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DID THE TAX CUTS INCREASE HOURS OF WORK?

A PRE - POST ANALYSIS OF SWEDISH PANEL DATA.*

by

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ABSTRACT

Based on longitudinal data covering periods before and after the major Swedish tax reform in 1991 a difference-in-difference approach is used to estimate the effects on hours of work of the cuts in the income tax. The results show that women increased their hours more than men did. If there is an effect for men at all, then primarily young men have adjusted to the new tax incentives

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1. Introduction

Several countries have in the last decade implemented tax reforms to increase the incentives to work and save and to decrease the incentives of tax avoidance and activities in the ”black” economy. Sweden is one of them. The progressivity of the Swedish income tax system was at its peak in the first half of the 1980s. Gradual decreases in the marginal tax rates then followed with the major steps taken in 1990 and 1991. Figure 1 shows the marginal tax rates by tax assessed income in constant Swedish crowns for 1985, 1990 and 1992.[1] The decrease in the tax rates is so large that one might expect observable adjustment effects as a result of these changes. The 1990/91 reform was preceded by extensive studies in a government commission. There were among others two issues, which were much discussed inside and outside the commission, namely the distributional issue and the size of any behavioral adjustments, in particular in the supply of labor.

Labor supply studies done for the government commission suggested that the substitution effects of the marginal tax changes were not negligible (see *Reformerad Inkomstbeskattning*, 1989). Although the 1990/91 reform was designed to become almost revenue neutral these results were a partial motive not to fund it fully. There were, however, also critical voices raising doubts about the size of any labor supply effects and suggesting that the labor supply studies were interpreted in an overly optimistic way (Flood & Klevmarken (1990), see also Björklund(1995) and his reference to the proceedings of the Swedish Economic Association 1988).

The Swedish Parliament allocated funds for an evaluation of the effects of the 1990/91 tax reform and the task was given to a government commission (KUSK) which contracted out part of the scientific evaluation to a group of economists. In their report (Agell, et.al., 1995) they conclude that the tax reform might have generated an increased supply of hours for married and cohabiting men in the order of 5 per cent or somewhat less, while the expected effect for married or cohabiting women probably is close to zero. For singles there are no results. (Agell et.al 1995, p. 143) With the exception of a preliminary version of the current study (Klevmarken et.al., 1995 section 4.4) these conclusions were entirely based on studies only using data from the period before the 1990/91 tax reform and in one case even cross-sectional data from 1980 (Aronsson & Palme, 1994).

After the tax reforms have been implemented we should now take advantage of the interesting experimental situation these reforms have given and use data collected both before and after the reforms. A defense for only using pre reform data is that Sweden entered its deepest recession since the 1930s immediately after the 1990/91 reform and that it will become difficult to separate the effects of the tax reforms on labor supply from other effects. This difficulty should, however not prevent us from supplementing previous studies with pre-post studies to better answer the question: Did the tax reform influence labor supply? This paper tries to answer this question using panel data for a random sample of Swedes collected in 1986 and 1993. Although it would be possible to estimate a conventional labor supply model assuming that each individual chooses consumption and leisure to maximize utility, we take a more agnostic approach in a statistical analysis of observed changes in hours worked.

[1] In 1992 labor incomes and incomes of capital were no longer jointly taxed. The curve for 1992 is a function of assessed labor income only.

Consequently, any welfare related conclusions are beyond the scope of this paper. The aim is only to investigate if the tax reforms made people work more (or less).

2. Previous experiences, theory and outline of the study.

Labor supply studies using Swedish data have recently been surveyed in Gustafsson & Klevmarken(1993) and in Aronsson, Heckman & Walker(1994). Like the international literature on labor supply the Swedish literature also give evidence of a diversity of results. Many of the most influential studies on Swedish data have, however, been made in the same approach as once suggested by Hausman and using one single cross-section of data, the 1980/81 LNU-wave. This perhaps explains why a certain consensus seems to have emerged among Swedish economists as to the magnitudes of labor supply elasticities, which is reflected in the summary and evaluation of empirical results in Agell et.al.(1995).[2] For prime aged married men they found that estimated income elasticities were in the range of -0.1 and 0 and compensated wage rate elasticities in the range of 0.08 to 0.24 with a concentration around 0.1. For women the range of results was wider. Income elasticities were found between -0.03 and -0.24 and compensated wage rate elasticities between 0.22 and 1.07.

There were two studies commissioned by KUSK, which are of particular interest. One is Aronsson & Palme (1994) because they estimated a household model taking into account the interaction between the two spouses. They assumed that a myopic quadratic utility function of the husband's and wife's work hours is maximized subject to a budget constraint for the household. The model was estimated by the maximum likelihood method. They found income elasticities close to zero (0.01 for men and -0.06 for women) and an own-price elasticity for men of 0.15 and a cross price elasticity close to zero. For women the own price elasticity was 0.31 but the cross price elasticity was -0.1. This implies that the decrease in marginal tax rate experienced by men after the 1990/91 tax reform, which was large compared to that of women, reduced the labor supply of women. The net effect simulated by the authors showed almost no change in annual hours of work for women. Men increased their hours 5-8 per cent depending on base year for the comparison.

Another interesting study is that of Ackum Agell & Meghir(1995) because this is the only study based on a long panel of Swedish micro data. They estimated both a life cycle model and a more conventional "within period" model of labor supply. The estimated equation was in the form of a log-change equation in hours of work. Their data covered male blue-collar workers from the Swedish engineering industry. The results were low elasticities in the same range as previous Swedish studies, and they concluded that the tax reform is unlikely to have had large incentive effects on hours worked by males.

In the international literature we have only been able to find two studies, Eissa(1995) and Mariger(1995) which uses panel data before and after a tax reform to evaluate its effects on labor supply. In both studies the object of the analysis is the Tax Reform Act of 1986 in the United States. Compared to the Swedish 1990/91 reform the US tax reform involved smaller decreases in the marginal rates in particular for people below the highest income brackets, and the decreases also started from a lower level. For people with the highest incomes the marginal tax rate decreased from 50 percent to 28 percent in the US and from 80 per cent to 50 per cent in Sweden. The analysis of Eissa (1995) is limited to the work behavior of married women at or above the 99th percentile of the income distribution. This choice is guided by the

[2]Although elasticities are model based concepts and do not exist independently of a model, and usually depend on a number of variables and thus vary to their magnitude from one individual to another, it is very common to try to assess "the" value of an elasticity.

fact the marginal tax rates were lowered much more for high-income individuals than for those further down the income distribution and that married women are believed to be more responsive to tax changes than other groups. A difference-in-difference technique was used to measure work responses to the 1986 tax changes. To control for changes in work caused by other factors than the tax reform women at the 75th (90th) percentile of the income distribution were used as control group. The impact of the tax reform was thus identified as the difference between the change in labor supply of women from high-income families (treatment groups) and the change in labor supply of women from the 75th percentile (control group). Income was defined as the sum of the husband's labor income and any nonlabor income received by the family. It was thus assumed that the wife conditions her participation and hours decisions on her spouse's labor supply decision. A regression framework was also used to hold variables like age, education, family size etc. constant.

The results, based on CPS data, indicate that women from high-income families did adjust their work according to the tax reform. The elasticity of total labor supply with respect to after-tax wage was approximately estimated to 0.8 and the participation elasticity to 0.4. It is also of some interest to note that for these high-income women "the participation decision is only slightly more sensitive to taxes than the hours decisions".

In the Mariger (1995) paper a life-cycle model was assumed which resulted in an estimated relation in which the log-change of leisure depended on marginal and average tax changes, changes in the gross wages, education, age, number of children and a regional unemployment rate. Separate relations were estimated for males and females. The data used came from the nonpoverty sample of the Panel Study of Income Dynamics. They were limited to families headed by the same married couple between 1985 and 1988 and only included individuals working an average of at least 10 hours per week in each year between 1985 and 1988. The estimates of the effects of the tax changes were close to zero and insignificant. The point estimates implied that the tax reform increased total hours worked about 1 percent for men and about 0.3 percent for women. Using a confidence interval the author concluded "that the tax reform is 95 percent certain to have increased hours worked by no more than 2 percent in 1988".

As a general observation we note that the now numerous studies of the incentive effects on labor supply of tax changes have given a variety of results depending on model specification, data and econometric methods used. We have learned that modeling labor supply behavior is a much more complex endeavor than most early analysts realized. There are severe problems of obtaining good and reliable measures of the key variables: hours worked, wage rate and incomes (c.f. for instance Duncan & Hill (1985) and Andersson et.al. (1993)). With most current data sets it is difficult to get a good representation of the budget sets even within a static model. The tax legislation and the transfer systems of most Western countries are so complex that the data sources available for research normally do not have all the information needed to compute correct budget sets. The most severe difficulty is, however, to obtain a realistic model representation of the very complex processes of labor supply. The relatively simple, usually static models, which have been used in most empirical studies, impose too much structure on data. There is a risk that the a priori assumed model structure will have a decisive influence on the estimated price and income effects.

The approach taken in this paper is not that of estimating the structural parameters of an economic model but rather that of using the analogy of a statistical experiment. This implies

looking upon the tax changes as a quasi experiment to which the taxpayers are exposed and try to assess the outcome of this experiment, as measured by the change in annual hours of work, in a statistical analysis.

Those who have experienced the largest changes in marginal taxes might also be expected to adjust their hours of work the most. By grouping a sample of tax payers by the size of the change in marginal tax rate and compute the average change in hours worked for each group we might be able to average out confounding effects on hours of work and estimate the effects of tax changes. A little reflection shows, however, that the analogy with a statistical experiment is far from perfect. It is relatively easy to find confounding factors which need to be controlled. Although we do not claim to estimate a structured economic model, economic theory is useful in guiding the analysis of work behavior and suggesting control variables. In a standard life cycle labor supply model in which a time-separable utility function of consumption and leisure is maximized subject to a budget constraint, it can be shown that the change in labor supply is a function of the change in the gross wage rate, the marginal tax rate and nonlabor income, and in any taste shifters. This very simple model, however, neglects important aspects of behavior, for instance, that decisions about work and leisure are joint family decisions and not independent decisions of each individual, that the formulation of the budget set is a simplification and that there are no reasons to believe people to have full knowledge of their budget sets[3]. Furthermore, hours worked are not at the complete discretion of the worker, because there are both institutional restrictions as to hours of work and general demand variations. In the following the 1986 and 1993 waves of Swedish HUS data will be used in a multivariate difference-in-difference approach to assess any effects on hours worked of the 1990/91 tax reform. First follows a discussion of data and variables used.

3. Data, population and variable definitions

Data were obtained from the longitudinal survey ”Household Market and Nonmarket Activities (HUS), see Klevmarken & Olovsson (1993). The first wave of data was collected in 1984 for a random sample of Swedish speaking individuals living in Sweden. This sample has since then been reinterviewed almost every second year and supplementary samples have been added to the study. In this paper we will only use data from the two waves of 1986 and 1993. They were relatively large waves including enough variables to compute good budget sets and they were also similar in design. The smaller waves of 1988 and 1991 in which data were primarily collected in postal questionnaires and not by telephone or in personal interviews do not include all the information needed to compute good marginal tax rates. The implication of only using the 1986 and 1993 waves is that we will not be able to isolate the effects of the 1990/91 tax reform, but on the other hand we might be able to capture any lagged reactions to the early adjustments of the tax system in the period 1985 - 1992.

Most Swedes who have not already retired before the age of 65 will do so at this age. For many employees 65 is a mandatory retirement age. For this reason everyone who were 58 or older in 1985 and thus became 65 no later than 1992 were excluded from our study. With this exception none was excluded from the population on the basis of industry, schooling, region, etc. Self-employed are thus included but the share of self-employed is very small.

[3] For an empirical verification of this statement see Wahlund(1987) and Klevmarken et.al.(1995)

Table 1 gives a few details about sample size by gender and labor force participation in 1985 and 1992. In all, the survey includes 1147 men and 1205 women who were below the age of 58 in 1985 but many of these respondents had dropped out of the panel by 1992. In some cases they did so because they died or left the country or joined an institution but in most cases because they did not want to participate or could not be found. In our analysis we will have to compensate for this attrition. There were 559 men and 504 women who worked both years. Some of these will drop out during the course of the analysis because there is partial nonresponse in some of the explanatory variables. Because the Swedish labor force participation rate is rather high for both gender, the number of individuals who did not work at all was relatively small both years which makes an analysis of transitions between work and no work difficult. The focus of our analysis is thus on those who worked in the market both years, a constraint, which also may cause sample selectivity.

In the following a brief description is given of the variables used in this paper. A more detailed account of variable definitions and measurement approaches is given in Appendix A.

The ”dependent” variable in this study is the (log) *change in annual hours of work* and it includes hours both at the main job and at any secondary job. It also includes vacations, sickleave and other leave from work up to eight weeks. Table 2 gives a few summary statistics. The median change in hours is zero for males and almost zero for women. The means suggest a 4 percent increase for men and 17 percent for women which implies that the right tail of the distribution is somewhat more elongated than the left tail. The skewness of these distributions is, however, very small. The higher increase for women starts from a lower level. On average sample women worked 1482 hours in 1985 while men worked 2037 hours.

The ”design variable” is the *change in marginal tax rate*. It was calculated on the basis of incomes received in 1985. We thus compared the marginal tax rate an individual would have had if the 1992 tax system had been enforced already in 1985, with the marginal tax rate obtained with the 1985 tax system. As the income definitions, tax bases, thresholds and rules for deductions and exemptions changed these computations are not straightforward. The assumptions used are detailed in Appendix. These marginal tax rate changes only result from changes in the income tax system. They do not include any changes in income dependent benefits nor the increase in indirect taxes. For most purposes the change in the marginal tax rate has been dichotomized. Two dummy variables were defined, one (D1) takes the value 1 when the decrease in the marginal tax rate exceeded 20 percentage units and the other (D2) takes the value one when the decrease exceeded 7 but not 20 percentage units.

Table 2 shows that in our sample of working men and women the marginal tax rate on average decreased by 14 per cent. The 10th percentile was - 25 per cent. There were very small gender differences in the changes. The gender differences in levels were also small. In 1985 the average marginal tax rate was 50.9 per cent for males and 45.2 per cent for female. The explanation is of course that the sample is limited to those who worked in both years.

One of our explanatory variables is the *log-change in the hourly wage rate*. The hourly wage rate can be estimated in two different ways. One alternative is to divide the sum of all labor incomes with an estimate of the annual hours of work. The other alternative is to use survey questions on pay combined with information on average weekly working hours at the time of the interview. The former estimates can be obtained for 1985 and 1992, i.e. the same years for which we have observations on annual work hours. The latter estimates are only available for

1986 and 1993. For this reason the survey-based estimates are less useful to explain the change in hours 1985-1992, but they will be used as instruments in the subsequent analysis.

Nonlabor income is the sum of income from capital, accrued capital gains and losses and nonwork related benefits. For households with two spouses the variable is defined as the sum of each spouse's nonlabor income. We also experimented with adding the labor income of the respondent's spouse to the household's nonlabor income. Both wage rates and incomes were deflated by the CPI.

A few demographic "taste shifters" were also used, mostly in the form of dummy variables. One is a variable which indicates if the respondent *separated* from a partner in the period 1985-1992 . For women, in particular, a separation might result in an increased labor supply. Women are also likely to become affected by changes in the *number of small children* in a household. In families with children below school age and in particular with infants women and perhaps also men will decrease their labor supply. During a period of one and a half years after a child is born one of the parents can stay at home with compensation from the social security system. Likewise, when children grow up and start school parents might increase their labor supply again. One variable (Chplus) indicates if the number of children below 7 years of age (school age) has increased in the period 1985-1992, and another variable (Chminus) indicates if the number of children in this age range has decreased. The first variable is expected to have a negative effect on labor supply and the second a positive. *Age differences* are represented by two dummy variables. AGE30 takes the value one if the respondent was at most 30 years old in 1985 and AGE50 takes the value one if the respondent was older than 50 in 1985. The first of these dummy variables is expected to capture any increases in labor supply when young people leave their education and training period and enter the labor market more permanently. AGE50 will capture the rather frequent partial withdrawal from the labor market a few years before normal retirement age. Early retirement has become ever more common.

In the period analyzed the Swedish economy was exposed to major changes not directly related to the tax reform. The financial markets became deregulated which resulted in a credit expansion and an increased demand for credit financed real estate and consumer durables. Real interest rates for a person who wanted to borrow money were negative until the beginning of the 1990's and then increased sharply. Inflation averaged almost 7 per cent 1985-1991 with a peak close to 11 percent in 1990. In 1992 it dropped to about 2 per cent. The financial crises of 1992 with increasing interest rates and a floating Swedish currency also had a major impact on the real economy. The excess demand for labor at the end of the 1980's and beginning of the 1990's in 1992 turned into an excess supply. The unemployment rate, which was about 2.8 per cent in 1985, first decreased and then in 1992 almost doubled compared to its 1985 level. It is obviously difficult to isolate the effects of the tax reforms from all other changes, which also might have influenced hours of work. We try to capture the effect of changes in the demand for labor by using regional *changes in the unemployment rate.*

4. A multivariate analysis to compensate for confounding effects.

If the tax payers had been exposed to a controlled random experiment we could simply have computed the mean change in annual hours by suitable levels of change in the marginal tax rate and compared. Because our data do not come from a controlled experiment

we have to control for confounding factors, which will be done by a regression model, and hope that any effects not controlled for are randomly allocated across the population. Our situation is, however, even more complicated, because our ”design variable” is not exogenous to the outcome of the experiment but depends on the 1985 work hours. We also have to deal with measurement errors in the wage rate variable which might be correlated with our outcome variable and with the possibility of sample selection because of nonresponse and because some people choose not to work at all. These three problems will first be discussed one by one.

To see that regressing the change in hours on the change in marginal tax rate at the 1985 observed hours might give spurious results, assume that the annual hours of market work are determined by an optimizing behavior according to a conventional labor supply model and a random error with zero expectation and independent of the optimal point. This implies that by chance a number of individuals will work more hours than normal in 1985 and thus also get unusually high incomes. For these individuals we will compute relatively large decreases in marginal tax rates. In 1992 they would tend to return towards their normal (optimal) hours, and we will thus observe a spurious positive correlation between the change in marginal tax rates and in hours worked. If labor supply is influenced by transitory forces other than an economic optimizing behavior subject to a budget constraint, here represented by a random error, we will tend to underestimate the change in hours for those who experienced large decreases in their marginal tax rates and overestimate the change in hours for those who experienced small or no tax decreases. A small sampling experiment demonstrated that a random error of this kind could produce insignificant effects of the tax decreases although they by assumption would increase labor supply (Klevmarken et.al., 1995, Table 4.4). For this reason the annual work hours in 1985 were instrumented by the respondents age in 1985, the square and cube of the age variable, years of schooling, schooling squared, the interaction of age and schooling, if the respondent lived in one of the big cities, the number of children less than 7 years of age in 1985, incomes of capital 1985 and its square, the spouse’s labor and capital incomes 1985, and the sum of not means tested transfer payments made to the household. Separate regressions were run by gender and for married and singles, see Table A1. The predicted annual hours were used to calculate a new estimate of labor income 1985 which jointly with observed incomes of capital etc. were used to compute ”instrumented” estimates of the marginal tax rates with the 1985 and 1992 tax systems respectively. These estimates were finally used to obtain new ”instrumented” estimates of the change in the marginal tax rate.

Table 3 shows average changes in work hours by the instrumented change in marginal tax rate and by gender. The mean change for males ranges from a decrease of 132 hours for those who did not get any tax cut to an increase of 105 for those who got a decrease by at least 20 percentage units. The difference-in-difference estimate is thus an increase in work hours of 327 hours for the latter group. However, if medians are used rather than means the effect is zero. The effect of the tax decrease is stronger for females. For those who experienced a decrease, which exceeded 20 percentage units the mean increase was 354 hours and the median increase 155. For those who did not get any decrease in their marginal tax rates the corresponding estimates are 43 hours and 0 hours. The difference-in difference estimates thus become 311 hours and 155 hours. An increase of 311 hours corresponds to a relative increase of as much as 23 per cent for the group of working women, which benefited most from the tax changes. It remains to see if this strong effect is still present when the effects of all the other variables have been separated out.

The wage rate measures for 1985 and 1992 were obtained by dividing labor income with annual hours of work. This implies that any measurement error in annual hours might render inconsistent estimates of the wage rate effects (and all other effects). To deal with this problem the log-change in the wage rate has been instrumented using as instruments the respondents age in 1985, ditto squared and cubed, years of schooling in 1986 and ditto squared, the survey based wage rates from 1986 and 1993, if the respondent lived in a big city in 1986, if married or cohabiting, the number of children below the age of 7 in 1985 and ditto in 1992, nonlabor income in 1985 and 1992 and the spouse's nonlabor income 1985 and 1992. (The estimates are given in Table A2.) Please note that the problem is measurement errors primarily in hours worked and that there is no reason to believe that these errors are correlated with the survey-based wage rate estimates for the succeeding years. These two variables are thus valid instruments for this purpose.

It has already been noted that the panel is burdened by attrition and we will find that there are partially missing observations which will decrease the effective sample size even further. This reduction of the sample may well be nonrandom, a selectivity which need be tested and if significant controlled for. Because the sample is limited to those who worked both in 1985 and in 1992 this is another possible source of selectivity, namely if the decision to work not is independent of the process which determines how many hours someone will work if he works. To control for these two sources of selectivity a probit was run and Heckman's lambda computed and added to the set of explanatory variables. The probit equation thus explained the probability to contribute to the analysis given that the observation was part of the 1986 HUS wave. Any selectivity caused by a selective initial nonresponse in the 1986 wave is thus not controlled for. The explanatory variables used in the probit was the respondent's age in 1985 and ditto squared, if the respondent was married or cohabiting, years of schooling in 1986 and ditto squared, number of children in the household 1986, and the number of children less than 7 years old, if the respondent lived in a big city 1986, and nonlabor income 1985. The estimates were obtained separately for males and females and they are exhibited in Table A3.

With the modifications explained above a regression model was estimated for the change in annual work hours using Heckman's two-step approach. The choice of functional forms in modeling the effects of the design and control variables on the change in hours is open for experimentation and a few alternative specifications have been tried. For instance, we tried higher powers of the explanatory variables, a polynomial in the change of the marginal tax rate and the dependent variable as the log-change rather than the change in hours.[4] A few alternative definitions of the wage rate and income variables have also been tried. The main results are rather robust relative to these changes in the specification. Table 4 gives the results for a specification, which introduces the variables previously motivated linearly and also nonlinearly when significant. The same model was estimated both with the change in hours and with the log-change as dependent variable. In the choice between these two alternatives some preference might be given to the first alternative because the distribution of hourly changes satisfies the assumption of a normal distribution more closely than the distribution of log-changes does, which has a high kurtosis (Table 2.). But it is also a matter of how one prefers to interpret the results, in terms of hourly changes or relative changes.

[4] An alternative is to use a non-parametric approach like, for instance, a kernel estimator, but the number of effective observations is so small that it is doubtful whether such an approach would give more useful results.

The estimates of Table 4 show that the tax changes had a major impact on women's work hours. According to the change equation the point estimate for those who experienced a tax decrease of at least 20 percentage units is as large as 436 hours which approximately corresponds to a relative increase of more than 30 per cent! A 95 per cent confidence interval ranges from 219 to 654 hours. Also women who got a smaller tax decrease increased their hours but by less, for them a confidence interval ranges from 54 hours to 413 hours. The corresponding estimates for men are about half the size of those for women, which implies that only the effect for those who experienced large tax decreases is significantly different from zero. As men on average work more than women the relative effect for men is even smaller, about 10 per cent for the group with the largest tax decrease. The log-change equation give estimates of relative effects, which are somewhat higher than those of the change equation, but the qualitative conclusions are the same.

Wage rate changes have a significant effect on men's work. Large increases increase hours while small increases decrease them. For women there is no significant effect. Changes in nonlabor income have no effect on work hours for either gender. The effect of changes in marital status is also insignificant.

It is conceivable that worker's adjustment to new incentives are constrained by the employers because jobs are only offered in certain packages, for instance, as full-time jobs of 40 hours per week and because overtime is decided by the employer. To test the hypothesis that this kind of constraints were important a dummy variable was added to the model. It indicated if the respondent was permitted to work more hours if he (she) wanted. This variable was available both from the 1986 and 1993 waves of data. The interaction between this variable and the tax and wage rate variables were also tried, but none turned out significant (not shown in Table 4).

When the number of preschool children increases women decrease their work effort significantly. The point estimate shows an average decrease as large as 700 hours. There is no corresponding effect for men. Using time-use data Flood(1990) and Carlin & Flood(1994) found that not only women but also men decreased their labor supply when they had small children. The difference in results is probably explained by the difference in definition of hours worked and in measurement method used. In our case the definition of work includes short leaves from work and if, for instance, a father stays at home for a day to attend to a sick child it will not be registered in our data while it will in time-use data. Studies of the take up of family benefits show that Swedish fathers frequently stay at home for a short period to attend a child while the mother takes the responsibility for long periods of attendance, for instance, after a child is born.

Those who are above the age of 50 significantly decrease their work hours independently of other incentives. The relative effect of early (partial) retirement is about the same for males and females, but because men on average work longer hours their decrease is larger measured in hours. The point estimate is as large as a decrease of almost 400 hours with a 95 per cent confidence interval ranging from -614 to -174 hours. There is no significant effect of being young.

Changes in the unemployment rate had a significant effect on women but not on men. An increase of the unemployment rate with 1 percentage unit decreased on average women's

labor supply by 91 hours. The corresponding confidence interval ranges from a decrease of 73 hours to a decrease of 175 hours. The point estimate of men is much smaller and also insignificant. This is consistent with the notions that men still are more firmly attached to the labor market than women and that the public sector, where many women are employed, for the first time after World War II tried to reduce the number of its employees.

The message given by Table 4 with respect to the significance of Heckman's lambda is somewhat mixed. The change equation indicates a significant selectivity for males but not for females, while the log-change equation shows a significant selectivity for females but not for males! To investigate how sensitive our results are to Heckman's compensation for selectivity results are also presented without Heckman's lambda but supplemented with a few diagnostic tests (Table 5). These models were estimated by OLS.

The diagnostic tests obtained from the model for males (model M1) shows that there are problems with this model. White's test for heteroskedasticity rejects the hypothesis of homoskedasticity, Ramsey's RESET test also indicates that the model is badly specified, and the residuals have a rather high kurtosis. As Heckman's lambda is significant for this equation selectivity could be the cause of these problems, but a closer analysis of the least-squares residuals reveals that there are a few extreme observations with very large positive or negative changes in work hours, and that there might be some kind of heterogeneity in behavior related to age. For these reasons a model was estimated with interactions between the dummy variable for people below 30 and the variables for changes in wage rates and marginal tax rates, and with six extreme observations removed with work hours exceeding 1500 hours in absolute change. The idea behind this specification is that young people are more mobile and find it easier to adjust to changes in incentives. The results are presented in Table 5 (model M2).

This revised model specification passes the diagnostic tests. It is true that the residual kurtosis is to high to make the Jarque-Bera test not reject the hypothesis of normal residuals, but the kurtosis is still rather mild and more importantly there is no skewness. The estimates now reveal that most of the action takes place among those below 30 years of age. Young men react more strongly negative to a small or moderate wage increase than middle aged and old men do. Using the point estimates one finds that a one per cent real wage increase before tax decreased the annual hours of work of young men by about 20 hours, but only by 6 hours for older men. If the tax incentives were effective on men at all this effect was present only for young men who got large marginal tax decreases. The point estimate is an increase of 400 hours but it is not well determined and barely significantly different from zero. All other results are approximately the same as in the previous model specification. Although the new model specification passes the diagnostic tests it does not exclude the presence of sample selection selectivity. Indeed, as demonstrated in the second column of Table 4 Heckman's lambda comes out significant. The estimates of all other parameters are, however, approximately the same as without correction for selectivity, and our conclusions about the behavior of men holds.

For females the original model specification passes the diagnostic tests. (The Jarque-Bera test of normality is an exception but this very mild deviation from a normal distribution is innocent.) Because Heckman's lambda was insignificant for females in this model one should expect the OLS-estimates to be rather close to those obtained with Heckman's two-step method, which also is the case. A test of the same interaction terms, which were found

important in the male equation, turned out nonsignificant. There is thus no indication that the incentive effects are different for young women compared with older women. The wage rate and income variables do not explain much of the behavior of women and a test of the hypothesis that they have no effect cannot be rejected. Estimates with these two variables deleted are given in the last column of Table 5. Because there is a rather high partial nonresponse in the wage rate variable, dropping it implies that the effective sample size increases by 56 per cent. These new results deviate in three respects from the old results. There is no longer any significant effect of moderate decreases in the marginal tax rates. The relatively large effect of high tax decreases remains however. The estimate of a return to more work after the children have reached school age becomes stronger although still not fully significant, and the negative effect on women's work hours of an increase in the unemployment rate drops and becomes insignificant.

There are previous results for Sweden, for instance in Aronsson & Palme (1994) which show significant cross-price effects on the labor supply of two spouses. To test the presence of such effects the spouse's wage rate and tax dummies were added to the models of Table 5. The sample was reduced to married and cohabiting couples. The point estimates were small and insignificant. There was thus no indication of any cross effects in data, but with such small sample insignificant estimates do not say much.

Most of the analysis in this paper has been limited to those who worked both in 1985 and 1992. It is a popular notion that decisions to enter the labor force is more sensitive to changes in incentives than changes in hours among those who already are in the labor force. Unfortunately the current data set does not permit a test of this notion. Table 1 confirms what is already known from population statistics that the share of both men and women outside the labor force is relatively small in Sweden. The number of individuals in the sample who did not work at all in 1985 is too small for a meaningful analysis. Also the opposite transition, i.e. out of work, is difficult to analyze because of too small sample sizes. Partial nonresponse in the wage rate and income variables makes it impossible to use these variables. Probit estimates using the two tax dummy variables, the change in unemployment rates and a few demographic variables are given in Table A4. The only variable which is significant for males is the age variable demonstrating that men above 50 had a relative high probability to quit working. The same is true for women who also had a high probability to stay at home if they got (more) preschool children in their household. There is a weak indication that decreased marginal taxes increased the probability to remain working.

5. Discussion and conclusion.

Contrary to the conclusions reached in Agell et.al.(1995) we have found that women increased their hours of work more than men did. We have also found that only those who experienced large tax decreases have increased their hours significantly. The estimates for males are not as robust as those for women but if there is an effect also for men, then it is primarily young men who have adjusted to the new tax incentives.

As noted in Agell et.al(1995) the confidence bands which usually hold for labor supply elasticities in traditional models give widely different estimates of the increase in hours resulting from tax decreases. Using a 95 per cent confidence interval of 0.1 - 0.27 for a wage rate elasticity from Ackum Agell & Meghir (1995) and the example of a relatively well paid

white-collar worker who got an increase in his marginal income of 76 per cent, they point out that it implies an increase in work hours from 14 to 370 hours in a year. Our point estimates for women and young men who got large tax cuts approximately agree with the upper bound of this interval. A 95 per cent confidence interval for these women ranges from 190 to 620 hours. In our sample about 25 per cent of all women belonged to this group.

Changes in the gross wage rate significantly influenced hours of work for men such that small and moderate increases decreased hours of work while large increases were associated with increases in hours. For women the wage rate effects were insignificant. It might be a little strange that women would react strongly to tax changes but not to changes in their wage rates. Most economists assume that behavioral adjustments depend on the net wage rate independently of the source of change - the gross wage rate or the marginal tax rate. An insignificant estimate, however, does not necessarily imply a zero effect, but rather a wide confidence interval. Thus, we cannot exclude that women react to changes in the gross wage rate although we cannot estimate such a behavior with good precision. It is interesting to note though that the point estimate for women in Table 5 indicates a positive reaction to wage increases.

Did the recession make it impossible to estimate any effects of the tax reform using data from 1992, a year just in the beginning of the recession, as some economists claim, for instance Björklund (1995)? It is of course impossible to know if we have been able to control for all important confounding variables. We have estimated a differential effect due to changes in the marginal tax rates. To claim that we have underestimated the effects of the tax changes because demand for labor dropped, one must argue that the decrease in demand primarily hit those who got small tax changes, and that the small and insignificant estimates we have obtained for this group thus primarily is the result of a decrease in the demand for them. It is possible that there is some truth in this but if changes in demand were so important, one would have expected the unemployment variable to come out much stronger than it did. It was not at all significant for men, and significant in a few models for women but not in all. One should also observe that the unemployment rate had not reached its peak in 1992. In any case, this argument only implies that we have overestimated the difference in behavioral reaction between those who got large tax cuts and those who got small, not that we have underestimated the increase in hours for the first group.

Another and more valid objection is that we may not have observed and estimated all effects on hours of work after such a short time. Behavioral adjustments to the major steps in the reforms of 1990/91 might take longer than just a year. Although this may well be true our analysis covers the adjustments during the whole seven year period 1985-1992 and this objection does not diminish the significant effects we at least have found for women.

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Table 1 Sample size by labor force participation 1985 and 1992 and by gender

Males

		1992			All
		zero hours	**hours >0**	**missing**	
	zero hours	4	22	35	61
		6.56	*36.07*	*57.38*	*100.00*
1985	**hours >0**	40	559	455	1054
		3.80	*53.04*	*43.17*	*100.00*
	missing	1	16	15	32
		3.13	*50.00*	*46.88*	*100.00*
All		45	597	505	1147
		3.92	*52.05*	*44.04*	*100.00*

Females

		1992			All
		zero hours	**hours >0**	**missing**	
	zero hours	16	56	60	132
		12.12	*42.42*	*45.45*	*100.00*
1985	**hours >0**	51	504	440	995
		5.13	*50.65*	*44.22*	*100.00*
	missing	24	14	40	78
		30.77	*17.95*	*51.28*	*100.00*
All		91	574	540	1205
		7.55	*47.63*	*44.81*	*100.00*

Note: Hours are annual hours. This table only applies to those who were below the age of 58 in 1985. Italic numbers are row percentages.

Table 2 Summary statistics for the change and log-change in annual hours of work and for the change in marginal tax rate

	Changes in hours		Log-change in hours		Change in marginal tax rate (0/00)	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
Percentiles						
10%	-619.2	-774	-0.295	-0.592	-244	-251
25%	-103.2	-103.2	-0.056	-0.051	-206	-206
50%	0.0	9.2	0.000	0.006	-167	-169
75%	206.4	557.8	0.095	0.409	-72	-63
90%	784.0	1084.0	0.398	1.099	-6	-23
Mean	46.3	168.9	0.039	0.159	-137	-139
Std.dev.	667.7	717.9	0.589	0.774	110	103
Skewness	0.44	-0.05	1.21	0.38	0.74	0.21
Kurtosis	6.78	3.65	20.86	8.77	7.86	4.50

Note: Table applies to respondents who were below the age of 58 in 1985 and worked in both 1985 and 1992.
The marginal tax rates were instrumented as explained in the main text.

Table 3 Work hours in 1985, change in annual hours of work 1985-1992 and marginal tax rate in 1985, by gender and change in marginal tax rate.

	Change in marginal tax rate		
	– -20	**-20 – -7**	**-7 –**
Males			
Mean Hours of work 1985	1965	2107	2139
Change in hours of work 1985-1992			
Mean	105	-47	-132
Median	0	0	0
Mean Marginal tax rate 1985	62.3	52.4	35.5
No. of observations	120	217	110
Females			
Mean Hours of work 1985	1335	1509	1636
Change in hours of work 1985-1992			
Mean	354	62	43
Median	155	0	0
Mean Marginal tax rate 1985	56.7	46.3	32.7
No. of observations	105	170	113

Note The sample is limited to those who worked in 1985 and 1992, were less than 58 years of age in 1985, and had no missing values on the tax rate variables.
The marginal tax rates were instrumented as explained in the main text.

Table 4 Heckman's two-step estimates of change equations by gender

	Change in hours			**Log-change in hours**	
	Males		**Females**	**Males**	**Females**
Dlog(wage)	-971.5 (2.35)	-580.2 (2.13)	-78.8 (0.32)	-0.930 (1.90)	-0.295 (1.03)
$(\text{Dlog(wage)})^2$	1033.7 (1.77)	1414.6 (2.55)	1199.8 (1.68)	0.998 (1.61)	0.839 (1.26
D(nonlabor inc)	3.0e-04(0.34)	4.8e-05 (0.08)	3.4e-04(0.62)	1.94e-07 (0.14)	3.11e-07 (0.50)
D1	222.9 (2.16)	21.8 (0.29)	436.6 (3.95)	0.231 (2.02)	0.484 (3.98)
D2	102.2 (1.35)	32.2 (0.52)	234.0 (2.57)	0.110 (1.80)	0.199 (2.49)
Separated	14.5 (0.19)	-33.0 (0.52)	-32.0 (0.33)	0.010 (0.13)	-0.038 (0.44)
Chplus	-30.7 (0.24)	50.4 (0.49)	-704.8 (3.90)	-0.077 (0.68)	-0.666 (4.00)
Chminus	64.6 (1.00)	51.7 (0.95)	93.7 (1.09)	0.012 (0.22)	0.114 (1.21)
Age30	104.3 (1.02)	307.0 (1.51)	-117.7 (0.92)	0.091 (0.92)	-0.067 (0.52)
Age30*Dlog(wage)	-	-1283.2 (2.79)	-	-	-
Age30*D1	-	421.2 (1.82)	-	-	-
Age30*D2	-	-89.0 (0.46)	-	-	-
Age50	-394.3 (3.53)	-318.6 (3.17)	-204.9 (1.83)	-0.282 (3.30)	-0.263 (2.37)
D(unemp.rate)	-1129.0 (0.37)	-17.4 (0.01)	-9104.4 (2.14)	-1.345 (0.49)	-9.73 (2.33)
λ	-357.1 (2.01)	-286.7 (2.02)	248.4 (1.12)	-0.241 (1.41)	0.483 (2.10)
Intercept	411.9 (2.00)	341.9 (2.05)	-131.2 (0.46)	0.292 (1.21)	-0.387 (1.34)
R^2	0.153	0.184	0.157	0.120	0.157
No of obs.	272	266	254	272	254

Note: t-ratios in parenthesis were based on White's standard errors.

Table 5 OLS-estimates of change equations by gender

	Males		Females	
	Model M1	**Model M2**	**Model F1**	**Model F2**
Dlog(wage)	-1013.7 (3.52)	-629.9 (2.52)	8.1 (0.03)	-
$(Dlog(wage))^2$	1085.7 (2.00)	1534.4 (2.69)	1279.1 (1.97)	-
D(nonlaborinc.)	6.5e-04 (1.11)	2.7e-04 (0.51)	-31e-04 (0.51)	-
D1	197.4 (2.18)	-0.2 (0.00)	404.9 (3.76)	357.4 (3.87)
D2	74.7 (0.96)	6.7 (0.10)	213.0 (2.21)	35.8 (0.44)
Separated	5.4 (0.07)	-40.0 (0.62)	-38.9 (0.41)	59.8 (0.78)
Chplus	-52.8 (0.47)	35.8 (0.38)	676.1 (4.08)	-508.2 (3.75)
Chminus	85.3 (1.08)	67.9 (1.04)	81.5 (0.80)	147.7 (1.60)
Age30	38.6 (0.38)	271.2 (1.12)	-72.1 (0.50)	-89.5 (0.85)
Age30*Dlog(wage)	-	-1364.7 (2.63)	-	-
Age30*D1	-	407.8 (1.75)	-	-
Age30*D2	-	-77.5 (0.39)	-	-
Age50	-441.2 (4.31)	-355.7 (4.23)	-146.2 (1.26)	-312.1 (3.15)
D(unemp.rate)	-1151.0 (0.33)	11.4 (0.00)	-8690.1 (1.78)	-3395.2 (0.81)
Intercept	21.1 (0.20)	27.2 (0.31)	167.7 (1.24)	145.1 (1.34)
R^2	0.140	0.172	0.152	0.124
No of obs.	272	266	254	396
Diagnostic tests				
Residual skewness	0.32	-0.08	0.30	0.08
Residual kurtosis	6.75	4.59	3.57	3.72
P-values:				
Jarque-Bera	0.000	0.000	0.028	0.011
White's hetero-skedasticity test	0.007	0.119	0.187	0.164
Ramsey's RESET test	0.003	0.501	0.611	0.722

Note: The dependent variable is the change in annual hours of work
t-ratios in parenthesis
Six extreme values less than -1500 hours or more than +1500 were deleted when Model M2 was estimated

Figure 1 Marginal tax rates 1985, 1990 and 1992 as a function of tax assessed income

APPENDIX Variable definitions and supplementary computations

Hours of work

Estimates of annual hours of work were obtained from the HUS event history files. These files contain event history information, month by month, on the respondents labor market status and average weekly working hours, if gainfully employed. To compute monthly estimates of work hours the number of weeks per month was assumed to average 4.3.

In the 1986 supplementary sample there are no event history data. Respondents in the sample were, however, asked retrospective questions concerning 1985, which gave us information on the number of weeks they were engaged in various activities (summing to 52 weeks as a consistency check) and the number of average weekly hours in full-time and part-time work. Combining this information gave us a measure on annual working hours in 1985. Unfortunately, there is no way to check if this way of estimating the annual hours of market work gives the same result as the questions used to collect event history information would have done.

All measures include hours in the main job and in any secondary job. They also include periods of sickness, vacation and other leaves no longer than eight weeks.

Marginal taxes

For 1985 marginal tax rates were computed using an estimate of labor income as explained in the main text, tax return data merged to the data base for each individual who had given his/her consent (or equivalent data obtained form the respondent in a interview) and the 1985 tax system.

For 1992 the tax system of this year was applied to the 1985 incomes (including the estimated income from work). To make the 1992 tax system and the 1985 incomes compatible the following definitions and adjustments were used:

Income from work (förvärvsinkomst) was defined as: (Income from employment)*k+(the sum of incomes from farming and business)-general deduction-losses; where k is a factor used to adjust for the increased tax bases in the 1992 tax system. k was assumed to depend on income in the following way: k=1 in the first quartile of income from employment, k=1.02 for the second quartile, k=1.04 for the third quartile and k=1.07 for the fourth. These factors (as well as the factors m and n explained below) are ”guestimates” based on income comparisons from Statistic Sweden.

Income from capital was defined as: (Income from capital in 1985)*m+(capital gains)*n-(deficit from owner occupied home+imputed income from owner occupied home). m and n are factors to adjust for the increased tax base for capital income tax. They were assumed to take the following values:

Quartiles	1	2	3	4
m	1.0	1.19	1.38	1.57
n	1.0	1.4	1.8	2.2

Other deficits (övriga underskott i förvärvskälla) were not included.

The following adjustments were made in the 1992 tax scales:

- Basic deductions (grundavdrag) and basic deductions for retired (särskilda grundavdrag för pensionärer) were divided with 1.5 to take inflation into account.

- The kink point of the state tax 186600 was adjusted to 124400.

- The kink point 100000 in the computations of tax reductions caused by a deficit from income of capital was reduced to 67000.

- The floor for taxable wealth was decreased from 800000 to 533000.

- The real estate tax was computed on the tax assessed values of 1985

The hourly wage rate

1985 and 1992
For these two years the hourly wage rate is estimated as the ratio of an estimate of labor income over the estimate of annual hours of work. Labor income was defined as the sum of reported cash earnings (kontant bruttolön) and taxable non-cash income (fri bil, bostad etc.)

1986 and 1993
Wage rates for 1986 and 1993 were estimated using the survey questions on pay combined with the information on average weekly working hours at the time of the survey. The answers to the survey questions could optionally be given as hourly, monthly, weekly, bi-weekly and even annual earnings. To transform the answers into hourly earnings, we divided monthly earnings by 4.3*(normal weekly hours), and bi-weekly hours with twice the normal weekly hours. When earnings were reported only as annual earnings, it was divided by 52 times the weekly hours.

The two estimates of the hourly wages differ. The wage rate defined as the ratio of labor income and annual hours has both a higher mean and larger variability than the wage rate obtained through the survey questions.

Nonlabor income

Nonlabor income includes income from capital, income from property other than farm property, accrued capital gains and losses and less interest deductions and losses. In households with two spouses their incomes were added . Added were also non-taxable scholarships, non-taxable pensions and annuities, student grants, student loans, support payments received, other non-taxable allowances, and subtracted were repayments of student loans, and support and periodic assistance paid.

Unemployment rate

The regional unemployment rates used were defined by county (län) and obtained from the labor force surveys. The unit of measurement is per mille.

Table A1 Instrumentation of work hours 1985 by gender and marital status

	Males		Females	
	Married	**Cohabiting or single**	**Married**	**Cohabiting or single**
Age85	1.728 (0.03)	-.311 (-0.00)	-211.041 (-2.39)	432.663 (3.20)
Age^2	.418 (0.27)	.737 (0.36)	4.594 (2.08)	-12.002 (-3.29)
Age^3	-.0072 (-0.60)	-.007 (-0.47)	-0.332 (-1.90)	.094 (3.06)
Sch86	-37.177 (-0.83)	356.573 (2.13)	-43.212 (-0.46)	-242.428 (-2.14)
Sch^2	.588 (0.52)	-12.994 (-2.38)	.826 (0.30)	.913 (0.25)
AgeSch	.252 (0.43)	-.923 (-0.55)	.813 (0.76)	3.814 (2.39)
Bigcty86	32.341 (0.82)	103.940 (1.16)	20.593 (0.32)	8.862 (0.08)
Nlinc	-.004 (-4.01)	-.004 (-1.02)	-.008 (-3.00)	-.005 (-0.66)
$Nlinc^2$	2.01e-08 (2.55)	5.01e-08 (0.38)	2.88e-08 (1.86)	3.05e-07 (0.95)
Trans	.001 (0.23)	-0.178 (-1.47)	.004 (0.63)	-.006 (-0.51)
Mnlinc	.001 (0.84)	-	-0.001 (0.94)	-
Minctj	.000 (0.59)	-	-.0000 (-0.68)	-
Child6	-32.669 (-1.16)	-388.337 (-2.35)	-133.024 (-2.66)	-253.262 (-1.41)
Const	1978.39 (2.21)	-788.115 (-0.48)	4616.739 (3.50)	-1190.815 (0.65)
R^2	0.100	0.3397	0.0652	0.2387
No of obs	591	109	549	105

Notes: OLS estimates, t-ratios in parenthesis

Table A2 OLS-estimates of log-change wage rate equations, by gender

	Males	**Females**
Age1985	-0.0380 (0.98)	-0.090 (2.38)
Ditto squared	0.0004 (0.92)	0.0010 (2.09)
Schooling 1986	-0.0011 (0.02)	0.0142 (0.17)
Ditto squared	-0.0004 (0.15)	-0.0006 (0.18)
Wage rate 1986	-0.3846 (2.12)	-0.2072 (1.30)
Wage rate 1993	0.1608 (1.42)	0.2114 (2.05)
Bigcty 1986	-0.0597 (0.65)	0.0286 (0.29)
Married/cohabit 1986	-0.3475 (1.23)	-0.1909 (0.40)
No of children <7 1985	-0.0326 (0.58)	-0.0508 (0.74)
No of children < 7 1992	0.0026 (0.04)	-0.2175 (2.36)
Nonlabor income1985	3.67e-06 (1.69)	-3.51e-06 (0.97)
Nonlabor income1992	6.78e-07 (0.50)	-1.92e-06 (0.55)
Spouse's nonlabor income 1985	-673e.06 (1.46)	-1.41e-06 (0.64)
Spouse's nonlabor income 1992	3.29e-06 (0.60)	1.29e-06 (0.55)
Intercept	2.1509 (2.00)	2.0945 (1.92)
R^2	0.0788	0.0748
No of observations	273	261

Note: Dependent variable is the log-change 1985-1992 in deflated hourly wage rates. These rates were obtained as the ratio of annual earnings and annual hours adjusted for the difference in CPI. The explanatory variables wage rate 1986 and wage rate 1993 were responses to survey questions about wage rates in these two years. They were also adjusted for the change in CPI.
t-ratios in parenthesis.

Table A3 Probit estimates of the probability to contribute to a change equation in work hours by gender

	Males	**Females**
Age 1985	0.083 (2.01)	0.180 (4.51)
Ditto squared	-0.001 (1.76)	-0.002 (4.15)
Married/cohabit 1986	0.172 (0.58)	-0.205 (0.49)
Schooling 1986	0.244 (3.35)	0.230 (2.42)
Ditto squared	-0.008 (2.95)	-0.007 (1.79)
No of children 1986	0.056 (1.10)	-0.150 (2.71)
Ditto < 7 in 1985	-0.034 (0.41)	0.108 (1.25)
Bigcty 1986	-0.086 (0.83)	-0.334 (3.07)
Nonlabor income1985	-6.42e-06 (2.53)	3.033e-06 (1.04)
Intercept	-3.922 (4.54)	-5.529 (5.91)
Pseudo R^2	0.0378	0.048
No of observations	999	1058

Note: t-ratios in parenthesis

Table A4 Estimates of probit models for the probability to remain working 1992

	Males	**Females**
D1	0.32 (1.24)	0.34 (1.43)
D2	0.32 (1.36)	0.46 (2.10)
Chplus	-	-1.19 (4.03)
Age30	-0.34 (1.16)	0.12 (0.42)
Age 50	-1.07 (4.89)	-1.06 (4.78)
D(unemp. rate)	-17.69 (1.50)	-6.47 (0.57)
Intercept	1.94 (6.23)	1.60 (5.78)
Pseudo R^2	0.120	0.146
No of observations	432	429

Note: The analysis is limited to those who worked in 1985. The dependent variable takes the value 1 if the respondent also worked in 1992.
t-ratios in parenthesis.