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The impact of minimum wages on adult female employment and labor force participation

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CHAPTER I.

INTRODUCTION

Definition of the Problem

Much has been written on the theoretical and practical implications of minimum wage legislation; how does this legislation affect the structure of wages, the level of distribution of employment, and the distribution of income? The results of the major studies by Kosters and Welch, (20), Gramlich (14), and Mincer (23) indicate that teenage employment and labor force participation are adversely affected by minimum wages. However, these studies are not consistent in the evaluation of the impact of minimum wages on the female labor force. This inconsistency, as well as the increasing importance of the adult female labor force, suggest the need for further analysis of the impact of this legislation on the employment and labor force participation of adult women. To what extent are adult women similar to the unskilled and inexperienced teenagers in their vulnerability to minimum wage legislation? Does the displacement of workers result in the higher unemployment and lower labor force participation of adult women or is the employment of adult women augmented by the displacement of teenage workers? If the employment and labor force participation of adult women are indeed affected by this legislation, is the effect indiscriminate or differential? In other words, does any age or racial or marital status group bear a greater burden or benefit from the legislation?

The need for analysis of the impact of minimum wage legislation on the adult female labor force also calls for analysis of the determinants of the employment and labor force participation of adult women; how does the husband's income, family responsibilities, and the availability of welfare influence the adult women's employment and labor force participation? Although much research has been done using cross-sectional analysis, there are relatively few time series studies.

General Objectives

Since the existing literature does not draw any clear conclusion with respect to the impact of minimum wage legislation on the adult female labor force, the major objective of this research is to fill this void.

The initial framework for this analysis will be to combine the existing theoretical and empirical knowledge of minimum wages and the labor force participation of adult women to theoretically analyze the effect of the wage differential and displacement, which are created by the legislation, on the labor force participation and employment of adult women. This framework will then be used to construct an empirical model to estimate the impact of minimum wages on the adult female labor force.

The initial empirical analysis will draw heavily on existing empirical models and approaches, using a limited set of variables to control for variations in employment and labor force participation of adult women. The objectives of this empirical section are to attempt

to reconcile the results of the previous minimum wage studies by estimating similar quarterly time series models.

The second empirical section will attempt to expand upon the existing literature by controlling for a more inclusive set of economic and demographic determinants of female employment and labor force participation. The objectives of this section are to evaluate whether a better specified model alters the estimated impact of minimum wages.

CHAPTER II.

REVIEW OF THE LITERATURE

An understanding of the impact of minimum wage legislation on the female employment and labor force participation decision requires some understanding of the female's labor supply decision as well as the impact of minimum wages.

Both theoretical and empirical studies of the determinants of the adult female labor force participation decision have demonstrated the importance of the wage rate as well as family size, job opportunities, household technology, and social attitudes. In general, higher wages tend to draw women into the labor force; the substitution effect of a wage increase dominates the income effect. Since minimum wage legislation alters the structure of wages, such legislation should have an impact on both the labor force participation and employment of adult women.

The primary studies of the female labor supply decision are those done by Bowen and Finegan (6), Ashenfelter and Heckman (2), and Gronau (15). Other studies by Deutermann and Brown (10), Morgenstern and Hamovitch (25), and Jones and Long (18) consider the determinants of full time and part time employment.

The impact of minimum wages on employment and labor force participation is considered in studies by Kosters and Welch (20), Mincer (23), and Gramlich (14).

Major Empirical Studies of the Female Labor Force Participation Decision

Looking first at the studies of the labor supply decision, Bowen and Finegan's (6) study considers the demographic and labor market characteristics that influence the female labor force participation. Their study divides women into two groups, married and single, and empirically tests the determinants of each group's labor force participation decision by analyzing cross-sectional data.

For single women and married women, the determinants include the demographic characteristics of age, color, education, occupation and other income. For married women, the demographic characteristics also include the presence of children, the occupation of the husband. The labor market characteristics are the rate of unemployment, the female wage, the husband's wage, the wage in the domestic service industry, a measure of the availability of female-type jobs, and the relative population size of females.

For both married and single women, the estimated relationship of the labor force participation rate is positive with respect to education and age, the female wage rate and industry mix, and is negative with respect to other income, and the domestic service wage rate. For married women, the labor force participation rate is also negatively related to the presence of young children. Finally, the labor force participation of women is negatively related to the unemployment rate; the discouraged worker effect outweighs the added worker effect.

Other empirical results are that the nonwhite female labor force participation rate is higher than the white female rate, the labor force participation rate of women whose husbands are employed in either a professional or technical occupation is lower than other women; never married women have the highest labor force participation rate.

The empirical results of the Bowen and Finegan (6) study point out the various demographic and market characteristics that will influence the female labor supply decision. However, the relationship between the female labor force participation and the unemployment suggested by this study is not unambiguous. As suggested by Barnes and Jones (3), the discouraged worker effect of cyclical unemployment dominates the labor force participation of adult women because household production is viewed as an alternative to market work. During a recessionary period when the availability of jobs declines, women withdraw from the labor force and substitute home work for market work. However, the Mitchell (24) study suggests that the negative relationship between the labor force participation rate and unemployment is a characteristic of cross-sectional studies and that the positive relationship suggested by the time series studies more accurately reflects the cyclical response to unemployment. Mitchell (24) contends that the added worker effect is the cyclical response to unemployment so that during recessionary periods, adult women enter the labor force to seek employment as a way of supplementing or replacing the primary source of income.

To examine the differences in the cross sectional and time series results, the Mitchell (24) study estimates both a time series and cross sectional labor force participation equation using a panel of cross-section time-series data for 19 urban labor markets. The independent variables include the unemployment rate, a wage variable (either educational attainment or a full time female wage rate), the husband's income, a demographic variable for fertility and age. The unemployment coefficients for the within-cities (time series) regressions are generally positive and some are significant, while the within-year (cross-sectional) regression coefficients for unemployment are negative and not significant. For the pooled data, where city specific variables are included, the unemployment coefficients are positive and generally significant. These results suggest the added worker effect is the dominant effect in the response to cyclical unemployment.

Mitchell (24) also uses a time series analysis to examine the labor force participation response to differences in the average and current unemployment rate. The results indicate a rise in the female labor force participation rate when the current rate exceeds the average rate of unemployment. Cyclical unemployment induces women to enter the labor force and the negative relationship suggested by cross sectional studies is reflecting responses to specific labor market characteristics not responses to cyclical unemployment.

Both the Ashenfelter and Heckman (2) study and the Gronau (15) studies are models of the allocation of time. The Ashenfelter and Heckman (2) model analyzes the allocation of time of a family between

work and leisure, the Gronau (15) model analyzes the individual's allocation of time among market work, household production, and leisure.

The analysis of the allocation of time of a family by Ashenfelter and Heckman (2) is based on the maximization of a utility function that depends upon the husband's leisure time, the wife's leisure time and market goods and that is subject to a budget constraint and total time constraint. The hours of market work decision for the wife will depend not only upon her wage rate but also on her husband's wage rate.

The empirical results of the Ashenfelter and Heckman (2) model indicate that the female labor supply decision is positive with respect to the female wage and inversely related to the husband's wage.

Gronau (15) hypothesizes the allocation of time decision as a utility maximization problem; the individual maximizes a utility function that depends upon the consumption of commodity Z and is subject to a budget and time constraint. The commodity Z is composed of goods and services; X, and leisure time; L. The goods and services may be either purchased in the market or produced at home. The household production of X is a function of time allocated to household production; H, and is subject to diminishing marginal productivity. Maximization requires equating the ratios of the marginal utilities of market goods, leisure, and household production time to the appropriate price ratios.

Theoretically the effect of a change in the wage rate on the allocation of time between work and leisure is ambiguous. Using a cross sectional data set of married white women, Gronau (15) empirically tests the relationship of one allocation of time to the presence of children,

unearned income, the husband's wage and education, the wife's age, education, work experience and expected wage rate. For women who allocate their time among all three activities, the hours of market work are positively related to the expected wage rate and are negatively related to the level of unearned income, the husband's wage and education, the wife's age and education, and the presence of children. The hours of leisure are negatively related to the presence of children and positively related to the other variables. The hours allocated to household production are negatively related to the expected wage rate and school age children and positively related to the other variables.

The Gronau (15) study lends further support to the importance of the wife's wage rate, the husband's wage, other income, and the presence of children in explaining the labor supply decision of the adult female.

Secondly, the negative relationship between the hours of market work and the presence of children indicated by Gronau's (15) research suggests that part-time employment is a possible outcome of this decision process.

Major Empirical Studies of the Full-Time vs. Part-Time Work Decision

Only recently have a few studies of the part-time work decision become available. Our understanding of this phenomenon is much more limited than that of the labor force participation.

Deutermann and Brown (10) describe the characteristics of part-time workers; their study indicates that part-time employment has increased since 1954. The change in the composition of the labor force as well as

the growth in the service industry have generated this increase. The study suggests the major factors in choosing part-time work are enrollment in an educational program, family responsibilities, and a preference for leisure time. It also suggests that part-time workers tend to earn less per hour than full-time workers. Finally, married women are more likely to work part-time than either married men or single women and single women are no more likely to work part-time than are single men.

The study by Morgenstern and Hamovitch (25) attempts to more fully explain why married women choose to work part-time. Using Census data for white women age 16-65, not enrolled, once married, husband present, and categorizing part-time work as less than 32 hours a week, their model estimates the contributions of the female's market productivity and household productivity, the husband's market productivity relative to the wife's and family income to annual hours worked (or weeks worked). The estimated coefficients for household productivity (presence of children under the age of 6) and the husband's income are negative while the estimated coefficients of the female wage rate are positive. Morgenstern and Hamovitch (25) also estimate the wage and income elasticities of the labor supply decision of married women. The wage elasticity of the labor supply decision of married women who work full-time is less than that of married women who work part-time. However, the income elasticity of the labor supply decision of married women who work full-time is greater than that of married women who work

part-time. Finally, the hours of work decision is more significantly influenced by the presence of children for women who work full-time than for women who work part-time.

The Jones and Long (18) study examines four areas of the female allocation of time; the decision to work part-time, the characteristics of part-time workers, the relationship between part-time work and the wage rate, and the nature of unemployment. Their study uses a theoretical model of time allocation to construct and empirically analyze the characteristics of part-time workers. To examine how part-time work affects female wages, their study constructs a model based upon an assumption of most human capital models; that market wages depend upon employment experience as well as formal education. The analysis of the nature of unemployment is constructed from the time allocation model, the human capital model and a model of the jobs search process. The data sets were obtained from the National Longitudinal Survey tapes, and were for 6 year intervals. The empirical tests of the extent, characteristics, and incidences of unemployment of part-time workers uses a multivariate probit analysis and the empirical test of the earnings of part-time workers uses a standard regression analysis.

The characteristics of part-time work were analyzed by estimating the relationship of the work experience of the women to the earnings potential (the market wage rate, on-the-job training, health, race and the unemployment rate), the value of household production (the presence of children, the birth of a child, age, and education), characteristics

of the husband (income), net family assets, migration and the loss or presence of the husband.

The results of this analysis indicate that the market wage rate, the presence of children, especially preschool age children, and the husband's income are negative. These coefficients suggest that the decision to work part-time is positively influenced by the presence of children and the husband's income but negatively influenced by the market wage rate.

Jones and Long (18) also estimate the relationship between wages and part-time work by regressing the wage rate on the time periods of market work (distinguishing between full-time and part-time work), time periods of work in the home, education, health, migration, the presence of children, current employment (hours a week) and last years employment (weeks per year). The estimated coefficients for the time spent at part-time work are negatively related to the wage rate, indicating that the rate of return on work experience is less for women who work part-time than for women who work full-time.

Finally, Jones and Long (18) empirically test the relationship between unemployment and part-time work; how is the experience of unemployment (incidence, spells, and duration) affected by part-time work, the expected wage (education and work experience), the opportunity cost of job search (presence of children), demand conditions (occupation or unemployment rate), the husband's income and migration. The results indicate that the incidence of unemployment is less for part-time workers and the duration of unemployment is less for part-time workers.

However, the results are not unambiguous about the relationship between part-time workers and the spells of unemployment; part-time workers appear to experience as many spells of unemployment as full-time workers.

Summarizing, this study suggests that part-time work is a viable alternative to full-time work, especially for women whose husband is present and earns some income and who have young children in the home. However, the choice of part-time work does reduce the potential earnings of those workers.

The review of the literature on the labor force participation decision indicates that the labor supply and employment decisions of an adult female are greatly influenced by the market wage rate, the presence of children and other sources of income. Since the presence of children and other sources of income tend to negatively affect the decision to work in the market, many women voluntarily choose to work part-time even though this generally reduces their market wage.

Minimum wage legislation alters the structure of wages and will influence the employment and labor force participation decision of adult women. These empirical studies indicate that labor force participation is positively related to the market wage. Also the substitution effect of a wage change tends to dominate the income effect causing the hours allocated to market work to rise when the wage rises. If minimum wage legislation reduces the uncovered sector's wage, some women may reduce their hours of work. The labor force participation and employment of adult women can be expected to be influenced by this legislation.

However, the direction of this effect is not clear and the empirical tests of this influence are not consistent. This inconsistency indicates a need to re-examine the theoretical and empirical question of the impact of minimum wages on adult female employment and labor force participation.

Major Empirical Studies of Minimum Wage Legislation

Even less research has been done on the impact of minimum wages on adult women. The three major studies of this impact have been done by Kosters and Welch (20), Gramlich (14), and Mincer (23). The Kosters and Welch (20) study is primarily concerned with the impact of minimum wages on the distribution of employment among adult men and women and teenage workers. The impact of minimum wages on the level of employment for adult men and women and teenagers is examined in the Gramlich (14) study. Mincer's study considers the impact of minimum wage legislation on the employment and labor force participation of adult men, adult women and teenagers.

Kosters and Welch (20) hypothesize that minimum wage legislation will alter the distribution of employment between normal and transitional employment. The expectations are that such legislation will reduce the marginal workers' share of normal employment and increase these workers' share of transitional employment.

To empirically test this hypothesis, Kosters and Welch (20) estimate the coefficients for the employment shares of demographic groups based on age, sex and race. The estimated coefficient for the

share of normal employment depends upon the minimum wage, the rate of economic growth, and previous normal employment levels. The estimated coefficient for the share of transitional employment depends upon the minimum wage, the rate of economic growth, and the difference between actual employment and the level of previous normal employment.

The coefficient of marginality is the ratio of the estimated coefficient of the share of transitional employment to the estimated coefficient of the share of normal employment and the elasticity of the coefficient of marginality is the difference between the estimated minimum wage elasticity for transitional employment and the estimated minimum wage elasticity for normal employment. To support the hypothesis, the value of the coefficient of marginality should be greater than one and the elasticity of the coefficient of marginality should be greater than zero.

For all sex and race groups of teenagers, the estimated coefficients of marginality are greater than one and the estimated elasticity of the coefficients of marginality are greater than zero. These results indicate that teenagers are marginal workers and their share of normal employment is adversely affected and their share of transitional employment is positively affected by an increase in the minimum wage.

However, for all adult females, the estimated coefficient of marginality is less than one, and the estimated elasticity of the coefficient of marginality is negative for white females and positive for nonwhite females. These empirical values do not support the hypothesis

that women are marginal workers and therefore their normal employment may not be adversely affected by minimum wage legislation.

However, this model does not attempt to test what happens to the level of employment with minimum wage legislation; it only tests the impact of such legislation on the distribution of employment. The conclusion of the study is not that the employment level of adult women is positively associated with minimum wage legislation but that the minimum wage results in less transitional employment and more permanent employment for women.

The Gramlich (14) study shows that minimum wages tend to have a positive effect on full time adult female employment rates and a negative impact on their part time employment. The study also suggests a positive relationship between total female employment and the minimum wage.

Gramlich (14) hypothesizes that minimum wage legislation will alter the level and distribution of employment between full time and part time employment. The impact of minimum wages on employment depends upon the minimum wage elasticity of the demand for workers and the breakeven elasticity (the wage demand elasticity at which the most risk averse worker is indifferent to an increase in the minimum wage). To adversely affect the employment of low wage workers, the minimum wage elasticity of the demand for workers must be greater than the breakeven elasticity.

To empirically test the impact of minimum wages on the employment of adult females, Gramlich (14) uses a quarterly time series regression

analysis. The level of aggregate female employment, the level of full-time female employment, and the level of part-time female employment are regressed on the level of nonfarm output or the aggregate unemployment rate, the real minimum wage, the number of children age 1-5 as a proportion of the total population of noninstitutional adult females, and a dummy variable for the minimum wage coverage rate. For the adult female regressions, the estimated minimum wage coefficients for aggregate employment and full-time employment are positive while the coefficient from the part-time employment regression is negative. None of these coefficients are statistically significant. The estimated minimum wage elasticity is less than the estimated breakeven elasticity for both the aggregate employment and full time employment models.

Gramlich (14) concludes that the overall employment of adult women is not adversely affected by minimum wage legislation and in fact such legislation seems to reallocate women from part-time employment to full-time employment.

Mincer's (23) analysis of minimum wages argues that there are three effects associated with this legislation; displacement, unemployment, and withdrawal from the labor force. The implementation of a minimum wage in excess of the competitive wage will reduce employment in the covered sectors and therefore displace some workers. The unemployment effect results from both the decision of some displaced workers to remain in the covered sector to continue to pursue employment in this sector and the decision of some workers to enter the covered sector to seek employment at the higher minimum wage. Finally the supply of labor

will respond to the lower wage rate in the uncovered sector; the lower wage may induce some workers to withdraw from the labor force.

To empirically test the impact of minimum wage legislation on employment, unemployment, and labor force participation of adult women, Mincer (23) uses a quarterly time series regression analysis for the years 1954 to 1969. The model regresses the ratio of employment or labor force participation of adult women to the noninstitutional adult female population on the minimum wage, the unemployment rate of males age 45-54, and a time trend variable. The empirical results of the impact of minimum wage legislation on the employment and labor force participation of women indicates that the minimum wage reduces both the employment and labor force participation of adult women. (Only the coefficients for white women are significant.) The results also indicate a positive unemployment effect from such legislation.

Mincer (23) concludes that minimum wages do adversely influence the labor supply and employment decisions of adult females.

Summarizing this review of the female labor supply and minimum wage literature offers several insights.

Although the market wage rate is the primary determinant of the female labor force participation decision, this decision as well as the hours of work decision will be influenced by the marital status and characteristics of women, the family status of women, and other economic factors such as the unemployment rate and the demand for female workers.

Minimum wage legislation alters the expected market wage rate and therefore may alter the labor force participation and employment of

adult women. This review of the literature suggests that any analysis of the impact of minimum wage legislation on the labor force participation and employment of adult women must be combined with the knowledge of the determinants of the female labor supply decision.

CHAPTER III.

THEORETICAL CONSTRUCTION OF THE PROBLEM

The primary purpose of this study is to further examine both the theoretical and empirical importance of minimum wage legislation on the employment and labor force participation of adult women. The theoretical foundations for this study will be drawn from the Gronau (15) analysis of the productive household and its allocation of time, and Mincer's (23) model of minimum wages.

Theory of Minimum Wages

Mincer's (23) model suggests that minimum wage legislation has three primary effects on the supply of labor and the employment of workers. The first of these is the displacement effect. Minimum wage legislation dictates a wage rate above the competitive market wage rate and results in a loss of employment to some workers in the covered sector. Mincer (23) assumes that the probability of employment in the covered sector is a random probability. Therefore, which workers lose their jobs is unknown and the proportion of workers who lose their jobs depends upon the minimum wage and the elasticity of the demand for labor in the covered sector.

Some of the workers displaced by the legislation will choose to remain in the covered sector and continue to seek employment in this sector. Therefore, the second effect of minimum wage legislation is unemployment. The size of the unemployment depends upon the workers'

expectations of future employment in the covered sector and the expectations of the paid wage and employment opportunities in the uncovered sector.

Theoretically, the level of unemployment in the covered sector also depends upon whether the possibility of employment at the minimum wage in the covered sector induces workers from the uncovered sector to move into the covered sector and seek employment in this sector.

More specifically, Mincer's (23) model predicts that the unemployment rate in the covered sector depends upon the separation rate (δ) and the wage gap between the covered sector's minimum wage and the uncovered sector's wage. This wage gap depends upon the coverage rate (k), the elasticity of the demand for labor in both sectors, the separation rate, the elasticity of the supply of labor to the uncovered sector and the change in the minimum wage. In general, a separate increase in the minimum wage (Wm) or k or δ will cause unemployment to rise. Although Mincer's (23) model assumes that the probability of finding a job in the uncovered sector is one, increases in Wm or K will increase the displacement effect and therefore the unemployment effect. Increases in δ will also increase the unemployment rate by raising workers' expectations about employment in the covered sector. Labor will move out of the covered sector into the uncovered sector or out of the labor force if the elasticity of the demand for labor in the covered sector exceeds the separation rate; the displacement effect outweighs the turnover of labor in the covered sector.

The flow of labor into the uncovered sector will force the wage rate down. The labor supply response to this lower wage will be some withdrawal from the labor force. Given the displacement and unemployment effects, the magnitude of the withdrawal depends upon the wage elasticity of the supply of labor. The more wage elastic the supply of labor, the smaller the re-employment in the uncovered sector and the greater the withdrawal effect.

Referring to Figure 1, the three effects of the legislation may be depicted graphically:

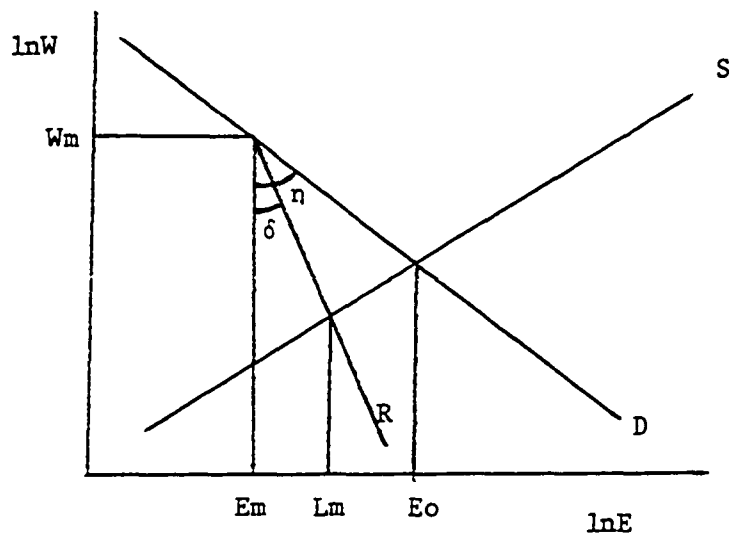

Figure 1. Covered sector

Mincer (23) assumes constant elasticities, so the slope of the demand curve, D, is the wage elasticity of the demand for labor, n, and the slope of R is the separation rate, δ. Imposing a minimum wage, W_m, reduces employment in the covered sector from E_o to E_m; the displacement effect. Given the possibility of future employment in the covered sector, because of the separation rate, some workers chose to remain in the covered sector. These workers, E_mL_m, create the unemployment effect. The remaining displaced workers, L_mE_o, either seek employment in the uncovered sector or withdraw from the labor force. The size of the labor force withdrawal effect is depicted in Figure 2. The supply of labor to the uncovered sector shifts by the amount of displaced workers who do not remain in the covered sector, L_mE_o. The increase in the supply of labor to the uncovered sector forces the wage rate down to W_n. This leads to an increase in employment of $E_{no}E_n$ and a labor force withdrawal of E_nN.

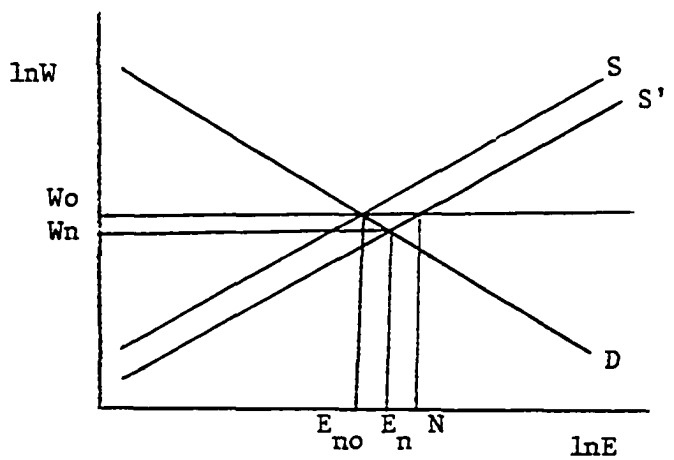

Figure 2. Uncovered sector

All else equal, the more wage elastic the demand for labor in the covered sector, the larger the displacement effect and labor force withdrawal effect. However, the more wage elastic the demand for labor in the uncovered sector, the smaller the labor force withdrawal effect. The greater the separation rate, the larger the unemployment effect and the smaller the labor force withdrawal effect. The more wage elastic the supply of labor to the uncovered sector, the greater the labor force withdrawal.

Summarizing, Mincer's (23) study suggests that minimum wage legislation has three effects. Initially the imposition of a minimum wage creates the displacement of workers. Some of these workers choose to remain unemployed in the covered sector. Other workers either accept employment in the uncovered sector at the lower wage or withdraw from the labor force.

Theory of the Female Labor Supply

How, then, do minimum wages affect the employment and labor supply decisions of adult women? A large segment of the adult female labor force is employed in the retail and service industries at relatively low wages. Many of these jobs are covered by minimum wage legislation. Theoretically the employment, unemployment, and labor supply decisions of these women will be affected by such legislation. The important questions are in what direction and of what magnitude are these effects?

To answer these questions, consideration must be given to the allocation of time decision. Using Gronau's (15) model of time

allocation, the adult woman may allocate her time among three activities; household production, market work, and leisure. The important determinants of this time allocation decision are the potential market wage rate, the marginal productivity of household production, and sources of other income.

The potential market wage depends upon the woman's level of education and training as well as the current minimum wage and the probability of getting a minimum wage job. The marginal productivity of household production depends upon the woman's level of education, the capital to labor ratio used in the production process, and the size of family. Other income is derived from the earned income of the other family members or the availability of welfare payments.

More specifically, Gronau's (15) model is one of a productive household where the objective is to maximize the utility of the household given a time and budget constraint. Utility depends upon the consumption of three things; market produced goods; X_m, household produced goods, X_H, and leisure, L. Each household has its own production function, $X_H = f(H)$, where household produced goods are a function of time allocated to such production. The time constraint allows the allocation of time among household production; H, market work; W, and leisure; L.

Mathematically the problem is to maximize U(X, L) subject to the time constraint $T^\circ = N + H + L$ and income constraint $WN + V + PXm$ where W is the earned wage rate, V is other income, and P is the average price of the market goods. Maximization requires that

$$MU_L = MU_X f'_H; \quad \frac{MU_L}{MU_{XM}} = \frac{W}{P}; \quad \frac{MU_{XH} f'_H}{MU_{XM}} = \frac{W}{P}$$

The individual will maximize utility be equating the marginal utility of time spent at household production to the marginal utility of leisure; the ratio of the marginal utility of leisure to the marginal utility of market produced goods to the wage price ratio, and the ratio of the marginal utility of time spent at household production to the marginal utility of market goods to the wage price ratio.

If hours of market work are zero, the ratio of the marginal utility of home produced goods to the marginal utility of leisure must exceed the market wage rate; the value of time spent at household production of leisure must exceed the value of time spent at market work.

One of the theoretical implications of the Gronau (15) model is that the effects of an increase in the wage rate on the working woman's allocation of time are unknown. An increase in the wage rate raises the value of market time and will reduce the time allocated to household production. However, the magnitudes of the substitution and income effects on market work and leisure are not known. Therefore the theoretical analysis cannot determine how an increase in the wage rate will affect the woman's allocation of time.

For a woman who previously did not allocate time to market work, an increase in the wage rate will induce her to reallocate her time to include market work if the new wage rate is greater than her reservation

wage rate. If the higher wage rate does not induce the woman to allocate time to market work, the increase in the wage rate will not affect her allocation of time.

A second theoretical implication of the Gronau (15) model is that increases in other income will not alter the time allocated to household production but will alter the allocation of time between market work and leisure of a woman who chooses to allocate time to market work.

Increases in nonlabor income do not change the marginal productivity of household production time or the market wage rate. Therefore the tradeoff between household production and market work will not be affected. The increase in nonlabor income does impose an income effect on the demand for leisure and market goods. If leisure is a normal good, the income effect should cause a reallocation of time between market work and leisure.

For the woman not participating in the market, an increase in other income will cause a reallocation of time between leisure and household production. If leisure is a normal good, the expected effect of the increase in other income would be a reduction in the time allocated to market work for the woman who does participate in the market and a reduction in household production for the woman who does not participate in the market and therefore an increase in time allocated to leisure.

Referring to Figure 3, with a budget constraint represented by T° V AB, and utility represented by the indifference curve Uo, the allocation of time will be $T^{\circ}H$ hours of household production, HN hours of market work, and NO hours of leisure. A higher wage rate will rotate

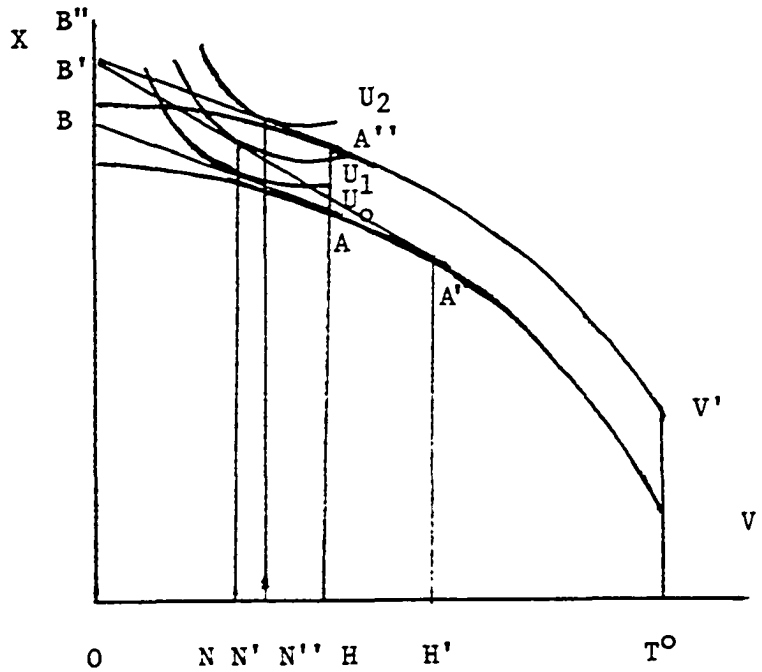

Figure 3. Allocation of time

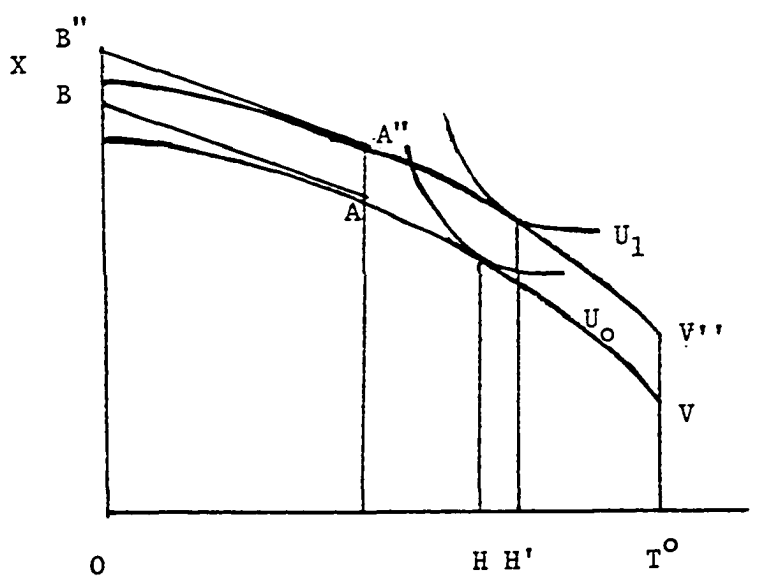

Figure 4. Allocation of time

the budget constraint to T° V A' B' and increase the obtainable level of utility to U_1. One possible response is an increase in hours of market work to H' N', an increase in hours of leisure to ON', and a reduction in the hours of household production to $T^{\circ}H'$.

The reduction in hours of household production is the only predictable response to the higher wage rate. The reallocation of time between market work and leisure is not predictable on theoretical grounds.

A decline in the market wage rate will have the opposite effect on the allocation of time to household production and an unpredictable effect on the allocation of time between market work and leisure.

Referring to Figure 3, an increase in other income will shift the budget constraint to T° V' A" B" and raise the obtainable level of utility. If leisure is a normal good, one possible response is to move to indifference curve U_2 which results in a reduction in the hours of market work to N" H and an increase in hours of leisure to ON" and no change in the hours of household production.

For the woman who does not allocate time to market work, an increase in other income will cause a reallocation of time between leisure and household production. Referring to Figure 4, the original budget constraint T° V AB will shift to T° V" A" B" and the hours of household production will fall from $T^{\circ}H$ to $T^{\circ}H'$ and an increase in leisure time from OH to OH'.

Summarizing, the basic theoretical conclusions of the Gronau (15) time allocation model are that changes in wage rates will induce women

to reallocate their time, but the direction of the reallocation between market work and leisure cannot be determined in the theoretical analysis.

One of the important implications of the Gronau (15) model is that women may adjust their hours of market work in response to changes in the expected wage rate; part of the time allocation solution may involve a choice between full-time and part-time market work. In that minimum wage legislation will alter the expected wage rate, such legislation may alter the distribution of employment between part-time and full-time as well as the level of employment.

Minimum Wages and the Female Supply of Labor

Given this basic theoretical analysis, how will minimum wage legislation alter the allocation of time of an adult woman and what are the implications of this reallocation on the employment and labor force participation decision?

By creating a wage differential, minimum wage legislation will alter the effective budget constraint faced by an adult woman. Following Mincer's (23) analysis some displaced women will seek employment in the covered sector and face a potentially higher wage rate. Other women will move to the uncovered sector and face a lower wage. This wage differential should force a reallocation of time but the theoretical analysis does not clearly specify the actual impact of minimum wages on this reallocation. Nevertheless, by examining some of the determinants of the impact of minimum wages and some of the empirical knowledge about the labor force participation decision of adult women, some tentative conclusions may be drawn.

Mincer's (23) model conditionally predicts that an increase in the minimum wage will generate some unemployment and cause some labor force withdrawal. This conclusion is conditional on there being some labor supply response to the lowered uncovered sector wage, that the elasticity of the demand for labor in the covered sector is not equal to the separation rate, and that the coverage rate is less than one.

By modifying these specifications, different results of the impact of such legislation may be obtained. If the supply of labor is fixed, the increase in the minimum wage would generate only unemployment; those workers who do not choose to remain in the covered sector will move to the uncovered sector and accept employment at the lower uncovered sector's wage.

This suggests that the more wage elastic the supply of labor, the greater will be the labor force withdrawal or the movement to part time employment.

Secondly, with a perfectly inelastic labor supply response and with the elasticity of the demand for labor in the covered sector equal to the separation rate, an increase in the minimum wage would force all displaced workers into the uncovered sector and create no unemployment.

This suggests that the smaller the difference between the elasticity of the demand for labor in the covered sector and the separation rate, the larger the unemployment effect.

Women tend to have a relatively wage elastic labor supply; women have an alternative to market work in the form of household production.

Secondly, women tend to have relatively high turnover rates; the separation rate for women may be large.

Referring to Figure 5, a wage elastic supply response, S', will encourage more women who are displaced by minimum wage legislation to withdraw from the labor force.

Referring to Figure 6, a large separate rate, δ', will create more unemployment; EmLm', than a smaller separation rate, δ, will create; EmLm. The larger separation rate will also result in fewer women moving to the uncovered sector, Lm'Eo as compared to LmEo and a smaller decline in the uncovered sector wage.

Together these two characteristics of the female labor supply should create both an unemployment effect and a labor force withdrawal effect in response to the minimum wage.

Also empirical results of the tests of the female labor force participation decision indicate that the supply of market work (the demand for leisure) is dominated by the substitution effect of a wage change. Therefore the time allocation of adult women should be responsive to the wage differential created by minimum wage legislation. The substitution effect of the decline in the uncovered sector wage should lead to a substantial labor force withdrawal or reduction in the offered hours of market work in the uncovered sector. The higher minimum wage may also create unemployment in the covered sector as women compete for the higher paying jobs.

Together the application of Mincer's (23) model and the empirical evidence of the labor force participation decision suggests that minimum

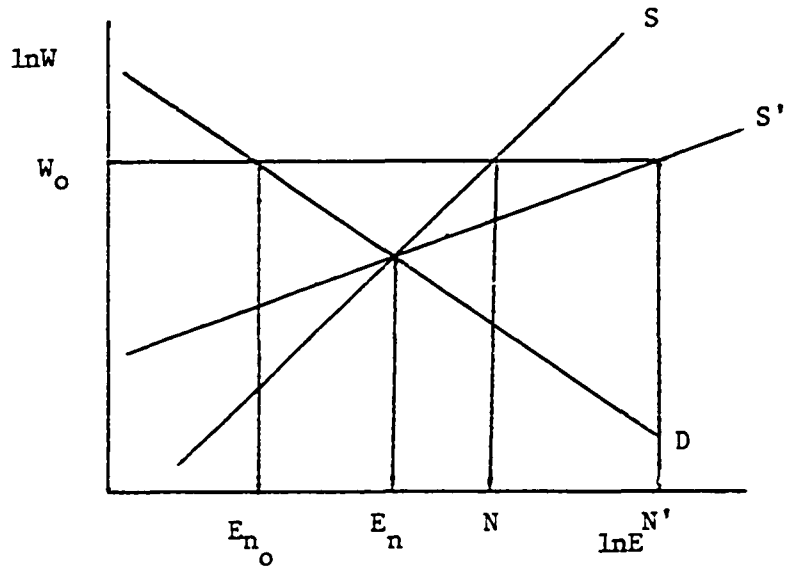

Figure 5. Uncovered sector

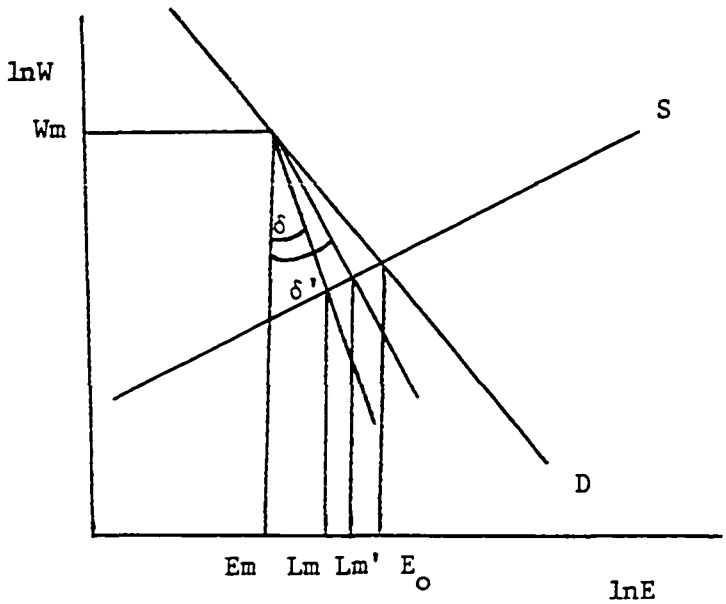

Figure 6. Covered sector

wage legislation should generate a substantial unemployment effect and labor force withdrawal effect. However, the labor force withdrawal effect may be reduced by the acceptance of part time employment.

CHAPTER IV.

CONSTRUCTION OF THE EMPIRICAL MODEL

Summary of the Minimum Wage Models

An overview of the minimum wage literature shows there are not consistent empirical results of the impact of such legislation on the adult female employment and labor force participation. The Mincer (23) study concludes that minimum wage legislation adversely affects the employment of adult women and the Gramlich (14) study concludes that this legislation does not adversely affect and may improve the employment of adult women.

Mincer's (23) study includes a theoretical discussion and empirical test of the impact of minimum wage legislation on employment, unemployment, and labor force participation. Theoretically minimum wage legislation displaces workers in the covered sector and the displaced workers face three alternatives. They may choose to remain in the covered sector and search for jobs or they may choose to seek employment in the uncovered sector or they may choose to withdraw from the labor force. Mincer (23) hypothesizes that not all displaced workers will choose to move to the uncovered sector or out of the labor force and therefore minimum wage legislation will reduce employment and labor force participation and increase employment.

To empirically test this hypothesis for the adult female labor force, Mincer (23) tests the following equation: $LnY = F(M, U, T, T^2)$

The dependent variable is the ratio of the labor force or employment of women age 20 and older to the total population of women age 20 and older (LF/P or E/P). The independent variables are a minimum wage index[1]; M, the unemployment rate of adult men age 45-54; U, and a linear and quadratic time trend, T and T^2.

$$M = \sum_i \frac{Ei}{Et} \left(Pi \frac{MPi}{AHEi} + Mi \frac{MNi}{AHEi} \right)$$

where MP is the basic minimum wage for previously covered workers, MN is the basic minimum wage for newly covered workers, AHE is the average hourly earnings of production workers, P is the fraction of previously covered nonsupervisory workers, N is the fraction of newly covered nonsupervisory workers, E is employment, t indexes the total nonform economy, and i indexes the major industries within the nonform economy.

Quarterly time series data for the period 1954 to 1969 are used and the minimum wage variable is entered with an Almon distributed lag of six or eight quarters.

The minimum wage coefficients are negative for both white and nonwhite women but the coefficients are statistically significant for only the white females. The coefficients for white females also indicate that the employment effect is stronger than the labor force participation effect; white female unemployment will be positively affected by minimum wage legislation. Mincer (23) concludes that the adult female

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[1]The minimum wage index is the one constructed by the Bureau of Labor Statistics (35).

labor force and employment are significantly affected by this legislation.

The Gramlich (14) study hypothesizes that minimum wage legislation alters the level and distribution of employment. The major concern of this study is to consider the income redistribution effects of minimum wage legislation and to do so Gramlich (14) must consider the impact on employment. Because his study is considering how the welfare of low wage workers is affected by minimum wage legislation, he hypothesizes that the importance of the impact of this legislation is how it alters the distribution of employment between full-time and part-time employment. Part-time employment is viewed as less desirable than full-time employment because it results in lower wages and fewer hours.

To empirically test the impact of this legislation on adult women, Gramlich (14) uses a set of regression models based on a CES production function of the demand for labor:

$$\ln E = g\,[L(\ln R),\ L(\ln Q),\ T,\ \ln K,\ C]$$

$$\ln E = g\,[L(\ln R),\ L(\ln U),\ T,\ \ln K,\ C]$$

$$\ln E = g\,[L(\ln R),\ L(\ln E^{d}),\ T,\ \ln K,\ C]$$

where E is the civilian nonagricultural employment of adult women (aggregate employment, full time employment and part time employment), Q is civilian nonagricultural output, R is the minimum in real dollars, t is a time trend variable, U is the aggregate unemployment rate adjusted by the demographic composition, K is the number of children age one to five as a proportion of the total population of noninstitutionalized adult females, E^{d} is the employment of all teenagers and adults, and C is a dummy variable for changes in the coverage rate.

Each model is estimated using total employment, full-time employment, and part-time employment as the dependent variable and the first model is estimated twice, the second estimation constrains the Q coefficient to equal 1. Each model is estimated with an autoregressive procedure where the minimum wage is entered with an Almon lag of four or six quarters. Quarterly time series data are used; the total employment model covers the period 1948 to 1975 and due to data limitations the full-time and part-time models cover the period 1963 to 1975.

For adult females, three of the four minimum wage coefficients in the total employment and full-time employment models were positive. For the total employment model, the negative coefficient is found in the model that constrains the Q coefficient to equal 1 and for the full-time employment model, the negative coefficient is found in the model that includes the unemployment variable. All minimum wage coefficients in the part-time employment models are negative.

Gramlich (14) concludes that minimum wage legislation does not force adult women out of the higher wage jobs and into the low wage part-time jobs and hypothesizes that the reverse may be true. Therefore, minimum wage legislation does not adversely affect the employment of adult women.

Analysis of the Conceptual and Empirical Differences of the Minimum Wage Models

The summary of the Mincer (23) and Gramlich (14) studies suggests that the differences in the approach and estimation procedures may

account for the conflicting results. Since Gramlich's (14) major consideration is the impact of minimum wage legislation on the welfare of low wage workers, the model is concerned with estimating the impact of minimum wages on the distribution of employment between full time and part time. Mincer's (23) objective is to analyze how minimum wage legislation affects not only the demand side of the market but also the supply side. Therefore, Mincer (23) is concerned with estimating the impact of minimum wages on both employment and labor force participation. The differences in the emphasis of the studies lead to the construction of somewhat different empirical models. These differences may provide a partial explanation of the conflicting results of these two studies.

One possibly important difference is the specification of the dependent variable. Both studies estimate the contribution of the minimum wage to employment. Mincer (23) measures employment as a function of the population and Gramlich (14) measures the absolute level of employment. Therefore Gramlich's (14) measurement of employment may reflect a long run trend of a larger absolute number of employed workers but it does not reflect accurately the percentage of a demographic group, such as adult women, that is employed; this measurement does not control for any trends in the size of the population. Given the upward trend in the labor force participation and employment of adult women, not controlling for the population size may disguise the true impact of this legislation on their employment. Although Mincer (23) does not

estimate models for full-time and part-time employment, the same specification problem may occur in the Gramlich (14) models. Use of the absolute levels of full-time and part-time employment fails to control for any trends in total employment and a more accurate measurement may be the fraction of total employment that is full-time and part-time.

Another possibly important difference is one specification of the independent variables. Mincer (23) uses the standard B.L.S. measure of the coverage-adjusted ratio of the minimum to average wage, and Gramlich (14) uses the real minimum wage and a separate dummy variable for the years when there is a change in the coverage rate. The real difference between the Mincer (23) specification and the Gramlich (14) specification is the inclusion of the coverage rate.

The inclusion of a separate variable for the coverage rate separates the effects of changes in the minimum wage and changes in the coverage rate. Mincer's (23) theoretical analysis suggests either an increase in the wage rate or the coverage rate will reduce total employment. However, a change in the wage by itself will generate a smaller employment effect than the same change in the wage that is accompanied by an increase in the coverage rate. Gramlich (14) argues that changes in the coverage rate have a separate and distinct effect on the level of employment. Increases in the coverage rate will reduce employment in sectors that were originally part of the uncovered sectors, as well as in sectors which continue to be covered.

There is no absolute argument in favor of either specification. In the context of legislated automatic increases in the minimum wage, the wage rate may change more frequently than the coverage rate. Therefore, the wage rate may have a separate and important effect on employment. However, Gramlich's (14) specification of the coverage variable as a dummy variable limits the measured impact. C = 1 only for the years when there is a change in the coverage rate and it is not clear that the effect is so limited. The B.L.S. measurement of the minimum wage variable is constructed by combining the minimum wage and coverage rate in the "old" covered sector and the minimum wage and coverage rate in the newly covered sector. Therefore, the B.L.S. measurement does incorporate the separate effect of the newly covered sector but it does not place any time constraint on this effect. Therefore, these different specifications of the coverage variable may partially explain the different results of the two studies.

These studies also control differently for long run trends in the labor supply decision of adult women. Mincer (23) uses a linear and a quadratic time trend variable; T and T^2, and Gramlich (14) uses a variable for childcare responsibilities, K as well as a linear time trend.

Labor force participation studies of adult females indicate that household responsibilities and other sources of income influence the female labor supply decision and therefore, their employment. Neither model adequately controls for these nonmarket factors. A general time trend variable may pick up the effects of more than one factor. This

may reduce its effectiveness as a significant explanatory variable. Although the childcare variable is an important determinant of the adult female labor force participation and employment, it is only one of the nonmarket factors that influence these decisions.

Admittedly any empirical model testing the impact of minimum wage legislation on the employment of adult females will have problems specifying variables that represent these nonmarket factors. The exclusion of these variables may bias the estimated coefficients of the included variables and may provide a partial explanation of the different results of the two studies.

Finally, the two studies use a different variable specification for the measurement of economic activity. Mincer (23) uses the unemployment rate of adult men age 45 to 54 and Gramlich (14) uses the aggregate employment or unemployment rate or the aggregate level of nonform output.

Changes in the level of output and changes in unemployment or employment reflect the cyclical nature of the economy. Mincer's (23) variable, by measuring the unemployment of men established in the labor market and their occupations, captures the existence of cyclical unemployment. Because of evidence that secondary workers move in and out of the labor force over the business cycle, the aggregate employment or unemployment variable of the Gramlich (14) model does not reflect as accurately the cyclical nature of the economy. Therefore, if the rate of unemployment is to be used as a variable, Mincer's (23) specification is preferred.

Construction of the Models

In order to establish the impact of minimum wages on the adult female labor force participation and employment, not only must the Mincer (23) and Gramlich (14) models be re-estimated, a more extensive model must be constructed. The labor force participation studies and time allocation models suggest that the adult female labor force participation and therefore employment are governed by the presence of household responsibilities, alternate sources of income, job availability and the value of market work.

The positive relationship between the value of market work and the labor force participation of adult women is well-documented. However, the employment and labor force participation of women also depends upon the availability of employment. Mincer (23) suggests this in the analysis of the separation rate and includes a measurement of the unemployment rate as an index of this overall demand for labor. Bowen and Finegan (6) suggest the time allocation decision also depends upon the occupational distribution of employment. Women tend to be concentrated into a small number of occupations and the percentage of total employment in these occupations measures a large part of the demand for female labor.

The labor force participation and employment of adult women also depends upon nonmarket factors. As Gronau (15) points out, women have an alternative to market work in the form of household production. Children represent a major source of household responsibilities and the labor force participation studies of women indicate that the presence

of children does affect their market work decision. However, women with children do choose market work as part of their allocation of time. For these women there is not only a positive return (the wage rate) but also a cost (foregone household production or the cost of domestic service) associated with market work. So both the return and the costs must be considered in the time allocation decision.

The marital status of women also influences the labor force participation and employment decision. The presence of a husband implies household responsibilities and an alternate source of income. The absence of a husband implies the alternate source of income may be welfare income.

This suggests constructing models similar to those used by Mincer (23) and Gramlich (14) and a more extensive model than includes variables representing the return and cost of market work, other sources of income, and the occupational employment mix.

For the replications of the Mincer (23) and Gramlich (14) models, the two basic equations to be estimated are:

$$(1) \quad \ln Y = f(M, U, T, T^2)$$

$$(2) \quad \ln X = f(\ln R, \ln U, \ln K, C, T)$$

where Y is the ratio of either the labor force or employment of women age 20 and older to the population of women age 20 and older, M is the B.L.S. minimum wage, U is the unemployment rate of men age 35 to 54, T and T^2 are time trends, X is either the labor force, aggregate employment, full time or part time employment of women age 20 and older, R is the real minimum wage, C is the coverage rate, and K is children

in the home. The replications of these studies cover the same time periods as Mincer (23), 1954-1969, and Gramlich (14), 1949-1975, for aggregate employment and 1963-1975 for full-time and part-time employment, and are based on quarterly data.

For the extended model, an annual time series regression analysis is used and covers the period from 1950 to 1977. The estimated equation is

$$(3) \qquad \ln Y = f\ (M,\ M_1,\ RWA,\ E,\ R,\ K,\ Hy,\ ADC,\ P_D,\ O).$$

The independent variables are the current and quarterly one year lagged B.L.S. minimum wage measurement; M and M_1, median educational attainment; E, the real full time female earnings; RWA, the unemployment rate of men age thirty-five to fifty-four; U, the presence of children; K, the median husband's income; Hy, median welfare income; ADC, the price of domestic service; P_D, and the occupational mix; O. The dependent variables, lnY, are the employment and labor force to population ratios. The dependent variable is stratified by marital status to capture any differential impact. Data on the labor force participation and employment of women by marital status are only available as annual data in the March Special Labor Force Reports (38) and thus limits the model to one observation per year.

Reconciliation of the Mincer (23) and Gramlich (14) studies requires the use of two different measures of the minimum wage; the real minimum wage and the B.L.S. minimum wage index. The real minimum wage is constructed by dividing the nominal minimum wage by the consumer price index. The minimum wage index, as mentioned previously, is based

upon the index published by the B.L.S. and interpolated to quarterly observations, taking into account the timing of wage increases. The real minimum wage variable is used in the re-estimation of the Gramlich (14) model. The minimum wage index is used in the re-estimation of the Mincer (23) model.

Both studies control for the cyclical nature of the economy by including a measurement of unemployment. This re-estimation procedure will include a variable, U, which is the quarterly unemployment rate of men age 35 to 54 and is constructed from the unemployment data published by the Bureau of Labor Statistics (36).

The reconciliation of Mincer's (23) and Gramlich's (14) models also requires estimating the contribution of the presence of children to the labor force participation and employment decision. To control for this, the variable K is constructed as the ratio of ever married women with children under the age of six to all women. To construct this ratio the ratio of ever married women with children under the age of six to all ever married women is multiplied by the ratio of all ever married women to all women. Since it is primarily the presence of young children in the home that influences the woman's allocation of time, this variable should provide an adequate measurement of the responsibilities of child care. Although this measurement does not show a substantial increase during the "baby boom" years, it does show a steady decline during the late 1960s and the 1970s. The data for this variable are available in the annual March Special Labor Force Report (38),

Marital and Family Characteristics, 1959-1978 (32), and the CPR Series P-50 Labor Force Reports, 1948-1958 (38). Quarterly data were obtained by interpolation.

The re-estimation of the Mincer (23) and Gramlich (14) models also requires the inclusion of a set of dummy variables and time trend variables. The re-estimation model of the Mincer (23) model includes a dummy variable for the change in the B.L.S. estimation procedure of the employment and labor force participation data; D=1 after 1962, second quarter, and a set of seasonal dummy variables. The replication of the model also includes a linear and quadratic time trend variable. The replication of the Gramlich model includes three dummy variables, one for each change in the coverage rate. The coverage variable equals one if the rate changed in that year. The replication of the Gramlich (14) model also includes a linear time trend variable and three seasonal dummy variables.

The dependent variable, the ratio of the labor force participation or employment of adult women to the adult female population, is available from the B.L.S. quarterly labor force participation and employment data. The full-time and part-time employment data are also available from the B.L.S.

The extended model's independent variables are the minimum wage, the unemployment rate, the full-time female earnings, educational attainment, the presence of children, the husband's income, the aid-to-dependent children payment, the cost of domestic service, and the occupational mix. The dependent variables are the ratio of labor force

to population and the employment to population of all women age 14 years or older by marital status and the labor force participation to population of women age 20 to 24, age 25 to 34, and age 35 to 44 by marital status.

The dependent variable data are available in the CPR series P-50 Labor Force Reports and Special Labor Force Reports; Marital and Family Characteristics.

The minimum wage variable in this extended model is the standard B.L.S. variable that is used in the re-estimation of the Mincer(23) model.

The unemployment variable used in the extended model is the unemployment rate of men age 35-54 for the first quarter of the year. This measurement was chosen because of the survey period for the dependent variables.

Since the studies of the female labor force participation decision suggest that the value of nonmarket time significantly influences this decision, the extended model includes two measurements of this alternative to market work. One alternative to the women's own household production is to hire domestic service. The cost of this domestic service provides an estimation of the value of household production. The variable P_D is the annual consumer price index measurement of the cost of domestic service in constant dollars and is available in the Consumer Price Index (37).

The other nonmarket time variable is the presence of children. The extended model variable, K, is the ratio of all ever married women

with children ever born to all women age 14 to 54. It is constructed from the ratio of all ever married women with children ever born to all ever married women and the ratio of all ever married women to all women. These data are available in the CPR Series P-20 Population Characteristics (33).[1]

The influence of the alternative sources of income on the employment and labor force participation decision is controlled for with the variables for the husband's income and the availability of welfare. The husband's income variable, Hy, measures the median annual income of a male head of household whose wife is present and the welfare variable, ADC, measures the average annual aid-to-dependent children payment per recipient. The data for the husband's income variable are available in the Series P-60; Consumer Income, of the Current Population Reports (33). The average annual AFDC payment per recipient is available in the Social Security Bulletin. Both income measurements are adjusted by the consumer price index and therefore in constant dollar terms.

The empirical model will control for the demand for female labor with a measurement of the occupational mix. The variable O is the ratio of employment in the sales, service and clerical occupations to total employment. Since women tend to be crowded into these occupations, this ratio should provide a reasonable estimation of the demand for female labor. The ratio is constructed from 4th quarter data available in the

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[1]Although this is a different measurement of the children variable than the one used in the replication of the Mincer (23) and Gramlich (14) studies, initial regression results do not indicate that the estimation of the coefficient is highly sensitive to the new specification.

Monthly Report on the Labor Force (36). Since this series moves smoothly it should not be too sensitive to this limitation.

The most difficult variable to construct is the variable that measures value of the woman's market time. The minimum wage variable measures only the return to market work in the covered sector. There are no time series data available on the average hourly wage paid to females for the period of 1949 to 1977. The closest approximation of the earnings opportunities for women is the median annual wage and salary income of women that is available in the Current Population Reports Series P-60; Consumer Income (31).

A variable measuring the relative return to market work for women may be constructed by using the ratio of the median annual wage and salary income of women to the median annual wage and salary income of men. However, an analysis of this variable reveals some problems in interpreting its contribution to the employment and labor force participation decision. The female-male wage gap widens during the 1950s and 1960s and then narrows during the 1970s. Since the hours of work and the investment in human capital will affect both female and male wages, changes in either determinant will affect the relative measurement and possibly bias the estimated contribution of the return to market work. The presence of discrimination also affects the size of the female-male wage gap. Finally there is a selectivity bias associated with the measurement of the female wage and this bias may affect the size of the wage gap. The value of a woman's nonmarket time tends to exceed that of a man's. Therefore, a larger portion of the wage offer distribution for

women is unacceptable and this portion is not observed. As Gronau (16) points out, this bias results in an overestimation of the value of market time for women and underestimates the size of the male-female wage gap.

The most important consideration to this discussion is the relationship between the hours of work pattern and the wage differential. Since women tend to work fewer hours than men, their median annual income will be less than men's, even if the average hourly wage gap is small. This consideration reduces the income ratio's effectiveness as a measurement of the value of the female's market time. This measurement problem is particularly important to the question of the distribution of employment between full-time and part-time employment. The median annual wage and salary income of women depends upon the hourly wage rate and the hours of work. Therefore, this wage measurement may not be completely independent of the hours of work decision. Does the annual wage and salary income ratio change because of a change in the hours of work or because of a change in the wage rate? Since this income ratio does not control for the hours of work pattern of women, the measurement may bias the estimated contribution of this variable to the employment and labor force participation decision.

Another possible measurement of the return to market work is the real median annual wage and salary income of women who work full time. This variable is constructed from the CPR Series P-60 (31) and the Consumer Price Index (37). By holding hours of work constant, this measurement eliminates the bias associated with variations in weeks and hours worked per

year. If part-time wages move in proportion to full-time wages over time, then this measurement may better capture the hourly wage rate for an adult female. This measurement of the return to market work is used in a study by Cain (7) and has the appropriate sign for married women whose husbands are present and for women other than ever married.

The full-time wage and salary income measurement is available only from 1955 and as a result it was necessary to exterpolate back to 1950 by estimating the equation

$$RWA = \delta_0 + \delta_1 \, WTH + \delta_2 \, WPH$$

where RWA is the real median annual full-time female income, WTW is the real median annual female wage and salary income multiplied by the ratio of total employment to full-time employment of females and WPH is the average part-time hours worked multiplied by the ratio of part-time female employment to full-time female employment.

The equation was derived from an equation measuring median wage and salary income;

$$TRW = \frac{\Sigma M_{PT} W_{PT} + \Sigma M_{FT} W_{FT}}{N}$$

where M_{PT} is the part-time wage rate, W_{PT} is hours worked part-time, M_{FT} is the full-time wage rate, W_{FT} is hours worked full-time and N is the total number of workers. To simplify the equation, M_{PT} and M_{FT} were assumed to be constant across workers. The data for these variables are available in the CPR series P-60 Consumer Income (31), CPR Series P-50

Work Experience of the Population (34) and the Special Labor Force Reports Work Experience (39).

Another possible measurement of the return to market work is the educational attainment of women. Education increases the expected wage rate and to the extent that changes in job training are correlated with changes in formal education, educational attainment may control for the return to market work.

The Bowen and Finegan (6) study indicates a positive relationship between the labor force participation rate and educational attainment, and the Gronau (15) study indicates a positive relationship between the hours of work and educational attainment. Ferber and Lowry's (11) study of sex differentials in earnings shows a positive relationship between female earnings and educational attainment but that the return is less for women than for men. An analysis of the median annual income of women by educational attainment also suggests there is a positive monetary return to education. However, these relationships were found in cross-section studies rather than time series.

An analysis of the median education attainment of women over time shows an increase in the median since the 1950s. The time path for the educational attainment is different than the time paths for the two alternate sources of income and therefore the inclusion of this variable should provide additional information about the determinants of the employment and labor force participation decision of adult women.

The educational variable, E, included in the extended model, is the median educational attainment of women in the labor force and is available annually in the Handbook of Labor statistics (37).

CHAPTER V.

RECONCILIATION OF MINIMUM WAGE MODELS

My attempts in this section to re-estimate Mincer (23) and Gramlich (14) minimum wage models leads to some reconciliation of the impact of minimum wages on the employment and labor force participation of adult women. With a few exceptions, the results also indicate that the employment and labor force participation decisions are inversely related to unemployment. Most of the regression coefficients for unemployment are negative. Although some of the regression coefficients are negative, the time series variation of the children does not appear to adversely affect the aggregate labor force participation and employment of adult women. The results suggest that the presence of children primarily affects the hours of work decision; the presence of children is positively related to part time employment.

Since the major concern of the empirical analysis is to determine the impact of minimum wage legislation, the emphasis of the discussion of the empirical results will be on this variable. Major exceptions to the above mentioned conclusions will be noted.

Re-estimation of Mincer (23) Model

The first empirical model re-estimated is the Mincer (23) model. The dependent variable is the proportion of noninstitutionalized civilian white or nonwhite females age 20 and older who are members of the labor

force or who are employed. The independent variables are the Almon lag minimum wage variable[1], the current and previous quarterly unemployment rate for men age 35-54, three seasonal dummy variables, a dummy variable for definitional changes (1962-), and a linear and quadratic time trend variable. The model is estimated for the period 1954 to 1969.

The estimated elasticities for white females are shown in Table 1a, columns 3 and 4 and the estimated elasticities for nonwhite females are shown in Table 2a, columns 3 and 4. All elasticities are computed using the regression coefficients and mean values of the variables. (The individual eight quarter minimum wage coefficients are in Table 1b and 2b, columns 3 and 4.) All minimum wage elasticities (ΣBm) are positive and those for the nonwhite females are significant.

These minimum wage results do not agree with those of the Mincer (23) study. In that study the minimum wage elasticities are negative and significant for white females and negative but insignificant for nonwhite females.

Although this study does re-estimate the Mincer (23) study, it does not exactly replicate it; the specification of the unemployment and Almon lag minimum wage variable differ. Mincer's (23) study uses the unemployment rate of men age 45 to 54 as opposed to men age 35 to 54. However, this difference would not seem to be a major problem and the regression results do have consistently negative signs, although they differ in magnitude.

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[1]The Almon lag variable is created by using an 8 quarter lag period and a third degree LaGrangian polynomial. The weights are not constrained to equal 1 in either the first or the last period. The minimum wage data is the standard B.L.S. measurement.

TABLE 1a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WHITE WOMEN AGE 20+, 1954-1969[a]

	Mincer (23) Almon		Long Almon lag		Unconstrained lag	
	LF/P	E/P	LF/P	E/P	LF/P	E/P
ΣB_m	-.023 (7.20)[b*]	-.035 (9.12)[b*]	.025 (1.78)	.028 (1.01)	.063 (1.48)[b]	.060 (1.53)[b]
ΣP_u	.258 (2.57)	-.636 (4.34)[b*]	-.001 (-7.07)*	-.003 (-1.31)	(-.029) (-5.57)[b*]	(-0.66) (-32.9)[b*]
B_t	-.80 (-1.09)	-1.22 (-1.74)	.086 (.002)	.074 (.002)	.112 (6.38)*	.122 (7.41)*
B_{t^2}	.002 (6.32)	.002 (7.19)	.028 (.002)	.028 (.002)	0 (-.10)	0 (-.62)
R^2	.98	.99	.945	.932	.959	.969
d	1.64	1.79	.803[c]	.496[c]		
N	64	64	64	64	64	64

[a] t-statistics are in parentheses.

[b] F-statistic.

[c] Note the size of the Durbin-Watson statistic.

* Statistically significant at 5% level.

TABLE 1b

REGRESSION COEFFICIENTS FOR ALMON LAG AND UNCONSTRAINED LAG MINIMUM WAGE VARIABLE - LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WHITE FEMALES AGE 20+ 1954-1969

	Mincer (23)		Long Almon lag		Unconstrained	
	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_{m1}	-.007	-.015	.0008	.0009	.001	-.0002
B_{m2}	-.005	-.008	.0001	.0002	-.0004	.0005
B_{m3}	-.003	-.003	-.0001	-.0001	-.0005	-.0005
B_{m4}	-.018	0	-.0001	-.0001	.0025	.0025
B_{m5}	-.002	0	.0002	.0001	-.0015	-.0015
B_{m6}	-.003	-.002	.0003	.0003	.0004	.0009
B_{m7}	-.004	-.006	.0004	.0003	.0014	.0014
B_{m8}	-.006	-.013	-.0008	-.0007	-.0009	-.0012

TABLE 2a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF NON-WHITE WOMEN AGE 20+, 1954-1969

	Mincer (23) Almon		Long Almon lag		Unconstrained lag	
	LF/P	E/P	LF/P	E/P	LF/P	E/P
ΣB_m	-.004 (1.68)[b]	.002 (1.90)[b]	.063 (2.82)*	.095 (3.21)*	.063 (.859)[b]	.063 (1.69)[b]
ΣB_u	-.026 (.19)[b]	-1.84 (4.81)[b]*	-.006 (-5.07)*	-.008 (2.59)*	-.008 (.431)[b]	-.007 (24.84)[b]*
B_t	3.17 (1.96)	2.18 (1.26)	.09 (.002)	.058 (.001)	.09 (4.88)*	.083 (4.29)*
B_t^2	0 (-.22)	0 (.34)	0 (0)	0 (0)	-.028 (-1.74)	-.028 (-1.44)
	1.87	1.58				
R^2	.84	.89	.846	.781	.866	.902
d	1.87	1.58	1.91	1.51		
N	64	64	64	64	64	64

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 2 b

REGRESSION COEFFICIENTS FOR ALMON LAG AND UNCONSTRAINED LAG MINIMUM WAGE VARIABLE - LABOR FORCE PARTICIPATION AND EMPLOYMENT OF NONWHITE FEMALES AGE 20+ 1954-1969

	Mincer (23)		Long Almon lag		Unconstrained	
	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_{m1}	-.027	-.052	-.0002	-.0016	.00003	-.0015
B_{m2}	-.013	-.020	.0003	.0007	-.0003	.0005
B_{m3}	-.002	.003	.0007	.0014	-.0007	-.0023
B_{m4}	.006	.0018	.0005	.001	-.0001	.0028
B_{m5}	.010	.024	.00001	.002	.0019	.002
B_{m6}	.010	.023	-.0004	-.0007	.0002	-.0002
B_{m7}	.007	.013	-.0007	-.0009	-.0034	-.0023
B_{m8}	.001	-.005	.0018	.0026	.004	.0033

To create the Almon lag variable, this study used a third degree polynomial function while the Mincer (23) study used a second degree polynomial function. The specification of the degree of the polynomial will determine the values of the Almon variables and the weights of the Almon variables. Therefore the degree of the polynomial will determine the minimum wage coefficients and the inconsistency of these two sets of results may lie in the specification of the degree of the polynomial function.

To verify the results of this study, the same regression equation was re-estimated by entering the minimum wage variable as an unconstrained 8 quarter lag variable. The results of this exercise are in Table 1a, columns 5 and 6 and Table 2b, columns 5 and 6. (The individual 8 quarter coefficients are in Table 1b and 2_b, columns 5 and 6.) The minimum wage elasticities are positive although none are significant. Although all the unemployment elasticities are negative, the size of the elasticities appear, in some cases, to be sensitive to the Almon lag procedure.

The results of the unconstrained lag and the re-estimated Almon lag regressions are similar. This suggests the differences in these results and Mincer's (23) may not be totally attributed to the Almon lag procedure. The re-estimation procedure attempted to duplicate as closely as possible the data set and regression procedure used by Mincer (23). Mincer (23) reports only the means of his data set so the data set used in this study is constructed from what specifications are stated in his article.

These data were checked for questionable observations by plotting the observations and by comparing the means with those of the Mincer (23) study. The means are reported in the summary table in the Appendix. The means of the dependent variables are virtually the same. (None differs by more than .001.) Given the differences in the age categories for the unemployment variable, the means for this variable are slightly different. (Mincer's unemployment mean is .0323 while the mean for this study is .0315.) As stated earlier, the differences in this specification should not significantly affect the results. Therefore, differences in the minimum wage variables may possibly create some of the discrepancies in the empirical results. The means are slightly different; Mincer's (23) mean is 32.1, while the mean of this study is 31.5. This slight difference may be due to the interpolation procedure. However, Mincer (23) uses the teenage minimum wage series for the adult female regressions while this study uses the all groups series. Mincer (23) justifies the use of this series on the basis of the similarity of the distribution of employment. Both series do exhibit the same trends and therefore this difference should not significantly affect the empirical results.

The examination of this data set does not suggest any serious deficiencies in the data. Other than the difference in the Almon lag procedure, the cause for this discrepancy in the results is not clear.

Since the results of the unconstrained minimum wage model are consistent with those of the re-estimation of the Mincer (23) study,

the results suggest that minimum wage legislation does not adversely affect the labor force participation and employment of adult women.

Re-estimation of Gramlich (14) Model

I also re-estimated the Gramlich (14) model. The dependent variable is the aggregate employment (or part-time or full-time employment)[2] of noninstitutionalized civilian women age 20 and older. Although the Gramlich study only used employment as a dependent variable, this study re-estimated his model using both employment and the labor force of noninstitutionalized civilian women age 20 and older as dependent variables. The independent variables are the Almon lag minimum wage[3], the quarterly unemployment rate of men age 35 to 54, the proportion of women age 20 and older with children under the age of six, three dummy coverage rate variables (one for each change in the coverage rate, C = 1 if the coverage rate changed in that year), three seasonal dummy variables and a linear time trend variable. The aggregate unemployment model is estimated for the period 1949 to 1975 and the full-time and part-time models are estimated for the period 1963 to 1975. The aggregate unemployment model is also estimated for the period 1963-1975.

The results are shown in Table 3a, columns 2 and 3, and Table 4a, columns 3, 4, and 5. (Individual 4 quarter minimum wage coefficients

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[2]The full-time employment measurement includes women who usually work full-time but are involuntarily working part-time where full-time is defined as 35 hours or more a week.

[3]The Almon lag variable is created by using a 4 quarter lag period and a third degree LaGrangian polynomial. The minimum wage variable is the real minimum wage. Gramlich (14) uses a 4 quarter lag period but does not specify the degree of the polynomial.

TABLE 3a

ELASTICITY COEFFICIENTS (ELASTICITIES) - LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20 AND OLDER 1948-1975[a]

	Gramlich (14)	Long Almon lag	
	E	LF	E
B_m	.028 (1.3)	-.047 (.249)	-.097 (.377)
B_u	-.03 (-4.8)*	.034 (-4.60)*	-.0537 (5.99)*
B_k	-.08 (-2.0)*	-.274 (-2.01)*	-.038 (-2.45)
B_t	.007 (26.3)*	.0024 (10.6)*	.003 (10.18)*
B_{c1}	b	.0122 (.949)	.0215 (1.36)
B_{c2}	b	.0068 (-.507)	-.0038 (-.226)
B_{c3}	b	.0007 (.05)	.0078 (.478)
R^2	.999	.999	.999
d	.34	1.81	2.02
N	108	108	108

[a] t-statistics are in parentheses; degrees of freedom (13,104).

[b] These results are not reported.

* Statistically significant at 5% level.

TABLE 3b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT
OF WOMEN AGE 20+, 1949-1975

	LF	E
B_{R1}	-.220	-.176
B_{R2}	.233	.138
B_{R3}	.091	.049
B_{R4}	-.151	-.108

TABLE 4 a

ELASTICITY COEFFICIENTS (ELASTICITIES) - FULL TIME, PART TIME AND AGGREGATE EMPLOYMENT OF WOMEN AGE 20 AND OLDER, 1963-1975[a]

	Gramlich (14)		Long Almon lag		
	FT	PT	FT	PT	E
ΣB_R	-.004 (.1)	-.100 (.8)	.376 (.289)	-.031 (.059)	-.159 (.341)
B_u	-.031 (-6.8)*	-.034 (2.1)*	.054 (1.30)	-.079 (-4.38)*	-.070 (-4.63)*
B_k	-.22 (1.6)	-1.26 (2.8)*	-1.42 (-1.09)	-1.03 (-1.79)	-.995 (-2.07)*
B_t	.006 (4.6)	-.001 (.3)	.0009 (.376)	.0023 (2.16)*	.0011 (1.27)
B_{c2}	b	b	.015 (.261)	.0097 (.377)	.0252 (1.18)
B_{c3}	b	b	-0.16 (.338)	-.0133 (.613)	.0117 (.653)
R^2	.997	.985	.999	.999	.999
d	1.26	1.20	2.34	2.15	2.16
N	52	52	52	52	52

[a] t-statistics are in parentheses; degrees of freedom (12.52).

[b] These results are not reported.

* Statistically significant at 5% level.

TABLE 4b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR FULL-TIME, PART-TIME AND AGGREGATE EMPLOYMENT
OF WOMEN AGE 20+, 1963-1975

	FT	PT	E
B_{R1}	1.498	-.580	.16
B_{R2}	-1.57	.032	-.412
B_{R3}	-.598	.278	-.144
B_{R4}	1.05	.240	.236

for this study are shown in Tables 3b and 4b.) For aggregate employment the minimum wage elasticities (B_R) are negative but none are significant. The minimum wage elasticity for part-time employment is also negative, but for full-time employment the elasticity is positive. Neither elasticity is significant. The coverage variables (B_c) are mixed in sign but none are significant. These initial replications of the Gramlich (14) study also result in negative but not significant elasticities for the children variables.

With the exception of the sign of the minimum wage elasticity for aggregate employment, these results are similar to those of the Gramlich (14) study. Gramlich (14) does not report any summary of his data so the data set and regression procedure for this study are constructed as closely as possible to specifications reported in his study. The difference in the full-time employment measurement has already been noted. Also, Gramlich (14) does not report the coverage coefficients and it is not clear from his article which coverage variables are left in his final equations. The results of this replication suggest the separate coverage variables do not significantly contribute to the understanding of the impact of minimum wage legislation. This may be attributed to the limited specification of the variable.

Further Testing of the Mincer (23) and Gramlich (14) Models

The re-estimations of the Gramlich (14) and the Mincer (23) models do not support the hypothesis that minimum wage legislation adversely affects the labor force participation and employment of adult women.

However, the Gramlich (14) model presents some problems in interpretation. The employment dependent variable does not control for changes in the population and the full-time and part-time dependent variables do not control for changes in the aggregate level of employment. Therefore the Gramlich (14) model is re-estimated again by substituting the ratio of aggregate employment of women 20 and older to the population of women age 20 and older for the level of employment as the dependent variable in the aggregate employment equation. The ratio of either full-time or part-time employment of women age 20 and older to the aggregate employment of women age 20 and older is substituted for the level of full-time or part-time employment as the dependent variable in these equations. The estimated elasticities are shown in Table 5a, column 3 and Tables 6a and 7a, column 2. (The individual coefficients for the 4 quarter minimum wage variables are in Table 5b, column 1 and Table 6b, columns 1 and 2.)

The minimum wage elasticity for the aggregate employment of women is negative but not significant. For both full-time and part-time employment the minimum wage elasticities are negative but not significant. This model also suggests the possible impact of children on the hours of work decision; the elasticity is negative for full-time employment and positive for part-time employment.

Although redefining the dependent variables altered the sign of the minimum wage elasticity for aggregate and full-time employment, none of the minimum wage elasticities are significant. Therefore, this

TABLE 5a

ELASTICITY COEFFICIENTS FOR THE EMPLOYMENT OF WOMEN AGE 20+, 1949-1975[a]

	Change Minimum Wage	Change Dependent Variable	
	Gramlich (14) E	E	E/P
ΣB_R	.028 (1.3)		-.0037 (-.025)
ΣB_m		-.0028 (-1.56)	
B_u	-.08 (-2.0)*	-.056 (-6.18)*	-.056 (-9.13)*
B_t	.007 (26.3)*	.0023 (19.2)*	.0012 (5.94)*
B_k	-.08 (-2.0)*	-.327 (-3.18)*	-.026 (.22)
B_{c1}		.022 (1.41)	.0048 (.454)
B_{c2}		.0048 (-.299)	.011 (-.96)
B_{c3}		.0032 (.191)	.0016 (.152)
R^2	.999	.999	.999
d	.34	2.02	1.78
N	108	108	108

[a] t-statistics are in parentheses.

[b] These elasticities are not reported.

* Statistically significant at 5% level.

TABLE 5b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR EMPLOYMENT OF WOMEN AGE 20+, 1949-1975

	E/P		E
B_{R1}	-.0976	B_{M1}	-.0046
B_{R2}	.1197	B_{M2}	.0033
B_{R3}	.0473	B_{M3}	.0012
B_{R4}	-.0731	B_{M4}	-.0027

TABLE 6a

ELASTICITY COEFFICIENTS FOR FULL TIME EMPLOYMENT
OF WOMEN AGE 20+, 1963-1975[a]

		Almon lag		Unconstrained lag	
	Gramlich (14) FT	FT/E	FT/E	FT/E	FT/E
ΣB_R	-.004 (.1)	-.725 (-.134)			
ΣB_m			.131 (.212)	-.256 (.412)	-.741 (.09)[b]
B_u	-.031 (-6.8)*	-.118 (-.667)	.077 (.46)	-.066 (-.358)	.076 (.017)[b]
B_t	.006 (4.6)	-.014 (-1.34)	-.068 (-.69)	-.047 (-1.6)	-.256 (-.322)
$B_t 2$			0 (.09)		0 (.047)
B_k	.22 (1.6)	-6.35 (-1.13)		-8.60 (-1.41)	
R^2	.997	.129	.129	.078	.089
d	1.26	2.14	2.13	2.18	
N	52	52	52	52	52

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 6b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE FULL-TIME AND PART-TIME EMPLOYMENT
OF WOMEN AGE 20+, 1963-1975

	FT/E	PT/E
B_{R1}	-1.001	-.5711
B_{R2}	.3724	.5025
B_{R3}	.2103	.2740
B_{R4}	-.3072	-.2343

TABLE 6c

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR FULL-TIME OF WOMEN AGE 20+, 1949-1975

	FT/E	FT/E	FT/E
B_{m1}	-.0014	.0015	-.0291
B_{m2}	.0051	.0051	.0253
B_{m3}	.0045	.0022	.0143
B_{m4}	-.0001	-.0039	-.0758
ΣB_m	.0081	.0049	-.0653
B_{m5}	-.0059	-.0103	.1472
B_{m6}	-.0098	-.0139	-.0793
B_{m7}	-.0088	-.0114	-.0627
B_{m8}	.0200	.0235	.0376
ΣB_m	-.0045	-.0121	.0428

TABLE 7a

ELASTICITY COEFFICIENTS FOR PART TIME EMPLOYMENT
OF WOMEN AGE 20+, 1963-1975[a]

		Almon lag		Unconstrained lag	
	Gramlich (14) PT	PT/E	PT/E	PT/E	PT/E
ΣB_R	-.100 (.8)	-.029 (.052)			
ΣB_m			.142 (2.29)*	.164 (2.65)*	.161 (2.52)[b]
B_u	-.034 (2.1)*	-.015 (-.765)	-.018 (-1.07)	-.006 (-.315)	-.021 (.949)[b]
B_t	-.001 (.3)	.003 (2.75)*	.036 (3.8)*	.075 (2.64)*	.104 (3.20)*
B_{t2}			0 (-.64)		0 (-.55)
B_k	-1.26 (2.8)*	.996 (1.57)		.950 (1.54)	
R^2	.985	.999	.791	.800	.808
d	1.20	1.92	1.74	1.68	
N	52	52	52	52	52

[a] t-statistics are in parentheses.

[b] F-statistic.

* Statistically significant at 5% level.

TABLE 7b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE PART-TIME EMPLOYMENT FOR WOMEN
AGE 20+, 1963-1975

	PT/E	PT/E	PT/E
B_{m1}	.0001	-.0004	.0035
B_{m2}	.0013	.0010	.0035
B_{m3}	.0012	.0014	-.0131
B_{m4}	.0007	.0011	.0130
ΣB_m	.0033	.0031	.0069
B_{m5}	-.0001	.0005	-.0042
B_{m6}	-.0007	-.0001	.0017
B_{m7}	-.0008	-.0004	.0023
B_{m8}	.0021	.0014	.0023
ΣB_m	.0005	.0014	-.0025

empirical evidence does not suggest that the employment of adult women is adversely affected by this legislation.

To further explore the importance of the dependent variable specification, the Gramlich (14) model is also estimated for the time period 1954 to 1969, the same period as the Mincer (23) study. The first regressions (reported in columns 1 and 2, Tables 8a and 9a) for white and nonwhite adult women, used the same dependent variable specification as the Gramlich (14) and the second regressions (reported in columns 3 and 4, Tables 8a and 9a) used Mincer's (23) specification for the dependent variables. (The individual 4 quarter minimum wage coefficients are shown in Tables 8b and 9b.)

For white women all of the minimum wage coefficients are positive but not significant and for nonwhite women all the minimum wage coefficients are negative but not significant. The children coefficients also suggest that the labor force participation of adult women is not adversely affected by children in the home.

These results for nonwhite women are conflicting with the original re-estimation of the Mincer (23) model. The minimum wage coefficients in both the re-estimated Almon lag and the unconstrained lag models (Tables 1 and 2) are positive for nonwhite women and the minimum wage coefficients in the Almon lag model are significant.

Replacing Gramlich's (14) dependent variable specification with Mincer's (23) specification does not reconcile the empirical results of the two models. Some of the discrepancy may result from the different specifications of the minimum wage variable and the lag period. These

TABLE 8a

ELASTICITY COEFFICIENTS FOR LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WHITE WOMEN AGE 20+, 1954-1969[a]

	LF	E	LF/P	E/P
ΣB_R	.088 (.411)	.108 (.532)	.082 (.471)	.094 (.623)
B_u	-.027 (-1.81)	-.047 (-2.9)*	-.021 (-1.64)	-.043 (-3.57)*
B_k	-.061 (-.231)	-.022 (-.076)	.051 (.221)	.152 (.695)
B_t	.0021 (5.27)*	.0021 (4.78)*	.001 (3.06)*	.001 (3.3)*
B_{c1}	.003 (.286)	-.002 (-.162)	.004 (.406)	-.0014 (-.166)
B_{c2}	-.001 (-.093)	-.007 (-.633)	.002 (.269)	-.008 (-.957)
R^2	.999	.999	.999	.999
d	2.24	1.89	1.70	1.82
N	64	64	64	64

[a] t-statistics are in parentheses.

*Statistically significant at 5% level

TABLE 8b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT
OF WHITE WOMEN AGE 20+, 1954-1969

	LF	E	LF/P	E/P
B_{R1}	-.074	.057	-.029	.085
B_{R2}	.159	.064	.142	.042
B_{R3}	.073	.015	.047	-.005
B_{R4}	-.069	-.027	-.079	-.028

TABLE 9a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF NONWHITE WOMEN AGE 20+ 1954-1969[a]

	LF	E	LF/P	E/P
ΣB_R	-.031 (-.102)	-.098 (-.390)	-.074 (-.268)	-.097 (-.388)
B_u	.01 (.723)	-.044 (-3.36)*	-.047 (-3.21)*	-.044 (-3.36)*
B_k	.119 (.509)	.184 (.844)	.629 (2.58)*	.184 (.844)
B_t	.0028 (7.56)*	.0029 (8.56)*	.0013 (3.41)*	.003 (8.56)*
B_{c1}	-.006 (.482)	-.007 (-.632)	.006 (-.432)	-.007 (-.632)
B_{c2}	.0016 (.120)	-.004 (-.357)	.011 (.793)	-.004 (-.357)
R^2	.967	.999	.999	.999
d	2.09	1.86	2.04	1.86
N	64	64	64	64

[a] t-statistics are in parentheses.

* Statistically significant at 5% level.

TABLE 9b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT
OF NONWHITE WOMEN AGE 20+, 1954-1969

	LF	E	LF/P	E/P
B_{R1}	-.245	-.223	.051	-.222
B_{R2}	.231	.166	-.381	.166
B_{R3}	.110	.073	-.055	.073
B_{R4}	-.127	-.113	.311	-.113

results also suggest the estimates may be sensitive to the inclusion of the children variable.

In an attempt to clarify the impact of minimum wage legislation on the employment and labor force participation of adult women and to further reconcile the Mincer (23) and Gramlich (14) studies, several other models are estimated.

The first one estimates the Mincer (23) model for aggregate, full-time and part-time employment for the same years as the Gramlich (14) study. The results are shown in Tables 6a and 7a, column 3 and Table 10 column 1. (The individual 8 quarter minimum wage coefficients are shown in Table 10b, 6c, and 7b, column 1.)

For aggregate employment and full-time employment, the minimum wage elasticity is positive but not significant. The minimum wage elasticity for part-time employment is positive and significant. As compared to Gramlich's (14) results (Table 3a, column 1 and Table 4a, columns 1 and 2), only the sign of the minimum wage elasticity for part-time employment is reversed. As compared to the re-estimation of Gramlich (14) (Table 3a columns 2 and 3, and Table 4a columns 3 and 4), the minimum wage elasticities for both part-time and aggregate employment are reversed. This suggests that the empirical results may be sensitive to the specification of the minimum wage and its lag.

To further examine these two empirical models, the aggregate, full-time and part-time employment decisions are estimated by combining the Mincer (23) and Gramlich (14) studies.

TABLE 10a

ELASTICITY COEFFICIENTS FOR THE EMPLOYMENT OF WOMEN AGE 20+, 1949-1975[a]

	E/P	E/P
ΣB_m	.0288 (1.64)	.0448 (2.55)*
ΣB_u	-.049 (-10.9)*	-.0766 (-17.06)*
B_t	.0756 (19.4)*	.081 (19.1)*
B_{t2}	0 (.24)	
B_k		.101 (1.76)
R^2	.979	.990
d	1.39	1.39
N	108	108

[a] t-statistics are in parentheses.

* Statistically significant at 5% level.

TABLE 10b

REGRESSION COEFFICIENTS - ALMON LAG MINIMUM WAGE VARIABLE
FOR THE EMPLOYMENT OF WOMEN AGE 20+, 1950-1975

	E/P	E/P
B_{m1}	-.00003	-.00002
B_{m2}	-.0002	-.0001
B_{m3}	.00001	.0002
B_{m4}	.0003	.0005
ΣB_m	.00008	.0004
B_{m5}	.0006	.0007
B_{m6}	.0007	.0008
B_{m7}	.0006	.0006
B_{m8}	-.0011	-.0011
ΣB_m	.0008	.001

First the Gramlich (14) model is estimated with the exception of using a 4 quarter lag Mincer (23) minimum wage variable. The results are reported in Table 5a, column 2. (The individual 4 quarter minimum wage coefficients are reported in Table 5b, column 2.) The minimum wage elasticity is negative but not significant. This suggests that the specification of the minimum wage variable may affect the empirical results.

Secondly, the Mincer (23) model is estimated for the Gramlich (14) time period with the exception of using an unconstrained 8 quarter lag minimum wage variable. The results are reported in Table 11a and Tables 6a and 7a, column 5. (The individual minimum wage coefficients for the 8 quarters are in Table 11b and Tables 6c and 7b, column 3.) All of the minimum wage elasticities are positive and for aggregate employment, the elasticity is significant.

These results support the earlier evidence that minimum wage legislation does not adversely affect the employment or labor force participation of adult women. A comparison of these results with the re-estimation of the Gramlich (14) model (Table 5a, column 3 and Tables 6a and 7a, column 2) also suggests the specification of the minimum wage variable may create some of the discrepancies in the Mincer (23) and Gramlich (14) results.

Thirdly, the Mincer (23) model is estimated over the Gramlich (14) time period with the exceptions of using an unconstrained 4 quarter lagged minimum wage variable and the children variable. These results are in Table 12a. (The individual 4 quarter minimum wage coefficients are

TABLE 11a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20+, 1949-1975[a]

	LF/P	E/P
ΣB_m	.0832 (7.25)[b]*	.064 (6.37)[b]*
ΣB_u	-.0021 (.09)[b]	-.0312 (25.29)[b]*
B_t	.189 (13.03)*	.162 (13.07)*
B_{t2}	0 (-1.7)	0 (-1.05)
R^2	.961	.966
N	108	108

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 11b

REGRESSION COEFFICIENTS - LAG MINIMUM WAGE VARIABLE
FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT
OF WOMEN AGE 20+, 1950-1975

	LF/P	E/P	LF/P	E/P
B_{m1}	-.0016	-.0011	-.002	-.0014
B_{m2}	.0017	.0018	.0016	.0017
B_{m3}	.0007	.0003	.0007	.0003
B_{m4}	.0009	.0003	.001	.001
ΣB_m	.0017	.0013		
B_{m5}	-.0022	-.0014		
B_{m6}	.0018	.0013		
B_{m7}	.0001	.0007		
B_{m8}	.0013	.0002		
ΣB_m	.001	.0008		

TABLE 12

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20+, 1949-1975[a]

	LF/P	E/P
ΣB_m	.0416 (2.76)[b]	.0384 (3.44)[b]
B_u	-.0068 (-1.05)	-.0345 (-6.00)*
B_t	.216 (16.26)*	.205 (3.76)*
B_k	.352 (4.42)*	.267 (3.76)*
R^2	.964	.964
N	108	108

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

in Table 11b, columns 3 and 4.) The minimum wage elasticities are positive for both the labor force and employment equations. The children elasticities are also positive and significant. Comparing these results with the results of the Gramlich (14) model reported in Table 5a, column 3 and the results of the Mincer (23) models reported in Tables 10a and 11a suggests the importance of the specification of the minimum wage. All of the minimum wage elasticities in these Mincer (23) models are positive while the Gramlich (14) model has a negative minimum wage elasticity.

These results also suggest that the estimates are somewhat sensitive to the inclusion of the children variable. None of the signs are reversed but the magnitudes do vary.

To further explore the importance of the specification of the time trend variable, the Mincer (23) model, with the exception of substituting the children variable for the quadratic time trend variable is estimated for the Gramlich (14) time period. The results are in Table 10a, column 2 and Tables 6a and 7a, column 4. (The individual 8 quarter minimum wage coefficients are in Tables 10b, 6c, and 7b, column 2.)

For aggregate employment and part time employment the minimum wage elasticity is positive and significant. The minimum wage elasticity is negative but not significant for full-time employment. The children elasticities in these results suggest a possible positive effect on the decision to work part time.

The inclusion of the children variable altered only the sign of the minimum wage elasticity for full time employment but did not alter

the statistical significance of this variable. However, the magnitudes of the variables do differ.

Finally, the Mincer (23) model is estimated for the period 1954 to 1975. Since the results of the replications of the Mincer (23) model indicate that the Almon lag procedure may affect the minimum wage coefficients, this last model uses an unconstrained 8 quarter lag minimum wage variable. The time period is extended to increase the number of observations. The results are in Table 13a. (The individual quarter minimum wage coefficients are in Table 13b.)

With the exception of the labor force participation of white women, all the minimum wage elasticities are positive but none are significant.

Summary

Summarizing these empirical results, it does not appear that minimum wage legislation adversely affects the labor force participation or aggregate employment of adult women in the long run. Although some of the regressions have negative minimum wage coefficients, none of these is significant. For the aggregate employment regressions all but one of the negative minimum wage coefficients occur in the regressions that include the children variable. (The exception is the equation of the Mincer (23) model for the time period 1954 to 1975, Table 13a.) Also with the same exception, all of the negative minimum wage coefficients occur in the regressions that use a 4 quarter Almon lag for the minimum wage variable and a separate coverage variable. Since none of the coefficients for the coverage variable is significant, the inclusion of

TABLE 13a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WHITE AND NONWHITE WOMEN AGE 20+, 1954-1975[a]

	LF/P	E/P	LF/P	E/P
ΣB_m	-.0003 (.0008)[b]	.0007 (.005)[b]	.0103 (.067)[b]	.0827 (2.69)[b]
ΣB_u	-.0699 (2.90)[b]	-.0369 (41.87)[b]*	.022 (8.42)[b]*	-.0542 (36.9)[b]*
B_t	.1232 (10.40)*	.1232 (10.26)*	.066 (4.18)*	.0572 (3.13)*
B_{t2}	0 (3.16)*	0 (2.39)*	0 (-2.62)*	0 (-3.11)*
R^2	.973	.972	.645	.697
N	88	88	88	88

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 13b

REGRESSION COEFFICIENTS - MINIMUM WAGE VARIABLE
FOR THE LABOR FORCE PARTICIPATION AND
EMPLOYMENT OF WHITE AND NONWHITE
WOMEN AGE 20+, 1954-1975

	White		Nonwhite	
	LF/P	E/P	LF/P	E/P
B_{m1}	.0004	-.0005	-.0019	-.0006
B_{m2}	-.0004	.0004	.002	.0012
B_{m3}	.0002	.0003	-.0003	-.0004
B_{m4}	.0009	.0005	-.00003	.0017
ΣB_m	.0011	.0007	-.0002	.0019
B_{m5}	-.0027	-.0023	-.0005	-.0007
B_{m6}	.0022	.0021	.0009	-.0005
B_{m7}	-.0005	.00002	-.0012	.0011
B_{m8}	-.0002	-.0005	.0013	.0006
ΣB_m	-.0012	-.00068	.0005	.0005

separate variable adds little to the determination of the impact of minimum wages on the labor force participation decision and aggregate employment of adult women.

For the distribution of employment between full time and part time, the signs of the minimum wage coefficients are mixed but three of the five part time coefficients are positive and significant. The negative coefficients for part-time employment occur in the estimations that use a 4 quarter Almon lag minimum wage variable.

Since not all of the regressions that include the children variable have negative minimum wage coefficients, this analysis suggests that the specification of the lag period within the Almon lag procedure may influence the empirical results.

An examination of the individual quarter minimum wage coefficient pattern for aggregate employment suggests that frequently at least two of the four subsequent quarters have negative coefficients and generally the first quarter coefficient is negative. This implies that minimum wages may have an adverse effect on the employment of adult women in the short run, but not in the long run.

The individual minimum wage coefficients in unconstrained lag models also suggest the use of the Almon lag minimum wage variable may influence the empirical results. Again, in general, the coefficient for the first quarter is negative. But, with one exception, the estimations that use the unconstrained lag pattern for the minimum wage variable, either an 8 or 4 quarter lag, have positive minimum wage coefficients

(ΣBm). (The exception is the equation for the Mincer (23) model for the labor force participation of white women, Table 13a.)

Therefore, constraining the lag pattern of the minimum wage variable may alter the measured impact of this legislation.

All of this does suggest that if minimum wages do adversely affect the labor force participation and employment of adult women, the effect is short run in nature and not very significant. The long run pattern of the adult female labor force does not appear to be adversely affected.

In terms of the distribution of employment, minimum wage legislation seems to augment the part-time employment of adult women in the long run. An analysis of the individual minimum wage coefficients reveals a different pattern for the distribution of employment.

For the 8 quarter Almon lag variables, minimum wage legislation has a lagged adverse effect on both the full-time and part-time employment of adult women. However, the lag pattern is not as pronounced for full-time employment and the adverse effect does not appear in the total effect for part-time employment. The same basic lag pattern appears in the regressions that use an unconstrained lag for the minimum wage variable. For the 4 quarter Almon lag variables, there is no distinct lag pattern. The estimation of the original Gramlich (14) model suggests an immediate adverse effect on part-time employment and a positive affect on full-time employment. The estimation of the Gramlich (14) model with the redefined dependent variables indicates an immediate adverse effect on both full-time and part-time employment.

The differences in the 4 quarter and 8 quarter lag patterns for full-time and part-time employment again suggest that the specification of the lag period and the use of the Almon lag pattern may influence the empirical results.

An analysis of the estimates of the impact of minimum wages on the labor force participation and employment of adult women by race suggests there is no differential impact. Both estimates of the Mincer (23) model indicate no adverse effect for either white and nonwhite adult women. In the estimation of the Gramlich (14) model, the minimum wage coefficients for the labor force participation and employment of nonwhite women are negative but not significant. An analysis of the individual 8 quarter minimum wage coefficients for nonwhite women reveals that in the unconstrained lag models, the sums of the first 4 quarter lags are negative for both the labor force and employment for the period 1954 to 1969 and for the labor force for the period 1954 to 1975. In both the constrained and unconstrained 8 quarter lag models, minimum wages have an immediate adverse effect on the labor force participation and employment of nonwhite women. For white women the immediate effect is negative only for their employment. This pattern for white women does not appear in the 4 quarter Almon lag models.

These empirical results also suggest a negative relationship between the aggregate labor force participation and the unemployment rate. For full-time employment, the unemployment elasticities for the

Mincer (23) model and the original Gramlich (14) model are positive but not significant while all the unemployment elasticities for part-time employment are negative. This suggests that the full-time employment of adult women may be less sensitive than their part-time employment to the cyclical nature of the economy.

The last point of interest in these empirical estimates is the relationship between the presence of children and the labor force participation and employment of adult women.

The estimates of the original Gramlich (14) models suggest that the presence of children does adversely affect the labor force participation and employment of adult women. However, the estimates of the Gramlich (14) model with the Mincer (23) dependent variables cast some doubt on the earlier Gramlich (14) results. The results of these regressions suggest part-time employment is positively related to young children in the family. Theoretically, this is the expected effect of children in the home and the full-time employment relationship is expected to be negative.

Therefore, this study implies that young children do not necessarily discourage women from participating in the labor market but that children do encourage women to seek part-time employment as opposed to full-time.

Finally, most of the linear time trend elasticities are positive and significant for aggregate and part-time employment and the labor force participation. Most of the quadratic time trend elasticities are

zero and insignificant. The substitution of the children variable for the quadratic time trend results in mixed signs for this variable and some are significant. Although some of the magnitudes of the elasticities appear to be sensitive to the inclusion of this variable, it is not clear that this variable captures the behavior of the labor force and employment of adult women any better.

CHAPTER VI.

EXTENDED TIME SERIES MODEL

The previous section's analysis demonstrated that the existing empirical estimates of the impact of minimum wages leave something to be desired. Due to the questionable estimation procedures, there are still inconsistencies in the results. In this section I will develop a more complete empirical model by the addition of some control variables and the use of a dependent variable which is conditional on marital status. The extended time series model explores the impact of minimum wages on the employment and labor force participation of adult women, on the employment and labor force participation of adult women by marital status and on the labor force participation of adult women by age and marital status. (Employment data by age and marital status is not available.) There is some evidence that the labor force and employment behavior of adult women are influenced by marital status and since the data are available, the model will attempt to differentiate these behaviors.

An attempt is made to control for several economic variables which Mincer (23) and Gramlich (14) abstracted from. This includes a female wage variable, an educational attainment variable, an occupational mix variable, and the price of domestic service, as discussed in Chapter IV. However, due to the problem of intercorrelation among

the variables, several specifications are estimated. If the Durbin-Watson statistic is close to or less than one, an autoregressive procedure is used to adjust for the serial correlation. The simplest model regresses the labor force or employment ratios on the current and lagged minimum wage, the female full-time earnings, the unemployment rate of men age 35 to 54 and, where applicable, the husband's income, average aid for dependent children payment, and the presence of children. This basic model includes one variable each for (a) female earnings potential, (b) an alternative source of income, and (c) household responsibilities.

To further control for the effects of female earnings and the demand for female labor, the same model plus either the educational or occupational variable are estimated. Finally, the basic model plus both the educational and occupational variable are estimated. As mentioned earlier, the children variable is also redefined as the ratio of ever married women with children ever born to all women in an attempt to better measure its effect.

The inclusion of these additional variables did not significantly alter the estimates of the basic regression model and with one exception, were not statistically significant. (The occupational variable was significant for married women.) Therefore,only the results of the basic time series model will be reported here. The results are shown in Tables 14, 15 and 16. (The estimated elasticities of the other three models are shown in Tables 23, 24 and 25 in the Appendix.)

TABLE 14

ELASTICITY COEFFICIENTS - LABOR FORCE PARTICIPATION AND EMPLOYMENT OF SINGLE WOMEN AGE 14+[a]

	LF/P	LF/P[b]	E/P	E/P[b]
B_m	-.179 (-1.06)	.062 (.436)	-.179 (-.957)	.028 (.15)
B_{ml}	-.339 (-2.07)*	-.105 (-.905)	-.302 (-1.71)	-.102 (-.710)
ΣB_m	-.524 (5.76)[c]*	-.0013 (.039)[c]	-.481 (4.20)[c]	-.074 (.097)[c]
B_{RWA}	.404 (2.19)*	.727 (3.00)*	.404 (1.30)	.404 (1.90)
B_R	-.029 (-.588)	.051 (1.22)	-.037 (-.677)	.036 (.701)
R^2	.549	.342	.399	.199
d	.883	1.33	1.02	1.58
N	28	27	28	27

[a] t-statistics are in parentheses.

[b] Adjusted for serial correlation of residuals.

[c] F-statistics.

* Statistically significant at 5% level.

TABLE 15

ELASTICITY COEFFICIENTS - LABOR FORCE PARTICIPATION AND EMPLOYMENT OF MARRIED WOMEN AGE 14+[a]

	LF/P	E/P	E/P[b]
B_m	-.037 (-.542)	.015 (.240)	-.007 (-.079)
B_{ml}	.154 (1.58)	.142 (1.56)	.022 (.307)
ΣB_m	.117 (.718)[c]	.157 (1.51)[c]	.014 (.015)[c]
B_{RWA}	.807 (1.65)	.404 (.522)	1.53 (10.8)*
B_R	.097 (4.52)*	.056 (2.88)*	.013 (.501)
B_{Hy}	.780 (2.09)*	1.20 (3.15)*	1.20 (3.12)*
B_K	-.288 (-.302)	-.772 (-.886)	-.77 (-.880)
R^2	.978	.98	.859
d	1.91	1.12	1.495
N	28	28	27

[a] t-statistics are in parentheses.

[b] Adjusted for serial correlation of residuals.

[c] F-statistics.

* Statistically significant at 5% level.

TABLE 16

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF OTHER MARRIED WOMEN AGE 14+, 1950-1977[a]

	LF/P	E/P
B_m	-.216 (-2.80)*	-.092 (-1.15)
B_{ml}	-.003 (-.031)	.123 (1.70)
ΣB_m	-.216 (3.88)[b]	.031 (.178)[b]
B_{RWA}	.0404 (.094)	-.404 (-1.27)
B_R	.017 (.607)	.007 (.258)
B_{ADC}	.0106 (.03)	.475 (1.63)
B_K	.272 (.689)	-.097 (-.272)
R^2	.410	.272
d	1.98	2.18
N	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

The dependent variables were grouped first by marital status for women age fourteen and older and then by marital status and age; the age categories are twenty to twenty-four, twenty-five to thirty-four, thirty-five to forty-four.

Women 14+ by Marital Status

For single women age fourteen and older, the aggregate minimum wage elasticities (ΣBm) are negative but not significant. The earnings elasticities (B_{RWA}) are positive and for the labor force, the elasticity is significant. The unemployment elasticity (B_R) are positive but not significant.

For married women age fourteen and older, the aggregate minimum wage elasticities are positive but not significant. However, for the labor force and employment the current minimum wage elasticity is negative. The earnings elasticities are positive, and for employment, significant. The unemployment and husband's income (B_{Hy}) elasticities are positive. With the exception of the unemployment elasticity, for employment, the elasticities are significant. The children elasticities (B_K) are negative but not significant. The regression for married women also have the best fit in terms of the R^2.

For other married women (widowed, divorced and married husband absent) age fourteen and older, the aggregate minimum wage elasticity is negative for the labor force and positive for employment. However, neither is significant. Also both current minimum wage elasticities are negative. The earnings elasticities are mixed in sign but none

is significant. Both unemployment elasticities are positive but not significant. The welfare elasticities (B_{ADC}) are positive but not significant and the children elasticity is positive for the labor force and negative for employment. Neither elasticity is significant.

This empirical analysis suggests that minimum wage legislation does have a differential impact. The labor force participation and employment of single women may be adversely affected by this legislation, as may be the labor force participation of other married women. Yet the married women's labor force participation is largely unaffected.

The theoretical analysis of minimum wages suggests that the legislation creates three effects; displacement, unemployment, and labor force withdrawal. This empirical analysis suggests that many single and other married women chose to withdraw from the labor force when faced with the lower uncovered sector wage. It also suggests that single women suffer the greatest displacement and therefore unemployment as a result of the legislation. This may be due to the distribution of age within the single category; a large proportion of these women are under twenty-five. These are the women with the least amount of job experience or training and are the most likely candidates for displacement. These women also have an alternative to market work in the form of future educational or training programs. Therefore they are the most likely to withdraw from the labor force.

These empirical results verify the positive relationship between the earnings potential (female wage) and the labor force participation

decision. The results also suggest that the participation decision and employment of women are not highly sensitive to the cyclical nature of the economy. Previous empirical studies suggest that female labor force participation is adversely affected by unemployment. However, these results suggest that single women are the only group whose employment may be adversely affected and this may be due to the age distribution and associated characteristics of these women. The unemployment coefficients for married women are positive and significant. This implies a significant added worker effect; married women are drawn into the labor force during economic downturns as a means of providing a secondary source of income. Also most employed women are not employed in the construction or manufacturing industries which are highly sensitive to economic cycles. Therefore, their aggregate employment may be somewhat insensitive to economic cycles; any adjustment in their employment may be in hours of employment, not number of employed.

These empirical results also suggest that the presence of children may discourage some women from working. However, none of the coefficients are significant. Before concluding that children in the home are not a major deterrent to market work, consideration must be given to the age distribution of the women and therefore the age distribution of the children. Since the dependent variable includes all women 14 and older, the effect of older children in the home may be offsetting the effect of younger children in the home.

Finally, the results imply that married women's and other married women's labor force participation is not adversely affected by an alternative source of income. In fact, for married women the results imply the greater her husband's income, the greater the incentive to participate in the labor force. This relationship may be due to a possible correlation in their educational attainment and therefore their expected earnings; the women most likely to participate in the labor force due to their education and expected earnings marry men with similar educational and expected earnings background. For other married women, the availability of welfare income does not significantly reduce their incentive to seek employment. These results suggest that many families prefer two incomes, either to attain or possibly maintain a desired standard of living.

Women by Age and Marital Status

To further explore the impact of minimum wages and other factors on the labor force participation of adult women, the marital groups are divided into three age categories; 20 to 24, 25 to 34, and 35 to 44. The percentage of the labor force in some of the marital status and age groups is small and this should be kept in mind when interpreting the results.[1] The results for single women are in Table 17, for married women in Table 18, and for other married women in Table 19.

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[1]The average percentages of the labor force in each marital status and age group are for age 20-24; single 48%, married 43%, other 5%, for age 25-34; single 19%, married 65%, other 16%, and for age 35 to 44; single 9%, married 72%, and other 19%.

TABLE 17

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF SINGLE WOMEN, 1950-1977[a]

	20-24	25-34	35-44
B_m	-.059 (-1.34)	-.046 (-.979)	.096 (2.31)*
B_{m1}	.009 (.243)	-.089 (-2.09)*	.006 (.162)
ΣB_m	-.049 (.786)[b]	-.136 (5.56)[b]*	.102 (3.87)[b]
B_{RWA}	-.4037 (-3.93)*	-.1211 (-1.91)	-.4037 (-4.25)*
B_R	-.0114 (-.710)	-.0143 (-.825)	.0532 (3.47)*
R^2	.484	.224	.770
d	1.71	2.63	2.06
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 18

ELASTICITY COEFFICIENTS - LABOR FORCE PARTICIPATION OF MARRIED WOMEN BY AGE[a]

	20-24	25-34	25-34[b]	35-44	35-44[b]
B_m	.089 (1.69)	-.108 (-1.10)	-.049 (-.434)	-.086 (-1.14)	-.059 (-.692)
B_{ml}	.216 (3.16)*	-.02 (-1.97(	-.022 (-.168)	.052 (.661)	.052 (.505)
ΣB_m	.305 (14.24)[c]*	-.308 (-5.37)[c]*	-.071 (.120)[c]	-.034 (.07)[c]	-.006 (.003)[c]
B_{RWA}	-1.62 (-4.11)*	1.62 (5.25)*	1.17 (2.15)*	.807 (2.99)*	.727 (1.74)
B_R	.047 (3.14)*	.065 (2.15)*	.068 (1.98)	.061 (2.44)*	.046 (1.72)
B_{Hy}	1.80 (9.09)*	-.120 (-.404)	.600 (1.19)	.600 (1.52)	.540 (1.34)
B_K	-2.6 (-9.43)*	1.02 (1.26)	-.996 (-.743)	.402 (.665)	.217 (.210)
R^2	.991	.962	.920	.961	.927
d	2.81	.982	1.38	.868	1.316
N	28	28	27	28	27

[a] t-statistics are in parentheses.

[b] Adjusted for serial correlation of residuals.

[c] F-statistic.

* Statistically significant at 5% level.

TABLE 19

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF OTHER MARRIED WOMEN, 1950-1977[a]

	20-24	25-34	35-44
B_m	.019 (.163)	-.028 (-.275)	.001 (.022)
B_{ml}	.208 (1.75)	.028 (.264)	.019 (.458)
ΣB_m	.231 (2.17)[b]	0 (0)[b]	.019 (.124)[b]
B_{RWA}	-.4037 (-.933)	.0404 (.048)	.4037 (.920)
B_R	.0571 (1.37)	.0349 (.881)	.0257 (1.53)
B_{ADC}	1.06 (2.58)*	.7396 (1.66)	.0528 (.374)
B_K	.0001 (.0001)	-1.30 (-2.61)*	-.337 (-1.80)
R^2	.708	.602	.390
d	2.16	1.69	1.67
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistic.

* Statistically significant at 5% level.

(The estimated coefficients for the other three models are in Tables 26 to 34 in the Appendix.)

As anticipated, for single women, the aggregate minimum wage elasticities (ΣBm) are negative and for the second age group, the elasticity is significant. However, for the single women age thirty-five to forty-four, the minimum wage elasticities are all positive and the current minimum wage elasticity is significant. All of the earnings elasticities (B_{RWA}) are negative and for the single women age twenty to twenty-four and age thirty-five to forty-four the elasticities are significant. The unemployment elasticities (Bu) are negative but not significant for the first two age groups but positive and significant for the eldest group.

For married women, the aggregate minimum wage elasticities are negative for the two older age groups. For the youngest group of married women, the minimum wage elasticity is positive and significant. However, the earnings elasticity for this group is negative and significant. For the other two age groups the earnings elasticities are positive and for the twenty-five to thirty-four age group, the elasticity is significant. All of the unemployment elasticities are positive and, for the youngest group, significant. The husband's income elasticity (B_{Hy}) is positive and significant for the youngest group and positive for the other groups. The children elasticity (B_K) is negative and significant for the youngest group. For the second

age group, the elasticity is negative and for the third age group, the elasticity is positive. Neither is significant.

For the other married women group, all the aggregate minimum wage elasticities are positive but none are significant. The earnings elasticity is negative for the youngest group and positive for the other two groups. None are significant. All of the unemployment elasticities are positive but not significant. All the welfare elasticities (B_{ADC}) are positive, and for the twenty to twenty-four age group, the welfare elasticity is significant. The children elasticity is negative for the two eldest groups and is significant for the twenty-five to thirty-four age group. However, for the youngest group, the children elasticity is positive but not significant. Again, even broken down by age, the model worked better in terms of the R^2 for married women.

Summary of the Results by Marital Status

The empirical analysis of the labor force participation of women by age and marital status suggests that minimum wage legislation may have an adverse effect on the labor force participation of women but that impact is discriminate. Young single women seem to be the most adversely affected while older women regardless of marital status seem to be the least affected. Theoretically this seems the appropriate response. Young women have the least job experience and are the most likely candidates for displacement and labor force withdrawal. They also have an alternative in the form of further education or training. Older women, with more job experience, may be more protected from the

displacement effect. Therefore, fewer older women would be forced out of the labor market by this legislation. This may also explain why other married women seem less affected by the legislation than married women. Married women, especially the women age twenty-five to thirty-four, may be new entrants to the labor force. If these women dropped out of the labor force to have children (as the children coefficient for married women age twenty to twenty-four suggests), they will not have the job experience to protect them from the minimum wage effects. Also, married women, especially with children, have an alternative to market work; household production. Other married women may not experience the same turnover and as such may have greater job experience than married women of the same age.

The only unexpected effect of the legislation is that of the young married women whose labor force participation is augmented by the legislation. A probable explanation may be the need for a second source of income in a newly established household and the higher minimum wage draws these women into the labor force.

This empirical analysis also suggests that young adult women are not drawn into the labor force by the expected market wage. A probable explanation for this involves the human capital investment analysis. For women in this age group, further education or training will enhance their future earnings potential and this is a more important factor in their labor force participation decision than is the current market wage. For married and other married women in the twenty-five to thirty-four and the thirty-five to forty-four age groups, the

expected wage is positively related to their labor force participation decision. Somewhat surprisingly, the three groups of single women are not drawn into the labor force by the expected wage. Yet in the previous analysis, the labor force participation of single women as a group was enhanced by the expected wage rate. Many single women, other than the young single women, would not have an alternative means of support. Therefore, their labor force participation decision may be somewhat independent of the wage rate. Over time their labor force participation is much more constant than that of married women or other married women, suggesting that the upward trend in female wages has not significantly altered their participation decision. This may also explain why the labor force participation of single women is not highly sensitive to economic cycles.

For married women, the positive unemployment elasticities reinforce the idea of the added worker hypothesis. These results are consistent with the Mitchell (24) time series results and suggest that the labor force participation of married women responds differently than other women to cyclical changes.

The labor force participation of married women and other married women in the age categories 25 to 34 and 35 to 44 is not significantly affected by the availability of other income. However, the labor force participation of young married and young other married women is significantly and positively related to the availability of other income. Due to the collinearity in the time series, it appears

difficult to disentangle the independent effects of changes in women's earnings from those of her husband's income and welfare supplements.

Finally, the presence of children adversely affects the labor force participation of young married women and other married women. This suggests that the presence of young children does govern the choice between market and nonmarket work for adult women and that possibly women with children who have an alternate source of income may choose not to work in the market.

Women Age 20 and Older

Finally, the extended time series model is applied to the quarterly labor force participation and employment data for women age twenty and older. Since this quarterly data is not available by marital status and the majority of these women are married, the model used in this application is the same as the one used for married women. The quarterly data for the husband's income, female earnings, and the presence of children are obtained by interpolation of the annual data. The data for the minimum wage and unemployment are the data used in the previous quarterly analysis. An auto regressive procedure is used if the original Durbin-Watson statistic is close to or less than one. The results for all women are reported in Table 20a, for women by race in Table 21a, and for full-time and part-time employment in Table 22a. (The individual 8 quarter minimum wage coefficients are reported in Tables 20b, 21b, and 22b.)

TABLE 20a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20, 1950-1977[a]

	LF/P	LF/P[b]	E/P	E/P[b]
ΣB_m	.028 (.393)[c]	.029 (.214)[c]	.015 (.059)[c]	-.0019 (.002)[c]
ΣB_u	.013 (4.14)[c]*	-.013 (4.33)[c]*	-.013 (4.02)[c]*	-.037 (33.97)*
B_{RWA}	-.404 (-1.73)	-.283 (-1.45)	-.121 (-.825)	-.121 (-.720)
B_{Hy}	.420 (9.23)*	.360 (6.18)*	.600 (7.61)*	.300 (4.99)*
B_K	-.620 (-6.64)*	-.710 (6.06)*	-.544 (-5.97)*	-.645 (-5.63)*
R^2	.965	.924	.962	.920
d	.882	1.49	.893	1.44
N	112	111	112	111

[a] t-statistics are in parentheses.

[b] Adjusted for serial correlation of residuals.

[c] F-statistic.

* Statistically significant at 5% level.

TABLE 20b

LAG REGRESSION COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20+, 1954-1977

	LF/P	LF/P[a]	E/P	E/P[a]
Bm	-.0018	-.0018	-.0017	-.0021
Bm_1	.0019	.0014	.0022	.0018
Bm_2	.00001	.00035	-.0006	-.00022
Bm_3	.0015	.0009	.001	.00038
Bm_4	-.0021	-.0018	-.0015	-.0013
Bm_5	.0017	.0013	.0016	.00108
Bm_6	.0001	.00019	.0005	.00055
Bm_7	-.00035	.00039	-.0011	-.00029

[a] Adjusted for serial correlation.

TABLE 21a

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN AGE 20+, BY RACE, 1954-1977[a]

	White				Nonwhite	
	LF/P	LF/P[b]	E/P	E/P[b]	LF/P	E/P
ΣB_m	-.094 (2.51)[c]	-.098 (1.33)[c]	-.067 (1.31)[c]	-.081 (1.26)[c]	.067 (1.03)[c]	.165 (4.47)[c]*
ΣB_u	.005 (.365)[c]	-.017 (7.58)[c]*	-.017 (4.62)[c]*	-.036 (33.10)[c]*	-.004 (.203)[c]	-.037 (13.1)[c]*
B_{RWA}	.412 (2.00)*	.288 (1.28)	.330 (1.36)	.247 (1.10)	-.247 (-.977)	-.288 (-.999)
B_{Hy}	.038 (.339)	.063 (.734)	.126 (.955)	.126 (.936)	.251 (1.98)	.251 (1.62)
B_K	-.587 (-6.34)*	-.711 (-6.39)*	-.538 (-5.46)*	-.650 (-5.52)*	-.103 (-.95)	-.002 (-.013)
R^2	.967	.922	.959	.917	.606	.626
d	.622	1.52	.615	1.39	1.71	1.45
N	96	95	96	95	96	96

[a] t-statistics are in parentheses.

[b] Adjusted for serial correlation of residuals.

[c] F-statistic.

* Statistically significant at 5% level.

TABLE 21b

LAG REGRESSION COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF WOMEN, AGE 20+ BY RACE, 1954-1977

	White				Nonwhite	
	LF/P	LF/P[a]	E/P	E/P[a]	LF/P	E/P
Bm	.0005	-.0005	-.0001	-.0013	.00003	.0011
Bm_1	-.00015	-.0001	.0006	.0008	.0006	.00055
Bm_2	-.0009	-.0003	-.0014	-.0007	.00008	-.0013
Bm_3	.0007	.0003	-.0012	.0004	.0005	.0039
Bm_4	-.0025	-.0018	-.0027	-.0018	-.0005	-.0025
Bm_5	.0007	.00014	.0017	.0008	.0007	.0016
Bm_6	.0006	.0003	.0006	.0005	-.00003	.0006
Bm_7	-.0018	-.0009	-.002	-.0011	.0006	.0008

[a]Adjusted for serial correlation.

TABLE 22a

ELASTICITY COEFFICIENTS FOR FULL TIME AND PART TIME EMPLOYMENT OF WOMEN AGE 20+, 1963-1977[a]

	FT/E	PT/E
ΣB_m	-5.47 (1.65)[b]	-5.29 (29.91)[b]*
ΣB_u	-.586 (1.30)[b]	-.168 (2.04)[b]
B_{RWA}	26.59 (1.44)	24.82 (5.60)*
B_{Hy}	-18.66 (-1.63)	-9.67 (-3.71)*
B_K	7.38 (1.13)	9.29 (6.21)*
R^2	.209	.828
d	2.16	2.19
N	60	60

[a] t-statistics are in parentheses.

[b] F-statistic.

* Statistically significant at 5% level.

TABLE 22b

LAG REGRESSION COEFFICIENTS FOR THE FULL TIME AND PART TIME EMPLOYMENT OF WOMEN AGE 20+, 1963-1977

	FT/E	PT/E
Bm	-.1019	-.064
Bm_1	-.0098	-.0305
Bm_2	.0289	.0144
Bm_3	-.0811	-.0429
Bm_4	.1224	.0375
Bm_5	-.0408	-.0510
Bm_6	-.1017	.0520
Bm_7	.0359	-.0595

For the aggregate labor force participation of adult women, the minimum wage elasticity (ΣBm) is positive while the minimum wage elasticity for aggregate employment is negative. Neither elasticity is significant. Both unemployment elasticities (ΣBu) are negative and significant. The earnings elasticities are negative but not significant. The elasticities for the husband's income (B_{Hy}) are positive and significant while the children elasticities (B_K) are negative and significant.

For white women both the labor force and employment minimum wage elasticities are negative but not significant. The minimum wage elasticities are positive for nonwhite women and the elasticity for employment is significant. All of the unemployment elasticities are negative and except for the labor force equation of nonwhite women, the elasticities are significant. The earnings elasticities are positive for white women and negative for nonwhite women but none are significant. All of the children elasticities are negative but only significant for white women.

For the distribution of employment, the minimum wage elasticities are negative for both full-time and part-time employment. The elasticity is significant for part time employment. Both unemployment elasticities are negative but neither is significant. Both earnings elasticities are positive and, for part-time employment, the elasticity is significant. The husband's income elasticities are negative but not significant. The children elasticities are positive and for part time employment the elasticity is significant.

Although some of the minimum wage elasticities are negative, only for part-time employment are the coefficients significant. This suggests that minimum wage legislation does not adversely affect the labor force participation of adult women in the long run. However, contrary to the earlier quarterly results, these results suggest that part-time employment is not augmented by this legislation. However, the earnings elasticity for part-time employment is positive and significant. The earnings variable measures full-time median annual earnings and therefore overestimates the return to part-time work. The minimum wage variable may more closely approximate the return to part-time work and the possible collinearity between the two wage variables makes it difficult to separate the two effects.

As in the previous quarterly models, the unemployment elasticities are negative, suggesting that as an aggregate group the labor force participation of adult women is adversely related to the cycles of the economy. Secondly, these results support the earlier hypothesis that the presence of young children in the home encourages part-time employment. The results also suggest that the availability of another income does not act as a deterrent to market work. And, not surprisingly, given the results of the marital status analysis, the earnings of women do not appear to be a strong incentive for market work. Again the collinearity of the income variables may make it difficult to distinguish the separate effects.

Summary of the Extended Time Series Analysis

To some degree the results of the extended time series analysis of women age 20 and older and the results of the analysis of adult women by marital status and age are consistent. Minimum wage legislation does not appear to adversely affect the labor force participation and aggregate employment of adult women. The presence of children in the home appears to discourage some women from working. However, the results also suggest that the importance of the minimum wage, market earnings and unemployment to the labor force participation decision varies with age and marital status.

As mentioned earlier, the signs and significance of the husband's income elasticities and female earnings elasticities suggest it is difficult to separate these effects on the labor force participation and employment decisions. Comparing these results with the results of the Cain (7) time series analysis of the labor force participation of adult women suggests this is not a unique problem. For married women age twenty-five to thirty-four and thirty-five to forty-four, his study also reports positive coefficients for the husband's income variable and positive and significant coefficients for the female earnings variable. For never married women, the earnings coefficients are negative but not significant. For other ever married women age thirty-five to forty-four, the earnings and welfare coefficients are positive but not significant while for other ever married women age twenty-five to thirty-four, the earnings coefficient is negative and the welfare

coefficient is positive. Neither is significant. The R^2 for the never married and other ever married women regression is also low.

CHAPTER VII.

CONCLUSIONS

Although my results are mixed, minimum wage legislation appears to have an impact on the adult female labor force. However, this impact is discriminate and limited. As an aggregate group, the direction of the labor force participation and employment of adult women is unaffected by the legislation. However, the legislation appears to alter the distribution of employment in favor of part-time employment. Possibly the aggregate employment and labor force participation of adult women are not adversely affected because part-time employment provides an alternative to remaining unemployed or to withdrawing from the labor force.

The legislation seems to be more harmful to the young adult female labor force, especially young single women, than to that of the mature adult female labor force. The educational and job experience characteristics of these young adult women are similar to those of teenagers and these women have the same alternative to market work in an educational or training program that is available to teenagers. Therefore these results are not surprising.

These results also suggest the growing importance of part-time work to the female labor force. Whether or not part-time employment cushions the impact of minimum wages, it provides an outlet for women

with alternative uses for their time or with alternative sources of income. Therefore part-time work may provide a viable source of employment to the growing number of adult women seeking market work.

As with any research, there are some shortcomings in this study. I have not been able to closely replicate Mincer's (23) regression results and the underlying course of the discrepancy is not clear. The lack of data on the employment of women by marital status and age prohibited comparing the employment behavior and labor force participation behavior of these adult women. The regressions for single and other married women have low R^2, indicating that not all of the important determinants of their labor force participation and employment decisions have yet been accounted for. It appears it has been difficult to disentangle consistently the effects of some of the control variables. This by itself does not bias the findings of minimum wage variables as the minimum wage variable has a rachet pattern which is less likely to be highly correlated with the control variables used in this study.

The major objective of this study is to test the impact of minimum wages while controlling for a variety of other influences on the employment and labor force participation of adult women. In Chapter V, the minimum wage effect is tested by using time trend variables and the specifications of the Mincer (23) and Gramlich (14) studies. Chapter VI tests the impact of minimum wages by using additional control variables. Regardless of the control variables, it

does not appear that minimum wage legislation adversely affects the aggregate employment or labor force participation of adult women.

Given the tentative nature of the results, any implications to be drawn from this study are also tentative. Although minimum wages do not appear to raise or lower the aggregate employment or labor force participation of adult women, there is some tentative evidence to suggest that minimum wages do encourage adult women to reduce their hours of work and this tends to reduce their earnings capacity. This may result in a long run adverse effect on the earnings incentive for women to investment in human capital and discourage their labor force participation.

APPENDIX

TABLE 23

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF SINGLE WOMEN AGE 14+, 1950-1977[a]

	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_m	-.163 (-1.03)	-.154 (-.914)	-.163 (-.983)	-.185 (-.989)	-.209 (-1.23)	-.225 (-1.19)
B_{m1}	-.308 (-2.10)*	-.277 (-1.70)	-.308 (-1.99)	-.277 (-1.50)	-.290 (-1.77)	-.246 (-1.38)
ΣB_m	-.471 (5.78)[b]*	-.431 (4.03)[b]	-.471 (5.52)[b]*	-.462 (3.90)[b]	-.493 (5.60)[b]*	-.462 (4.15)[b]
B_{RWA}	1.615 (2.59)*	1.615 (2.07)*	1.615 (2.51)*	1.615 (2.09)*	.807 (1.82)	.807 (1.73)
B_R	.050 (.683)	.0387 (.463)	.0504 (.665)	.0449 (.552)	-.0018 (-.025)	.0018 (.022)
B_O	-1.45 (-2.04)	-1.44 (1.77)	-1.44 (-1.67)	1.18 (-1.22)		
B_E			-.1156 (-.034)	-1.89 (-.490)	-3.14 (-1.04)	-4.38 (-1.33)
R^2	.620	.474	.621	.480	.570	.443
d	1.06	1.13	1.05	1.09	.847	.978
N	28	28	28	28	28	28

[a] t-statistics are in parentheses,
[b] F-statistics.
* Statistically significant at 5% level.

TABLE 24

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF MARRIED WOMEN, HUSBAND PRESENT, AGE 14+, 1950-1977[a]

	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_m	-.216 (-.395)	.031 (.554)	-.123 (-.224)	.043 (.903)	-.015 (-.223)	.043 (.796)
B_{m1}	.123 (1.58)	.123 (1.51)	.092 (1.25)	.092 (1.09)	.092 (1.06)	.074 (.983)
ΣB_m	.102 (.865)[b]	.145 (1.84)[b]	.092 (.641)[b]	.136 (1.56)[b]	.077 (.436)[b]	.117 (1.25)[b]
B_{RWA}	.404 (.731)	-.162 (-.508)	.404 (.748)	-.162 (-.563)	.404 (1.44)	.040 (.102)
B_R	.056 (1.98)	.015 (.539)	.050 (1.83)	.001 (.286)	.091 (3.29)*	.035 (1.53)
B_O	1.16 (3.86)	.972 (3.35)*	.956 (2.9)*	.663 (2.26)*		
B_E			1.34 (1.40)	1.99 (2.34)*	2.59 (2.58)*	2.87 (3.42)*
B_{Hy}	.600 (.966)	.600 (2.22)*	.600 (.902)	.600 (2.31)*	.600 (1.66)	.600 (2.93)*
Bk	.0002 (.0003)	-.531 (-.739)	.118 (.161)	-.356 (-.544)	.0002 (1.02)	-.531 (-.573)
R^2	.987	.987	.989	.99	.984	.987
d	2.43	1.44	2.42	1.52	2.07	1.36
N	28	28	28	28	28	28

[a] t-statistics are in parentheses; [b] F-statistic; * Statistically significant at 5% level.

TABLE 25

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF OTHER MARITAL STATUS WOMEN, AGE 14+, 1950-1977[a]

	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_m	-.216 (2.45)*	-.092 (1.07)	-.216 (-2.57)*	-.092 (-1.06)	-.216 (-2.59)*	-.092 (-1.15)
B_{m1}	-.003 (-.010)	.123 (1.60)	-.001 (-.007)	.123 (1.64)	-.003 (-.044)	.123 (1.68)
ΣB_m	-.216 (2.96)[b]	.031 (.167)[b]	-.216 (3.15)[b]	-.216 (.156)[b]	-.216 (3.68)[b]	.037 (.161)[b]
B_{RWA}	.004 (.009)	-.404 (-1.05)	.004 (.0084)	-.404 (-1.07)	.0404 (.078)	-.0404 (-1.17)
B_R	.014 (.371)	.008 (.228)	.014 (.388)	.006 (.189)	.016 (.499)	.010 (.335)
B_O	.064 (.116)	.061 (.120)	.067 (.135)	.008 (.018)		
B_E	.019 (.012)	-.394 (-.264)			.096 (.065)	-.320 (-.242)
B_{ADC}	-.011 (-.035)	.475 (1.41)	-.011 (-.034)	.475 (1.42)	.001 (.003)	.475 (1.57)
Bk	-.272 (.450)	.097 (-.257)	.233 (.465)	-.102 (-.225)	.270 (.660)	-.087 (-.236)
R^2	.410	.274	.410	.272	.410	.274
d	2.01	2.24	2.01	2.18	1.97	2.24
N	28	28	28	28	28	28

[a] t-statistics are in parentheses; [b] F-statistics; * Statistically significant.

TABLE 25

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION AND EMPLOYMENT OF OTHER MARITAL STATUS WOMEN, AGE 14+, 1950-1977[a]

	LF/P	E/P	LF/P	E/P	LF/P	E/P
B_m	-.216 (2.45)*	-.092 (1.07)	-.216 (-2.57)*	-.092 (-1.06)	-.216 (-2.59)*	-.092 (-1.15)
B_{m1}	-.003 (-.010)	.123 (1.60)	-.001 (-.007)	.123 (1.64)	-.003 (-.044)	.123 (1.68)
ΣB_m	-.216 (2.96)[b]	.031 (.167)[b]	-.216 (3.15)[b]	-.216 (.156)[b]	-.216 (3.68)[b]	.037 (.161)[b]
B_{RWA}	.004 (.009)	-.404 (-1.05)	.004 (.0084)	-.404 (-1.07)	.0404 (.078)	-.0404 (-1.17)
B_R	.014 (.371)	.008 (.228)	.014 (.388)	.006 (.189)	.016 (.499)	.010 (.335)
B_O	.064 (.116)	.061 (.120)	.067 (.135)	.008 (.018)		
B_E	.019 (.012)	-.394 (-.264)			.096 (.065)	-.320 (-.242)
B_{ADC}	-.011 (-.035)	.475 (1.41)	-.011 (-.034)	.475 (1.42)	.001 (.003)	.475 (1.57)
Bk	-.272 (.450)	.097 (-.257)	.233 (.465)	-.102 (-.225)	.270 (.660)	-.087 (-.236)
R^2	.410	.274	.410	.272	.410	.274
d	2.01	2.24	2.01	2.18	1.97	2.24
N	28	28	28	28	28	28

[a] t-statistics are in parentheses.
[b] F-statistic.
* Statistically significant at the 5% level.

TABLE 26

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF SINGLE WOMEN AGE 20-24, 1950-1977[a]

B_m	-.062 (-1.37)	-.055 (-1.29)	-.062 (-1.51)
B_{m1}	.019 (.419)	.012 (.292)	.019 (.480)
ΣB_m	-.043 (.639)[b]	-.043 (.634)[b]	-.043 (.724)[b]
B_{RWA}	.004 (.023)	-.012 (-.063)	-.081 (-.579)
B_R	.002 (.117)	.001 (.034)	-.002 (-.131)
B_E	-.517 (-.57)		-.800 (-1.04)
B_O	-.130 (-.568)	-.200 (-1.04)	
R^2	.515	.508	.508
d	1.76	1.90	1.61
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 27

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF SINGLE WOMEN AGE 25-34, 1950-1977[a]

B_m	-.04 (-.839)	-.043 (-.930)	-.049 (-1.01)
B_{m1}	-.092 (-1.98)	-.089 (-2.04)	-.092 (-1.92)
ΣB_m	-.132 (4.90)[b]*	-.132 (5.19)[b]*	-.142 (5.29)[b]*
B_{RWA}	.081 (.358)	.081 (.399)	-.081 (-.426)
B_R	-.003 (-.135)	-.002 (-.110)	-.011 (-.554)
B_E	.188 (.190)		-.283 (-.336)
B_O	-.223 (-.89)	-.198 (-.110)	
R^2	.256	.254	.227
d	2.84	2.76	2.55
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 28

REGRESSION COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF SINGLE WOMEN AGE 35-44, 1950-1977[a]

B_m	.105 (2.58)*	.099 (2.48)*	.009 (2.19)*
B_{m1}	.003 (.045)	.009 (.249)	.102 (.205)
ΣB_m	.108 (4.64)[b]*	.108 (4.70)[b]*	.111 (3.73)[b]
B_{RWA}	.040 (.322)	.081 (.449)	-.162 (-1.43)
B_R	.069 (3.74)*	.072 (3.93)*	.055 (3.10)*
B_E	.661 (.793)		-.160 (-.218)
B_0	-.391 (-.186)	-.303 (-1.72)	
R^2	.803	.797	.771
d	1.89	1.95	2.06
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 29

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF MARRIED WOMEN, HUSBAND PRESENT, AGE 20-24, 1950-1977[a]

B_m	.065 (1.19)	.089 (1.67)	.293 (1.16)
B_{m1}	.283 (3.25)*	.206 (2.76)*	.062 (3.47)*
ΣB_m	.348 (15.88)[b]*	.296 (12.01)[b]*	.354 (17.22)[b]*
B_{RWA}	-2.02 (-4.42)*	-1.62 (-3.40)*	-2.02 (-4.47)*
B_R	-2.88 (2.34)*	-2.58 (1.88)	2.94 (3.47)*
B_E	-1.97 (-1.57)		-1.78 (-1.49)
B_O	.232 (.610)	.088 (.232)	
B_{Hy}	1.80 (6.19)*	1.80 (5.88)*	1.80 (7.89)*
B_K	-1.94 (-7.92)*	-1.74 (-8.08)*	-1.98 (-8.47)*
R^2	.992	.991	.992
d	2.8	2.55	2.81
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistic.

* Statistically significant at 5% level.

TABLE 30

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF MARRIED WOMEN, HUSBAND PRESENT, AGE 25-34, 1950-1977

B_m	-.028 (-.339)	-.055 (-.674)	-.04 (-.477)
B_{m1}	-.191 (-2.24)*	-.151 (-1.73)	-.243 (-2.71)*
ΣB_m	-.217 (3.96)[b]	-.206 (3.18)[b]	-.283 (6.08)[b]*
B_{RWA}	.807 (1.75)	.807 (1.79)	1.21 (3.72)*
B_R	-.005 (-.124)	.001 (.031)	.040 (1.08)
B_E	2.95 (1.86)		4.51 (2.91)*
B_0	1.33 (2.20)*	1.83 (3.20)*	
B_{Hy}	-.600 (-1.17)	-.600 (-1.14)	-.180 (-.686)
B_K	.101 (.144)	-.013 (-.016)	.758 (1.09)
R^2	.979	.975	.973
d	1.16	1.09	1.12
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 31

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF MARRIED WOMEN, HUSBAND PRESENT, AGE 35-44, 1950-1977[a]

B_m	-.123 (-.195)	-.031 (-.479)	-.034 (-.500)
B_{m1}	.059 (.923)	.089 (1.35)	.022 (.302)
ΣB_m	.046 (.281)[b]	.059 (.378)[b]	.012 (.021)[b]
B_{RWA}	-.040 (-.162)	-.008 (-.026)	.404 (1.49)
B_R	.015 (.486)	.020 (.629)	.046 (1.54)
B_E	2.15 (1.77)		3.41 (2.85)*
B_O	1.05 (2.29)*	1.42 (3.29)*	
B_{Hy}	.600 (1.3)	.600 (1.21)	.600 (1.55)
B_K	-.274 (-.521)	-.360 (-.654)	.226 (.430)
R^2	.978	.975	.972
d	1.01	.947	1.03
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 32

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF OTHER MARITAL STATUS WOMEN AGE 20-24, 1950-1977[a]

B_m	.123 (.109)	.022 (.188)	.123 (.106)
B_{m1}	.234 (1.67)	.216 (1.72)	.216 (1.67_
ΣB_m	.246 (2.11)[b]	.237 (2.10)[b]	.228 (2.09)[b]
B_{RWA}	-.808 (-.915)	-.808 (.592)	-.404 (-.885)
B_R	.052 (.888)	.049 (.873)	.062 (1.25)
B_E	-.861 (-.325)		-.418 (-.185)
B_O	.274 (.340)	.014 (.211)	
B_{ADC}	1.11 (1.94)	1.06 (1.95)	1.16 (2.34)*
B_K	-.082 (-.200)	-.035 (-.093)	-.007 (-.022)
R^2	.710	.708	.708
d	2.23	2.18	2.18
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 33

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF OTHER MARITAL STATUS WOMEN AGE 25-34, 1950-1977

B_m	.034 (.322)	-.009 (-.071)	.031 (.332)
B_{m1}	-.015 (-.148)	.043 (.389)	-.022 (-.198)
ΣB_m	.018 (.019)	.034 (.054)	.009 (.0099)[b]
B_{RWA}	-.162 (-.328)	-.404 (-.322)	-.121 (-.302)
B_R	-.005 (-.107)	.008 (.153)	-.001 (-.033)
B_E	3.68 (1.75)		3.79 (1.97)
B_O	.120 (146)	.629 (.783)	
B_{ADC}	.423 (.850)	.581 (1.13)	.423 (.982)
B_K	-1.56 (-2.24)*	-1.71 (-2.35)*	-1.49 (-3.12)*
R^2	.668	.614	.667
d	1.84	1.79	1.82
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistics.

* Statistically significant at 5% level.

TABLE 34

ELASTICITY COEFFICIENTS FOR THE LABOR FORCE PARTICIPATION OF OTHER MARITAL STATUS WOMEN AGE 35-44, 1950-1977[a]

B_m	.034 (.694)	.028 (.616)	.015 (.734)
B_{m1}	.022 (.509)	.031 (.705)	.009 (.199)
ΣB_m	.055 (.807)[b]	.059 (.898)[b]	.025 (.179)[b]
B_{RWA}	.0404 (.124)	.0404 (.123)	.162 (.751)
B_R	.003 (.149)	.005 (.239)	.018 (.969)
B_E	.443 (.499)		.849 (.998)
B_O	.490 (1.32)	.55 (1.66)	
B_{ADC}	-1.06 (-.586)	-1.06 (-.52)	0 (-.011)
B_K	-.661 (-2.37)*	-.676 (-2.48)*	-.380 (-1.98)
R^2	.471	.464	.419
d	1.87	1.79	1.82
N	28	28	28

[a] t-statistics are in parentheses.

[b] F-statistic.

* Statistically significant at 5% level.

TABLE 35

SUMMARY STATISTICS FOR THE QUARTERLY DATA-MEANS

	1949-75	1950-77	1954-69	1954-75	1954-77	1963-75	1963-77
L/P	.399	.393	.404			.423	
white			.369	.404	.391		
nonwhite			.499	.507	.506		
E/P	.369	.374	.364			.400	
white			.363	.387	.373		
nonwhite			.459	.463	.462		
FT/E						.793	.793
PT/E						.207	.207
labor force	23,081		22,227	24,451		27,318	
white			19,220	20,056			
nonwhite			2,964	3,254			
employment	19,456		21,074	23,136		25,885	
white			18,678	20,401			
nonwhite			2,578	2,868			
full time						29,048	
part time						5,401	
minimum wage							
m	32.01		31.5	34.45	33.7		37.01
R	1.20		1.25	1.28			

TABLE 35 (Continued)

	1949-75	1950-77	1954-69	1954-75	1954-77	1963-75	1963-77
unemployment	.0306	.0306	.0315	.0303	.0315	.0258	.0273
children	.210	.206	.215	.199	.203	.190	.195

TABLE 36

SUMMARY STATISTICS ANNUAL DATA-MEANS

	L/P	E/P
single	.493	.461
married, husband present	.345	.341
other	.401	.376
age 20-24		
single	.720	
married, husband present	.398	
other	.571	
age 25-34		
single	.816	
married, husband present	.335	
other	.605	
age 35-44		
single	.772	
married, husband present	.409	
other	.892	
Mw	30.8	
Hy	6001	
u	.0306	
K	.837	
RWA	4037	
ADC	528.27	
O	.3125	
P_D	102.6	
E	12.3	

TABLE 37

SYMBOLS

M	- B.L.S. minimum wage
R	- real minimum wage
U	- unemployment
K	- presence of children
C	- coverage rate
RWA	- median annual real fulltime female income
R	- first quarter unemployment (annual)
E	- median female eduactional attainment
O	- occupational mix
Hy	- median annual real income of husband
ADC	- average annual real welfare payment

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