxy for increased skill at household tasks, and possibly, preferences for marriage. Age had a positive effect on attachment scores, possibly due to the fact that older women were more likely to have older children who might help with housework. Education had a positive effect, and was assumed to be a proxy for potential market wage. Years in which children under six were present in the household had a negative effect on scores, due to increased child care responsibilities which raise the home wage of the wife relative to her market wage.

The larger the difference between education of husband and wife, the lower the attachment score tended to be. The educational difference seemed to be a combination of effects of permanent income, and husband's and wife's education, as well as possibly representing wife's inability to find employment comparable to her husband's status.

If wives worked any length of time during the first three years of marriage, which 77 percent of the wives did, attachment scores were lower than if they had not worked

during this time. It was suggested that wives who worked might have been helping husbands through school. When husbands became employed, wives dropped out of the labor force.

Experiencing divorce had a positive influence on attachment scores. Divorced women were possibly more reluctant to sever ties with the labor force than were women who had never been divorced, because of unwillingness to risk loss of income.

The independent variables accounted for between 36 and 46 percent of the variation in attachment scores, with the higher percentages obtained with full model equations.

The relationship between attachment scores and current labor force status was investigated. The regression coefficients for the entire sample, and married women only, were highly significant. Currently working women had greater past attachment than non-working women. Personal and family characteristics however provided a more complete determination of labor force attachment.

LABOR FORCE ATTACHMENT OF MATURE WOMEN,
CORVALLIS, OREGON: AN ANALYSIS OF
DETERMINANTS

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APPROVED:

Redacted for Privacy

~~Associate Professor of Family Resource Management~~
in charge of major

Redacted for Privacy

~~Assistant Professor of Economics, Thesis Advisor~~

Redacted for Privacy

~~Head of Department of Family Resource Management~~

Redacted for Privacy

~~Dean of Graduate School~~

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PAMELA ANN FERRARA

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LABOR FORCE ATTACHMENT OF MATURE WOMEN,
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I. INTRODUCTION

The female labor force in the United States has grown dramatically since 1950. Women over age 35 were largely responsible for the increase between 1950 and 1965. Women under age 35, a large percentage of whom were married and had small children, accounted for most of the increase since 1965 (30). A major area of research in labor economics has focused on the reasons for these increases, predictions of future rates, and the implications for the United States economy.

The major research on female labor force participation (LFP) has focused on LFP rates at a point in time. Labor force participation rates are inadequate measures of female labor supply, as variation in participation patterns among women in various stages of the family life-cycle is the major characteristic of female LFP (18). Although LFP rates for all age groups have increased over time, a common pattern has existed, which reflects the family life-cycle. For example, a woman might work prior to marriage and for a time after marriage. She might then withdraw from the labor force to have children, and re-enter again when the children were older (4). Therefore, for a group of women, LFP rates could be similar from one

time period to the next, but two entirely different segments of that group could be working in each time period (2).

The recognition that participation rates are inadequate measures of labor supply has led researchers to explore alternative measures. Statistical adaptations of the LFP model were made by Heckman and Willis and applied to prediction of participation rates over a time span (14). Researchers using panel data have related life-cycle labor force behavior to demographic, economic, and attitudinal variables, and to LFP rates at a point in time (26,31). Measures such as the number of years in which a woman has worked six months or more have been used as substitutes for more accurate and complete data, which have not been available (31).

Statement of the Problem

The accuracy of LFP rates as a measure of female labor supply has been questioned in recent research (14, 16). It is the purpose of this study to attempt an accurate measure of life-time female labor supply, and to investigate its determinants.

Need for the Study

An important question to be answered by researchers is whether or not female LFP rates will continue to rise as they have in the past. Higher levels of education have been positively associated with female participation rates, and the presence of children has been negatively associated with these rates. Women are acquiring more education than ever before, and family size is decreasing. These changes suggest that LFP rates will continue to rise (26).

Knowledge of and the ability to predict female labor force patterns are important to policy makers at all levels of government, as well as to the business sector, in part for assessing job creation and economic development. Researchers have not been successful in the past in predicting the size of the increase in the female work force. Women have accounted for a large portion of the unemployed since 1950, possibly in part because of failure to predict the rise in numbers of female job seekers, and the consequences of that failure for job planning programs.

Educators need accurate assessments of the size and nature of the female labor force in order to provide educational programs designed to meet women's needs. Lack of skills appropriate to a contemporary job market hinders women re-entering the labor force after a period of absence.

Many women are therefore forced into unskilled, low-paying jobs. Due to an increasing divorce rate, many women are often the sole support of families. In March 1975 more than 50 percent of all divorced and separated women headed their own families (13). These women are often faced with choosing between a low-paying job and welfare. Knowledge about educational and work-skill needs of women must be applied to the dual problems of high unemployment among women, and concentration of women in unskilled, low-paying jobs.

The female labor force is also an important area of investigation because wives' wages are increasingly relied upon by families, to maintain adequate levels of living in the face of inflation. Attempts to estimate female labor supply must continue in view of the pressing problems upon which accurate estimations can be brought to bear. The employment determinants of women need to be identified, and appropriate assistance provided to women at various stages of the life cycle.

Major Objectives

The major objectives of this study were to:

1. calculate labor force attachment scores, using complete work histories, for a random sample of Corvallis women age 30-45;

2. investigate whether or not the factors which determine labor force participation are also useful in determining labor force attachment;

3. investigate whether or not current labor force status is useful in determining past labor force attachment.

Assumptions of the Study

1. It was assumed that the Corvallis telephone directory was as complete a listing of Corvallis residents as was available.

2. It was assumed that information from respondents was reported as accurately as recall would allow.

Limitations of the Study

1. The sample was confined to subjects whose phone numbers appeared in the 1978-79 Corvallis telephone directory. The directory included both city and rural residences.

2. Only women between the ages of 30-45 were interviewed for this study.

II. REVIEW OF LITERATURE

This review of literature will discuss the theoretical framework in which female labor force participation (LFP) is studied, the major determinants of female LFP derived from the model, and measures of life-time female labor supply.

Theoretical Framework

The traditional analysis of labor supply has been of the choice between work and leisure. A wage increase makes leisure more expensive in terms of earned income foregone, and the choice could be to work more hours (the substitution effect). However, for a given number of hours worked, an increase in the wage rate implies increased income, which could be used to purchase more goods, including leisure (the income effect). The actual outcome of the two effects working together depends on their relative strengths. Historically, hours of work have decreased. Workers have chosen to use the extra income from increased wages to purchase more leisure time (29).

Survey studies of female LFP rates bear out the theory. As other family income (OFI) rises (OFI being family income minus wife's wages), LFP rates of wives fall (18). However, in spite of the rise in real family incomes

over time, female participation rates have risen steadily as well. Mincer, in an attempt to resolve this paradox, introduced a three way choice for married women, among leisure, work in the market, and work in the home (18). He recognized that any substitution and income effects of variations in family income must take into account the substitutability of home production for market goods. How income will affect hours of work is therefore dependent not only on the work-leisure choice, but also on the ease with which substitution for the wife's time, or home production, is possible. At any moment in time, ease of substitution depends on life-cycle factors such as presence of small children. Therefore, as Mincer states, "...over shorter periods of observation, variation in labor force participation is the outstanding characteristic of labor force behavior of married women." (18: 68).

Mincer makes use of Friedman's permanent income hypothesis, that families adjust their spending not to current income but to permanent, life-time expectations, in explaining the contradiction between cross-section and time-series relationships of female LFP to OFI. Labor force participation decisions of family members other than the husband respond to family attempts to maintain a permanent level of income, when current levels fall below the permanent, expected one. For example, wives would work

to help support husbands through college, or to bring the current level of income up to the expected, permanent one. Husband's education is an indication that permanent levels of income are likely to be high.

Mincer noted that over the long run, increases in wives' earning power have shifted women from the home into market work. Life-cycle variations such as presence of children, as well as responses to fluctuations around permanent income expectations, help to explain the inverse relationship between wives' LFP rates and OFI at any moment in time.

Becker broadened the analysis of labor supply in a household context by introducing the concept of time to traditional consumption theory (1). Households are both producing units and utility maximizers, and choose the best combination of commodities with which to maximize their utility. Time inputs are introduced directly into the utility maximizing function of the household. Commodities are consumption items which combine varying amounts of market goods and time inputs, depending on whether the commodity is time-intensive or market-goods-intensive. Foregone earnings, what a person might have earned had he or she worked, are a part of the cost of a time-intensive commodity. Leisure is a special case of a time-intensive commodity.

Time in a household context was investigated further by Gronau in an attempt to account for the factors influencing the price of a wife's time (12). He assumed the supply of a wife's time to be perfectly inelastic, and the demand for her time to be derived from its uses. The price of her time is located at the intersection of the supply and demand curves. The decision of a wife to participate in the labor force was used to infer the price of her time at home. When her potential wage in the market exceeds the value of her time at home, she will enter the labor force.

Determinants of Female Labor Force Participation

The economic theory of the household suggests that differences exist in the price of women's time. Researchers in the area of female LFP use the theory of the household as an analytical framework for the construction of testable models of LFP. The models generally include four major categories of variables, 1) tastes, including tastes for market work, and for work in the home, 2) expected market earnings rates, 3) expected non-market earnings rates, and 4) family resources (4). Specific variables used to measure tastes for market work include education and marital status. Variables used to measure tastes for work in the home include numbers and ages of children.

Expected market earnings rates are measured by variables such as average market wage rates, industry and occupational mix, age, and education. Expected non-market earnings rates are measured by variables such as numbers and ages of children (which increase the amount of home work to be done). Family resources are often measured by OFI, that is, total family income minus wife's earnings.

Basically two types of data are used to test models of LFP. Survey data on individuals, such as the 1/1000 Sample of the 1960 Census, are used to investigate the influence of individual and family characteristics, such as numbers and ages of children, marital status, education, and OFI, on wives' LFP. Grouped data (or aggregated data) from Standard Metropolitan Statistical Areas (SMSA's), and census years, are often used to investigate the influence of unemployment rates, wage rates, and industry mix on female LFP (4).

Marital Status

Marital status is an important influence on female LFP. Although most studies of women in the labor force have concentrated on married women, LFP rates of single women have also been discussed (5,27). A major treatment of single women as a group was provided by Bowen and Finegan as part of their work on participation rates of major groups of the United States population (4).

Individual survey data from the 1/1000 Sample of the 1960 Census and intercity comparisons from 100 SMSA's were used to analyze participation rates of five major groups, prime age males, single women age 25-54, married women under age 54, younger persons, and older persons. Single women included those never married, those separated or divorced, the widowed, and those whose husbands were absent. The never married group had the highest participation rate, 91.2 percent; the separated or divorced group's rate was 88.5 percent; widowed, 80.5 percent; and women with husbands absent, 66.3 percent. It was found that among the last three groups, presence of children accounted for some of the variation in the rates. Other factors accounting for differences were expectations of husbands returning home within a short period of time, and, for widows, how recently husbands had died.

The importance of marital status on LFP is also seen in the estimation of work-life expectancy. The Bureau of Labor Statistics estimated the work-life expectancy, that is, the number of years a person could expect to be in the labor force, for a 20 year old woman in 1970 (10). If she remained single, her work-life expectancy was 41.2 years. If she married but remained childless, it was 34.1 years. If she at some time in her life became widowed, divorced or separated, it was 42.3 years.

The researchers of the National Longitudinal Survey of women age 30-44 found that for white women, never married, a life-time participation rate was 90 percent, whereas for married childless women, it was 74 percent (31). Being single could be interpreted as a preference for market work over family life.

Married women have lower participation rates than single women (4). Not working is interpreted as having home wage exceeding market wage, especially when children are present. It is also assumed that the family receives some other income, usually husband's wages. Therefore, the family is able to purchase the wife's home production services.

Measures of marital instability have been investigated in several studies of female LFP in order to isolate possible marital factors correlated with high participation rates. Cain attempted to explain the higher participation rates of black women by hypothesizing that the prevalence of marital instability among black families might be a factor contributing to black wives' reluctance to withdraw from the labor force (5). In regression analysis, the dependent variable was LFP, and the independent variable was whether or not the woman was remarried or separated. The independent variable had a positive effect on wives' LFP, but was not statistically significant.

Sweet's 1970 study, using the 1/1000 Sample of the 1960 Census, also incorporated marital instability into the analysis (27). The variable had four values, both spouses married only once, husband married once and wife married more than once, wife married once and husband married more than once, and both spouses married more than once. It was found, for white women, that if only one spouse was married more than once, wife's LFP went up by four percentage points. If both spouses had been married more than once, LFP went up by six percentage points, with other variables held constant.

Presence and Age of Children

The presence of children, especially children under age six, has been used as a variable in all major studies of female LFP. The presence of children has the effect of raising the value of the wife's time in home production. If the price of her time in the home exceeds her market wage rate, she will not work outside the home (12). The marginal product of a woman's time in producing home goods (in this case, child care) is largest in households with young children (11). Researchers using BLS statistics for 1975 found that within the group of currently married women, those with no children were as likely to be working as single women, with the implication that the presence of children is an important factor affecting female labor supply (17).

Researchers conducting a 1962 survey of family economic welfare investigated race and age of children jointly as a measure of wife's employability (20). This variable was the most highly significant of all variables used in analysis of participation rates of wives. Number of children was found to be significant in a 1964 study, with 66 percent of wives with no children working, 57 percent with one child, 47 percent with two children, 43 percent with three children, and 39 percent with four or more (21). Mincer found that when small children were present, the negative relation of participation rates of wives with husbands' income was even stronger than in their absence, indicating the strength of children's influence (18).

Bowen and Finegan analyzed the influence of children on female participation rates as having the following effects: increasing the amount of work to be done in the home, increasing the need for money income, and, in the case of older children, providing a source of assistance with home production (4). These effects had differing results on wives' LFP. The net effect varied with ages and numbers of children, and interactions with other variables. In order to sort out these effects, Bowen and Finegan constructed eight categories for different age combinations of children. Regression analysis was used, with LFP rates of married women as the dependent variable.

Ages of children were highly significant in determining the labor force participation of married women, and presence of children under age six was the most significant, affecting participation negatively.

Other researchers have used ages of children in regression analysis of wives' LFP rates. Cain, using aggregated 1950 Census data, considered the number or presence of children under age 18 and under age six as variables (5). Both were significant negative influences on wives' participation rates. Sweet classified married women by age of youngest child and number of children under age 18, and by age of youngest child alone (27). The 1/1000 Sample of the 1960 Census was used as a data base. Percentage of wives employed was plotted vertically and age of youngest child horizontally. A continuous increase in the percentage of wives employed, when age of youngest child ranged from 0 to 13, was observed. Only a slight increase was observed when children were between ages six and seven. When number of own children was plotted, there was a decrease from 43 percent participation for wives with no children, to 33 percent for wives with one child, to 20 percent for wives with three children, and 17 percent for wives with six children. Age of the youngest child alone, however, was more significant than number of children. Adding another child does not presumably add twice

as much work, whereas the age of a child has a large effect on the amount of time spent on child care. Care of young children is also difficult to adapt to an employment schedule, as most children do not begin school until age six (4).

Age and number of children were also considered by Gronau in his investigation of the price of a married woman's time (12). Numbers and ages of children reflected the price of the wife's time, and how it changed over the life-cycle. The 1/1000 Sample of the 1960 Census was used for analysis and children were classified into four age groups, under age three, from three to five, from age six to 11, and from age 11 to 17. A second classification was made according to the number of children in each age group. The only statistically significant effect on wives' participation was ages of children. Presence of children under three decreased participation significantly, presence of children between three and 11 had no significant effect, and presence of children 11 and over either had no effect, or increased participation slightly. This could be partial support for Bowen and Finegan's hypothesis that older children help out with household chores.

Other Family Income

Other family income (OFI) is a variable integral to the theoretical basis of the three way choice of work at

home, in the marketplace, or leisure. In Mincer's development of this concept, the family is assumed to be the unit of analysis, income is assumed to be pooled, and total family consumption related to that income (18). A change in income of some family member results in a change in family consumption (including consumption of home production services and leisure). Wife's home production is assumed to be a normal good, and the demand for this good rises with increased family income. Therefore, as family income increases, the family is able to purchase more of the wife's home production services. The expected inverse relationship between OFI and wives' LFP is evident (18).

In studies of female LFP at a point in time, this inverse relationship has been found (4, 5, 18, 27). Historically, both LFP of married women and family income have steadily increased. This apparent contradiction between cross-section findings and historical trends was explored by Mincer (18). He hypothesized that wives' LFP was a response to fluctuations in transitory income and could be interpreted as attempts to keep current levels of income as close to permanent income expectations as possible.

Mincer utilized two types of data to demonstrate his hypothesis. Data from 57 SMSA's of the 1950 Census were analyzed. Averages, or median values, served as approximations to long-run, or permanent levels of the variables

being considered. By using averages, short-run transitory variations cancelled each other out. Regression analysis was used, with LFP rates of married women as the dependent variable, and median income of male family heads, and median income of females who worked a full year, as the independent variables. The median female income variable (a proxy for female wage rate) had a positive sign, explained over half the variation in female LFP, and was stronger than the negative effect of husband's income. This finding corroborated the effect of the historical rise of female LFP rates, and suggested to Mincer the possibility of using survey data to decompose income effects into permanent and transitory components, in order to further test his hypothesis.

The 1950 BLS Survey of Consumer Expenditures provided data on 6,766 consumer units, and was stratified by age, education of head, and presence of young children. Weekly earnings of fully employed male heads and weekly earnings of employed wives were used as approximations of permanent income and female wage rates. The effects of these variables on labor force behavior of wives are consistent with findings from aggregated data. The positive female wage rate effect outweighed the negative effect of husbands' income.

Variables intended to capture transitory income effects were husbands' education and whether or not the

male head worked a full year. It was found that when current income of husbands was low, wives' LFP increased with increasing education of husbands. Mincer concluded that this result was consistent with his hypothesis. Husbands' education was a proxy for permanent income, and high educational levels were proxies, therefore, for high levels of permanent income. When current income was low, wives worked in order to bring current levels in line with permanent income expectations.

In addition, when male heads did not work a full year, LFP of wives was high. Mincer concluded that wife's LFP was a response to the current low income level. However, in regression using averages from SMSA's in 1950, a variable representing male unemployment had a negative but not significant effect on female LFP (18).

Survey data and community averages were also used by Bowen and Finegan to analyze the effects of OFI on wives' participation rates (4). The 1/1000 Sample of the 1960 census provided the data base, and a unique element of the analysis was the use of twelve categories of family income. This allowed the incremental effect of OFI on wives' LFP to be examined. On the whole, the expected negative relationship of OFI to wives' LFP was found, with each increment of \$100 associated with a decrease in wives' LFP of one and one-half to two points. The only aberration was a

drop in LFP at the \$1000-1,999 income level, with LFP being higher both before and after this level. Bowen and Finegan hypothesized that this trough was possibly explained by the distribution of welfare payments in this income range. Additional evidence to support this explanation was that the trough was much deeper for women with children under six, who were presumably receiving Aid to Families with Dependent Children (AFDC) payments.

A second aberration in the expected relationship between OFI and wives' LFP was for black women, whose LFP rates seemed less sensitive to fluctuations in OFI than were rates of white women. Bowen and Finegan cited as explanation Cain's work on higher black participation rates being related to higher incidence of marital instability among black families, causing black women to be more firmly tied to the labor force than white women.

These survey results were compared to results using intercity averages. Results were similar, although the coefficients of the independent variables were not as large as those in the survey results. Bowen and Finegan concluded that the smaller coefficients obtained with the aggregated data supported Mincer's hypothesis that aggregated data were superior in showing effects of permanent income on wives' LFP.

Cain used both community averages and survey data in order to further investigate the relationship between wives' LFP and OFI (5). The primary focus was a comparison of the size of the coefficients of the variables, female wage, and husbands' income, to Mincer's findings, in order to make estimates of the relative strength of each effect on wives' LFP. The principle finding was that, for 1950 Census data, the coefficients were similar to Mincer's. The positive wage effect exceeded the value of the negative husbands' income effect. For 1940 and 1960 Census data however, the negative income effect was larger than the positive wage effect, in opposition to Mincer's findings. Cain concluded that these results weakened Mincer's finding somewhat.

The 1955 Growth of American Families (GAF) Survey provided additional data for testing female wage and husbands' income effects on wives' LFP. In two samples taken from the GAF, it was found that the wage effect was larger than the income effect.

The effect of husbands' unemployment on wives' LFP was also investigated by Cain. For each of the census years, 1940, 1950, and 1960, he found the male unemployment rate having a significant negative effect on wives' LFP. This finding was explained by the fact that, in times of high unemployment, efforts of other family members to find work

encounter an unfavorable job market. The necessity of other family members working when the head is unemployed could counter the unfavorable job market conditions, however, and the net effect is an empirical question. Cain concluded that the finding should be tested further, as the time period in which family labor force decisions are carried out was not known.

There have been attempts to obtain better measures of permanent income, other than earnings at a point in time and husbands' education. Cain tried several measures of long-run income, including a socio-economic proxy variable, but the results were not significant. An income effect over time was mentioned by Bowen and Finegan but not used in analysis (4). They suggested that participation of the wife might be related not only to husbands' current income but also to the expected growth of that income over time. Two wives, with different expectations about the future, and whose husbands had identical current income, would have different labor force behavior. Expectation of an increase in husbands' income might decrease wives' participation, while expectation of no increase, or a small one, might increase wife's participation.

Sobol also attempted a measure of income over time (26). A panel study of married women of childbearing age, over a ten year period, was used for analysis. Income

change over ten years was categorized as income up more than \$4,000, income the same, and income down \$4,000 or more. It was hypothesized that women whose husbands' income had gone down would have higher participation rates, as attempts were made by wives to keep levels of income as close to permanent levels as possible. However, no significant relationship was found between wives' participation rates and changes in husbands' income in the Sobol study.

The labor force behavior of single women, including never married, divorced and separated women, is also affected by OFI. Bowen and Finegan, using the 1/1000 Samples of the 1960 Census, found OFI to be one of the most significant determinants of LFP of these groups of women (4). As other income increased, participation rates declined. With increasing OFI, these women were able to purchase more home production, or possibly leisure time, thus causing their LFP rates to decline.

Education

Increased education is one of the major factors affecting the rising participation rates of females (29). An increase in education increases potential market wage relative to wage for home production (or price of time for home production), and has a positive effect on participation rates. The amount of education may also affect access

to cleaner, more pleasant jobs. Education could serve as a proxy for underlying tastes for market work, and for a natural aptitude for employment. Women who wanted to work would acquire more education. Schooling itself could increase the taste for work, by providing exposure to stimulating areas of endeavor (4).

Mincer, using Current Population Reports for March, 1957, considered education of wives as a proxy for their earning power (18). He found a positive and significant relationship between wives' education and LFP. When husbands' income was held constant, the effect of the proxy for wives' wage rates on LFP was even stronger. Morgan, in a 1962 study using survey data, investigated a combination of wife's age and education as a proxy for the range of jobs and rates of pay available to married women (20). The effect of this variable on wives' participation was positive and highly significant.

A positive effect of education on female LFP was also found by Bowen and Finegan, using the 1/1000 Sample of the 1960 Census as a data base (4). Educational attainment was assumed to be a proxy for potential wage, and also for other factors such as access to better working conditions (Bowen and Finegan called them "psychic returns"). An attempt was made to distinguish the relative importance of each effect on LFP rates. A measure of female earnings

was obtained for each educational category used, and the effect of \$100 earnings increments on LFP was estimated. These estimates were compared to estimates of the incremental increases in LFP rates that would have occurred, had education affected LFP only by increasing potential wage. The results were consistent with the hypothesis that more education provided the benefits of both increased potential wage, and "psychic returns."

Bowen and Finegan's hypothesis of the double effect of education on LFP seemed to be supported by Cain's findings (5). Using census data, Cain found that the variable, wife's education, had a positive but insignificant effect on LFP for the census years 1940 and 1950, but a significant effect in 1960. He speculated that the growing importance of white collar occupations had, by 1960, provided more pleasant working conditions and more appealing work, and thus accounted for the increased significance of education.

Sweet also used education as an economic variable, considering it a measure of employability and earnings potential (27). In his analysis of the 1/1000 Sample of the 1960 Census, wives' increasing educational attainment had a positive significant effect on LFP. Sandell, using a stratified sample from the National Longitudinal Survey, also considered wives' education a proxy for potential wage, and found it to have a positive significant effect on wives' LFP (25).

Morgan found that increasing education of the wife increased the percentage of wives who worked, through each of seven educational categories (21).. Three educational levels were used by Leibowitz, who also found an increase in participation at each increasing level (15).

While most researchers used women's educational attainment as a proxy for potential market wage, Gronau mentioned another aspect of education, that of the effect of "on the job training" of homemakers (12). Presumably the longer a woman is a homemaker, the better she becomes at home tasks, thus increasing her home wage, and her value to the household. Gronau commented that the effect was difficult to isolate, and that years married, or age, might serve as a proxy.

The difference between educational attainment of husband and wife is another aspect of the effect of education on participation decisions of wives. Morgan suggested that if the wife had more education than her husband, she would work to bring the spending level of the family up to her standards (20). If she had less education than her husband, she might not be able to find a job comparable to her husband's status. She would therefore not work outside the home. Morgan used the difference in education as a variable in regression analysis on participation rates of wives, but it was not statistically significant.

Husband's Education

Husband's education has been used in several studies as a proxy for permanent income. Mincer used the 1950 Survey of Consumer Expenditures, stratified by husbands' educational level, in order to separate out the effects of permanent and transitory income fluctuations on wives' LFP. He found that at low current levels of husbands' income, wives' LFP increased with husbands' increasing education. In other words, current low income when husbands' education was high, was transitory income. Wives' increased LFP was therefore a response to low transitory income levels.

Cain, using the Growth of American Families Survey, constructed a variable that was intended to measure predicted income (5). The measure consisted of an income figure determined by husband's education, age, region, and a socio-economic occupational score. It was not significant in the analysis.

Sandell used husband's education as a variable in his study of LFP of married women, with the National Longitudinal Survey as a data base (25). He divided wives' LFP into two periods, participation before and after birth of the first child. Husbands' education had a positive effect on wives' LFP before birth of the first child. Sandell suggested that this effect was due

to husbands being more likely to be in school during this period, and wives working. Husbands' education had the expected negative effect on wives' LFP after the birth of the first child. This finding would seem to support Mincer's hypothesis that wife's LFP responds to fluctuations around levels of permanent income.

Labor Market Conditions

Female earnings and industry mix, representing labor market conditions, have been used with aggregated data in studies of female LFP. Mincer used the median income of females who worked 50 to 52 weeks in 1949 as a proxy for female wage rates, and the variable had a significant positive effect on female LFP (18). Cain also used full-time earnings of females as a proxy for wage rates, and found a similar relationship, as did Bowen and Finegan (5, 4).

A more recent study by Cain and Dooley of the effects of female wage rates on LFP used aggregate data from the 1970 Census for analysis (6). Three simultaneous equations were used for estimation of the variables, LFP, fertility (number of children ever born), and full-time earnings of wives (a proxy for wage rate). Full-time earnings were found to have the expected positive influence on female LFP.

Industry mix has been used as a variable in studies with aggregate data, to take account of the effects of

"male" and "female" type industries on the demand for female labor. Industry mix was defined by Cain as the percent of the civilian labor force in an area employed in industries that are heavy demanders of male labor (5). The variable had the expected negative and highly significant effect on female LFP. Bowen and Finegan constructed a female industry mix variable, designed to measure the fraction of female-type jobs within an SMSA (4). They found that in SMSA's with an industry mix conducive to female employment, LFP of women was significantly higher than in SMSA's where the industry mix was not as favorable to females.

Other variables

Other variables relevant to this study are age, labor force status of mothers, and a measure of mobility.

Bowen and Finegan investigated the effects of age on female LFP, adjusted for other variables, and found that the age profile for married women age 15 to 24 resembled an inverted U (4). The low participation rates for women age 14-19 were explained as the result of several factors: high teenage unemployment, the fact that married teenage women are likely to have young children, or be pregnant, and willingness of parents to help support teenage newlyweds. The decline in LFP in the 45 to 54 age range was thought to be the result of early retirement decisions.

The profile is relatively stable from age 20 to 44, with a small dip in the 30 to 35 age range.

Sweet examined the effects of age on LFP of wives with and without children (27). He found that if a woman is under age 50, and has children, ages of her children are the significant determinants of her LFP, and not her own age. For women without children, his findings were similar to those reported by Bowen and Finegan, that is, low rates at both ends of the age scale, and the highest rates for women age 20-34.

Family background variables were included in the National Longitudinal Survey of women age 30-44 (31). Specifically, women were asked whether or not their mothers worked when they, the survey women, were in high school. Mother's labor force behavior was considered a formative influence on daughter's future labor force behavior. This variable did not have a significant effect on survey participants' LFP in 1967, the first survey year. This finding was explained by the fact that participation rates for mothers of survey women, when the survey women were age 15, were historically low. In other words, not enough mothers would have worked for the role model effect to be significant. A 1960 survey, however, found that more working wives had mothers who had worked, than did non-working wives (28). Sandell, using NLS data on married

women with at least one child, found that for the period after birth of the first child, to 1967, mother's labor force status had a significantly positive effect on wives' participation. He mentioned the role model effect as a possible explanation (25).

Length of current residence was used by Mincer and Polachek as an inverse measure of a family's mobility, which was expected to have a negative effect on wives' participation rates (19). Wives were assumed to move with husbands' job changes, and these moves were seen as disruptive of wives' LFP. It is also possible that wives are responsible for the physical aspects of the move, and both before and after the move, are occupied with getting the household settled.

Measurement of Labor Supply

Major studies of female labor supply have focused on the percentage of women in the labor force in a survey week, or labor force participation rates (7). Participation rates are a limited measure of labor supply, as they refer to a point in time (4, 29). Looking at participation rates at a point in time involves looking at women in different stages of the family life-cycle. Differences in participation rates may be due to differences in the life-cycle stages, and do not give a true picture of labor supply.

The statistical model used to analyze participation rates was shown to be inadequate for the analysis of panel

data by Heckman and Willis (14). The model normally used is called a logit model, after the shape of the response curve of the dichotomous dependent variable. In the case of LFP, one is either in the labor force or not in the labor force. The model estimates a sample mean, which is not useful in giving information about sequential participation behavior. For example, a participation rate of 50 percent could mean that each woman in a homogenous population has a 50 percent chance of being in the labor force, or that in a heterogenous population, 50 percent of the women always work, and 50 percent never work. There are infinite possibilities between these two extremes of interpretation. Either extreme outcome would have very different implications for life-cycle labor supply.

Heckman and Willis used a sample of 1,583 married women from the University of Michigan Panel Study of Income Dynamics to test the hypothesis that the logit model would not accurately predict participation rates from one year to the next. They did find large discrepancies between predicted and actual rates, over a two year period. The failure of the logit model, according to Heckman and Willis, was due to an assumption of the independence among variables affecting participation. It was more reasonable to assume that the variables remain constant over time, but vary among women. It was postulated that the response

function of the dependent variable resembled a beta (U shaped) distribution, rather than the logit one. The characteristic of a beta response function in the case of LFP, is that there is a group of women who tend to work, and a group who do not; that is, the probability of working for one group is close to 0, and for the other, close to 1. This implied that knowledge of a woman's current work status is of value in predicting the amount of time she is likely to spend in the labor force.

Heckman and Willis tested the modified model, called a beta-logistic model, with the Michigan Panel Study data, and found that it did predict rates over a five year period more accurately than did the logit model. It was recognized however, that the beta-logistic model had limitations. The assumption that a woman's participation probability is constant through time is oversimplified. Variables that change through time, such as the aging of children, would affect probabilities for any individual woman. The importance of continued investigation of life-cycle patterns of labor supply was noted.

Rather than attempting to adapt the participation model to panel data, as Heckman and Willis did, other studies have focused on more direct measurements of labor supply. The National Longitudinal Survey of mature women age 30-44 used a measure called life-time participation, or, labor force

participation rate since leaving school. The researchers of the NLS found that the mean proportion of years worked between leaving school and 1967, the first survey year, for white women, was 44 percent. Twenty-one percent of the women had worked more than 76 percent of the years between school and 1967, 43 percent had worked between 26 and 75 percent of those years, and 28 percent has worked less than 25 percent of those years (3). It was also found that within every race, marital status and child category, women who had participated in the labor force in 1967 had also worked a greater proportion of years between leaving school and 1967 than women who did not work in 1967.

Proportion of years worked between birth of first child and 1967 was another longitudinal measure used in the NLS study. The mean proportion of years worked during this time period was 27 percent. Twelve percent of the women had worked over 75 percent of those years, 27 percent had worked between 26 and 75 percent, and 26 percent had worked less than 25 percent of those years. It was also found that women who participated in the labor force in 1967 were found to have a higher proportion of years worked after birth of first child, than women who did not work in 1967. It was concluded that participation at any point in time was positively related to the extent of previous labor market experience.

Sobol, using the 814 white wives of the Princeton Fertility Study as a data base, developed a longitudinal measure of labor supply. The wives were interviewed once in 1957, once in 1960 and once between 1963 and 1967. The life-time measure was developed on the basis of answers to questions about current work status, and future work plans. An index was constructed, with values from 0 to nine, 0 being the value for a woman who had never worked, and did not plan to work, and nine the value for a woman who had worked, and did plan to work in the future.

Twenty-nine percent of the women had scores of six or above, and 71 percent had scores below six. Three percent of the women had scores of nine, and 14 percent had scores of 0, in other words, did not work at any time during the three interview periods, and had no plans to work in the future.

A more complete measure of female attachment to the labor force was constructed by Maret-Havens, using the National Longitudinal Survey sample of women age 30-44 as a data base (16). An ideal measure of female attachment was $LFA = WW/TW$, where WW was weeks worked since leaving school, and TW was total weeks since leaving school. This ideal measure was adapted to the data of the Survey, which provided detailed work histories from 1967 to 1971, and information on the number of years in which women had

worked six months or more, prior to 1967. The adaptation was $LFA = [(A/B + C/24) + (D/24)] 50$, where A was years in which respondents worked at least six months between leaving regular school and 1967, B was years since respondent left school and 1967, C was hours worked per week between 1967 and 1971, categorized from one to 12, and D was weeks worked per year between 1967 and 1971, categorized from one to 12. A/B represented work experience prior to 1967, and C and D represented work experience in two dimensions, during the survey years. The sums were multiplied by 50 to yield an index ranging from 0 to 100, 0 representing no attachment, and 100 representing uninterrupted attachment. Five types of attachment were distinguished by score ranges: career, 80 to 100; strong, 60-79; moderate, 40-59; sporadic, 20-39; and casual, 1-19. LFA scores were calculated for the women of the NLS and categorized by score ranges. The mean attachment value for all women was 40.8, with a standard deviation of 29. Less than 50 percent of the women employed during a survey week of 1971 had scores in the career and strong range, and 51 percent of those employed had scores below 60. Maret-Havens concluded that current labor force status was not a strong determinant of female labor force attachment.

Measures of labor supply other than participation rates have been mentioned briefly in other studies. For

married working women only, Bowen and Finegan suggested a dependent variable, hours worked per week, and noted that weeks worked per year was another possible dimension (4). Hours or weeks worked measured degree of participation in the labor force, whether work was part-time, or full-time, year around or seasonal. Cain used a measure of years worked while married to years married in an attempt to find a relationship to long-run income (5). Polachek mentioned overall life-cycle labor force commitment and noted that work history data from which such a measure could be constructed were scarce (24).

A re-examination of the women in the NLS after completion of the survey in 1971 focused on the effects of marital status, presence of children, and race, on lifetime labor force participation (3). Patterns of participation were also examined, with the hypothesis that there would be consistent patterns among women over time. It was also hypothesized that variables associated with participation rates at one point in time were likely to influence rates during other periods. It was suggested that women with increased labor market experience would earn higher wages, which in turn would be more incentive for these women to remain in market work.

Life-time rates (proportion of years worked between leaving school and 1967) were highest for never married women with no children. Married women with no children under 18 had the next highest rates, and married women with children under 18, the lowest rates. These results suggested that factors influencing participation rates influenced life-time participation as well.

A stratified sample from the NLS was investigated by Sandell, and consisted of married women with at least one child (25). He used two life-cycle work history periods of the NLS survey, years between leaving school and birth of first child, and years between birth of first child and 1967, to analyze the differences in wives' labor force behavior in each period. It was found that some variables having an effect on supply in one period did not have an effect on supply in the other. For example, husbands' income had a positive effect on wives' LFP for the period between leaving school and birth of first child, and a negative effect for the subsequent period. In the first period, husbands with high educational levels were likely to be in school, and wives were likely to be working, whereas in the second period, the more expected negative influence was found.

Sobol, using the Princeton Fertility Study sample, investigated the effects of sociological variables such as

income of friends, feelings of economic security, and expected family size, as well as economic variables, on the labor force attachment score she constructed. Variables having a significant effect on LFP were feelings of economic security (a negative effect), wife's age at marriage (negative), expected family size (negative), husband's education (negative), and wife's education (positive). The two variables having the strongest effect on attachment over the ten year period were expected family size and wife's education. Sobol noted that birth rates were declining, and women's educational attainments rising, and suggested that continued increase in the LFP of married women could be predicted. It was concluded that knowledge of lifetime labor supply's determinants would be useful in estimating levels of LFP.

III. METHODOLOGY

The Model: Labor Force Attachment

This study assumed the theoretical framework of the household as utility maximizer, and the choice for the wife as a three way one among work at home, work in the market, and leisure. A model of life-time labor force attachment (LFA) was developed. Labor force attachment was defined as the months worked since leaving school, divided by months since leaving school, and multiplied by 100, to yield a score from 0 to 100 (see Appendix A for how scores were calculated). As never married, married, divorced and separated women were all included in this study, the LFA of two different groups was analyzed, LFA of all women in the study, and LFA of married women, husbands present. Determinants of attachment would not necessarily be the same for both groups.

The Model: Determinants of Attachment

The major determinants of LFP at a point in time are also likely to influence behavior over time (3). Therefore the important determinants of current participation, age, marital status, numbers and ages of children, other family income (OFI), education, family background variables, and mobility, were investigated as possible determinants of

LFA. Other economic variables such as the unemployment rate, and industry mix, were not considered, as they are inappropriate to survey data from one community.

Marital Status

Marital status was investigated as a possible determinant of LFA in this study. Never married women were expected to have higher attachment scores than married women, as being single was assumed to be an expression of a preference for a career over family life. Divorced and separated women were expected to have higher scores than women who had never been divorced or separated, other factors being equal. It was assumed that divorced or separated women would be unwilling to risk a loss of income by giving up market work when remarrying. Being married more than once was also assumed to be indicative of this unwillingness to risk loss of income and was expected to have a positive influence on attachment. Years married was expected to have a negative influence on scores, and could serve as a proxy for on the job training of housewives, as mentioned by Gronau. An increase in years married would imply an increase in the value of home production (12). It is also possible that years married is a proxy for tastes for family life over being single.

Children

Number and spacing of children were expected to be major determinants of attachment. Spacing takes into account the changes that occur in the age distribution of children over the family life-cycle. The longer the interval between births the more negative the effect on attachment was expected to be, as there would be more years in which young children were present in the household. Number of children was expected to have a negative influence on attachment, indicating an increase in wife's household wage, relative to her market wage.

Other Family Income

Other family income (OFI) was expected to have a negative effect on attachment scores of married women, as a married woman's work in the home is assumed to be a normal good, and will be purchased with increasing OFI. Other family income in 1977 was considered a proxy for permanent income. Current income has been used in other studies of female LFP, and was used in this study as a substitute for more detailed knowledge of a family's economic history. Average annual percentage change in real OFI (income trend) was also considered a possible determinant of LFA of married women. A large positive change was expected to have a negative influence on LFA. It was assumed that the wife might work early in the marriage, but as current levels of income

move upward toward permanent levels, she would not work. In addition, when included with current OFI, income trend gives a more complete picture of past income levels than the simplistic assumption that current income is an average of past incomes.

Education

Educational attainment was expected to influence attachment. Women's educational attainment was assumed to be a proxy for potential market wage, and was expected to have a positive influence on attachment scores. Husband's education was assumed to be a proxy for life-time earnings, or permanent income, and was expected to have a negative influence on attachment, as the greater the difference, the greater the inability of the wife to find employment.

The difference between husband's and wife's education was used as a variable. The larger the difference, the lower the LFA scores were expected to be. It was assumed that if there was a large difference, wives might not be able to find employment comparable to their husbands' status (20).

Mobility

A measure of mobility, number of times a married woman moved since her marriage, was expected to have a negative influence on attachment. The assumption was that a move was disruptive to wife's potential job opportunities, and might also include additional home chores for the wife.

Family Background

Family background variables were included as possible determinants of LFA. Attachment is a life-time measure and formative influences such as family background characteristics have been thought to influence labor supply (31). Both mother's education and whether or not a woman's mother worked in her teenage years were expected to have a positive influence on LFA.

Whether or not the wife worked any of the first three years of marriage was considered as a variable with possible influences on LFA. The direction of the relationship was unclear. Heckman and Willis found that if a woman was in the labor force in one time period, the likelihood of her being in the labor force in a future period was extremely high (14). It is possible that LFP in any one time period increases tastes for market work, and also increases potential market wage.

Current Labor Force Status

The relationship between current labor force status and attachment scores was investigated. Although the literature is inconclusive, it would seem reasonable to expect women who are currently working to have greater past attachment than women who are not currently working (3, 14, 16, 31). In other words, greater past attachment would be predicted for a currently working woman than for a non-working woman.

Development of Instrument

The interview questionnaire was developed from the ideas of previous researchers with the assistance of the Oregon State University Family Resource Management Department, the Department of Economics, and the Survey Research Center (Appendix B). Questions were developed to collect data appropriate to the testing of the specified model. The questionnaire was pre-tested by personal interview with five Corvallis women chosen randomly from the Corvallis telephone directory. Minor revisions were made to clarify the questions and secure additional information.

Selection of Sample

The sample of 105 women (five for the pre-test and 100 for the sample) was drawn from the Corvallis 1978-79 telephone directory. Businesses and persons who had lived a major part of their adult lives in foreign countries were excluded. With a table of random numbers for starting points, a name was selected on every page, every second column, and every fifteenth name, resulting in 67 names. A name was selected every other page, first column, ninth name, resulting in 33 names. A name was selected every thirteenth page, second column, second name, resulting in five names.

The first name selected was telephoned between the hours of 6:30 pm and 8:30 pm, Monday through Thursday evenings. If the person was not home, telephoning was done at two other times during the day (approximately 9:30 am and 4:30 pm). If it was determined that the person was not home after three attempts, the name was eliminated, and the next name was called.

Interviews were scheduled over the phone after it was determined that the person was female, between the ages of 30 and 45, and willing to participate (Appendix C). A letter confirming the time and date of the interview was sent after the phone call (Appendix D).

Collection of Data

The interview was conducted either in the home of the woman, or at her place of employment. Questions about age, education, marital status, children, income, moves since marriage, husband's occupation and education, current labor force status, and education and labor force status of mothers, were asked (Appendix B). In addition, a complete work history from high school graduation to the date of the interview was obtained. The interviews began on March 20, 1978 and concluded on April 19, 1978. The interviews averaged 15 minutes.

Definition of Variables

Labor Force Attachment Score: Ratio of months worked since leaving school, to months since leaving school, and multiplied by 100. LFA scores were used as dependent variables in regression analysis (see Appendix A for calculation of scores). It was recognized that the score was more technically an employment attachment score, as no account was taken of periods when respondents might have been looking for work, and thus, technically, in the labor force.

Education: Total years of schooling, for example, high school as 12 years, college degree as 16 years, Master's degree as 18 years, Ph.D. as 20 years, and M.D. as 22 years.

Marital History: Never married was entered as 1 if the woman was never married, 0 if otherwise; ever divorced was 1 if married more than once, divorced at the time of the interview, or divorced but remarried at the time of the interview, and 0 if otherwise; married more than once was 1 if the woman was married more than once, 0 if otherwise; married was 1 if the woman was married at the time of the interview, 0 if otherwise.

Years Married: Number of years married, including all marriages reported

Number of Children: As reported.

Years in Which Children Under Six Present in Household:

Defined in years, from birthdates of children as reported.

Current labor force status: As of the date of the interview. If woman was working or looking for work, 1 was entered; 0 if otherwise.

Moves since Marriage: Moves from one house or apartment to another in the same town were not counted as moves; living in Corvallis was counted as 1 move.

Mother's Labor Force Status: Entered as 1 if respondent reported that her mother worked when the respondent was in high school; 0 if otherwise.

Whether or not respondent worked any of the first three years of marriage: Entered as 1 if any income earned by wife was reported during the first three years of marriage; 0 if no wife's income was reported.

Other 1977 Family Income: Total 1977 family income minus wife's earnings, if any. Mid-point of an income range was entered; respondent was shown a card with income ranges preceded by a letter, and asked to choose appropriate range (Appendix E).

Income Trend: Average annual percentage change in real OFI, calculated by using the Consumer Price Index (CPI) to adjust current dollars, as:

$$\left[\frac{\frac{1977 \text{ OFI}}{\text{CPI for 1977}} \times 100 - \frac{\text{OFI, 1st 3 years of marriage}}{\text{CPI for middle year}} \times 100 \right] \div \frac{1977 - \text{middle year of first 3 years}}{1}$$

$$\left[\frac{\text{OFI, 1st three years} \times 100}{\text{CPI of middle year}} \right]$$

Statistical Model

Multiple regression analysis was used to test the general hypothesis that a linear relationship existed between the dependent variable, LFA scores, and the independent variables. The general form of the multiple regression model is:

$$Y_i = B_0 + B_1x_{i1} + B_2x_{i2} + \dots + B_{p-1}x_{i,p-1} + E_i$$

where B_0, B_1, \dots, B_{p-1} are parameters, $x_{i1} \dots x_{i,p-1}$ are known constants, E_i is a random error term with mean = 0, and variance = σ^2 (22). The $b_1 \dots b_{p-1}$ are point estimates of the parameters $B_1 \dots B_{p-1}$, and are estimated by the method of least squares, which minimizes the sum of the squared deviations of the observed values of the dependent variable from its expected value.

Meaning of Regression Coefficients

The point estimate b_0 is a constant and the intercept of the regression line. It is also the predicted value of the dependent variable when all independent variables have values of 0 (23). The point estimates b_1, \dots, b_{p-1} are called regression coefficients and represent the expected change in the dependent variable with a one unit change in the independent variable, the value of all other independent variables held constant. A regression coefficient is also

interpreted as the slope of the regression line (22).

Regression coefficients are positive or negative, depending on the direction of the relationship with the dependent variable.

Independent variables in this study used as indicator (or dummy) variables are marital history and labor force status. Indicator variables are used when variables are qualitative, and a qualitative variable with c classes is represented by $c-1$ indicator variables. In other words, one is either in or out of the labor force. The variable is qualitative, has two classes and is therefore one indicator variable (22).

Test for Significance of Regression Coefficients

Each regression coefficient was tested with the hypothesis that it was not significantly different from 0, at the .05 level. The appropriate test statistic was the F where $F = \frac{\sum(y' - \bar{y})^2/1}{\sum(y - \bar{y})^2/(N-2)}$ with 1 and $N-2$ degrees of freedom. Y' is the predicted value, \bar{Y} is the mean value, Y is the observed value, and N is the sample size (23). If the hypothesis that $b_1 \dots b_{p-1} = 0$ was accepted at the .05 level of significance, the conclusion was that the regression coefficient was not significantly different from 0. If the hypothesis was rejected, it was concluded that the coefficient was significantly different from 0, and the

independent variable had a significant positive or negative effect on the dependent variable, all other independent variables being held constant.

R² Statistic

The R² statistic is interpreted as the proportion of the variance in the dependent variable explained by the set of independent variables, and ranges from 0 to 100 (22).

Stepwise Search for Best Model

The stepwise procedure of the Statistical Package for the Social Sciences, subprogram Regression, was employed in a search for the best model (23). The researcher's criterion for the best model was that coefficients of all independent variables in the regression be significant at the .05 level.

In the stepwise procedure, the researcher specified all possible variables to be considered for inclusion in the regression. The variables were considered for inclusion in the following manner. Each independent variable was entered in a one variable regression with the dependent variable, and an F statistic was calculated. The variable producing the highest F was entered as the first variable in the model. All possible two variable equations were then calculated with the dependent variable, and the variable

already entered first. A partial F, which measures the contribution of the second variable, given that the first variable is in the equation, was calculated. The variable with the highest partial F statistic was entered next, and so on, until all variables were entered, or until the default value was reached (the entering variable would not explain any more than .1 percent of the variance in the dependent variable). The stepwise procedure allowed the researcher to examine the full model, with all independent variables included, and also allowed selection of a best model.

IV. FINDINGS

This chapter includes a discussion of response rates, a descriptive analysis of personal and family characteristics of 100 Corvallis women age 30-45, their current labor force status, labor force attachment scores, and regression results.

Response Rate

Of 854 people contacted by phone, 110 women fit the requirement of being between age 30 and 45 and willing to participate. These women were interviewed. Five were used to pre-test and revise the questionnaire. Four were eliminated when it was determined that illness prevented them from working. One was eliminated because work history information could not be recalled.

One hundred and fifty-three persons were not home after three phone attempts, 566 did not fit the requirement, and 25 who fit refused to participate. The refusal rate was 18.5 percent.

Personal and Family Characteristics

The mean age for the sample was 35.21 years (Table 1). Six women had never been married, 86 were married at the time of the interview, and eight were divorced or separated.

Table 1. Personal and Family Characteristics of 100 Corvallis Women Age 30-45.

Personal and Family Characteristics	Mean	Standard Deviation	Range	Number
Age	35.21 yrs	4.17	30-45 yrs	
Marital Status				
Never Married	---	---	---	6
Divorced or Separated	---	---	---	8
Married Currently	---	---	---	86
Married Once	---	---	---	81
Married More than Once	---	---	---	13
Number of Children	2.17	1.58	0-10	---
Years in Which Children Under Six in Household	7.83	4.50	0-22	---
Respondent's Education	15.00 yrs	2.25	9-18 yrs	---
Husband's Education	17.18 yrs	2.74	12-22 yrs	---
Total Family Income 1977	\$21,399	\$9,763	\$3,500-\$50,000+	---
OFI, 1977	\$16,288	\$10,690	\$0-\$50,000+	---
Income Trend	+12.46%	28.48	-13% to + 166%	---
Mother Worked When Respondent in High School	---	---	---	54
Mother's Education	12.55 yrs	2.41	5-17 yrs	---

Of the 94 women who had been or were married, 13 had been married twice. Twelve of the women married twice were married at the time of the interview, and one was divorced. The mean number of years married for the sample was 12.67, with a low of 0 and a high of 27 years.

The mean number of children for the sample was 2.17. Sixty-two percent of the women with children had one or two children, and 38 percent had three or more. The mean number of years in which children under six were present in the household was 7.83. Of the women with children, 52 percent had children under age six present in the household for nine years or less.

The mean years of education for the sample was 15, with a low of nine and a high of 18 years (a Master's degree). This relatively high level of education was expected because in 1974, the median educational level for the Corvallis population was 14.2 years, as opposed to 12.3 years for the state of Oregon as a whole (7).

Mean educational attainment for husbands or women married at the time of the interview was 17.18 years, with a low of 12 to a high of 22 years (a medical doctor).

Mean total family income for 1977 was \$21,399 with a low of \$3,500 to a high of over \$50,000. Mean of the income trend, average annual percentage change in real income, was 12.46 percent, and ranged from -13 percent to 166 percent.

Fifty-four percent of respondents' mothers had worked, either part-time, full-time, or in a family owned business, when the respondents were in high school. The mean years of education for mothers was 12.56 years, with a low of five and a high of 17 years (one year of graduate work).

Labor Force Status

At the time of the interview, 58 women were working, either full-time or part-time (10 hours or more per week) or in a family-owned business, five were actively seeking work, and 37 were neither working outside the home nor looking for work (Table 2). The labor force participation rate as defined by the U.S. Department of Labor was 63 percent for the sample. The United States LFP rate in 1976, for approximately the same age group, was 58 percent (30).

The labor force participation rate for women with children under age 18, for the Corvallis sample, was 58 percent, compared to 46 percent for all women in the U.S. with children under 18, in 1976. For the sample of Corvallis women with children under six, the participation rate was 42 percent, compared to 37 percent for the same group in the U.S. in 1976 (Table 2).

Seventy-seven percent of the women, married with husbands present, had worked at some time during the first three years of marriage.

Table 2. Labor Force Participation Rates for Corvallis Women, Age 30-45, and Selected Groups, 1977, Compared to U.S. Rates, 1976.

Group	Participation Rate at Time of Interview	Group	U.S. Rate 1976*
100 Corvallis Women, Age 30-45	63%	All U.S. Women, Aged 25-34 Aged 35-44	57% 58%
81 Corvallis Women, Children Under 18	58%	All U.S. Women, Children Under 18	46%
33 Corvallis Women Children under Six	42%	All U.S. Women, Children Under Six	37%

*Source: United States Dept. of Labor, Bureau of Labor Statistics. U.S. Working Women: A Databook. Bulletin 1977. Washington, D.C.: Government Printing Office, 1977.

Labor Force Attachment Scores

The mean labor force attachment score for the sample was 48.85 (standard deviation 28.30) with a low of 0 to a high of 99 (Table 3). The mean score for women currently married, husbands present, was 46.12 (standard deviation 27.90). Maret-Havens found a mean score of 40.8 (standard deviation 29) for the 5000 women of the National Longitudinal Survey (16). The work history information from which attachment scores were calculated in the Maret-Havens study was not complete. For example, years in which respondent worked at least six months were counted as full years of work. Her scores were therefore possibly over-stated. The higher mean score for the Corvallis sample was expected, as participation rates for women have risen in the ten years since the NLS. Also, the Corvallis sample had a high level of educational attainment, which has been a major determinant of high female LFP rates (6, 9, 16).

In both the Maret-Havens study and the Corvallis study, LFA scores were widely distributed among the six categories (Table 3). Thirty-seven percent of the Corvallis women had scores above 59, and 30 percent of the NLS women had scores over 59. In the Corvallis sample, 63 percent had scores below 60 compared to 71 percent of the NLS women. A score of 60 or above was considered strong labor force attachment.

Table 3. Labor Force Attachment Scores of 100 Corvallis Women, Age 30-45, February, 1978,
and LFA Scores of 5,000 Women, Age 30-44, National Longitudinal Survey, 1971.*

Type of Attachment	Range of Scores	Percent of Total	
		Corvallis Sample	National Longitudinal Survey Sample
Career	80-100	18	14
Strong	60-79	19	16
Moderate	40-59	17	19
Sporadic	20-39	28	21
Casual	1-19	17	22
None	0	1	9

*Source: Maret-Havens, Elizabeth. "Developing an Index to Measure Female Labor Force Attachment." Monthly Labor Review (May, 1977): 35-38.

The score distribution of the Corvallis sample was also similar to the distribution found by the researchers of the NLS (3). Life-time participation rates in the NLS study were fairly evenly distributed among three life-time participation categories (from 0 to 25 percent, 26 to 75 percent, and over 75 percent). The Corvallis score distribution was also similar to that of the Sobol study (26). Sobol found women's scores divided fairly equally among the nine categories of LFP she developed.

Regression Results

Regression analysis focused on two dependent variables, the LFA scores of the entire sample of 100 Corvallis women, and the LFA scores of only married women with husbands present (86 women). Analyzing the married women's scores separately enabled the researcher to use variables that would not have been appropriate for the entire sample, such as husband's education, and OFI.

Independent variables used in regression analysis with the dependent variable, LFA scores of 100 Corvallis women, were years married, age, education, years in which children under six were present in the household, number of children, mother's education, mother's labor force status when respondent was in high school, and the marital status variables, ever divorced, married more than once, ever

married, and married currently. These variables were also used in regression with the dependent variable LFA scores of married women, husbands present. Additional variables used in the second regression were husband's education, husband's minus wife's education, OFI for 1977, income trend, and number of moves since marriage.

Regression Results, Full Model: 100 Corvallis Women

Labor force attachment scores of 100 Corvallis women were used as the dependent variable in analysis. All independent variables were included in the regression (full model). The results are presented in Table 4.

The R^2 statistic for the full model was .46. The set of independent variables specified explained 46 percent of the variation in LFA scores of the sample of 100 women. Significance of the regression coefficients was tested with a two-sided F test. The only independent variable in the full model with an F of .05 significance level was the variable, respondent's education. The direction of the relationship between education and LFA scores was positive. As educational level increased, LFA scores increased significantly. This was an expected result, as education has been an important determinant of female LFP in other studies, as a proxy for potential wage rate. As education increased, potential wage rates increased, and more women entered the

Table 4. Regression Results, LFA Scores of Sample of 100 Corvallis Women, Aged 30-45: Full Model

Variable	b	Standard Error	F Value (Significance Level)
Years married	-1.90	.99	3.66 (.059)
Age	1.60	.94	2.87 (.09)
Education	3.60	1.49	5.85 (.02)
Ever divorced	-10.05	20.88	.23 (.63)
Years in which children under six present	-2.04	1.16	2.26 (.14)
Mother's education	-1.82	1.09	2.79 (.099)
Mother's labor force status when respondent in high school	-7.77	5.12	2.30 (.13)
Married more than once	22.59	19.37	1.36 (.25)
Ever married	-25.43	24.97	1.04 (.31)
Married currently	-18.06	18.46	.96 (.33)
Number of children	1.33	3.25	.17 (.68)

$R^2 = .46$

labor force. In the Corvallis study, more highly educated women had stronger attachment to the labor force.

Other variables with an F of .10 significance were years married, age, and mother's education. Years married had a negative effect on LFA scores. The longer a woman was married, the lower her score tended to be. Increasing years married was assumed to represent increasing skill at household tasks, and would have a negative effect on market work (12).

Age had a positive effect on LFA scores. The older a woman was, the higher her score tended to be. Possibly, as Bowen and Finegan suggested, this reflected the aging of children (4). As children get older, they might help with housework. The aging of children also might decrease the amount of time spent on child care by a woman. It might also lower the costs of going to work, because as children get older, paid day-care services are not necessary. These effects would lower the price of the wife's home production time, relative to her market wage, thereby enhancing her decision to go to work.

The negative effect of mother's education on LFA scores was puzzling and not expected. The variable, mother's labor force status when respondent was in high school, although not significant, also had a negative sign. The expected positive relationship, as a measure of a role model

effect, was not found in the Corvallis sample.

The marital status variables were not significant. Three of the four, however, did have the expected directional sign. Married more than once had a positive effect, ever married a negative effect, and married currently a negative effect on LFA scores.

The variable, years in which children under six were present in the household, had the expected negative influence on LFA scores. Number of children had a positive sign, but this variable was the last one included in the regression, and was not significant.

Regression Results, Best Model: 100 Corvallis Women

The best model of the determinants of LFA for the sample of 100 Corvallis women is presented in Table 5. The criterion for selection of the best model was that all independent variables were significant at the .05 level. The best model variables explained 36 percent of the variation in LFA scores. The significant variables were years married, age, and education. As in the full model, years married had a negative effect on LFA scores, and age a positive effect. Respondent's education also had a positive effect on LFA scores.

The best model equation was superior to the full model, in that it explained 36 percent of the score variation with

Table 5. Regression Results, LFA Scores of 100 Corvallis Women, Age 30-45: Best Model

Variable	b	Standard Error	F Value (Significance Level)
Years Married	-2.74	.64	18.33 (.00)
Age	1.80	.75	5.73 (.02)
Education	2.85	1.40	4.17 (.04)

$$R^2 = .36$$

inclusion of only three variables. Adding variables added little to the amount of variation explained, and did not allow the significance of each variable to be seen as clearly as in the best model.

Regression Results, Full Model: Corvallis Women,
Married, Husbands Present

LFA scores of Corvallis women, married with husbands present, were used as the dependent variable in this analysis. All independent variables were included in the regression (full model). The results are presented in Table 6.

The set of independent variables explained 49 percent of the variation in LFA scores of 86 married Corvallis women. Significance of the regression coefficients was tested with a two-sided F. Only one independent variable in the full model, husband's minus wife's education, was significant at

Table 6. Regression Results, LFA Scores of Corvallis Women, Married, Husbands Present: Full Model

Variable	b	Standard Error	F Value (Significance Level)
Years in which children under six present in household	-2.06	1.57	1.72 (.19)
Husband's - Wife's Education	-3.65	1.70	4.62 (.04)
Labor Force Status, First Three Years of Marriage	-8.11	6.92	1.37 (.25)
Ever Divorced	7.60	8.71	.76 (.39)
Mother's Education	-1.71	1.19	2.05 (.16)
Husband's Education	2.13	1.81	1.38 (.24)
Labor Force Status, Respondent's Mother	-10.27	5.78	3.16 (.08)
Other 1977 Income	-.32	.32	1.00 (.32)
Age	2.38	1.28	3.45 (.07)
Years Married	-2.19	1.24	3.14 (.08)
Income Trend	-.24	.92	.07 (.80)
Number of Children	.55	3.40	.02 (.87)
Moves Since Marriage	-.96	.88	.01 (.91)

Variables not meeting default level for inclusion:

Respondent's education - Ever married - Married more than once - Married currently

$$R^2 = .49$$

the .05 level. This variable had a negative effect on LFA scores. The larger the difference between husband's and wife's education, the lower the scores of the wives tended to be. Morgan suggested a possible explanation. Wives might not be able to find jobs comparable to husband's status, and would be less likely to work when the educational difference was large (20). Two other explanations seemed reasonable. If a wife's education is low, her potential market wage is low also, and would have a depressing effect on market work. If husband's education is extremely high, OFI would be also, and possibly the negative effects of OFI in the guise of husband's education were operating here. Further explanation might be possible with a closer examination of the distribution of the difference variable, and a broader range of educational levels.

Variables with F values of .10 level of significance were age, years married, and labor force status of respondents' mother when respondent was in high school. Age had a positive effect, and years married a negative effect, on LFA scores of married women, as they did on the scores of the entire sample. The negative sign for labor force status of respondent's mother was puzzling (mother's education also had the negative effect in this regression but was not significant). Labor force participation rates for all U.S. women for the years 1950 to 1964 when the respondents were

in high school, ranged from 30 to 50 percent (30). The LFP rate for mother's of Corvallis women, for approximately this time period, was 53 percent. The comparison is by necessity rough but on the whole, mothers of Corvallis women had higher participation rates during the time daughters were in high school than did U.S. women. Possibly, more mothers of Corvallis women were "career" women, and their working actually had a negative role model effect on daughters, rather than the expected positive one. This result might be unique to the Corvallis sample, and might not be found in a sample more representative of the U.S. population.

Years in which children under six were present in the household had the expected negative sign, and was assumed to measure the effects of young children on the value of wife's time in home production. Number of children had a positive sign, but was not significant.

The variable, whether or not the wife worked any of the first three years of marriage, had a negative influence on LFA scores. In other words, if wives worked during any of those three years, scores tended to be lower than those of wives who did not work during this time. It was possible that wives who did work were putting husbands through school. As soon as husbands found employment, wives left the labor force. It was also possible that wives who did not work during this period were in school themselves, acquired high

levels of education, and engaged in greater amounts of work later on, than did wives who worked during the first three years.

The variable, ever divorced, had a positive effect on LFA scores. Women who had been divorced at some time or other had scores about 17 points higher than women who had never been divorced. It was possible that women who experienced divorce were less willing to give up jobs when they married again, as they realized the risk of being without a source of income.

Husband's education had a positive effect on LFA scores. It was assumed that husband's education was a proxy for permanent income expectations, and a negative sign was predicted. The positive sign in this regression was possibly the result of interactions with the educational difference variable. For example, if two respondents with the same amount of educational difference are compared, two different effects might be seen. If the constant difference were between a wife with a high school education and a husband with a college degree, one would expect the husband's education in this case to have a negative influence on wife's labor force behavior. If the difference were between a wife with a bachelor's degree and a husband with a Ph.D. (a common pattern in the Corvallis sample) the net effect of husband's education alone is difficult to predict.

Normally, high educational levels of husbands imply high OFI, which tends to lower labor force participation of wives. However, high educational attainment of wives raises potential market wage, which would encourage LFP. The net result depends on which effect, that of OFI, or wife's education (and increased potential wage) is stronger. It seems, in the second case, that wife's education was stronger. In a regression without the difference variable present, husband's education had the predicted negative sign, at the .02 level of significance.

Current OFI and the income trend variable both had negative but not significant influences on married women's scores. OFI has been an important determinant of wives' LFP (5, 18, 27). Possibly, current OFI was not a good income measure for the Corvallis sample, as it was a current measure, and did not represent permanent income. In other words, it was possible that transitory, as well as permanent levels of income were being measured in the 1977 OFI figure. As Mincer demonstrated, wives' LFP behavior responded to transitory income fluctuations (18). The effect of the OFI variable in the Corvallis study would be different depending on which type of income was predominantly reflected in the OFI figure. As labor force attachment is a life-time measure, a more accurate measure of transitory and permanent income effects is needed, in order to

observe effects on the life-time attachment measure.

There is another possible explanation for failure of OFI to have a significant effect in the Corvallis study. The educational difference variable may be "capturing" some of the effects of permanent OFI. A regression omitting both husband's education and the educational difference variable did result in OFI having the expected negative sign, at the .03 significance level.

The variables that did not meet the default level for inclusion in the regression were: ever married, married more than once, married currently, and respondent's education. When the regression without the difference variable was calculated, respondent's education had a positive effect, and was highly significant. Possibly, the effects of the educational difference variable overshadowed respondent's education, in the full model equation.

Regression Results, Best Model: Married Corvallis Women,
Husbands Present

The best model of the determinants of LFA scores of married women, husbands present, is presented in Table 7. The criterion for the best model was that regression coefficients of independent variables were significant at the .05 level. The R^2 for the best model was .39 (R^2 for the full model was .49). The independent variables whose F

Table 7. Regression Results, LFA Scores of Corvallis Women, Age 30-45, Married, Husbands Present: Best Model.

Variable	b	Standard Error	F Value (Significance Level)
Years in which children under six present in household	-3.14	.67	21.79 (.00)
Difference in education	-2.20	1.02	4.65 (.04)
Labor Force Status, First Three Years of Marriage	-13.97	6.31	4.90 (.03)
Ever Divorced	16.62	8.10	4.21 (.04)

$$R^2 = .39$$

statistics were significant at the .05 level were years in which children under six were present in the household, the educational difference variable, whether or not the wife worked any of the first three years of marriage, and ever divorced.

The best model was again superior to the full model, in that, with inclusion of only four variables, it explained 39 percent of the score variation, and allowed the significance of important variables to be clearly shown.

Regression Results, LFA Scores and Current Labor Force
Status

Regression results for the entire sample, and married women only, with current labor force status as the only independent variable in the equation, are presented in Tables 8 and 9. As LFP rates are often used as approximations of labor supply, it was of interest to determine whether or not currently working women did have greater past attachment than non-working women.

The R^2 for both equations were similar, .18 for the entire sample and .20 for married women only. The regression coefficients in both equations were highly significant. Currently working women had LFA scores about 25 points higher than women who are not currently working. However, the best model equations previously discussed explained between 36 and 39 percent of the variation in scores. Use of personal and family characteristics as variables provided a more complete determination of life-time labor supply than use of current labor force status alone.

Table 8. Regression Results, LFA Scores of 100 Corvallis Women: Current Labor Force Status as the Only Independent Variable in Model.

Variable	b	Standard Error	F Value (Significance Level)
Current Labor Force Status	24.78	5.71	18.82 (.00)

$$R^2 = .18$$

Table 9. Regression Results, LFA Scores of Corvallis Women, Married, Husbands Present: Current Labor Force Status as the Only Independent Variable in Model.

Variable	b	Standard Error	F Value (Significance Level)
Current Labor Force Status	25.37	5.90	18.48 (.00)

$$R^2 = .20$$

A Comparison of Corvallis Results with LFA and LFP Research

Because labor force participation rates are often used as approximations of life-time labor supply, a comparison of the Corvallis findings with other research on LFP and LFA seemed appropriate.

Life-time Labor Supply Measures

Heckman and Willis, in their attempt to predict participation rates over a three year time span, suggested that the assumption of a woman's labor force participation probability over time as constant was oversimplified. Variables changing through time, such as ages of children, would affect participation probabilities. The Corvallis study allowed the researcher to investigate variables that could affect participation over time, by providing an accurate measure of life-time labor supply. The variables used in analysis explained almost 40 percent of the variation in the life-time measure, whereas current labor force status explained only 20 percent. It would seem that LFA is a more accurate measure of labor supply, and that variables changing through time affect that measure.

The LFA measure in the Corvallis study was superior to other longitudinal measures. The National Longitudinal Survey did not provide complete work histories for the entire working life of women, and the measure in the Sobol study was a composite of answers to questions about actual and intended behavior. The work histories from which the Corvallis women's scores were calculated were as complete as respondents' recall allowed. The histories included complete records of labor force participation for every month since high school, as well as part-time jobs, occasional jobs, and summer jobs (Appendix B).

Determinants of LFA

Determinants of life-time labor supply have been investigated by several researchers (3, 25, 26). The NLS researchers investigated the influence of marital status, children, and race, on life-time participation. Never married women had the highest rates, married women with no children, the next highest, and married women with children, the lowest rates. Regression analysis was not used, and strict comparisons to the Corvallis study were not warranted, but similarities were obvious. The mean attachment score for the married Corvallis women was several points lower than for the entire sample, indicating the effect of marital status. The variables currently married, and ever married, had negative effects on scores. Years married had a negative and significant effect on the best model for the entire sample, and was possibly measuring tastes for marriage, and increasing skill at household tasks.

Years in which children under six were present in the household had a significant negative effect of scores on married Corvallis women, and was assumed to measure the effect of wife's price of time at home. Results of the Corvallis survey suggested that children have effects that last over the entire life-cycle, at least for the life-cycle of women age 30-45. Sandell suggested that variables having

an effect on supply in one period do not necessarily have effects on another period, but the variable, years in which children under six were present, had a negative and significant effect on Corvallis LFA scores. Of all variables commonly used in analysis of LFP rates, this variable seemed to have the most persistent effects over time.

A comparison of the Corvallis results with those of Sobol also showed similarities. Sobol found the strongest effects on LFA to be wife's education and expected family size. In the Corvallis study, education and the child-spacing variable both had significant effects on LFA scores.

Determinants of LFP

Variables previously found to be significant determinants of LFP were also found to be significant determinants of attachment in the Corvallis study. Measures of marital instability have been significantly positive determinants of LFP, and in the Corvallis sample, the variable ever divorced was found to have a positive significant effect on scores of married women. Although the actual divorce process normally covers a short time period, effects of divorce on LFA seem to persist over the life-cycle, even through successive marriages. Divorced women have stronger attachment to the labor force, possibly because they are reluctant to risk loss of income, and income producing skills.

The Corvallis results differed from studies of LFP in that other family income was not found to be a significant determinant of attachment scores. In a regression omitting husband's education, and the educational difference variable, OFI did have a significant negative effect. However, it is possible that the educational difference variable is a better measure in analysis of life-time attachment, possibly representing the net effects of age, education, and income.

Education has been a positive influence on LFP, and was also found to be positive and significant in the Corvallis study. In the regression with only married women, it was not significant, but effects were possibly confounded by the educational difference variable. When the difference variable was omitted, education had the expected positive sign, and was significant.

Husband's education, a proxy for permanent income, has been a negative influence on female LFP, but had a positive effect on LFA scores of married women in the Corvallis study. When the difference variable was omitted, however, the expected negative influence was seen.

Heckman and Willis found in their study of LFP rates that women who were working in one time period tended to be working in another. Sandell found that the proportion of years a woman worked before the birth of her first child

had a significant positive influence on her labor market participation in the subsequent period. However, the Corvallis study found that for married women, working any time during the first three years of marriage had a significant negative influence on LFA scores. Women who worked during this period were possibly helping husbands through school, and left their jobs as soon as husbands were employed. Women who did not work during this period were possibly in school themselves, raised their potential market wage by acquiring more education, and worked more later on.

The Corvallis results differed from those of other researchers on the direction of the role-model effects of mother's education, and mother's labor force status when daughters were in high school. Other studies found either positive effects or no effects. The effects in the Corvallis study were negative and significant. Possibly, the variables represented an opposite role-model effect than was expected.

Length of current residence was used in one study as an inverse measure of family mobility, but had an insignificant effect on LFP, and the results of the Corvallis study also produced an insignificant negative effect with this variable.

V. SUMMARY AND CONCLUSIONS

This chapter includes a summary, conclusions, and suggestions for further research.

Summary

The purpose of this study was to construct a measure of labor force attachment of Corvallis women, age 30-45, and to investigate its determinants. From a random sample drawn from the 1978-79 Corvallis telephone directory, 100 women, age 30-45, were identified as sample participants. Personal interviews with each of the women were conducted by the researcher to obtain information on work histories, and personal and family characteristics.

The labor force participation rate for the sample was 63 percent. The mean labor force attachment score, calculated as a ratio of months worked since leaving school to months since leaving school, and multiplied by 100, was 48.85, with a standard deviation of 29 points. Scores ranged from 0 to 99. A score of 60 was considered strong attachment. Thirty-seven percent of the women had scores above 60, and 63 percent had scores below 60 or below.

The following variables were significant determinants of LFA scores in regression analysis: years married, age, education, years in which children under six were present

in the household, husband's minus wife's education, whether or not the wife worked any of the first three years of marriage, and whether or not a woman had ever been divorced.

Years married had a negative influence on LFA scores. It was assumed that years married was a proxy for increased skill at household tasks, and possibly, tastes for marriage. Age had a positive effect on LFA scores, possibly due to the fact that older women were more likely to have older children, who might help with housework. Education had a positive effect, as it was assumed to be a proxy for potential market wage. Years in which children under six were present had a negative effect on scores, due to increased child care responsibilities raising the home wage of the wife relative to her market wage.

The larger the difference between education of husband and wife, the lower the LFA score tended to be. The educational difference seemed to be a combination of effects of permanent income, and husband's and wife's education, as well as possibly representing wife's inability to find employment comparable to her husband's status.

If wives worked for any length of time during the first three years of marriage, which 77 percent of the Corvallis wives did, LFA scores were lower than if they had not worked during this time. It was suggested that wives who worked

were helping husbands through school, and when husbands became employed, wives dropped out of the labor force.

Experiencing divorce had a positive effect on LFA scores. Divorced women, it was suggested, were more reluctant to sever ties with the labor force than were women who had never been divorced, because of unwillingness to risk loss of income.

The independent variables accounted for between 36 and 46 percent of the variation in LFA scores, with the higher percentages obtained with full model equations.

The relationship between LFA scores and current labor force status was investigated. The regression coefficients for the entire sample, and married women only, were highly significant. Currently working women had greater past attachment than non-working women.

Conclusions

The following relationships were tentatively identified from results of the Corvallis sample of 100 women age 30-45: women with high attachment scores were likely to be older, married fewer years, and more highly educated than women with lower scores. Married women who had high attachment scores differed from married women with lower scores in the following ways: they had fewer children, with closer spacing between births, educational levels more

comparable to their husbands, had not worked during the first three years of marriage, and had been divorced.

The difference between husband's and wife's education had a strong influence on labor force behavior of married women in the Corvallis study. The larger the difference, the weaker the attachment was. Influences of wife's education, husband's education, and other family income, found in studies of participation rates, were not found to be as influential in the Corvallis study of attachment. It was possible that the difference measure, over the life-time, is measuring some of the effects that husband's and wife's education, and other family income, measured in studies of participation.

The influence of the educational difference may also be due to the wife's inability to find employment comparable to her husband's status. This explanation seemed reasonable in view of the common pattern found in the Corvallis study, of wives with two or three years of college, and husbands with a Ph.D.

Wives who worked during the first three years of marriage tended to have weaker attachment than wives who did not work during this period. The high educational level of the Corvallis sample was a possible explanation of this effect. Wives who worked the first three years of marriage were possibly helping husbands through school,

and exited the labor force as soon as husbands were employed. Wives who did not work during the first three years were possibly in school themselves during this time, acquiring more education, raising their potential market wage, and therefore engaging, later on, in more market work.

The positive role model influence of mother's labor force status when daughters were in high school, and mother's education, was not found for the Corvallis sample. The effect found was a negative one, and relatively significant. Mothers in the Corvallis sample had a high educational level. A possible explanation for the negative effect is that mothers were career women, and the effect of their working on daughters was negative. The difficulties involved in maintaining dual roles as career women and homemakers were possibly impressed on daughters in a negative way, either directly by mothers, or indirectly through observation. This result is possibly unique to the Corvallis sample, and might also be unique to the time period in which the analysis was done, which reflects such economic variables as relative affluence, and low rates of unemployment.

Divorce had a significant effect on the labor force behavior of women in the Corvallis sample. Women who had been divorced had stronger labor force attachment than women

who had never divorced. This finding is important in light of the increasing divorce rate, and implications for future increases in female participation rates.

Some factors found to influence participation influenced life-time attachment as well. The effects of young children were found to have a significant negative influence on attachment. Effects of marital instability also persisted over the life-cycle. Increasing educational attainment also had a positive effect on attachment.

Some factors having significant influences on participation did not, in the Corvallis study, have the same effects on attachment. Difference in husband's and wife's education was a significant negative influence on attachment, and seemed to "capture" some of the effects normally seen on participation, of other family income, and husband's and wife's education. The difference in education is possibly a more important effect over the life-cycle, than other family income, or education alone.

Knowledge of a woman's current labor force status is valuable in determining the strength of her past labor force attachment. Currently working Corvallis women had attachment scores about 25 points higher than women not currently working. However, use of personal and family characteristics provided a more complete determination of factors involved in score variations among Corvallis women.

Suggestions for Further Research

It is suggested that further investigation is needed of the influence of mothers' labor force behavior and education on daughters' future labor force behavior. The tentative conclusion of the Corvallis study was that the influence was a negative one.

It is suggested that further investigation of the effects of difference in education of husband and wife on labor force attachment is needed. A more detailed investigation could provide corroboration of the influence, and possible explanations for it.

It is suggested that further investigation is needed of measures of life-long labor supply, and its determinants, as determinants of attachment found in the Corvallis study have not been found in other studies. The women in the Corvallis sample had a high level of education, and were therefore not representative of the general population. Also the sample size of 100 had limitations for observing the labor force behavior of single women.

Further investigation of determinants of LFA is also needed in order to accurately assess the future growth of the female labor force in the U.S. Knowledge of which determinants influenced LFP at various stages of the family life-cycle would be a useful area of investigation

as well. Job planners would have knowledge of which age groups of women needed assistance, and could provide that assistance in the form of jobs appropriate to a particular life-cycle stage (for example, more part-time jobs for women with children). Educators could use that knowledge also to assist women in acquiring skills needed for successful market work experience.

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APPENDICES

APPENDIX A

Calculation of Labor Force Attachment Scores

Labor force attachment scores were calculated as a ratio of months worked since leaving school (numerator) to months since leaving school (denominator). The ratio had a maximum value of 1 and was multiplied by 100 to obtain scores ranging from 0 to 100.

Numerator Calculation

The numerator, months worked since leaving school, represented the total number of months in which paid work, or more than 15 hours of unpaid work in a family business or farm, was done. Three types of work were distinguished for the purpose of calculating scores, full time work (35 hours or more per week), part-time work (10 to 35 hours per week), and spotty work (less than 10 hours per week). Full-time and part-time work were counted as full months, as reported by respondents. Spotty work was added together in hours, divided by 8 (hours per day), divided again by 22 (the number of working days in a month) and collapsed as months. All work was counted through February 28, 1978.

A full-time teaching job was counted as 10 months of work. If a teacher also worked during the summer, a total of 12 months of work was possible.

Denominator Calculation

The denominator was calculated by counting the number of months since June of the year the respondent left high school, through February, 1978. If respondent did not graduate from high school, the year respondent turned 18 was used instead.

All other formal full-time education was counted in months and subtracted from the number of months since leaving high school. The only exception was if respondent worked full-time and attended school full-time, simultaneously. In that case, work was counted and school was not. A full-time year of college attendance was counted as nine months. Respondents who attended nursing school were asked if it was nine months or 12. If 12, then 12 months were subtracted out. If Master's degrees were obtained by attending school full-time in the summers (true of several teachers) two months of full-time schooling for as many summers as were attended were subtracted from the denominator.

APPENDIX B
Questionnaire

Date of interview: _____

1. What is the date of your birth? _____
2. Did you graduate from High School? _____ What was the date? _____
3. Do you have education beyond high school? _____
(IF YES) What were the dates? _____
4. Have you ever been to business school, or taken any special training? _____ (IF YES) What were the dates? _____
5. Are you married now? ____ (If not, have you ever been married? _____)
6. Do you have children? _____ (IF YES) What are their birthdates? _____

Were there any substantial amounts of time the children were not living with you? (For example, not counting vacations at Grandma's) _____

Do you have any children away at school? _____ How long have they been away? _____

7. Are you working now? _____
(IF NO) Are you looking for work? _____
(IF YES) What are you doing to find work? _____

8. Now I would like to ask some questions about your work history. Let's go back to the first job you had after you graduated from high school. What were you doing?

What were the dates of the job? From _____ 19__ to _____ 19__

How many hours per week did you work at this job? _____

If you had children at this time, what arrangements were made for their care? _____

Why did you leave this job? _____

What was your next job? _____

What were the dates of the job? From ____19__ to ____19__

How many hours per week did you work at this job? _____

If you had children at this time, what arrangements were made for their care? _____

Why did you leave this job? _____

9. (IF RESPONDENT IS OR HAS BEEN MARRIED) Have you been married more than once? _____
10. What was the date of your (first) marriage? _____
 Dates of subsequent marriages _____
 Dates of divorce or separation _____
11. (IF RESPONDENT IS PRESENTLY MARRIED) Are you living with your husband now? _____
12. What is your husband's occupation? _____
13. What is your husband's total number of years of education? _____
14. Since your (first) marriage, how many localities have you lived in? (Counting Corvallis as one) _____
15. Was your mother working when you were in high school? ____
 (IF YES) Part time or full time? ____ What was her job? ____
16. What was the highest grade your mother completed in school? _____

____ IF RESPONDENT IS NEVER MARRIED, ASK QUESTIONS 17,18-19

____ IF RESPONDENT IS MARRIED NOW, ASK QUESTIONS 17,18,20,21

____ IF RESPONDENT IS NOT NOW MARRIED, BUT HAS BEEN MARRIED, ASK QUESTIONS 17,18,20,21,22,23

17. What was your total income before taxes for your household for 1977? (SHOW CARD) This includes wages and salaries, net income from business or farm, pensions, dividends, interest, rent, Social Security payments, welfare payments, GI bill, etc. (FILL IN APPROPRIATE LETTER) _____
 Does this represent a typical year for you? In other words, did anything happen to make this figure unusually high or low? _____

18. What was your salary for 1977? (if respondent worked) _____
19. What was your yearly income for the first three years you worked? _____ What was your yearly salary for those three years? _____
20. What was the total yearly income for your household for the first three years of your (first) marriage? _____
21. What was your yearly salary for those three years, if you worked? _____
22. What was the total income of your household for the last year of your marriage? _____ Was this a typical year for you? _____
23. What was your salary for the last year of your marriage, if you worked? _____
-

Total number of months worked _____

Number of months since HS _____

Number of months of schooling beyond HS _____

LFA Score _____

APPENDIX C

How Potential Respondents Were
Addressed on the Telephone

MY NAME IS PAM FERRARA AND I AM A GRADUATE STUDENT AT OREGON STATE UNIVERSITY IN HOME ECONOMICS. I AM DOING A STUDY ON WOMEN AND WORK AND WOULD LIKE TO INTERVIEW WOMEN BETWEEN THE AGES OF 30 AND 45. I WOULD LIKE TO VISIT AND ASK SOME QUESTIONS THAT WOULD TAKE ABOUT 20 MINUTES. DO YOU FIT THE AGE REQUIREMENT OF MY STUDY?

THE QUESTIONS WILL BE ABOUT ANY WORK EXPERIENCE YOU MAY HAVE HAD SINCE HIGH SCHOOL AND SOME QUESTIONS ABOUT YOUR HOUSEHOLD. RIGHT NOW THERE IS NO DETAILED INFORMATION ABOUT WOMEN'S WORK HISTORIES. BY PARTICIPATING IN THIS STUDY, YOU WOULD BE CONTRIBUTING TO THE UNDERSTANDING OF WOMEN AND WORK. WOULD YOU BE WILLING TO PARTICIPATE?

APPENDIX D

Letter Sent to Potential Participants

Thank you for agreeing to participate in my study. I will be visiting you on _____ at _____ o'clock. The interview will take about 20 minutes.

I will be asking you questions about the jobs you may have had since high school, when they were, whether they were full time or part time, and why you may have quit. I will also ask about your marital status, your education, your children (if you have them), your husband (if you are presently married), and your income level.

When I have interviewed all the women in my sample, I will attempt to construct a measure of work experience, and relate it to the household information obtained.

You are free at any time not to participate in this study, and your name will in no way be connected with the information received from you. I will be happy to answer any questions you may have. Please feel free to call me at Oregon State University (during the day), at 754-4992, or at my home in the evenings, at 752-7278.

Thank you again,

Sincerely,

Pamela Ferrara
Graduate Student
Department of Family Resource Management

Geraldine Olson
Department Head
Family Resource Management

APPENDIX E

Income Range Card Shown to Participants in Order
to Answer Income Questions

A	under \$1,000
B	\$1,000 to \$1,999
C	\$2,000 to \$2,999
D	\$3,000 to \$3,999
E	\$4,000 to \$4,999
F	\$5,000 to \$5,999
G	\$6,000 to \$7,499
H	\$7,500 to \$9,999
I	\$10,000 to \$11,999
J	\$12,000 to \$14,999
K	\$15,000 to \$19,999
L	\$20,000 to \$24,999
M	\$25,000 to \$29,999
N	\$30,000 to \$34,999
O	\$35,000 to \$39,999
P	\$40,000 to \$44,999
Q	\$45,000 to \$49,999
R	\$50,000 and over

May 8, 1978

We would like to thank you again for your willingness to participate in the study on women and work. Without your cooperation, the study would not have been possible.

For your information, the following is a "statistical" picture of the 100 Corvallis women who were interviewed:

Mean (average) age	= 35.2 years
Marital status	= 6 single, 8 divorced or separated, 86 married (13 married more than once)
Mean number of children	= 2.17
Mean years of education	= 15 years (high school + 3 years of college)
Labor force status	= 5 looking for work 58 working outside the home 37 not working outside the home
Husband's mean Years of education	= 17.2 years
Mean number of moves since marriage	= 4.3
Mean total income for 1977	= \$22,000

A surprising finding was that 53% of your mothers worked, either part-time or full-time, when you were in high school.

Again, thank you for your cooperation.

Sincerely,

Pamela Ferrara
Graduate Student

Geraldine Olson
Department Head
Family Resource Management