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Wage suppression of married women induced by geographic immobility

Yesook Merrill
Binghamton University--SUNY

MERRILL, Y.

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BY

YESOOK MERRILL

B.A., Chungang University, 1977
M.A., The State University of New York at Binghamton, 1984

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Accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics in The Graduate School of the State University of New York at Binghamton

Haim Ofek
Economics Department
Haim Ofek
August 17, 1987

Phillip Nelson
Economics Department
Phillip Nelson
August 17, 1987

Solomon Polachek
Economics Department
Solomon Polachek
August 17, 1987

Martin Freedman
School of Management
Martin Freedman
August 17, 1987

ABSTRACT

Although the relative geographic immobility associated with married women--as the result of family utility maximization--is a familiar notion, its effect on the male-female wage gap has not been examined empirically, perhaps because of the unavailability of adequate data. Utilizing the 1980 Census, which for the first time identifies the locations of all respondents in metropolitan areas, the present study estimates the impact of sex-related immobility on the male-female wage gap.

To the extent that wives have less market human capital than their husbands, married women may be forced to optimize their employment mainly in the <u>local</u> labor market, unlike their husbands who are more likely to optimize their employment in the <u>national</u> labor market. If this is the case, then married women's wages will presumably be more sensitive than those of men or single women to the size of the local labor market.

The empirical findings from a 1/1000 sample from the 1980 Census indicate that the positive impact of city size on earnings is in fact larger for married women than for married men; in other words, the wage gap between married men and

women narrows as city size increases. Computations based on the regression results show that about 12 percent of the unexplained wage gap between married men and women may be accounted for by city size. However, the wage gap between single men and women does not seem to have a statistically significant relationship with city size.

These results are consistent with the main implications of Mincer's hypothesis of a locational tie associated with married women. But the results do not identify which of the following two mechanisms is primarily responsible for depressing the wages of tied individuals in small labor markets: overqualification (because of too little diversity and specialization in available jobs) or monopsony (too few employers to guarantee wage competition). Since tests for the overqualification hypothesis were inconclusive, the present study primarily examines the monopsony hypothesis, both theoretically and empirically.

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CHAPTER ONE

INTRODUCTION

Gender and marital status are important determinants of geographic mobility. To the extent that wives have less human capital investment and labor force attachment than their husbands, the family utility maximization process may place a locational constraint on married women. To put it in Mincer's terms, wives are more likely to be tied stayers or tied movers. To what extent is the relative immobility of married women responsible for the widely observed male-female wage gap? Until recently this has been a difficult question to answer empirically, since detailed identification of individuals by geographic location in national micro-data samples has not been available. With the 1980 Census now identifying locations of all respondents residing in metropolitan areas, the impact of sex-related immobility on the male-female wage gap can be estimated, and the implications derived from the locational tie hypothesis can be more easily tested.

The present study is essentially an attempt to explain the difference in the degree of geographic mobility between married men and women, and to examine its effects on the wage

gap between these two groups. The analysis is based on the premise that immobility affects married women more in small labor markets than in large ones.

The earnings of women in a small labor market (i.e., a small city) may be affected by two factors: (a) the narrow range of occupational categories and the limited specialization within each occupation, which forces women to take odd jobs in which their qualifications cannot be fully utilized; and (b) the fact that, even if they find employment in their optimal job, the number of potential employers in that occupation may be too small to guarantee competitive wages. In case (a), women's wages may be suppressed by overqualification; in case (b), their wages may be suppressed by the inelastic labor supply curve to the employer leading to monopsonistic wages. These two possibilities are not mutually exclusive. Women in a small city may suffer the consequences of either overqualification or monopsony, or both. Note, however, that the earnings of women in a large city are less likely to be affected by either condition.

In sum, if married women (given their locational costraint) can optimize their earnings primarily in the local labor market, then the very size of the local market becomes a determinant of the wage gap between married men and women. For the wages of married women will be more sensitive to the size of the local market than the wages of married men.

In fact, the results of the 1980 Census 1/1000 sample

worked out in this study indicate that the impact of city size on earnings is larger for women than for men. The wages of married males increase by 1.3 percent for each increment of a million in city size, while the wages of married females increase by 2.2 percent for the same increment in city size.

When the census data are grouped into subsamples by occupation, the results show instructive differences. For instance, the results for segregated occupations reveal that there is a great difference between male segregated and female segregated occupations in the effect of city size on wages. While nurses (representing female segregated occupations) gain 3.7 percent in wages for each increment of one million in city size, engineers (probably the most comparable male segregated occupation) gain only 1.1 percent in wages for each increment of one million in city size. The findings for mixed occupations reveal that there is often an even greater difference between men and women in the sensitivity of wages to city size. The data for postsecondary teachers indicate that the wages of male professors do not have a statistically significant relationship with city size, but that the wages of female professors increase by 4.3 percent for each increment of a million in city size. There are of course exceptions to this rule. The main exception I could find is public school teachers. While male teachers gain 4 percent in wages per increase of one million in city size, female teachers gain

only 1.4 percent in wages for the same increment in city size.

Since about one quarter of the U.S. population lives in cities with a population of under one million and another quarter in rural areas and towns with a population of under 100,000, the aggregate effects of the locational tie on the earnings of married women is expected to be substantial. In fact, the calculations show that about 12 percent of the otherwise unexplained wage gap between married men and women can be explained by city size.

The findings are consistent with the locational tie theory of Mincer. But such findings are also consistent with two partly conflicting implications of that theory: the overqualification and monopsony hypotheses. If overqualification (as an indication of wasted human capital) is a major manifestation of the locational tie for married women, then one would expect that the rate of return to education for married women would increase with city size. However, the findings indicate that the rate of return to education for married women does not have a statistically significant relationship with city size. One cannot reject a hypothesis on the basis of statistically insignificant results. Such results, however, suggest that a thorough investigation of alternative arguments is in order. As one alternative, the present study pays special attention to the monopsony hypothesis, particularly in the context of sex-

related geographic immobility.

Chapter 2 provides a brief review of the relevant literature, constructs a theoretical framework from these existing studies, and derives testable implications. Chapter 3 derives monopsony models applicable to gender-specific differences in geographic mobility. Chapter 4 gives a detailed description of the 1980 Census data. Chapters 5, 6, and 7 discuss the empirical findings. The final chapter presents a summary of the empirical findings and conclusions.

CHAPTER TWO

BACKGROUND

The principle that division of labor allows specialization which in turn increases wealth -- noted as early as the time of Adam Smith -- applies to families no less than nations. The division of labor between husband and wife, which has been observed in all cultures throughout the history of mankind, is understood by economists to be the outcome of a rational process of family utility maximization. The increasing returns from specialization create a division of labor in the allocation of time and human capital investments between the husband and wife.[1] Even in the absence of differences in natural abilities and acquired training, the different roles men and women play in the process of child rearing would most likely result in the traditional sexual division of labor -- the wife's specialization in the household sector and the husband's specialization in the market sector.

Family Resp. + Education (FR+E)

The simple fact that a married working woman has to divide her time between market work and household work has profound implications for her economic status. Human capital studies often link the household responsibilities of married women

with their disadvantages in the labor market (for example, Mincer and Polachek [1976, 1978], Mincer and Ofek [1982], Sandell and Shapiro [1978], Becker [1985]). The bottom line of these studies is that, because of their traditional role, women in general invest less in job training in both quantity and quality. A brief review of the human capital approach to the male-female wage gap is provided in the following section.

2.1 Less Investment in On-the-job Training: Premarket Effects

Mincer and Polachek [1974] noted that women, as the primary providers of household work, spend a shorter time in the labor force over their life cycle. Moreover, their labor force participation is often discontinuous. On the average, mainly due to their child rearing responsibilities, women spend more than ten years of their lives out of the labor force. The labor force intermittency of women has a two-fold effect on their earnings. It may depreciate their existing human capital stock outright (ex post effect); and it may deter them from investing in their human capital in anticipation of having to leave the work force in the future (ex ante effect).[2] The discontinuous labor force participation of women not only lowers their earnings directly, but also indirectly -- by leading women into low-

skill occupations with low "atrophy" rates (Polachek [1979]).

In a recent work, Becker [1985] adds another dimension to the on-the-job investment analysis by explicitly formulating the quality aspect of the investment. He proposes that even if a married woman participates in the labor force as long as a man, her job investment may still be lower.

> If child care and other housework demand relatively large quantities of "energy" compared to leisure and other nonmarket uses of time by men, women with responsibilities for housework would have less energy available for the market than men would. (pp. S35)

Married women (particularly those with young children), to the extent that they are primarily responsible for housework, may have less energy available to allocate to market activities. Holding other factors constant, therefore, their on-the-job investment may be suppressed in terms of intensity as well. And this relatively lower energy available for market work may force women to economize by seeking jobs and occupations that require less expenditure of energy per hour, further suppressing the level of their on-the-job investment.

2.2 Locational Constraints: More Premarket Effects

We have just seen how the traditional role of a woman in the family may decrease her market productivity by lowering both the quantity and quality of her job investments. Mincer [1978] takes this a step further. He proposes that that the

low market productivity of married women may cause them to invest less in yet another form of human capital -- migration. As a result, wives are more likely to be geographically "tied", locating where their husbands' earnings are maximized rather than their own. Mincer establishes an economic definition of family migration ties and predicts, among other things, how they affect the earnings of family members.

Of course, the lower level of labor force participation, the lower expenditure of effort, and the locational tie are not separate problems. They are interrelated in many ways, reinforcing one another and producing a compound effect on women's market earnings. The detailed review of Mincer's work in the next section is provided as a point of departure for the present study.

2.2.1 Family Migration Decision

Mincer investigates the problem of labor migration in the context of family utility maximization. For simplicity, he implicitly assumes that utility is monotonically related to real income. Thus migration to a particular destination takes place when the net gain in family income from moving (return minus cost of moving) is positive. For husband-and-wife families, to give the most simple illustration, there

are two streams of personal returns, R_i, and personal costs, C_i, from migration:

$G_h = R_h - C_h$; $G_w = R_w - C_w$. Thus, net family gain from migration is, $G_f = G_h + G_w$, where G is net gain from migration and the subscripts f, h, and w denote family, husband, and wife respectively.

The decision to migrate will be made only when G_f is positive. If G_h and G_w have the same sign or if one of them is zero, then there are no negative externalities imposed by the migration tie on either spouse. Thus the decision whether or not to migrate will be unaffected by marital status. But if G_h and G_w are non-zero and differ in sign, then there are two kinds of negative externalities that must be imposed on one of the spouses.

(1) If $G_f > 0$, then one spouse will accompany the other despite his or her personal loss - Mincer terms this person a "tied mover".

(2) If $G_f < 0$, then one spouse will be forced to remain in the original family location even though he or she can obtain a personal gain from moving - Mincer terms this person a "tied stayer".

By definition, whether a move takes place or not, the personal loss incurred by the tied person must be smaller than the personal gain of his or her spouse.

To get a rough idea of the prevalence of migration ties, suppose that 25 percent of unattached adults migrate over a

period of three years.[3] If the signs of G_h and G_w are independent in probability, 6.25 percent of all families will migrate without producing tied movers; 56.25 percent of all families will stay without producing tied stayers; 37.5 percent of all families will have either a tied stayer or a tied mover. The actual distribution of tied spouses among these movers and stayers is not the main focus of this study, for either form of tie creates negative externalities for the affected persons.

Our immediate task is to analyze why migration ties, on the average, affect women more than men. Let us define the net monetary gain from moving for family when $G_h > 0$ and $G_w < 0$ as:

$$(2.1) \qquad G_{fh} = arK_hN_h - drK_wN_w - c$$

Similarly, the net monetary gain from moving for family when $G_h < 0$ and $G_w > 0$ is:

$$(2.2) \qquad G_{fw} = arK_wN_w - drK_hN_h - c$$

where r = the rate of return to human capital

a = the rate of appreciation in earnings at the destination

d = the rate of depreciation in earnings at the destination

N = the expected number of remaining years in the labor force until retirement

K = human capital stock prior to migration

c = the direct costs of moving, including psychic costs.

The relevant for the discussion are the cases in which $a > 0$ and $d > 0$. Assuming a zero discount rate for simplicity, the first terms on the right-hand-side of equations (2.1) and (2.2) are the personal returns from migration in terms of the augmented earnings streams until retirement. The second terms in both equations represent the indirect costs of moving in terms of the foregone earnings of the spouse at the destination. The direct costs of moving can be regarded as the same for the family no matter who initiates the migration.

If the term G_{fh} is smaller than zero, then the husband is the tied stayer; if it is greater than zero, then the wife is the tied mover. Similarly, a negative sign of G_{fw} implies that the wife will be the tied stayer; a positive sign implies that the husband will be the tied mover. For the husband to be the tied mover, the wife's personal gains from migration should be large enough to compensate for his loss in earnings and the direct cost of moving.

It is obvious that the probability of a spouse being tied depends on the relative magnitude of his or her N_iK_i. If

$N_hK_h > N_wK_w$, then there is a higher probability of the occurrence of a tied wife than of a tied husband. In general, the wife's market oriented experience level (K) is less than her husband's. Moreover, the wife expects a shorter period of labor force participation (N) than her husband mainly due to her responsibilities in the home and child rearing.[4] This leads to the generalization that the probability of married women being either tied movers or tied stayers is greater than that of married men. To put it in formal terms, suppose a and d are random variables distributed with $E(a) = E(d) = \rho > 0$. Then

$$(2.3)\quad E(G_{fh}) = r\rho(K_hN_h - K_wN_w) - c \quad > \quad r\rho(K_wN_w - K_hN_h) - c = E(G_{fw})$$

It follows that:

$$(2.4)\quad Prob(G_{fh} > 0) > Prob(G_{fw} > 0)$$

That is, the wife is more likely to become a tied mover than the husband. Similarly,

$$(2.5)\quad Prob(G_{fh} < 0) < Prob(G_{fw} < 0)$$

which indicates that the wife is also more likely than her husband to become a tied stayer.

The concept of migration ties can be generalized by considering all possible destinations.[5] The main implication remains the same.

Thus far we have established how family income maximization results in geographic constraints on the mobility of married women. In fact, several studies provide evidence that family migration increases the earnings of husbands but reduces the earnings of wives [Polachek and Horvath (1977), Sandell (1977), Gallaway (1969)].

2.3 Locational Tie and City Size

To carry the argument of the "tied wife" to its extreme, husbands would tend to locate themselves in the geographic market of their highest possible earnings (appropriately adjusted for non-monetary factors). Their job searches span all areas in the entire market system. Wives, however, would tend to optimize their employment opportunities mainly in the local markets where their husbands' chosen jobs are located.

For wives, therefore, the characteristics of local labor markets become a major determinant of earnings. In particular, the number and availability of competing potential employers in the local market may place an important constraint on the earnings of married women. The penalty that the family migration tie imposes in terms of

wives' earnings will be greater for wives living in smaller cities. Women in large urban areas will suffer a lesser loss from the tie, for a diverse range of employment opportunities exists within the local labor market. They have a higher probability of being employed in their optimal occupation since a large labor market offers a large range of occupations and high degree of job specialization within each occupational category. In addition, women in large city have many potential employers within their occupations.

But women in a small city may be penalized for being tied stayers or movers in two ways: (a) because of the small range of occupational categories and the limited job specialzation within each occupation, they may have to choose an odd occupation in which their full qualifications cannot be utilized; (b) even if they find employment in their optimal occupation, the number of potential employers in the occupation may be too small to guarantee competitive wages. In case (a), women's wages may be suppressed by overqualification; in case (b), their wages may be suppressed by the inelastic labor supply curve to the employer that result in monopsonistic conditions.

Since the size of the local labor market determines the degree of wage loss associated with the locational tie, we can predict the following decision making behavior. When both spouses have high levels of human capital and labor force attachment, the couple may expect the potential income

loss from the locational tie in a small city to be too great and are more likely to locate in a large metropolitan area. The larger the difference in earning power between husband and wife, the less cost is incurred by the tied spouse in terms of foregone earnings and the more likely it is that the couple will be willing to move to a small city. Therefore, one can expect that the husband-wife wage ratio will decrease as city size increases.

2.4 Market Effects

Up to section 2.2 we have considered only premarket or the supply-side effects of the division of labor. Now we have to bring employers into the picture to see the full effects of women's traditional role on their earnings. For the reasons given in section 2.3, this should not make significant difference for women in large labor market. However, women in small labor market may be at a disadvantage even in selling their human capital at its already depressed level. We must ask what kind of market conditions confront tied women in small city. One possible process is hypothesized by Frank [1978]. He addresses the plight of tied women in small local labor market. As reviewed in the next section, Frank presents overqualification as the main mechanism through which the family migration tie suppresses the wages of

married women.

2.4.1 Overqualification Theory

In order to make the analysis consistent with the human capital framework, I made some modification to Frank's exposition of overqualification. Suppose that each worker possesses human capial whose production function is given by

$$(2.6)\ K = K\ (S_g,\ S_s,\ E_g,\ E_s)$$

where S and E represent schooling and job experience and subscripts g and s denote general and specific kinds of investments respectively. This particular production function allows human capital investments in both schooling[6] and job experience to have general and specific components.

General human capial is defined to be compensated at a rate determined in the national market. But specific human capital is compensated at a rate determined by individual employers. Since the return to specific investment fluctuates from one employer to another, it can be used to determine the degree of matching between the employer and employee.

By definition, one is exactly qualified, if she is compensated fully for all her specific human capital; one is

overqualified, if she is less than fully compensated for her specific human capital. The excess qualifications of the overqualified person have no value to the employer in terms of productivity. Of course, the person's qualifications are not fairly compensated from the employee's point of view -- some of her qualifications are wasted.

The level of overqualification is given by

$$(2.7) \quad Z = r_s^{**} - r_s$$

where r_s^{**} and r_s are the potential maximum rate of return and the actual rate of return to specific human capital respectively. If $Z = 0$, the individual is exactly qualified for the position; if $Z > 0$, overqualified.

In order to maximize one's wage, the individual should identify the job vacancy in which she can minimize her overqualification level. Let the minimum level of overqualification in a local market be:

$$(2.8) \quad Z^* = r_s^{**} - r_s^*$$

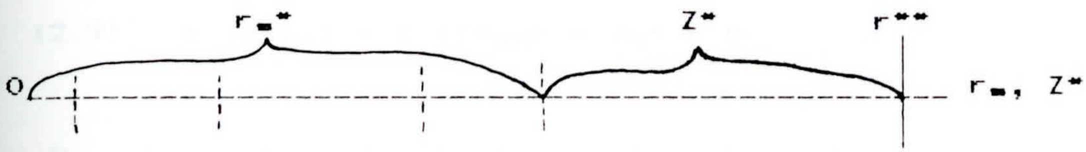
where r_s^* represents the maximum rate of return to specific human capital obtainable in the local market.

Assuming that each local labor market has a distribution of vacancies with different levels of r_s, the illustration in Figure 2.1 summarizes the process described above. The

straight hash mark denotes the level of r^{**}.

FIGURE 2.1

OVERQUALIFICATION LEVELS IN A LOCAL LABOR MARKET



If Z^{*}, the minimum overqualification level in a given local market, is non-zero, the individual may consider other markets. Maximizing one's earnings globally implies that one should move to a market that contains the employer offering her r_m^{**}. For a single individual, moving to a market that offers zero overqualification is a relatively simple matter.

But for married individuals complications may arise since each spouse may find his or her zero overqualification level in a different market. A couple may try to locate where the combined level of Z of both spouses is minimized. However, considering every possible market for two individuals simultaneously may be extremely costly. Thus, given imperfect information and high cost of search, the family may opt to locate where the husband's overqualification level is zero: the wife will then minimize her own Z, taking the market as given. To the extent that human capital of

husbands greatly exceeds that of wives, this sequential optimization may closely approximate the results of simultaneous optimization. Under this scheme, the husband can achieve global optimization -- just like his single counterpart. Thus for a husband,

$$(2.9) \quad E\ (Z^*_{n_1}) = E\ (Z^*_{n_0}) = Z_N^* = 0$$

where N = the number of jobs in total market system

n_1 = the number of jobs in large market

n_0 = the number of jobs in small market

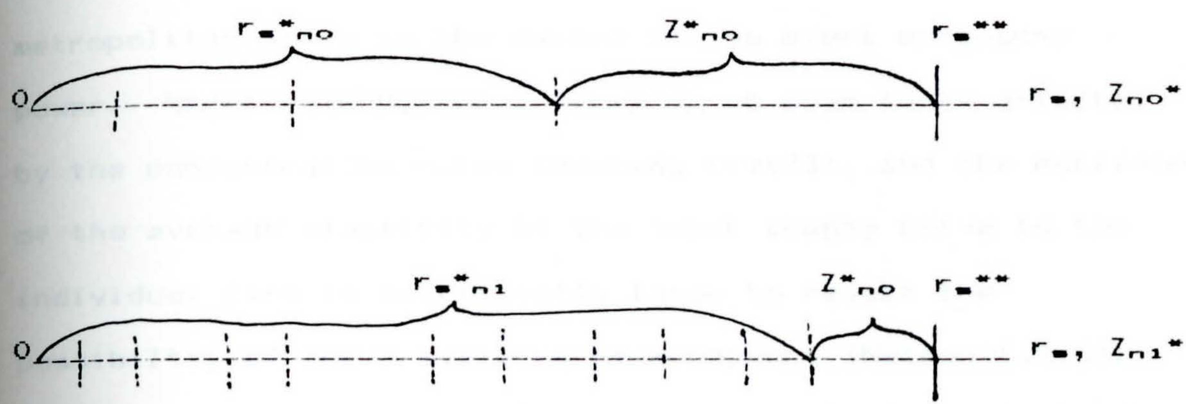
For a wife, on the other hand, optimization takes place only in a local market. The number of vacancies in the given market determines her optimal overqualification level, Z^*. To be more specific,

$$(2.10) \quad E\ (Z^*_{n_1}) < E\ (Z^*_{n_0})$$

The number of vacancies in the local market is inversely related to Z^*, as also illustrated in Figure 2.2.

FIGURE 2.2

OVERQUALIFICATION LEVELS IN MARKETS OF UNEQUAL SIZE



To conclude, the effect of overqualification is greater for individuals with more specific human capital. If the overqualification level is a factor in wage determination, then the penalty for a wife's being tied should be greater for women with higher levels of specific human capital. And for a given level of specific human capital, the overqualification level of a tied person should be inversely related to the size of the local market.

2.4.2 Employer Monopsony

Overqualification is one manifestation of the locational tie associated with married women in a small city. But there is another possible market condition that may negatively

affect women's earnings in small city -- the potential monopsony power of employers. When the overall economy is considered, there is little evidence that private firms in metropolitan areas in the United States exert monopsony power. Wages paid by these firms do no seem to be affected by the concentration ratio (Bunting [1962]), and the estimate of the average elasticity of the labor supply curve to the individual firm is sufficiently large to reject the possibiltiy of the prevalence of monopsony (Nelson [1973]). These observations are in line with the relatively high labor mobility in the United States. But the general framework of such studies do not deal with the geographic immobility specifically associated with married women.

Despite evidence against monopsony in the economy as a whole, there are indications that monopsony may prevail in the case of special occupational groups. Some studies, as we will see, have found that the markets for registered nurses in small towns and for public school teachers in large consolidated school districts are monopsonistic to some extent.

Link and Landon [1975] found a substantial influence of monopsony behavior on the wage level of registered nurses. Their study is based on the fact that over 70 percent of the hospitals in the United States are the only ones in their communities. With the limited geographic mobility of nurses, labor supply of nurses such local hospitals face are likely

to be inelastic. Using national survey data collected from sixty-five U.S. cities (the largest fifty cities and fifteen small cities of 20,000 to 250,000, in population), a sample of hospitals were drawn from each city. The number of hospitals in each city ranged from one to ten, and the usable sample included 317 hospitals. Link and Landon's empirical results indicate that the concentration rate alone, (measured by the natural logarithm of Herfindahl index) can explain 15 percent of the variation in nurses' salaries. Link and Landon also calculated that a doubling in the Herfindahl index is associated with $400 less in annual starting salaries for nurses with B.S. and other degrees. This result is consistent with the prediction of the monopsony hypotheseis in the nursing sector and confirms earlier findings by Hurd [1973].

Another example of employer monopsony is provided by Landon and Baird [1971] in their study of the wage level of public school teachers. Since teaching is a skilled profession, whether alternative employment in the profession is available or not determines labor supply elasticities to any given employer. If there are many competing school districts in a metropolitan area, even the locally tied teachers can have a number of potential employers. Using 1966-67 national cross-sectional data on 136 school districts which had enrollments of more than 25,000, the authors empirically examined whether the number of school districts

in the county had an impact on the contractual salary of beginning teachers. The number of school districts was shown to be positively related to the salary level, and the relation was highly statistically significant. The authors concluded that the more districts in a county, the less monopsony power possessed by the district and the higher the salaries of beginning teachers.

The two studies just reviewed provide convincing evidence of monopsony in the market for nurses and teachers. One should note that individuals in these two occupations have something in common; they are relatively highly skilled and predominantly female. Reinforced by the fact that their employment is limited to their narrowly defined occuapations, the locational tie may be the cause of the monopsonistic wage determination of these groups.[7]

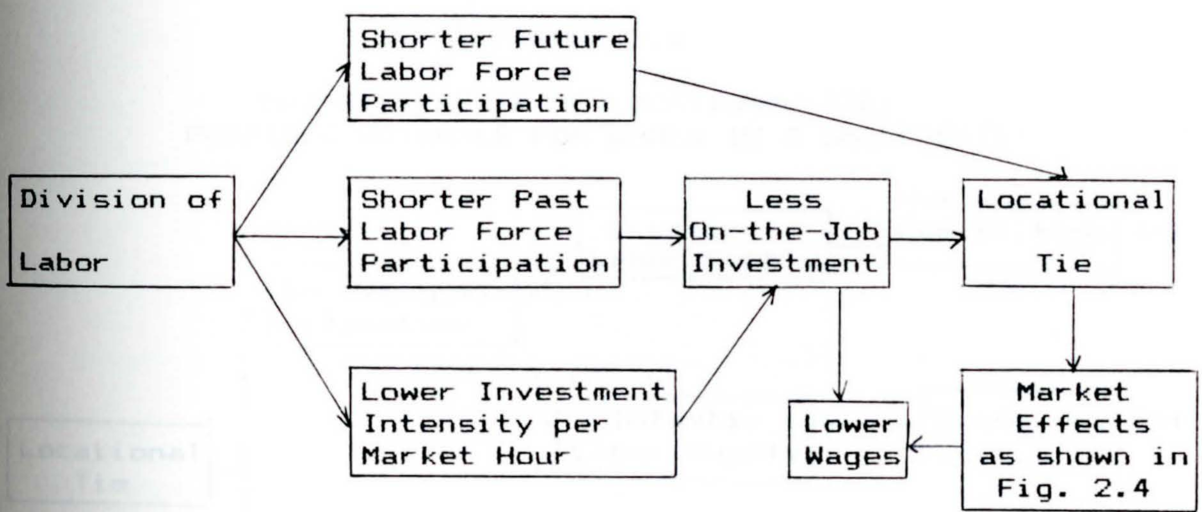
If the problem of the locational tie affects most adult married women, then the monopsony problem may not be confined just to these two occupations. It may affect women in a wider range of occupations, particularly those requiring specialized skills. Thus the logical next step is to explore monopsony induced by the locational tie in a broader context. With this in mind, the following chapter will model employer monopsony in more generally applicable ways.

2.5 Summary

A causal relationship between the traditional sexual division of labor within the family and its economic consequences for women was presented. Perhaps the best way to summarize these connections is to illustrate it with a chart. Figure 2.3 presents the supply-side effects of the typical role of female in the family.

FIGURE 2.3

SUPPLY-SIDE EFFECTS OF TRADITIONAL SEXUAL DIVISION OF LABOR



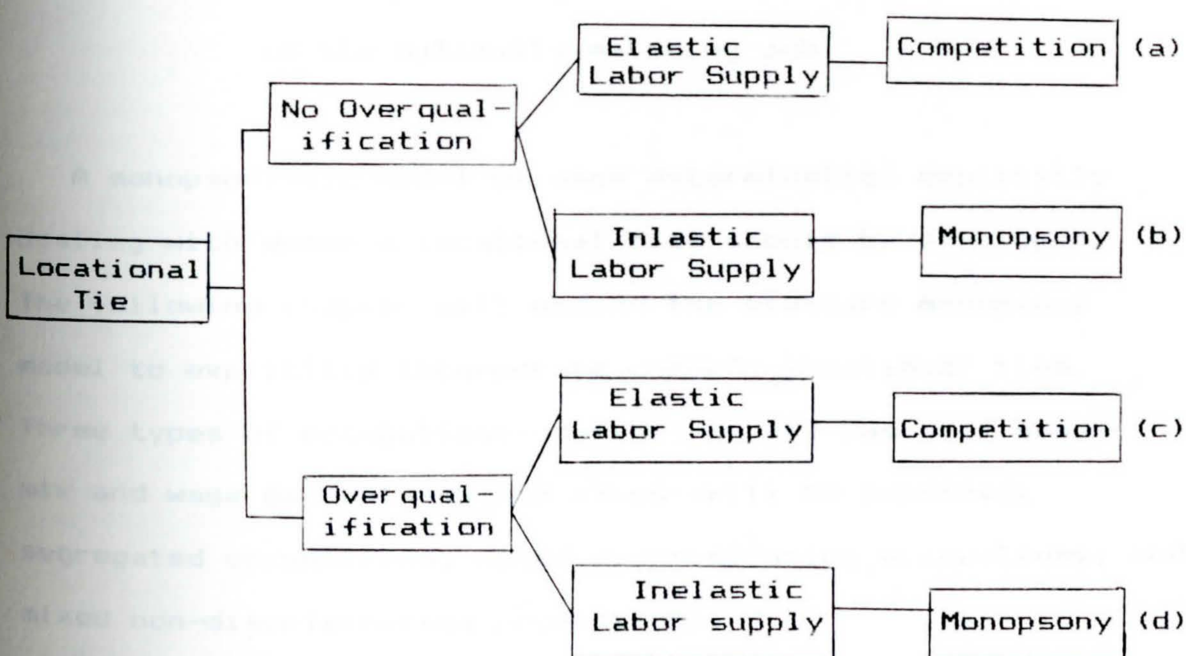
The traditional sexual division of labor between husband and wife makes women less attached to the market. A typical working wife works fewer hours and with less expenditure of energy per hour (often by choosing less demanding jobs) in the market than her husband. The result is that women may have less market human capital compared to men of equal age

and schooling. Because of the lower market investment of the wife, the locational decision of a family is often dominated by the husband's employment opportunity. Thus women's job searches may typically involve only the local labor market.

Besides the supply-side effects outlined earlier, women in a small city may experience additional disadvantages induced by their locational ties when they enter the labor market: the overqualification problem and employer monopsony. These two possibilities are not mutually exclusive. Any combination of them is possible as illustrated in Figure 2.4.

FIGURE 2.4

MARKET EFFECTS OF LOCATIONAL TIE:
POSSIBLE OUTCOMES FOR WOMEN IN A SMALL CITY



Outcome (a), where tied women suffer from neither overqualification nor monopsony, is mostly applicable to

women in a large city. The implied wage level for outcome (a) is $w = VMP = VMP^* = w^*$. More likely outcomes for women in a small city are (b), (c), and (d). The implied wage levels for these three categories are:

for outcome (b), $w < VMP = VMP^* = w^*$ (monopsony only);

for outcome (c), $w = VMP < VMP^* = w^*$ (overqualification only);

for outcome (d), $w < VMP < VMP^* = w^*$ (both overqualification and monopsony);

where w = actual wage received

w^* = competitive wage in the optimally matching job

VMP = the value of marginal product to the actual employer

VMP^* = the value of marginal product to the employer in the optimally matching job

A monopsonistic model of wage determination explicitly dealing with women's locational ties should be developed. The following chapter will expand the standard monopsony model to explicitly incorporate women's locational ties. Three types of occupations--defined on the basis of gender mix and wage gap between the sexes--will be examined: segregated occupations, mixed discriminating occupations, and mixed non-discriminating occupations.

NOTES TO CHAPTER 2

1. For detailed discussions, see Polachek [1975, pp. 451-470], Becker [1985, pp. S33-S58].

2. The second effect would lead to somewhat higher wages early in life and lower wages later on. At equilibrium the two effects are equal in terms of <u>discounted</u> values: higher wages early in life will exactly offset lower wages later on. In terms of <u>current</u> values, however, lower wages in late life dominate.

3. Between 1975-78, about 25 percent of the men and women in their twenties in the U.S. migrated between counties or between states [Ehrenberg and Smith (1982), p. 276]. Thus it is not excessive to say that the probability of migration of unattached adults is approximately 25 percent.

4. However, families may decide not to move together if the costs of maintaining two separate residences in different geographic areas is less than the expected losses associated from the family tie. The solution of "commuter marriage" is likely adopted more by professional couples with a high level of specialized skills when both spouses have a similar level of market productivity and labor force attachment. These families may find the indirect costs of being together too costly to absorb.

5. Suppose that each spouse has a set of possible locations offering different levels of personal economic opportunities. Let G^*_h and G^*_w stand for maximum obtainable gains for husband and wife. Let D^*_h and D^*_w stand for destinations where G^*_h and G^*_w can be obatained. cD^*_h and D^*_w will be the same only by coincidence. When they are not, nonzero externalities caused by migration ties will be imposed on the family.

The externalties stemming from migration ties can be defined as the sum of the discrepancies between the actual and potential maximum gains of each spouse:

$$(2.6)\quad T_i = (G^*_{hi} - G_{hi}) + (G^*_{wi} - G_{wi})$$

where G_{hi} and G_{wi} are the actual gains of husband and wife at D_i. Therefore, the term in the first parentheses represents the externalities at D_i imposed on the husband, the term in the second parentheses, those imposed on the wife.

When D^*_h and D^*_w are not the same, families can make the

decision on where to locate in two ways: (a) they can choose a location that minimizes T, the combined externalities stemming from the ties of the husband and wife; or (b) they can choose D^*_h or D^*_w. Option (a) is consistent with the maximization of the combined income of the family. If the couple follows this strategy, they will have to search for a pair of jobs in all possible locations simultaneously. The outcome of this search is likely to force both spouses to give up their personal optimum. Under option (b), however, only one spouse gives up his or her personal optimum.

The personal cost of the migration ties increases with the value of T_1Y_1. To the extent that husbands as a group have higher values of T_1Y_1 than wives, choosing D^*_h will produce a result that is close to the minimization of T, the sum of the externalities caused by the migration ties of both spouses.

6. Perhaps one can regard education up to high school as general human capital investment and postsecondary schooling as specific human capital investment.

7. Since they are employed in the occupations for which they are trained, the overqualification problem may not be significant.

CHAPTER THREE

THE MONOPSONY THEORY

Literally speaking, a labor monopsony exists when there is only one employer in a closed labor market. But more generally, monopsony is associated with an employer who faces a labor supply which is less than perfectly elastic. As discussed in the previous chapter, the labor supply curve of married women to a firm in a small town (due to their relative geographic immobility) is likely to be inelastic compared to that of men. Thus one can argue that even if a married woman in a small town is lucky enough to be employed in her optimal occupation, or not to suffer a loss from overqualification, it does not necessarily mean that she will not incur a wage penalty due to her geographic immobility.

3.1 Standard Monopsony Model

A direct realtionship between the monopsonistic wage and the labor supply elasticity is derived from the theory of profit maximization. Assuming for simplicity that labor is the only variable input,

$$(3.1)\ \text{Max } pf(x) - w(x)x$$

where p = price of output

x = units of labor hired

w = wage

The inverse supply function of labor, $w(x)$, indicates the wage level at which workers are willing to offer the combined amount of x units of labor. The first-order condition is

$$(3.2)\ [pf'(x) - w(x)] / w(x) = 1/e$$

where e is the wage elasticity of the labor supply to the firm. Equation (3.2) tells us that the proportional excess of value of marginal product over wage is inversely related to the supply elasticity of labor. Thus the inverse of the supply elasticity to the firm measures its monopsonistic power.

If workers are perfectly mobile, then $e = \infty$ regardless of the number of local employers. The wages of mobile workers are thus independent of local conditions. Such a situation is applicable to male workers regardless of marital status, since they are geographically more mobile. But for women, marital status is a critical determinant of geographical mobility. Therefore for married women, given their locational tie, the local market condition may become a determinant of wages. The number of employers in a local

market will directly affect the labor supply elasticities of married women, and thus their wages. The smaller the number of potential employers in a given occupation, the more inelastic will be the pro-rata labor supply curve to the employer. (The labor supply curve of individuals with narrowly specialized job skills will be even more sensitive to market size.) Thus equation (3.2) can be modified as:

$$(3.3) \quad w_s = VMP_s \; / \; (1 + 1 \; / \; e_s)$$

$$(3.4) \quad w_l = VMP_l \; / \; (1 + 1 \; / \; e_l)$$

where subscripts, s and l represent small and large markets respectively. The fact that $e_s < e_l$ implies that $w_s < w_l$, assuming $MP_s = MP_l$ and $p_s = p_l$ or $VMP_s = VMP_l$.

3.2 Monopsony Models by Occupational Categories

As mentioned in the previous chapter, despite the lack of evidence of monopsony in economy as a whole, there is some evidence that it exists in specific occupational groups, most notably in the case of nurses and public school teachers. It may be that monopsony is more observable when special groups are considered, particularly when their members have relatively high levels of specialized skills. This is

because individuals in specialized occupations have fewer potential employers than those in low-skilled ones in any given local market. Of course, the relative immobilitiy of married women arising from the family migration tie may further reinforce monopsony.

With the above considerations in mind, this chapter will extend the standard theory of monopsonistic wage determination to incorporate the gender-specific labor supply elasticity to the firm. I shall develop monopsony models applicable to different types of occupations: (a) the monopsonist for segregated occupations, (b) the discriminating monopsonist for mixed occupations, and (c) the non-discriminating monopsonist for mixed occupations. This distinction allows us to predict the differential impact of monopsony on different kinds of occupations. Each of the three monopsony models is presented in Table 3.1 and explained in the following sections.

Table 3.1

THREE TYPES OF MONOPSONY IN A SMALL LOCAL LABOR MARKET

Types of Monopsony	Production Function	VMP	Elasticities	Wages	Comments
Segregated Occupation	$f(X_M, X_M)$	$VMP_M \neq VMP_F$	$e_M > e_F$	$w_M \neq w_F$	male and female workers are not substitutable
<u>Mixed Occupations</u>					male and female workers are substitutable
Discriminating	$f(X_M+X_F)$	$VMP_M = VMP_F$	$e_M > e_F$	$w_M < w_F$	
Non-Discriminating	$f(X_M+X_F)$	$VMP_M = VMP_F$	$e_M = e_F$	$w_M = w_F$	$w_M = w_F$ for institutional reasons

3.2.1 Segregated Occupations

There are occupations in which the workers are almost exclusively of one gender group.[1] Across segregated occupations the VMP_F is in general not equal to VMP_M since the VMPs are specific to the occupations. Let us define a female segregated occupation as one in which the proportion of female workers exceeds, say, 90 percent and a male segregated occupation as one in which the proportion of female workers is less than 10 percent. While some occupations such as security guards, firefighters, engineers,

and models for men's clothing are segregated male occupations, others such as nurses, kindergarten teachers, and fashion models are female segregated occupations.

Let the profit of the monopsonist, who hires employees in both types of segregated occuaptions, be:

$$(3.5)\ pf(X_M,\ X_F) - W_F(X_F)X_F - W_M(X_M)X_M$$

Thus the profit maximization condition is:

$$(3.6)\ W_M/W_F = VMP_M(1+1/e_F)/VMP_F(1+1/e_M)$$

The implication is that the ratio of the male to female wages is directly related to the elasticity of male labor supply and inversely related to elasticity of the female labor supply. If the sex differentials of supply elasticities are larger in a small city, the ratio of male to female wages should be larger.

3.2.2 Discriminating Monopsonists for Mixed Occupations

By a "discriminating monopsonist", we mean a profit maximizing employer who is in a position to pay different wages to men and women in the same occupation. By a "mixed occupation", we mean an occupation in which $VMP_F = VMP_M$. In

other words, men and women are perfect substitutes in terms of productivity and skill; the production function is additive, $f(X_F + X_M)$. This case is analogous to Pigouvian third-degree price discrimination in the product market. The discriminating monopsonist can divide equally qualified workers into two independent groups by sex. If each group has a different elasticity of labor supply to the employer, the profit-maximizing behavior of the employer will result in a sexual wage differential. For this case, the profit function is:

$$(3.7)\quad pf(X_F + X_M) - w_F(X_F)X_F - w_M(X_M)X_M$$

where X_F and X_M represent the number of workers of females and males. From the first-order conditions:

$$(3.8)\quad w_F = VMP_F/(1 + 1/e_F)$$

$$(3.9)\quad w_M = VMP_M/(1 + 1/e_M)$$

Since $VMP_F = VMP_M$ by definition,

$$(3.10)\quad w_M/w_F = (1 + 1/e_F)/(1 + 1/e_M)$$

If $e_F < e_M$, then the wage ratio of males to females will be greater than one. Hence, again, the smaller the size of the

labor market, the larger the wage differential between men and women.

3.3.3 Non-Discriminating Monopsonists for Mixed Occupations

In this model, the employer hires both men and women for a given occupation and recognizes the different labor supply elasticties of each sex, just as discriminating monopsonist would do. However, the non-discriminating monopsonist is unwilling to or cannot (for institutional reasons) pay different wages to the two groups. Since $w_F = w_M = w$, the profit function is:

$$(3.11) \quad pf[X_M(w) + X_F(w)] - w[X_M(w) + X_F(w)]$$

The first-order conditions is:

$$(3.12) \quad w(t) = VMP/[1 + \{1 / te_F+(1-t)e_M\}] \qquad 0 < t < 1$$

where t is the proportion of females employed. Although the wages of men and women are the same, $w'(t) < 0$. Therefore, the wage level is negatively related to the proportion of women in the occupation.

3.3 Monopsonistic Profits in the Long-Run

The geographic immobility of labor is often regarded as a short-run phenomenon. Since the employer monopsony model assumes a certain degree of labor immobility, it may appear that monopsonistic wage determination is not sustainable in the long-run. However, the geographic immobility of married women induced by locational ties may persist as long as they stay married, particularly to husbands who earn more than they do. Thus the monopsonistic exploitation by employers that married women face may continue to prevail even in the long-run.

However, it is questionable whether the monopsonist can hold on to the profits obtained in this way indefinitely. There are underlying factors inherent in the market economy which may prevent the monopsonistic firm from keeping its profits. For example, if a firm enjoys monopsonistic profits, then it may eventually have to face the threat of new entries. In order to prevent potential new entries, the firm will be driven to make appropriate adjustments that will reduce its economic profits in the long-run. To see how this may occur, the profit maximization condition for monopsonists from equation (3.2) is reproduced as:

$$(3.13) \quad pf'(x) = w\,(1 + 1/e)$$

which simply states that the VMP of an additional unit of labor should be equal to its marginal cost. The firm can impose entry barriers by reducing its profit level, either by making adjustments to p, the price of its products or to w, the wage it pays to its workers. A primary factor in determining which adjustment the firm will make is the nature of the product market.

If the firm is a producer of local goods, then the price of these goods is determined within the local market. If the local market is small, the firm might lower the price of its product in order to prevent new entries. In this case, the monopsonistic profits wrung from immobile employees are transferred to consumers. The immobile employees of the local goods producing monopsonist will receive wages lower than their VMP even in the long-run.

If the monopsonist produces export goods, which are sold in a national market, then the price of the goods, assuming perfect competition in the product market, is determined in the national market. In this case, since the product's price cannot be adjusted to prevent new entries, the firm may have to adjust by raising the wages of its employees. Thus the workers employed by a national goods producer, even if they remain immobile, may receive more than monopsonistic wages in the long-run.

The discussion above showed how the monopsonist may reduce his supranormal profits by voluntary moves to block the entry

of new competitors. Alternatively, suppose the monopsonist fails to take the appropriate preventive action, and new competitors do actually enter the market. In this instance, the competition will drive prices down (in the case of a local good), or wages up, or both. In any event the end result is more or less the same.

Quite apart from these adjustments, however, there are other market forces that may suppress the profits of the monopsonist. To be more specific, as long as the monopsonist enjoys supranormal profits, factor owners who are in a position to bargain will pressure the firm to share its profits. Landlords, for example, will demand higher rents. And such pressures may continue until the monopsonist no longer enjoys economic profits.

To conclude, the special kind of monopsonistic exploitation facing immobile married women cannot be corrected by the market system even in the long-run. Market forces may be able to drive the monopsonist's economic profit to zero. But this will be done by redistributing monopsonistic profits, not by correcting the monopsonistic exploitation itself. For the geographic immobility associated with married women does not change even in the long-run, so long as their earning power is less than that of their husbands.

NOTES TO CHAPTER 3

1. Such sexual segregation may occur when the gender characteristics are themselves the direct determinant of productivity in certain occupations.

CHAPTER FOUR

THE DATA

The main implication of the theoretical analysis is that the wages of married women will rise more rapidly than those of married men as the size of local labor market increases. Since the size of the local labor market plays such a pivotal role, the critical information needed for this study is nation-wide identification of individuals by SMSA (Standard Metropolitan Statistical Area). The only microdata source which provides this information is the 1980 Public-Use Microdata Samples (PUMS). It is the first time a census sample has reported the location of all respondents residing in SMSAs. (The 1970 PUMS provided this information only for the 125 SMSAs with a population of over 250,000.) Since the machine-readable data identifies the SMSA only by code, the population of each SMSA was obtained from printed census publications.

In the 1980 PUMS, there are three independently drawn samples, each of which features a different geographic scheme.[1] The only sample which identifies SMSAs is B Sample. Out of the total of 318 SMSAs, it identifies the 282 having a population of 100,000 or more. SMSAs of less than 100,000

population were not coded in the B Sample in order to avoid possible disclosure of information about identifiable households and individuals. Also, due to confidentiality constraints, the information on income is given only up to $75,000.

Since the samples provide data for all individuals living in sampled households, which are identified by serial number, one can create within-family data to examine the inter-family effects of personal variables.

There are 53 files in B Sample: a 1 percent sample file for each state and the District of Columbia; a 1 percent sample file for all county groups in the nation crossing state lines; and a .1 percent sample file for the entire nation. The national one-in-one-thousand file was chosen since it contains an appropriate number of observations while being relatively easy to manage. In the unedited national file, there were 226,524 individuals from 94,254 households.

My subsample included only individuals of working age (sixteen years of age or older and sixty five years of age or younger) with earned income, who worked at least one week during the previous year and at least one hour during the census week. Those serving in the military or living in group quarters were excluded. Also excluded were the residents of non-SMSA areas. After all these individuals were deleted, there were 60,586 persons left in the subsample. Table 5.1 reports the means and standard

deviations of key variables.

TABLE 4.1

SUMMARY STATISTICS
(N = 60,586)

Variable	Mean	Standard Deviation
WAGE	8.21	7.71
AGE	39.37	12.26
EDUCATION	12.85	3.04
EXPERIENCE	20.52	13.05
SEX (female=1)	0.44	0.50
FERTILITY	2.01	1.80
SMSA SIZE	2.25	2.55

Note:
WAGE = annual earned income/(weeks worked*hours worked per week)
EDUCATION = years of schooling completed
EXPERIENCE = Age - Education - 6
FERTILITY = the number of children ever born for female, 0 for male
SMSA SIZE = SMSA population in millions

NOTES TO CHAPTER 4

1. See U.S. Bureau of Census (1983) for more details concerning the census in general and the PUMS in particular.

CHAPTER FIVE

MALE-FEMALE WAGE GAPS AND THE SIZE OF THE LOCAL LABOR MARKET: ESTIMATION

To test whether the geographic migration tie imposed on married women amplifies wage differentials between the sexes the following earnings function is used.

(5.1) $w = F_1 (X, S, M, SM)$

where X represents a vector of personal human capital characteristics such as scooling and work experience. S is a dummy variable for sex (S = 1 if female and S = 0 if male) and M represents the size of the local labor market, measured by the SMSA size. In a way, the SMSA size can be regarded as a variable controlling for all location-specific amenities that are related to city size affecting men and women equally. S can be regarded as a control for sex differences independent of market size. It follows that the coefficient of SM, the interaction term of the sex variable and market size, will represent the net effect of SMSA size on women's wages relative to men's wages.

5.1 Control Variables

Following the convention of earning fuction estimation, standard human capital variables serve as control variables. These include schooling, experience, experience squared, etc. In accord with prior estimates of earnings functions, I expect years of schooling and years of work experience to be positively associated with earnings producing coefficients at an order of magnitude roughly equal to market rates of return to investment. In the absence of more direct data, fertility, the number of children ever born, is included to control for women's labor force participation intermittency and reduced duration. Following the findings of Mincer and Polachek (1974), it is expected that the fertility variable is negatively associated with the earnings of women since it is directly related to years spent at home, out of the labor force.

5.2 City Size

The main explanatory variable is the city size variable. As indicated, by interacting the city size with the sex dummy variable, the effect of city size on the wages of men and women are separately measured. In accordance with previous investigations of the relationship between earnings and city

size [Clark, Kahn, and Ofek (1988), Fuchs (1968)] I expect city size to have a positive impact on both male and female wage level due to cost of living, unionization, commuting costs, and compensation for other urban disamenities. Thus the coefficient of M may overestimate the impact of local labor market size on wage level. Fortunately though, this bias is likely to affect both sexes equally (through the coefficient of M), and thus not critically affecting the coefficient of the interaction SM.

5.3 Results

The ordinary least-squares results of the earnings equations for married men and women are presented in Table 5.1. In the linear specification with respect to city size (Column 1), the estimates indicate that the male wage level will increase by 1.3 percent for each increment of a million in city size. For females the wage level is expected to increase by 2.2 percent for the same increment of city size, and the difference (.022 - .013 = .009) is statistically significant at the level of .01 percent. The results indicate that a married female worker's penalty for being confined to a local labor market gets smaller as city size increases. This supports the hypothesis developed earlier: the negative impact of the geographic migration tie on

relative earnings of women is inversely related to city size.

The result obtained from the quadratic specification (Column 2), too, is consistent with the hypothesis. The wage level, which increases with city size but at a decreasing rate, reaches its peak at a different city size for men and women. Male wages peak at a city size of 5 million and female wages at a city size of 9.5 million.[1] The fact that female wages peak at the largest city in the sample indicates that female wages, unlike those of males, increase with city size monotonically in the relevant range of the data.

Table 5.2 shows the impact of labor market size on the wages of never married individuals. Like the married group, the wages of singles increase with city size at a rate of 1.6 percent per million. However, contrary to the married group, the additional increment in wages for women is only .5 percent and is not statistically significant. Since the F-ratio obtained from the Chow test is 1.4 (the critical value is 1), we can reject the hypothesis that the two groups have identical slopes. This result implies that, for women, marital status is a factor in determining the sensitivity of their wages to city size. This further supports the hypothesis of a migration tie associated with married women.

For an additional test of the hypothesis, I also examine the husband-wife wage ratio using the paired sample of two-earner couples. Within-family data, where the unit of observation is the family rather than an individual, is

created by pairing the individual data for married couples. Such a sample controls for otherwise unobservable family-specific variables, such as the length of marriage, the spacing of children, family wealth, patterns of division of labor between spouses, etc. The following function is fitted to the sample.

$$(5.2) \quad \ln (w_h/w_w) = F_2 (X_h, X_w, M)$$

where X_h and X_w denote the human capital variables of husband and wife respectively, and M stands for the SMSA size. The results in Table 5.3 indicate that the husband-wife wage ratio declines as the SMSA size becomes larger. For each increment of one million in the SMSA population, the ratio declines by 2 percent, thus narrowing the wage gap between husband and wife. This result further confirms that wives suffer economic penalties -- although they can be alleviated to some extent in large labor markets -- because of family migration ties. Note that compared to the estimates obtained from the unpaired sample (Table 5.1), the estimated response of the male-female relative wage to city size in the paired sample is roughly twice as sensitive (2 percent per million compared with .9 percent per million). The mere fact that the results differ is not particularly surprising, because the two samples differ in a systematic way.[2] (Recall that the paired sample is confined to two-earner couples.) But

it provides strong evidence of compensating substitution in earning power for two-earner families, as implied by Mincer's rules of optimal migration. That is, potential employers in small cities will have to "bribe" husbands -- by paying higher wages -- in order to compensate for the forseeable loss of employment opportunities for their working wives.

From the results of the within-family data, one can also see that another factor may be operating. As noted in section 2.3, when both the husband and wife have high earning power, it is more costly to be locationally tied to a small city and more likely that they will locate in a large city. Such couples are likely to be overrepresented in the sample of two-earner couples compared to the sample of individuals, which may explain the relatively larger impact of city size on the sexual wage gap when within-family data are used.

5.4 Potential Biases

One source of potential bias is the sample selection problem.[3] The fact that tied wives in a small city may become unemployed or drop out of the labor force altogether poses a question of selectivity bias. The potential decrease in their earnings, which would contribute to widening the wage gap between men and women, should they remained employed, is not captured by this study. In other words,

those who may be the biggest losers from the family migration tie may be systematically excluded from the sample since they receive no wages and cannot be included in the estimation of earnings equations. Quite likely, this effect will lead to an underestimation of the net impact of city size on women's earnings.

One way to examine the seriousness of the selectivity bias is to investigate whether the labor force participation rate of women is affected by city size. If women's labor force participation rate is lower in a small city than in a large city, then the bias is more likely to be serious. The result of a logistic regression obtained from the sample of women, presented in Table 5.4, indicates that there is no significant impact of city size on the labor force participation of women. The coefficient of SMSA size is both negligible in the magnitude and statistically insignificant at 5 percent level. Thus one can infer that the labor force participation is not systematically related to city size and that the sample selection bias is not a serious problem for the models in this study.

5.5 Male-Female Wage Gaps Explained by the City Size

If married women's wages, as our findings indicate, are more positively sensitive to SMSA size than those of married men, then one important implication can be derived: at least some of the income differential between married men and women can be explained by SMSA size. This allows us to quantify the proportion of the residual wage gap between the sexes attributable to city size. Since SMSA size affects the discrimination coefficient (@WAGE/@SEX = -.529 + .009SMSA in the linear specification; @WAGE/@SEX = -.493 - .003 SMSA + .005 SMSA^2 in the quadratic specification), transferring all individuals somehow into larger cities would automatically decrease the magnitude of the unexplained wage gap between the sexes. For example, from the quadratic specification the discrimination coefficient for New York City is -.385 (-.493 - .005*9^2 - .033*9) while the discrimination coefficient of an average small town with a population, say, of 1,000 is about -.493. Thus, taking these figures at face value, if a woman moves from a small town to New York City, her wage is likely to increase by 10.8 percent (.493 -.385) holding other factors constant. Now let us imagine for a moment that the whole population of the United States moved to a city the size of New York. The resulting change in the discrimination coefficient, after such an exodus took place can be calculated using the actual distribution of the population.[4]

The SMSA coefficient is used as a cross-sectional deflator for the discrimination coefficient. The results of this calculation are tabulated in Table 5.5. The base for the calculation is set at a city size of 9 million, which is the population of New York. In 1980, 5.7 percent of the wage differential that is not explained by other control variables would disappear if everyone moved to a city the size of New York. Put differently, about 12 percent (5.7/49.3) of the total residual wage gap between men and women can be explained by SMSA size.[5]

The same technique is applied to the years of 1950, 1960, and 1970. The discrimination coefficient deflators have decreased each decade as urbanization has increased. But the magnitude of the change is minimal; during the period of 1950-1980, the size of the deflator decreased from 6.43 to 5.71 or by only .7 percent. This result is in line with the observation that the male-female wage gap has persisted with little change over the decades, at least in the case of married women and men.

TABLE 5.1

CITY SIZE AND WAGES: MARRIED INDIVIDUALS

Dependent Variable: Ln Hourly Wage
T-Statistics in parenthesis
(N = 46,495)

Variables	(1) Linear	(2) Quadratic
INTERCEPT	.985 (62.1)	.946 (58.5)
EDUC	.063 (67.8)	.062 (67.1)
EXP	.025 (30.9)	.025 (30.7)
EXP^2	-.0003 (-20.4)	-.0003 (-20.4)
SEX	-.529 (-75.0)	-.493 (-52.9)
FERT	-.009 (-6.3)	-.009 (-6.2)
SMSA	.013 (9.9)	.071 (14.8)
$SMSA^2$	* * *	-.007 (-12.5)
SEX*SMSA	.009 (4.2)	-.033 (-4.3)
SEX*$SMSA^2$	* * *	.005 (5.7)
ADJ. R^2	.267	.270

Key: WAGE=annual income/(weeks worked*hours worked per week)
EDUC=years of schooling completed
EXP=age-EDUC-6
SEX=1 for female, 0 for male
FERT=number of children ever born for female, 0 for male
SMSA=SMSA population in millions

TABLE 5.2

CITY SIZE AND WAGES: NEVER MARRIED INDIVIDUALS

Dependent Variable: Ln Hourly Wage
T-Statistics in Parenthesis
(N = 6,320)

Variables	(1) Linear	(2) Quadratic
INTERCEPT	.656 (15.6)	.610 (14.1)
EDUC	.065 (25.2)	.064 (25.1)
EXP	.040 (19.3)	.040 (19.2)
EXP^2	-.0006 (-13.4)	-.0007 (-13.3)
SEX	-.186 (8.8)	-.171 (-6.2)
FERT	-.004 (-0.8)	-.004 (-0.8)
SMSA	.017 (5.1)	.070 (5.3)
$SMSA^2$	* * *	-.006 (-4.2)
SEX*SMSA	.005 (1.0)	-.012 (-.7)
SEX*$SMSA^2$	* * *	.002 (1.0)
ADJ. R^2	.174	.177

Key: WAGE=yearly earnings/(weeks worked*hours worked)
EDUC=years of schooling completed
EXP=age-EDUC-6
SEX=1 for female, 0 for male
FERT=number of children ever born for female, 0 for male
SMSA=SMSA population in millions

TABLE 5.3

CITY SIZE AND HUSBAND-WIFE WAGE RATIO

Dependent Variable: Ln (W_h/W_w)
T-Statistics in Parenthesis
(N = 16,432)

Variables	(1)	(2)
INTERCEPT	.354 (8.24)	.426 (23.3)
HEDUC	.0456 (15.42)	* * *
WEDUC	-.0530 (-15.92)	* * *
HEDUC-WEDUC	* * *	.0493 (17.28)
HEXP	.0279 (8.51)	* * *
WEXP	-.0056 (-1.65)	* * *
HEXP-WEXP	* * *	.0071 (5.35)
$HEXP^2$	-.0004 (-6.96)	* * *
$WEXP^2$	.00007 (1.02)	* * *
$HEXP^2-WEXP^2$	* * *	-.0001 (-2.45)
SMSA	-.0206 (-9.31)	-.0184 (-8.32)
FERT	.0198 (4.21)	.0462 (11.67)
ADJ. R^2	.038	.030

Key: HEDUC=husband's education
WEDUC=wife's education
HEXP=husband's experience
WEXP=wife's experience
SMSA=SMSA population in millions
FERT=number of children ever born to wife

TABLE 5.4

LABOR FORCE PARTICIPATION OF WOMEN AND CITY SIZE:
LOGIT ESTIMATION

Dependent Variable: Labor Force Status
(N = 36,097)

Variable	Coefficient	Asymptotic T-Statistics
INTERCEPT	0.398	5.0
EDUCATION	0.091	20.1
EXPERIENCE	-0.015	-17.1
FERTILITY	-0.084	-12.2
MARITAL	-0.799	-15.6
SMSA	-0.005	-1.3

Note: Labor Force Status = 1 if in labor force;
MARITAL = 1 if married spouse present;
SMSA = SMSA population in millions.

TABLE 5.5

THE URBANIZATION DEFLATOR OF "SEX DISCRIMINATION" AND THE DISTRIBUTION OF THE POPULATION BY SMSA POPULATION

SELECTED YEARS: 1950-1980

SMSA POPULATION (millions)	PERCENT OF TOTAL POPULATION 1950	1960	1970	1980	PROJECTED DECREASE IN DISCRIMINATION COEFFICIENT DEFLATOR*
7-10	6.3	5.3	7.9	6.8	0
5-7	4.2	6.8	3.0	2.7	.063
4-5	9.0	4.6	4.6	4.1	.034
3-4	0.0	0.0	3.0	2.9	.027
2-3	4.4	7.6	7.2	9.3	.030
1-2	5.4	10.0	14.0	15.9	.043
.5-1	8.2	10.7	10.8	12.9	.059
.25-.5	9.6	8.8	9.7	10.6	.070
.10-.25	7.6	8.1	7.4	9.6	.077
0-.10	1.1	1.0	1.0	.9	.079
Non-SMSA**	44.2	37.0	31.4	24.1	.081
Total	100	100	100	100	
DEFLATOR	6.43	6.23	5.84	5.71	

* The projected decrease in the sex coefficient (discrimination coefficient) when the entire population of the United States is hypothesized to reside in a city the size of New York is calculated in the following way. First, using the coefficients of the SMSA variable in Column 2, Table 5.1 and the midpoint for each population-interval, the actual deflator of the discrimination coefficient is calculated for each population category. The smaller the size of a city, the smaller the deflator, thus the larger the discrimination coefficient. For New York, the actual deflator of the discrimination coefficient is .081 ($.005*8.5^2 - .033*8.5$). The projected change in the sex coefficient when the entire population of each city-size group moves to a city the size of New York is obtained by subtracting the actual deflator for each city size category from .081.

** For the non-SMSA category, a population of 1,000 was assigned for the the purpose of calculation.

1. Clark, Kahn, and Ofek (1988) also found that the wage level of a sample of white males drawn from the CPS data set was highest at a city size in the range of 4 to 5 million.

2. Suppose that husbands of working women have a higher reservation wage when considering job openings from employers in a distant area. The reservation wage will be greater then when an opening is in a smaller city and when a wife's market oriented productivity is high. Thus husbands of women with higher market productivity are less likely to move to small city for they expect larger indirect costs in terms of the foregone earnings of their wives. On the other hand, husbands, whose market-oriented experience substantially exceeds that of their wives and whose earnings are substantially more to begin with, are more likely to decide to migrate to small city if such a move enhances their own income. This tends to further widen the wage gap between them and their wives. Similarly, Therefore, one is more likely to observe a wider market productivity gap between a husband and wife in a small city. Whether a couple decides to locate in a small citylargely depends on the couple's characteristics. Thus the characteristics of couples living in a small city might be different from those of couples in a large city; a small market tends to attract families in which the husband's market productivity far exceeds his wife's. Theses effects can be captured more accurately by using the within-family data of two-earners couples.

3. Heckman [1979] treats the sample selection bias as a specification error and presents a consistent estimation method which involves the estimation of a selection equation with a probit function.

4. Clark, Kahn, and Ofek (1988) employed the same technique to calculate GNP deflators.

5. If we instead use the results from the linear specification to calculate the discrimination coefficient deflators, the figure is slightly larger: about 13 percent of the residual wage gap then can be explained by city size. However, the quadratic specification is intuitively more appealing, because the most dramatic jump in wages with respect to city size is expected to occur in the range of smaller cities. In other words, a migration from Binghamton to New York is likely produce a greater increase in wages per million increment in population than a migration from Chicago to New York. This difference in the slope of the wage curve

over the range of city sizes is captured only by the quadratic specification.

CHAPTER SIX

THE RATE OF RETURN TO EDUCATION AND CITY SIZE: A TEST OF OVERQUALIFICATION

In Section 2.4.1, we asserted that the effect of overqualification should be greater for women with more specific human capital. Thus the directly testable implication is that the positive impact of city size on wage levels should be larger for more productive women (presumably with more specific human capital investments.)

One way to carry out this test is to compare the magnitudes of the rate of return to human capital for women in large and small cities. With the traditional earnings function, one can estimate the rates of return to educational attainment and level of work experience. Of these two, the education variable is the better one to employ for examining overqualification. Not only is it more straightforward to measure, but the education variable is also conceptually more relevant than the experience variable to the overqualification problem. In a way, overqualification results from ignorance about future employment and location. Job investment tends to be made while an individual has relatively more information and foresight with respect to her

actual job (or occupation) and the specific local labor market; it may be less susceptable to overqualification. Put differently, job investment is more likely to be custom-made and thus less likely to be wasted. However, schooling investments tend to be made earlier in life, when an individual has less certainty about her actual job as well as the location of the geographic labor market. There is more room for wasting some of the investment. Schooling investment, therefore, might be more sensitive to the overqualification problem and is a better variable to employ for the testing of overqualification.

The following function was fitted to the subsample of women to test the overqualification hypothesis.

$$(6.1) \quad \text{Ln } w = f\ (X, E, M, EM)$$

where X denotes individual attributes, E education level, M market size, and EM the interaction term of the last two. The coefficient of E measures the rate of return to education. By examining the coefficient of EM, we can infer the impact of city size on the rate of return to education. The overqualification theory predicts that the coefficient of EM is positive. But as shown in Table 6.1, the coefficient of the interaction term is not correctly signed and not significant. The result does not conform to the overqualification hypothesis.

In order to corroborate this result, an alternative specification can be applied to the sample of married women.

$$(6.2) \quad \text{Ln } w = f\ (X,\ W_h,\ M,\ W_h{*}M)$$

W_h, husband's wage, is used as an alternative measure of the wife's market productivity based on its positive correlation to wife's wage.

If overqualification is a factor in the wage suppression of locationally tied wives in small city, then productive women (presumably with more specific human capital investments) should gain more than less productive women by residing in a large labor market. Thus the wages of wives of high-wage men should be more sensitive to city size. But the regression result presented in Table 6.2 indicates that the positive impact of city size is smaller for more productive than for less productive women. For example, a woman whose husband's hourly wage is one dollar would have a 3.2 percent increase in her wage per one million increment in city size. But if the husband's wage is 2.5 times the mean log of male wages (the sample mean is 2.08), the wife's wage is hardly affected at all (.032 - .006 * 2.5 * 2.08 = 0). Thus the higher the wife's productivity, as measured by her husband's wage, the smaller the impact of city size on her wage. This result contradicts the predictions of the overqualification theory.[1]

TABLE 6.1

SMSA SIZE AND THE RATE OF RETURN TO EDUCATION OF WOMEN

Dependent Variable: Ln Wage
T-Statistics in Parenthesis
(N =21,631)

Variable	Intercept
INTERCEPT	.522 (17.4)
EDUC	.068 (34.3)
EXP	.022 (18.5)
EXP^2	-.0003 (-12.4)
SMSA	.025 (3.7)
EDUC*SMSA	-.001 (-.29)
MS	-.066 (-5.5)
FERT	-.027 (-9.8)
ADJ. R^2	.115

Key: WAGE=yearly earnings/(weeks worked*hours worked)

EDUC=years of schooling completed

EXP=age-EDUC-6

FERT=number of children ever born

SMSA=SMSA population in millions

MS=1 for married, 0 for never married

TABLE 6.2

WAGE DETERMINATION OF MARRIED WOMEN:
CITY SIZE AND HUSBAND'S WAGE

Dependent Variable: Ln Wage
T-Statistics in Parenthesis
(N = 16,432)

Variable	Coefficient	
Intercept	.297	(7.3)
HEDUC	.0003	(0.1)
WEDUC	.063	(25.6)
HEXP	-.007	(-2.7)
WEXP	.018	(7.0)
$HEXP^2$	.0002	(3.3)
$WEXP^2$	-.0003	(-5.5)
SMSA	.032	(6.4)
Ln HWAGE	.154	(11.0)
SMSA*Ln HWAGE	-.006	(-2.7)
FERT	-.024	(-6.8)
Adj. R^2	.112	

Key: HEDUC=husband's education
WEDUC=wife's education
HEXP=husband's experience
WEXP=wife's experience
SMSA=SMSA population in millions
FERT=number of children ever born

NOTES TO CHAPTER 6

1. Frank [1978] interprets the higher rate of return to city size for women solely as manifestation of overqualification. Dividing the sample of professional men and women from the Survey of Economic Opportunities into five city size categories, he found that female wages were 7 percent more sensitive than male wages to city size. But he does not consider the possibilty of other factors that might be also related to city size, such as monopsony.

CHAPTER SEVEN

CITY SIZE EFFECTS FOR SELECTED OCCUPATIONS: EXAMPLES OF MONOPSONY

Chapter 5 provided strong evidence of wage suppression of women induced by the locational tie. However, the empirical findings of Chapter 6 did not lend full support to the overqualification hypothesis. Exploring alternative hypotheses is therefore in order.

Among the possible explanations of the locational tie effect, the main alternative to overqualification is monopsony. A test of monopsony can be obtained by estimating the differential city size effects on the wages of men and women by occupational groups. By doing so, we can automatically eliminate the overqualification possibility at least in its inter-occupational manifestation. However, the occupations selected for this purpose should be those requiring a high level of specialized training, in order to reduce the possibiltiy of mobility across occupational lines.

Another point we should be aware of is the possibilty of intra-occupational overqualification. We cannot control this by grouping samples by occupation as defined in the data. For example, an operating room nurse may be overqualified if

she has to work as a general pediatric nurse. However, if the loss induced by inter-occupation overqualification is a more serious problem than intra-occuaptional overqualification, then the city size effects from within-occupation data may be an adequate measure of the extent of monopsony.

Since the census data identifies the occupations of individuals we can employ the same estimation method use in previous chapters using within-occupation data.

From the three monopsony models presented in Chapter 3, testable implications for each category are derived and summarized in Table 7.1.

TABLE 7.1

EXPECTED SIGNS FOR THE THREE CATEGORIES OF MONOPSONISTS

Monopsonist for Segregated Occupations	Monopsonist for Mixed Occupations	
	Non-discriminating	Discriminating
$(b_3 + b_4) > 0$	$(b_3 + b_4) > 0$	$(b_3 + b_4) > 0$
$b_3 \lesseqgtr 0$	$b_3 > 0$	$b_3 \lesseqgtr 0$
$b_4 > 0$	$b_4 \lesseqgtr 0$	$b_4 > 0$

Note: The coefficients correspond to the following estimation specification.

$$\text{Ln } w = b_0 + b_1X + b_2S + b_3M + b_4S*M + u$$

where X = human capital variables
S = sex
M = market size as measured by SMSA population

The common effect of city size on the wages of men and women (b_3) is expected to be positive for non-discriminating mixed occupations, since both men and women are equally subject to monopsony. But for the other two types of occupations, it is not clearly predictable. The net additional effect of city size on women's wages (b_4) is not predictable for the non-discriminating monopsonist, for gender plays no clear role in determining the degree of market competition; but it is expected to be positive for monopsonists for segregated occupations and discriminating monopsonists for mixed occupations. In any case, for all three types of

monopsonists, the total effect of city size on the wages of women ($b_3 + b_4$) is expected to be positive.

To test the implications tabulated in Table 7.1, several occupations are selected. The occupations had to be limited to those that provided a large enough sample and that required a relatively high level of specialized training. For individuals in occupations that require less specialized training may have many potential employers, even in a very small city, violating a necessary condition for monopsony.

As representative occupations for segregated occupations, nurses, engineers, physicians, policemen, and firefighters were selected. These are male segregated occupations except for nurses. Unfortunately, there are no other female-segregated occupations which require a high level of specialized training and still provide a large enough sample. For mixed occupations, postsecondary teachers, public school teachers, natural scientists, computer equipment operators, and social scientists were selected. In the following sections, we will discuss the empirical results obtained from the within-occupation data.

7.1 Segregated Occupations

The regression results for the dominating sex in segregated occupations are reproduced in Table 7.2.[1]

Except for physicians, all occupations have positive coeffecients of the city size variable. But as predicted by equation (3.6), the magnitude of the city size coefficient is greater for nurses, the female-segregated occupation, than for the three male-segregated occupations. Nurses' wages increase by 5.4 percent for each increment of one million in city size. For the same increment of city size, the wages of police and firefighters increase 3.1 and 3.7 percent respectively for each increment of one million in city size. The relatively large size of the coefficents of these two occupations may be related to their high level of unionization. Since the unionization rate generally increase with city size, the city size coeffecient may overestimate the the true city size effect. However, the fact that the nurses' coeffeicient is much larger than the coefficients of police and firefighters, even with the possiblity of overestimation, adds additional strength to this test of the monopsony model for segregated occupations.

The wages of engineers, perhaps the most comparable male-segregated occupation -- in terms of the required education and training level -- increase only by 1 percent for each increment of one million in city size. This result is consistent with the prediction of the monopsony model for segregated occupations.

7.2 Mixed Occupations

Five occupations were selected as representing mixed occupations: public school teachers, postsecondary school teachers, natural scientists, computer equipment operators, and social scientists. A common feature all these occupations share is a fairly mixed male-female structure of employment. (The proportion of females in these occupations ranges from 26 to 72 percent.) The estimation results for the five within-occupation data are tabulated in Table 7.3. The data for public school teachers exhibit negligible sex-differentials in wages. But the data for the other four occupations demonstrate substantial wage differentials between the sexes, ranging from 15 percent to 44 percent. Considering that the sex coefficient is estimated controlling for human capital, fertility, marital status, and occupation, the size of the "discrimination coefficient" for these occupations is surprisingly large. We will test the discriminating monopsony model against the data for these four occupations.

7.2.1 Examples of Discriminating Monopsony: Postsecondary Teachers, Natural Scientists,Social Scientists, and Computer Equipment Operators

Although the census data for postsecondary teachers show a relatively low and insignificant "discrimination coefficient", data from other sources indicate that there are substantial salary differentials between the sexes for postsecondary teachers.[2] The most notable result is obtained from this group. Although city size effect on male wages is positive, it is not significant. The city size effect on female wages, however, amounts to 4 percent per million increase in city size and is significant. Taken at face value, the strength of the locational tie associated with women academics is high and colleges located in small towns may exploit the situation. Also, it is interesting to note that the market for male academics is quite global; the salaries of male faculty do not exhibit a significant fluctuation across the range of city sizes.

Academic salaries, perhaps except for teachers who are just starting, are often determined on an individual-by-individual basis rather than by structured pay schedules. A married woman faculty member with a strong local tie in a small town is not likely to be a hard bargainer in a pay negotiation. For there may be no other college in the area which would hire anyone in her discipline. The way academic

salaries are determined may allow enough room for the college to discriminate against married women faculty members in setting their salary level.

The results from the data for natural scientists, computer equipment operators, and social scientists are remarkably similar. All three occupations demonstrate negative but negligible insignificant city size coeffcients for males, and positive, substantial ones with higher t-values for females. Since these occupations require fairly high levels of skill and specialization (which rule out overqualification), we can argue that these results more or less conform to the predictions of discriminating monopsony model for mixed occupations.

7.2.2 Public School Teachers: A Case of Non-Discriminating Monopsony

The data for public school teachers indicate no significant sex differentials in wages. In fact, public school teachers are the only group that meets the standard of a non-discriminating occuaption (with high skill level) and that has a large enough number of observations.

However, between male and female teachers, the difference in the effects of city size on wages is quite substantial. As shown in Table 7.3, female teachers will gain only a 1.2

percent increase in wages for each increment of one million in city size. But male teachers will gain a 4.7 percent increase in wages for the same increment in city size. The large size of the male coefficient may be attributable to unobserved factors that are positively related to city size.[3]

The direct way to test the non-discriminating monopsonist model is to see whether the impact on wages of the proportion of females in an occupation is affected by city size. As discussed in Chapter 3, the proportion of females in an occupation is directly related with the probability of non-discriminating monopsony. Thus one can predict that the higher the proportion of females in an occupation, the more positively sensitive the wages in the occupation to city size. Unfortunately, we cannot test this implication directly, since there are not enough mixed occupations that have the same wage levels for both men and women.

TABLE 7.2

MONOPSONY TESTS FOR SEGREGATED OCCUPATIONS

DIFFERENTIAL CITY SIZE EFFECTS:
SELECTED OCCUPATIONS

Occupations	N	Mean Wage	Mean EDUC	SMSA Coefficients
Female				
Nurse	970	8.14	14.9	.054 (1.8)
Male				
Physicians*	312	20.66	19.8	-.007 (-.4)
Police & Detectives	393	9.34	13.4	.031 (3.9)
Firefighting & Prevention	161	7.67	12.6	.037 (3.1)
Engineers	1217	12.19	15.6	.011 (2.2)

Dependent Variable: Hourly wage
Control variables: EDUC, EXP, EXP^2, MS, FERT (for nurses)

* Include self-employed.

TABLE 7.3

MONOPSONY TESTS FOR MIXED OCCUPATIONS

SEX-DIFFERENTIALS OF CITY SIZE EFFECTS ON WAGES:
SELECTED OCCUPATIONS

Occupation	% Female	N	Mean Wage	SEX	SMSA	SEX*SMSA
<u>Discriminating</u>						
Postsecondary Teachers	37	461	11.54	-.153 (-.1)	.014 (.96)	.040 (1.8)
Natural Scientists	26	234	10.86	-.284 (-1.9)	-.006 (-.3)	.037 (1.2)
Computer Equipment Operators	57	279	7.28	-.435 (-3.8)	-.006 (-.4)	.021 (1.0)
Social Scientists	33	166	11.1	-.156 (-.8)	-.005 (-.2)	.041 (1.3)
<u>Non-Discriminating</u>						
Public School Teachers	72	1622	11.46	-.009 (-.1)	.047 (4.4)	-.035 (-2.8)

T-statistics in parenthesis
Dependent Variable: Hourly wage
Control Variables: EDUC, EXP, EXP^2, MS, MS*SEX, FERT

NOTES TO CHAPTER 7

1. Since there were too few members of the minority sex in the data for segregated occupations to use as a sample, the members of the minority sex were deleted from the sample.

2. According to the National Science Foundation Register, although the starting salaries of men and women with Ph.Ds are nearly equal, the salary differential increases with years of experience in all disciplines. For further analysis of sex differentials in the academic job market, see Johnson and Stafford [1975].

3. Also, it is widely known that moonlighting and summer employment are quite prevalent among teachers. The census data does not identify the income from moonlighting and seasonal employment separately. Therefore, if the following conditions are met, we should suspect that the estimate is biasd: (1) wages from the moonlighting and the summer employment are higher than from teaching, (2) male teachers practice moonlighting and summer employment more heavily, (3) moonlighting and summer employment opportunities for teachers increase with city size. If all three conditions are met, then the city size effect for male teachers must be overestimated.

CHAPTER EIGHT

CONCLUSION

The empirical findings from the 1980 Census 1/1000 sample indicate that the wage gap between married men and women decreases with city size. The computation based on regression results shows that about 12 percent of the unexplained wage gap between married men and women may be accounted for by city size. However, the wage-gap between single men and women does not seem to have a significant relationship with city size. These results are consistent with the main implications derived from the hypothesis of a locational tie associated with married women. To the extent that wives have less market human capital than their husbands, married women may be forced to optimize their employment mainly in the local labor market, unlike their husbands who are more likely to optimize their employment in the national labor market. Given such circumstances, married women's wages will be more sensitive to city size than those of men or single women. For as locationally tied individuals, they are likely to suffer more--in terms of lower wages--in a small city than in a large city.

This study presented two hypotheses of how the locational tie operates through specific market mechasnisms to suppress

the wages of affected individuals in a small city: (1) overqualification and (2) employer monopsony. Since the empirical results did not render full support to the overqualification theory, employer monopsony, as one alternative hypothesis, was more closely examined.

If our interpretation of the empirical findings is correct, then two predictions can be made:

Con clusion Accurate

(1) The wage gap between men and women arising from the relative geographic immobility of married women may be slightly reduced if urbanization trends continue, since women will increasingly find themselves located in more competitive local labor markets.

(2) The wage gap caused by the differential mobility of married men and women is also likely to be reduced as the job investment behavior of women increasingly assimilates to that of men (perhaps accompanied by a continuing decrease in the fertily rate). For the increased investment of women in their market human capital would lower the probability of their being tied.

The present study also reveals the relevance of the monopsony model to labor market studies for married women. Employer monopsony, often regarded as a short-run condition, has generally received little attention, perhaps because labor is generally assumed to be mobile in the long-run. However, as a result of the family utility-maximization process, married women are likely to remain relatively

immobile even in the long-run. Thus for married women, employer monopsony may not be a transient phenomenon which can be eventually corrected over time. This may be the reason behind the evidence of monopsony found earlier from the data of registered nurses and public school teachers, both occupations being predominantly female.

If such monopsony exclusively affects the wages of married women in a small labor market, then the usual estimation of sex-discrimination coefficients, unadjusted for this factor, will tend to overestimate the actual extent of sex discrimination.

BIBLIOGRAPHY

Becker, Gary. Human Capital. Chicago: University of Chicago, 1964, Second Edition 1975.

________. The Economic Approach to Human Behavior. Chicago: University of Chicago Press, 1976.

________. A Treatise on the Family. Cambridge, Massachusetts: Harvard University Press, 1981.

________. "Human Capital, Effort, and the Sexual Division of Labor." Journal of Labor Economics, 3 (1985, no. 1, pt. 2): S33-S58.

Bunting, Robert. Employer Concentration in Labor Markets. Chapel Hill: University of North Carolina Press, 1962.

Cardwell, Lucy and Mark Rosenzweig. "Economic Mobility, Monopsonistic Discrimination and Sex Differences in Wages." Southern Economic Journal, 46 (1980): 1130-1145.

Clark, David, James Kahn, and Haim Ofek. "City Size, Quality of Life, and the Urbanization Deflator of the GNP: 1910-1984." mimeograph, Department of Economics, State University of New York at Binghamton, 1987.

Finegan, T. Aldrich. "Participation of Married Women in the Labor Force." In Sex, Discrimination, and the Division of Labor, edited by C. Lloyd. New York: Columbia University Press, 1975.

Frank, Robert. "Why Women Earn Less: The Theory and Estimation of Differential Overqualification." American Economic Review, 68 (June 1978): 360-373.

Fuchs, Victor. "Hourly Earnings Differentials by Region and Size of City." Monthly Labor Review, 90 (January 1967): 22-30.

Gallaway, Lowell. "The Effect of Geographic Labor Mobility on Income: A Brief Comment." Journal Of Human Resources, 4 (Winter 1969): 103-109.

Goldin, Claudia and Solomon Polachek. "Residual Differences by Sex: Perspectives on the Gender Gap in Earnings." American Economic Review, Papers and Proceedings 77 (May 1987): 143-151.

Gordon, Nancy and Thomas Morton. "A Low Mobility Model of Wage Discrimination -- With Special Reference to Sex differentials." Journal of Economic Theory, 7 (March 1974): 241-253.

Heckman, James. "The Sample Selection Bias as a Specification Error." Econometrica, 47 (January 1979): 153-161.

Hurd, Peter. "Equilibrium Vacancies in a Labor Market Dominated by Non-Profit Firms: The Shortage of Nurses." Review of Economics and and Statistics, 55 (May 1973): 234-240.

Johnson, George and Frank Stafford. "Women and the Academic Labor Market." In Sex, Discrimination, and the Division of Labor, edited by C. Llyod. New York: Columbia University Press, 1975.

Landon, John and Robert Baird. "Monopsony in the Market for Public School Teachers." American Economic Review, 61 (December 1971): 966-971.

Link, Charles and John Landon. "Monopsony and Union Power in the Market for Nurses." Southern Economic Journal, 41 (December 1975): 649-659.

Long, Larry. "The influence of Number and Ages of Children on Residential Mobility." Demography 9 (August 1972): 371-382.

________. "Women's Labor Force Participation and the Residential Mobility of Families." Social Forces 52 (March 1974): 342-348.

Madden, Janice. "Discrimination: A Manifestation of Male Market Power." In Sex, Discrimination and the Division of Labor, edited by C. Lloyd. New York: Columbia University Press, 1975.

________. The Economics of Sex Discrimination. Lexington, Mass., 1973.

________. "Why Women Work Closer to Home." Urban Studies. 18 (1981): 181-194.

Mincer, Jacob. Schooling, Experience, and Earnings. National Bureau of Economic Research, 1974.

_________. "Family Migration Decision." Journal of Political Economy. 86 (October 1978): 749-773.

Mincer, Jacob and Haim Ofek. "Interrupted Work Careers: Depreciation and Restoration of Human Capital." Journal of Human Resources, 17 (Winter 1982): 3-24.

Mincer, Jacob and Solomon Polachek. "Family Investments in Human Capital: Earnings of Women." Journal of Political Economy, 59 (March/April 1974, Part 2): S76-S108.

Nelson, Phillip. "The Elasticity of Labor Supply to the Individual Firm." Econometrica, 41 (September 1973):853-866.

Niemi, Beth. "Geographic Immobility and Labor Force Mobility: A Study of Female Unemployment." In Sex, Discrimination, and Division of Labor, edited by C. Llyod. New York: Columbia University Press, 1975.

Polachek, Solomon. "Differences in Expected Post-School Investment as a Determinant of Market Wage Differentials." Intrnational Economic Review, 16 (June 1975): 451-70.

________. "Potential Biases in Measuring Male-Female Discrimination." Journal of Human Resources, 10 (Spring 1975): 205-229.

________. "Occupational Seggregation among Women: Theory, Evidence, and a Prognosis." In Women in the Labor Market, edited by C. Lloyd, E. Andrews, and C. Gilroy. New York: Columbia University Press, 1979.

Polachek, Solomon and Francis Horvath. "A Life Cycle Approach to Migration." In Research in Labor Economics, edited by R. Ehrenberg. Greenwich, Conn.: JAI Press, 1977.

Robinson, Joan. The Economics of Imperfect Competition. London: Macmillan and Co., 1933, Second Edition 1969.

Sandell, Steven. "Women and the Economics of Family Migration." Review of Economics and Statistics, (November 1977): 406-414.

U.S. Bureau of the Census. Census of Population and Housing, 1980: Public-Use Microdata Samples Technical Documentation. Washington: Government Printing Office, 1983.