Taxes, Health Insurance and Women's Self-Employment

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1 Introduction

The incidence of self-employment increased in the United States since the mid-1970s, both among men and women. This phenomenon is well-documented by Blau (1987), Devine (1994a, 1994b), Lombard (2001) and many others. 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 increasing labor force participation. And the large shift from industrial employment to service sector employment during the 1980s expanded the opportunities for self-employment, thus potentially accounting for the relative increase in self-employment rates. However, as the incidence of self-employment rose in the U.S., there was a concurrent trend of rising health care costs.[1] 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 (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. Thus, employers have an incentive to finance insurance premium costs rather than shift these costs to employees. 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.

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

[1] Between 1980 and 2001, estimates suggest that the total cost of employer-sponsored health insurance benefits increased four times faster than the cost of living (Employment Trends, 2003).

being self-employed, the price of selecting into their desired sector 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.[2] Given the high and rising cost of health insurance, this price wedge is likely to significantly affect an individuals choice of employment sector.

There is an extensive literature on the effect of employment-based health insurance on various labor market outcomes[3] 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.[4] However, there has been very little research on the effect of employment-based insurance on households' choice of employment sector.[5] 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.

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

[2]Holtz-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.

[3]Gruber and Madrian (2002) review the literature.

[4]See Buchmueller and Valletta (1999), for example.

[5]DeCicca (2008), Fairlie *et.al.* (2008), Gumus and Regan (2009) and Seldon (2009) are notable exceptions.

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 womans 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 for the 1975-87 period, Devine (1994a, 1994b) found that self-employed women were more likely to be married, to be covered by someone elses 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) used a CPS Benefits supplement 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 may 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 the capital to finance the business venture. 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 will have no effect on shifting workers across sectors. We thus need a methodological approach that allows us to disentangle these effects.

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. 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 1 and reveal that the after-tax price reductions were sizeable 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'. We would therefore expect (1) more single workers and (2) more married workers without the benefit of spousal health insurance, to select into self-employment after TRA86. This is the prediction I propose to test in Section 5.

There is some evidence of a strong behavioral response from variation in insurance premiums at the state level. In August 1993, the New Jersey Individual Health Coverage Plan (IHCP) introduced guarantees on availability and renewability of health insurance in the individual market, and also imposed pure community rating on insurance premiums, as a means of breaking the historical link between wage employment and health coverage. DeCicca (2008) estimated the impact of these changes on the incidence of self-employment in New Jersey between 1991 and 1996, relative to a set of other states in the U.S. that did not introduce any reforms in the insurance market. He

found evidence of a significant increase in self-employment in New Jersey. Moreover, the impact was more pronounced among single, older and less-healthy individuals, the groups that were likely to benefit more from these reforms.

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.[6] For this reason, the TRA86 is potentially a better instrument for identifying the price effect of health insurance on the propensity for self-employment.

Figure 1 plots self-employment rates for men and women between 1979 and 1989, using data from the March supplement files of the Current Population Survey (CPS). The sharp increase in self-employment rates for both men and women following the TRA86, is clearly evident from the graph. Although the increase is more pronounced for men, 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.

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.

A 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

[6]See Zissimopoulos *et.al.* (2007) and Giandrea *et.al.* (2008), for instance.

1993-2003 period does not exhibit an increasing trend; male self-employment actually declined over this period (CPS, March supplement, various years). 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 sizeable, relative to the 1996-2003 amendments.[7]

In order to identify the effect of the price of health insurance on self-employment propensities, I use both cross-sectional variation - between women with actual or potential health insurance coverage through their spouse versus women without - and the 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. By using both these sources of variation however, I can eliminate spurious factors correlated with each degree of variation individually and arrive at an estimate that denotes the price effect of TRA86 on the assignment of women across employment sectors. This is the approach that I will use below.

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 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,

[7]Seldon (2009) used the Medical Expenditure Panel Survey to investigate the impact of TRA amendments on private insurance coverage. He found evidence of substantial increase in coverage among self-employed workers.

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.[8] 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 classified as self-employed.

Table 2 records employment status by marital status. While self-employment rose among all marital groups over the two time periods, the largest increases were among married women with no access to spousal health insurance coverage, and previously married women. In contrast, the incidence of wage-employment decreased among married women with no spousal health insurance, previously married and never married women, while it rose among married women with access to spousal health coverage.

Table 3 gives the characteristics of employed and non-employed women in the two time periods, 1984-85 and 1990-91.[9] On average, self-employed women tend to be older than their counterparts in wage-salary employment and this difference has increased over time. Women who are not employed

[8]Individuals 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.

[9]To 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.

are older than those employed. Average educational attainment increased for all women over the two time periods. The increases were highest in the college education categories, especially among the self-employed. The predominance of white women in self-employment has also been noted by other studies and is clearly reflected in Table 3. Not surprisingly, a larger fraction of women who are not employed have dependents living in the household.

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 a sharp decrease in this category across all groups. Among the sub-sample of married women, a larger fraction of self-employed women have a spouse who is covered by his employer-provided health plan, relative to married women in the other sectors. This suggests that the cost of health insurance may be an important determinant of the employment 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 both wage and salaried women and non-working women in both time periods. This 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 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.

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 Estimates

Table 4 presents marginal effects from a probit model of self-employment, estimated separately for single and married women. Each specification controls for a detailed set of individual characteristics.[10] I first test for patterns observed in Table 3.

The estimates in the first column are for the sub-sample of single women, while those in the second and third columns are for married women. Comparing the first and second columns, the probability of being self-employed rises with age and education. However, single women with more than 5 years of college education are more likely to take up self-employment, while married women in this category are as likely to be self-employed as married women with very low education. Single, white women are 68% more likely than non-whites to be self-employed while among married women, this gap is about 47%.[11] While the CPS does not collect any information on household

[10] 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.

[11] All percentages are calculated as the ratio of the corresponding marginal effect to the predicted probability of self-employment at the mean levels of all control variables, which is 0.0396 for single women and 0.0906 for married

assets, it does include family income from sources other than earnings. This variable can be used as a 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. Its effect is positive, sizeable and significant, suggesting that non-earnings income is an important determinant of self-employment.[12] Single women were 21% more likely to be self-employed in the post-TRA86 period, relative to the pre-TRA86 period while the corresponding coefficient is not significant for married women.

Regardless of marital status, women residing in states that do not levy state income tax are no more likely to take up self-employment relative to women in other states. However, higher income taxes discourage self-employment.[13] A notable difference between these two groups is in the effect of having dependents; while this variable has no impact for single women, it increases the probability of self-employment among married women by 36% relative to married women with no dependents.

In the third column of Table 4, I add controls for husband's employment sector as well as his health insurance coverage status for the sub-sample of married women.[14] In this specification, the marginal effect of the post-reform period is negative and significant; married women are 11% *less* likely to be self-employed after TRA86, controlling for husband's employment sector and health insurance status. The health coverage estimate indicates that married women with a husband who has health insurance coverage are 35% more likely to be self-employed, relative to married women whose spouse has no coverage through his employer. One interpretation of this result is that the access to health coverage for the wife through the husband's employer-provided health plan creates a wedge in the price of health insurance between married women enjoying this privilege and other

women.

[12] 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.

[13] To get around the endogeneity of income tax rates, I re-estimated the probit regressions by replacing the marginal tax rates with the average marginal tax rates, grouped by the three education groups. The results were similar and are not reported here.

[14] In the CPS, the question used to determine whether the husband has employment-based health coverage asks whether the respondent participates in group health coverage offered by his employer. If the husband is self-employed, he might be referring to himself as the employer while responding to this question. For this reason, it seems important to control for his employment sector while estimating the impact of his health coverage on his wife's propensity to be self-employed, a point emphasized by Lombard (2001).

women. This price effect in turn affects the assignment of women across different sectors of the economy.

However, there may be several other reasons why women with no access to spousal health insurance coverage do not select into self-employment. By comparing these women with similar characteristics before and after the tax reform, we can control for other factors influencing the decision to become self-employed that may be correlated with having no spousal health coverage. By comparing the change in the incidence of self-employment between women without and with spousal health coverage, we can control for other changes in the economy that may have affected the overall incidence of self-employment, including TRA86. As long as there were no exogenous shocks affecting only one of these groups over this period, this method 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:

$$E_i = \alpha + \gamma_1(Married, spouse-no-health-coverage) + \gamma_2(Previously-Married) + \quad (2)$$
$$\gamma_3(Never-Married) + \gamma_4 Year + \gamma_5(Married, spouse-no-health-coverage * Year) +$$
$$\gamma_6(Previously-Married * Year) + \gamma_7(Never-Married * Year) + \gamma_8.X_i + \varepsilon_i,$$

where $E_i = 1$ if the woman is self-employed and $E_i = 0$ otherwise, X_i is a vector of controls, 'Married,spouse-no-health-coverage' is an indicator variable which equals 1 if the woman is married and her husband does not have health coverage, 'Previously-married' is an indicator for a divorced/widowed/separated woman, 'Never-Married' is an indicator for a never married woman, 'Post-Reform' 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. Our control group here is married women with access to health coverage through their spouse. Since this is the group which 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_5, γ_6 and γ_7 are all positive.

Table 5 presents the 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 across individuals to get the average marginal effect. The Delta method is used to compute standard errors.[15] The

[15]Note that marginal effects based on the method proposed by Ai *et.al.* (2004) are smaller than those based solely

estimates are positive and significant for all three treatment groups. The marginal effects indicate that in the post-reform period, married women who did not have access to spousal health insurance, previously married women and never married women were 50% , 59% and 38% more likely to be self-employed respectively, relative to their corresponding pre-reform rates implied by the regression (0.0804, 0.0456 and 0.0474 respectively). When measured as a fraction of the predicted probabilities of self-employment estimated by the regression (0.0705), the marginal effects imply a 57%, 38% and 25% increase in self-employment respectively among the three treatment groups.[16]

The results in Table 5 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, 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:

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

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 which 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 $\gamma 11$ measures the double-difference - the effect of the tax subsidy on single womens propensity to be self-employed, relative to married women. Again, γ_{11} is predicted to be positive. The results are presented in Table 6.

The differential effect of being single in the post-TRA86 period is indeed positive and significant. The estimates indicate that while married women were also more likely to be self-employed following the tax reform, the time difference was about three times higher for single women. The marginal effect indicates that single women in the post-TRA86 period were 17% more likely to take up self-employment relative to their pre-reform rate of 4.59%. This is a sizeable effect. The marginal effect

on the interaction terms such as γ_5 , γ_6 and γ_7 in equation 4. 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.

[16] I also estimated all the Probit regressions clustered by marital status (Moulton, 1986) to obtain clustered standard errors. There was no qualitative change in the results. The results are not reported.

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.[17]

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 2 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 rates in the population, following the changes introduced by the TRA86. Their calculations are reproduced in Figure 3, 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

[17] As a robustness check, I estimated the difference-in-difference estimate of self-employment propensities for single and married women for 1996 relative to 1994, a period when the tax subsidy was increased from 25% to 30%. While the estimate was positive, suggesting that self-employment increased relatively more among single women relative to married women, it was not statistically significant. The results are not reported here.

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 4 and 5 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 net cost savings from the tax subsidy were presumably quite small, for most individuals. Thus, 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 4 and 5 lie well within these bounds - between 1 and 4 percentage points - and thus provide confidence in the plausibility of the estimates. Gruber 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 17% and 33%, and are thus consistent with those of the 'job-lock' literature as well.

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.

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 equation 3. The relative risk ratios for wage-employment and non-employment are shown, relative to the self-employment outcome, along with the corresponding marginal effects. As expected, relative to married women, single women are over two times more likely to be in paid employment than non-employment, with a substantial marginal effect. In the post-reform period, however, single women were *less* likely to be in paid employment relative to self-employment. Similarly, they were also much less likely to be non-employed, relative to self-employment.

The marginal effect of the interaction term (Single*Post-TRA86) for the self-employment outcome is 0.01, which is significant at the 95% level. The self-employment rate among single women, as a proportion of all women (employed as well as non-employed) was 3.08% in the pre-TRA86 period. The marginal effect of 0.01 thus implies a 33% increase in self-employment among single women, relative to the pre-TRA86 period. This is almost two times the increase implied by the Probit estimates, based solely on employed women. Measured as a fraction of the predicted probability of self-employment implied by the multinomial regression (0.0619), the marginal effect implies an increase of 16%.

6 Conclusions

In this paper, I study the effect of the husband's employer-provided family health insurance on the wifes propensity to select into self-employment. A consistent finding in the literature on womens 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 womans 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.[18] The arguments put forth and the evidence presented are an attempt to persuade readers that while the estimates may be overstating the impact of the tax subsidy on the incidence of self-employment, the true effect is still sizeable. 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 33% depending on the specification, in the postTRA86 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.

[18] Gumus and Regan (2007) also find a large responsive to health insurance prices among single women.

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Figure 1: Self-Employment Rates

(% of non-agricultural employed: 18-64 age group)

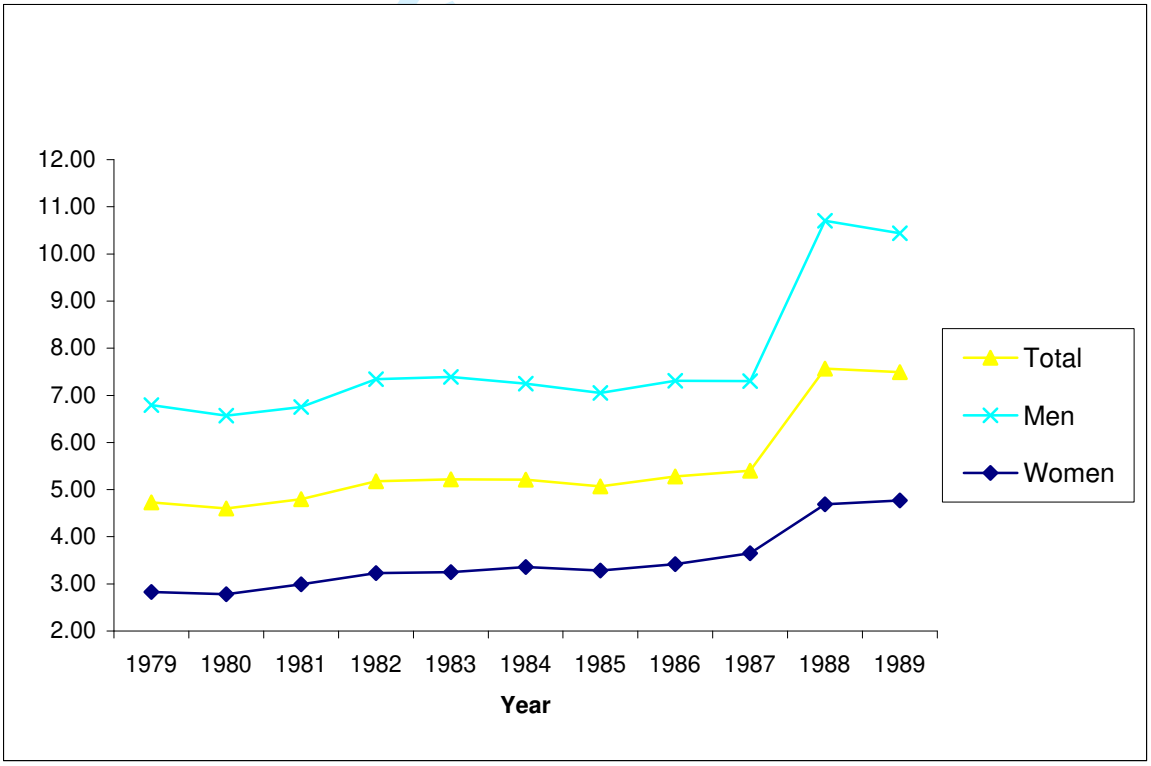

Figure 2: Wage-Employment Rates

(% of non-agricultural employed: 18-64 age group)

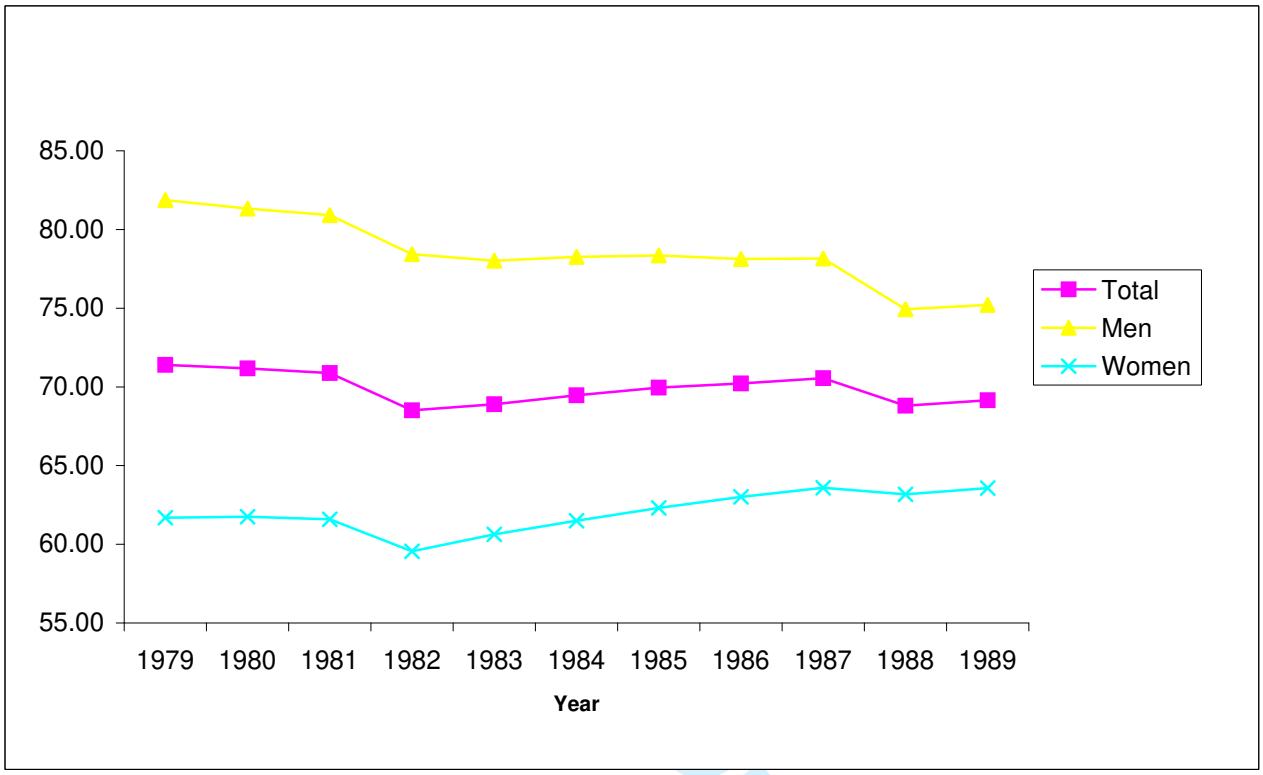

Figure 3: Marginal Tax Rate Change Distribution, following TRA86

Source: Hausman and Poterba (1987), Fig.1, p.104

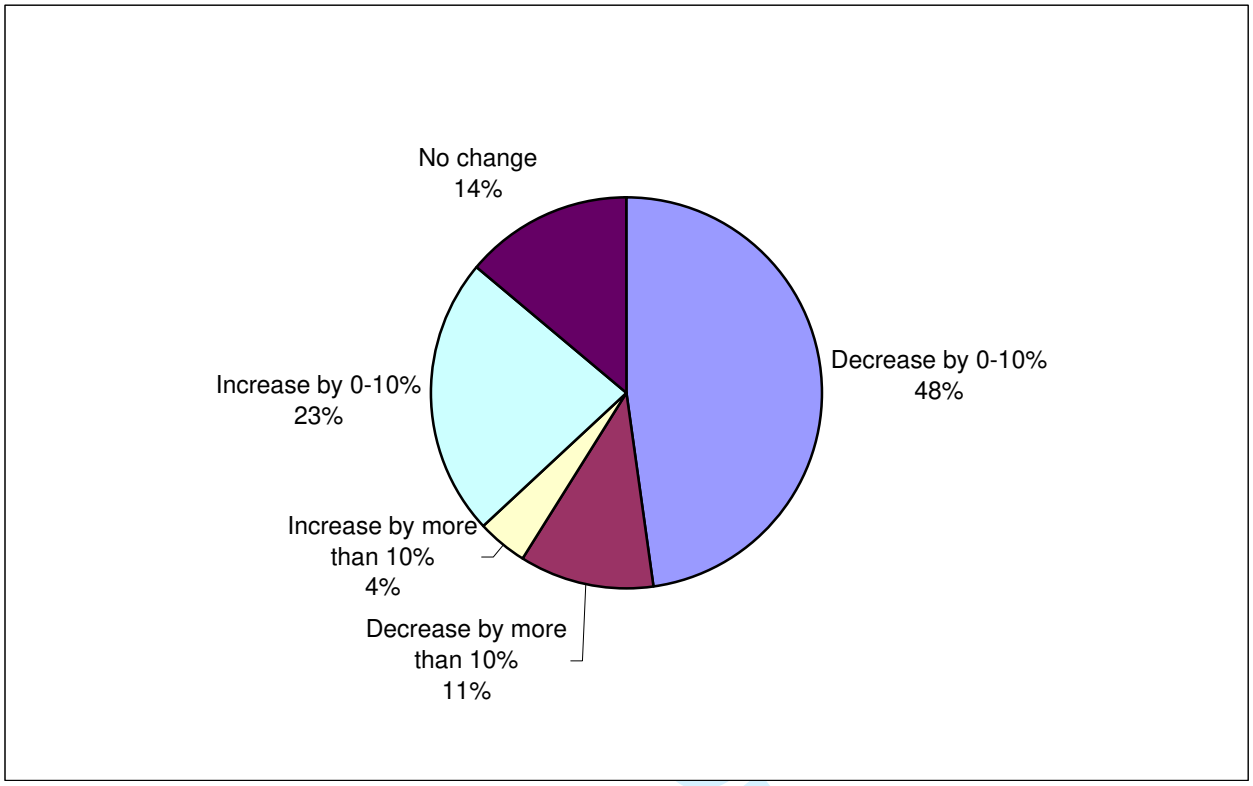

Table 1: Average After-Tax Price of Health Insurance

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

	Previously Married		Never Married		Married			
					Spouse has no EHI*		Spouse has EHI	
	1984-85	1990-91	1984-85	1990-91	1984-85	1990-91	1984-85	1990-91
	(63.38%)	(65.49%)	(5.37%)	(5.80%)	(31.25%)	(28.71%)		
Self-Employed	0.0342	0.0458	0.0231	0.0240	0.0543	0.0697	0.0491	0.0514
	(0.1818)	(0.209)	(0.1503)	(0.153)	(0.2267)	(0.2547)	(0.2161)	(0.2208)
Wage-Employment	0.7147	0.7069	0.8000	0.7676	0.6008	0.5966	0.6480	0.6800
	(0.4516)	(0.4552)	(0.4001)	(0.4224)	(0.4898)	(0.4906)	(0.4776)	(0.4665)
Observations	5,654	15,790	2,464	12,198	11,719	22,961	22,295	63,837

Note: Figures in parentheses are standard deviations

* EHI - Health insurance through employer

Table 3: Percent Distribution of Women Workers in Non-Agricultural Occupations, and the Non-Employed, by Selected Characteristics, 1984-85 and 1990-91

		Wage Employment		Self-Employment		Non-Employed	
		1984-85	1990-91	1984-85	1990-91	1984-85	1990-91
		(63.38%)	(65.49%)	(5.37%)	(5.80%)	(31.25%)	(28.71%)
Age (Years)	Mean	38.75	38.32	41.28	42.45	43.73	43.13
		(11.61)	(11.19)	(10.84)	(10.44)	(13.26)	(13.66)
Dependents	Yes	23.39	21.30	24.19	21.64	30.13	30.34
		(42.33)	(40.94)	(42.84)	(41.18)	(45.88)	(45.97)
Race	White	85.89	84.22	93.7700	92.35	87.51	83.36
		(34.82)	(36.46)	(24.17)	(26.58)	(33.06)	(37.25)
Live in Central City		25.59	24.77	20.17	18.66	25.46	26.97
		(43.64)	(43.17)	(40.14)	(38.96)	(43.56)	(44.38)
Education	HS and Less	57.79	50.15	53.46	48.33	74.24	68.25
		(49.39)	(50.01)	(49.89)	(49.98)	(43.73)	(46.55)
	Some College	36.68	42.67	41.40	43.12	23.94	28.18
		(48.20)	(49.46)	(49.27)	(49.53)	(42.67)	(44.99)
	> 5 yrs College	5.53	7.18	5.14	8.55	1.82	3.57
		(22.85)	(25.82)	(22.10)	(27.97)	(13.38)	(18.55)
Marital Status	D/W/S	19.39	19.88	11.54	15.13	13.57	16.07
		(39.53)	(39.91)	(31.95)	(35.84)	(34.25)	(36.73)
	Never Married	9.52	16.91	3.42	6.21	4.20	10.62
		(29.35)	(37.49)	(18.17)	(24.15)	(20.05)	(30.81)
	Married	71.09	63.21	85.05	78.65	82.23	73.31
		(45.34)	(48.22)	(35.67)	(40.98)	(38.23)	(44.23)
Husband SE		7.38	10.71	26.20	41.54	9.82	14.50
		(26.15)	(30.93)	(43.98)	(49.29)	(29.76)	(35.21)
Husband has		43.10	48.61	50.83	50.46	47.48	48.99
EHI*		(49.52)	(49.98)	(50.01)	(50.00)	(49.94)	(49.99)
Live in State with	Yes	13.77	15.36	15.94	16.73	13.40	14.90
No State Taxes		(34.46)	(36.06)	(36.62)	(37.33)	(34.06)	(35.61)
Observations		21,558	56,841	1,827	5,038	10,629	24,919

Note: Figures in parentheses are standard deviations

* EMI - Health insurance through employer

Table 4: Probit Estimates of Women's Self-Employment Choices

(Marginal Effects)

	Single	**Married**	
	1	2	3
Age (years)	0.0072***	0.0134***	0.0108***
	(0.0007)	(0.0009)	(0.0009)
Age Squared	-0.0001***	-0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)
Live in Central City	-0.0015	-0.0151***	-0.0095***
	(0.0025)	(0.003)	(0.0030)
Education			
Base Category:	High School and less		
Some College	0.0122***	0.0124***	0.0057**
	(0.0027)	(0.0026)	(0.0025)
> 5 yrs College	0.0379***	-0.0016	-0.0049
	(0.0063)	(0.0051)	(0.0048)
Race=White	0.027***	0.0423***	0.0316***
	(0.0024)	(0.0032)	(0.0033)
Post-TRA86	0.0085***	0.0017	-0.009***
	(0.0028)	(0.0029)	(0.0028)
Dependents = Yes	-0.0013	0.0328***	0.0338***
	(0.0039)	(0.0035)	(0.0034)
Family Income>50,000^{+}	0.0836***	0.0681***	0.0403***
(in 2000 $)	(0.0219)	(0.0121)	(0.0113)
Live in No-Tax State	0.0099	0.0038	0.0009
(Live NSIT)	(0.0077)	(0.0064)	(0.006)
Live NSIT*Post-Tra86	-0.0072	0.0151**	0.0133*
	(0.0067)	(0.008)	(0.0076)
Federal MTR	-0.0009***	-0.001***	-0.0016***
	(0.0001)	(0.0001)	(0.0001)
Husband has EHI^{+}			0.028***
			(0.0025)
Husband SE^{++}			0.2169***
			(0.0056)
Predicted Probability	0.0396	0.0906	0.0801
Log Pseudolikelihood	-5,014.09	-17,789.87	-16,108.88
Observations	27,726	57,538	56,121

Note: Figures in parentheses are (robust) standard errors; +EHI - Employer-provided health insurance; ++SE - Self-Employed

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

Table 5: Difference-in-Difference Estimates of Self-Employment Propensities by Marital Status (N=85,264)

	1984-85	1990-91	*Time Difference*	% change^{+}
Treatment Groups:				
T1. Married women with No Spousal Health Ins.	0.0804*** *(0.0032)*	0.1068*** (0.0025)	0.0264*** *(0.0041)*	
T2. Divorced/Separated/ Widowed Women	0.0456*** *(0.0032)*	0.0584*** *(0.0022)*	0.0128*** *(0.0039)*	
T3. Never Married Women	0.0474 *** *(0.0057)*	0.0512*** *(0.0031)*	0.0038 *(0.0065)*	
Control Group:				
C1. Married women with Spousal Health Ins.	0.1033*** *(0.0033)*	0.0891*** *(0.0019)*	-0.0142*** *(0.0038)*	
Group Difference for a given period:				
T1 Vs. C1	-0.0229*** *(0.0046)*	-0.0177*** *(0.0032)*		
T2 Vs. C1	-0.1033*** *(0.0046)*	-0.0891*** *(0.0029)*		
T3 Vs. C1	-0.1065*** *(0.0066)*	-0.0913*** *(0.0036)*		
Difference-in-Difference:	T1 Vs. C1		0.0406*** *(0.0055)*	50(57)
	T2 Vs. C1		0.027*** *(0.0054)*	59 (38)
	T3 Vs. C1		0.018** *(0.0075)*	38 (25)
Predicted Probability at $\overline{X}$			0.0705	

Note: This table reports the marginal effects from the estimates of equation 4. 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.

+ Percentage changes are calculated as the corresponding marginal effect divided by the respective self-employment rates in the pre-TRA86 period (0.0804, 0.0456 and 0.0474 respectively). The figures in parentheses provide an alternative metric: percentage changes calculated by dividing the corresponding marginal effects by the predicted probability of self-employment, 0.0705.

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

Table 6: Difference-in-Difference Estimates of Self-Employment Propensities: Single Vs. Married Women (N=73,604)

	1984-85	1990-91	*Time Difference*	% change
Treatment Group:				
T: Single Women	0.0459***	0.0585 ***	0.0126***	
	(0.0033)	(0.0024)	*(0.0041)*	
Control Group:				
C: Married Women	0.0945***	0.0993***	0.0048**	
	(0.0023)	*(0.0016)*	*(0.0038)*	
Group Difference for a given period:				
T Vs. C	-0.0486***	-0.0408***		
	(0.004)	*(0.0029)*		
Difference-in-Difference:			.0078*	17 (10)
			(0.0049)	
Predicted probability at $\overline{X}$			0.0811	

*Note:*This table reports the marginal effects from the estimates of equation 5. 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, interaction of indicator for dependent children with marital status, estimated federal marginal taxes, spouse's health insurance status and family non-earnings income. Standard errors, using the Delta method, are in parentheses.

+ Percentage changes are calculated as the corresponding marginal effect divided by the self-employment rate in the pre-TRA86 period (0.0459). The figure in parenthesis provides an alternative metric:percentage changes calculated by dividing the marginal effect by the predicted predicted probability of self-employment, 0.0811.

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

Table 7: Multinomial Logit Results - Relative Risk Ratios (RRR) and Marginal Effects

(N=106,150)

	Wage Employment		Non-Employment		Self-Employment
	Base Outcome - Self Employment				
	Relative Risk Ratio	Marginal Effect	Relative Risk Ratio	Marginal Effect	Marginal Effect
Control Group: Married Women					
Treatment Group: Single Women (Single)	2.2123***	0.1277***	1.1304	-0.0472***	
	(0.1836)		*(0.0981)*		
Post-TRA86 (Post)	0.9495	-0.0035	0.9435	0.0008	
	(0.0326)		*(0.0344)*		
Single*Post	0.8466 **	-0.0125**	0.8535**	-0.0005	0.01**
	(0.0741)		*(0.0782)*		
Predicted probability at $\overline{X}$	0.6645		0.2736	0.0619	
Log-Likelihood			-77,067.22		
Pseudo R^2			0.1181		

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