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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 difference-in-difference estimates based on an analysis of employed women indicate that the incidence of self-employment among women who did not enjoy spousal health benefits rose significantly - between 14% and 25% - 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 around 9%.

JEL Classification: J0,J3,I1

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"*Health care is expensive because the vast majority of Americans consume it as if it were free. Health insurance policies with low deductibles insulate people from the cost of the medical care they use - so much so that they often do not even ask for prices. And people don't recognize the high premium costs of this low-deductible insurance because premiums are paid by employers. Finally, the tax code subsidizes these expensive, employer-purchased insurance policies.*" Al Hubbard, Director, United States National Economic Council, New York Times, April 03, 2006.

1 Introduction

The incidence of self-employment has 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 is some controversy over whether this represents a sustained increase for men, there seems to be a consensus that this does signify a long-term trend for women, with the self-employment rate increasing both absolutely and relative to total female employment.[1]

The absolute increase in the numbers of self-employed women is not surprising in itself. This could simply be a consequence of their increasing labour 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.[2] The linkage between health care costs and the labour 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

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

[2] One measure of trend increase in health care costs suggests that between 1980 and 2001, the total cost of employer-sponsored health insurance benefits increased four times faster than the cost of living (Employment Trends, 2003).

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 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 prevalence of married women in self-employment.

This problem is important because the U.S. labour 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.[3] Given the high and rising cost of health insurance, this price wedge is likely to significantly affect an individual's choice of employment sector.

There is an extensive literature on the effect of employment-based health insurance on various labour market outcomes[4] 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

[3]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.

[4]Gruber and Madrian (2002) review 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 labour supply decisions - mainly hours of work - of secondary earners is also well established. However, there has been very little research on the effect of employment-based insurance on households' choice of employment sector. 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 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 test whether this policy change, by narrowing the gap in health insurance prices between the 2 sectors, 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 favours 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).

Three 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 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. 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 some factors affecting spouses' employment sector decisions that are not observed by researchers, these estimates will 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 this group. 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.

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). 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.

Figure 2 traces self-employment rates among women, disaggregated by marital status. Two points are worth noting: firstly, there is a distinct break following the passage of the TRA86, with self-employment rates increasing among all these groups.[5] Secondly, over this period, there appears to be no other deviation from trend. Together, these features suggest that the TRA86 might have had some impact on self-employment rates.

The TRA86 brought in two other changes that are relevant to this study.[6] It lowered marginal tax rates. One effect of lowered tax rates is to raise the after-tax price of health insurance for employed workers, relative to the option of being uninsured and claiming a portion of their medical expenses as a tax deduction. At the same time, TRA86 also increased the standard deduction that non-itemising taxpayers could claim and reduced the share of medical expenses that could be itemised, thus lowering the relative price of insurance for the employed worker. Gruber and Poterba (1994) calculated the average after-tax price of health insurance relative to being uninsured, for employed and self-employed individuals before and after TRA86, taking account of all these changes. 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%.

One major challenge arises in using the TRA86 experiment to estimate the effect on employment sector choices. If the lowered tax rates introduced by TRA86 are the primary reason for the trend increase in self-employment that figures 1 and 2 reflect, 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.

The tax deduction for the self-employed introduced by TRA86 remained at 25% of health insurance costs till 1996. From 1996 onwards, this subsidy rose every year in small steps till it

[5]The figure suggests that the increase in self-employment may have been larger for married women (who were less affected by the subsidy) than for single women. However the married women category includes both sub-groups - those covered by their spouse's health plan and those not covered. So it is possible that the increased trend in self-employment that we notice is driven almost entirely by married women who did not have spousal health coverage. However, I have no way of ascertaining this, since the spousal health coverage question does not go back that far. In my empirical analysis, I attempt to estimate the effects of the subsidy on each of these sub-groups.

[6]For a careful and detailed analysis of the impact of changes introduced in TRA86 on health insurance prices, see Gruber and Poterba (1994).

stood at 100% of health insurance costs by 2003. While it can be argued that these later changes thus constitute a more recent natural experiment to test my predictions, the gradual nature of the subsidy increase makes it less likely to observe big changes in a discrete dimension of behaviour such as the employment-sector decision. This reason dictates the choice of using the TRA86 changes to study the relationship between health insurance prices and self-employment.

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 spouses 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, labour 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 labour 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 labour 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.

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 labour 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. I also use the NBER's TAXSIM programme, to estimate marginal tax rates for the individuals in my sample.[7]

Table 2 gives the characteristics of employed and non-employed women in the two time periods, 1984-85 and 1990-91.[8] 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 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. The predominance of white women in self-employment has also been noted by other studies and is clearly reflected in Table 2. 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.

In the post-TRA86 period, relative to non-employment, more married women were self-employed. Among the sub-sample of married women, a larger fraction of self-employed are covered by their spouse's employer-provided health plan relative to married women in the wage-salary sector and non-employed women. Moreover, the fraction of self-employed couples went up significantly in the post-TRA86 period, possibly because of the tax subsidy. This suggests that the cost of health insurance may be an important determinant of the employment decision for both men and women. At the same time, the fact that the fraction of self-employed women whose husbands are also self-employed is significantly higher than the corresponding fraction for both wage and salaried women and non-working women in both time periods suggests that household employment-sector decisions may also be driven by preferences and not solely by the cost of health insurance. These pat-

[7]For a description of the TAXSIM model, visit www.nber.org/taxsim/

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

terns 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

This section presents estimates of the impact of TRA86 on the incidence of self-employment. The first set of estimates are based on the sub-sample of women who are employed, while the second set extends the analysis to include non-employed women.

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

$$E_i^* = X_i\beta + Y_i\gamma + P_i\delta + \varepsilon_i \tag{1}$$

where ε_i is an individual-specific error term. The family wealth variable Y_i controls for possible capital constraints that might prevent some women from selecting into self-employment.
The probability of observing a woman in self-employment is given by

$$Pr(E_i = 1) = Pr(E_i^* > 0) = Pr(\varepsilon_i > -X_i\beta - Y_i\gamma - P_i\delta) = 1 - F(-X_i\beta - Y_i\gamma - P_i\delta) \tag{2}$$

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

The hypothesis that I am testing in this paper is the following: since TRA86 lowered the price of health insurance for the self-employed, this policy change induced more single women and more married women without health insurance coverage through their spouse's insurance plan, to select into self-employment, relative to married women who already enjoyed health insurance coverage through their spouse. The tax incentives for health insurance purchases by women who were already covered through their spouse's health plan did not change with TRA86: 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. Therefore, this group serves as a good 'control' group, and the difference-in-difference estimate is given by the following equation:

$$\Delta^2 = (SE_a^{1991} - SE_a^{1985}) - (SE_b^{1991} - SE_b^{1985}) \tag{3}$$

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 labour market participation decision itself. 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. A MNL model is motivated by a random utility function, where we assume that for the i^{th} individual faced with J choices, the utility from making choice j is given by

$$U_{ij} = \beta' Z_{ij} + \varepsilon_{ij}, \tag{4}$$

where z is a vector of co-variates, ε_{ij} is an error term assumed to be distributed as Type 1 extreme value and the βs are parameters to be estimated (Greene, 2000).

If the individual chooses option j, then we assume that this choice gives the maximum utility.

$$Prob(U_{ij} > U_{ik}), \text{ for all } k \neq j$$

For the analysis in this paper, J comprises three choices: 1 - Paid employment, 2 - Self-employment and 3 - Non-employment.

Eissa (1995)estimated an increase in the labour 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. The multinomial specification also addresses this issue.

5 Estimates

5.1 Probit Estimates

In unreported results, I first test for patterns observed in Table 2 based on probit equations such as those specified in equation 2. The results are broadly consistent with those of other studies, and reflect the trends seen in Table 2. The probability of being self-employed rises with age and education. Self-employment rates are significantly higher for married women relative to single women; divorced/widowed/separated women and never married women are 50% and 54% less likely to be self-employed respectively, compared to married women.[9] White women are 54% more likely than non-whites to be self-employed. Self-employment propensities are also higher for women with children under 6 at home, and those residing outside central city areas.

Women are more likely to be self-employed in the post-TRA86 period relative to the pre-TRA86 period. Since the CPS does not collect any information on household assets, I include family income from sources other than earnings as a proxy for family wealth, to control for liquidity constraints that might restrict women's choice of employment sectors (Evans and Jovanovic, 1989). The results reveal that its effect is positive, sizeable and highly significant, suggesting that family income is an important determinant of self-employment. Self-employment propensity decreases as marginal tax rates increase.

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. If they answered in the affirmative, they were asked whether their spouse was also covered by the plan. I matched the husband-wife pairs in the data and used the responses to these questions to ascertain whether a married woman had health insurance coverage through her spouse. This variable proxies for the price of health insurance; women who benefit from their spouse's health plan can be thought of as paying a smaller price for selecting into self-employment, relative to women who do not enjoy this benefit.

Controlling for marital status, women with spousal health coverage are 17% more likely to be self-employed, relative to women without coverage through the husband's health plan. One interpretation of this result is that the extension of health coverage for the wife through the husband's employer-provided health plan creates a wedge in the price of health insurance between married

[9] 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 0.071.

women enjoying this privilege and other women. This price effect in turn affects the assignment of women across different sectors of the economy.[10]

There may be several reasons why women with no spousal health insurance coverage do not select into self-employment. By comparing women with similar characteristics before and after the tax reform, we can control for other factors influencing the employment-sector decision 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 (actual or potential), 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 first run the following regression:

$$\begin{aligned} E_i = \alpha + \gamma_1(Married, no-spousal-health-coverage) + \\ \gamma_2(Previously-Married) + \gamma_3(Never-Married) + \\ \gamma_4 Year + \gamma_5(Married, no-spousal-health-coverage * Year) + \\ \gamma_6(Previously-Married * Year) + \gamma_7(Never-Married * Year) + \gamma_8.X_i + \varepsilon_i, \end{aligned} \tag{5}$$

where $E_i = 1$ if the woman is self-employed and $E_i = 0$ otherwise, X_i is a vector of controls, 'Married,no-spousal-health-coverage' is an indicator variable which equals 1 if the woman is married and has no spousal 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 spousal health coverage. Since this is the group which remained unaffected by TRA86, we expect the self-employment incidence for all the 'treatment' groups - married women with no spousal health coverage, previously married women and never married women to increase in the post-reform period. Thus, my prediction is that γ_5 , γ_6 and γ_7 are all positive.

Table 3 presents the probit coefficients of interest, the standard errors and the associated marginal effects.[11] The difference-in-difference estimates of the effect of the tax subsidy on self-

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

[11] I calculate the marginal effects on the interaction terms using the method outlined by Ai et. al (2004). I average

employment propensities are positive and statistically 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 were 23%, 25% and 14% more likely to be self-employed respectively, compared to married women who were covered by their spouse's health insurance policy.[12]

The results in Table 3, while interesting and informative, are based on treatment and control groups that are endogenously determined with employment-sector decisions. 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:

$$E_i = \alpha + \gamma_9 Single + \gamma_{10} Year + \gamma_{11}(Single.Year) + \gamma_{12} X_i + \varepsilon_i, \tag{6}$$

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's 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 Table 4.

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, single women were over three times more likely than married women to select into this sector. The marginal effect indicates that single women in the post-TRA86 period were 15% more likely to take up self-employment compared to married women.[13]

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the marginal effect across individuals to get the average marginal effect. The Delta method is used to compute standard errors.

[12]The percentage changes are calculated as the ratio of the marginal effect (0.0165, 0.0178 and 0.0101 respectively) to the predicted probability of being self-employed, as estimated by the probit regression underlying these results, which is 0.0710.

[13]This percentage change is calculated as (0.0104/0.0713) - the ratio of the marginal effect (0.0104) to the predicted

The estimate presented in Table 4, while sizeable and significant, is simply the marginal effect of the interaction between the post-policy indicator variable and a treatment group indicator variable. This specification might still pick up differential trends between the treatment and control groups. To overcome this possibility, it is necessary to impose more structure on the independent variable of interest. 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). The subsidy was therefore more valuable for those facing higher marginal tax rates, as the estimates in Table 1 reveal. I use this additional source of variation by re-estimating 6 and presenting the difference-in-difference estimates for those who were facing high marginal tax rates - defined to be more than 28%.

The results in Table 5 provide strong support for the hypothesis put forth in this paper. The marginal effect of the difference-in-difference estimator is over two times the effect reported in Table 4, and suggests that among women facing high marginal tax rates, single women in the post-TRA86 period were 18% more likely to take up self-employment compared to married women. [14] This is a sizeable effect. Since there is some evidence that the probability of take-up of the subsidy rose with income (Gruber and Poterba, 1994), I interpret the difference-in-difference estimate presented in this table as an upper-bound estimate.

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 labour supply, notably on the extensive margin; Eissa (1995) showed that the labour 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. While the estimates in Table 5 indicate that self-employment propensity among single women went up significantly even after controlling for taxes, I also cite additional evidence in support of my hypothesis from other studies.

probability of being self-employed, as estimated by the probit regression underlying these results. The predicted probability in this case is 0.0713.

[14] This percentage change is calculated as (0.0130/0.0716) - the ratio of the marginal effect (0.0130) to the predicted probability of being self-employed, as estimated by the probit regression underlying these results. The predicted probability in this case is 0.0716.

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. The upward trend in these rates for women preceded the tax reform, suggesting that increases in self-employment rates after the reform were not driven by changes in 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 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)

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%. Importantly, these changes were not accompanied by changes in the marginal tax rate schedule. Gumus and Regan (2007) estimate the effect of these changes on the probability of insurance take-up among the self-employed. While they find modest effects for most sub-groups, the effect for single people is sizeable, notably single women; a 10 percent decrease in the after-tax price of health insurance increases the likelihood of coverage by 0.68 and 1.02 percentage points among single men and single women respectively.

If TRA86 increased the share of women in self-employment who were also private insurance policy-holders, this would be an additional piece of evidence in support of my hypothesis. Admittedly, this is not a strong test since any such increased insurance take-up could be driven by women who were already self-employed. Nevertheless, this exercise would give us an upper bound on the

increase in self-employment among women that can be attributed to the tax subsidy. A comparison reveals that the share of self-employed women with private health insurance has increased from 13.31% in 1984/85 to 28.27% in 1990/91. This large responsiveness indicates that individuals are very sensitive to the price of health insurance.[15]

In order 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 underreport self-employment income relative to wage-salary income (Blau, 1987). Slemrod et.al. (2001) provide strong evidence to support this view. 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.

The 1980s was a period of increasing labour force participation among women in the United States. Moreover, as discussed above, there is evidence suggesting that TRA86 increased female labour 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. There is no evidence of such a change in composition based on observable characteristics of the self-employed; Table 2 suggests that self-employed women are very similar before and after TRA86. Nevertheless, other unobserved factors might have caused women entering the labour market after the reform to have higher propensities towards self-employment, thus driving up self-employment rates for reasons unrelated to the tax subsidy.

[15]The question on private health insurance changed between the two time periods used in this paper. In the 1984/85 surveys, the question that was used to ascertain whether the respondent was a policy-holder of a private insurance plan is 'Other insurance?', where 'other' refers to civilian insurance other than public or employer-based. This question is intended to measure 'persons who purchased coverage on their own.'(CPS, 1985). For the 1990/91 surveys, the corresponding questions are more direct and specific: 'Was (respondent) covered by private health insurance plan?' and a follow-up question 'Was this health insurance plan coverage in (respondent's) own name?'. Thus, despite the fact that these questions in the two survey periods were intended to elicit the same information, the changed wording suggests that we should interpret the measured increase in the share of private insurance holders among the self-employed with some caution.

5.2 Multinomial Logit 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 among single women is now estimated using a multinomial logit (MNL) model, pooling data from before and after the tax reform. The coefficients of interest, presented in Tables 6, are based on a specification with a full set of interactions, as described in the footnote to the table. The relative-risk ratios for wage-employment and self-employment are shown, relative to the non-employment outcome, along with the corresponding marginal effects.

The relative-risk ratios indicate that women are less likely to be employed when faced with high tax rates. Moreover, higher tax rates were more likely to discourage women from seeking employment after the tax reform. This is not surprising given that TRA86 lowered marginal tax rates, thus encouraging more women into employment. Single women are much more likely to be in paid employment and non-employment, relative to self-employment. Following TRA86 however, single women had a much lower probability for being in paid-employment. These estimates imply a 7% decrease in paid-employment relative to non-employment among single women, following the reform.[16]

The relative-risk ratio suggests that compared to non-employment, single women had a slightly lower probability of being self-employed following the tax reform. However, this effect is not precisely estimated. Note also that the marginal effect of the interaction term is positive, suggesting that in the post-reform period, single women were 9% more likely to be self-employed compared to being non-employed. Moreover, single women facing high marginal tax rates in the post-reform period had a higher propensity for self-employment relative to non-employment. This effect is significant at the 90% significance level and the marginal effect suggests that single women facing high marginal tax rates were 44% more likely to be self-employed following the reform, relative to being non-employed.[17]. Thus, the MNL results are more consistent with the Probit estimates in Table 5 than with those in Table 4; among the treatment group, those who had the most to gain from the TRA86 tax subsidy were the ones who selected into self-employment.

In summary, the MNL results are largely consistent with the probit estimates based solely on

[16]The marginal effect of the interaction term (single*post) is -0.0455 and the predicted probability of paid-employment is 0.6769. Dividing the marginal effect by the predicted probability gives the 7% decrease in paid-employment for this group.

[17]The variables and interaction terms reported in the table are jointly significant at 99% significance level.

employed women. While there is clear evidence that TRA86 encouraged more women to seek employment either in the wage-salary sector or in self-employment, there is no indication that women who became self-employed following the reform changed the composition of self-employed women workers discernibly. Over the years surrounding the tax reform, the incidence of self-employment increased among single women facing relatively high marginal tax rates. This effect, after controlling for the significant increase in the labour supply of married women, is a strong test of the impact of TRA86 on self-employment propensities.

6 Discussion and 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.

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. The relevant literature to evaluate this question comes from papers that try to estimate the price elasticity of demand for health insurance in the U.S., using tax policy changes that affected the price of health insurance. The evidence from this literature is mixed; Gruber and Washington (2005) find that the introduction of a tax subsidy for employer-provided health insurance among federal employees had a very small impact on insurance coverage. Gumus and Regan (2007) also find small price elasticities of demand for health insurance among most demographic groups. However, they find that single, self-employed women do

respond very strongly to price incentives. Similarly, Gruber and Poterba (1994) also estimate large increases in insurance take-up following the introduction of the tax subsidy in TRA86, especially among single individuals. My findings are consistent with the evidence of strong responsiveness among single individuals in both Gumus and Regan (2007) and Gruber and Poterba (1994).

The lower-bound marginal effects in this paper are smaller in magnitude than the estimates of insurance take-up implied by Gumus and Regan (2007) and Gruber and Poterba (1994) for single individuals. However, it is not clear that a direct comparison of magnitudes is meaningful since these papers estimate the impact of price changes along one discrete dimension - the insurance take-up decision, while I study the impact on a different discrete decision - the employment-sector choice. The decision to take up employment or to switch employment sectors is arguably more radical than the decision to purchase health insurance. So the fact that the employer-sector response is weaker than the insurance purchase response is not inconsistent with what one would expect.

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 and married women without spousal health coverage went up between 9% and 25% 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 biggest effects were among married women with no spousal health coverage and previously married women.

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.

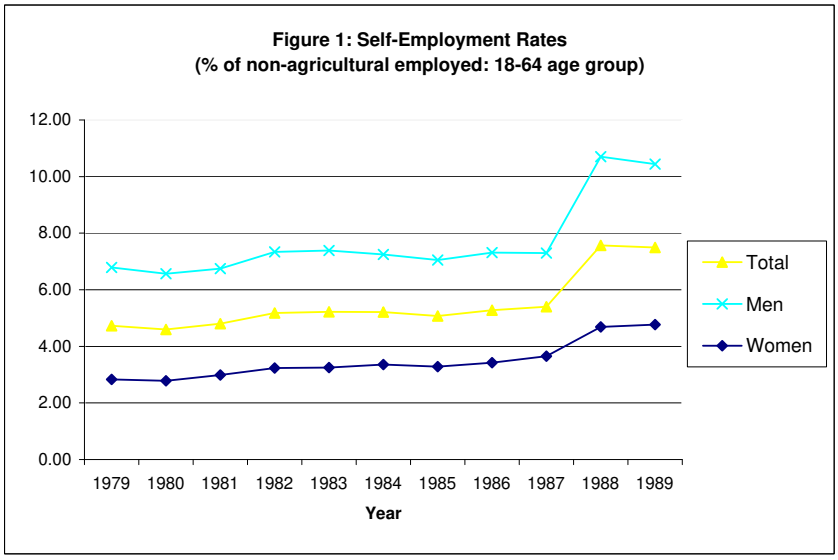
Figure 1: Self-Employment Rates
(% of non-agricultural employed: 18-64 age group)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989
Year
Total
Men
Women

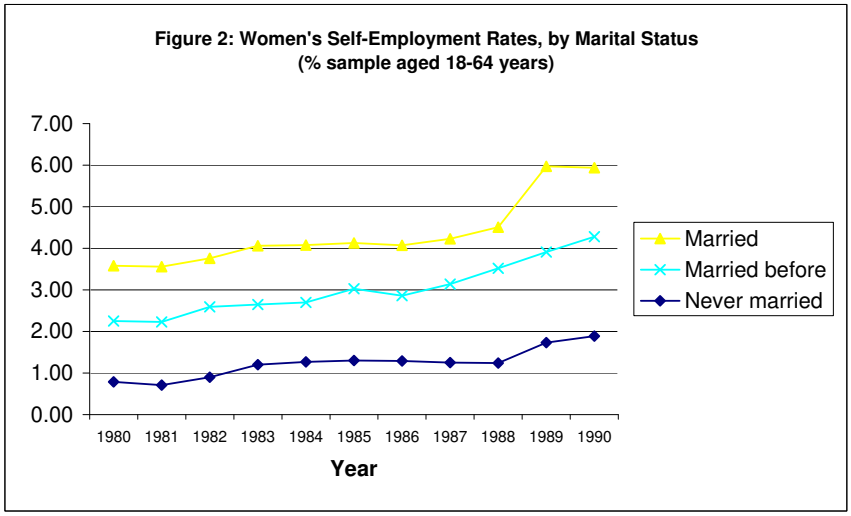
Figure 2: Women's Self-Employment Rates, by Marital Status
(% sample aged 18-64 years)
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990
Year
Married
Married before
Never married

Figure 3: Wage-Employment Rates
(% of non-agricultural employed: 18-64 age group)

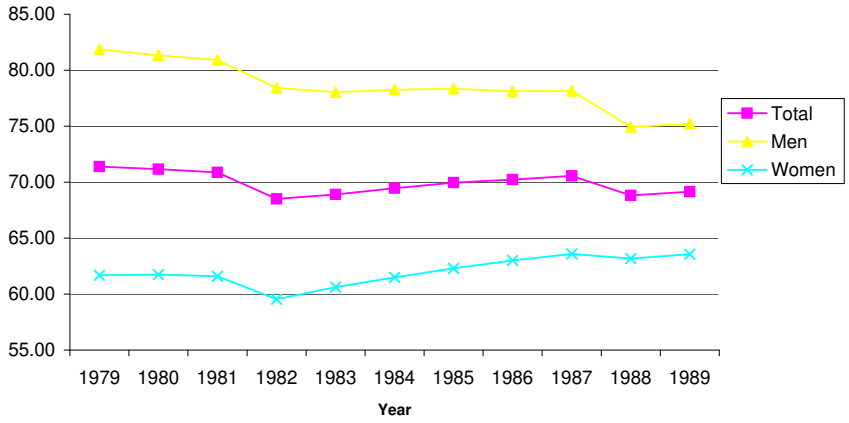

Figure 4: Marginal tax rate change distribution, following TRA86
Source: **Hausman and Poterba (1987), Fig.1, p.104**

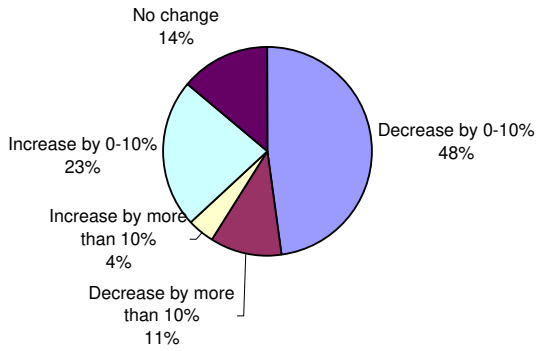

Table 1: Average After-Tax Price of Health Insurance

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 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
		(63.39%)	(65.49%)	(5.37%)	(5.80%)	(31.24%)	(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	23.38	21.29	24.19	21.64	30.13	30.34
		(42.32)	(40.94)	(42.84)	(41.18)	(45.88)	(45.97)
Race	White = 1	85.89	84.22	93.77	92.35	87.51	83.36
		(34.82)	(36.46)	(24.17)	(26.58)	(33.06)	(37.25)
Living in Central city	Yes	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	High School and Less	57.77	50.15	53.46	48.33	74.24	68.25
		(49.39)	(50.00)	(49.89)	(49.98)	(43.73)	(46.55)
	College, upto 5 years	36.70	42.67	41.40	43.12	23.94	28.18
		(48.20)	(49.46)	(49.27)	(49.53)	(42.67)	(44.99)
	$>$ 5 years of College	5.53	7.18	5.14	8.55	1.82	3.57
		(22.86)	(25.82)	(22.10)	(27.97)	(13.38)	(18.55)
Marital Status	Previously Married	19.38	19.88	11.54	15.13	13.57	16.07
		(39.53)	(39.91)	(31.95)	(35.84)	(34.25)	(36.73)
	Never Married	9.57	16.92	3.42	6.21	4.20	10.62
		(29.42)	(37.49)	(18.17)	(24.15)	(20.05)	(30.81)
	Married	70.05	63.20	85.05	78.65	82.23	73.31
		(45.35)	(48.23)	(35.67)	(40.98)	(38.23)	(44.24)
Husband Self-Employed		7.38	10.71	26.20	41.54	9.82	14.50
		(26.14)	(30.93)	(43.98)	(49.29)	(29.76)	(35.21)
Covered by Husband's		30.65	32.23	39.57	43.17	38.42	41.34
Employer-Provided Health Plan		(46.10)	(46.74)	(48.91)	(49.54)	(48.64)	(49.25)
Observations		21,567	54,014	1,827	4,838	10,629	23,056

Table 3: **Difference-in-Difference Estimates of Self-Employment Propensities by Marital Status (N=85,279)**

	1984-85	1990-91	*Time Difference*
Treatment Groups:			
T1. Married women with No Spousal Health Ins.	0.0797*** *(0.0022)*	0.0899*** (0.0014)	0.0101*** *(0.0026)*
T2. Divorced/Separated/ Widowed Women	0.0437*** *(0.0017)*	0.0551*** *(0.0011)*	0.0115*** *(0.002)*
T3. Never Married Women	0.0461 *** *(0.0019)*	0.0498*** *(0.0011)*	0.0037 *(0.0022)*
Control Group:			
C1. Married women with Spousal Health Ins.	0.1056*** *(0.0038)*	0.0993*** *(0.0020)*	-0.0064 *(0.0043)*
Group Difference for a given period:			
T1 Vs. C1	-0.0259*** *(0.0044)*	-0.0094*** *(0.0024)*	
T2 Vs. C1	-0.0619*** *(0.0041)*	-0.0441*** *(0.0022)*	
T3 Vs. C1	-0.0595*** *(0.0042)*	-0.0494*** *(0.0022)*	
Difference-in-Difference:	T1 Vs. C1		0.0165*** *(0.005)*
	T2 Vs. C1		0.0178*** *(0.0047)*
	T3 Vs. C1		0.0101** *(0.0048)*

Note: This table reports the marginal effects from regression on equation 5. The regression includes controls for age, education, race, residence in central city, estimated marginal tax rates, indicator for presence of dependent children and family non-earnings income. Standard errors, using the Delta method, are in parentheses.
*** - significant at the 99% level; ** - significant at the 95% level;* - significant at the 90% level

Table 4: **Difference-in-Difference Estimates of Self-Employment Propensities: Single Vs. Married Women (N=85,279)**

	1984-85	1990-91	*Time Difference*
Single Women	0.0445***	0.0538 ***	0.0092***
	(0.0012)	(0.0007)	*(0.0014)*
Married Women	0.0902***	0.0942***	0.0040*
	(0.0022)	*(0.0012)*	*(0.0025)*
Group Difference for a given period:			
	-0.0457***	-0.0404***	
	(0.0025)	*(0.0014)*	
Difference-in-Difference:			
			0.0052***
			(0.0022)
Predicted probability at $\overline{X}$			0.0716

Note: This table reports marginal effects from a probit regression on equation 6. The regression includes controls for age, education, race, residence in central city, estimated marginal tax rates, indicator for presence of dependent children and family non-earnings income. Standard errors, using the Delta method, are in parentheses.

*** - 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 (High Income Tax Sample): Single Vs. Married Women (N=85,279)**

	1984-85	1990-91	*Time Difference*
Single Women	0.0444***	0.1028 ***	0.0584***
	(0.0012)	(0.0011)	*(0.0016)*
Married Women	0.0922***	0.1375***	0.0453*
	(0.0023)	*(0.0016)*	*(0.0028)*
Group Difference for a given period:			
	-0.0478***	-0.0347***	
	(0.0026)	*(0.0019)*	
Difference-in-Difference:			
			0.0130***
			(0.0032)
Predicted probability at $\overline{X}$			0.0716

Note: This table reports marginal effects from a probit regression on equation 6, restricted to those women facing estimated marginal tax rates higher than 28%. The tax rates were estimated using NBER's TAXSIM programme. The regression includes controls for age, education, race, residence in central city and indicator for presence of dependent children. Standard errors, using the Delta method, are in parentheses.

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

Table 6: Multinomial Logit Results - Relative Risk Ratios (RRR) and Marginal Effects (N=120,828)

	Wage Employment			Self-Employment		
Control Variables	Relative Risk Ratio	Marginal Effect	Percentage+ Change	Relative Risk Ratio	Marginal Effect	Percentage+ Change
Marital Status: *Base Category - Married Women*						
Single	1.4975***	0.0943	13.93	0.7642***	-0.0261	-48.53
	(0.0507)			(0.0597)		
Post-TRA86 (Post)	1.0709***	0.0115	1.71	1.1021***	0.0024	4.54
	(0.0207)			(0.0413)		
Single*Post	0.8080***	-0.0455	-6.72	0.9467	0.0049	9.21
	(0.0305)			(0.0821)		
High Marginal Taxes (HighMTR)	0.5359***	-0.1266	-18.70	0.5590***	-0.0081	-15.05
	(0.0186)			(0.0387)		
High MTR*Post	0.4090***	-0.1980	-29.25	0.6269***	0.0048	8.90
	(0.0196)			(0.0575)		
Single*High MTR	13.4344***	0.2367	34.98	12.1201***	0.0118	21.90
	(2.8676)			(3.4678)		
Single*High MTR*Post	1.2712	0.0255	3.77	1.7739*	0.0240	44.69
	(0.3477)			(0.0269)		
Predicted Probability		*0.6769*			*0.0537*	
Log-Likelihood			-88,514.86			
Pseudo-R2			0.0883			

Note: The regression also includes controls for age, education, race, residence in central city and indicator for presence of dependent children. Figures in parentheses are robust standard errors.
+ All percentage changes reported in the paper are calculated as the corresponding marginal effect divided by the predicted probability of the corresponding employment outcome, evaluated at mean levels of all control variables.
*** - significant at the 99% level; ** - significant at the 95% level; * - significant at the 90% level

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