Hourly wage rate and taxable labor income responsiveness to changes in marginal tax rates ☆

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A B S T R A C T

Recently, a voluminous literature estimating the taxable income elasticity has emerged as an important field in empirical public economics. However, to a large extent it is still unknown how the hourly wage rate, an important component of taxable income, reacts to changes in marginal tax rates. In this study we use a rich panel data set and a sequence of tax reforms that took place in Sweden during the 1980s to estimate the elasticity of the hourly wage rate as well as the taxable labor income elasticity with respect to the net-of-tax rate. We also estimate elasticities with respect to the non-labor income in a way that is novel in the literature. While carefully accounting for the endogeneity of marginal tax rates we find a statistically significant response in wage rates both among married men and women. The estimates of the hourly wage rate elasticity with respect to the net-of-tax rate fall in the range of 0.14–0.16 for males and 0.41–0.57 for females, whereas the corresponding taxable labor income elasticity estimates hover between 0.19–0.21 for males and 0.96–1.44 for women. Moreover, for men we find that the taxable labor income elasticity with respect to non-labor income is statistically significant; the point estimate being −0.07. This implies that the compensated taxable labor income elasticity is about 5 percentage points higher than the uncompensated one. In general, we consider the estimates for males to be more certain and robust than the estimates for females.

1. Introduction

Historically, the study of the behavioral response to changes in marginal tax rates has been centered on the labor supply choice. However, the standard labor supply model, where the individual chooses hours of work given an exogenous wage rate, abstracts from the possibility that the individual is able to affect her own wage rate. Indeed, it is not far-fetched to consider situations when a lower tax rate may induce the individual to change job, take on more difficult and compensated tasks, put in more effort into wage bargaining, alter form of compensation or simply work more intensely. Even though such changes in work effort and tax avoidance to a large extent are unobservable to the econometrician, behavioral changes along this margin are nevertheless likely to show up in altered hourly wage rates.

Reasoning along these lines has been one of the rationales of a growing body of research measuring the elasticity of taxable income

with respect to the net-of-tax rate (one minus the marginal tax rate) with Lindsey (1987) and Feldstein (1995) as seminal contributions. However, it is still unknown if, or to what extent, individuals influence their hourly wage rates in response to tax changes. Recent research on U.S. data (Gruber and Saez, 2002; Kopczuk, 2005 and Giertz, 2007) indicates that much of the taxable income response lies in deduction behavior.[1]

Here we address the issue of hourly wage rate responsiveness by employing a rich survey and register data set created from the 1981 and 1991 waves of the Swedish Level of Living Survey.[2] In particular, we have access to a survey variable on the individual's hourly wage rate on a longitudinal basis. Between 1981 and 1991 top marginal tax rates were cut by 34 percentage points in Sweden in a piecemeal fashion. This sequence of tax reforms created substantial individual exogenous variation in marginal tax changes depending on tax bracket in 1981. In this paper we exploit this exogenous variation, together with the rich panel data material, to test whether hourly wage rates are sensitive or not to changes in marginal tax rates.

While carefully accounting for the endogeneity of marginal tax rates as well as other factors that determine wage rates we do find a statistically significant response both among married men and

[1] See Saez et al. (2009) for a comprehensive survey of the literature.
[2] See, for example, Fritzell and Lundberg (1994) for a description of this data source.

women: The estimates of the hourly wage rate elasticity with respect to the net-of-tax rate fall in the range of 0.14–0.16 for males and 0.41–0.57 for females. Seen from the perspective that wage rates often have been assumed to be exogenous in labor supply models these estimates must be thought of as surprisingly large.

In line with previous literature, we have also estimated the elasticity of taxable labor income with respect to the net-of-tax rate. For married men we obtain estimates of the (uncompensated) taxable labor income elasticity ranging between 0.19 and 0.21. For women the corresponding estimates hover between 0.96 and 1.44. Taxable labor income is defined as the earnings net of costs of earning the income. One should note, however, that the elasticity estimates for males in general are more precise and more robust than the estimates for females.

We improve upon existing studies in one additional crucial respect: we specify virtual incomes and set out to estimate the taxable labor income elasticity with respect to the non-labor income. For males we find a statistically significant non-labor income elasticity with expected sign: −0.07. The corresponding estimates for females are not significantly different from zero. Armed with these elasticities we are able to compute *compensated* elasticities. For males, an uncompensated elasticity of 0.19 corresponds to a compensated taxable labor income elasticity of 0.24. Interestingly, our finding of significant income effects conflicts with a frequently cited result in Gruber and Saez (2002). Using a different methodology, they did not find significant income effects on U.S. data from the 1980s.

Our paper also adds to a growing literature that examines tax responsiveness on Swedish data. From different methodological perspectives Gelber (2008), Hansson (2007), Holmlund and Söderström (2007), Ljunge and Ragan (2006) and Selén (2005) all exploit large register data sets and study how mostly earned income reacts to changes in net-of-tax rates. However, none of these papers utilizes the Swedish Level of Living Survey and none of these makes a separate analysis for hourly wage rates.

The paper is structured as follows. In the next section we briefly describe the income tax changes that occurred between 1981 and 1991 in Sweden; a more thorough description is given in Appendix A. In Section 3 we discuss a number of methodological issues. These involve our treatment of income effects, our model framework and instrumentation procedure. Section 4 contains a description of the data source. The estimation results are presented and discussed in Section 5. Section 6 concludes.

2. Swedish income tax reforms 1981–1991

In 1981 top marginal taxes were near a historical high; taxpayers in the highest bracket were subject to a marginal tax rate of 85%. As can be seen from Fig. 1, which depicts the evolution of top marginal tax rates during the relevant time period, there was a steady decline in
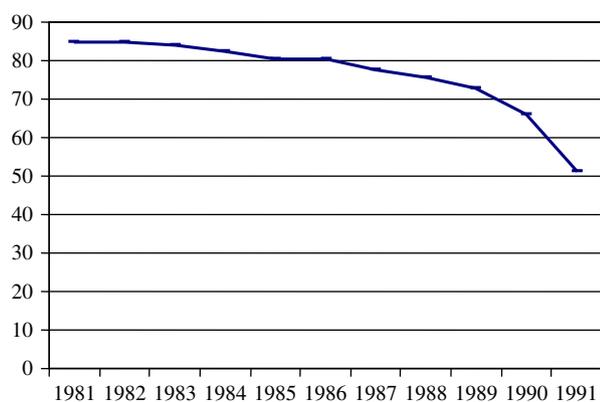
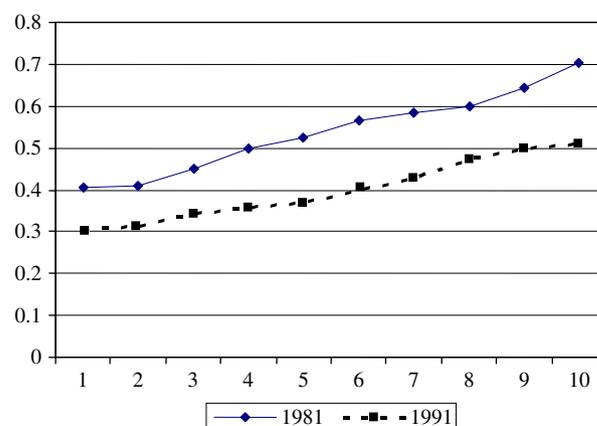**Fig. 1.** Top marginal tax rates 1981–1991 in percent by year.

Fig. 2. Average actual marginal tax rates in 1981 and 1991 by deciles. Individuals are ordered based on their taxable labor income in 1986.

top marginal tax rates between 1981 and 1991. The most dramatic cut occurred in conjunction with the profound tax reform of 1991, sometimes called 'the tax reform of the century' (Agell et al., 1998), when top marginal taxes fell by 15 percentage points.[3] However, if one considers the whole period 1981–1991 marginal taxes were reduced by 34 percentage points for those who were in the top bracket in 1981.

Fig. 2 illustrates average marginal tax rates for 1981 and 1991 by income decile in our estimation sample, where income deciles have been defined based on taxable labor income as of 1986. Marginal tax rates have been computed while taking both the statutory income tax schedule and means-dependent housing allowances into account. Apparently, income tax progressivity has been considerably reduced between the two years. The largest decrease in marginal tax rates was in the 10th decile, whereas the tax changes were noticeably more modest in the two bottom deciles. There were also considerable reductions in marginal tax rates in the middle of the income distribution. The main reason is that the 1981 statutory tax schedule caused marginal tax rates to be high even at moderate income levels.

3. Methodological considerations

3.1. Taxable income model

In what follows, we briefly describe the canonical taxable income model as presented in Gruber and Saez (2002) to get a framework for interpreting the taxable income elasticities. The wage rate responses cannot be interpreted within that model. Therefore, in Section 3.2 we also discuss a model where the individual can vary both work effort and hours worked.

Following Gruber and Saez (2002) we consider a model of utility maximization where the individual chooses her optimal amounts of consumption, C, and taxable income z, subject to the budget constraint $C = (1 - \tau)z + R$, where τ is the marginal tax rate on a linear segment of the income tax schedule and R is virtual income. In a

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[3] The timing of the 1991 Swedish tax reform coincided with the most severe macroeconomic downturn since the 1930s, and the recession has rendered appraisals of the reform more difficult. In June 1990, the unemployment rate was 1.1%, while it in the same month of 1993 was 9.0% (SCB, 2005). Our interpretation is that the soaring unemployment rates pose a minor problem to our study that uses data from 1981 and 1991. First, on an annual basis the unemployment rate was 3.0% in 1991, which can be compared with 2.5 for 1981. Second, the biggest increase in unemployment was among younger individuals. Since our sample contains individuals aged 22–54 in 1981 and 32–64 in 1991 our sample was less affected by the macroeconomic crisis.