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Health Insurance, Employment-Sector Choices and Job Attachment Patterns of Men and Women

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Dedicated to my parents.

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Health Insurance, Employment-Sector Choices and Job Attachment Patterns of Men and Women

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The chapters presented in this dissertation deal with two labor market issues in the United States: (1) the impact of the cost of health insurance on households' choice of employment sector and (2) job attachment patterns of men and women. Chapter 1 presents the motivation for the research. Chapter 2 models the effect of employer-provided health insurance on households' decision concerning whether to select into the wage-salary sector or the self-employment sector. Chapter 3 provides an empirical test of this issue. Chapter 4 provides empirical support for a possible theory explaining why women might exhibit stronger attachment to their job relative to men, early in their careers. Chapter 5 presents the major conclusions of the dissertation and suggests directions for future research.

Table of Contents

List of Tables

List of Figures

Chapter 1

Introduction

In the United States, self-employment among the civilian non-agricultural labor force declined from the 1920s to the mid-1970s. Thereafter, the trend was reversed and the proportion of self-employed persons increased. By itself, this is a very interesting phenomenon since self-employment is generally associated with low levels of GDP per capita. As Blau (1987) observes, "Even in most developing countries, where self-employment is typically a much larger proportion of the labor force than in developed countries, the trend is away from self-employment." (p.446) From international comparisons of self-employment, other important factors which are found to be highly correlated with self-employment incidence are high marginal rates of taxation and restrictive labor legislation which raises the cost of layoffs to firms (OECD, 1992). Neither of these phenomena is characteristic of the U.S. economy; marginal rates of taxation are relatively low and have declined even further after 1986. Moreover, the large shift from industrial employment to service sector employment since the late 1970s led to a decline of unionism, lowering the costs of laying off workers to firms. In the light of these facts, the increasing trend of self-employment in the U.S. invites further analysis.

As the incidence of self-employment rose in the U.S., there was a concurrent trend of rising health care costs. The linkage between health care costs and the labor market comes from a unique feature of the U.S. health care system. In the U.S., employment-based health insurance is the dominant form of financing health care; over two-thirds of non-elderly Americans receive health insurance through employers, either their own or that of a family member. This is due to the fact that the tax code in the U.S. subsidizes employer payments for health insurance, by excluding these payments from income for tax purposes. If employees are paid in wages, they must pay taxes on those wages. On the other hand, the employer-paid portion of the health insurance premium is exempt from income tax. Moreover, since employee contributions for health insurance are usually paid with after-tax dollars, economic theory predicts that employers should finance insurance premium costs rather than shifting these costs to employees, with a corresponding decrease in wages. Moreover, group rates of insurance offered by employers are substantially below individually-purchased insurance rates due to adverse selection in insurance markets. All these factors make the after-tax price of employer-provided health insurance substantially lower than the price of individually-purchased health insurance (Gruber and Poterba, 1994). In the second and third chapters of my dissertation, I study the impact of this 'price wedge' on households' incentives to select into wage-employment vis-a-vis self-employment. My objective is to explain the observed trend in the incidence of self-employment.

This problem is interesting and important for the following reason: the

U.S. labor market is considered to be a very flexible labor market, relative to the labor markets of other industrialized countries, both in terms of the availability of part-time jobs and access to flexible work schedules. However employers rarely, if ever, provide health benefits to part-time workers. And as stated above, the self-employed do not receive a tax benefit that is comparable to the benefit extended to employment based health insurance.[1] Thus, in addition to the problem of adverse selection in insurance markets, the prevalence of the system of employer-provided health insurance in the U.S., together with the tax advantages that go with it imposes a cost on individuals opting for flexible work schedules, in the form of higher premia for health insurance. Given the high and rising cost of health insurance, this price wedge is likely to affect the assignment of workers across the two sectors.

In the second chapter of my dissertation, 'Health Insurance and Household Employment Sector Choices', I address the following question: How does employer-provided health insurance influence a household's choice of employment sector - wage employment versus self-employment? I write down a simple model in which the choice of employment sector in determined jointly by household members. In this model, the household takes the compensation package offered by the wage-salary sector as given, and makes employment-sector choices to maximize total household utility. I show that when there is a price wedge for health insurance between the self-employment and wage-

[1]The Tax Reform Act of 1986 (TRA86) introduced a tax subsidy for the self-employed on their health insurance purchases. Despite this, the average after-tax price of health insurance remains higher for the self-employed (Gruber and Poterba, 1994).

employment sectors, labor supply to the self-employment sector is smaller and to the wage-salary sector bigger, relative to the case where there is no price wedge. Thus, the price wedge causes a distortion in the assignment of workers between the two sectors. I also show that the extension of employer-provided health benefits to dependents outside the firm through a family health plan enables married couples to effectively eliminate the price wedge.

I extend this model to include the insurance-purchase decision for single workers. In this model, in addition to choosing which sector to work in, workers also decide whether to purchase health insurance or not. I use standard results in the 'adverse selection' literature to illustrate how pooling the health risk over the subset of workers who choose to buy insurance raises the insurance premium, relative to the case where the risk-pooling is over all the workers in the firm. Moreover, firms can economize on fixed costs by getting as many workers as possible to participate in the group health insurance that they offer. This result could explain why firms might prefer to include health benefits as part of the compensation package to all workers, instead of making the choice of health coverage optional.

In the third chapter of my dissertation 'Spousal Health Insurance and Women's Employment Sector Choices', I study whether the availability of health coverage through the spouse's health plan influences a married woman's decision to become self-employed. This chapter is motivated by two empirical facts: (1) the increasing incidence of self-employment among *women* in the United States since the mid-1970s - both in absolute and relative terms, and

(2) the prevalence of married women in self-employment. The absolute increase in the numbers of self-employed women is not surprising in itself. This could be a consequence of their increasing labor force participation. And the large shift from industrial employment to service sector employment during the 1980s dramatically expanded the opportunities for self-employment and could explain the relative increase in self-employment rates. However, this was also a period of rising *real* health care costs. Thus, although the self-employment option was easily available for women looking for flexible work schedules, it was a costly option to exercise for those who had to purchase their own health insurance coverage, at rates that were invariably more expensive than group insurance rates offered by firms. On the other hand, women who had health coverage through a spouse's health plan could focus on other job attributes like flexibility and non-standard work schedules. This could account for the prevalence of married women in self-employment.

The Tax Reform Act of 1986 (TRA86) introduced a tax subsidy for the self-employed to purchase their own health insurance. I test whether this 'natural' experiment induced more women without spousal health insurance coverage to select into self-employment. My estimates suggest that the availability of health coverage through the spouse had a positive and significant effect on women's self-employment propensities before TRA86. Moreover, the difference-in-difference estimates indicate that the incidence of self-employment among women who did not enjoy spousal health benefits went up in the post-TRA86 period.

In the fourth chapter of my dissertation 'Job Attachment Patterns of Men and Women: The Role of Promotion Expectations and Experience' (joint with Richard Prisinzano), we study job turnover behavior by men and women. Labor economists studying job turnover behavior in the 1960s and 1970s in the United States found that women exhibited substantially higher job turnover rates compared to men. Researchers ascribed this behavior to the long stretches of time that women spent out of the labor force. Subsequent research has attributed the gender wage-gap to women's lack of attachment to the labor force. One theory that links gender differences in turnover behavior to the gender wage gap suggests that since firms anticipate higher turnover from women, they are not willing to invest as much in training and promoting women as they are in men. Since firm-specific training tends to be highly correlated with promotions and career growth within the firm, promotion rates for men tend to be much higher for men relative to women. These differences in promotion rates translate into a gender wage gap.

Women's labor force participation has increased dramatically over the past few decades, prompting researchers to re-examine job turnover behavior by men and women. There is evidence suggesting that more recent cohorts of women have a higher propensity to stay on their jobs and are exhibiting a strong attachment to the labor market.[2] We would expect firms to treat these women - the 'stayers' - no differently from men. However, women workers are still a heterogenous group comprising both 'stayers' and 'quitters,' with

[2]See Prisinzano (2004), Light and Ureta(1992), and references therein.

higher average turnover rates than men. If firms cannot distinguish between the two types of women workers based on observable characteristics, statistical discrimination would still result in lower promotion rates for women and a persistence of the wage gap. If, on the other hand, the women who are strongly committed to their careers could successfully signal their intentions to stay in the labor force and separate themselves from the quitters, they could overcome internal labor market discrimination.

We hypothesize that women who are concerned about their careers use job attachment as a means to signal their attachment to the labor force. This concern is likely to be highest for women in the early stages of their career. We therefore expect women with little or no job market experience to have lower job turnover rates compared to men of similar experience, all else equal. Thus, during this period we expect women to exhibit less sensitivity to expectations of promotion, relative to men. This rationale also suggests that once women have gained adequate labor market experience and revealed themselves as stayers, their job attachment patterns should respond more closely to their expectations of promotions. Hence, we expect women with adequate job market experience to reveal job attachment patterns similar to those of men.

We use a longitudinal dataset to test our predictions. Specifically, we study how the expectation of promotion affects the decision to stay on a job and whether this pattern varies by gender and by the amount of labor market experience. The dataset also contains information on workers' perceived chances of promotion in their current job. We expect workers who are con-

cerned about their careers to be sensitive to the potential for career growth in their firms. We examine how turnover behavior responds to this subjective likelihood of promotion and how this response differs by gender and experience level. Our results suggest that individuals with low expectations of promotion are less likely to stay on their jobs relative to those with high expectations of promotion. We also find evidence that women are more likely than men to stay on a job all else equal. Furthermore, women with low promotion expectations are more likely than comparable men to stay on a job and this difference is more pronounced early in careers. The fact that the difference diminishes with experience supports our hypothesis.

Chapter 2

Health Insurance and Household Employment Sector Choices

2.1 Introduction

Employment-based health insurance continues to be the dominant form of financing health care in the United States; over two-thirds of non-elderly Americans receive health insurance through employers. Group rates of insurance (also known as community-rated premia) offered by employers are substantially below individual rates (also known as risk-rated premia) due to adverse selection in insurance markets. While some self-employed individuals enjoy group insurance coverage, the majority of those with coverage purchase insurance on their own account (Gruber and Poterba, 1994). These individuals therefore face a substantially higher premium for health insurance, relative to salaried workers. With high and rapidly rising health care costs in the U.S., this 'price wedge' is likely to create a distortion in labor market outcomes, by affecting the assignment of workers across the wage-employment and self-employment sectors. This is the issue that I address in this chapter.

A closely related line of research explores the linkage between married women's labor supply choices - both hours worked and choice of employment

sector - and spousal health insurance. Married workers working in a firm which provides health benefits can extend the coverage to their spouse and other dependents outside the firm. This influences a household's chosen bundle of job attributes, offering married couples a greater latitude to substitute health coverage for flexible hours, because of trading opportunities among themselves (Lombard, 2001). A number of empirical papers have found support for this theory. Using cross-section data from the CPS, Buchmueller and Valletta (1998) find a strong negative effect of health insurance coverage under the husband's health plan on wives' work hours. Using the same data set, Lombard (2001) finds that women's likelihood of self-employment rises with health coverage through the spouse. These papers treat the husband's employment sector and compensation package as exogenous to the wife's choice of employment sector and hours worked.

In this chapter, I first write down a simple model in which the choice of employment sector is determined jointly by household members. In this model, everyone demands health insurance but the health insurance premium differs between the two sectors. Households take the compensation package offered by the wage-salary sector as given, and make employment-sector choices to maximize total household utility. I address the following question: How does employer-provided health insurance influence a household's choice of employment sector - wage employment versus self-employment? I show that when there is a price wedge for health insurance between the self-employment and wage-employment sectors, labor supply to the self-employment sector is

smaller, relative to the case where there is no price wedge. Thus, the price wedge causes a distortion in the assignment of workers between the two sectors.

I also show that the extension of employer-provided health benefits to dependents outside the firm through a family health plan enables married couples to effectively eliminate the price wedge. I extend this model to include the insurance-purchase decision for single workers. In this model, in addition to choosing which sector to work in, workers also decide whether to purchase health insurance or not. I use standard results in the 'adverse selection' literature to illustrate how pooling the health risk over the subset of workers who choose to buy insurance raises the insurance premium, relative to the case where the risk-pooling is over all the workers in the firm. This result could explain why firms might prefer to include health benefits as part of the compensation package to all workers, instead of making the choice of health coverage optional.

The rest of the chapter is organized as follows: section 2 describes the environment in which workers and firms operate, section 3 looks at the single workers' labor supply problem while section 4 discusses the labor supply problem of married households. I present the firms' problem very briefly in section 5 and discuss some comparative statics properties. In section 6, I introduce and discuss the insurance-purchase decision for single workers. Section 7 presents the conclusions.

2.2 Environment

2.2.1 Workers

The population in our economy consists of workers of unit mass, who differ along two dimensions. Workers differ in their preference for flexibility, indexed by θ_i which is uniformly distributed in the population along the unit interval: $\theta_i \ \epsilon \ (0, 1)$. A high realization of θ indicates a high preference for flexibility. Flexibility can be defined along various dimensions; for our purpose, we want to think of flexibility as the extent to which a worker has the freedom in planning her work schedule over a specific time period.

The economy consists of two sectors of employment - the wage-salary sector and the self-employment sector. In our model, the wage-salary sector consists of firms offering workers a compensation package in exchange for their labor supply. The self-employment sector employs professionals like independent owner-operators, proprietors and partners, and also includes workers engaged in household production. For simplicity, we assume that a job in the self-employment sector is associated with complete flexibility, while a job in the wage-salary sector represents a completely inflexible job.

The compensation package in the wage-salary sector includes a private health plan, which has two cost components - an average fixed cost component H^{ws}, associated with administrative expenses and overheads, and a variable cost component h for every subscriber to the plan; h is small, relative to H. The cost of the health plan for a single worker is $(h + H^{ws})$. For a married worker opting for a family health plan, the cost of the plan is $(n \cdot h + H^{ws})$,

where n equals the number of subscribers to the plan. The cost of a health plan for a self-employed single worker, on the other hand, is the sum of the variable cost and the average fixed cost, H^{se}, $(h + H^{se})$ while the cost of a family health plan for a married couple who are both in self-employment is $(n \cdot h + H^{se})$, with $H^{se} > H^{ws}$. This is the trade-off facing individuals and households making the choice of working in the wage-salary sector versus the self-employment sector. The self-employment sector offers the benefit of full flexibility but comes with the cost of higher premium on health insurance. The wage-salary sector offers savings on health benefits as part of the worker's compensation package, but requires workers to give up flexibility in exchange. We can interpret the term $(H^{se} - H^{ws})$ as the premium wedge or price wedge arising out of the different prices of health insurance facing the worker in the self-employment and wage-employment sectors. [1]

I assume that the worker's preferences can be represented by a quasi-linear utility function, given by $U(C, I) = C + V(I)$, where C denotes consumption and I denotes health insurance . $u(.)$ is well-behaved and has the usual properties: $u_1 > 0$,$u_2 \geq 0$, $u_{21} = 0$ and $u_{22} \leq 0$. I also assume that incomes are sufficiently large so that we always have an interior solution. To

[1]The U.S. tax system favors employer-provided health insurance over individually-purchased insurance in several respects. "Employer-provided insurance strictly dominates insurance purchased on own account for both itemizing and nonitemizing taxpayers, due to the higher loading factors on individual policies, the full deductibility of employer-provided insurance expenditures relative to the partial deductibility of own insurance expenditures, and the deductibility of employer-provided health insurance from the payroll tax as well as the income tax." (Gruber and Poterba, 1994). In this section, I ignore these details and simply focus on the price difference arising out of differences in administrative costs between employer-provided health insurance and individually purchased health insurance.

focus on the impact of the price of health insurance on the choice of employment sector, I initially assume that everyone has the same valuation for health insurance which I denote by γ; i.e., $V(I) = \gamma$. Thus, with this simple setup, I focus on the choice that households face between working in the wage-salary sector and the self-employment sector.

The economy consists of a fixed fraction δ of single workers and the remaining fraction, $(1 - \delta)$ of married workers.

2.2.2 Firms

I assume that firms operate in a competitive environment, both in input and product markets. The firm takes the market wage ω, the labor supply functions of the two worker types as well as the health insurance prices set by the insurance companies, as given and chooses how much labor to demand, to maximize profits.

2.3 Single-person Labor Supply Problem

If the worker works in the self-employment sector, her indirect utility function is given by:

$$u_s^{se} = \theta_i + \gamma - h - H^{se}$$

where $H^{se} \gg h$.

This gives us an alternative interpretation for θ. We can think of θ as reflecting a person's ability to earn outside of the wage-salary sector; the

higher the θ, the higher the worker's earning potential outside the wage-salary sector. However, I assume that θ does not affect a worker's productivity in the wage-salary sector.

If she works in the wage-salary sector, her utility function is given by:

$$u_s^{ws} = \omega + \gamma - h - H^{ws},$$

where ω is the money wage offered by the firm.

The decision rule facing the single worker is the following:

A single worker will work in the wage-salary sector iff the utility from doing so exceeds the utility from being self-employed iff $u_s^{ws} \geq u_s^{se}$

$$\omega + \gamma - h - H^{ws} \geq \theta_i + \gamma - h - H^{se}, \text{ which implies}$$

$$\theta_i \leq \omega + H^{se} - H^{ws}$$

Lemma 1: The mass of single workers working in the wage-salary sector, μ_s^{ws} and in self-employment, μ_s^{se} is

$$\mu_s^{ws} = \omega + H^{se} - H^{ws}$$

$$\mu_s^{se} = 1 - [\omega + H^{se} - H^{ws}]$$

Proof: Since $\mu_s^{ws} \epsilon (0,1)$ and $\mu_s^{se} \epsilon (0,1)$

$$\mu_s^{ws} = Pr(\theta_i \leq \omega + H^{se} - H^{ws}) = \omega + H^{se} - H^{ws}$$

$$\mu_s^{se} = Pr(\theta_i \geq \omega + H^{se} - H^{ws}) = 1 - [\omega + H^{se} - H^{ws}] \ \square$$

If $H^{se} - H^{ws}$ is sizeable, such that $\omega + H^{se} - H^{ws} \geq 1$, then all single workers work in firms and $\mu_s^{ws} = 1$. To focus on the more interesting case, I assume that $\omega + H^{se} - H^{ws} < 1$ so that $\mu_s^{ws} < 1$.

It is easy to observe that the price wedge for health insurance between the wage-salary sector and the self-employment sector, $H^{se} - H^{ws}$, affects the assignment of workers between the two sectors. In the absence of the price difference, the mass of workers in self-employment would be ν_s^{se}, where[2]

$$\nu_s^{se} = 1 - \omega > 1 - [\omega + H^{se} - H^{ws}] = \mu_s^{se}$$

The difference between ν_s^{se} and μ_s^{se} is exactly the price differential for health insurance between the self-employment and wage-employment sectors.

Note that

(i) $\partial \mu_s^{ws} / \partial \omega = 1 > 0$,

[2]The Tax Reform Act of 1986 (TRA86) introduced a tax subsidy for the self-employed on their health insurance purchases, effectively lowering the after-tax price of health insurance for the self-employed. Velamuri(2003) tested whether this subsidy induced more women without spousal health insurance coverage to select into self-employment. Her results suggest that the incidence of self-employment among women who did not enjoy spousal health benefits went up in the post-TRA86 period.

(ii) $\partial \mu_s^{ws} / \partial h = 0$

(iii) $\partial \mu_s^{ws} / \partial H^{ws} = -1 < 0$

(iv) $\partial \mu_s^{ws} / \partial H^{se} = 1 > 0$.

2.4 Married Households' Labor Supply Problem

I assume that a married worker knows not only his/her own θ but can observe the spouse's θ as well. I also assume that the θs are independently and identically distributed.

$$(\theta_f, \theta_m) \, \epsilon \, (0,1)^2$$

If both spouses work in the wage-salary sector, they each get the benefit of health insurance through the family health plan provided by one of their employers. If only one spouse works in the wage-salary sector, the other spouse gets health insurance coverage through the employer-provided family health plan of the former.

I assume a unitary model of the household such that the utility of the household is simply the sum of the utilities of the two spouses. The indirect utility functions of the households are specified below.

The indirect utility function of households with both spouses in self-employment:

$u_m^{se,se} = \theta_m + \theta_f + 2\gamma - 2h - H^{se}$

The utility function for households with both spouses working in wage-salary sector : $u_m^{ws,ws} = 2\omega + 2\gamma - 2h - H^{ws}$

The utility function for households with the husband working in wage-salary sector and the wife in self-employment : $u_m^{ws,se} = \omega + \theta_f + 2\gamma - 2h - H^{ws}$

The utility function for households with the husband working in self-employment sector and the wife in the wage-salary sector : $u_m^{se,ws} = \omega + \theta_m + 2\gamma - 2h - H^{ws}$

I now examine the decision rule facing married households.

2.4.1 Both Spouses in self-employment

Both spouses will be self-employed iff

$$u_m^{se,se} \geq u_m^{ws,ws} \Leftrightarrow \theta_m + \theta_f + 2\gamma - 2h - H^{se} \geq 2\omega + 2\gamma - 2h - H^{ws} \quad (2.1)$$

$$u_m^{se,se} \geq u_m^{ws,se} \Leftrightarrow \theta_m + \theta_f + 2\gamma - 2h - H^{se} \geq \omega + \theta_f + 2\gamma - 2h - H^{ws} \quad (2.2)$$

$$u_m^{se,se} \geq u_m^{se,ws} \Leftrightarrow \theta_m + \theta_f + 2\gamma - 2h - H \geq \omega + \theta_m + 2\gamma - 2h - H^{ws} \quad (2.3)$$

From condition (1) we get

$$\theta_m + \theta_f \geq 2\omega + H^{se} - H^{ws}$$

Conditions (2) and (3) yield

$$\theta_m \geq \omega + H^{se} - H^{ws}$$

$$\theta_f \geq \omega + H^{se} - H^{ws}.$$

Lemma 2: The mass of workers in self-employment coming from households in which both spouses are self-employed is $\mu_m^{se,se} = [1 - (\omega + H^{se} - H^{ws}]^2$

Proof: Let $X_1 = \theta_m + \theta_f$

be a new random variable.[3]

Condition (1) now implies that $X_1 \geq 2\omega + H^{se} - H^{ws}$.

Adding conditions (2) and (3), we get

$$X_1 \geq 2\omega + 2(H^{se} - H^{ws}) > 2\omega + H^{se} - H^{ws}$$

Therefore, condition (1) does not bind and we have

$$\mu_m^{se,se} = Pr(\theta_m \geq \omega + H^{se} - H^{ws}) \cdot Pr(\theta_f \geq \omega + H^{se} - H^{ws}) =$$
$$[1 - (\omega + H^{se} - H^{ws})]^2 \ \square$$

Once again, we observe that the price wedge for health insurance between the wage-salary sector and the self-employment sector, $H^{se} - H^{ws}$, affects

[3]The density of X_1 is as follows:

$$a(x_1) = x_1, 0 < x_1 < 1$$
$$= 2 - x_1, 1 < x_1 < 2$$
$$= 0, \text{otherwise}$$

the assignment of married workers between the two sectors. In the absence of the price difference, the mass of workers in self-employment coming from households with both spouses in self-employment would be $\nu_m^{se,se}$, where

$$\nu_m^{se,se} = [1-\omega]^2 > [1-(\omega + H^{se} - H^{ws})]^2 = \mu_m^{se,se}$$

From $\mu_m^{se,se}$, we have

(i) $\partial\mu_m^{se,se}/\partial\omega = -2[1-(\omega + H^{se} - H^{ws})] < 0$,

(ii) $\partial\mu_m^{se,se}/\partial h = 0$

(iii) $\partial\mu_m^{se,se}/\partial H^{ws} = 2[1-(\omega + H^{se} - H^{ws})] > 0$

(iv) $\partial\mu_m^{se,se}/\partial H^{se} = -2[1-(\omega + H^{se} - H^{ws})] < 0$.

2.4.2 Both Spouses in wage-salary sector

Both spouses will work in the wage-salary sector iff

$$u_m^{ws,ws} \geq u_m^{ws,se} \Leftrightarrow 2\omega + 2\gamma - 2h - H^{ws} \geq \omega - 2h - H^{ws} + \theta_f + 2\gamma \qquad (2.4)$$

$$u_m^{ws,ws} \geq u_m^{se,ws} \Leftrightarrow 2\omega + 2\gamma - 2h - H^{ws} \geq \omega - 2h - H^{ws} + \theta_m + 2\gamma \qquad (2.5)$$

$$u_m^{ws,ws} \geq u_m^{se,se} \Leftrightarrow 2\omega + 2\gamma - 2h - H^{ws} \geq \theta_m + \theta_f + 2\gamma - 2h - H^{se} \qquad (2.6)$$

Conditions (4) and (5) yield

$$\theta_f \leq \omega,$$

$$\theta_m \leq \omega,$$

and equation (6) implies that $\theta_m + \theta_f \leq 2\omega + H^{se} - H^{ws}$.

Lemma 3: The mass of workers coming from two-earner households is $\mu_m^{ws,ws} = \omega^2$

Proof: Equation (6) can be restated as :

$$X_1 \leq 2\omega + H^{se} - H^{ws}$$

Re-writing the three conditions required for both spouses in a married household to work in the wage-salary sector, we have:

1. $\theta_f \leq \omega$;
2. $\theta_m \leq \omega$;
3. $X_1 \leq 2\omega + H^{se} - H^{ws}$.

From the first two conditions, we get $\theta_m + \theta_f \leq 2\omega$ which implies $X_1 \leq 2\omega$.

Note that $2\omega < 2\omega + H^{se} - H^{ws}$, since $H^{se} - H^{ws} > 0$.

Therefore, the third condition does not bind and the above three conditions imply that the mass of workers coming from two-earner households is simply

$$\mu_m^{ws,ws} = Pr(\theta_f \leq \omega) \cdot Pr(\theta_m \leq \omega) = \omega^2 \ \square$$

$\mu_m^{ws,ws}$ is increasing in ω and is independent of all other parameters.

2.4.3 Married Households - One spouse in wage employment and the other in self-employment

A married worker in the wage-salary sector with the spouse in the self-employment sector would have no incentive to choose a single coverage plan. Opting for a family health plan would extend the health benefits to the spouse and to other dependents, if any.

Households will have the husband in the wage employment and the wife in self-employment iff

$$u_m^{ws,se} \geq u_m^{ws,ws} \Leftrightarrow \omega - 2h - H^{ws} + \theta_f + 2\gamma \geq 2\omega - 2h - H^{ws} + 2\gamma \quad (2.7)$$

$$u_m^{ws,se} \geq u_m^{se,ws} \Leftrightarrow \omega - 2h - H^{ws} + \theta_f + 2\gamma \geq \omega - 2h - H^{ws} + \theta_m + 2\gamma \quad (2.8)$$

$$u_m^{ws,se} \geq u_m^{se,se} \Leftrightarrow \omega - 2h - H^{ws} + \theta_f + 2\gamma \geq \theta_m + \theta_f + 2\gamma - 2h - H^{se} \quad (2.9)$$

These conditions yield

1. $\theta_f \geq \omega$;
2. $\theta_f \geq \theta_m$;
3. $\theta_m \leq \omega + H^{se} - H^{ws}$

Lemma 4: The mass of married, male workers in the wage-salary sector with their wives in self-employment is $\mu_m^{ws,se} = (1-\omega)(\omega+H^{se}-H^{ws})-(1/2)(H^{se}-H^{ws})^2$

Proof: This is clear from Figure 2.1. The area labelled A is the relevant mass.

$\partial\mu_m^{ws,se}/\partial\omega = (1-\omega)-(\omega+H^{se}-H^{ws})$, the sign of which depends on the value of ω;

$\partial\mu_m^{ws,se}/\partial H^{ws} = -(1-\omega)+H^{se}-H^{ws} = -(1-(\omega+H^{se}-H^{ws})) < 0$

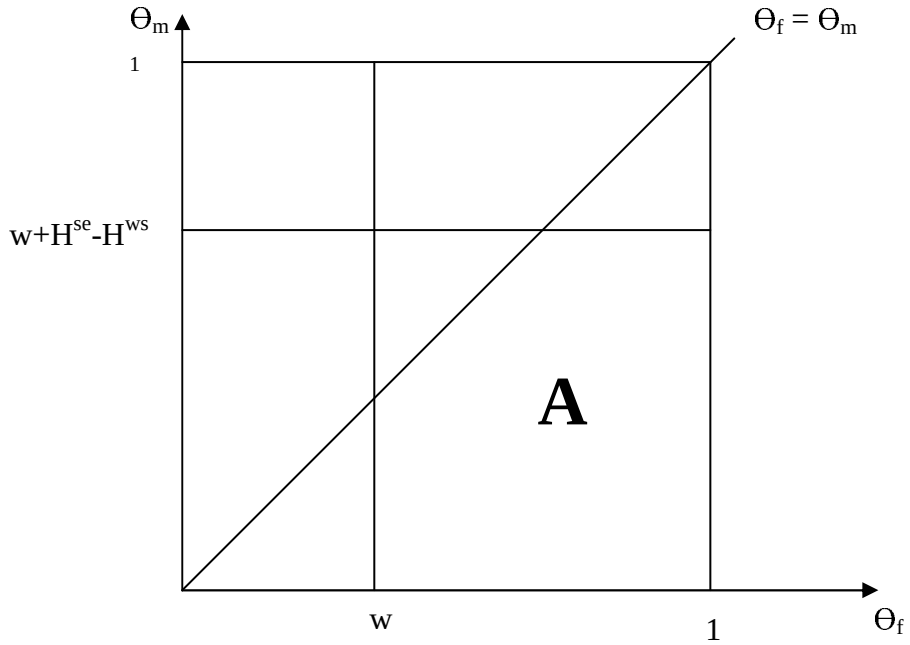
$\partial\mu_m^{ws,se}/\partial H^{se} = (1-\omega)-(H^{se}-H^{ws}) = (1-(\omega+H^{se}-H^{ws})) > 0$

The case of the wife in wage employment and the husband in self-employment is symmetric to the above case and gives us the same mass as above, i.e., $\mu_m^{se,ws} = \mu_m^{ws,se}$.

The ability of married couples to trade flexibility for health coverage among themselves causes more workers with spousal health coverage to select into self-employment. In the absence of the benefit of extending health coverage purchased through the employer to dependents outside the firm, the utility of a household with one spouse in wage-employment and the other in self-employment would be:

$$v_m^{ws,se} = \theta_m + \omega + 2\gamma - 2h - H^{se} - H^{ws}$$

Figure 2.1: Mass of married workers with husbands in wage-employment
and wives in self-employment



The area of the region denoted by A = $(1-w)(w+H^{se}-H^{ws}) - (1/2)(w+H^{se}-H^{ws}-w)^2$
$= (1-w)(w+H^{se}-H^{ws}) - (1/2)(H^{se}-H^{ws})^2$

and the mass of married workers,with one spouse in wage-employment and the other is self-employment would be

$$\nu_m^{ws,se} = (\omega + H^{se} - H^{ws})(1 - (\omega + H^{se} - H^{ws})) <$$
$$(1-\omega)(\omega + H^{se} - H^{ws}) - (1/2)(H^{se} - H^{ws})^2 = \mu_m^{ws,se}.$$

Thus married households with one spouse in wage-employment and the other in self-employment effectively eliminate the difference in premia between the two sectors, because an employer-provided family health plan offers health coverage to the other spouse and eliminates the need for the self-employed spouse to purchase health insurance at a higher cost.

The total labor supply to the wage-salary sector in the economy is therefore

$$\mu^{ws} = \delta \cdot \mu_s^{ws} + (1-\delta)[\mu_m^{ws,ws} + 2\mu_m^{ws,se}]$$

$\partial\mu^{ws}/\partial\omega = \delta + (1-\delta)[2\omega + 2 - 4\omega - 2(H^{se} - H^{ws})] = \delta + 2(1-\delta)[1 - \omega - (H^{se} - H^{ws})] > 0$

$\partial\mu^{ws}/\partial H^{ws} = -\delta + (1-\delta)[-2(1-\omega) + 2(H^{se} - H^{ws})] = -[\delta + 2(1-\delta)(1 - \omega - (H^{se} - H^{ws})] < 0$

$\partial\mu^{ws}/\partial H^{se} = \delta H + (1-\delta)[2(1-\omega) - 2(H^{se} - H^{ws})] = \delta + 2(1-\delta)(1 - (\omega + H^{se} - H^{ws})) > 0$

2.5 Firm's Problem

I normalize the price of output to 1. Firms take the labor supply functions of the two worker types as given, and maximizes profits by choosing ω. I denote by Z, the vector of parameters for the problem: $Z = \{h, H^{ws}, H^{se}\}$.

$$Max \prod(\omega; Z) = f(\mu) - \omega\mu \tag{2.10}$$

where I assume that $f(.)$ is quasiconcave, differentiable and that the first-order condition with respect to ω characterizes the firm's labor demand as a function of the parameters:

$$F \equiv f'(.) - \omega = 0$$

The aggregate demand for labor is simply the sum of the labor demand of all the firms in the economy. Equating aggregate demand to the aggregate labor supply gives us the equilibrium wage, ω^*.

2.5.1 Comparative Statics

The variable cost of health insurance h, has no effect on labor supply and does not affect the equilibrium wage. Therefore, the only two parameters of interest in this model are H^{ws} and H^{se}. I look at the effect of changes in these parameters on the equilibrium wage.

Lemma 5: An increase in the average fixed cost of health insurance in the wage-salary sector H^{se} lowers the equilibrium wage ω^*.

Proof: $d\omega/dH^{se} = -(\partial F/\partial H^{se})/(\partial F/\partial \omega)$, while

$\partial F/\partial H^{se} = f''(.)\partial \mu^{ws}/\partial H^{se} < 0$ and

$\partial F/\partial \omega = f''(.)\partial \mu^{ws}/\partial \omega - 1 < 0$

Therefore, the sign of $d\omega/dH^{se} = -(-)/(-) = (-)$ $\square$

The intuition for this result is straightforward. An increase in H^{se} increases the cost of being self-employed and causes the labor supply to the wage-salary sector to increase. An increase in labor supply to the wage-salary sector, all else equal, lowers the equilibrium wage.

Lemma 6: An increase in H^{ws}, the average fixed cost of health insurance in the wage-salary sector, increases the equilibrium wage ω^*.

Proof: $d\omega/dH^{ws} = -(\partial F/H^{ws})/(\partial F/\partial \omega)$

$\partial F/\partial H^{ws} = f''(.)\partial \mu^{ws}/\partial H^{ws} > 0$

Therefore, the sign of $d\omega/dH^{ws} = -(+)/(-) = (+)$ $\square$

An increase in H^{ws}, all else equal, increases the cost of health insurance to a worker in a firm and is likely to switch some workers into self-employment, thus lowering labor supply to the wage sector. This decrease in labor supply,

ceteris paribus, will cause the equilibrium wage to go up.

2.6 The Insurance Decision

So far, I have assumed that everyone has the same valuation for health insurance and that everyone's income is sufficient high for an interior solution to exist. In reality, people have different valuations for health insurance and will purchase health insurance only when this value exceeds the cost of purchasing the insurance. In this section, I incorporate the insurance-purchase decision into the above framework. I briefly discuss how this decision can lead to 'adverse selection' when only a subset of workers chooses to purchase insurance, causing health insurance premia to rise. Self-employed individuals acting on their own behalf do not have the ability to pool their risk with anyone else and consequently, face costly 'risk-rated' premia. This is one reason why health insurance premia between the two employment sectors diverge. Moreover, since firms can lower the wages offered to workers in exchange for providing them with health insurance, they also have an incentive of extending health coverage to all their workers. This strategy has the effect of lowering the premium for their workers and increases the firms' ability to trade-off wages with health benefits.

I restrict the analysis to single workers. In addition to differing in terms of how much they value flexibility, workers also differ along another dimension - in terms of how much they value health insurance. I assume that the value

of health insurance is also uniformly distributed in the population according to γ, along the unit interval: $\gamma_i \epsilon (0, 1)$. One way to interpret γ is to assume that it reflects expected medical costs; the higher the expected medical costs, the more the individual values health insurance. Therefore, γ reflects the risk types of the population, ranging from the most healthy (γ close to 0) to the least healthy (γ close to 1).

If the worker works in the self-employment sector, her indirect utility is one of the following: (i)$u_s^{se,Ins}$, if she chooses to purchase health insurance or (ii) $u_s^{se,\neg Ins}$ if she chooses to remain uninsured:

$$u_i^{se,Ins} = \theta_i + \gamma_i - h - H^{se}, \text{ (with self-insurance)}$$

$$u_i^{se,\neg Ins} = \theta_i, \text{ (without self-insurance)}$$

If she works in the wage-salary sector, her utility is (i)$u_s^{ws,Ins}$, if she chooses to purchase health insurance through the employer or (ii) $u_s^{ws,\neg Ins}$ if she chooses to remain uninsured:

$$u_i^{ws,Ins} = \omega + \gamma_i - h - H^{ws}, \text{ (with insurance)}$$

$$u_i^{ws,\neg Ins} = \omega, \text{ (without insurance)}$$

Now, the decision rule facing the worker is the following:

Self-Employed Workers with no Health Insurance: A worker will choose to be self-employed, without health insurance iff

$$u_i^{se,\neg Ins} \geq u_i^{se,Ins},$$

$$u_i^{se,\neg Ins} \geq u_i^{ws,Ins},$$

$u_i^{se,\neg Ins} \geq u_i^{ws,\neg Ins}$, which implies

$$\gamma_i \leq h + H^{se} \tag{2.11}$$

$$\theta_i \geq max(\omega, \omega + \gamma_i - h - H^{ws}) \tag{2.12}$$

Lemma 7: The mass of uninsured workers in self-employment is

$$\varphi^{se,\neg Ins} = (1-\omega)(h + H^{se}) - (1/2)(H^{se} - H^{ws})^2$$

Proof: From (11), $Pr(\gamma_i \leq h + H^{se}) = h + H^{se}$

From (12), $max(\omega, \omega + \gamma_i - h - H^{ws}) = \omega$, if $\gamma_i < h + H^{ws}$.

This happens with probability $(h + H^{ws})$. In this case, condition (12) reduces to

$$\theta_i \geq \omega$$

With probability $(1-(h+H^{ws}))$, $max(\omega, \omega+\gamma_i-h-H^{ws}) = \omega+\gamma_i-h-H^{ws}$.

In this case, condition (12) becomes

$$\theta_i \geq \omega - h - H^{ws} + \gamma_i$$

Note that when $\gamma_i \leq h + H^{ws}$, this implies that $\gamma_i < h + H^{se}$, since $H^{se} > H^{ws}$. In this case, condition (11) does not bind.

Therefore, the mass of uninsured workers in self-employment is given by

$$\varphi^{se,noIns} = (1-\omega)(h + H^{se}) - (1/2)(H^{se} - H^{ws})^2 \ \square$$

We have

(i) $\varphi^{se,noIns}/\partial\omega = -(h + H^{se}) < 0$,

(ii) $\varphi^{se,noIns}/\partial h = (1-\omega) > 0$

(iii) $\varphi^{se,noIns}/\partial H^{se} = (1-\omega) - (H^{se} - H^{ws}) = 1 - (\omega + H^{se} - H^{ws}) > 0$

(iv) $\varphi^{se,noIns}/\partial H^{ws} = H^{se} - H^{ws} > 0$.

In the earlier model, where all workers had the same valuation for health insurance, the only effect of changing prices was to shift workers across sectors. In the present model, changing prices can affect either the insurance decision, or the employment-sector decision or both. For instance, in the above case, a sizeable increase in ω can not only cause workers to switch from the self-employment to the wage-employment sector, but for γ_i lying between H_{ws} and H^{se}, can also cause them to purchase health insurance through their employers.

Self-Employed Workers with Health Insurance: A worker will choose to be self-employed, with health insurance iff

$$u_i^{se,Ins} \geq u_i^{se,noIns},$$

$$u_i^{se,Ins} \geq u_i^{ws,Ins},$$

$$u_i^{se,Ins} \geq u_i^{ws,noIns},$$

These conditions imply

$$\gamma_i \geq h + H^{se} \tag{2.13}$$

$$\theta_i + \gamma_i - h - H^{se} \geq max(\omega, \omega + \gamma_i - h - H^{ws}) \tag{2.14}$$

Lemma 8: The mass of workers in self-employment who purchase health insurance is $\varphi^{se,Ins} = [1 - (h + H^{se})][1 - (\omega + H^{se} - H^{ws})]$

Proof: Condition (14) is true iff $\theta_i - \omega + \gamma_i - (H^{se} - H^{ws}) \geq max(\gamma_i, h + H^{ws})$

Note that since we have $\gamma_i \geq h + H^{se}$ from (13), we cannot have $\gamma_i \leq h + H^{ws}$. Therefore, $max(\gamma_i, h + H^{ws}) = \gamma_i$

Condition (14) now reduces to

$\theta_i - \omega + \gamma_i - (H^{se} - H^{ws}) \geq \gamma_i \Leftrightarrow$

$\theta_i \geq \omega + (H^{se} - H^{ws})$

Thus, the mass of self-employed workers who choose to purchase health insurance is

$$\varphi^{se,Ins} = [1 - (h + H^{se})][1 - (\omega + H^{se} - H^{ws})] \square$$

We have

(i) $\varphi^{se,Ins}/\partial\omega = -[1 - (h + H^{se})] < 0$,

(ii) $\varphi^{se,Ins}/\partial h = -[1 - (\omega + H^{se} - H^{ws})] < 0$

(iii) $\varphi^{se,Ins}/\partial H^{se} = -[1 - (h + H^{se})] - [1 - (w + H^{se} - H^{ws})] < 0$

(iv) $\varphi^{se,Ins}/\partial H^{ws} = [1 - (h + H^{se})] > 0$.

Here an increase in ω, *ceteris paribus*, will switch more workers into wage-employment, without changing the insurance decision. Changes in the prices of health insurance have the expected effects.

Wage-Salary Workers with no Health Insurance: A worker will choose to work in the wage-salary sector, and not purchase health insurance iff

$$u_i^{ws,noIns} \geq u_i^{ws,Ins},$$

$$u_i^{ws,noIns} \geq u_i^{se,Ins},$$

$$u_i^{ws,noIns} \geq u_i^{se,noIns},$$

These condition imply the following:

$$\gamma_i \leq h + H^{ws} \tag{2.15}$$

$$\omega \geq max(\theta_i, \theta_i + \gamma_i - h - H^{se}) \tag{2.16}$$

Lemma 9: The mass of workers in wage-employment who choose not to purchase health insurance is $\varphi^{ws,noIns} = \omega(h + H^{ws})$

Proof: Since, from (15), we have $\gamma_i \leq h + H^{ws}$, we know that $\gamma_i < h + H^{se}$

This implies that $max(\theta_i, \theta_i + \gamma_i - h - H^{se}) = \theta_i$

Therefore condition (16) reduces to

$$\omega \geq \theta_i$$

We thus get the mass of workers in wage-employment who choose not to purchase health insurance as

$$Pr(\gamma_i \leq h + H^{ws}).Pr(\theta_i \leq \omega) = \omega(h + H^{ws}) \ \square$$

Note that

(i) $\varphi^{ws,noIns}/\partial\omega = (h + H^{ws}) > 0$,

(ii) $\varphi^{ws,noIns}/\partial h = \omega > 0$

(iii) $\varphi^{ws,noIns}/\partial H^{se} = 0$

(iv) $\varphi^{ws,noIns}/\partial H^{ws} = \omega > 0$.

In this case again, a decrease in ω, all else equal, switches more workers into self-employment, without affecting the insurance decision.

Wage-Salary Workers with Health Insurance: A worker will choose to work in the wage-salary sector, and purchase health insurance iff

$$u_i^{ws,Ins} \geq u_i^{ws,noIns},$$

$$u_i^{ws,Ins} \geq u_i^{se,Ins},$$

$$u_i^{ws,Ins} \geq u_i^{se,noIns},$$

These conditions give us

$$\gamma_i \geq h + H^{ws} \tag{2.17}$$

$$\omega + \gamma_i - h - H^{ws} \geq max(\theta_i, \theta_i + \gamma_i - h - H^{se}) \tag{2.18}$$

Lemma 10: The mass of workers in wage-employment who purchase health insurance is $\varphi^{ws,Ins} = (\omega + H^{se} - H^{ws})(1 - (h + H^{ws})) - (1/2)(H^{se} - H^{ws})^2$

Proof: Condition (18) is equivalent to $\omega - \theta_i + H^{se} - H^{ws} + \gamma_i \geq max(h + H^{se}, \gamma_i)$

If $max(h + H^{se}, \gamma_i) = h + H^{se}$, condition (18) reduces to

$\theta_i \leq \omega + \gamma_i - h - H^{ws}$

If $max(h + H^{se}, \gamma_i) = \gamma_i$, condition (18) is $\Leftrightarrow$

$\theta_i \leq \omega + H^{se} - H^{ws}$

These conditions define the mass of workers in wage-employment who purchase health insurance:

$$\varphi^{ws,Ins} = (\omega + H^{se} - H^{ws})(1 - (h + H^{ws})) - (1/2)(H^{se} - H^{ws})^2$$

Note that

(i) $\varphi^{ws,Ins}/\partial\omega = 1 - h - H^{ws} > 0$,

(ii) $\varphi^{ws,Ins}/\partial h = -(\omega + H^{se} - H^{ws}) < 0$

(iii) $\varphi^{ws,Ins}/\partial H^{se} = 1 - h - H^{se} > 0$

(iv) $\varphi^{ws,Ins}/\partial H^{ws} = -1 - \omega + h + H^{ws} < 0$.

A decrease in ω switches more workers into self-employment and all else equal, reverses the insurance decision for those workers with γ lying between H^{ws} and H^{se}.

The total labor supply to the wage-salary sector in the economy is

$$\varphi^{ws} = \varphi^{ws,noIns} + \varphi^{ws,Ins} =$$

$$\omega(h + H^{ws}) + (\omega + H^{se} - H^{ws})(1 - (h + H^{ws})) - (1/2)(H^{se} - H^{ws})^2$$

$\partial\varphi^{ws}/\partial\omega = 1 > 0$

$\varphi^{ws}/\partial H^{ws} = -1 + h + H^{ws} < 0$

$\varphi^{ws}/\partial H^{se} = 1 - h - H^{se} > 0$

The firm's problem is the same as in section 2.5. Once again, the aggregate demand for labor in the economy is the sum of demands of individual firms. Equating the aggregate demand for labor to the aggregate supply φ^{ws} gives us the equilibrium wage ω^*. Again, we have the same comparative static properties. An increase in the premium for health insurance in the self-employment sector, H^{se} lowers the equilibrium wage, ω^* while an increase in H^{ws} causes ω^* to increase.

2.6.1 Discussion

Presumably, workers who have low expected medical costs are healthy and do not value health insurance at its cost. Workers choosing to purchase health insurance, on the other hand, reveal themselves as the 'risky' pool of workers with high expected medical costs. Thus, when purchase of health insurance is optional, health insurance companies will increase the premium for those who choose to purchase it. Intuitively, as the pool of insured workers gets larger, the average expected medical cost is less likely to vary.

Assuming that risk types can be ordered, the premium for a pool of workers including everyone from a risk type γ_j to the least healthy person can be formulated as:

$$P_{(\gamma_j \to 1)} = E(\gamma | \gamma \geq \gamma_j)$$

The premium is therefore an increasing function of γ_j, or equivalently,

a decreasing function of the mass of workers opting for health insurance.[4]

The expected value of medical costs to the insurance company depends on the premium charged. As the premium increases, the healthier workers who do not value health insurance too highly drop out of the insurance pool, and the average medical costs of those who remain in the pool rises. The equilibrium premium for health insurance is given by the following condition:

$$P^* = E(\gamma|\gamma \geq P^*)$$

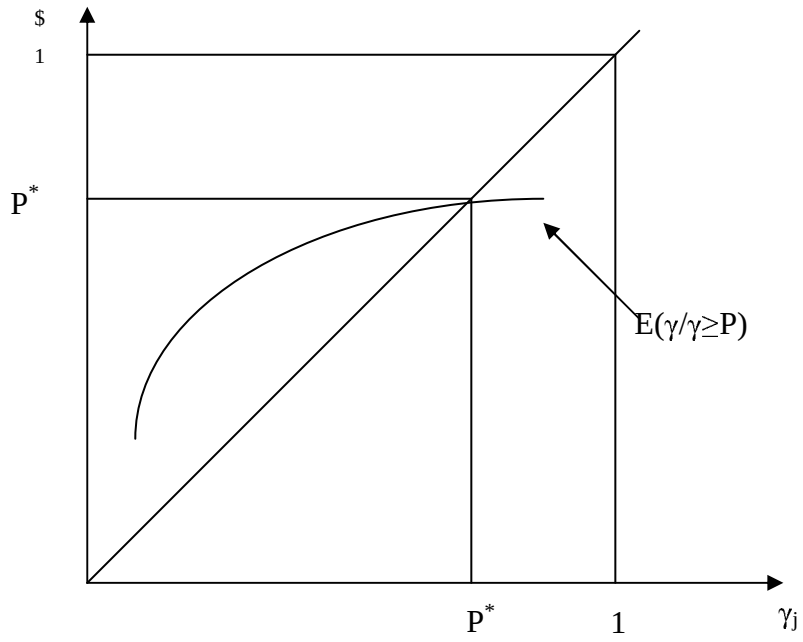
Figure 2.2 graphs the values of $E(\gamma|\gamma \geq P)$ as a function of the premium P. The function gives the expected medical costs for workers who choose to be insured by firms when the health insurance premium is P. It is an increasing function of P. The equilibrium premium P^* is that level of P at which this function crosses the 45-degree line, satisfying the equilibrium condition defined above.[5]

Thus the health insurance premium is an increasing function of γ_j or the expected medical costs. This tells us why firms might want to extend insurance to all their workers, without making the choice of health coverage optional; the bigger the mass of workers in the insurance pool, the lower the

[4]Since risk-rated insurance contacts charge a premium in proportion to the individual's expected medical costs during the life of the contract, premia in the individual market tend to be very high. Estimates suggest that 10% of the population accounts for 70% of total medical spending (Li, 2000).

[5]The existence of an equilibrium is not guaranteed, and if an equilibrium does exist, it need not be unique. There is a voluminous literature on this topic. For instance, see Akerlof(1970).

Figure 2.2: An Equilibrium Health Insurance Premium, with Adverse Selection



premium charged by insurance companies. The lower the premium facing workers in wage-employment, the wider is the potential price wedge for health insurance between the two sectors. As the price wedge gets bigger, the labor supply to the wage sector increases, causing the equilibrium wage to decrease and increasing the profitability of firms. [6]

When the option of not purchasing health insurance is taken away from workers, for a given wage, those who have a high preference for flexibility and low valuation of health insurance (the high-θ, low-γ workers) are likely to select into self-employment. However, since θ does not affect a worker's productivity in the wage-salary sector, firms can still attract those workers who have a low preference for flexibility and low valuation of health insurance (the low-θ, low-γ types). These are the 'healthy' workers who will lower the insurance premium and lower the firm's average costs. The (low-θ, high-γ) types have a strong incentive to select into wage-employment while the choice of employment sector for the high-θ and high-γ type will be more senstive to the wage, ω and the difference in health insurance premia between the two sectors. These factors will impact how workers get sorted into the two

[6]The primary reason for the pre-dominance of employer-provided health insurance in the U.S. is because it is subsidized through the tax code. If employees are paid in wages, they must pay taxes on those wages. On the other hand, the employer-paid portion of the health insurance premium is exempt from income tax. Moreover, employee contributions for health insurance are usually paid with after-tax dollars. Thus economic theory predicts that employers should provide and finance insurance premium costs rather than shifting these costs to employees, with a corresponding decrease in wages (Gruber and McKnight, 2002). In this section, I focus on a different though related issue: given the primary reason for providing health insurance to employees, why firms stand to benefit from having more employees participate in the group health insurance provided by them.

employment sectors in equilibrium.[7]

It is immediately apparent that the firms' decision problem can get very complex when θ is also an index of productivity in the wage sector and additionally, θ is correlated with γ. Wages have to be very high to draw the high-θ, low-γ workers into wage employment for two reasons: the reservation wage for this type will be very high, and competition between firms to attract this type of worker will bid wages up. If firms have differential costs to offering health insurance to workers, then one can examine the equilibrium sorting of different types of workers to different types of firms, and the size distribution of firms. This is a topic for further research.

2.7 Conclusions

There is asymmetric information between individuals and health insurance companies over expected medical costs of those insured. This means that individual choice over health insurance policies may result in risk-based sorting across plans. Firms have the ability to pool the health risk of all their workers and obtain group insurance coverage for their workers. The self-employed, purchasing insurance for themselves, do not enjoy this leverage.

[7]The preferential tax treatment for employer-sponsored health insurance (see footnote above) suggests that firms should bear the entire premium cost for all their workers and adjust wages accordingly. In reality, not all workers in a firm value health insurance at its cost. Thus, one theory explaining why we see employee contributions to health premia suggests that firms use employee contributions as a sorting device; by getting employees to share in the costs of health insurance, firms provide health coverage to only those who demand it and pass the savings back to employees in the form of higher wages (Gruber and Washington, 2003).

Thus, among the self-employed, the majority of those purchasing health coverage pay substantially higher risk-rated insurance premia compared to group insurance rates offered by firms. In this paper, I develop a simple model to study the distortion arising out of this price difference, on workers' choice of employment sector. In this model, all workers purchase health insurance but optimally choose whether to work in the wage-salary sector or to be self-employed. I find that in the presence of a disparity in health insurance premia between the two sectors, fewer workers select into the self-employment sector relative to the case when there is no disparity. I also show that the extension of employer-provided health benefits to dependents outside the firm through a family health plan provided by the firm, enables married couples to effectively eliminate this price wedge.

This model has some easily testable predictions. Changes in insurance premia which narrow the gap between employment-based group insurance and insurance purchased on own account will, *ceteris paribus*, switch more workers into self-employment. Another implication of this model is that as the premium gap between the two sectors widens, we should expect to see more married individuals selecting into self-employment with the spouse working in the wage-salary sector. This finding could explain the fact that self-employed women in the U.S. are predominantly married women (Devine (1994a) and Lombard (2001)). I test these predictions the following chapter.

I extend the above model to incorporate the insurance-purchase decision by workers. In this model, in addition to deciding which sector to work

in, workers also make the discrete decision on whether to purchase health insurance. I use standard results from the adverse selection literature to discuss the impact of these choices on the insurance premia in both sectors. A testable prediction arising out of this model is that as the insurance premium rises, the pool of uninsured workers in the population expands. This prediction finds support in a number of papers. Gruber and Poterba (1994) showed that the demand for insurance by the self-employed went up significantly following the Tax Reform Act of 1986, which introduced a subsidy for the self-employed on their health insurance purchases, thus lowering their cost of insurance. Cutler (2002) found that when employee costs for health insurance increased in the United States during the 1990s, workers responded by declining to take up insurance offered by their employers. His estimates suggest that increased costs to employees can explain the entire decline in take-up rates in the 1990s. These findings are highly relevant to the current debate on the state of the health care system in the United States and the concern over the increasing pool of uninsured individuals in the economy.

I also examine the effect of workers' insurance-purchase decisions on firms' costs. I argue that firms can increase their profitability by leveraging the premium wedge between the two sectors to lower wages. This gives us one possible rationalization for why firms with large numbers of employees have an incentive to extend health benefits to all their full-time employees as part of the compensation package, without making the choice of health coverage optional.

Chapter 3

Spousal Health Insurance and Women's Employment Sector Choices

3.1 Introduction

The incidence of self-employment has increased in the US since the mid-1970s, both among men and women. This phenomenon is well-documented by Blau (1987), Devine (1994a, 1994b), Evans and Leighton (1989), Lombard (2001) and many others. While there is some controversy over whether this represents a sustained increase for men, there seems to be a consensus that this does signify a long-term trend for women, with the self-employment rate increasing both absolutely and relative to total female employment.[1]

The absolute increase in the numbers of self-employed women is not surprising in itself. This could be a consequence of their increasing labor force participation. The large shift from industrial employment to service sector employment during the 1980s dramatically expanded the opportunities for self-employment and could explain the relative increase in self-employment rates.

[1]Devine (1994a) found an increasing trend in male self-employment rates in the US during 1975-1990 while Schuetze (2000) estimated a fall, between 1980 and 1994. Some of this discrepancy may have to do with the data used by the two authors. Devine's sample included all civilians 16 years and older, while Schuetze's sample was restricted to men in the age group of 25-64. Both used data from the Current Population Survey (CPS).

However, this was also a period of rising *real* health care costs. To understand how rapid this increase has been, it is estimated that between 1980 and 2001, the total cost of employer-sponsored health insurance benefits has increased four times faster than the cost of living (Employment Trends, 2003). Thus, although the self-employment option was easily available for women looking for flexible work schedules, it was a costly option to exercise for those who had to purchase their own health insurance coverage, at rates that were invariably more expensive than group insurance rates offered by firms. On the other hand, women who had health coverage through a spouse's health plan could focus on other job attributes like flexibility and non-standard work schedules. This could account for the prevalence of married women in self-employment.

A number of papers have found a linkage between married women's labor supply choices - both hours worked and choice of employment sector - and spousal health insurance. Using cross-section data from the CPS, Buchmueller and Valletta (1998) found a strong negative effect of health insurance coverage under the husband's health plan, on wives' work hours. Using the same data set, Lombard(2001) found that women's likelihood of self-employment rises with health coverage through the spouse. From a household bargaining perspective, this makes intuitive sense; the household takes the compensation package offered by the wage-salary sector as given, and makes adjustments in its labor supply choices to maximize total household utility . As Lombard (2001) points out "Household membership influences the wife's chosen bundle of job attributes; for example, the wife may have greater latitude to substitute

pay or health coverage for desired hours because of the trading opportunities with her husband." (p.215, fn 4)

Employer-provided health insurance in the U.S. is subsidized through the tax code. If employees are paid in wages, they must pay taxes on those wages. On the other hand, the employer-paid portion of the health insurance premium is exempt from income tax. Moreover, since employee contributions for health insurance are usually paid with after-tax dollars, economic theory predicts that employers should finance insurance premium costs rather than shifting these costs to employees, with a corresponding decrease in wages. However, firms will be constrained in their ability to lower wages if workers do not value health insurance at its cost (Cutler and Madrian, 1996). Moreover, group rates of insurance offered by employers are substantially below individual self-insurance rates due to adverse selection in insurance markets, and employer-provided insurance has a lower loading factor relative to individual policies and is fully deductible while own insurance expenditures are only partially deductible. Furthermore, employer-provided insurance is deductible from the payroll tax as well as the income tax (Gruber and Poterba, 1994). These features of employer-provided insurance make the linkage between spousal health insurance and women's employment choices interesting and important for a number of reasons. If we think of the cost of health insurance as the price of selecting into the self-employment sector, then health coverage through the spouse's health insurance plan creates a price wedge between women who do and who do not enjoy this benefit. Given the high cost

of health insurance, this price wedge is likely to create a distortion in labor market outcomes, by either creating a mismatch between actual hours worked and desired hours, or by affecting the assignment of women across sectors - the self-employment sector and the wage-salary sector.

My focus in this paper is on the relationship between spousal health insurance and women's choice of employment sector. The tax reform act of 1986 (TRA86) provides us with an opportunity to test this relationship. TRA86 introduced a tax subsidy for the self-employed to purchase their own health insurance. This subsidy effectively lowered the after-tax price of health insurance for the self-employed. I test whether this policy change induced more women without health insurance coverage through their spouse to select into self-employment. Gruber and Poterba (1994) tested the effect of TRA86 on the (discrete) decision of the self-employed to purchase health insurance, and found that it led to a significant increase in insurance demand among the self-employed. In this paper, I focus my attention on another discrete decision - the choice of employment sector - and study whether TRA86 affected the assignment of women across sectors.

The paper is organized as follows: section 2 presents a theoretical framework for studying the association between spousal health benefits and a woman's choice of work sector. Section 3 describes the data set used for the analysis and presents some descriptive statistics. I discuss the empirical strategy for testing my hypothesis in section 4 and present my results in section 5. Section 6 presents the conclusions.

3.2 Theoretical Outline

3.2.1 Labor Supply

I want to describe the assignment of women workers with heterogeneous tastes for flexibility across two sectors - the wage-salary sector and the self-employment sector. The framework is essentially that of Rosen (1986). All workers are assumed to be equally productive and to maximize utility defined over two types of consumption goods:

$$u = u(C, \phi)$$

where u is the utility index, C represents market consumption goods which can be purchased with money and ϕ is the level of "flexibility" associated with the job. Flexibility can be defined along many dimensions; for my purpose, flexibility has to do the notion of the extent of freedom that a worker enjoys in planning her work schedule over a specific time period. For simplicity, I assume that a job in the self-employment sector is associated with a level of $\phi = 0$, which represents a completely flexible job. On the other hand, a job in the wage-salary sector is associated with a level of $\phi = 1$, representing a completely inflexible job[2]. I assume that $u(C, \phi)$ is quasiconcave. Given C, I suppose that $u(C, 0) \geq u(C, 1)$, i.e. all else equal, a flexible job is preferred to an inflexible one.

[2]As in Rosen (1986), we can think of ϕ as a continuous variable such as the length of time that a worker is required to be physically present on the job site, but make the actual choices dicrete.

I modify Rosen's framework by imagining an economy that consists of two types of workers - women who do *not* have health insurance coverage through their spouse (denoted as type I workers), and women who do (denoted as type II workers). The population of women workers is taken as fixed and normalized to 1, with type I workers constituting a fraction μ_1 of the female labor force and type II workers constituting the remaining fraction $\mu_2 = 1 - \mu_1$. I indicate the market value of the health benefit accruing to the worker through her husband's health plan by H. I make the simplifying assumption that married women take their spouse's employment choice and compensation package as given in making their own decisions. In this economy, everyone has health insurance - through their employers if they work in the wage-salary sector, through their spouse if they are type II workers and individually purchased if they are type I workers.

To solve for the "shadow" price of the inflexible jobs in the wage-salary sector for these two types of women workers, I denote by C_0 the market consumption on a $\phi = 0$ job for a type I worker, and by $C_{0H} = C_0 + H$ the market consumption for a type II worker. By construction, $C_{0H} > C_0$. Given C_0 and C_{0H}, I define C^* and C^{**} as the consumption levels required to compensate type I and type II workers respectively on the $\phi = 1$ job over the $\phi = 0$, with $C^{**} \geq C^*$. We now have

$$u(C^*, 1) = u(C_0, 0) \text{ and } u(C^{**}, 1) = u(C_{0H}, 0)$$

Given that all workers value flexibility, it follows that $C^* \geq C_0$ and $C^{**} \geq C_{0H}$. I define $Z_0 = C^* - C_0$ and $Z_{0H} = C^{**} - C_{0H}$ as the "shadow" prices or the willingness-to-pay for a $\phi = 1$ job compared to a $\phi = 0$ job.

The market is competitive but does not discriminate against either type of worker. The self-employment sector offers a wage of w_0 while the paid employment sector offers w_1. Workers take these numbers as given in making their choices. The wage difference $\Delta w = w_1 - w_0$ is defined as the market compensating differential, or the implicit price for inflexibility. Figure 1 illustrates the choice problem facing type I and type II workers. Denoting the market price of health insurance facing a worker by p_h, the consumption and flexibility levels of the two types of workers in the two sectors are as follows:

$C_0 = w_0 - p_h$ and $\phi = 0$ for a type I worker in the self-employment sector;

$C_{0H} = w_0$ and $\phi = 0$ for a type II worker in the self-employment sector; and

$C_1 = w_1$ and $\phi = 1$ for both a type I and a type II worker in the paid employment sector.

The vertical distance *ab* and *cd* measure Z_0 and Z_{0H} respectively. In effect, type II workers have a higher reservation wage for the wage-salary sector because they enjoy health coverage through their spouse and do not have to pay for it with their earnings. Therefore, the choice problem facing the two types of workers can be described as follows:

For a type I worker, choose the wage-salary sector if $\Delta w > Z_0$, and the self-employment sector if $\Delta w < Z_0$. The worker is indifferent between the two if $\Delta w = Z_0$. Similarly, a type II worker would choose the wage-salary sector if $\Delta w > Z_{0H}$, the self-employment sector if $\Delta w < Z_{0H}$ and would be indifferent between the two if $\Delta w = Z_0$.

Given this choice rule, we can figure out the supply of workers to the two sectors. If we assume that f(Z) is the density of type I workers' preference for flexibility in the population, g(Z) is the corresponding density for type II workers in the population, with associated cumulative densities of F(Z) and G(Z) respectively, then the proportion of workers working in the paid employment sector is

$$N^{WS} = \mu_1 F(\Delta w) + \mu_2 G(\Delta w)$$

The remaining fraction of workers, N^{SE} work in the self-employment sector. If Δw is sufficiently big, we would expect to see the wage-salary sector employing a lot of both type I and type II workers. As drawn in the figure, for smaller Δw, we would see more type I workers choosing the wage-salary sector and more type II workers choosing the self-employment sector.

Labor demand is as in Rosen(1986). The market equilibrium achieves a matching of workers with the least taste for inflexibility with jobs in the self-employment sector and those with the least distaste for inflexibility with jobs in the wage-salary sector.

From Figure 1, we can predict how a change in p_h affects the supply of workers to the two sectors. A decrease in p_h reduces the gap between C_0 and C_{0H} and all else equal, switches more type I workers into the self-employment sector. This is the empirical prediction I propose to test in section IV.

3.3 Data and Descriptive Statistics

I use the Current Population Survey (CPS) data, which is a nationally representative survey of over 50,000 households. Every March, the survey collects detailed information on personal and family characteristics of respondents, labor force variables and health insurance status in the previous calendar year. However in the March files before 1989, owner-operators of incorporated businesses were coded as wage-salary workers. This is problematic for my analysis. Fortunately, the May CPS data files contain one question pertaining to the current job of the respondent, where both the unincorporated and incorporated self-employed are separately classified. Thus for the 1984 and 1985 years, I match the March and May CPS files and create a sample of women workers for the pre-TRA86 period. This way, I get all the data on labor force and personal characteristics and health insurance status from the March files and a correct identification of self-employed workers from the May files. However the labor force information pertains to the main job during the week prior to the survey while the health information refers to the longest job held the previous year. While this is likely to cause a mismatch between job characteristics and insurance status for a subset of our sample, a number of papers (Swartz (1986)

and Shore-Sheppard (1996)) make a strong claim that March CPS respondents interpret the health insurance questions as pertaining to their current job, and answer accordingly. To the extent that this occurs, it not only mitigates the problem but also suggests that using retrospective employment status and job characteristics data is likely to cause similar problems. From 1989 on, the March CPS files contain separate data on the incorporated self-employed. For data after 1988, I therefore use the March files alone. Since the policy changes introduced in the TRA86 went into effect in 1988, I combine data from the March CPS files from 1990 and 1991 to construct a post-TRA86 sample of women workers. To keep the data consistent across the two periods, I use the labor force information pertaining to the week prior to the survey. My sample consists of women aged 18 and above who are employed in non-agricultural occupations. Individuals reporting themselves to be self-employed on their main job during the week prior to the survey are classified as self-employed.

Table 1 gives the characteristics of self-employed and wage-salary women workers over the period 1984-85 and 1990-91. On average self-employed women tend to be older than their counterparts in wage-salary employment and this difference has increased over time. The percentage differences among the various age groups indicate that it is the pre baby-boomer generations that had a significant effect on this difference. The differences by marital status are more dramatic. A significantly higher proportion of self-employed women are married, constituting over 75% of all self-employed women in each of the two time periods, despite an also significant decrease in this category across both

groups. Another notable feature is the dramatic increase in the proportion of single (never married) women in wage-salary employment compared to a more modest increase among the self-employed. Over time, women entering the labor force seem to be getting more education. The increases were highest in the college education categories, especially among the self-employed. The predominance of white women in employment and more so in self-employment, has also been noted by other studies and is clearly reflected in Table 1.

On average, there is no significant difference between the two groups of women in terms of the number of dependents living in the households. As expected, the variance in hours worked per week is much higher for the self-employed. They are much more likely to work part-time hours compared to their counterparts in wage-salary employment, but are also more likely to work over 55 hours. This U-shaped distribution suggests that the demand for non-standard work schedules may play an important role in women's employment-sector choices. To understand how the choice of hours worked might be related to the availability of spousal health insurance, we examine figure 3.2, which shows the distribution of hours worked by married women who are covered, and who are not covered by their husband's employer-provided health insurance policy. Women who are covered by their husbands' policy are less likely to work and if working, less likely to work full-time relative to women who are not covered by their spouses' health policy.

Table 2 presents some statistics on the sub-sample of married women. A large fraction of self-employed women's spouses are also self-employed, and

this fraction is significantly higher than the corresponding fraction for wage and salaried women in both time periods. A larger fraction of self-employed women are covered by their spouse's employer-provided health plan, relative to married women in the wage-salary sector, but what is notable is the dramatic decrease in this fraction among both groups in the post-TRA86 period[3]. This, along with the fact that the presence of young children in the household does not seem to affect the choice of employment sector, *and* that in the pre-TRA86 period a significant fraction of married women with spousal health coverage selected into the wage-salary sector, suggests that the self-employment sector attracts women who have an inherent preference for flexibility.

After studying these patterns, I look at factors which influence women to select into the self-employment sector over the wage-salary sector.

3.4 The Self-Employment Choice

I specify a discrete choice model of self-employment choice for employed women. I assume that a woman's desired choice of employment sector E_i^* is conditioned by a vector of demographic characteristics X_i which includes her marital status, family wealth Y_i and the after-tax price of health insurance, P_i.

[3]I consider only employer-provided spousal health coverage and ignore coverage through other outside sources. This is because of changes in the CPS survey questions across years which makes it difficult to determine whether the responses are consistent.

$$E_i^* = X_i\beta + Y_i\gamma + P_i\delta + \varepsilon_i \tag{3.1}$$

In practice, what we observe is not E_i^* but whether the woman is self-employed, denoted by $E_i = 1$ if $E_i^* > 0$, or in wage-salary employment denoted by $E_i = 0$ if $E_i^* \leq 0$. The decision to be self-employed or to opt for wage-salary employment has a random component ε_i. So the probability of observing a woman in self-employment is given by

$$Pr(E_i = 1) = Pr(E_i^* > 0) = Pr(\varepsilon_i > -X_i\beta - Y_i\gamma - P_i\delta) = 1 - F(-X_i\beta - Y_i\gamma - P_i\delta) \tag{3.2}$$

where F denotes the cumulative distribution function for the random variable ε_i. I assume that F is the normal distribution and estimate the parameters of (2) by fitting a probit model to the pooled data set, which includes observations from before and after TRA86.

The hypothesis that I am testing in this paper is the following: since TRA86 lowered the price of health insurance for the self-employed, this policy change induced more single women and more married women without health insurance coverage through their spouse's insurance plan, to select into self-employment, relative to married women who already enjoyed health insurance coverage through their spouses. In order to identify the effect of the price of health insurance on self-employment propensities, I use two sources of variation in my sample: (1) cross-sectional variation between women with health

insurance coverage through their spouses versus women without; and (2) time-series variation, before versus after TRA86.

Each of these sources is likely to be correlated with other factors affecting the incidence of self-employment. From the time-series variation alone, it is difficult to disentangle other shifts that affect the attractiveness of the self-employment sector vis-à-vis the wage-salary sector over this time period. The cross-sectional variation may be driven by different attitudes towards risk (Gruber and Poterba, 1994). By using both these degrees of variation however, I can eliminate spurious factors correlated with each degree of variation individually and arrive at an estimate that denotes the effect of TRA86 on the assignment of women across the two sectors of employment. This is the difference-in-difference approach that I will use below.

The tax incentives for health insurance purchases by women who were already covered through their spouse's health plan did not change around TRA86: "...TRA86 includes a provision disqualifying self-employed individuals who are eligible for insurance coverage through a spouse from taking advantage of the tax subsidy." (Gruber and Poterba (1994), p. 723, fn 22). Therefore, this group serves as a good 'control' group, and the difference-in-difference estimate is given by the following equation:

$$\Delta^2 = (SE_a^{1991} - SE_a^{1985}) - (SE_b^{1991} - SE_b^{1985}) \tag{3.3}$$

where SE^t denotes the percentage self-employed at period t and the subscripts

a and b refer to our comparison groups - either single and married women respectively or women without and with spousal health coverage, respectively.

3.5 Estimates

Table 3 presents results from the probit equations such as those specified in equation (2). These estimates are based on the entire sample of single as well as married women from the pooled sample[4]. Each specification controls for a detailed set of individual characteristics. The estimates presented are the partial effects on response probabilities. For indicator variables, this estimate reflects the effect of a discrete change of the indicator variable from 0 to 1, on the probability of becoming self-employed. For continuous variables, this is the estimated change in probability of becoming self-employed, due to an infinitesimal change in the corresponding variable.

I first test for patterns observed in Table 1. The results in the first column are broadly consistent with that of other studies, and reflect the trends seen in Table 1. The probability of being self-employed rises with age and education. Self-employment rates are higher for married women relative to single women, higher for white women relative to non-whites, higher for women

[4]I also tried to exploit the quasi-panel structure of the CPS. In the CPS sampling rotation, households are interviewed for four consecutive months, and after a break of eight months, are interviewed again for four consecutive months. Respondents can be linked across two years because the second set of interviews take place in the same calendar months as the first set of interviews (Welch, 1993). I matched individuals across the 1988 and 1989 surveys, to get a sample of women from the year before TRA86 went into effect (1987) and the consecutive year. However, since there was little change in characteristics of the individuals across the two years, the results were not significant, and are not reported here.

with children under 6 at home and residing in non-MSA areas. Women are more likely to be self-employed in the post-TRA86 period relative to the pre-TRA86 period[5].

I next include family income from sources other than earnings as a proxy for unearned income, to control for liquidity constraints that might restrict women's choice of employment sectors (Evans and Jovanovic, 1989). This variable is measured in 2001 dollars. The results, from column 2 of Table 3, reveal that its effect is positive and significant, suggesting that family wealth is an important determinant of entrepreneurial choice. Since TRA86 affected the price of health insurance for the self-employed through a tax subsidy, the subsidy was more valuable at higher tax rates. Gruber and Poterba (1994) calculated the average after-tax price of health insurance before and after the policy change and their calculations are presented in Table 4.

I interact the family wealth variable with the indicator for the post-TRA86 period to test for a differential effect of the tax subsidy by wealth status. The results are presented in column 3 of Table 3. While the wealth effect continues to be significant, the interaction term has no effect on the self-employment propensity.[6] One explanation for this result is that the constraint

[5]I have not included industry and occupation controls on the grounds that the industry and occupation choices may be jointly determined with the self-employment choice.

[6]The TRA86 also lowered marginal tax rates significantly. Eissa (1995) showed that the labor force participation of high-income married women increased as a result. One could argue that it is this group that is responsible for the increased incidence of self-employment after TRA86. However, from the results in column 3, we cannot reject the hypothesis that after TRA86 wealthier women were as likely to be in self-employment as in wage-employment. This suggests that increases in self-employment rates after the reform were

of a higher cost of health insurance is not binding for the wealthy and therefore TRA86 made essentially no difference to them. Gruber and Poterba (1994) provide an alternative explanation. In their view, individuals are prone to what they term 'recognition effects' as far as discrete decisions are concerned. Here, this means that the magnitude of the tax subsidy is less important than the introduction of the subsidy itself, which leads people to reevaluate their options and make new choices - switching from not being insured to purchasing health insurance, moving from the wage-salary sector to the self-employment sector and so on.

Since the core of my analysis depends on whether or not a married woman has health coverage through her spouse's health plan, I matched the husband-wife pairs in the data. All persons 15 years and older in the survey who worked in the previous calendar year were asked if they participated in group health insurance plans offered by their employers. If they answered in the affirmative, they were asked whether their spouse was also covered by the plan. I used the responses to these questions to ascertain whether a married woman had health insurance coverage through her spouse. This variable proxies for the price of health insurance; women who benefit from their spouse's health plan can be thought of as paying a smaller price for selecting into self-employment, relative to women who do not enjoy this benefit.

I present the results on self-employment propensities controlling for

not driven by changes in the marginal tax rates alone.

the presence of spousal health insurance coverage in column 1 of Table 5. The health insurance variable has a positive and highly significant coefficient, suggesting that health insurance coverage through the spouse significantly influences the probability of a woman becoming self-employed. Since we would expect the value of an employer-provided family health plan to increase with the number of children in the household (Buchmueller and Valletta, 1998), I interact the health insurance dummy with the number of children under 18 in the family. The results are presented in column 2 of Table 5. While the presence of children under 18 in the household has no influence by itself on the self-employment decision, the positive and significant effect of the interaction term does suggest that a family health insurance plan affects the propensity towards self-employment, the more it is valued by the household.

In column 1 of table 6, I present probit estimates after adding controls for husband's employment sector. I excluded non-working husbands from the sample on the grounds that they might be experiencing temporary, frictional unemployment. I also excluded working husbands who did not report their average weekly hours of work. These restrictions caused a significant drop in the sample size. As seen in the descriptive statistics, the probability of self-employment is significantly higher if the spouse is also self-employed. One interpretation of this result is that it reflects positive assortative matching in the marriage market (Becker, 1973). This explanation is also consistent with the notion that selection into the self-employment sector reflects a preference for flexibility, after controlling for the number of children in the household.

In summary, these results indicate that health coverage through the husband's health plan, after controlling for the husband's employment sector, positively affects the wife's selection into self-employment, a point made by Lombard (2001). I also control for hours worked by the husband to test for possible complementarities in the family's time allocation choices. The results are presented in column 2 of table 6. Again, after controlling for the husband's sector of employment and health insurance status, we find that women whose husbands work over 55 hours a week on average, are more likely to be self-employed.

The results from the probit estimates above suggest that a woman's propensity to be self-employed is significantly affected by the availability of health insurance coverage through her spouse. This lends strong support to the hypothesis that the externality caused by the extension of health coverage for the wife through the husband's private, employer-provided health plan creates an important price wedge between married and single women. This price effect in turn seems to affect the assignment of women across different sectors of the economy. Single women who wish to be self-employed may be unable to exercise their preference because the price of selecting into their desired sector of employment may be too high. However, there may be several other reasons why a single woman might not select into self-employment. By comparing single women with similar characteristics before and after the tax reform, we can control for these other factors influencing the decision to become self-employed that may be correlated with being single. By comparing the change

in incidence of self-employment between single women and married women, we can control for other changes in the economy that may have affected the overall incidence of self-employment, including TRA86. Under the assumption that there were no exogenous shocks affecting only one of these groups, this gives us a difference-in-difference estimate of the effect of TRA86 on the incidence of self-employment.

To calculate the double-difference estimates described in the above section, I run the following regression:

$$E_i = \alpha + \gamma_1 single + \gamma_2 year + \gamma_3 (single.year) + \gamma_4 X_i + \varepsilon_i \qquad (3.4)$$

where $E_i = 1$ if the woman is self-employed and $E_i = 0$ otherwise, X_i is a vector of controls, single is an indicator variable which equals 1 if the woman is single and equals 0 if she's married, year is another indicator variable which equals 1 if the observation is from 1990-91 and equals 0 if its from 1984-85 and ε_i is a normally distributed error term. The interaction term describes the differential effect of being single after TRA86. The coefficient γ_3 measures the double difference described at the end of section 4.

In order to estimate the double-difference, I collapsed the three marital status categories into two - (1) single (never married, widowed, divorced and separated) and (2) married, and interacted this indicator variable with the post-TRA86 variable. The results are presented in column (1) of Table 7.

Although the effect of being single is still negative and dominates the interaction term, the differential effect of being single in the post-TRA86 period is positive and statistically significant. This suggests that single women in the post-TRA86 period are more likely to take up self-employment, as our theory predicts. To understand what is driving these results, I re-estimated this regression using the original specification of marital categories. The results are presented in column (2) of Table 7. Its clear from these results that TRA86 affected the self-employment propensities of the divorced/widowed/separated women, and does not seem to have affected the employment sector choices of the never married category of women, even after controlling for age[7].

Even if we acknowledge the endogeneity of spousal health insurance, single women serve as the "uncontaminated" sub-group of our treatment group for TRA86 since they do not have access to spousal health insurance. Moreover, as mentioned already, in addition to introducing the tax subsidy for the self-employed, TRA86 also significantly lowered marginal tax rates; it lowered the top marginal tax rate by 44% but the decrease was less significant for those in the lower end of the income distribution (Feldstein, 1986). Eissa (1995) showed that the labor force participation of high-income married women increased after TRA86, as a result of the decrease in the marginal tax rate. Since married women are believed to be more responsive to a given change in the tax rate compared to other demographic groups, the positive and significant differential effect of single women in the post-reform period *after controlling*

[7]On average, women who have never been married are younger than married women.

for any changes in labor supply of married women is a strong test of the effect of TRA86 on self-employment propensities. Besides, Gruber and Poterba (1994) state in their paper that in 1988-89, less than one-half of self-employed tax filers in most income classes claimed the tax subsidy (p.723, fn 23). This suggests that the estimates presented here understate the effect of the tax subsidy on self-employment rates.

3.6 Conclusions

In this chapter, my focus of study has been the effect of the husband's employer-provided family health insurance on the wife's propensity to select into self-employment. A number of papers have found an association between a married woman's labor supply behavior and spousal health insurance. A consistent finding in the literature on women's self-employment in the US since the mid-1970s is the predominance of married women in this sector. While numerous papers have remarked on the relationship between spousal health insurance and a married woman's propensity to select into self-employment, no clean test of this linkage was established.

The Tax Reform Act of 1986 provides us with an opportunity to test this linkage. The TRA86 introduced a tax subsidy for the self-employed to purchase health insurance. At the same time, it disqualified self-employed individuals who were already enjoying health insurance benefits through a spouse from taking advantage of the subsidy. Since the effect of the tax subsidy was to lower the after-tax price of health insurance for those among the self-

employed who were purchasing their own health insurance, I predict that this subsidy increased the incidence of self-employment among single women. My estimates suggest that health insurance coverage through the spouse biased a married woman's employment sector choice strongly towards self-employment in the pre-TRA86 period. Moreover, the incidence of single women in self-employment went up significantly in the post-TRA86 period, after controlling for the effect of health insurance coverage through the spouse. This finding supports my hypothesis that the decrease in the price of health insurance through the tax subsidy induced more single women to select into self-employment in the post-TRA86 period relative to married women.

In summary, my findings suggest that in the pre-TRA86 period, the high cost of health insurance created a price wedge between women who enjoyed health insurance coverage through their spouse's health plan and those who did not. Women who had a preference for working in the self-employment sector and who enjoyed spousal health benefits were able to exercise their preference and select into self-employment. On the other hand, for women with a preference for the self-employment sector but constrained to purchase their own health insurance, it was too costly to opt for this sector. For these women, the TRA86, by narrowing this price wedge, lowered the price of selecting into their desired sector of employment.

Figure 3.1: Choice Problem of Type I and Type II Workers

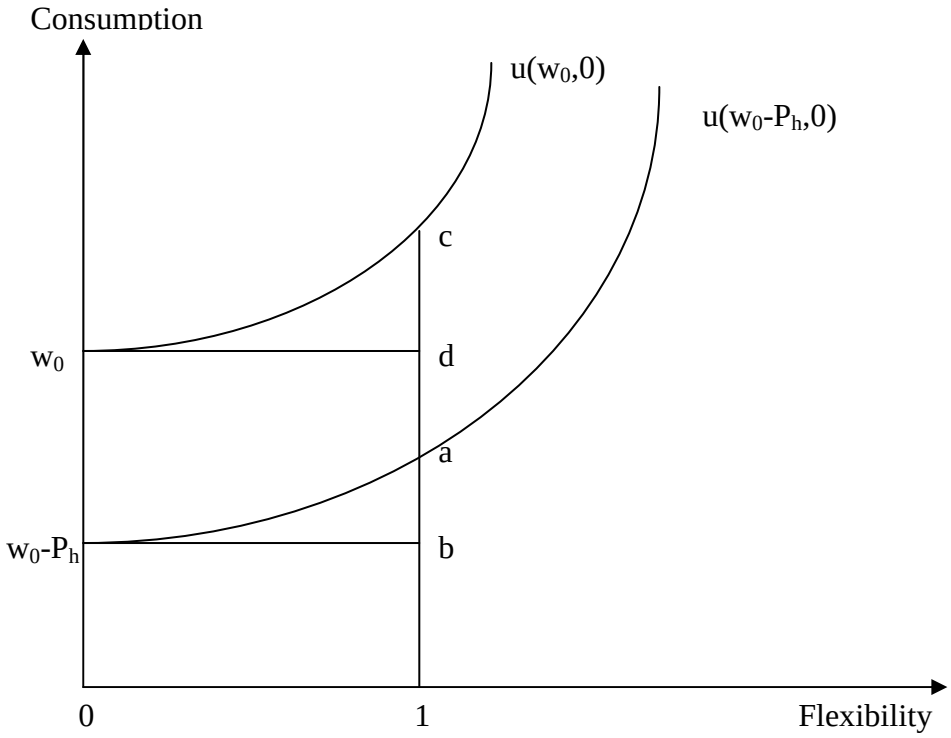


Table 3.1: Percent Distribution of Wage-Salary and Self-Employed Women Workers in Non-Agricultural Occupations, by Selected Characteristics, 1984-85 and 1990-91

		Wage Employment		Self-Employment	
		1984-85	1990-91	1984-85	1990-91
		52.67%	54.94%	4.30%	4.85%
Age					
	18-25	11.80	12.64	4.82	3.54
	26-35	30.94	30.82	26.31	23.04
	36-45	24.74	27.35	27.45	31.18
	46-55	17.05	17.07	20.78	22.73
	56-65	12.25	9.36	14.63	13.67
	>65	3.23	2.76	6.01	5.83
	Mean Age	40.26	39.35	43.70	44.37
	Standard Deviation	(12.87)	(12.36)	(12.92)	(12.38)
Marital Status					
	Married	70.22	62.36	82.87	76.99
	Separated/Divorced/Widowed	20.50	21.01	13.66	16.91
	Never married	9.28	16.62	3.48	6.10
Dependents					
	Yes	21.08	20.63	20.14	20.20
Race					
	White	86.11	84.32	94.04	92.48
	Black	11.19	12.58	2.90	3.72
	Other	2.70	3.10	3.06	3.81
Education					
	< 1st Grade	0.08	0.20	0.16	0.02
	Elementary 1-8	4.48	3.02	3.16	3.50
	High School 1-4	53.83	47.75	51.03	45.63
	Some College-Bachelor's	36.16	42.05	40.01	42.39
	Masters,Professional,Ph.D. etc.	5.46	6.97	5.65	8.46
Hours/Week Worked					
	1-20	13.76	10.84	29.29	22.81
	21-35	21.28	17.21	18.17	17.94
	36-55	62.36	54.79	42.15	36.57
	>55	2.60	3.57	10.39	12.25
	Mean Hours	35.62	36.78	34.06	36.35
	Standard Deviation	(11.42)	(11.83)	(18.55)	(18.71)

Table 3.2: Percent Distribution of Self-Employed and Wage-Salary Married Women Workers in Non-Agricultural Occupations, by Selected Characteristics

		Wage Employment		Self-Employment	
		1984-85	1990-91	1984-85	1990-91
		52.67%	54.94%	4.30%	4.85%
Husband is Self-Employed					
	Yes	12.47	11.43	42.19	43.91
Covered by Spouse's Employer-Provided Health Plan					
	Yes	21.00	11.05	25.69	12.57
	of which: Employer Paid for All/Part of plan	95.95	90.72	94.56	77.01

Figure 3.2: Distribution of Weekly Hours: Married Women Covered/ Not Covered, by Husband's Health Insurance

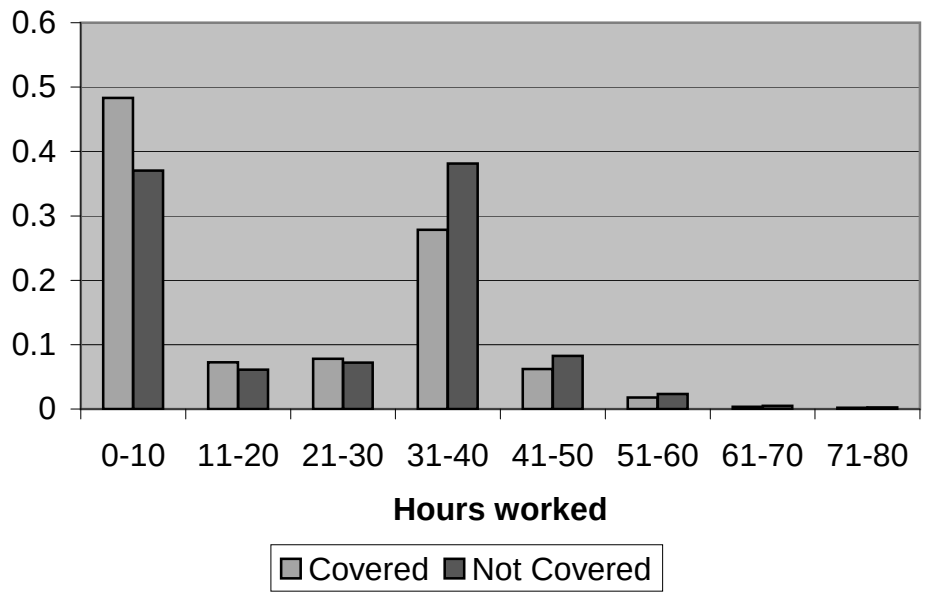


Table 3.3: Probit Estimates of Women's Self-Employment Choices: Partial Effects on Response Probabilities

		(1)	(2)	(3)
Age		0.0071***	0.00711***	0.00712***
		(0.0002)	(0.0002)	(0.0002)
Age squared		-0.00008***	-0.00008***	-0.00008***
		(0.0000)	(0.0000)	(0.0000)
Marital status (Base=Married)	Separated/divorced/ widowed	-0.01061***	-0.01028***	-0.01029***
		(0.0011)	(0.0011)	(0.0011)
	Never married	-0.01621***	-0.01603***	-0.01604***
		(0.0015)	(0.0015)	(0.0015)
Post-TRA86		0.00666***	0.00664***	0.00375***
		(0.0012)	(0.0012)	(0.0014)
Children age<6		0.0037***	0.00375***	0.00375***
		(0.0014)	(0.0014)	(0.0014)
Race (Base=White)	Black	-0.0273***	-0.02717***	-0.02717***
		(0.0012)	(0.0012)	(0.0012)
	Other race	-0.00439*	-0.00431*	-0.0043*
		(0.0025)	(0.0025)	(0.0025)
Education (Base=No school)	Primary school (1-8)	0.05286***	0.05292***	0.05292***
		(0.0258)	(0.0258)	(0.0258)
	High school (1-4)	0.0576***	0.05716***	0.05717***
		(0.0150)	(0.015)	(0.1499)
	Upto 5 years of college	.08778***	.08664***	0.08665***
		(0.0237)	(0.0236)	(0.0236)
	> 5 years of college	0.14474***	0.14208***	0.14209***
		(0.0430)	(0.0426)	(0426)
Non-MSA		0.00866***	0.00874***	0.00874***
		(0.0013)	(0.0013)	(0.0013)
Family income>50,000			0.01043***	0.01439**
(2000 dollars)			(0.0032)	(0.0067)
Family income*Post-TRA86				-0.00403
				(0.0054)
Number of observations		146,656	146,656	146,656

Note: Figures in parentheses are (robust) standard errors. All regressions include state controls.

*** - significant at the 99% level; ** - significant at the 95% level;* - significant at the 90% level

Table 3.4: Average After-Tax Price of Health Insurance

Category	Before TRA86	After TRA86
Self-Employed	1.410	1.334
	(0.074)	(0.055)
Employed	0.922	0.920
	(0.045)	(0.045)
High-income Self-Employed	1.455	1.307
	(0.065)	(0.041)
Low-income Self-Employed	1.389	1.355
	(0.078)	(0.068)
High-income Employed	0.900	0.902
	(0.038)	(0.029)
Low-income Employed	0.950	0.953
	(0.046)	(0.042)

Source: Gruber and Poterba (1994), Table I, p.709. The prices are calculated as the ratio of the tax-adjusted price of health insurance to the cost of self-insurance for each category.

Note: Figures in parentheses are standard deviations.

Table 3.5: Probit Estimates of Women's Self-Employment Choices: Partial Effects on Response Probabilities

		(1)	(2)
Age		0.007***	0.00686***
		(0.0002)	(0.0002)
Age squared		-0.00008***	-0.00007***
		(0.0000)	(0.0000)
Marital status (Base=Married)	Separated/divorced/ widowed	-0.00684***	-0.00731***
		(0.0013)	(0.0013)
	Never married	-0.01323***	-0.01411***
		(0.0016)	(0.0016)
Post-TRA86		0.00376***	0.00439***
		(0.0014)	(0.0013)
Children age<6		0.00376***	
		(0.0014)	
Race (Base=White)	Black	-0.02691***	-0.02677***
		(0.0012)	(0.0012)
	Other race	-0.00387	-0.0038
		(0.0025)	(0.0025)
Education (Base=No school)	Primary school (1-8)	0.05171***	0.05137***
		(0.0255)	(0.0255)
	High school (1-4)	0.05568***	0.05545***
		(0.0149)	(0.0149)
	Upto 5 years of college	0.08403***	0.08347***
		(0.0233)	(0.0232)
	> 5 years of college	0.13832***	0.13753***
		(0.042)	(0.0419)
Non-MSA		0.00899***	0.00896***
		(0.0013)	(0.0013)
Family income>50,000		0.01291***	0.01277**
(2000 *dollars*)		(0.0065)	(0.0065)
Family income*Post-TRA86		-0.00297	-0.00256
		(0.0056)	(0.0056)
Covered by husband's		0.00777***	0.00565***
health plan=yes		(0.0012)	(0.0015)
Children age <18			-0.00039
			(0.0006)
Children age <18*Family health			0.00222*
insurance plan			(0.0009)
Number of observations		146,656	146,656

Note: Figures in parentheses are (robust) standard errors. All regressions include state controls.

*** - significant at the 99% level; ** - significant at the 95% level;* - significant at the 90% level

Table 3.6: Probit Estimates of Women's Self-Employment Choices: Partial Effects on Response Probabilities

		(1)	(2)
Age		0.00695***	0.00643***
		(0.0004)	(0.0004)
Age squared		-0.0001***	-0.0001***
		(0.0000)	(0.0000)
Marital status (Base=Married)	Separated/divorced/ widowed	0.01307***	0.0114**
		(0.0055)	(0.0057)
	Never married	-0.0035	-0.00456
		(0.0062)	(0.0065)
Post-TRA86		0.00008	-0.00316
		(0.0026)	(0.003)
Children age¡18		0.00219**	0.00218*
		(0.001)	(0.0011)
Children age ¡18*Family health insurance plan		-0.00121	-0.00045
		(0.0014)	(0.0015)
Race (Base=White)	Black	-0.03142***	-0.03377***
		(0.0026)	(0.0029)
	Other race	-0.002	0.00133
		(0.0044)	(0.0047)
Education (Base=No school)	Primary school (1-8)	0.04561*	0.06388*
		(0.0334)	(0.0442)
	High school (1-4)	0.05568***	0.06855***
		(0.0216)	(0.0266)
	Upto 5 years of college	0.06913***	0.08249***
		(0.0278)	(0.0335)
	> 5 years of college	0.09558***	0.1175***
		(0.0443)	(0.0557)
Non-MSA		0.00528***	0.00593***
		(0.002)	(0.0022)
Family income>50,000 (2000 dollars)		0.01175**	0.01705***
		(0.0055)	(0.0068)
Covered by husband's health plan=yes		0.00753**	0.00821*
		(0.0036)	(0.0043)
Husband's sector (Base=Self-Employed)	Husband in wage-salary sector	-0.13096***	-0.12359***
		(0.0035)	(0.0037)
Husband's hours worked (Base= >55 hours/week)	1-20		-0.01605***
			(0.0033)
	21-35		-0.01796***
			(0.0028)
	36-55		-0.02392***
			(0.0026)
Number of observations		77,607	70,595

Note: Figures in parentheses are (robust) standard errors. All regressions include state controls.

*** - significant at the 99% level; ** - significant at the 95% level;* - significant at the 90% level

Table 3.7: Probit Estimates of Women's Self-Employment Choices: Partial Effects on Response Probabilities

		(1)	(2)
Age		0.00699***	0.00685***
		(0.0002)	(0.0002)
Age squared		-0.00007***	-0.00007***
		(0.0000)	(0.0000)
Marital status (Base=Married)	Single	-0.01367***	
		(0.0023)	
	Separated/divorced/ widowed		-0.01191***
			(0.0023)
	Never married		-0.01351***
			(0.0036)
Post-TRA86		0.00147	0.00303**
		(0.0017)	(0.0015)
Single*Post-TRA86		0.00636**	
		(0.003)	
Separated/divorced/ widowed*Post-TRA86			0.00731**
			(0.0033)
Never married*Post-TRA86			-0.0006
			(0.005)
Children age<18		-0.00013	-0.00045
		(0.0006)	(0.0006)
Children age <18*Family health insurance plan		0.00205**	0.0024***
		(0.0009)	(0.0009)
Race (Base=White)	Black	-0.02693***	-0.02674***
		(0.0012)	(0.0012)
	Other race	-0.00386	-0.00377
		(0.0025)	(0.0025)
Education (Base=No school)			
Primary school (1-8)		0.05309***	0.05154***
		(0.0258)	(0.0255)
	High school (1-4)	0.05642***	0.0554***
		(0.015)	(0.0149)
	Upto 5 years of college	0.08467***	0.0834***
		(0.0234)	(0.0232)
	> 5 years of college	0.13868***	0.13743***
		(0.0421)	(0.0419)
Non-MSA		0.00909***	0.00896***
		(0.0013)	(0.0013)
Family income>50,000 (2000 dollars)		0.01011***	0.0104***
		(0.0032)	(0.0032)
Covered by husband's health plan=yes		0.00196	0.00585***
		(0.0026)	(0.0015)
Number of observations		146,656	146,656

Note: Figures in parentheses are (robust) standard errors. All regressions include state controls.

*** - significant at the 99% level; ** - significant at the 95% level;* - significant at the 90% level

Chapter 4

Job Attachment Patterns of Men and Women: The Role of Promotion Expectations and Experience

4.1 Introduction

In documenting the pattern of lifetime jobs in the US using data from the 1968-1978 period, Hall(1982) found that on average, women's jobs were of substantially shorter duration relative to men's jobs. According to Hall, this higher job turnover for women was a consequence of the long stretches of time they spent out of the labor force. Researchers have studied the implications of these gender differences in turnover behavior on various labor market outcomes. Ureta (1995) examined the effect of non-employment spells on wage growth, by studying the timing and frequency of non-work spells for a sample of young, white workers drawn from the National Longitudinal Surveys. Her estimates suggest that 12% of the male-female wage gap can be explained by women's intermittent employment spells.

One channel through which gender differences in job turnover translate into the gender wage gap is through differential rates of promotion for men and women; some contend that women face a 'glass ceiling' that prevents their upward mobility in internal labor markets (Gjerde, 2002). According to this

theory, since training workers is a costly activity, firms are only willing to invest in those workers from whom they expect to recoup the costs of training. Given that the expected time horizon to recover these costs is shorter for women, firms are unwilling to train their women workers. And since training is invariably a prerequisite for promotion, promotion rates for women tend to be smaller than those for men. These differences in promotion rates then translate into a gender wage-gap.[1]

A significant increase in the labor force participation of women over the past few decades has motivated researchers to re-examine job turnover behavior by men and women. There is evidence suggesting that more recent cohorts of women are as concerned about their careers as men, have a higher propensity to stay on their jobs and are exhibiting a strong attachment to the labor market.[2] We would expect firms to treat these women - the 'stayers' - no differently from men. However, women workers are still a heterogenous group comprising both 'stayers' and 'quitters,' with higher average turnover rates than men. If firms cannot distinguish between the two types of women workers based on observables, statistical discrimination would still result in lower promotion rates for women and a persistence of the wage gap. If, on the other hand, the stayers could successfully signal their intentions to stay in the labor force and separate themselves from the quitters, they could overcome internal labor market discrimination.

[1]Wages usually grow with promotions; McCue's(1996) estimates suggest that between 9%-18% of wage growth is due to promotions.

[2]See Prisinzano (2004), Light and Ureta(1992), and references therein.

Prisinzano (2004) estimated a bivariate probit model of job-stays and promotions for men and women. His results indicate that the error terms between the job-stay equation and the promotions equations are correlated for men, suggesting that the unobservables affecting the stay decision are correlated with those affecting whether they receive a promotion or not. In contrast, the hypothesis that the estimated correlation between the error terms in the two equations for women is equal to zero cannot be rejected, implying that whether women receive a promotion offer or not is uncorrelated with their job-stay decisions. This seemingly strange result is the motivation for the current paper. It is our view that women who are concerned about their careers are using job attachment as a signal to indicate their attachment to the labor force. We expect women with little or no job market experience to have lower job turnover rates compared to men of similar experience, all else equal. Therefore, during this period, we expect women to exhibit less sensitivity to expectations of promotion, relative to men. This rationale also suggests that once women have gained adequate labor market experience and revealed themselves as stayers, their job attachment patterns should respond more closely to their expectations of promotions. Hence, we expect women with adequate job market experience to reveal job attachment patterns similar to those of men.

Accordingly, we use a longitudinal dataset to study how the expectation of promotion affects men's and women's decision to stay on a job and whether this relative pattern varies with the amount of labor market experience. The dataset also contains information on workers' perceived chances of promotion

in their current job. We expect workers who are concerned about their careers to be sensitive to the potential for career growth in their firms. We examine how turnover behavior responds to this subjective likelihood of promotion and how this response differs by gender and experience level. Our results suggest that individuals with low expectations of promotion are less likely to stay on their jobs relative to those with high expectations of promotion. We also find evidence that women are more likely than men to stay on a job all else equal. Furthermore, women with low promotion expectations are more likely than comparable men to stay on a job and this difference is more pronounced early in careers. The fact that the difference diminishes with experience supports our hypothesis.

The rest of the paper is organized as follows: section 4.2 gives a description of our data, the variables used in our analysis and some descriptives for our sample. In section 4.4, we describe the empirical models we use in our estimation, in section 4 we discuss the results and present our conclusions in section 4.5.

4.2 Data and Descriptives

We use data from the National Longitudinal Survey of Youth (NLSY) for the following survey years: 1979-83, 1996, 1998 and 2000.We restricted our sample to those who exhibited a reasonable attachment to the labor market. We eliminated respondents who worked for less than 15 weeks per year or less than 20 hours per week in any year. We also eliminated respondents who were

either self-employed, working in a farming occupation or industry, or in the armed forces. This restriction removes those individuals that face considerably different job and promotion structures than the typical worker.

The information on job changes and the subjective perception of promotion possibilities on the current job are of particular interest for the present study. Accordingly, we identify the respondent as a 'job-stayer' in a particular year if he or she reported that the main job that year was also the main job in the previous year. In the 1979 through 1982 surveys, the NLSY includes the respondent's assessment of whether the chances for promotion in the current job are good. The responses are coded as: 1. Not true at all; 2. Not too true; 3. Somewhat true and 4. Very true. In the 1996 and 1998 surveys, a similar question is asked as follows: "Do you believe it is possible for you to get a promotion with this employer in the next two years?", and the respondent replied with a yes/no. One problem in comparing these questions is that in the 1979-82 surveys, the question does not specify a time horizon while in the 1996 and 1998, the scope of the question is limited to two years. However, we believe that the respondents interpreted the question as referring to a short time horizon in the 1979-82 surveys, especially given that they were all between 15 and 25 years old. We therefore combine the first two categories in the 1979-82 survey responses - Not true at all and Not too true - into one, and label this as "Low chances of promotion", and combine the other two categories - Somewhat true and Very true - into the "High chances of promotion category. In the 1996 and 1998 surveys, if the response to the promotion

question was No, this was categorized as "Low chances of promotion" and if it was Yes, it was categorized as "High chances of promotion." This way, we construct a comparable measure of subjective perception of promotion chances on the current job.

Tables 4.1 and 4.2 present the fraction of job-stayers and job-movers among men and women for the two time periods, categorized by their self-perceived chances of promotion. In the 1979-82 period, among workers who feel they have little or no chance of promotion in their current job, a significantly larger fraction of women workers stayed on their jobs. By contrast, a much higher fraction of men stay on in jobs in which they think that the likelihood of promotion is very high, relative to women. Among the job-movers, there's no discernible pattern among women while a significant fraction among men, nearly 60%, move jobs even when they think they have good chances of promotion. We observe the same pattern in the 1996-1998 period.

The summary statistics for our sample are presented in table 4.3. Women constituted less than half the sample, as did non-whites. Although we do not see too many differences between men and women in terms of the marital status variables, on average, women had more children. Women were also slightly younger and had about an extra half-year of education. This translated into a lower average level of potential experience for women. As expected, women had lower mean wages, compared to men. However, a higher fraction of women stayed on their jobs from one year to the next compared to men, despite a substantially higher fraction of women reported facing low chances of promotion

in their current jobs.

4.3 Model Specification

In the present paper, we examine the likelihood of an individual remaining on a job. It is possible to estimate this decision using a simple probit model of the following form:

$$y_i = X\beta + \epsilon_i \tag{4.1}$$

where $y = 1$ if the individual stayed on the current job and $y = 0$ if she did not stay on the job. X is a set of covariates, β is a vector of parameters to be estimated, and ϵ is assumed to have a standard normal distribution. The set of covariates includes characteristics pertaining to the individual and her job. This model is appealing because it is easy to implement and interpret. However, the model does not take advantage of the panel nature of the data. We can incorporate the panel nature of the data into the probit model and account for omitted variable bias by estimating a random-effects specification of equation 4.1. The specification used in this paper follows the model proposed by Guilkey and Murphy (1993).[3] The model is as follows:

$$y^*_{it} = X_{it}\beta + \mu_i + \upsilon_{it} \tag{4.2}$$

[3]Heckman and Willis (1976) and Chamberlain (1980) both present a similar model. Hsiao (1986) gives a useful discussion of the literature. Butler and Moffitt (1982) describe a procedure to calculate the likelihood function.

where X_{it} is a set of covariates for individual i at time t and β are parameters to be estimated. μ_i and υ_{it} are independent random variables with μ_i characterizing individual i and following a normal distribution with mean 0 and variance σ_μ^2) while υ_{it} is a random disturbance distributed as $N(0, \sigma_\upsilon^2)$. Given these conditions, we have the following:

$$E(\mu_i + \upsilon_{it}, \mu_i + \upsilon_{it}) = \sigma_\mu^2 + \sigma_\upsilon^2 \tag{4.3}$$

and

$$Corr(\mu_i + \upsilon_{it}, \mu_i + \upsilon_{is}) = \rho = \frac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma_\upsilon^2} \tag{4.4}$$

Following from a simple probit, we observe the following:

$$\begin{aligned} y_{it} &= 1 \text{ if } y_{it}^* > 0 \\ y_{it} &= 0 \text{ if } y_{it}^* \leq 0. \end{aligned} \tag{4.5}$$

The likelihood function is then:

$$\begin{aligned} L = \prod_{i=1}^{N} \{ \int_{-\infty}^{\infty} \prod_{t=1}^{T} [1 - \Phi(x_{it}\frac{\beta}{\sigma_\upsilon} + \sqrt{\frac{\rho}{1-\rho}}\frac{\mu}{\sigma_\mu})]^{1-y_{it}} \\ \times [\Phi(X_{it}\frac{\beta}{\sigma_\upsilon} + \sqrt{\frac{\rho}{1-\rho}}\frac{\mu}{\sigma_\mu})]^{y_{it}} \phi(\frac{\mu}{\sigma_\mu}) \mathrm{d}(\frac{\mu}{\sigma_\mu}) \} \end{aligned} \tag{4.6}$$

where Φ represents the standard normal distribution, N is the number of individuals, and T is the number of observations for individual i. X_{it} is a set of covariates for individual i at time t and β, μ, and ρ are parameters to be

estimated.[4]

In order to capture the differential effects of gender, promotion expectations, and experience on the probability of staying on a job, we adopt a 'difference in difference in difference' specification of X_{it}.[5] First, we examine how the probability of staying on a job differs by promotion expectations. Any difference in the probability is likely due to simple concerns regarding the career path. That is, individuals may be less likely to remain on a job if they do not expect to be promoted. Second, we examine how these concerns differ by gender. It is possible that women and men differ in how promotion expectations change their likelihood of staying on a job. The presumption is that women may have different expectations about career length. We have the following 'difference-in-difference' approach after combining the above two analyses:

$$\begin{aligned}\Delta^2 =&(Pr(y_{it}=1)_F^L - Pr(y_{it}=1)_F^H) \\ &-(Pr(y_{it}=1_M^L - Pr(y_{it}=1)_M^H)\end{aligned} \tag{4.7}$$

where $Pr(y_{it}=1)$ represents the probability of staying on a job, the superscripts L and H represent individuals who have either low or high expectations of promotion, and the subscripts F and M represent females and males, respectively. Equation 4.7 assumes that the difference in the probability of staying

[4]A pooled probit will provide consistent estimates of $\frac{\beta}{\sigma_\epsilon}$ with incorrect standard errors. However, these estimates will equal the random effects estimates only if $\sigma_\mu^2 = 0$. If $\sigma_\mu^2 \neq 0$ then the preferred estimation method is the variance-components model of equation 4.6.

[5]The specification presented follows the example of Hamermesh and Trejo (2000).

would be similar across promotion expectation if not for gender. The equation is represented in the probit framework by:

$$Pr(y_{it} = 1) = z_{it}\gamma + \delta_1 L + \delta_2 F + \delta_3 (L * F) + \epsilon_{it} \tag{4.8}$$

where z_{it} is a set of covariates and γ is the corresponding set of parameters to be estimated. L is a dummy variable for an individual who has low expectations for promotion and F is a dummy variable for females. δ_1 and δ_2 are the associated coefficients to be estimated. δ_3 is the coefficient that identifies the difference in difference expressed in equation 4.7. Lastly, we examine whether differences in the probability of staying on a job given promotion expectations and experience level differ by gender. Following the form above, we have:

$$\begin{aligned} \Delta^3 = &[(Pr(y_{it} = 1)_F^L - Pr(y_{it} = 1)_F^H) - (Pr(y_{it} = 1_M^L) - Pr(y_{it} = 1)_M^H)]_I \\ &-[(Pr(y_{it} = 1)_F^L - Pr(y_{it} = 1)_F^H) - (Pr(y_{it} = 1_M^L) - Pr(y_{it} = 1)_M^H)]_E \end{aligned} \tag{4.9}$$

where the subscripts I and E represent individuals who are inexperienced and experienced and all other notation is defined as above. However, rather than assign an indicator for 'inexperience,' we use a continuous measure of experience and its square. This difference is incorporated in the probit framework as follows:

$$\begin{aligned} Pr(y_{it} = 1) = &z_{it}\gamma + \delta_1 L + \delta_2 F + \delta_3 (L * F) + \delta_4 E + \delta_5 E^2 + \\ &\delta_6 (L * E) + \delta_7 (L * E^2) + \delta_8 (F * E) + \delta_9 (F * E^2) + \\ &\delta_{10} (L * F * E) + \delta_{11} (L * F * E^2) + \epsilon_{it} \end{aligned} \tag{4.10}$$

where E and E^2 are potential experience and its square, respectively while δ_4 and δ_5 are the associated coefficients. δ_6 and δ_7, and δ_8 and δ_9 are the pairs of coefficients that identify the difference-in-differences for low promotion expectations and inexperience, and gender and inexperience, respectively. δ_{10} and δ_{10} are the coefficients that identify the 'difference-in-difference-in-difference' expressed in equation 4.9. The remaining notation is as defined above.

The above specification allows for comparisons across different groups. We are interested in the following differences. First, we are concerned with the difference in the likelihood of staying across gender given low promotion expectations and the same difference given high promotion expectations. The former difference is represented by $\delta_2 + \delta_3 + \delta_8 + \delta_9 + \delta_{10} + \delta_{11}$ while the latter difference is represented by $\delta_2 + \delta_8 + \delta_9$. Second, we are interested in the difference in the likelihood of staying across promotion expectation given gender. For men, this difference is represented by $\delta_1 + \delta_6 + \delta_7$. The same difference for women is represented by $\delta_1 + \delta_6 + \delta_7 + \delta_8 + \delta_9 + \delta_{10} + \delta_{11}$. Lastly, we are interested in how the difference in the likelihood of staying between low and high promotion expectation men differs from the analogous difference for women after controlling for experience level. This difference is represented by $\delta_{10} + \delta_{11}$.

4.4 Estimates

The results from the random-effects probit models are presented in table 4.4 . The estimate of the correlation between the decision to stay on a job in

year t and the same decision in year $t+1$, denoted by ρ, is positive and significant. This result suggests that the random effects probit is the preferred estimation.[6] The implication of the positive sign on the correlation is that individuals who stay on their job in year t are more likely to stay on their job in year $t+1$; in other words, certain individuals may be 'stayers' while others are 'non-stayers.'

4.4.1 Basic Results

An important determinant of staying on a job is changes in marital status. We define changes in marital status for an individual as staying single from year t to $t+1$, remaining married from year t to $t+1$, getting married between year t and $t+1$, or going from married to single between year t and $t+1$. Individuals who remain married or who get married are more likely to stay on a job than individuals who are single, all else equal. The former group is 35% more likely to remain on a job while the latter group is 23.5% more likely to remain on a job.[7] It is likely that this result reflects the notion that these two groups are either more stable or desire more stability than single individuals. The stability is likely due to the fact that individuals who are married have a dependent and any decision is a 'joint' decision. The coefficient on becoming single between two time periods is positive and significant. However, the marginal effect is

[6] In general, there is little difference between the pooled estimates and the random effects estimates. However, the estimate of ρ is significantly different from zero in each model estimated. Given this fact, we report only the results of the random effects probits.

[7] The predicted probability of remaining on a job at the mean levels of all continuous variables and each dummy variable set to 0 is .5118.

considerably smaller than the effects associated with marriage (14%). It is not surprising that there is a small difference in the likelihood of staying on a job for individuals who become single and those who remain single. This difference may reflect the fact that 'newly' single individuals are not that removed from marriage and have not fully realized their single status.

Presumably, two important considerations that affect job turnover are the wage and the potential for promotion within the firm. The former reflects the cost to the individual of leaving the job. The coefficient on the log of the hourly wage is positive and significant. The marginal effect associated with the coefficient is sizable at 28.76%. This result coincides with the expectation that the higher the wage, the higher the cost to the individual of leaving the job. The latter is likely important to those individuals who are concerned with a career and the associated benefits. As such, we expect individuals with low promotion expectations to be less likely to stay on the job. Our estimate accords with this notion; individuals who have low expectations of promotion on their jobs are less likely to stay on their jobs.

The effect of potential experience on job turnover seems counter-intuitive; search theory predicts that job turnover will be high at low levels of experience as workers search for a good 'match.' Once good job matches are made, turnover is expected to decline. Thus, we would expect the coefficient on the linear experience term to be positive and the one on the quadratic term to be negative. Our results suggest the opposite pattern. A possible explanation for this pattern is that there are differential effects of experience by gender and

by promotion expectation. We explore this hypothesis in subsequent specifications. However, it is important to note that the marginal effect associated with potential experience is negligible.[8]

The coefficient on the gender variable is of particular interest to the present study. Recent studies have found that women are more likely than men to stay at jobs.[9] Our result is consistent with this finding. The coefficient on the female dummy variable is significant and positive. It suggests that women are 12% more likely than men to stay on a job all else equal.

4.4.2 Gender-Promotion Expectation Comparisons

Column 3 of table 4.4 presents the results of the double-difference estimation. The coefficients of particular interest are those associated with the variables that are used in the 'double-difference' presented in equation 4.7. These variables are dummy variables for female and having low expectations of promotion. The results from the basic specification presented in column 2 of table 4.4 suggest that women are 12% more likely to remain on a job than men all else equal. It is not obvious why women are more likely to stay on jobs than men. The unconditional probabilities of staying on a job are very close. In our sample, 55.5% of men stayed on jobs while 56.9% of women stay on jobs. This difference represents only a 2.5% increase. A reasonable explanation for the estimated difference is that women may face a form of discrimination in

[8]The marginal effect of potential experience is calculated as the mean of effects in the sample.

[9]For example, Prisinzano (2004).

hiring practices. Under this condition, women may be less likely to receive a new job offer. As such, women may hold onto jobs longer because the job search costs they face are higher than job search costs faced by men.

If individuals are concerned with career 'growth', promotion expectations are likely an important consideration in the stay decision. The basic specification supports this notion. That is, individuals with low promotion expectations are less likely to stay on a job. The presumption is that they will incur the costs of leaving a job in order to move to a job with more promotion potential. It is also possible that individuals who have low promotion expectations recognize they are not productive at the job. In this case, individuals may leave in order to find a job at which they are productive. The estimation presented here does not distinguish between these possibilities but as presented in the previous section, individuals with low promotion expectations are 15% less likely to stay on a job all else equal. Considering the magnitude of the marginal effect, it appears that promotion expectations are an important determinant of staying on a job.

The coefficient on the interaction between female and low promotion expectations identifies the double difference. It captures any difference in the probability of staying on a job across promotion expectation that is due to gender. The coefficient on the interaction is insignificant at conventional levels. As such, it appears that women are more likely to stay on jobs than men regardless of the promotion expectations. However, if women do need to signal attachment to the labor market, it is likely that women with low

levels of experience will differ from men with low levels of experience but women with high levels of experience will not differ from men with high levels of experience. In order to capture this effect, we estimated the specification presented in equation 4.10.

4.4.3 Gender-Promotion Expectation-Experience Comparisons

The results of the triple difference estimation are presented in column 6 of table 4.4 and the marginal effects of interest are in table 4.5. In the case of the control variables, the results of the triple difference are similar to the results of the previous specifications. In the previous estimation, we found little evidence of 'job-shopping.' We found that the net effect of potential experience decreased the likelihood of staying on a job. In the current specification, we also find this result but the inclusion of the set of interactions that identify the triple difference changes the interpretation.[10] The net effect of potential experience differs by gender, promotion expectation, and gender-promotion expectation group. In the case of men with high promotion expectations, the effect is simply the net of the coefficients on the potential experience variables. The result suggests that as potential experience increases the likelihood of staying on a job for men with high promotion expectations decreases.[11] This result

[10]The set of coefficients is Female, Low, Low*Female, Potential Experience, the square of Potential Experience, Potential Experience*Low, (Potential Experience)^2*Low, Potential Experience*Female, (Potential Experience)^2*Female, Potential Experience*Low*Female, and (Potential Experience)^2*Low*Female. The χ^2 statistic for joint significance of the full set is 192.71 and its associated p-value is .0000.

[11]The χ^2 statistic for joint significance of the coefficients on the potential experience variables is 21.99 and its associated p-value is .0000.

is mild evidence of negative selection for men. In the previous specifications, we also found that individuals with low promotion expectations are less likely to stay on a job. In the current specification, we see a different result for men. The marginal effect associated with the coefficient on low promotion expectations also accounts for the interaction between this variable and the potential experience variables. The net marginal effect is .0004. This result suggests that men with low promotion expectations are .03% more likely to stay on a job than men with high promotion expectations.[12] Even though this result is negligible, it also reflects a negative selection of men into long tenure. That is, men who have low promotion expectations are also less likely to find comparable jobs in the labor market and therefore, stay on the current job.

In the double-difference specification, we found that women were 12% more likely than men to stay on a job all else equal. In the current specification, we also find that women are more likely to stay on a job than men. The marginal effect associated with women also takes into account the interaction of the potential experience variables and the female dummy variable. This effect suggests that women who have high promotion expectations are 16.5% more likely than men with high promotion expectations to stay on a job.[13] A possible explanation for this result is that since women are less likely to receive a promotion, when they are likely to receive a promotion they remain on the

[12]The χ^2 statistic for joint significance of the coefficient on low promotion expectations and the interactions with the potential experience variables is 87.29 and its associated p-value is .0000.

[13]The χ^2 statistic for joint significance of the coefficients on female and the interactions with the potential experience variables is 22.61 and its associated p-value is .0000.

job. The presumption is that men who have high promotion expectations may be able to find a comparable job whereas women are not able to find a comparable job. A possible explanation for why they are not able to find a comparable job is our signalling story. Women must signal attachment to the labor market in order to receive promotions (and the likely wage increases). If attachment to the labor market is observed noisily from outside a firm, women will stay on current jobs longer than men all else equal. The difference is highlighted when we control for promotion expectations in the estimation. We also find that women with low promotion expectations are less likely to stay on a job than women with high promotion expectations. The marginal effect associated with being a women with low promotion expectations takes into account the coefficients on the female and low promotion expectations variables as well as each of the included interactions. The results suggest that women with low promotion expectations are 13.8% less likely to stay on a job than women with high promotion expectations.[14] Contrary to the result for men, it appears that there is *positive* selection of women into long tenure.

Given the present specification, it is possible to compare across gender and promotion expectations. A useful comparison is women to men given low promotion expectations. This difference in the likelihood staying on a job is due to the turning on of the female indicator as well as the female-potential experience and female-low interactions. The marginal effect is .0122 at the mean

[14]The χ^2 statistic for joint significance of the coefficients on low and the interactions with female and potential experience variables is 131.82 and its associated p-value is .0000.

of experience and suggests that women with low promotion expectations are 2.5% more likely to stay on job than their male counterparts.[15] This difference in the likelihood of staying across gender increases if we consider men and women with a potential experience level that is one standard deviation below the mean. Women with low promotion expectations and 'low' potential experience are 16.6% more likely than comparable men to stay on a job. This result is of particular interest in our study. Our hypothesis is that early in their careers women are likely to respond to promotion expectations differently than men. Specifically, we expect women who are early in their careers to stay on jobs for which they have low promotion expectations more often than men. The reason for this difference is that women early in their careers must signal an attachment to the labor market that men do not have to signal. As such, 'job-shopping' by women is a negative signal regarding labor force attachment. It suggests that women who have low promotion expectations and are inexperienced are more likely to stay on a job than their male counterparts. Later in the career, the difference in the likelihood of staying on a job between men and women with low promotion expectations diminishes. For individuals with a potential experience level that is one standard deviation above the mean, women with low promotion expectations are only 12.8% more likely to remain on a job than comparable men. Our hypothesis is that men and women's behavior in response to promotion expectations should be indistinguishable at

[15]The χ^2 statistic for joint significance of the coefficients on female and the female-potential experience and female-low interactions is 43.15 and its associated p-value is .0000.

high levels of experience. Even though there is still a difference, this result supports this notion.

4.4.4 Early Sample

As noted in section 4.2, the promotion expectations question in the 1979-82 surveys had four possible responses while the corresponding question in the 1996-98 surveys had only two possible responses. In pooling the data, it was necessary to collapse the four response categories from the earlier period into two categories. To ensure that this restriction is not affecting our results, we estimated the triple-difference specifications for the 1979-82 and the 1996-1998 periods separately. In estimating the specifications for the earlier period, we combined the two responses 'Not true at all' and 'Not too true' into one category, 'Low promotion expectations' but kept the other two responses - 'Somewhat true' and 'Very true' - separate. The results are presented in columns 2 and 3 of Table 4.6 and the marginal effects for the variables of interest are in Table 4.7.

The results for the education, wages, children, living in MSA, race and marital variables are all qualitatively similar to those of the pooled sample. The coefficients on the detailed promotion expectation categories have the expected signs; individuals who perceive their chances of promotion to be small or moderately good are less likely to stay on the job relative to those who believe that they have very good chances of getting promoted. Unlike in the pooled sample, the net effect of potential experience is positive. However

the marginal effect still remains small and furthermore, the coefficients on the linear and quadratic terms are not jointly significant.[16]

Similar to the findings in the pooled sample, we find that women are more likely to stay on their job relative to men, regardless of promotion expectations. Specifically, we find that women are 29.5%, 18.3% and 21.3% more likely to stay on the job than their male counterparts for all low, moderate and high promotion expectation categories, respectively. [17] Given that most of the individuals in this sub-sample have low levels of potential experience, this results supports our hypothesis that women stay on jobs to signal attachment to the labor force. When we consider these marginal effects at one standard deviation above and below the mean level of potential experience, the results also support our hypothesis. However, we find that as potential experience increases, the gender differences in the relative probabilities of staying on the job also increase. This results is contrary to our expectation that as women gain experience, their response to promotion expectations should be similar to that of men. However, it is possible that signalling takes longer than 3.89 years.[18]

[16]The χ^2 statistic for joint significance is 1.64 with a p-value of .4407.

[17]The χ^2 statistic for joint significance of the respective coefficients are 28.19, 22.02 and 11.50 with associated p-values of .0001, .0012 and .0093 respectively.

[18]This value is the level of potential experience at one standard deviation above the mean.

4.4.5 Late Sample

The results of the triple difference estimation for the 1996-1998 period are presented in column 4 and 5 of table 4.6. The marginal effects for the variables of interest are in Table 4.8. In the case of the control variables, these results are very similar to the results of the full sample specification. One notable change is the coefficient on the number of children. In the full sample estimation, the coefficient is significant and suggests that increasing the number of children decreases the likelihood of staying on a job by 3.2%. In the current specification, the coefficient on this variable is negative but is insignificant and carries a considerably smaller marginal effect (-1.3%). A possible explanation for this difference is the fact that the children in the household are more likely to be of school age and therefore, individuals do not have to take care of the children. One other change is the effect of experience on the likelihood of staying on a job. In the full sample estimation, we found that experience had a negative effect on the likelihood of staying on a job, albeit a very small one. In this estimation, we find that experience has a positive net effect on the likelihood of staying on a job. The effect is also considerably larger in magnitude than the effect we found in the full sample estimation (2.5% vs. -.6%). This result aligns with the expectation that individuals are more likely to 'job shop' at low levels of experience and are more stable as they gain experience. Similar to the result from the full sample estimation, we find that men with low promotion expectations are 3.5% *more* likely to stay on a job than men with high promotion expectations all else equal. This result

supports the notion that for men, there is negative selection into long tenure.

We find that women with low promotion expectations are 6.8% less likely than women with high promotion expectations to stay on a job. In each of the previous estimations, we found that women are more likely to stay on jobs all else equal. This estimation yields a slightly different result. At the mean level of potential experience (17 years), women with high promotion expectations are almost 10% more likely than men with high promotion expectations to stay on a job all else equal.[19] However, women with low promotion expectations are 1% *less* likely than their male counterparts to stay on a job all else equal.[20] This result supports our hypothesis that as women gain experience in the labor market (and successfully signal attachment) they will behave no differently than men. The fact that women with low promotion expectations are less likely than their male counterparts to stay on their job may reflect the fact that women's careers are delayed by the need to signal attachment to the labor force.

We find that women with low promotion expectations and potential experience that is one standard deviation below the mean level (13.93 years) are 2.6% more likely to stay on jobs than their male counterparts all else equal. We also find that women with a potential experience level that is one standard deviation above the mean level (20.7 years) and low promotion expectations

[19]The χ^2 statistic for joint significance of the coefficient on the female indicator variable and the interactions with the potential experience variables is 9.48 with a p-value of .0235.

[20]The χ^2 statistic for joint significance of the coefficients on female and the interactions with low and potential experience variables is 29.97 and its associated p-value is .0000.

are 13% more likely to remain on a job than their male counterparts. It appears that the gender difference in the likelihood of staying on a job given low promotion expectations first decreases and then increases. We expect the difference to tend toward zero and perhaps change direction as women 'catch up' with men. It is possible that the result we find is due to the fact that women may enter the labor force later than men. These women will have high levels of potential experience but still be early in their careers. In an effort to explore this result, we estimate the triple difference using the sample of individuals that appear in both time periods in the following section. This sample comprises individuals who are serious about their careers and therefore, should behave as our signalling model suggests. It also eliminates the possibility that our results are driven by women who know they are going to drop out of the labor force and therefore, do not respond to promotion expectations.

4.4.6 Individuals in Both Samples

The results of the triple difference estimation are presented in columns 6 and 7 of table 4.6 while the marginal effects of the variables of interest are presented in table 4.9. The results for the control variables do not differ significantly from the main results presented in table 4.4 with the exception of the coefficient on the education variable. This coefficient is insignificant in the present specification but is significant in each of the other specifications. The marginal effect is also considerably smaller in magnitude than other specifications at just .0025 percentage points. It also appears that experience level has

a negative net effect but is again relatively small at -.8% for men with high promotion expectations.

The advantage to running the triple difference with just the sample of individuals who appear in both time periods is that we can eliminate the possibility that our results are driven by women who are not serious about their careers. That is, it is likely that the full sample contains some women who know they are going to leave the labor force and therefore, remain on jobs despite low promotion expectations. The results presented in table 4.6 suggest that our results are not driven by this group of women. Furthermore, the results support our signalling story. As in previous estimations, we find that women are more likely to stay on jobs than men all else equal. Women with high promotion expectations are 18.66% more likely to remain on jobs than their male counterparts all else equal while women with low promotion expectations are 2.5% more likely to remain on jobs than their male counterparts all else equal.[21] The large difference in the likelihood of staying on a job across gender for individuals with high promotion expectations likely reflects a difference in the cost of finding a similar job. We also expect women to behave more like men after they have successfully signalled attachment to the labor force. If we consider individuals with an experience level that is one standard deviation below the mean, women with low promotion expectations are

[21]The χ^2 statistic for joint significance of the coefficients on female and the interactions with potential experience variables is 12.07 and its associated p-value is .0071. The χ^2 statistic for joint significance of the coefficients on female and the interactions with the low and potential experience variables is 15.74 and its associated p-value is .0076.

21% more likely to remain on jobs than men with low promotion expectations all else equal. For individuals with an experience level that is one standard deviation above the mean level, women with low promotion expectations are only 7.5% more likely than men to remain on a job all else equal. This result supports our explanation. It suggests that women become more responsive to promotion expectations after they have signalled labor force attachment. Given that our sample consists of only individuals that are attached to the labor force, this result is strong evidence for our signalling explanation.

4.5 Conclusions

Labor economists have explained the male-female wage differential as a consequence of women's historic lack of attachment to the labor force. However, with a rapid rise in the female labor force participation rate over the last few decades, the career profiles of recent cohorts of women workers has undergone significant changes. Studies indicate that women are now more likely to stay on their jobs compared to men of similar characteristics. In this paper, we examine how job turnover relates to concerns regarding a career path. We expect to see job turnover when promotion opportunities on the job are low. Accordingly, we study the relationship between individuals' expectations of promotion on their jobs and their turnover behavior. We examine how this relationship varies between men and women and with experience level. It is our hypothesis that early on in their careers, women who are strongly committed to a career are more likely to stay on their jobs, regardless of promotion opportu-

nities, in a bid to signal their commitment to current and potential employers. However, once women have acquired adequate labor market experience and their commitment to the labor force is no longer in question, we predict that their turnover behavior will be more responsive to career opportunities and will be similar to that of men.

We use longitudinal data for men and women from the NLSY to test our predictions. In order to exploit the longitudinal nature of the data, we use a random-effects probit model to estimate the probability that an individual will stay on a job. We estimate three models: a basic model that includes indicator variables for female and low promotion expectations; a model that includes an interaction between female and low promotion expectations; and a model that includes interactions between female, low promotion expectations, and potential experience. The results from the basic specification suggest that as expected, individuals with low expectations of promotion are less likely to stay on their jobs than those with high expectations of promotion. This result is repeated in the model that allows for differences in the effect of low promotion expectations across gender. In this model, we also find that the tendency of women to be more likely than men to stay on a job does not vary with promotion expectations. In the third model, we find a different result. We find that the difference across gender in the likelihood of staying on a job varies by potential experience. By evaluating the marginal effect of low promotion expectations at different levels of potential experience we find support for our hypothesis that early in their career, women are more likely

to stay on a job despite having low promotion expectations since they need to signal their attachment to the labor force. Later in the career, women should not differ from men in terms of their response to promotion expectations. Our results suggest that while women are still more likely to remain on their job in the face of low promotion expectations later in the career, the difference is smaller than the difference early in the career.

We repeat the third model for three sub-samples: a 1979-82 sample, a 1996-98 sample and a sample of individuals that appear in both time periods. The 1979-82 sample has more detailed information on promotion expectations. This additional information strengthens our model but does not qualitatively change the results. Similarly, the results from the 1996-98 sample do not differ significantly from those of the pooled sample. By estimating the model using the final sub-sample, we eliminate the possibility that our results are driven by women who are not serious about their careers and therefore, unresponsive to promotion expectations. These results further lend credence to our signalling story that women at low levels of experience are more likely to stay on jobs despite low promotion expectations than men of the same characteristics.

Table 4.1: Self-Reported Promotion Expectations at Job By Mobility: 1979-1983

Women				
	Job Stays		No Stays	
Response	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Not True at All	.1324	.339	.2484	.4322
Not True	.2295	.4206	.262	.4398
True	.3411	.4742	.2868	.4524
Very True	.297	.4571	.2027	.4021
Observations	**1586**		**1771**	
Men				
	Job Stays		No Stays	
Response	*Mean*	*Std. Dev.*	*Mean*	*Std.Dev.*
Not True at All	.0874	.2826	.1639	.3703
Not True	.1768	.3816	.2512	.4338
True	.3654	.4817	.3288	.4699
Very True	.3704	.4831	.256	.4365
Observations	**1601**		**2074**	

Table 4.2: Self-Reported Promotion Expectations at Job By Mobility: 1996-1998

	Women			
	Job Stays		No Stays	
Response	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Low Expectations	.4461	.4972	.4564	.4983
Observations	**2746**		**1514**	
	Men			
	Job Stays		No Stays	
Response	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Low Expectations	.3864	.4870	.4058	.4912
Observations	**3305**		**1863**	

Note: The survey question was "Do you believe it is possible for you to get a promotion with this employer in the next two years?". If the respondent replied "No", this was coded as low chances of promotion.

Table 4.3: Descriptive Statistics - Entire Sample

	Total		**Women**		**Men**	
Variable	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Remained on job from t to $t+1$	0.5617	0.4962	0.5692	0.4952	0.5553	0.4970
Age	28.7269	8.1292	28.6096	8.1329	28.8277	8.1252
AFQT	44.4645	28.6104	43.8316	27.0915	45.0091	29.8462
Education	12.7589	2.1648	12.9290	2.0711	12.6126	2.2320
Potential Experience	10.9685	7.9043	10.6816	7.9769	11.2154	7.8334
Low Expectations of Promotion	0.4077	0.4914	0.4453	0.4970	0.3754	0.4843
Log Hourly Wage	2.0009	0.7648	1.8858	0.7188	2.0999	0.7890
Non-White	0.4284	0.4949	0.4352	0.4958	0.4226	0.4940
In Metropolitan Statistical Area	0.7994	0.4004	0.8066	0.3950	0.7932	0.4050
Number of Children	0.8238	1.1720	0.9137	1.1803	0.7464	1.1593
Stayed Single	0.4338	0.4956	0.4410	0.4965	0.4276	0.4948
Stayed Married	0.3745	0.4840	0.3595	0.4799	0.3873	0.4872
Single-Married	0.0549	0.2278	0.0579	0.2336	0.0523	0.2227
Married-Single	0.0218	0.1460	0.0252	0.1567	0.0188	0.1360
Observations	**16394**		**7582**		**8812**	

Table 4.4: Random Effects Probit Estimation Staying on a Job, Double and Triple Difference

	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$
In Metropolitan Statistical Area[a]	-.1251*** (.0309)	-.0499	-.1251*** (.0309)	-.0499	-.1223*** (.0309)	-.0485
Number of Children	-.043*** (.0132)	-.0154	-.043*** (.0132)	-.0154	-.0429*** (.0132)	-.0153
Education	.0206*** (.0079)	.0074	.0206*** (.0079)	.0074	.0213*** (.0079)	.0076
AFQT	.0000 (.0006)	.0000	.0000 (.0006)	.0000	.0001 (.0006)	.0001
Log Hourly Wage	.4119*** (.0256)	.1472	.4119*** (.0256)	.1472	.4104*** (.0256)	.1459
Potential Experience	-.0219*** (.0081)	-.0000	-.0218*** (.0081)	-.0000	-.0562*** (.0124)	-.0031
(Potential Experience)^2	.001*** (.0003)		.001*** (.0003)		.0022*** (.0005)	
Low Promotion Expectations[a]	-.2123*** (.0239)	-.0843	-.211*** (.0328)	-.0838	-.6628*** (.074)	
Female	.1548*** (.0261)	.0613	.1559*** (.0325)	.0618	.1138* (.0647)	
(Low Chances of Promotion)*Female	.		-.0026 (.047)	-.0231	.1825* (.1021)	
(Pot. Experience)*Female	.		.		.0162 (.017)	
(Pot. Experience)^2*Female	.		.		-.0007 (.0008)	
(Pot. Experience)*Low	.		.		.0988*** (.0181)	
(Pot. Experience)^2*Low	.		.		-.0034*** (.0008)	
(Pot. Experience)*Low*Female	.		.		-.0639** (.0262)	
(Pot. Experience)^2*Low*Female	.		.		.0029** (.0012)	
Stayed Married	.4807*** (.0321)	.1833	.4808*** (.0321)	.1833	.4821*** (.0321)	.1872
Single-Married	.312*** (.0505)	.1219	.312*** (.0505)	.1219	.3024*** (.0506)	.1196
Married-Single	.1831** (.0796)	.0724	.1831** (.0796)	.0724	.1821** (.0794)	.0725
Non-White	-.0073 (.0295)	-.0029	-.0073 (.0295)	-.0030	.0035 (.0295)	.0014
Constant	-.9031*** (.0817)		-.9037*** (.0823)		-.7655*** (.0873)	
Predicted Probability at $\overline{X}$	.5118		.5116		.479	
Observations	16394		16394		16394	
ρ	.2211		.2211		.2183	
Log-Likelihood	-10365.49		-10365.49		-10326.6	
χ^2 statistic	1298.822		1298.843		1353.493	
Groups	7903		7903		7903	

Standard errors are in the parentheses. *,**,*** represent significance at the 90%, 95%, and 99% levels, respectively. For the continuous variables, the marginal effect reported is the mean of the marginal effects in the sample. In the case of dummy variables, the marginal effect is calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the dummy variable set to 1 and 0, respectively.[a]Individuals are classified as having low expectations if they thought a promotion was not likely in survey years 1979-1982 or they thought a promotion was not possible in the next 2 years in survey years 1996 or 1998.

Table 4.5: Triple Difference Marginal Effects

Base Probabilities			
Experience Level	-1 s.d.	mean	+1 s.d.
Men - Low	.403	.47942	.4927
Men - High	.5586	.47898	.5092
Women - Low	.4699	.4916	.556
Women - High	.6193	.5579	.5659

Low vs. High Promotion Expectations			
Experience Level	-1 s.d.	mean	+1 s.d.
Women	-.1493	-.0662	-.0098
Men	-.1555	.0004	-.0164

Women vs. Men			
Experience Level	-1 s.d.	mean	+1 s.d.
Low	.0669	.0122	.0633
High	.0607	.0789	.0567

The marginal effects are calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the set of dummy variables set to 1 and 0, respectively.

Table 4.6: Random Effects Probit Estimation Staying on a Job by Time Period

	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$	Coefficient	$\phi(\overline{X}\widehat{\beta}) * \widehat{\beta}_i$
In MSA	-.1168***	-.0465	-.1548***	-.0608	-.0978**	-.0239
	(.0447)		(.0505)		(.0421)	
Number of Children	-.3232***	-.1160	-.0240	-.0080	-.0446**	-.0158
	(.0658)		(.0164)		(.0183)	
Education	.0641***	.0230	.0443***	.0148	.0066	.0023
	(.0131)		(.0139)		(.0106)	
AFQT	.0000	.0000	-.0005	-.0002	.0003	.0001
	(.0009)		(.001)		(.0008)	
Log Hourly Wage	.5229***	.1876	.4591***	.1529	.449***	.1590
	(.0497)		(.0369)		(.0356)	
Potential Experience	-.0404	.0066	-.0169	.0153	-.0575***	-.0044
	(.079)		(.0647)		(.0165)	
(Potential Experience)^2	.0125		.0018		.0023***	
	(.0095)		(.0019)		(.0007)	
Low Promotion Chances	-.6684***		-2.547***		-.6184***	
	(.1764)		(.857)		(.0896)	
Moderate Promotion Chances	-.1352		.		.	
	(.1733)					
Female	-.2184		.1246		.1067	
	(.1963)		(.8411)		(.0828)	
(Low Chances)*Female	.1994		3.1252**		.2143	
	(.2508)		(1.2796)		(.1317)	
(Moderate Chances)*Female	.2220		.		.	
	(.2579)					
(Pot. Exp.)*Female	.3004**		.0118		.0277	
	(.1334)		(.0981)		(.0247)	
(Pot. Exp.)^2*Female	-.0402**		-.0005		-.0014	
	(.0188)		(.0028)		(.0012)	
(Pot. Exp.)*Low	.0847		.3222***		.0912***	
	(.1063)		(.0992)		(.0239)	
(Pot. Exp.)^2*Low	-.0089		-.0098***		-.0031***	
	(.0129)		(.0028)		(.0011)	
(Pot. Exp.)*Moderate	.0011		.		.	
	(.1025)					
(Pot. Exp.)^2*Moderate	-.0043		.		.	
	(.0123)					
(Pot. Exp.)*Low*Female	-.1715		-.4153***		-.0759**	
	(.1679)		(.1487)		(.0374)	
(Pot. Exp.)^2*Low*Female	.0322		.013***		.0035**	
	(.0232)		(.0043)		(.0017)	
(Pot. Exp.)*Moderate*Female	-.2084		.		.	
	(.1745)					
(Pot. Exp.)^2*Moderate*Female	.0365		.		.	
	(.0245)					
Stayed Married	.6652***	.2483	.5211***	.1811	.4527***	.1759
	(.0703)		(.0456)		(.0441)	
Single-Married	.2826***	.1115	.3581***	.0703	.2747***	.1087
	(.0688)		(.0868)		(.0686)	
Married-Single	.1183	.0472	.1872**	.1298	.2082*	.0827
	(.2722)		(.0946)		(.1101)	
Non-White	.0411	.0164	-.0485	-.0189	.0216	.0086
	(.0436)		(.0452)		(.0384)	
Const.	-1.4674***		-1.6599***		-.6445***	
	(.1945)		(.6191)		(.1149)	
Predicted Probability at $\overline{X}$	.4934		.5983		.4859	
Observations	6966		9428		8695	
ρ	.2187		.4121		.1544	
Log-Likelihood	-4454.005		-5756.515		-5431.279	
χ^2 statistic	462.9645		413.2975		832.5092	
Groups	4902		5845		2844	

Standard errors are in the parentheses. *,**,*** represent significance at the 90%, 95%, and 99% levels, respectively. For the continuous variables, the marginal effect reported is the mean of the marginal effects in the sample. In the case of dummy variables, the marginal effect is calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the dummy variable set to 1 and 0, respectively.[a] Dual Sample refers to individuals that appear in both time periods.

Table 4.7: Triple Difference Marginal Effects 1979-1982

Base Probabilities

Experience Level	-1 s.d.	mean	+1 s.d.
Men - Low	.2674	.2962	.3324
Men - Moderate	.4395	.431	.4375
Men - High	.494	.4934	.5165
Women - Low	.2944	.3836	.4706
Women - Moderate	.4694	.51	.5586
Women - High	.4935	.5983	.6487

Low vs. High Promotion Expectations

Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Women	-.1991	-.2147	-.1781
Men	-.2266	-.1972	-.1841

Low vs. Moderate Promotion Expectations

Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Women	-.175	-.1264	-.088
Men	-.1721	-.1348	-.1051

Moderate vs. High Promotion Expectations

Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Women	-.0241	-.0883	-.0901
Men	-.0545	-.0624	-.079

Women vs. Men

Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Low	.027	.0874	.1382
Moderate	.0299	.079	.1211
High	-.0005	.1049	.1322

The marginal effects are calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the set of dummy variables set to 1 and 0, respectively.

Table 4.8: Triple Difference Marginal Effects 1996-1998

Base Probabilities			
Experience Level	-1 s.d.	mean	+1 s.d.
Men - Low	.551	.6193	.6147
Men - High	.5452	.5983	.6651
Women - Low	.5652	.613	.6948
Women - High	.6149	.658	.7092

Low vs. High Promotion Expectations			
Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Women	-.05	-.045	-.0944
Men	.0058	.021	-.0503

Women vs. Men			
Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Low	.0142	-.0062	.0801
High	.0696	.0597	.0441

The marginal effects are calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the set of dummy variables set to 1 and 0, respectively.

Table 4.9: Triple Difference Marginal Effects
Individuals in Both Samples

Base Probabilities			
Experience Level	-1 s.d.	mean	+1 s.d.
Men - Low	.411	.4783	.4973
Men - High	.5772	.4859	.51
Women - Low	.4969	.4903	.5344
Women - High	.6401	.5766	.5483

Low vs. High Promotion Expectations			
Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Women	-.1432	-.0863	-.0139
Men	-.1662	-.0076	-.0127

Women vs. Men			
Experience Level	*-1 Std. Dev.*	*Mean*	*+1 Std. Dev.*
Low	.0859	.012	.0371
High	.0629	.0907	.0383

The marginal effects are calculated as $\Phi(\overline{X}_{d=1}\widehat{\beta}) - \Phi(\overline{X}_{d=0}\widehat{\beta})$ where $d = 1$ and $d = 0$ represent the set of dummy variables set to 1 and 0, respectively.

Chapter 5

Conclusions

In the United States, self-employment among the civilian non-agricultural civilian labor force declined from the 1920s to the early 1970s. Since then, the incidence of self-employment has been increasing. Although the rate of self-employment is higher among men than among women, it seems clear that the increased rate of self-employment since the 1970s is primarily a consequence of women selecting into self-employment. This period happened to coincide with an era of rapidly increasing health care costs.

There are two features of the health care system - one which is characteristic of any health care industry in the world and another which is specific to the economy of the United States - that suggest that there is a linkage between health care costs and households' choice of employment sector in the United States. Because there is asymmetric information about expected medical costs of those purchasing health insurance, individual choice over health insurance policies may result in risk-based sorting across plans. This phenomenon, called adverse selection, is a feature of any health care industry. In the United States, health insurance is predominantly employment-based, which allows employers to pool the health risk of their employees and obtain

lower health insurance premia from health insurance companies. Moreover, employment-based health insurance enjoys a tax subsidy that is not available to workers outside the wage-salary sector. Thus, the health insurance premia facing workers in wage-employment tend to be significantly lower than those facing workers in self-employment. This price wedge is likely to distort the employment sector choices of households.

The second and third chapters of my dissertation examine how differences in health insurance premia between the wage-employment and self-employment sectors impact labor supply to the two sectors. The second chapter is a theoretical paper. Here I describe a simple model in which the choice of employment sector is determined jointly by household members. In this model, everyone demands health insurance but the health insurance premium differs between the two sectors. Households take the compensation package offered by the wage-salary sector as given, and make employment-sector choices to maximize total household utility. I address the following question: How does employer-provided health insurance influence a household's choice of employment sector - wage employment versus self-employment? I show that when there is a price wedge for health insurance between the self-employment and wage-employment sectors, labor supply to the self-employment sector is smaller, relative to the case where there is no price wedge. Thus, the price wedge causes a distortion in the assignment of workers between the two sectors. I also show that the extension of employer-provided health benefits to dependents outside the firm through a family health plan enables married cou-

ples to effectively eliminate the price wedge. I extend this model to include the insurance-purchase decision for single workers. In this model, in addition to choosing which sector to work in, workers also decide whether to purchase health insurance or not. I use standard results in the 'adverse selection' literature to illustrate how pooling the health risk over the subset of workers who choose to buy insurance raises the insurance premium, relative to the case where the risk-pooling is over all the workers in the firm. Moreover, firms can capture economies of scale by getting as many workers as possible to participate in the group health insurance that they offer. This result could explain why firms might prefer to include health benefits as part of the compensation package to all workers, instead of making the choice of health coverage optional.

There are two extensions to this model that I believe can give us some interesting and testable predictions. The first is to incorporate the number of hours worked into the worker's decision problem and to introduce two inputs into the firm's production process - the number of workers and hours per worker. This extension will allow me to examine the effect of changes in health insurance costs on hours worked. Another extension is to allow workers' preference for flexibility to be correlated with their valuation of health insurance.[1] If firms have differential costs to offering health insurance to workers, then one can examine the equilibrium sorting of different types of workers to different types of firms, and the size distribution of firms.

[1]For instance, a single mother with a young child is likely to be a (high θ, high γ) type.

In the third chapter, my focus of study has been the effect of the husband's employer-provided family health insurance on the wife's propensity to select into self-employment. A number of papers have found an association between a married woman's labor supply behavior and spousal health insurance. A consistent finding in the literature on women's self-employment in the U.S. since the mid-1970s is the predominance of married women in this sector. While numerous papers have remarked on the relationship between spousal health insurance and a married woman's propensity to select into self-employment, no clean test of this linkage was established. The Tax Reform Act of 1986 (TRA86) provides us with an opportunity to test this linkage. The TRA86 introduced a tax subsidy for the self-employed to purchase health insurance. At the same time, it disqualified self-employed individuals who were already enjoying health insurance benefits through a spouse from taking advantage of the subsidy. Since the effect of the tax subsidy was to lower the after-tax price of health insurance for those among the self-employed who were purchasing their own health insurance, I predict that this subsidy increased the incidence of self-employment among single women.

My estimates suggest that health insurance coverage through the spouse biased a married woman's employment sector choice strongly towards self-employment in the pre-TRA86 period. Moreover, the incidence of single women in self-employment went up significantly in the post-TRA86 period, after controlling for the effect of health insurance coverage through the spouse. This finding supports my hypothesis that the decrease in the price of health

insurance through the tax subsidy induced more single women to select into self-employment in the post-TRA86 period relative to married women. In summary, my findings suggest that in the pre-TRA86 period, the high cost of health insurance created a price wedge between women who enjoyed health insurance coverage through their spouse's health plan and those who did not. Women who had a preference for working in the self-employment sector and who enjoyed spousal health benefits were able to exercise their preference and select into self-employment. On the other hand, for women with a preference for the self-employment sector but constrained to purchase their own health insurance, it was too costly to opt for this sector. For these women, the TRA86, by narrowing this price wedge, lowered the price of selecting into their desired sector of employment.

One limitation of this chapter is that I restrict my study to women who have chosen to be in the labor force. Although women's labor force participation has been rising steadily over the last few decades, a substantial fraction of working-age women still choose to stay out of the labor force. It is possible that the availability of spousal health insurance also impacts the decision about participating in the labor force. It would therefore be fruitful to extend the analysis in chapter 3 to a two-stage analysis: in the first stage, women decide whether to join the labor force or not. If they decide to participate in the labor force, they choose between self-employment and wage-employment. This kind of analysis will address issues regarding selection, in addition to the effect of spousal health insurance on employment sector choices.

In the fourth chapter (joint with Richard Prisinzano), we examine differences in job turnover patterns between men and women. We expect to see job turnover when promotion opportunities on the job are low. Accordingly, we study the relationship between individuals' expectations of promotion on their jobs and their turnover behavior. We examine how this relationship varies between men and women and between more and less experienced workers. It is our hypothesis that early on in their careers, women who are strongly committed to a career are more likely to stay on in their jobs, regardless of promotion opportunities, in a bid to signal their commitment to the labor force. However, once women have acquired adequate labor market experience and their commitment to the labor force is no longer in question, we predict that their turnover behavior will be more responsive to career opportunities and will be similar to that of men. Using the 1979 National Longitudinal Survey of Youth (NLSY), we find that men and women differ in their response to promotion expectations. Specifically, we find that early in their career women with low promotion expectations are more likely to stay on a job than corresponding men. We also find that this difference diminishes with experience.

Our results suggest that women who are committed to the labor market stay on in jobs which have little or no prospects for growth early in their career because of the need to signal their commitment to their employer. Thus, signalling is a costly activity and leads to inefficient outcomes; women are under-employed on their job in the early stages of their career. An obvious extension to this chapter is to examine whether women experience a faster

career growth once they have successfully signalled their attachment to the labor market. Once firms come to believe that these women are serious about their careers, they should respond by placing these women in positions that match with their abilities. If this is the case, we should expect to see women getting promoted more rapidly than men of comparable characteristics at later stages in their career path. This is a topic that merits research.

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