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Taxes, Health Insurance and Women's Self-Employment

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Abstract

I examine whether the availability of health coverage through the spouse's health plan influences a married woman's decision to become self-employed. 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. The most conservative difference-in-difference estimates based on an analysis of employed women indicate that the incidence of self-employment among single women rose by 10% in the post-TRA86 period, while a multinomial specification based on a sample of both employed and non-employed women suggests that the increase was about 13%.

JEL Classification: J0,J3,I1

Keywords: Health Insurance, Self-Employment

1 Introduction

The incidence of self-employment increased in the United States since the mid-1970s, both among men and women. Unincorporated self-employment rose from 6.9% in 1970 to 7.5% in 1990 (Hipple, 2004). This phenomenon is well-documented by Blau (1987), Devine (1994a, 1994b), Lombard (2001), Hipple (2004) and many others. Devine (1994a) reported a 3 percentage-point increase in female self-employment between 1975 and 1989, while the male self-employment rate registered a 2 percentage point increase over the same period. Her data is reproduced in Table 1. While there was some controversy over whether this represented a sustained increase for men, there was a general consensus that this represented a long-term trend for women, with the self-employment rate increasing both absolutely and relative to total female employment (Budig, 2003). Moreover, Devine (1994a) and Lombard (2001) emphasized 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 simply be a consequence of their labor force participation, which rose from 43% in 1970 to 58% by 1990, according to the Bureau of Labor Statistics (BLS).¹ Moreover, the share of employment in the service sector rose from around 16% in 1970 to 24% in 1984 (Personick, 1985). This large increase in service sector employment expanded the opportunities for self-employment, thus potentially accounting for the relative increase in self-employment rates. These factors were, however, common to most industrialized economies and yet, trends in self-employment were far from uniform across these countries.

Schuetze (1998) documented declines as well as increases in self-employment rates across OECD countries during the 1970s and 1980s. He compared male non-primary self-employment rates in Canada and the United States during the 1983-1994 period. These two countries are similar in terms of the overall institutional structure, including labor markets, but differ considerably in their income tax policies and macroeconomic conditions. Importantly, Canada had increasing income tax rates and a deteriorating macroeconomic environment relative to the U.S. over this period. His data indicate that self-employment rates for prime-age males

¹<http://www.bls.gov/opub/med/2007/jan/wk2/art03.txt>, and <http://www.bls.gov/opub/working/data/chart3.txt>

were higher in Canada than in the U.S. during this period. Moreover, the self-employment rate for this group fell in the U.S. while it increased in Canada. Thus, he argues that country-specific or region-specific factors were primarily responsible for the evolution of self-employment rates. One institutional feature that sets the U.S. apart from other OECD countries is the linkage between the labor market and health care provision.

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 (Cutler, 2002). 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 both income and payroll taxes. On the other hand, employee contributions for health insurance are paid with after-tax dollars.² Thus, employers have an incentive to finance insurance premium costs rather than shift these costs to employees. This is especially the case in large companies where employers have greater bargaining power with insurance companies, and risks can be spread over more people.³ Even if employees bear the full incidence of these costs in the form of lower wages, group rates of insurance offered by employers are substantially below individually-purchased insurance rates due to adverse selection in insurance markets.⁴

The above factors make the after-tax price of employer-provided health insurance substantially lower than the price of individually-purchased health insurance. These features, in effect, create a wedge in the price of health insurance between the wage-employment sector on the one hand, and the self-employment and non-employment sectors on the other. This price wedge is likely to create a distortion in employment-sector decisions; for some workers who have a preference for being self-employed, the price of selecting into their desired sector

²The only exception is where employers offer Section 125 plans, also known as ‘cafeteria plans’, that are specifically excluded from the calculation of gross income for federal income tax purposes.

³Brown *et.al.* (1990) found that small firms were less likely to offer health insurance or pension benefits. Moreover, three-fourths of workers without health insurance coverage worked for firms with fewer than 500 employees.

⁴Adverse selection obtains when individuals’ demand for health insurance is positively correlated with their underlying health risk, which is not fully revealed to the insurer. This information asymmetry induces risk-based sorting into health insurance plans.

of employment may be too high. Married couples, however, have the opportunity to appropriate the surplus created by the price wedge; health coverage through the spouse's health insurance plan allows married workers who enjoy this benefit to effectively eliminate the price wedge. This could explain the predominance of married women in self-employment.

This problem is important because the U.S. labor market is perceived as a very flexible market relative to that of other industrialized countries, 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. Thus, in addition to the problem of adverse selection in insurance markets, the prevalence of the system of employer-provided health insurance with the associated tax advantages imposes a cost on individuals opting for flexible work schedules, in the form of higher after-tax prices for health insurance.⁵ Increases in the cost of health insurance can widen this price wedge and affect an individual's choice of employment sector.

There is an extensive literature on the effect of employment-based health insurance on various labor market outcomes⁶ Notably, there is compelling evidence that insurance has a significant effect on the timing of retirement; individuals with post-retirement health insurance provided by their employer are likely to retire much earlier than those without such insurance. The literature on 'job-lock' suggests that health insurance plays an important role in the job-mobility decisions of individuals. Moreover, the effect of this form of insurance on the labor supply decisions - mainly hours of work - of secondary earners is also well established.⁷ However, there has been very little research on the effect of employment-based insurance on households' choice of employment sector.⁸ This neglect is surprising, given the sharp increase in self-employment rates since the mid-1970s. One of the reasons for the absence of convincing empirical evidence on this relationship is the difficulty in finding an exogenous source of variation in health insurance prices.

⁵Holtz-Eakin et.al. (1996) state that for comparable insurance plans and benefits, small businesses and the self-employed pay 10%-40% more in health insurance costs, relative to those in wage-salary employment.

⁶Gruber and Madrian (2002) review the literature.

⁷See Buchmueller and Valletta (1999), for example.

⁸Fairlie *et.al.* (2008) and Gumus and Regan (2009) are notable exceptions.

The Tax Reform Act of 1986 (TRA86) provides an opportunity to isolate the effect of the price of health insurance on employment-sector choices. TRA86 introduced a tax subsidy for the self-employed to purchase their own health insurance. This subsidy effectively lowered the after-tax cost of health insurance for the self-employed. However, individuals enjoying health coverage through the insurance plan of a family member could not avail of this benefit. Using the Current Population Survey (CPS) data for the relevant period, I therefore test whether this policy change induced more women without spousal health coverage to select into self-employment.

The paper is organized as follows: in Section 2, I discuss the methodological issues that arise in estimating the impact of spousal health benefits on 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 concludes.

2 Health Insurance and the Tax Reform Act 1986

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 non-itemizing 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). Four other papers examine the linkage between women's employment-sector choices and spousal health insurance.

Using cross-sectional data from the Current Population Survey (CPS) for the 1975-87 period, Devine (1994a, 1994b) found that self-employed women were more likely to be married, to be covered by someone else's health plan and to work non-standard hours. Using the same data source for a later period, Lombard (2001) found that women's likelihood of self-employment rises with health coverage through the spouse. Wellington (2001) also used the CPS to estimate the impact of health insurance coverage through the spouse on the

probability of self-employment, and found evidence of a positive association between these variables. None of these papers examine the effect of the price of health insurance on the decision to become self-employed.

If there are no unobserved factors affecting the employment-sector decisions of households, then using cross-sectional variation in spousal health insurance coverage, after controlling for other observed characteristics, would correctly identify the effect of the price of health insurance on self-employment propensities. However, if there are factors affecting spouses' employment sector decisions that are not observed by the econometrician, then these estimates are likely to be biased.

For instance, it is possible that the observed pattern of assignment of married workers across employment sectors is driven by heterogeneity in the taste for risk. A married household that is maximizing joint household utility may have one spouse taking up a risky entrepreneurial venture with the objective of making higher returns relative to the wage-salary sector, with the other spouse working in the less risky wage sector and providing a stable income. On the other hand, a more risk-loving couple may decide that the benefits of flexibility and higher potential returns in self-employment outweigh the costs of higher risk. If employment sector decisions are based purely on these risk-return trade-offs, changes in the price of health insurance may not have a sizeable effect on shifting workers across sectors. We thus need a methodological approach that allows us to disentangle these effects.

Fairlie *et.al.*(2008) examine whether the system of employer-provided health insurance in the U.S. has impeded entrepreneurial activity, a situation they refer to as 'entrepreneurship lock'. They examine transitions from wage-employment to self-employment using CPS data, as a function of family health status and access to alternative health insurance options. They also exploit the discontinuity in health insurance coverage at age 65 created by Medicare, studying entrepreneurship behaviour of individuals below age 65 to those above. Using this strategy, however, it is difficult to disentangle the price effect of health insurance from a preference to transition into retirement gradually by working fewer hours, which is afforded by self-employment.⁹ For this reason, a natural experiment like the TRA86 is potentially a better instrument for identifying the price effect of health insurance on the propensity for

⁹See Zissimopoulos *et.al.* (2007) and Giandrea *et.al.* (2008), for instance.

self-employment.

The TRA86 introduced a tax subsidy on health insurance purchases by the self-employed. After this reform, self-employed individuals who itemized their income-tax deductions could claim a tax deduction for 25% of their health insurance costs. This subsidy therefore lowered the after-tax price of health insurance for those self-employed individuals who itemized their deductions. Gurley-Calvez (2006) examined whether the TRA86 health insurance subsidy decreased the exit rate from self-employment. Using panel data from the University of Michigan Tax Research Database, she defined the self-employed as those who filed a Schedule C along with their tax return. Schedule C lists income and expenses related to self-employment and is used by sole proprietors, who are most likely to be eligible for the health insurance deduction. Using this definition, she found that the rate of exit from self-employment decreased following TRA86. Besides, the effect was much more sizable for single individuals. She estimated an elasticity of -1.06 for single filers and -0.12 for married filers.

Gruber and Poterba (1994) calculated the average after-tax price of health insurance relative to self-insurance, for employed and self-employed individuals before and after TRA86. Their calculations are presented in Table 2 and reveal that the after-tax price reductions were significant for the self-employed but negligible for those in wage-employment. For the high-income self-employed, the price reduction was in excess of 10%. However, since the subsidy was restricted to those who were not eligible for health coverage through the spouse, it is only this group of workers that received the ‘treatment’. Hence, the demographic group that was most likely to respond to the subsidy was single individuals. Consistent with their prediction, they found that health insurance take-up increased considerably among single, self-employed individuals after TRA86 was introduced. They estimated the price elasticity of demand for insurance to be -1.8.

In this paper, I estimate the effect of TRA86 on a different outcome: the propensity for self-employment. I test whether a greater proportion of single workers and married workers with no access to spousal health insurance coverage, selected into self-employment after TRA86. Figure 1 plots self-employment rates for men and women between 1979 and 2004, using data from the March supplement files of the Current Population Survey (CPS). There is a discernible increase in self-employment rates for both men and women following the TRA86.

However, I focus on women because women’s health insurance coverage and employment decisions are likely to be more endogenous with respect to their spouse’s compensation package, compared to those of men.¹⁰

One major challenge arises in using the TRA86 experiment to estimate the effect on employment sector choices. In addition to introducing the tax subsidy for the self-employed, TRA86 also lowered marginal tax rates significantly. If this is the primary reason for the trend increase in self-employment that Figure 1 reflects, then I may be wrongly attributing these increases to the change in the price of health insurance implied by the tax subsidy. I address this concern and present evidence suggesting that lowered marginal tax rates are not the primary source of my findings.

3 Data and Descriptive Statistics

I use the March Current Population Survey (CPS) data, which 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.

I match the March and May CPS files for 2 years - 1984 and 1985 - to create a sample of women for the pre-TRA86 period. This way, I get all the data on labor force and personal

¹⁰A series of amendments made to the TRA86 between 1996 and 2003 gradually increased the tax credit for health insurance purchases by the self-employed, from 25% to 100%. These changes were not accompanied by changes in the marginal tax rate schedule. Gumus and Regan (2009) examine the impact of these amendments on entry and exit rates into self-employment, and on the propensity to be self-employed among men. They find significant but small effects on entry, but no effects on exit rates or on the likelihood of being self-employed. Self-employment over the 1993-2003 period does not exhibit an increasing trend; male self-employment actually declined over this period, as Figure 1 reveals. Moreover, the gradual nature of the increase in subsidy over this period makes it difficult to identify significant changes in trend that can be attributed to the subsidy. For this reason, I consider the impact of the original TRA86 subsidy, which was discrete and sizable, relative to the 1996-2003 amendments.

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)) find 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.

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 employer. I matched the husband-wife pairs in the data and used the responses to these questions to ascertain whether a married woman's spouse had employer-provided health insurance coverage.¹¹ A married woman whose spouse has health insurance coverage through his employer is more likely to be covered under the same plan. Therefore, this variable proxies for the price of health insurance; women whose spouse has an employer-provided health plan can be thought of as paying a smaller price for selecting into self-employment, relative to women whose spouse does not have coverage.

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. To keep the data consistent across the two periods, I use the labor force information pertaining to the week prior to the survey. I focus on women aged between 18 and 64, who are employed in civilian, non-agricultural occupations or not employed. Individuals reporting themselves to be self-employed on their main job during the week prior to the survey are

¹¹Individuals who respond in the affirmative to whether they have employer-provided health insurance are asked whether their spouse and children are also covered by the same policy. Thus, it is possible to determine whether a married woman has coverage under her husband's employer-provided health insurance plan. However, to mitigate the endogeneity of insurance coverage, I only use the husband's own coverage status as a covariate.

classified as self-employed.

The subsidy introduced by TRA86 was more valuable for some members of the treatment group than to others - those facing higher income taxes. I make use of this variation to examine the differential effects of marginal tax rates on self-employment. I estimate the federal marginal tax rates for the individuals in my sample using the NBER's TAXSIM programme. To mitigate the endogeneity of tax rates with respect to the employment decision, the estimates are based on marital status and the number of dependent children only. In the case of married women, the tax rates are estimated with respect to their husband's earnings.

Table 3 records employment status by marital status. While self-employment rose among all marital groups over the two time periods, the largest increase was among married women with no access to spousal health insurance coverage, followed by single women. In contrast, the incidence of wage-employment decreased among these two groups, while it rose among married women with access to spousal health coverage. The change in self-employment among married women with access to health insurance and the change in paid employment among married women with no access to health insurance are not significant. All other changes are significant.

Table 4 gives the characteristics of employed women in the two time periods, 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. Average educational attainment increased for all women over the two time periods. The predominance of white women in self-employment has also been noted by Devine (1994a) and Lombard (2001), and is clearly reflected in Table 4.

The CPS does not collect any information on household assets. However, it does include family income from sources other than earnings. This variable can be used to proxy for family wealth, to control for liquidity constraints that might restrict women's choice of employment sectors (Evans and Jovanovic, 1989). I create an indicator variable that equals 1 for individuals whose annual family non-earnings income in real terms was over \$50,000, and 0 for whom it was \$50,000 or less.¹² The fraction of self-employed women with non-earnings

¹²The motivation for using an indicator variable based on a threshold, instead of using the actual reported income is to overcome measurement error. See for instance, Bollinger (1998).

family income over the defined threshold is about three times more than the corresponding fraction for those in wage-employment, in both time periods. The differences by marital status are also dramatic.

Self-employment among single women increased by over 6 percentage points between the two time periods. However, a notably higher proportion of self-employed women are married, constituting over 75% of all self-employed women in each of the two time periods. Among the sub-sample of married women, over half the fraction of self-employed women have a spouse who is covered by his employer-provided health plan. This fraction is lower among married women in wage employment. This suggests that the cost of health insurance may be an important determinant of the employment-sector decision. At the same time, a large fraction of self-employed women's spouses are also self-employed. This fraction is significantly higher than the corresponding fraction for wage and salaried women in both time periods. This in turn suggests that household employment-sector decisions are also driven by preferences and not solely by the cost of health insurance. These patterns reinforce the argument that the joint distribution of employment-sector choices and spousal health insurance offers limited information on the relationship between health insurance prices and employment-sector choices. The tax reform act of 1986, by providing an exogenous source of variation in health insurance prices, allows us to potentially identify this relationship.

4 The Tax Reform Act of 1986 and Self-Employment

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 had access to health insurance coverage through their spouse. TRA86 explicitly 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). Therefore, this group serves as a good control group, and the difference-in-difference estimate of the impact of the insurance subsidy on the incidence of self-employment is given by the following

equation:

$$\Delta^2 = (SE_a^{1991} - SE_a^{1985}) - (SE_b^{1991} - SE_b^{1985}) \quad (1)$$

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. Thus, I use both cross-sectional variation - between women with potential health insurance coverage through their spouse versus women without - and the time-series variation - before versus after TRA86 - in order to identify the effect of the price of health insurance on self-employment propensities.

Two crucial assumptions underlie the approach adopted to identify the impact of TRA86 on self-employment propensities: (1) that trends in self-employment propensities for the treatment and control groups are equal in the absence of treatment, and (2) the economic environment over time has a similar impact on the labour-market behaviour of the two groups; underlying trends in outcomes that differ by demographic group will violate this assumption. I address these issues in Section 5.

Health insurance prices may impact not only the choice of employment sector but the labor market participation decision itself. For instance, Eissa (1995) estimated an increase in the labor force participation rate of high-income married women following TRA86, which she attributed to the lowering of marginal tax rates. This implies that the characteristics of women working in 1990-91 are likely to be quite different from those working in 1984-85, and failure to account for this might lead to a composition bias in estimates using the limited sample of employed women. It is therefore important to include the non-employed in the analysis and treat non-employment as a separate state. Thus, I also present estimates from a multinomial logit (MNL) model, by expanding my sample to include women who are not employed.

5 Results

In this section, I present estimates of the impact of the health insurance subsidy introduced by TRA86 on self-employment propensity, using the following comparison groups: (1) single

women and married women with no access to spousal health insurance coverage (two treatment groups) versus married women *with* access to spousal health coverage (control group); (2) single women (treatment group) versus married women (control group). I first estimate these differences using a sample of employed women only, and subsequently, using the entire sample of women, including the unemployed and those not in the labor force.

5.1 Single and Married Women with no Spousal Health Coverage Access, versus Married Women with Access

I calculate the double-difference estimates described in the above section for my first comparison groups, by running the following regression:

$$E_i = \alpha + \gamma_1(\text{Married, no health coverage}) + \gamma_2(\text{Single}) + \gamma_3(\text{Post Reform}) + \gamma_4(\text{Married, no health coverage} * \text{Post Reform}) + \gamma_5(\text{Single} * \text{Post Reform}) + \gamma_6 \cdot X_i + \varepsilon_i, \quad (2)$$

where $E_i = 1$ if the woman is self-employed and $E_i = 0$ otherwise, X_i is a vector of controls, ‘Married, no health coverage’ is an indicator variable which equals 1 if the woman is married but has no access to health coverage through her spouse¹³, ‘Single’ is an indicator for a single woman (never married, divorced, widowed or separated), ‘Post Reform’ is another indicator variable which equals 1 if the observation is from 1990-91 and equals 0 if it is from 1984-85 and ε_i is a normally distributed error term. Our control group here is married women with access to health coverage through their spouse. Since this is the group that remained unaffected by TRA86, we expect the self-employment incidence for all the ‘treatment’ groups to increase in the post-reform period. Thus, my prediction is that γ_4 and γ_5 are both positive.

The estimates in the second column of Table 5 are the marginal effects of control variables as well as difference-in-difference estimates of the effect of TRA86 on self-employment propensities, based on a probit regression. I calculate the marginal effects on the interaction terms using the method outlined by Ai *et. al.* (2004). I average the marginal effect

¹³In other words, her husband does not have an employer-provided health insurance plan

across individuals to get the average marginal effect. The Delta method is used to compute standard errors.¹⁴ The estimates of age, education, race, marginal tax rate, marital status and presence of dependents have the expected sign, and are all statistically significant. On average, single women and married women with no access to health insurance coverage through their spouse are, respectively, 5 percentage points and 2 percentage points less likely to be self-employed relative to married women with access to spousal health insurance. The estimate of family income is also noteworthy. Its effect is positive, sizeable and significant, suggesting that non-earnings income is an important determinant of self-employment.¹⁵

The marginal effects of the interaction terms are the difference-in-difference estimates. These estimates are positive and significant for both treatment groups. The marginal effects indicate that in the post-reform period, single women and married women who did not have access to spousal health insurance were 74% and 69% more likely to be self-employed respectively, relative to their corresponding pre-reform rates (0.0323 for single women and 0.0575 for married women with no access to spousal health coverage respectively). When measured as a fraction of the predicted probabilities of self-employment estimated by the regression (0.0706), the marginal effects imply a 34% and 56% increase in self-employment respectively among the two treatment groups, relative to the control group.

5.2 Single Women versus Married Women

One could argue that the above results are based on treatment and control groups that are endogenously determined. For example, the wife’s ability to obtain subsidized health insurance through her self-employment status could impact the husband’s decision to choose a job that offers health insurance versus one that does not. To get around this endogeneity, I next use marital status to divide up my sample into potential treatment and control groups. Single women represent the ‘uncontaminated’ sub-group of the treatment group for TRA86,

¹⁴Note that marginal effects based on the method proposed by Ai *et.al.* (2004) are smaller than those based solely on the interaction terms such as γ_4 and γ_5 in equation 2. There is some controversy regarding which of these methods captures the true treatment effect of a policy change (Puhani, 2008). I have chosen to report the more conservative estimates here.

¹⁵The results are robust to alternative thresholds.

since they cannot have access to spousal health coverage. I therefore estimate the effect of TRA86 on the self-employment probabilities of single women, relative to married women. I run the following regression:

$$E_i = \alpha + \gamma_9(\textit{Single}) + \gamma_{10}(\textit{Post_Reform}) + \gamma_{11}(\textit{Single} * \textit{Post_Reform}) + \gamma_{12}X_i + \varepsilon_i, \quad (3)$$

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 that equals 1 if the woman is single (never married, divorced, widowed or separated) and equals 0 if she is married, and all the other terms are as defined for the earlier specification. The coefficient γ_{11} measures the double-difference - the effect of the tax subsidy on single women’s propensity to be self-employed, relative to married women. Again, γ_{11} is predicted to be positive. The results are presented in column 3 of Table 5.

The differential effect of being single in the post-TRA86 period is indeed positive and significant. The marginal effect of 0.0078 indicates that single women in the post-TRA86 period were 24% more likely to take up self-employment relative to their pre-reform rate of 3.23%. This is a sizeable effect. The marginal effect implies a 10% increase in self-employment among single women, when measured as a fraction of the predicted probability of self-employment generated by the regression, 0.0811. These estimates are smaller than the difference-in-difference estimates in column 2. This is unsurprising since the control group (married women) includes those who were also eligible for the health insurance subsidy. We can potentially interpret these as lower bound estimates of the impact of the health insurance subsidy. The estimates of the other control variables are similar to those in the second column.

5.3 Robustness Tests

To address the first concern expressed in section 4 that underlying trends in self-employment may have been different among the treatment and control groups, Figure 2 plots self-employment rates for single and married women before TRA86 was introduced. As the graph reveals, both groups experienced similar trend growth in self-employment until TRA86. This

suggests that differential changes observed after TRA86 cannot be attributed to pre-existing trends. I also estimated Probit models of specifications based on equation 2 and equation 3, controlling for secular changes in outcomes.¹⁶ The estimates in Table 5 are robust to the inclusion of these secular trends. The results are not reported here.

Many studies have found that self-employment is more prevalent among older individuals. To test how the results vary by age, I estimate Probit models based on equation 2 for different sub-groups based on age. Panel A of Table 6 reports marginal effects on the variables of interest, including the difference-in-difference estimates, for different age groups in the sample. In column 2, estimates from Table 5 are reproduced, for comparison with the other sub-samples. The marginal effects for the 24-53 age group and the 54-64 age group are consistently higher than those based on the entire sample - this is the case both for the treatment group dummies as well as the difference-in-difference estimates. In the 24-53 age group, the difference-in-difference estimates of 0.0245 and 0.0418 represent a 34% and 57% increase in self-employment propensity for the two treatment groups respectively, when measured as a fraction of the predicted probability of self-employment (0.0731) from the estimated equation for that sub-group. The corresponding percentages for the 54-64 sub-sample are 46% and 63% respectively. Thus, the estimated effects are robust across different age groups, and bigger in the sample of older individuals.

To address the second concern expressed in section 4 that the economic environment over time may have had a different impact on the labour-market behaviour of the treatment and control groups, I re-estimate the Probit regressions for different age-groups as in Panel A, but add the following controls: each treatment group dummy is interacted with the male unemployment rate for the four time periods used in the analysis: 1984, 1985, 1990 and 1991. The male unemployment rate is used to proxy for business-cycle effects in each period. The interaction between this variable and the treatment dummy variables therefore allows for diverse business-cycle responses by the different demographic groups. The objective is thus

¹⁶Specifically, the indicator variable Post.Reform in equation 2 and equation 3 was replaced with three time/year dummy variables - one each for the years 1985, 1990 and 1991, with 1984 being the left-out category. These time dummies were in turn interacted with the treatment dummy variables. The results were very similar to those reported in Table 5 - for all treatment groups, self-employment increased in the years 1990 and 1991 relative to 1984, while the changes in year 1985 were inconclusive.

to examine whether the main results hold, even when we allow various groups to respond differently to the economic environment.

The results in Panel B of Table 6 indicate that the main results are robust to the inclusion of differential business cycle responses; the difference-in-difference estimates are bigger for single women and smaller for married women with no access to spousal health insurance, relative to the corresponding estimates in Panel A. Nevertheless, all estimates are positive and significant, suggesting that even after controlling for potentially different responses to the economic environment, the incentive effects of the health insurance subsidy introduced in TRA86 have the predicted impact on self-employment propensities.¹⁷

5.4 Impact of Lowered Tax Rates

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% while the decrease was less significant for those at the lower end of the income distribution (Feldstein, 1986). A lowering of tax rates increases the after-tax price of employer-provided health insurance, thus lowering the value of this form of insurance relative to self-insurance. However, the predominant effect of lowered tax rates is expected to be on labor supply, notably on the extensive margin; Eissa (1995) showed that the labor force participation of high-income married women increased after TRA86, as a result of the decrease in marginal tax rates. One concern that arises is that my findings might have very little to do with the price of health insurance and might simply reflect the fact that, following TRA86, lowered tax rates made employment in all sectors more attractive to women.

Figure 3 plots the trend in paid employment over the 1979-1989 period. The figure reveals no discernible change in the overall trend, following TRA86. Wage employment rates for men show a slight decline. While there is a slight upward trend in these rates for women, this increase is not as sharp as the trend in self-employment, suggesting that increases in self-employment rates after the reform were not driven by changes in the marginal tax rates alone. Hausman and Poterba (1987) estimated the distribution of changes in marginal tax

¹⁷I also estimated Probit models based on equation 3 for these different sub-groups based on age. The results were similar to those reported in Column 3 of Table 5, and are not reported here.

rates in the population, following the changes introduced by the TRA86. Their calculations are reproduced in Figure 4, and reveal that a very small share of households - around 11% - experienced a fall in the marginal tax rate in excess of 10%. For the majority of households, the decrease was modest. A sizeable share of households - around 14% - faced no change at all while a significant fraction actually experienced an increase in the rate facing them. Thus, while nearly 60% of households faced decreases in marginal tax rates, the decrease was extremely modest for the majority of these households.

Moore (2003) estimated the effect of lowered marginal and average tax rates on self-employment, using the tax reforms of 1986 and 1993 as natural experiments. While he reports a small negative effect of the 1986 reforms on self-employment, his results are not robust to alternate specifications and sample restrictions. He finds that other factors such as education, attitude towards risk and wealth seem more important in explaining self-employment decisions, relative to tax rates. He concludes that "...changing marginal tax rates does not seem to be the best policy tool for promoting self-employment." (Moore, 2003, p.25). Using aggregated individual data from seven decennial Censuses of Population in the U.S., Fairlie and Meyer (1998) also found no significant relationship between tax rates and self-employment.

Taken together, the various pieces of evidence cited above suggest that the effect of lowered income taxes on self-employment following TRA86, was likely to have been modest. To attribute the increased propensity for self-employment implied by the estimates in Tables 5 and 6 entirely to lowered marginal tax rates, one would have to argue that lowering income tax rates made self-employment more attractive to single women, while not changing the desirability of paid employment. This argument is difficult to support, as higher rates of self-employment are typically associated with high marginal tax rates, presumably because it is easier to under-report self-employment income relative to wage-salary income (Blau, 1987). Moore's (2003) results are consistent with this view. The negative and significant estimates of marginal tax rates in Table 5 also support this thesis.

5.5 Plausibility of Estimates

The net cost savings from the tax subsidy were presumably quite small, for most individuals. According to Gruber and Poterba's (1994) estimates using the NBER's TAXSIM model, less than half of self-employed tax filers in most income classes had availed of the deduction in 1988/89, though this share did increase over time. Gurley-Calvez's (2006) calculations using tax returns data show that the share of filers claiming the deduction increased by 4 percentage points from over 11% in 1988 to more than 15% in 1990. The average dollar value of deductions claimed also increased from \$427 to \$536. In 1988, a deduction of \$427 represented a tax savings of \$120 - or 7% of the premium total - for a household in the 28 percent marginal tax bracket. The question arises whether the increases in self-employment found here are plausible, given the magnitude of the decrease in net insurance costs.

According to Gruber and Poterba (1994), TRA86 led to a 6.8 percentage point increase in private insurance coverage among the self-employed (men and women), relative to the employed (Gruber and Poterba (1994), Table VI, p.720). One could imagine that this increased take-up was driven entirely by women who were already self-employed, with no increase in self-employment rates due to TRA86, giving us a lower bound of 0 for the impact of the TRA86 subsidy on self-employment. At the other extreme, this increased take-up could be accounted for entirely by new entrants into self-employment, with no change in the insurance status of those already self-employed when TRA86 was announced. This gives us an upper bound of 6.8 percentage points that can be attributed to the tax subsidy. The estimates in Tables 5, and 6 lie well within these bounds - between 1 and 4 percentage points - and thus provide confidence in the plausibility of the estimates.¹⁸

¹⁸Gruber and Madrian (2002), in their review paper, report a lower bound of 10% and an upper bound of 35% for the magnitude of 'job-lock'. My estimates of the impact of the TRA86 subsidy on self-employment are between 10% and 34% for single women, when measured as a fraction of the predicted probability of self-employment in the respective regressions. These estimates are thus consistent with those of the 'job-lock' literature as well, for this group.¹⁹

5.6 Multinomial Logit Estimates

The 1980s was a period of increasing labor force participation among women in the United States. Moreover, as discussed above, there is evidence suggesting that TRA86 increased female labor force participation, especially that of married women. In this section, I address the concern that restricting the sample solely to employed women could introduce a composition bias in the estimates. I expand the sample to include non-employed women and extend the analysis to incorporate all three employment-status outcomes - working in paid employment, self-employed and not-employed.²⁰

The effect of the TRA86 on self-employment is now estimated using a multinomial logit model, pooling data from before and after the tax reform. The results are presented in Table 7, which reports parameter estimates for the variables of interest, based on a specification that is analogous to equations 2 and 3. The relative risk ratios for wage-employment and non-employment are shown, relative to the self-employment outcome, along with the marginal effects for all outcomes. The top and bottom panels report estimates based on treatment and control groups as defined in equation 2 and equation 3 respectively.

The relative risk ratios in the top panel indicate that compared to married women with access to spousal health coverage, the two treatment groups - single women, and married women with no access to spousal health coverage - are, respectively, over two times and about 1.4 times more likely to be in paid employment than in self-employment, with substantial and significant marginal effects. In the post-reform period, however, single women and married women with no access to spousal health coverage were 9 percentage points and 16 percentage points *less* likely to be in paid employment respectively, relative to self-employment. Similarly, these two groups are also much less likely to be non-employed, relative to self-employment. The decrease in paid employment in the post-TRA86 period for the two treatment groups is offset by increases in self-employment and non-employment. The increase in self-employment is significant for both groups and implies a 26% and 31% increase for the two treatment groups respectively, as a function of the predicted probability of self-employment, 0.0559.

²⁰To minimize measurement error due to possible mis-coding of the unemployed and those out of the labor force, I combine both these categories into the non-employed category.

The bottom panel reports relative risk ratios for single women relative to married women, and these are similar to the ratios in the top panel. The marginal effects of the interaction term (Single*Post), -0.0155 and -0.0085, imply a 2% and 3% decrease in wage employment and non-employment respectively among single women after TRA86, relative to the corresponding predicted probabilities of 0.6849 and 0.2594. However, the marginal effect for non-employment is imprecisely estimated. The marginal effect of self-employment in the post-TRA86 period is 0.0071 for single women, implying a 13% increase relative to the predicted probability of that outcome, 0.0557. In summary, the results of the multinomial logit estimation are smaller than those of the corresponding Probit estimates. This is not surprising given that these estimates are based on the sample of employed as well as non-employed women. Nevertheless, they are qualitatively similar to the results based on the sample of employed women only.

6 Conclusions

In this paper, I study the effect of the husband's employer-provided family health insurance on the wife's propensity to select into self-employment. 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 be self-employed, the lack of an exogenous source of variation in health insurance prices made it difficult to convincingly test for a causal effect of insurance prices on employment-sector choices.

The Tax Reform Act of 1986 (TRA86) provides us with an opportunity to test this relationship. The TRA86 introduced a tax subsidy for the self-employed to purchase health insurance. Self-employed individuals who were already enjoying health insurance benefits through a spouse were excluded from this benefit. 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 this group of women.

My findings are in line with Gruber and Poterba (1994), who estimate large increases in

insurance take-up following the introduction of the tax subsidy in TRA86, especially among single individuals.²¹ My estimates indicate that health insurance coverage through the spouse strongly influenced a married woman's employment sector choice towards self-employment in the pre-TRA86 period. Moreover, the incidence of self-employment among single women went up between 10% and 34% depending on the specification, in the post-TRA86 period.

These findings support the hypothesis that the decrease in the after-tax price of health insurance through the tax subsidy lowered the cost of selecting into self-employment for those women who had no spousal health coverage. The findings in this paper suggest that in the pre-TRA86 period, the high cost of health insurance created a significant wedge in the price of health insurance between the wage-salary sector and self-employment. 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 some 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.

²¹Gumus and Regan (2007) also find a large response to health insurance prices among single women.

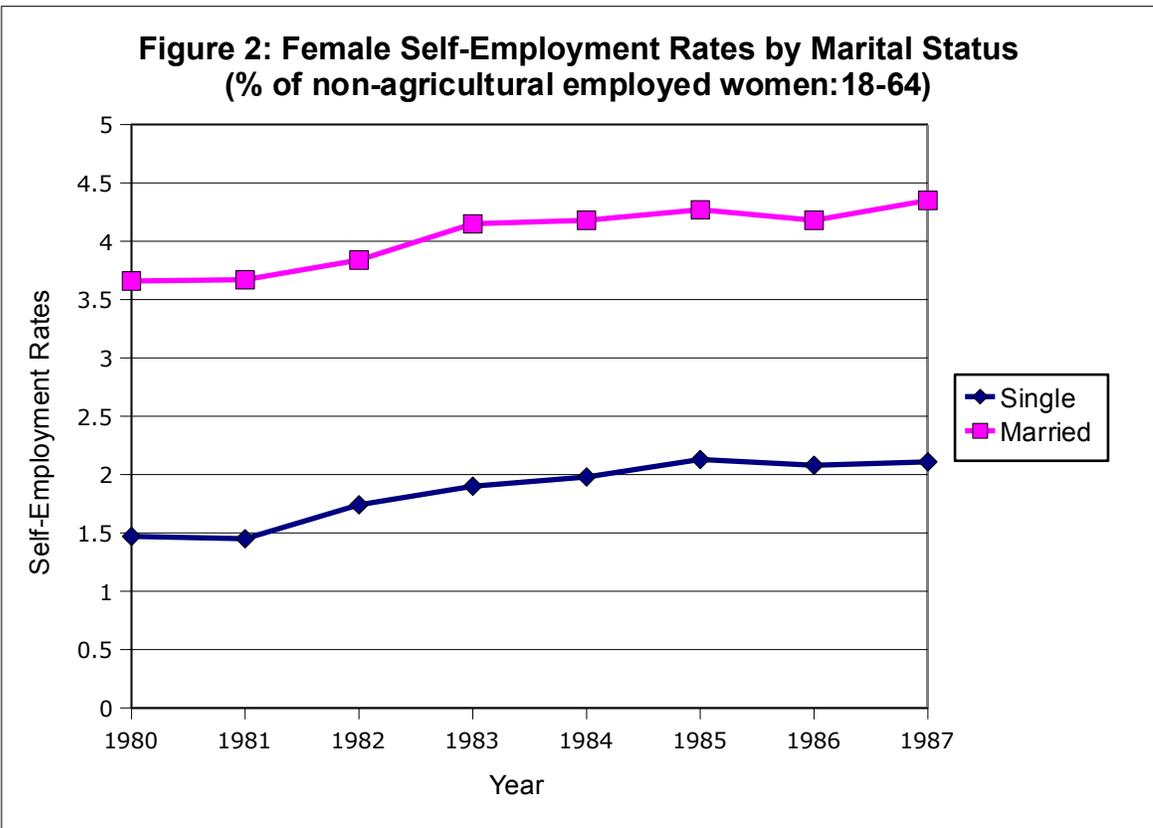
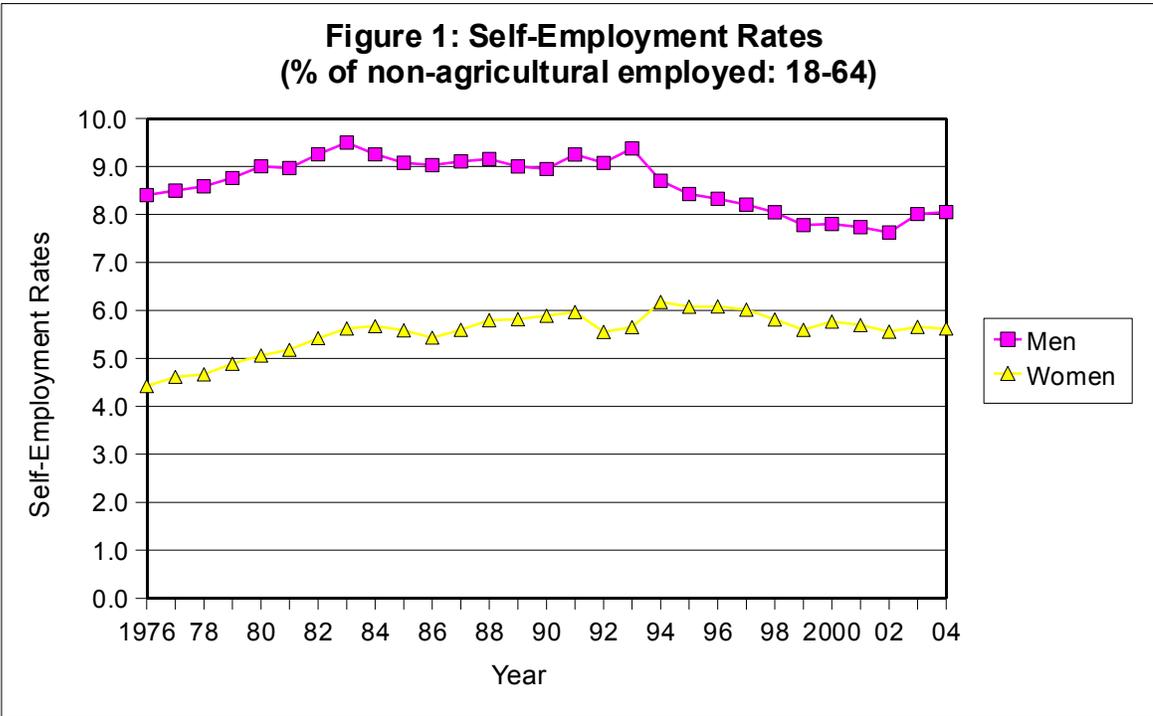
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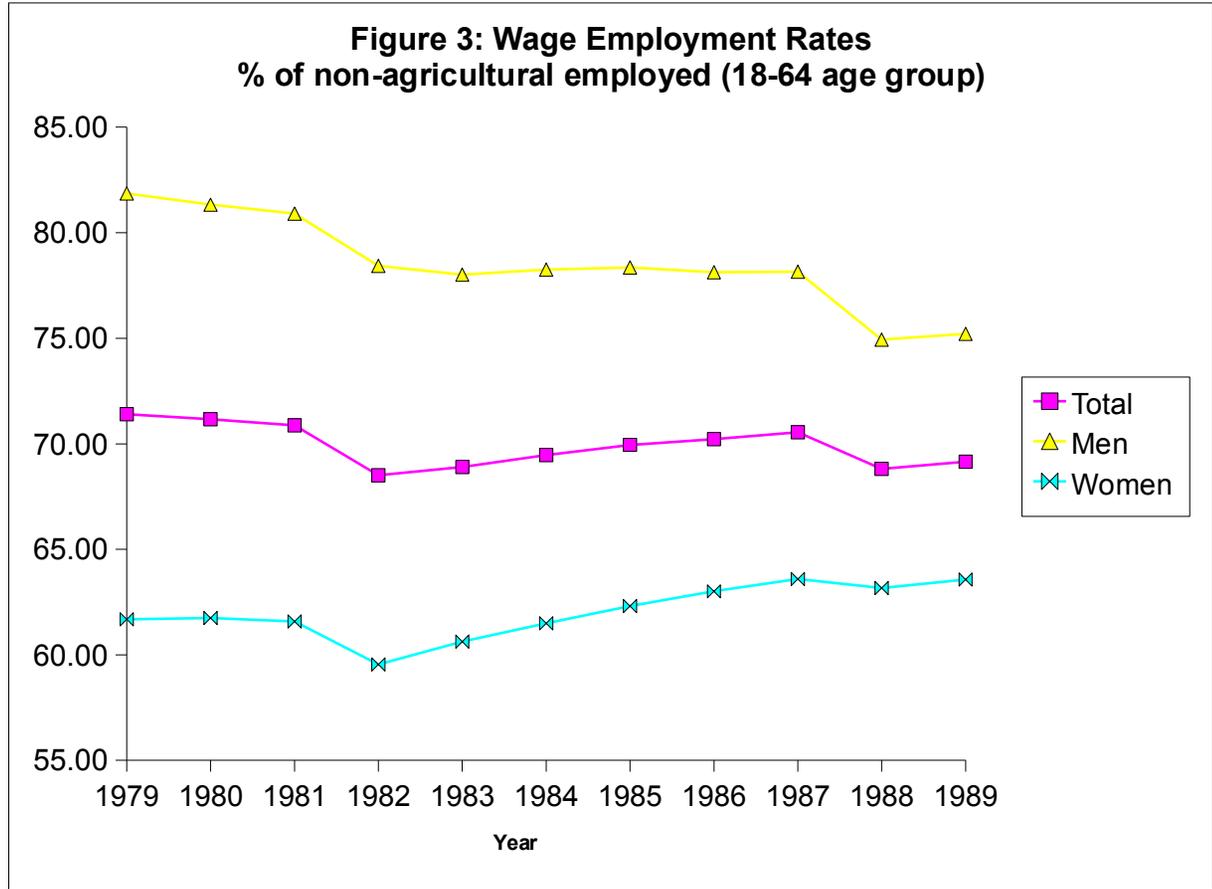


Figure 4: Marginal Tax Rate Change Distribution, following TRA86
Source: Hausman and Poterba (1987), Fig.1, p.104

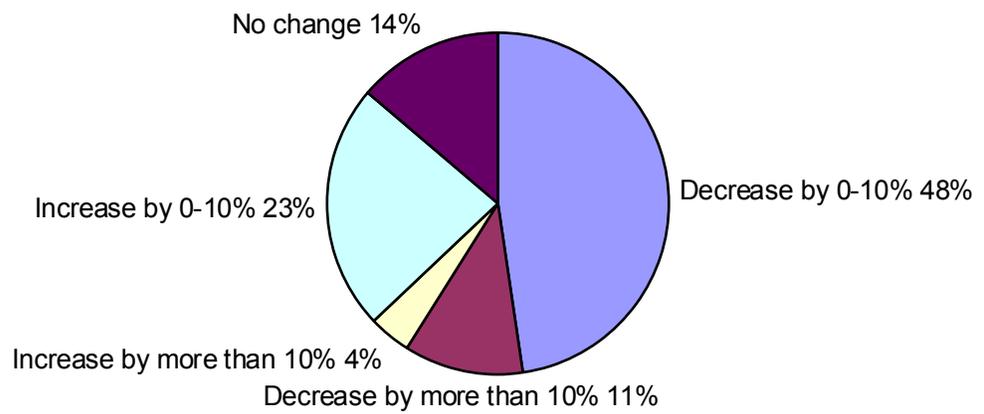


Table 1: Self-Employment Rates of Women and Men
in the Nonagricultural Sector, 1975-1989 (%)

Year	Total	Women	Men
1975	7.4	4.1	10.0
1979	8.6	5.3	11.3
1989	9.4	6.6	11.9

Source: Devine (1994a); *Note:* Includes individuals 16 years and older. Includes workers in both incorporated and unincorporated businesses

Table 2: Average After-Tax Price of Health Insurance

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

Source: Gruber and Poterba (1994), Table I, p.709. Reprinted with permission from *Quarterly Journal of Economics*, and Jonathan Gruber and James Poterba.

The prices are calculated as the ratio of the tax-adjusted price of health insurance to the cost of self-insurance for each category. ‘High-income’ refers to incomes in excess of \$50,000 in 1985 dollars while ‘low-income’ refers to incomes below \$20,000. Figures in parentheses are standard deviations.

Table 3: Percent Distribution of Women's Marital Status By Employment Sector, 1984-85 and 1990-91

	Single			Married					
	1984-85	1990-91	Difference	Spouse has EHI*			Spouse has no EHI		
	1984-85	1990-91	Difference	1984-85	1990-91	Difference	1984-85	1990-91	Difference
Sample Share	(23.87%)	(32.24%)		(41.68%)	(41.30%)		(34.45%)	(26.45%)	
Self-Employed	0.0323 (0.1767)	0.0377 (0.209)	0.0054**	0.0628 (0.1904)	0.0644 (0.2427)	0.0016	0.0575 (0.2455)	0.0729 (0.2601)	0.0154***
Wage-Employment	0.7441 (0.4364)	0.7278 (0.4552)	-0.0163***	0.594 (0.4451)	0.6371 (0.4911)	0.0431***	0.6055 (0.4888)	0.5938 (0.4911)	-0.0117
Observations	8,118	27,988		14,177	35,849		11,719	22,961	

Note: Figures in parentheses are standard deviations

* EHI - Health insurance through employer

Table 4: Percent Distribution of Women Workers in Non-Agricultural Occupations, by Selected Characteristics, 1984-85 and 1990-91

		Wage-Employment			Self-Employment		
		1984-85	1990-91	Difference	1984-85	1990-91	Difference
Age (Mean Years)		38.75 (11.61)	38.32 (11.19)	-0.43***	41.28 (10.84)	42.45 (10.44)	1.17***
Dependents	Yes	23.39 (42.33)	21.30 (40.94)	-2.09***	24.19 (42.84)	21.64 (41.18)	-2.55***
Race	White	85.89 (34.82)	84.22 (36.46)	-1.67***	93.77 (24.17)	92.35 (26.58)	-1.42***
Live in Central City	Yes	25.59 (43.64)	24.77 (43.17)	-0.82***	20.17 (40.14)	18.66 (38.96)	-1.51
Education	HS and Less	57.79 (49.39)	50.15 (50.01)	-7.64***	53.46 (49.89)	48.33 (49.98)	-5.13***
	Some College	36.68 (48.20)	42.67 (49.46)	5.99***	41.40 (49.27)	43.12 (49.53)	1.72
	> 5 yrs College	5.53 (22.85)	7.18 (25.82)	1.65***	5.14 (22.10)	8.55 (27.97)	3.41***
Marital Status	Single	28.91 (45.34)	36.79 (48.22)	7.88***	14.95 (35.67)	21.35 (40.98)	6.4***
Among Married	Husband has EHI*	43.10 (49.52)	48.61 (49.98)	5.51***	50.83 (50.01)	50.46 (50.01)	-0.37
	Husband SE +	7.38 (26.15)	10.71 (30.93)	3.33***	26.20 (43.98)	41.54 (49.29)	15.34***
	Live in State with No State Taxes	13.77 (34.46)	15.36 (36.06)	1.59***	15.94 (36.62)	16.73 (37.33)	0.79
Family Income >50,000 [@]	Yes	0.0105 (0.1022)	0.0117 (0.1076)	0.0012	0.0303 (0.1716)	0.0353 (0.1845)	0.005
Observations		21,558	54,008		1,827	4,838	

Note: Figures in parentheses are standard deviations; * EHI - Health insurance through employer; + SE - Self-Employed; @ Indicator variable that equals 1 if family non-earnings income > \$50,000 in real terms.

Table 5: Probit Estimates of Women's Self-Employment Choices
(Marginal Effects)

Control Variables	2	3
Age (years)	0.0116*** (0.0006)	0.0121*** (0.0007)
Live in Central City	-0.0125*** (0.0025)	-0.0135*** (0.0028)
Education, Base Category	High School or less	High School or less
Some College	0.013*** (0.0019)	0.014*** (0.0022)
> 5 yrs College	0.0154*** (0.004)	0.0009 (0.0048)
Race=White	0.038*** (0.0021)	0.0406*** (0.0026)
Marital Status, Base Category:	Married, Access to Spousal HI ⁺	Married
T1: Single	-0.0532*** (0.004)	-0.0508*** (0.0043)
T2: Married, no Access to Spousal HI	-0.0192*** (0.0037)	
Post_TRA86	-0.012*** (0.0031)	0.004* (0.0024)
(T1*Post_TRA86)	0.024*** (0.0052)	0.0078** (0.0049)
(T2*Post_TRA86)	0.0398*** (0.006)	
Dependents = Yes	0.0334*** (0.0037)	0.0288*** (0.0032)
Family Income>50,000 [®] (in 2000 \$)	0.0667*** (0.0100)	0.0726*** (0.011)
Live in No_Tax State (Live NSIT)	0.0100*** (0.0025)	0.0127*** (0.0029)
Federal MTR	-0.0012*** (0.0001)	-0.0012*** (0.0001)
Predicted Probability	0.0706	0.0811
Observations	85,264	85,264

Note: Figures in parentheses are (robust) standard errors; +HI -Health insurance

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

Table 6: Difference-in-Difference Estimates By Marital Status and Age
(Marginal Effects)

Age-Group	18-64	24-53	54-64
	Panel A		
T1: Single	-0.0532*** (0.004)	-0.0544*** (0.0046)	-0.0765*** (0.0112)
T2: Married, no Access to Spousal HI	-0.0192*** (0.0037)	-0.0209*** (0.0043)	-0.0367*** (0.0115)
T1*Post_Reform	0.024*** (0.0052)	0.0245*** (0.0061)	0.0446*** (0.0185)
T2*Post_Reform	0.0398*** (0.006)	0.0418*** (0.0071)	0.0608*** (0.0204)
Predicted Probability	0.0706	0.0731	0.0966
	Panel B: Including Business-Cycle Effects ⁺		
T1: Single	-0.0749*** (0.0145)	-0.0772*** (0.0163)	-0.0863* (0.0423)
T2: Married, no Access to Spousal HI	-0.0101 (0.0141)	-0.0124 (0.0161)	-0.0158 (0.0477)
T1*Post_Reform	0.0407*** (0.0129)	0.0419*** (0.0154)	0.0675* (0.0365)
T2*Post_Reform	0.0306*** (0.0092)	0.0331*** (0.0105)	0.0519** (0.0332)
Predicted Probability	0.0707	0.0732	0.0968

Note: This table reports the marginal effects from Probit estimates of equation 2. Dependent variable takes the value 1 if individual is self-employed, 0 otherwise. The regression includes controls for age, education, race, residence in central city, residence in state with no state income taxes, presence of dependent children, estimated federal marginal taxes and family non-earnings income. Standard errors, using the Delta method, are in parentheses.

+ Estimates in this panel include additional controls for the male unemployment rate in the pre-reform and post-reform periods, interacted with the treatment group indicators.

Table 7: Multinomial Logit Estimates: Relative Risk Ratios (RRR), Marginal Effects (ME)

(N=120,812)

(Base Outcome: Self-Employment)

	Wage Employment		Non-Employment		Self-Employment
	RRR	ME	RRR	ME	ME
<i>Control Group: Married Women with Access to HI</i>					
<i>Treatment Groups:</i>					
T1: Single Women	2.4787*** (0.1905)	0.2687***	0.5141*** (0.0416)	-0.2429***	-0.0258***
T2: Married, no Access to HI	1.4096*** (0.0846)	0.1906***	0.4500*** (0.0288)	-0.1865***	-0.0041
Post_TRA86 (Post)	1.1828*** (0.0500)	0.0602***	0.8775*** (0.0395)	0.0558***	
T1*Post	0.6838*** (0.0563)	-0.0886***	1.0239 (0.0885)	0.0739	0.0147***
T2*Post	0.5883*** (0.0384)	-0.1564***	1.2065*** (0.0836)	0.1392**	0.0173***
Predicted probability at \bar{X}	0.6897		0.2544		0.0559
<i>Control Group: Married Women</i>					
<i>Treatment Group: Single Women</i>	2.1515*** (0.1493)	0.178***	0.856** (0.0617)	-0.1523***	-0.0257***
Post_TRA86 (Post)	0.9438** (0.0299)	-0.0118***	0.9969 (0.00337)	0.0096***	0.0022
Single*Post	0.8642** (0.067)	-0.0155**	0.9132 (0.0741)	-0.0085	0.0071*
Predicted probability at \bar{X}	0.6849		0.2594		0.0557

Note: The regressions includes controls for age, education, race, residence in central city, residence in state with no state income taxes, marginal tax rates and indicator for presence of dependent children.

Figures in parentheses are robust standard errors.

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