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PLACE OF RESIDENCE AS IT RELATES TO FEMALE LABOR FORCE PARTICIPATION, WORK TIME SUPPLIED AND INCOME RETURNS*

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INTRODUCTION

Few changes have been as dramatic in our economy as the female participation in the labor force. In general, the rise of female participation, while it varies widely according to age, marital status, and period studied, is nevertheless characteristic of both young and old, married and single, and of recent as well as of earlier years. Female participation has been increasing, in percent terms, in all its sectors - urban, rural, nonfarm, and rural farm (Table 1). The participation rate of the urban sector, however, has always been larger than that of the rural nonfarm, which, in turn has always been larger than that of the rural farm sector.

Many factors have been proven to be influential in the decisions of women to enter the labor force and include:[1] (1) age, [1, 8, 10], (2) race [10], (3) marital status [3, 7, 10], (4) health [10], (5) family structure [1, 3, 7, 8, 9, 10], (6) work experience [8], (7) attitudes [1, 8, 9, 10], (8) family income [1, 3, 7, 8, 9, 10], and (9) education and training [3, 4, 6, 7, 9, 10]. Other factors may prove to be more important in describing under what conditions a woman is willing to supply a given amount of work time. Such factors include labor returns (wages) [2, 6] and commuting time or distance to job [5, 6].

Objectives of the Study

This study is primarily concerned with the role of place of residence in determining female labor force participation rates, amount of work time supplied, and income returns for women 30 to 44 years of age. This age group is of major concern due to re-entry of women to the labor market after the children are grown

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[1] A discussion of the expected relationships and their basis is deferred until later sections where results of the present study are given.

or in school [13, 14]. Residence categories have been delineated as (1) SMSA-nonfarm, (2) SMSA-farm, (3) nonSMSA-farm, and (4) nonSMSA-nonfarm. The objectives are: (1) to determine whether residence categories affect expected labor force participation rates or work time supplied for women age 30 to 44 years-after adjusting for differences in social and economic characteristics, and (2) to determine whether place of residence affects income returns for comparable amounts of work time supplied. If labor force participation rates, work time supplied or income returns for women are found to be significantly different in rural or nonmetropolitan areas than in metropolitan areas, long run adjustments may be reflected in future decisions of where families locate.

REGIONAL LABOR MARKETS

Valerie Oppenheimer [12] suggests that perhaps the best explanation for the overall increase in female labor force participation in recent years has been an increase in the demand for female workers which, in turn, has stimulated an increase in the supply of women in the labor market. This would suggest that where the demand for labor in typically female occupations is the strongest is where increases will most readily occur in the supply of work time by women. The demand for labor in a perfectly competitive market should reflect the marginal value product of that labor. Hence, if the marginal value product of labor per hour supplied by women is 10 percent greater in metropolitan areas than in rural or nonmetropolitan areas, firms in the metropolitan areas are able to offer 10 percent higher wages than firms in the nonmetropolitan areas.

Similarly, conditions may vary between residence categories such that women are willing to offer the same amount of work time at different locations for different wage rates. Conditions may reflect (1) differences in cost of living between locations, (2) accordance with the husband's decision as to where he wants to work, or (3) certain nonmonetary factors such as may constitute differences in quality of living. To attain labor market equilibrium, firms would move to areas with lower wages relative to the marginal value product of labor and women would move to areas with higher wages relative to the amount of work time they are willing to supply. This would tend to raise wages in the first case and force wages down in the second case until for all locations the marginal value product of labor is equal to the marginal cost of labor.

Questions can be asked relative to the growth and development of rural areas. Is the marginal value product of labor supplied by women significantly different in rural and nonmetropolitan areas than in metropolitan areas? If so, there is a basis for differences in wage rates. Do "women move to jobs" or do "jobs move to women" or is there a two way causal relationship as explained above?

Lee D. Olvey [11] in a study of labor markets for fifty-six SMSA's concluded that "people chase jobs" rather than "jobs chase people". In the case of a sub-sector of the labor market, such as the female work force, the conclusion may be less emphatic. A certain amount of the female work force is restricted to areas where their husbands are bound by jobs in fixed resource occupations such as agriculture and mining. And in such cases there is a tendency for factories to move in which cater to a "female work force". The marginal value product of

labor may actually be lower for firms in these locations relative to other locations but the wage rates may also be sufficiently lower.

The study, in general, is restricted to an analysis of the work time supplied by women in various residence categories. It does not include an analysis of the demand for female labor.

THE DATA

The data are the results of a National Longitudinal Survey of some 5,000 women, 30 to 44 years of age.[2] The data are for 1967, the first year of a five year survey of labor market experience and work attitudes. The sample consisted of 3,606 white women and 1,746 nonwhite women.[3]

Each individual is interviewed periodically over the course of five years in order to record complete work histories as well as changes in characteristics hypothesized to be related to labor market behavior, i.e., health, family structure, education, and training. In addition, the initial survey provides a considerable amount of background material for each respondent, including an abbreviated history of work activity since leaving school.

Several measures of a respondent's labor force participation are used in the survey. One is based upon the conventional definition of labor force status, which depends on the individual's activity in the calendar week preceding the time of the interview. If the individual is at work during that week or actively seeking work, she will be classified as "in the labor force"; all others are classified as "not in the labor force". A second measure of participation is the number of hours the respondent worked the week before at all jobs. Finally, there is a measure of past labor force attachment -- years worked as a percent of potential labor force exposure.

PROBABILITY OF LABOR FORCE PARTICIPATION

Labor force participation rate is defined as the percentage of those in a group who are currently working or looking for work during a predetermined survey period. In Table 1 the overall labor force participation rate for females 16

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[2]Tapes summarizing the results of the survey are available from the Chief, Demographic Surveys Division, Bureau of the Census, U. S. Department of Commerce, Washington, D. C. The original study [13, 14] had as its major concern the problem of re-entry to the labor market of women after their children are grown or in school.

[3]The sample is a probability sample of the noninstitutional civilian population drawn by the United States Census Bureau from 235 primary sampling units in the experimental Monthly Labor Survey (MLS). The MLS is an area probability sample of the United States, including every state and the District of Columbia. To permit statistically reliable estimates for blacks, a sampling ratio four times as great as for whites was used.

TABLE 1: Female Labor Force, 16 Years and Over, by Marital Status: 1950, 1960, and 1970

United States Urban and Rural	1950[a] Number	1950[a] Participation Rate[b]	1960 Number	1960 Participation Rate	1970 Number	1970 Participation Rate
Total	16,551,990	29.0	22,221,588	35.7	30,546,667	41.4
Married	7,650,845	21.5	12,361,152	30.7	17,417,565	39.2
Single[c]	8,874,145	41.2	9,860,436	44.9	13,129,102	44.6
Urban						
Total	12,846,650	33.3	17,338,204	38.4	23,949,957	43.1
Married	5,616,665	24.2	9,124,329	32.4	12,951,399	40.4
Single	7,229,985	46.8	8,213,875	48.6	10,998,588	46.9
Rural Nonfarm						
Total	2,503,510	22.8	3,873,103	29.9	5,755,726	37.1
Married	1,386,355	19.2	2,555,614	28.4	3,881,009	37.6
Single	1,117,155	29.7	1,317,489	33.4	1,874,717	35.9
Rural Farm						
Total	1,201,830	16.0	1,010,281	23.9	840,984	29.9
Married	647,825	13.1	681,209	21.9	585,157	29.0
Single	527,005	22.6	329,072	29.6	255,827	32.3

[a]1950 data include females 14 and 15 years of age.

[b]The labor force participation rate is defined to be the labor force of any age group divided by the population of that age group.

[c]This category includes the never married, married but spouse absent, widowed, divorced, and separated.

Source: U. S. Summary Detailed Characteristics for the census years 1950, 1960, and 1970.

years and over in 1970 was 41.4. The unadjusted rate[4] for urban women was 43.1 versus 37.1 and 29.9 for rural nonfarm and rural farm women, respectively.

Labor force participation rates may be misleading. They reflect the demand for as well as the supply of labor. Hence, labor force participation rates are equilibrium points between demand and supply for labor. The use of a labor force participation model in this section has a somewhat different purpose. A regression model is used to describe the probability of labor force participation of an individual woman. The probability of a woman being in the labor force is hypothesized to be influenced by a number of her social and economic factors.

Place of residence is used as a further explanatory variable. Once all identifiable social and economic factors have been accounted for in explaining the probability of labor force participation, it is hypothesized that place of residence offers no further significant variation. If place of residence is significant there is some evidence to support a lack of job opportunities for women with certain characteristics in some locations. If place of residence is nonsignificant, conclusions are more dubious. Job opportunities may still be lacking in some locations, but women, knowing this, have adjusted their place of residence accordingly.

The Variables

Labor force participation is the dependent variable.[5] The objective of the analysis is to determine what effect the independent variables, whose descriptions follow (also see Table 2), will have on the probability of the woman being in the labor force. Results of the dependent variable (LFP) in the regression models are in the form of probability statements as to whether the woman is expected to be part of the labor force.

Race. Most previous studies indicate that nonwhite women are more likely to be in the labor force than white women even after adjusting for comparable socio-economic conditions. The unadjusted overall LFP ratio for nonwhites in the sample is 64.3 versus 47.0 for whites. The hypothesized relation between labor force participation and race (RACE) is negative.

Marital Status and Family Structure. The probability of a "single" (see Table 2) woman being in the labor force is hypothesized to be greater than for married women with alternative sources of family income. Family size (FS) determines the number in the family spending unit. The hypothesis is that an increase in the size of a family unit increases the LFP probability.

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[4]Unadjusted rates are defined here as not reflecting residence differences in such factors as age, race, marital status, family size, or family income.

[5]There are problems encountered in the event that the dependent variable takes on values of "0" or "1". The assumption of homoscedastic disturbances has been shown to be untenable in this situation. Beyond this, care must be exercised in carrying out significance tests on the coefficients of such variables.

TABLE 2: Description of Variables for the Labor Force Participation Models

Variable Name	Unit	Description
LFP	1,0	labor force participation; "1" if the respondent was working or actively seeking work during the survey week in 1967, "0" otherwise
RACE	1,0	"1" white; "0" nonwhite
MS	1,0	marital status; "1" if the woman was never married, separated, divorced, widowed, or married with spouse absent; "0" if married and spouse present
FS	no.	family size
CHILD	1,0	presence of children under six; "1" if at least one child under six years of age
EWORK	no.	work experience; actual number of years, between leaving school and some major event in which the respondent worked at least six months
WATT	1,0	woman's attitude toward work; "1" if respondent, at age 15, lived in the suburb of a large city or in a city of 25,000 or more; "0" if respondent, at age 15, lived on a farm, in the country, or in a town or small city (under 25,000)
HATT	1,0,-1	husband's attitude; "1" if woman is married and the indication is that her husband likes the idea of women working; "0" if woman is single or indicates that her husband does not care either way about the idea of women working; "-1" if husband does not approve of the idea of women working
HI	$1,000	husband's income; 1966 amount
OFI	$1,000	other family income; 1966 amount
PUBLIC	1,0	public assistance; "1" if respondent or some member of her family receives some type of public assistance
EDUCA	1,0	education; "1" if respondent is a high school graduate and completed no additional formal education
EDUCB	1,0	education; "1" if respondent attended college, but did not graduate, or received some technical training
EDUCC	1,0	education; "1" if respondent graduated from college
FARM	1,0	residence; "1" if respondent living in an SMSA and indicating land usage was farm
NFARM	1,0	residence; "1" if respondent living in an SMSA and indicating land usage was nonfarm
NSFARM	1,0	residence; "1" if respondent not living in an SMSA and indicating land usage was farm

Most past studies indicate that the presence of young children is a definite deterrent to the labor force participation of the mother. The presence of children under six years of age is hypothesized to be a factor contributing to a decrease in labor force participation.

Work Experience. It is hypothesized that women who have had an early work experience will find less resistance to joining the labor force in later years than those women who have never worked. If the woman has never worked, EWORK (see Table 2) is set at zero. If she has never married and has no children, EWORK would equal the number of years since leaving school that she has worked. For the never married respondent with children the variable's value is the number of years she had worked between leaving school and the birth of her first child. The value of EWORK for the married respondent is the actual number of years worked between leaving school and her first marriage.

Attitudes. A woman's attitudes toward work is hypothesized to affect labor force participation. Place of residence in early life is used as a proxy for the woman's attitude. If she were living in a large city, a city of 25,000 to 100,000 people or in the suburb of a large city at the age of 15, the hypothesis is that she would more likely be in the labor force in later years. This could be the result of exposure to a more liberal atmosphere in metropolitan areas where a working wife is less out of the ordinary and viewed with less scorn than in the more rural areas. Today, perhaps, this distinction of liberal urban areas and conservative rural areas is not so sharply made, but it must be remembered that these women are in their thirties and forties and some fifteen years have passed since their teens. Keeping in mind the changes that have occurred in our society's attitude toward women in general and their labor force participation in particular and the fact that individuals are slow to change their opinions this hypothesis seems to have some validity. We would expect a positive relationship between WATT and labor force participation.

Husband's attitudes also may influence the wife's decision to work. If he approves of women working he is more likely to encourage his wife to work if she indicates a desire to do so. However, if he does not approve of women working then his wife will be less likely to be in the labor force. The expected relationship between HATT and labor force participation is positive.[6]

Family Income. The husband's income (HI) is seen to be a major influence in his wife's labor force decision. The hypothesis, fairly well substantiated in recent studies, is that the larger his income the less likely his wife will be in the labor force.

Other family income (OFI), in addition to husband's income, includes income earned by older children who may be working. There may also be other adults present in the household who contribute to the total family income (or who relieve the woman of some of her home responsibilities). This variable determines

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[6]The variable HATT as specified in Table 2 assumes equal importance for those women whose husband likes the idea of women working as for those whose husband does not approve.

if the likelihood of the respondent being in the labor force will decrease as the dollar amount of other family income increases.

Public assistance (PUBLIC) is viewed as a substitute for other family income. It is hypothesized that the woman whose family receives some type of public assistance is less likely to be in the labor force.

Education. Each increasing level of education is hypothesized to increase the probability of the woman being a member of the labor force (see Table 2). The respondent with zero values for EDUCA, EDUCB, and EDUCC is a non high school graduate.

Residence. Significance of place of residence in our analysis of regional labor markets was discussed earlier. If all three of the residence variables defined in Table 2 have zero values, the woman is living in a nonfarm-nonSMSA residence category.

Results and Conclusions

Results of the probability of labor force participation are given in Table 3. The values in parentheses below the estimated coefficients are computed t-values. In the first model all variables are significant at the five percent level except the two residence variables, FARM and NSFARM. The measure of the proportion of total variation about the mean varies from model to model. The R^2-values are all quite small, though, a fact which is partially explained by the form of the dependent variable and relates to an individual's probability. Such results are consistent with other similar studies.

For two of the models all 5,083 observations are used implying that each observation contains values for each variable in the model. Model 2 uses husband's income (HI) rather than other family income (OFI) in its analysis of the data. When this variable is used the sample size is decreased due to the failure of some women to volunteer information on their husband's income in 1966. The incomplete observations in this case were excluded from the regression analysis.[7] When OFI is used, if HI is blank it is assumed to be zero and annual income of other family members (excluding the husband and wife) is used as the value of OFI rather than the sum of husband's income and the income of other members of the family, as would normally be the case.

Results in Table 3 are interpreted in the following way. For Model 1, the intercept term, .744, indicates the probability of a woman in the sample's age group (30 to 44 years) being in the labor force if she is nonwhite, married with her husband present in the household, no children under six years of age, less than a high school eduation, and living in a nonSMSA-nonfarm residence. If the woman were white the probability would decrease by .143. If she was

[7]This practice can lead to biased results if husband's income is correlated with response or nonresponse. No means existed whereby part of the nonrespondents could be interviewed in a follow-up survey.

TABLE 3: Probability of Labor Force Participation Models, Women Age 30-44, 1967, LFP Dependent Variable

Independent Variables	Model 1	Model 2	Model 3
Social			
RACE	-.143	-.091	-.099
	(-9.104)**	(-5.257)**	(-7.001)**
MS	.138	-0.52	.254
	(7.387)**	(-2.146)**	(13.062)**
CHILD	-.197	-.175	-.145
	(-10.354)**	(-8.732)**	(-8.515)**
Work Experience			
EWORK		.00047	.000391
		(1.456)	(1.469)
Attitudes			
WATT		-.035	
		(-2.225)**	
HATT			-.390
			(-36.394)**
Family Income			
HI		-.028	
		(-11.729)**	
OFI			-.0084
			(-5.508)**
PUBLIC			-.031
			(-2.271)**
Education			
EDUCA	.035	.058	.044
	(2.443)**	(3.727)**	(3.437)**
EDUCB	.051	.080	.058
	(3.559)**	(5.214)**	(4.567)**
EDUCC	.136	.220	.191
	(5.204)**	(7.617)**	(8.118)**
Residence			
FARM	-.043	-.107	-.042
	(-.577)	(-1.188)	(-.630)
NFARM	-.040	.014	-.051
	(-2.638)**	(.826)	(-3.792)**
NSFARM	-.020	-.075	-.027
	(-.647)	(-1.840)*	(-.966)
Intercept	.744	.847	.989
	(29.017)**	(29.879)**	(40.986)**
R^2	.077	.113	.274
N	5,083	4,280	5,083

Student's t values: **Significantly different from zero at the 5% level
*Significantly different from zero at the 10% level

"single" - never married, separated, widowed, divorced or married with spouse absent - the probability would be .882, indicating an increase in the likelihood of her being in the labor force. If there was a child under the age of six present in the household the probability would decrease by .197 to .547. The educational variables indicate that each increase in the woman's educational level has a positive effect on the probability of her being in the labor force.

Social Factors. The findings of this study corroborate those of past studies in regard to the relationship between race and labor force status of a woman. If she is white, she is less likely to be in the labor force. The nonwhite woman is more often supporting herself or augmenting the family income.

The single woman is more likely to be in the labor force than the married woman with spouse present as indicated by Models 1 and 3. This may be due to fewer home responsibilities for the single woman or the need to support herself and any dependents she may have. Model 2 shows a reversal in significance for MS when husband's income is used in place of other family income. One explanation is multicolinearity between the two independent variables.

The presence of young children decreases the probability of a respondent's presence in the labor force. The decrease is large enough to outweigh the increase in probability due to the attainment of any educational level from high school graduate and beyond.

The attainment of a higher educational level indicates she is more likely to participate in the labor force than the woman who has failed to complete high school. Attaining a higher level of education may signify an already strong desire on the woman's part to be active in the labor force and that she is becoming better educated to promote that end.

The attitudinal variables did not perform as expected. The crudeness of the measures in the case of both the woman's attitude toward work and the husband's attitude toward his wife working may have greatly influenced their performance. As a proxy for the woman's attitude, her place of residence at 15 is used. Place of residence, it appears, cannot indicate a person's attitudes, or, perhaps attitudes are arrived at after the age of fifteen. The working woman was asked to indicate her husband's views toward her working and this may have caused a bias in the measurement of husband's attitudes.

Economic Factors. Early work experience is seen to be a positive but not statistically significant influence in the labor force status of a woman. For the age group studied, this suggests the first entry or re-entry into the labor force may not be a major problem after adjusting for other social and economic conditions.

Husband's income is seen to be an extremely influential variable in this study as it has in previous studies. It seems that a significant percentage of the working wives are primarily in the labor force to augment family income.

When other family income, the income of all family members excluding the woman, increases the probability of the woman being in the labor force decreases.

This decrease is not as large as the decrease in probability caused by an increase in the husband's income.

The receipt of public assistance by a family member is associated with a decrease in the woman's participation probability. This effect would be exhibited particularly at the lower levels of family income since the families with low incomes are more likely to be receiving public assistance of some kind.

Place of Residence. Models 1 and 3 show a statistically significant decrease in LFP rates for SMSA-nonfarm residents over nonSMSA-nonfarm residents. If LFP rates reflect at all the availability of jobs for women the opposite relationship would have been hypothesized. Model 2 shows a positive but nonsignificant coefficient for SMSA-nonfarm residents. The conclusion from this data is that, in general, when corrections are made for race, marital status, income levels, educational levels, family size, and work experience, place of residence does not convincingly influence labor force participation rates for women 30 to 44 years of age.

As indicated earlier, nonsignificance of the place of residence variables may be the result of women having already adjusted their location to meet work needs. The LFP model is not a strong test for the availability of jobs in metropolitan or nonmetropolitan areas.

SUPPLY OF WORKING TIME

A demand function for the consumption time of the women surveyed is formulated based on the theory supplied by Gary S. Becker [2] which divides time between work activities (time at work) and consumption activities (time at home). This type of analysis is particularly applicable to the situation of women and their time which can be divided among leisure activities, home production, and market participation.

Because the theory concerns all members of a household, multiperson households must also allocate the time of different members. Members who are relatively more efficient at market activities would use less of their time at consumption activities than would other members. Moreover, an increase in the relative market efficiency of any member would effect a reallocation of the time of all other members towards consumption activities to permit the former to spend more time at market activities. In short, the allocation of the time of any member is greatly influenced by the opportunities open to other members.

After the husband, the next member of the household most efficient at market activities oftentimes is the wife and, therefore, she will enter the labor force. This, of course, will decrease the time she can spend in leisure and home production activites. Furthermore, as the market wage increases the wife is willing to supply more of her time in the market, placing more consumption duties on other family members. At some point, though, the income effect dominates the substitution effect - the backward bending segment of the supply curve of labor is reached - and some income is foregone so that more "leisure" (actual leisure or time to be spent in the production of home goods) can be had.

Additional Variables

Consumption hours (CHOURS) per week is used as the dependent variable.[8] If the woman is not working outside the home this variable is automatically valued at 168. When the woman is in the labor force, however, her hours at work per week are substracted from 168 to arrive at the time spent in "consumption" activities.

Many of the same factors that influence a woman's probability of labor force participation affect the amount of time spent in the home and, therefore, the time supplied in the labor market. Independent variables defined for the probability of labor force participation model remain unchanged. Additional independent variables for the supply of working time model are defined in Table 4.

Wage Rate. As the market wage increases the incentive to give up consumption time and supply more hours to the job is reinforced. The labor leisure model, however, says there is some wage at which the woman will give up the income of an extra hour for one more hour of leisure (time off the job) - the supply curve becomes backward bending at this point. For this reason the square of the wage variable was included (WAGE2). For those women not working the wage variable takes on a zero value.

Family Members. Several additional variables were added to indicate the presence of family members in other age groups and the actual number of children in two age classes. When other adults are present in the household to help with home responsibilities it is postulated that the woman can reduce her consumption time and, therefore, increase the time supplied in the labor market. Employing the actual number of children in age groupings one to five years old and six to eighteen years old, one would expect that as the number in the younger age group (NCHILD) increases, more of the woman's time is spent in the home and, thus, CHOURS increases. On the other hand, as NCHILD2 (the number of children between six and eighteen years of age) increases it is hypothesized that the time of the woman spent in consumption will decrease, i.e., the time she is willing to supply to the labor market will increase.

Commuting Time. All women who work spend some time commuting. Thus, initially the relationship between CTIME and CHOURS will be negative. However, there is postulated to be some level of commuting that, when reached, will discourage the woman from supplying more time in the labor market and, thereby, increase her consumption hours. At higher wage levels this limit will be reached at higher amounts of commuting time since women may be willing to extend their time in commuting because of the wage increase involved.

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[8] As specified here, either HOURS or CHOURS could be used as the dependent variable. In fact, results are later discussed in terms of both variables.

TABLE 4: Description of Additional Variables for the Supply of Working Time Model

Variable Name	Unit	Description
HOURS	no.	hours worked per week by respondent
CHOURS	no.	the difference between hours worked per week and total hours in a week
WAGE	$	hourly wage rate
WAGE2	-	WAGE squared
CHILD2	1,0	presence of children over five but under nineteen; "1" if at least one child in this age bracket
NCHILD	no.	children under six years of age; actual number
NCHILD2	no.	children over five and under nineteen; actual number
CTIME	minutes	actual time spent commuting to the job (one way)
CTIME2	-	CTIME squared
(WAGE)(OFI)	-	WAGE times OFI
(WAGE)(CTIME)	-	WAGE times CTIME
(OFI)(CTIME)	-	OFI times CTIME
(WAGE)(FARM)	-	WAGE times FARM
(WAGE)(NFARM)	-	WAGE times NFARM
(WAGE)(NSFARM)	-	WAGE times NSFARM

Results and Conclusions

Empirical results of the demand for consumption time and, thus, the supply of work time for women age 30 to 44 years are summarized in Table 5. The first model corrects for other family income, race, marital status, presence of children, and education. The coefficients of the wage variables, in accordance with economic theory, indicate that at higher wage rates women are willing to give up more consumption time (supply more work time) but at a slightly decreasing rate. In Model 1, an increase in WAGE of $1.00 per hour decreases consumption time (increase time at work) by approximately 4.4 hours per week. Other family income, when increased by $1,000 increases a woman's time in consumption activities by .46 hour. The education variable EDUCA indicates a decrease in CHOURS of 1.89 hours for the high school graduate as compared to the consumption time of the woman who has not completed high school. The woman with some college and/or technical training decreases her consumption time by about 2.54 hours.

Children under six present in the household increase the woman's time in the home by 7.6 hours. If there are children present in the six to eighteen age group consumption time increases slightly. A white woman spends more time in consumption activities than a nonwhite woman, 1.86 hours. The single woman spends less time at home - 3.70 hours - than the married woman. This model explained 14.4 percent of the variation about the mean ($\overline{CHOURS}$), as indicated by the R^2-value. All variables were signficant in the regression (all coefficients significantly different from zero at the five percent level) except CHILD2, which indicated the presence of children in the older age group.

Models 1 and 2 employed all 5,083 observations. The models using commuting time (CTIME) had 85 invalid responses, leaving 4,998 observations.[9] The models that did use CTIME had R^2-values which were considerably higher than those that did not correct for commuting time, indicating that a greater proportion of the variation about the mean was explained.

Economic Factors. In accordance with economic theory, as the wage rate increases the time the women in this study are willing to supply the labor market increases. However, within the range of this data there is no backward bending segment of the supply curve as generally hypothesized in a labor leisure analysis of time and its allocation.

As the income of other family members increases, the time the woman spends at home increases. If any family member is receiving some type of public assistance there is an increase in the consumption time of the woman.

Considering the interaction of the wage rate and other family income, at a given wage rate consumption time of women increases (supply of working time decreases) as other family income increases. At higher wage rates, moreover, the time at home increases at a faster rate as other family income increases.

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[9]Again statistical bias can result since commuting time may be correlated with nonresponse.

TABLE 5: Results of the Demand for Consumption Time (Supply of Work) Model, Women Age 30-44, 1967 (CHOURS Dependent Variable)

Independent Variables	Model 1	Model 2	Model 3	Model 4
Economic				
WAGE	-4.444	-4.406	-2.731	-3.793
	(-19.62)**	(-19.46)**	(-12.98)**	(-8.78)**
WAGE2	.007	.007	.004	.005
	(19.44)**	(19.28)**	(12.86)**	(8.24)**
OFI	.465	.452	.356	.476
	(7.32)**	(6.89)**	(6.26)**	(7.84)**
CTIME			-1.031	-.906
			(-37.72)**	(-28.90)**
(WAGE)(OFI)				.150
				(4.48)**
(WAGE)(CTIME)				.026
				(1.43)
(OFI)(CTIME)				-.033
				(-8.51)**
PUBLIC			.876	
			(1.70)*	
Social				
RACE	1.861	1.905	-1.677	-1.693
	(3.07)**	(3.13)**	(-3.04)**	(-3.09)**
MS	-3.703	-3.824	-2.555	-3.438
	(-4.79)**	(-4.90)**	(-3.73)**	(-5.12)**
CHILD	7.609	13.470		
	(6.87)**	(8.84)**		
CHILD2	.200			
	(.21)			
ADULTS		-5.889		
		(-4.20)**		
NCHILD			2.360	2.211
			(7.68)**	(7.24)**
NCHILD2			.585	.614
			(3.71)**	(3.93)**
Education				
EDUCA	-1.891	-1.961	-1.446	-1.515
	(-3.44)**	(-3.57)**	(-3.03)**	(-3.20)**
EDUCB	-2.541	-2.678	-1.608	-1.609
	(-4.68)**	(-4.91)**	(-3.39)**	(-3.42)**
EDUCC	-2.486	-2.729	-1.935	-2.056
	(.247)**	(-2.72)**	(-2.21)**	(-2.37)**

TABLE 5: (Continued)

Independent Variables	Model 1	Model 2	Model 3	Model 4
Residence				
FARM		-.679	-.318	-.798
		(-.24)	(-.13)	(-.29)
NFARM		.616	2.398	2.505
		(1.06)	(4.75)**	(4.75)**
NSFARM		-.038	-.157	.717
		(-.032)	(-.15)	(.63)
(WAGE) (FARM)				1.262
				(.47)
(WAGE) (NFARM)				-.094
				(-.24)
(WAGE) (NSFARM)				-3.525
				(-2.05)**
Intercept	146.470	146.181	157.867	157.749
	(160.08)**	(146.52)**	(192.82)**	(193.92)**
R^2	.144	.147	.372	.383
N	5,083	5,083	4,998	4,998

As an example, at a $1.00 wage rate, for each $1,000 increase in OFI the supply of individual working time decreases by about .63 hours per week. At a wage rate of $2.00 per hour, HOURS decreases by about .78 for each $1,000 increase in OFI. This, again, brings up the point that the woman is primarily in the labor force to augment the family's income.

Commuting Time. Initially, there is a positive relationship between commuting time and hours offered in the labor market. This is expected since virtually all jobs require some amount of commuting time. The data of this study demonstrate the existence of a level that actually discourages women from supplying more time at work - 58 minutes. Beyond this level a woman will choose to forego the extra income that could be earned, but she is also foregoing the additional time and cost of commuting. At higher wage rates the reduction in commuting time becomes less important in the determination of the time she will spend in the labor market.

Social Factors. In the models uncorrected for commuting time there is a positive relationship between RACE and CHOURS indicating that white women spend more time in consumption activities than nonwhite women. In Models 3 and 4 CTIME is included and the sign of the RACE variable becomes negative with t-values indicating coefficients significantly different from zero. This may appear to result from nonwhites tending to live closer to their jobs than whites and, thus, when the models correct for commuting time, nonwhites spend more time at home.

Single women are willing to supply more time in the labor market than married women with husband present in the household. If the woman has never married, fewer home responsibilities may lead her to giving up more time at home. If she is the head of the household with other family members depending upon her for support she may supply more time at work to satisfy these demands. This result is consistent with prior findings.

Children in the household are a definite deterrent to the woman working outside the home. Young children, especially, increase the demand for the woman's time in the home. When there are other adults in the household, their presence alleviates this demand to some extent as they help perform duties she would normally do by herself.

Education. The premise that education increases the efficiency of the woman in home production activities is corroborated by the results of this study. It has been suggested, also, that education may have additional effects on the supply of working time by creating skills for analyzing and interpreting information, including the evaluation of job opportunities, thereby improving allocative efficiency [6]. The empirical results imply that the woman with more years of formal education is willing to supply more time in the labor market.

Place of Residence. It was argued earlier that conditions may vary between residence locations such that women are willing to offer the same amount of work time but only at different wage rates. Results in Table 5 have adjusted individual work time supplied for differences in such social and economic factors as race, marital status, family structure, education, and other family income. In addition, two of the models adjust for commuting time. In Model 2, when

commuting time is absent, none of the residence variables are significantly different from zero; i.e., residence has no significant effect on consumption time or hours at work. When commuting time is included in the linear and quadratic forms, Models 3 and 4, the coefficient of NFARM is statistically different from nonSMSA-nonfarm, accounted for in the intercept. It is interpreted as meaning that, all other factors the same, an SMSA-nonfarm woman is willing to offer fewer hours at work than a nonSMSA-nonfarm woman.

To determine the joint product effects of wage rate and residence on consumption hours, interaction terms were included in Model 4. An additional residence variable becomes significant and states that nonSMSA-farm women are willing to offer more hours of work than nonSMSA-nonfarm women, all other factors equal.

Looking at the estimated equation of Model 4, Table 5, adjusted so that hours at work is the dependent variable and all variables not containing WAGE or NFARM are included in the constant term, c, as well as the intercept value, we have:

$$\begin{aligned} HOURS = c &+ 3.793\ WAGE - .005\ WAGE2 - .150\ (WAGE)\ (OFI) \\ &- .026\ (WAGE)\ (CTIME) - 2.505 NFARM + .094\ (WAGE)\ (NFARM) \end{aligned}$$

These results indicate that a higher wage rate is needed in the SMSA-nonfarm areas to entice a woman residing there to supply the same number of work hours as a woman in a nonSMSA-nonfarm area. This is observed in metropolitan labor markets where higher wages must be offered to increase the supply of labor. When the wage level is initially high in both areas, it will take a smaller increase in wage rate for the SMSA-nonfarm woman to encourage her to offer the same number of hours at work as her counterpart in the nonSMSA-nonfarm area. This results since the interaction term has a positive sign.

Evaluating this function at the mean values of OFI and CTIME we have:

$$HOURS = c + 2.788\ WAGE - .005\ WAGE2 - 2.505\ NFARM + .094\ (WAGE)\ (NFARM)$$

To find the change in the wage rate for a change in residence from the "base" (nonSMSA-nonfarm), but holding hours supplied constant, we can take the partial derivatives, so that

$$\frac{d\ WAGE}{d\ NFARM} = - \frac{\frac{\partial\ HOURS}{\partial\ NFARM}}{\frac{\partial\ HOURS}{\partial\ WAGE}} = - \frac{-2.505 + .094\ WAGE}{2.788 - .010\ WAGE + .094\ NFARM}$$

If the wage rate is set at \$1.50 evaluating $\frac{d\ WAGE}{d\ NFARM}$ indicates a wage difference of \$.85 between residents of SMSA-nonfarm areas and nonSMSA-nonfarm residents to encourage both to supply the same number of work hours. As the overall wage rate increases, however, this differential decreases.

The results also indicate a wage rate differential between nonSMSA-nonfarm

women and nonSMSA-farm women to supply the same amount of work hours. Comparing the SMSA-farm and nonSMSA-nonfarm residence areas, it seems that these labor markets are somewhat comparable. At least these data indicate no significant differences in coefficients for FARM and (WAGE)(FARM) variables.

INCOME RETURNS

In the analysis of the unadjusted data a difference in income returns is noted for the various categories of residence. Occupation or industry mix is presumed to explain some of the variance, but to determine the significance of these variables and others a regression analysis was employed. The annual income rate (dollars) for 1967 was used as the dependent variable (YINCOME).

Independent variables include hours worked per week, race, marital status, education, residence, and occupation or industry. Occupation and industry variables enter in the dummy form either as "1" or "0" and are identified below. The "base" individual for occupations - one for whom all occupation dummies would have values of zero - is the woman who indicated she was a professional, technical or kindred worker. The regression analysis will indicate if a change of occupation from the "base" significantly affects the income returns of the individual.

Occupations

FARMERS = a farmer or a farm manager
MANAGER = a manager, official or proprietor (not farm)
CLERK = a clerical or kindred worker
SALES = a sales worker
CRAFTS = a craftsman, foreman or kindred worker
OPERATOR = an operative or a kindred worker
HOUSE = a private household worker
SERVICE = a service worker (not private household)
FARMLAB = a farm laborer or foreman
LABORER = a laborer (not farm or mine)

The "base" individual for industries is in agriculture or forestry.

Industries

MINE = mining
CONST = construction
MANU = manufacturing
TRANS = transportation, communication and other public utilities
WHOLE = wholesale and retail trade
FINAN = finance, insurance and real estate
BUS = business and repair service
PERSER = personal services
ENTER = entertainment and recreation services
PROFS = professional and related services
PUBLICA = public administration

Our interest here is mainly with regards to place of residence and income returns to women for work time supplied. One of the hypotheses to be tested is that once individual annual income returns have been adjusted for differences in number of hours worked, race, marital status, education, and occupation or industry, then place of residence has no significant effect. An alternative hypothesis would be that the differences in rates of income return between residence categories are no larger than the cost of living differences which would tend to leave families in comparable states of well being. A further interest is to determine if the mix of occupations or industry jobs is such that one residence category has a proportionately larger share of high income positions while another residence category has a proportionately larger share of low income positions.

Results and Conclusions

The regression models are in two forms, the linear and the logarithmic, and results are presented in Table 6. The first and third models are the results of the linear form differing only by the presence of either occupation or industry. The second and fourth models are the results of the logarithmic form.

From Model 1 the 1967 income returns of a woman in any of the eleven major occupation groupings may be determined. The intercept includes the income of the professional, technical, or kindred worker in a nonSMSA-nonfarm place of residence category. If she is white her income increases by $457.48; if she is a high school graduate her income increases by $278.55; if she works 40 hours per week (the observed average is 34.5) the increase in her yearly income is $40.15. The R^2-value indicates that 32.5 percent of the variation about the mean (YINCOME) is explained by this model. The number of observations employed is 2,304, those indicating they were at work in 1967.

Interpreting a logarithmic model, Model 4, we see that the coefficient of RACE indicates a white woman's income will be 1.24 ($e^{.219}$) times greater than that of a nonwhite woman, all other things remaining the same. (Table 7 indicates the remaining multiplicative factors for both Model 2 and Model 4). The multiple correlation coefficient (R^2) tells us that 42.3 percent of the variation about the mean is explained.

Occupations and Industries. Table 8 lists the income of a white married woman with a high school education who lives in a nonSMSA-nonfarm area by occupation and industry. Within the occupational categories, the range is from a low for private household workers to a high for professional, technical or kindred workers. The only variables that contribute as much to the variations in income are a completed college education and race.

Occupations and industries play a large role in explaining the variations in yearly income returns. Thus, the types of jobs available in an area play an important role in determining the income generating capabilities of women.

Place of Residence. The coefficients of the place of residence variables indicate some differences in annual income rates by residence categories although only the SMSA-nonfarm (NFARM) coefficient is statistically significant. Both

TABLE 6: The Income Differential Model Corrected for Occupational and Industrial Differences

VARIABLES	MODEL 1	MODEL 2[a]	VARIABLES	MODEL 3	MODEL 4[a]
HOURS	7.30	.159[b]	HOURS	9.97	.175[b]
	(2.481)**	(9.220)**		(3.441)**	(9.976)**
RACE	457.48	.138	RACE	683.88	.219
	(4.940)**	(6.161)**		(7.510)**	(9.681)**
MS	201.64	.009	MS	168.23	-.001
	(2.248)**	(.422)		(1.858)*	(-.036)
EDUCA	278.55	.088	EDUCA	395.59	.128
	(3.178)**	(4.126)**		(4.641)**	(6.041)**
EDUCB	363.63	.125	EDUCB	486.53	.169
	(4.251)**	(6.002)**		(5.748)**	(8.066)**
EDUCC	2,115.64	.372	EDUCC	2,903.76	.603
	(10.842)**	(7.862)**		(17.980)**	(15.012)**
FARM	369.31	.158	FARM	347.08	.163
	(.845)	(1.495)		(.790)	(1.493)
NFARM	633.87	.213	NFARM	647.04	.218
	(7.321)**	(10.138)**		(7.395)**	(10.024)**
NSFARM	-21.73	-.022	NSFARM	-92.29	-.049
	(-.111)	(-.475)		(-.472)	(-1.004)
OCCUPATIONS			INDUSTRIES		
FARMERS	-2,489.60	-.962	MINE	1,635.30	.581
	(-4.049)**	(-6.447)**		(1.887)*	(2.703)**
MANAGER	-783.76	-.339	CONST	1,068.04	.412
	(-3.150)	(-5.653)**		(2.062)**	(3.206)**
CLERK	-641.37	-.179	MANU	907.99	.363
	(-3.763)**	(-4.326)**		(3.922)**	(6.298)**
SALES	-1,491.87	-.435	TRANS	1,033.23	.337
	(-6.254)**	(-7.519)**		(3.247)**	(4.260)**
CRAFTS	-1,212.14	-.327	WHOLE	138.14	.072
	(-3.140)**	(-3.492)**		(.592)	(1.250)
OPERATOR	-984.38	-.231	FINAN	543.31	.207
	(-5.234)**	(-5.064)**		(1.830)*	(2.813)**
HOUSE	-2,673.52	-.980	BUS	557.24	.203
	(-12.336)**	(-18.660)**		(1.543)	(2.271)**
SERVICE	-1,569.15	-.480	PERSER	-511.46	-.196
	(-8.460)**	(-10.644)**		(-2.199)**	(-3.401)**
FARMLAB	-1,675.79	-.544	ENTER	122.16	.128
	(-5.635)**	(-7.539)**		(.273)	(1.157)
LABORER	-850.20	-.182	PROFS	683.39	.270
	(-1.177)	(-1.040)		(2.948)**	(4.691)**
			PUBLICA	1,478.11	.449
				(5.271)**	(6.441)**
INTERCEPT	3,433.66	7.528	INTERCEPT	1,498.23	6.859
	(15.322)**	(100.372)**		(6.165)**	(86.681)**
R^2	.325	.457	R^2	.313	.423
N	2,304	2,303	N	2,304	2,303

Note: The values in parentheses below the predicted coefficients of the independent variables are the computed t-values for each variable.

[a] This model uses the dependent variable in logarithmic form: log(INCOME).

[b] This variable appears in logarithmic form in this model: log(HOURS).

**Significantly different from zero at the 5% level.

*Significantly different from zero at the 10% level.

TABLE 7: Multiplicative Factors in Determining Income Differentials of the Logarithmic Model

Model 2[a]		Model 4[b]	
Variables	Multiplicative Factors	Variables	Multiplicative Factors
RACE = 1	1.15	RACE = 1	1.24
MS = 1	1.01	MS = 1	.99
EDUCA = 1	1.09	EDUCA = 1	1.14
EDUCB = 1	1.14	EDUCB = 1	1.18
EDUCC = 1	1.45	EDUCC = 1	1.83
FARM = 1	1.17	FARM = 1	1.18
NFARM = 1	1.24	NFARM = 1	1.24
NSFARM = 1	.98	NSFARM = 1	.95
FARMERS = 1	.39	MINE = 1	1.79
MANAGER = 1	.71	CONST = 1	1.51
CLERK = 1	.84	MANU = 1	1.44
SALES = 1	.65	TRANS = 1	1.40
CRAFTS = 1	.72	WHOLE = 1	1.08
OPERATOR = 1	.79	FINAN = 1	1.23
HOUSE = 1	.38	BUS = 1	1.22
SERVIC = 1	.62	PERSER = 1	.82
FARMLAB = 1	.58	ENTER = 1	1.14
LABORER = 1	.83	PROFS = 1	1.31
		PUBLICA = 1	1.57

[a]If a woman is black, resides in a nonSMSA-nonfarm place, non high school graduate, and works 40 hours per week in a professional, technical or kindred occupation her expected annual income is $3,348.00. Any other category or groups of categories are the results of the multiplicative factors.

[b]For similar conditions as in footnote a but for a woman classified in the industry of agriculture her expected annual income is $1,829.76.

TABLE 8: Annual Income Levels by Occupation and Industry Categories Adjusted for Socioeconomic Differences, Sample of Women Aged 30 to 44 Years, 1967[a]

Occupation	Income	Occupation	Income
PROF	$4,209.84	AGRIC	$2,632.54
FARMERS	1,720.24	MINE	4,267.84
MANAGER	3,426.08	CONST	3,700.58
CLERK	3,568.47	MANU	3,540.53
SALES	2,717.97	TRANS	3,665.77
CRAFTS	2,997.70	WHOLE	2,770.68
OPERATOR	3,225.46	FINAN	3,175.85
HOUSE	1,536.32	BUS	3,189.78
SERVICE	2,640.69	PERSER	2,121.08
FARMLAB	2,534.05	ENTER	2,754.70
LABORER	3,359.64	PROFS	3,315.93
		PUBLICA	4,110.65

[a]Figures for a white woman who is married with spouse present, has a high school education, is a nonSMSA-nonfarm resident, and works 40 hours per week.

SMSA categories have increased incomes -- farm, $369.31, and nonfarm, $633.87 for Model 1. The nonSMSA-farm resident earns slightly less ($21.73) than the "base" individual, the nonSMSA-nonfarm resident.

Table 9 shows the difference in income returns predicted from the linear model and weighted by own residence occupation mix (the percentage of each occupation in the residence category) and by overall occupation mix (the percentage of each occupation in the sample as a whole). Adjusted incomes show a difference between SMSA-nonfarm and nonSMSA-nonfarm of $685.29 ($3,783.82 - $3,098.53). In percentage terms, the income of a woman in a nonSMSA-nonfarm area is approximately 82 percent of the income of a woman in an SMSA-nonfarm area. This compares to a difference in cost of living between the two regions of about 85 percent as computed for the Poverty Index. These data would indicate that the income differential is not significantly different than the cost of living differential.

Part of the difference is due to the mix of occupations in nonSMSA-nonfarm areas relative to the mix in SMSA-nonfarm areas. This contributes to a $40.04 ($3,098.53 - $3,138.57) disadvantage in the nonSMSA-nonfarm areas and to a $11.38 ($3,783.82 - $3,772.44) advantage in SMSA-nonfarm areas.

Looking at the differentials predicted when industry differences are taken into consideration (Table 10), adjusted incomes show a difference between SMSA-nonfarm and nonSMSA-nonfarm residences of $703.48 ($3,751.57 - $3,048.09). This would indicate that the nonSMSA-nonfarm income is again about 81 percent of the SMSA-nonfarm income. Industrial mix differences contribute to a $30.02 disadvantage in the nonSMSA-nonfarm areas and to a $26.42 advantage in the SMSA-nonfarm areas.

CONCLUSIONS

Proportionately, more women are working today than ever before. This rise in female participation is all-pervasive, encompassing both the young and old, married and single. Increasingly, where to locate is a joint decision as more married women enter the labor force. People concerned with rural development need to know what the employment opportunities are in rural areas for females and other family members.

Labor force participation rates for women age 30-44 are not convincingly different by residence location once corrections are made for social and economic conditions. This is a weak test, however, of the availability of jobs in rural areas. Women, and families, may already have adjusted their location to meet their own conditions for labor supply. Results of succeeding questionnaires of the National Longitudinal Surveys of Work Experience will be useful to determine, if indeed, women do change their location for employment reasons.

Women most definitely do offer different amounts of work time under different conditions. Commuting time offers a restraint. Wage rates influence work time supplied. In addition, place of residence acts as a proxy for other conditions which affect amount of work time supplied. Women are willing to supply the same amount of work time in SMSA metropolitan areas only at significantly higher wage

TABLE 9: Predicted Annual Income Differentials and Annual Adjusted Incomes Weighted by Own Mix and Total Mix for Occupations, By Place of Residence, 1967

Place of Residence	Annual Income Differential by Place of Residence[a]	Annual Adjusted Income Weighted by Own Occupation Mix[b]	Annual Adjusted Income Weighted by Overall Occupation Mix[b]
SMSA-farm	+369.31	$3,396.04	$3,507.88
SMSA-nonfarm	+633.87	3,783.82	3,772.44
nonSMSA-farm	- 21.73	2,897.56	3,116.84
nonSMSA-nonfarm	-	3,098.53	3,138.57

[a]From Table 5.

[b]Occupation mix is computed from the sample and annual adjusted income from Table 8.

TABLE 10: Predicted Annual Income Differentials and Annual Adjusted Incomes Weighted by Own Mix and Total Mix for Industries, By Place of Residence, 1967

Place of Residence	Annual Income Differential by Place of Residence[a]	Annual Adjusted Income Weighted by Own Industry Mix[b]	Annual Adjusted Income Weighted by Overall Industry Mix[b]
SMSA-farm	+347.08	$3,326.85	$3,425.19
SMSA-nonfarm	+647.04	3,751.57	3,725.15
nonSMSA-farm	- 92.29	2,842.73	2,985.82
nonSMSA-nonfarm	-	3,048.09	3,078.11

[a]From Table 4.

[b]Industry mix is computed from the sample and annual adjusted income from Table 6.

rates. Women living in nonSMSA cities and towns offer the same amount of work time but only at higher wage rates than rural-farm women.[10]

Income returns are affected by mix of occupations or industries and place of residence. Both lead to lower annual income returns for women in non-metropolitan areas. The mix of jobs available in nonSMSA areas includes a greater proportion of those with lower pay. Differences in annual income returns are only slightly greater than differences in cost of living indexes.

[10]This result may be highly influenced by low inputed wage rates of farm owners.

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