

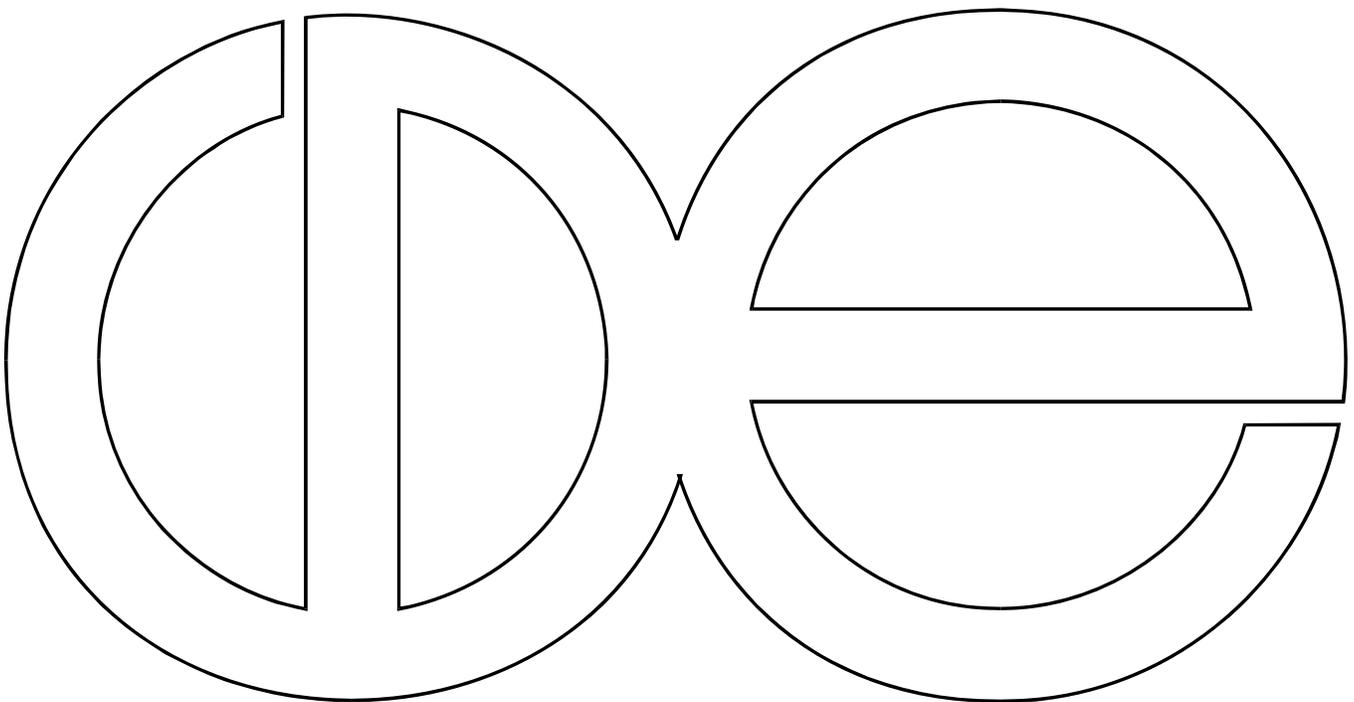
**Center for Demography and Ecology
University of Wisconsin-Madison**

Labor Supply, Tax Base and Public Policy in Sweden

Thomas Aronsson

James R. Walker

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by

**Thomas Aronsson
Umeå University**

and

**James R. Walker
University of Wisconsin-Madison and NBER**

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1. Introduction

Sweden has long been at the forefront of creating innovative social insurance programs. For nearly as long, these programs have undergone intense scrutiny of effects on economic and social behavior. In terms of effects on hours of work, the consensus of opinion is that male work hours are relatively unresponsive to changes in the tax and transfer system, whereas female work hours appear to be (at least) slightly more responsive to economic incentives. Yet, this seeming non-responsiveness of labor supply to tax and program incentives is surprising and unsettling. If incentive effects are so important, as many economists believe, why are the effects so elusive to recover empirically? Should one infer that there are **no** labor supply effects from Sweden's high marginal tax rates and generous (by U.S. standards) program benefits?

To address these and other questions, we continue the analysis of Aronsson and Walker (1997). Our earlier study gave a broad overview of incentives generated by the Swedish tax, transfer and social insurance systems as well as an overview of labor supply behavior with an emphasis on studies based on Swedish data. We also related the incentive structure to existing empirical results by focusing attention on the tax and benefit reforms that took place in Sweden during the 1980s and early 1990s.

In this paper we consider labor supply trends and literature since our first study. Additional explanations emerge as possible reasons for the low responsiveness of work hours to taxes and transfers. We summarize this literature, and we review the related literature on why Swedes (and Europeans in general) appear to supply much less market work than Americans do. Are differences due to higher tax rates in Europe and Sweden than in the U.S., or are they due to the functioning of the labor market?

The last decade has witnessed an expansion from hours of work to consider the incentive effects on other dimensions of labor supply. Recent research considers the relationship between the tax system and before-tax income. Pre-tax income reflects hours of work, and it also reflects effort, occupational choice, wage formation, savings and to some extent tax

avoidance (depending on the income measure used). Therefore, we combine the study of tax base determination with results from traditional labor supply studies in order to get a better understanding of the relationships between economic incentives and behavior. We also briefly address relationships between, on the one hand, the tax system and, on the other, union wage formation and tax avoidance. The incentives associated with unionized labor market are also relevant from perspectives other than just wage formation; for instance, for understanding international differences with regards to work hours.

The shift in focus from hours of work to broader measures of labor supply is complemented by a shift in interest from the effects of the income tax to the effects of social insurance, and notably for Sweden, sickness insurance and pension problems. We review this literature and consider Sweden's major pension reform of 1999. The consequences of demographic changes (particularly in connection with pay-as-you-go social security systems) have become increasingly important. The reform of 1999 is the latest example of Sweden's innovative design of social insurance programs.

In summary, we will address the following questions;

- Why are the estimated effects of taxes and transfers on hours of work typically modest? In the light of empirical evidence for Sweden, we will discuss whether social norms and quantitative constraints contribute to this outcome as well as augment the standard labor supply model with tax avoidance behavior.
- Why are the estimated effects of marginal tax rates on before-tax income typically larger than the corresponding effects on work hours? Are issues such as tax avoidance and wage formation important here?
- What factors determine cross-country differences with respect to work hours; in particular differences between Sweden, other European countries and the U.S.?

- How does the labor supply respond to health insurance and pension systems? The effects of the pension system are particularly interesting to analyze because of (i) the major reform implemented in 1999 and (ii) the aging of the population.

Although estimated labor supply elasticities on hours of work are low, as we argued in Aronsson and Walker (1997) behavioral responses to income tax and social insurance programs appear in other dimensions of labor supply. So our answer to the second question posed in the first paragraph is no – one cannot safely assume that labor supply does not respond to economic incentives. We agree that large responses do not appear in (reported) hours of work, but for reasons presented below, believe substantial responses appear in other dimensions. As the OECD (2005) notes in a recent report, in light of these responses Sweden faces important challenges regarding the structure of its social insurance programs and the tax programs necessary for their finance.

Before turning to this evidence, we first consider recent trends in labor supply.

2. Trends in labor supply

Over the last fifteen years, traditional measures of labor supply have been stable. Figure 1 presents labor force participation rates for three age groups by gender for Sweden and the United States for 1975 to 2004. Whereas labor force participation among Swedish youth equalled or exceeded that in the United States, since 1990 labor force participation in Sweden is ten to fifteen percentage points less than in the United States. Participation rates among prime age men are nearly identical over this period in the United States and Sweden. Among the oldest age group of men, the secular pattern of participation is quite similar across the two countries. Participation rates for this group are lower in Sweden, and have been for thirty years.

Participation rates between the older two age groups of women vary between Sweden and the United States. The role of Sweden's work-related social insurance programs produce high rates of participation, as labor market participation in Sweden is substantially higher for women age 25 and higher. Also, evident is the severe recession of the early 1990s which was particularly

harsh on the middle age group (ages 25-54); participation rates fell sharply (approximately 10 percentage points) and have not fully recovered. Participation for women ages 55 to 64 increased in both countries, however, Sweden's recession depressed participation rates for this group, but less so than the younger age group.

Figure 1 -- HERE

Figure 2 presents the average hours of work per week (measured among those working) for three age groups by gender for the United States and Sweden for 1975 through 2004.¹ Among Swedish males, hours of work declined for all three age groups, with hours falling most sharply for the youngest group. Hours of work among prime-age workers (25-54) and mature workers (55-64) show little variation in US. However, in Sweden hours of work fell during the recession in the early 1990s and have yet to return to their earlier levels. Among women, hours of work declined for the youngest age group in Sweden and in the US. For prime-age women hours of work increased slightly in both countries. For mature women, average hours in Sweden increased and narrowed the difference with US mature women.

Figure 2 – HERE

The sector of employment changed substantially for Swedish women during the 1990s. Figure 3 reports the sector of employment from 1970 through 2002. Again, the recession in the early 1990s is visible as the share of women in the local government sector declined precipitously at that time and never fully recovered. Employment in the local government sector stagnated and women's employment increased in the second half of the 1990s as employment in the private sector increased.

Figure 3 – HERE

Finally, Figure 4 – which is based on the OECD country report for Sweden 2005 - reports by gender the population share not at work from 1990 through 2003. Not at work includes individuals not in the labor force (e.g., those retired or in school full-time), the unemployed, and

employed individuals absent from work. The last group includes individuals on disability insurance, sickness insurance, vacation, and on temporary layoff.² We combine these different groups of non-workers to avoid arbitrary labels of the different subpopulations.³ The striking feature of this graph is the level of the curves – slightly more than 1 in 2.5 women and roughly 1 in 3 Swedish men are not actively working. And consistent with the trends in Figures 1 and 2, the share of inactives increased during the recession of the early 1990s and stabilized at this higher level into the new century. The OECD (2005) country report for Sweden notes that Sweden has one of the highest levels of labor market inactivity levels (rivalled only by the other Nordic countries). This is an ominous trend for Sweden. Arguably, this increasing proportion of non-workers provides long-run evidence of the work disincentives within the Swedish system that offers relatively generous (again by U.S. standards) income support with high rates of income taxation which lessen the need and the returns to market work.

Figure 4 - HERE

3. Hours of work; some evidence for Sweden and extensions

To provide a starting point for the analyses, consider the simple labor-leisure model that forms the basis of empirical work on labor supply, where the individual chooses the hours of work and the consumption of a single good to maximize utility subject to the budget constraint, i.e.

$$\underset{h,c}{\text{Max}} \quad u(c, h; z)$$

$$\text{subject to} \quad wh + y - T(wh, y_{tax}) - c = 0$$

¹ These are “usual weekly hours” as reported in the Current Population Survey and “weekly hours of work” in the Labor Force Survey (AKU).

² The 2005 OECD report notes (p. 60) that Sweden leads the OECD in the average number of days lost per year because of sickness. And Sweden has a relatively large share of potential workers who do not participate in the labor market because of medical reasons, especially among older age groups. Palme and Svensson (2002) report as well that sickness insurance and disability insurance systems serve as unofficial forms of unemployment.

³ Thus, we want to avoid distinctions between unemployed and discouraged workers, neither of which is employed and only the unemployed are considered in the labor force.

in which c is consumption, w the gross wage rate, h the hours of work, y the nonlabor income, z a vector of observable characteristics, y_{tax} (which is part of y) the taxable nonlabor income and $T(\cdot)$ the tax payment net of transfers. The outcome of this problem can be written as a labor supply function

$$h = g(w_n, y_n; z) \quad (1)$$

where $w_n = w(1 - T')$ is the marginal wage rate and $T' = \partial T(\cdot) / \partial (wh)$ the marginal effect of the tax and transfer system, while y_n is typically referred to as the virtual nonlabor income (which we obtain by linearizing the budget constraint around the optimum point).

The model serves to define the basic labor supply responses to changes in the budget constraint. The income effect, $\partial h / \partial y_n$, is the change in hours of work in response to an increase in the virtual nonlabor income. If leisure is a normal good, the income effect is negative (i.e., an increase in income induces the individual to consume more leisure and thus work less). The compensated wage effect, $\partial h / \partial w|_u$, measures the change in hours to an increase in the marginal wage rate holding constant the consumer's utility. This effect captures the price or substitution effect. By the law of demand, the compensated wage effect is non-negative. The compensated effect is important because the welfare cost of taxes is proportional to the compensated wage effect. Finally, the uncompensated wage effect, $\partial h / \partial w$, summarizes the (net) change in hours with an increase in the marginal wage rate (which includes both the substitution and income effect).⁴

Blundell and MaCurdy (1999) summarize a large number of studies presenting estimates of the uncompensated labor supply elasticity with respect to the marginal wage rate (henceforth called wage elasticity) and the income elasticity. Estimates of the wage elasticity for men are typically small; most studies cover the interval from slightly negative point estimates to point estimates around 0.15. The estimates of the income elasticity are typically negative and

⁴ Readers interested in more thorough reviews of different labor supply models, as well as the econometric methods typically associated with them, are referred to Blundell and MaCurdy (1999).

relatively small in absolute value, although the variation between studies regarding the income elasticity appears to be greater than the corresponding variation with respect to the wage elasticity. For women, the picture is somewhat different; both the wage and the income elasticity are typically estimated to be larger in absolute value than the corresponding elasticity for men, suggesting that women's hours of work are generally more responsive to economic incentives than the male hours of work.⁵ Studies based on Swedish data yield a similar conclusion. (See Aronsson and Walker 1997).⁶ The Appendix gives a brief summary of empirical results.

Responsiveness to taxation and programs

Clearly, one cannot infer the consequences of major reforms in the tax and transfer systems just by looking at the elasticity measures discussed above. In this subsection, therefore, we briefly review some attempts to measure the labor supply responses to changes in the tax and transfer system; again with a focus on results based on Swedish data. Aronsson and Palme (1998) estimate a household labor supply model using data from 1980. The model is then used to compute the desired hours of work for the husband and the wife, respectively, under three tax and transfer systems; 1980, 1989 and 1991, respectively, (where the changes refer to

⁵ Until recently it was common to consider women "secondary workers" with men as "primary workers". The greater labor supply responsiveness of women was often attributed to their movement in and out of the labor market.

⁶ See also the more recent the studies of male labor supply by Blomquist et al. (2001) and Blomquist and Newey (2002) and the study of household labor supply by Flood et al. (2004). The own wage elasticity of women's labor supply presented by Flood et al. is lower than the estimates presented in many earlier studies on labor supply based on Swedish data.

the income tax, the value added tax, the housing allowance and the child allowance).⁷ Their results show a 2.1 percent increase in the desired hours of work for the husband and a 0.7 percent increase for the wife on average due to the switch from the 1980 to the 1989 system. The main explanation for the seemingly small response in the wife's hours of work is a negative cross-wage effect (from the increase in the husband's marginal wage rate) accompanied by a relatively large income effect from the transfer system. The corresponding changes in desired work hours, due to the shift from the 1989 to the 1991 system, are 3.1 percent for the husband and 2.8 percent for the wife, respectively. Blomquist, Ecklöf and Newey (2001) use data from 1973, 1981 and 1991 to estimate the labor supply of married men aged 20-60. The estimated model is used to simulate how the desired hours of work responds to the change in the tax and transfer system between 1980 and 1991 (where the change refers to the income tax, the value added tax, the payroll tax, the child allowance and the housing allowance). The average response in the desired hours of work is estimated to be 2.2 percent (if evaluated in isolation, the changes in the marginal income tax rates cause the desired hours of work to increase by approximately 4 percent). Our interpretation is that the estimated effects are relatively small considering the magnitude of the reforms. We shall return to the 1991 reform in section 6, where we more fully explore the relationship between the marginal tax rate and the before tax income.

Other types of policy-reform simulations based on Swedish data refer to combinations of deductions and transfer payments. This is interesting because certain transfer payments may

⁷ The most important changes refer to the income tax system. In the early 1980s, the national income tax was highly progressive with many tax brackets; for instance, in 1980, the tax rates of the national income tax schedule ranged from 0 to 58 percent depending on the level of taxable income. In addition, labor income and capital income were taxed jointly, and capital losses were deductible from the labor income when computing the taxable income. Together with the local tax rate, an average earner may have faced a marginal income tax rate of around 50 percent, and the top rate exceeded 80 percent. The tax reform implemented during 1983-1985 meant splitting the national income tax into two parts; a basic part and a supplemental part. Nearly all income earners paid the basic tax, and this tax schedule had two brackets (with tax rates equal to 5 and 17 percent, respectively, in 1989). The supplemental tax, which contained higher tax rates, was only paid by those with sufficiently high income. Capital losses could still be deducted from the tax base for the basic tax, although it could not be deducted from the tax base associated with the supplemental tax (implying that the latter tax base was broader). The top rate for the national income tax was 42 percent in 1989. In 1991, an additional (and major) tax reform was implemented, which meant introducing a simpler national income tax system with two tax brackets for the labor income tax; the national tax rate was set to zero for taxable incomes below 170 000 SEK (i.e. individuals with lower levels of income only paid the local income tax) and 20 percent for higher incomes. It also implied a broader tax base, by including some previously fringe benefits, as well as separate taxation of capital income (including capital gains) at 30 percent. By analogy, 30 percent of net

give rise to important marginal effects of relevance for the labor supply decision. Flood et al. (2004) estimate a household labor supply model using data from 1993 and 1999. Their model is then used to analyze the labor supply responses among married men and women to a substantial increase in the basic deduction in combination with reduced housing allowances and welfare benefits (by 25 percent each). The results show very small (almost negligible) effects on the desired hours of work except for low-income households (where the labor supply increase is substantial for women).

Does the standard model capture all relevant effects?

As many studies on labor supply refer to time periods with increases in women's labor force participation, it is not surprising to find that women's hours of work are generally more responsive to economic incentives (measured in terms of the wage and income elasticity) than the hours of work supplied by men. In addition, the labor supply results for women seem to vary more across studies than the corresponding results for men, indicating (perhaps) that it is more difficult to reach consensus regarding women's labor supply; more recent research - e.g. Flood et al. (2004) – suggests a relatively low responsiveness of women's labor supply to economic incentives. The results from studies on male labor supply are surprisingly stable over time and across countries in the sense that the estimates of the wage and income elasticity are typically found to be relatively small in absolute value. How can we explain this seemingly stable result? Does it mean there are no substantive responses to taxes and/or transfers?

To answer the second question first we draw on Slemrod's (1992) behavioral hierarchy of response. This perspective recognizes that decisions involving transactions are the most responsive followed by a variety of financial, accounting and avoidance decisions. Real decisions involving savings, labor supply and investment are the least responsive. In section 6 we consider some of the other responses to assess other possible effects of the tax. To answer the first question on why the real labor supply effects are so small, one possibility is, of course, that the standard labor supply model is correct, in which case the explanation has to

capital losses were made deductible from the labor income tax payment. Another part of the reform was to increase in the value added tax. For a more detailed discussion, see Aronsson and Walker (1997).

do with the preferences for the tradeoff between consumption and leisure. However, alongside this (unlikely) explanation, other studies try (at least in part) to attribute this finding to the character of the standard labor supply model by arguing that it neglects vital aspects of either the preferences or the choice set. We will discuss some of these approaches below by extending the standard model in order to capture quantitative constraints, social norms and tax avoidance, respectively.

Quantitative constraints

By quantitative constraints, we normally mean demand-oriented constraints, such that individuals facing them are off their labor supply curves. The presence of such constraints can, at least in principle, explain why the hours of work appear to be relatively unresponsive to small changes in the marginal wage rate and the virtual nonlabor income, respectively. Using Swedish data on prime-aged married men from 1980, Sacklén (1996) addresses the issue of quantitative constraints. His study makes use of a question to the participants in the Level of Living Survey, where the respondents were asked to say whether they were satisfied with their work hours, or if they wanted to increase or decrease their hours of work given a corresponding change in their income. Those who claimed to be rationed in this sense were treated as if they were off their labor supply curves. This means that the labor supply of those who report rationing is treated as a latent variable. Therefore, a basic hypothesis is that, once quantitative constraints are recognized and properly addressed, we may expect to find that the underlying (latent) labor supply is more responsive to economic incentives than in the standard model, where the constraints are neglected. However, the results do not show strong support for this hypothesis.

Social norms

The standard labor supply model assumes atomistic behavior – that individuals make their labor supply decisions in isolation from one another. There is a growing literature that merges economic and sociological perspectives. One class of models incorporates social norms by augmenting individual preferences to depend on actions (and/or preferences) of

others. Thus, utility declines as the individual's behavior deviates from the average choice within the group. Individual actions determine their own consumption but with possible spillover effects on others operating through the group choice. Moreover, multiple equilibria are possible and likely as both Lindbeck, Nyberg and Weibull (1999) and Brock and Durlauf (2001a, 2001b) show. Small changes of individual behavior operating through the social norm can get magnified leading to large changes in observed outcomes; at least over a longer time perspective. Thus, "social multipliers" may arise much like the old investment multiplier of Keynesian economics in which the total effect of investment is larger than the individual marginal effect.

To exemplify, consider a slight modification of the utility function used above, $u(c, h, \bar{h}; z)$, where \bar{h} is interpretable as the average hours of work in the reference group, with which the individual compares himself/herself. This variable may reflect a utility loss of deviating from a social norm regarding work hours (which is here assumed to be reflected in the average hours of work). In addition, to simplify the calculations, suppose that the utility function is such that the resulting labor supply function takes the form

$$h = \alpha + \beta w_n + \gamma y_n + \delta \bar{h} + \nu z \quad (2)$$

The parameters β and γ reflect the influence on hours of work of a change in the marginal wage rate and the virtual nonlabor income, respectively, conditional on \bar{h} . In the present context, these are only partial effects; a social multiplier exists in the sense that, if the marginal wage rate and the virtual nonlabor income facing all individuals would change (e.g. if the tax system is subject to reforms) so would the average hours of work in the reference group. Therefore, the total effect of a proportional increase in the marginal wage rate is $\beta/(1-\delta)$, where $\delta \in [0,1)$, and $1/(1-\delta)$ is the social multiplier. If δ is large, we may expect substantial indirect effects via the presence of interdependent behavior. Therefore, in the standard labor supply model, if at least part of the effect of \bar{h} is hidden in the constant, we may underestimate the total response to a change in the tax system.

The study of interdependent behavior in the context of labor supply models has a rich history.⁸ Using Swedish data referring to prime aged married men, a variant of the model set out above has been estimated by Aronsson, Blomquist and Sacklen (1999). The results show that interdependent behavior is present and affects the labor supply. In addition, the effects are estimated to be sizeable; in terms of equation (2), the point estimate of δ is around 0.67. The partial wage and income elasticities evaluated at the mean of the data, $\beta\bar{w}_n/\bar{h}$ and $\gamma\bar{y}_n/\bar{h}$, are equal to 0.061 and -0.017 , respectively, which resemble (or fall slightly short of) those found in earlier studies, which do not address interdependent behavior. The corresponding estimates of the ‘full elasticities’, $\beta\bar{w}_n/[(1-\delta)\bar{h}]$ and $\gamma\bar{y}_n/[(1-\delta)\bar{h}]$, are 0.187 and -0.052 , respectively. Taken at face value, these results suggest that the effects of interdependent behavior are substantial, and that the traditional labor supply model may imply considerable underestimation of the effects of taxation.⁹ However, it is necessary to be careful in the interpretations, as we note the construction of social reference groups is arbitrary. The Monte Carlo simulations carried out by Aronsson, Blomquist and Sacklen (1999) suggest that this is a potential problem; it may lead to overestimation of δ , which is the parameter of main interest.

Although not formally addressed in the example above, the time dimension is possibly very important here. As a consequence, there is no formal distinction between ‘short run’ and ‘long run’. In the short run, social norms are likely to constrain behavior – suggesting moderate behavioral responses to policy – whereas social norms may gradually evolve in the long run as a result of the behavior of all individuals. If this argument is correct, then the long run behavioral effects – which also incorporate the effects via changes in the social norm - will exceed those that follow in the short or medium run.

Tax avoidance and the choice of assets

⁸ See e.g. Kapteyn (1977), Alessie and Kapteyn (1991) and Woittiez and Kapteyn (1998). See also Manski (1993) for a thorough analysis of identification, and Brock and Durlauf (2001a, 2001b) for a partial solution.

⁹ Some normative implications of social norms and social interaction in the labor market are analyzed by Aronsson and Sjögren (2006).

Clearly, many economists would expect the highly progressive income tax characterizing Sweden in the 1970s and 1980s to have caused serious disincentive effects in terms of work hours. Yet, these expected behavioral responses were not found in the empirical work based on data for that time period (at least not for men). Can asset trade, which is carried out for the purpose of avoiding taxation, explain the seemingly moderate influence taxes have on the labor supply? If it can, then the tax tables may exaggerate the effective degree of tax progression for certain groups of wage earners. We will formalize our argument by using a model developed by Agell and Persson (2000), which only requires a slight extension of the reference model set out above. Consider an economy with two types of assets, a tax-exempt asset and a taxable asset, the returns on which now constitute the ‘nonlabor income’ part of the reference model. Let e denote the initial endowment, x the tax-exempt asset and d the taxable asset. Both assets are risk-free and give the rates of return r for the taxable asset and ρ for the tax-exempt asset. By using the wealth constraint, $d = e - x$, the optimization problem of a typical individual can be written as

$$\underset{h,c,x}{\text{Max}} \quad u(c,h;z)$$

$$\text{subject to} \quad wh + \rho x + r(e - x) - T(wh + r(e - x)) - c = 0$$

$$x \geq 0$$

We assume that $T(\cdot)$ is such that $T'(\cdot) > 0$ and $T''(\cdot) > 0$ for $wh + r(e - x) \geq 0$. The tax system described here resembles, at least in part, the Swedish system before the 1983 tax reform, where negative asset income was fully deductible from labor income when calculating the taxable income. Examination of the first order conditions suggests that, when the pre-tax wage rate is sufficiently high, $x > 0$, whereas $x = 0$ for lower pre-tax wage rates. If the individual decides not to use the tax-exempt asset, then the labor supply takes the same form as in the reference model described above. If, on the other hand, the individual decides to place part of his/her endowment in the tax-exempt asset, the hours of work choice will obey the following condition

$$u_c(c, h; z)w \frac{\rho}{r} + u_h(c, h; z) = 0 \quad (3)$$

The labor supply implicit in equation (3) takes the form $h = h(w\rho/r, \hat{y}; z)$, where \hat{y} denotes the virtual nonlabor income. This result has a very interesting implication; conditional on the ratio between the rates of return, ρ/r , a small tax reform will only give rise to an income effect. In other words, there is a distinction, in terms of labor supply, between tax avoiders and those who do not use the possibility to adjust their marginal income tax rate via the tax-exempt asset. For avoiders, who lower their effective marginal income tax rate via avoidance behavior, the statutory marginal income tax rates exaggerate the distortions imposed by the income tax system. Therefore, avoiders will, in a sense, create their own labor supply incentives, suggesting that the work disincentives associated with the tax system may not have been as great as they may have appeared from the tax tables in the late 1970s and early 1980s.

Empirical research based on the Swedish tax system from the 1980s suggest that people responded to the incentives associated with tax avoidance; individuals with high labor income were found to be more inclined to have tax-favored assets than those with lower labor income (Edin, Englund and Ekman 1995). Similarly, a decline in indebtedness seems to have taken place after the 1991 tax reform was implemented (Agell, Englund and Södersten 1998). These results are interpretable as supporting the idea that individuals choose their portfolios in order to avoid taxation which may, in turn, have implications for their labor supply behavior. In addition, and perhaps even more important, if individuals respond to taxation via their portfolios, we may expect taxation to have a larger effect on taxable income than on hours of work.

4. Sickness insurance and family policy

A distinguishing feature of the Swedish social insurance system is its two-part structure – nearly every program offers some minimal or guaranteed benefit and another component that replaces a fraction of earnings. For example, the sickness insurance, parental insurance and unemployment

insurance systems all have this feature. The work-conditioned benefits are distinctly more generous than the guaranteed benefits and offer a strong incentive for employment. Yet, the existence of the work-conditioned benefits requires that we distinguish between contract or paid hours of employment and active hours of work, hours spent working producing a good or service. The 2005 OECD country report on Sweden does this and the results are striking. Workers in Sweden were on the job and actively working an average 35.4 weeks per year, while the average for Europe was 40.7 weeks. The number of weeks away from work due to holidays varied little across countries in Europe. Hence, the primary difference in annual hours worked in Sweden versus the European average was in “weeks absent for other reasons.” In Sweden the weeks absent (excluding holidays) was more than twice the average for Europe (9.8 versus 4.5). We explore some of the features of the social insurance programs that may give rise to this difference.

Sickness insurance

Recent reforms requiring increased medical documentation of the illness and for the employer to pay sickness benefits for the first two weeks of absence were intended to increase monitoring of usage and thereby tighten control over benefit costs. Nevertheless, use of sickness insurance benefits continues to remain high in Sweden.

Using the conceptual framework presented in section 3, it is straightforward to explain the effect of sickness insurance benefits on labor supply. As we mentioned, demand-side considerations (e.g., setup costs and returns to coordination) may dictate the number of hours per period that must be supplied. Jobs can be seen as a tied-sale of bundled attributes of which hours of work is only one of many attributes describing working conditions and the nature of the job. Workers select the job that gives them the highest utility. Because it is cheaper to do so employers have an incentive to offer job-packages that workers prefer. Nevertheless, technology limits the choices available and some workers may select jobs with required hours of work greater than desired (as defined by the labor supply function in equation (1)). Access to sickness insurance benefits permit workers to adjust their hours of work to more nearly equate desired and demanded hours. The qualifying period and less than full replacement rate means the adjustment will be less than complete. In this interpretation there is nothing stochastic or unexpected about

the use of sickness insurance – the worker accepts the job demanding a fixed number of hours, knowing he or she can adjust the level of effort downward through the use of sickness insurance.

Building on the same structure, we can view the labor supply function (1) as implicitly defining the (unrestricted) supply price of labor. Inverting equation (1) gives $w_n = g^{-1}(h, y_n; z_n)$, where w_n is the worker's asking price (net of taxes and transfers) to supply h units of labor at a given level of effort or intensity. We can think that the effort required on the job may vary over the business cycle, with more effort requested in expansions and less in economic contractions. Once again, sickness insurance benefits permit the worker to moderate the demands over the cycle. This framework implies we should see a pro-cyclical use of sickness benefits – the number of sick days should increase when demand for labor is high and should decline when demand for labor is low. We reported in Aronsson and Walker (1997) that from 1967 (when the 3 day qualifying period was reduced to a single day) through the early 1990s, usage of sickness cash benefits has been strongly pro-cyclic. Indeed, during the last decade a simple correlation of unemployment and sick days is -0.9.

Henrekson and Persson (2004) investigate the responsiveness of sick days to the major reforms of the sickness insurance system from 1968-2002. The National Insurance Board (RVF) reports sick days funded by the national sickness insurance system. The national register data reports sick days funded by the sickness insurance system. These register data undercounts the true number of sick days during the 1990s as occupation sickness insurance plans offered additional coverage that partially offset the cost of the qualifying period and covered earnings above the basic amount threshold of the national system.¹⁰ Henrekson and Persson's aggregate time series data do not permit parameterizing the reforms in terms of their direct monetary incentives. Instead, the authors code the reforms by time varying indicator variables and limit their analysis to only the major reforms. They adopt a distributed lag specification with the number of sick days as the dependent variable and include controls for the age composition of the working population, gender mix, and unemployment rate as regressors. They find that sick days and unemployment are negatively related. Indeed, they find the 1991 reform that increased the length of the qualifying period and reduced benefits reduced sick days to decline by 20 percent.

The careful and thorough analysis provides compelling evidence of the link between the structure and generosity of the sickness insurance plan and hours of work.

Social norms and transfer programs

Recall our earlier discussion of social norms on hours of work, where we noted that social norms may moderate behavior in the short-run whereas over the longer run generate larger effects. This is so for two reasons. First, the social multiplier may take time to work as individuals learn about reference group behavior. And second social norms may evolve over time providing an internal dynamic for changing behavior. Lindbeck and his co-authors (Lindbeck 1995, Lindbeck, Nyberg and Weibull 1999, 2003) consider economies in which agents either work or receive a transfer payment and consume full leisure. Program participation entails a psychic cost (“stigma”), which is a decreasing function of the population living off benefits. As is common in models with social interaction, multiple equilibria exist. If the social norm for work is strong with high psychic costs for those who deviate, then a “good” equilibrium with high program benefits and low free-riding can be supported. Another “bad” equilibrium entails low benefits and high free-riding. Lindbeck, Nyberg and Weibull (1999) show these extreme equilibria are stable compared to intermediate ones with moderate levels of program benefits and free-riding levels. Shelling (1971) was the first to see that such economies may experience “tipping” in which a small (exogenous) perturbation can shift the economy from one equilibrium to another.

Such extreme behavior has not been observed in Sweden though its possibility is daunting. Consider the type of dynamic response in which the social norm depends on past program usage. An increased usage of program benefits today reduces the stigma to living off benefits in the tomorrow. Higher free-riding tomorrow further lowers the cost. The “tipping” phenomenon is more gradual but the system gravitates from the “good” equilibrium to the “bad” one.

The OECD (2005) reports that on an average day in Sweden, 14 percent of the working age population is on sick leave or disability insurance. Figure 4 shows that the proportion of the population not at work increased dramatically during the early 1990s and stabilized in the mid

¹⁰ These authors report that the national registers underreport the true level of sick days by 10 percent.

1990s at the higher level. Disability claims show increases among women and those at younger ages. In our 1997 paper, we discussed intergenerational differences in use of sick leave, where the results suggest that young people's usage of sick leave may be less related to medical need than to work preferences. All these figures point to a weakening of collective work ethic and the decline of a social norm against free riding on social insurance programs. The OECD (2005) recognizes this shift and called for a "change in the culture of sickness and disability" to one of "mutual obligation" to get the sick and disabled back to work as quickly as possible. If norms erode too much and a tipping point is reached even more radical reforms will be needed.

All insurance programs face issues of moral hazard and adverse selection. Lindbeck, Nyberg and Weibull (2003) note the difficulty of the insurance provider to develop objective criteria to distinguish between the deserving ("unlucky") and undeserving ("free riders") beneficiaries. When sufficiently strong, social norms may be a cost efficient way of limiting free-riding. Lindbeck, Nyberg and Weibull (2003) argue that social norms are tacitly enforced by individuals who are close to the beneficiaries and who have better information than do program administrators. And enforcement of the social norm may operate through a variety of social channels, unconstrained by the formal rules and procedures that restrict program administrators. A hidden cost of weakening social norms against free-riding on social insurance programs and especially sickness and disability insurance will be increased administrative costs for additional monitoring and enforcement. In addition, stricter enforcement may imply that some of the truly needy will be denied benefits.

The social cost of continuing to allow easy access to generous social insurance programs is large. Getting people back to work has a twofold benefit of increased output and lower tax rates to cover the reduced program expenditure. Harder to measure are the reduced deadweight losses associated with the lower tax rates. We recognize these costs and realize the challenge encompasses the design of social insurance programs and their administration.

Parental benefits

Historically, Sweden has been one of the leaders in offering benefits connected to childbearing and child rearing. Sweden offers subsidies to defray the medical costs of child bearing and child

allowances to offset child-related expenditures necessary for young children and adolescents. As part of its family policy, parent benefits offer either parent subsidies to stay home with the child. It is important to recognize that parental benefits are one component of family policy and have the intended role of helping parents, and primarily women, balance the demands of family and the workplace. Thus, an evaluation of their effects requires a broader perspective than simply their incentive effects on labor supply. Even on labor supply the effects are complicated and somewhat offsetting. Of course, upon childbirth parental benefits offset the cost of leaving the market and will increase time away from work. Within the OECD framework described above, absences while on parental benefits fall within “absent for other reasons.” However, guaranteed benefit levels are so low, prospective parents have an incentive to enter the labor market prior to *each* birth.¹¹ Empirical studies are few,¹² but the net effect for labor supply is likely to be negative particularly as the entitlement period is substantially shorter than the benefit period.

The recent OECD country report on Sweden is critical of the level of parental benefits in Sweden, labeling the benefits as very generous and questioning their value on child development and welfare. We recognize the likely disincentive effects on labor supply, but are less critical of the current generosity of parental benefits. Households and individuals make decisions within the current and anticipated social insurance programs. For example, private savings decisions are made with knowledge of the benefit levels of the public pension system. And, fertility decisions are made anticipating the programs and subsidies available to families with children. Reductions in child-related subsidies and programs that are interpreted as signaling the future policies to be even less supportive to families with children may decrease fertility. In light of Sweden’s aging population policies that may lower fertility merit further attention.

5. Public pensions

Sweden retains its position as leader in innovative social insurance programs with its pension reform of 1999 that completely restructured the public pension system. The pre-reform

¹¹ See Mortensen (1977) for an elegant early analysis of entitlement effects evaluating the employment effects of unemployment insurance within the United States.

pension system was a pay-as-you-go (PAYG) defined benefit system that had two components, a basic pension and a supplemental pension. The basic pension offered income security and established the minimum income floor for all workers. The supplement pension augmented the basic pension and targeted payments to replace about 60 percent of the worker's labor market earnings. Under the supplemental pension system, benefits were tied to the worker's highest earnings over fifteen years, and to obtain a full supplement benefit an individual had to work 30 years. Over time, however, benefits became more generous, life expectancies rose and birth rates fell. Thus, pensioners had to be supported for more years, were entitled to more generous benefits with a declining worker base to support them. These changes necessitated either large tax increases or a significant cut in benefits.

The 1999 reform

The Swedish pension reform of 1999 offers an innovative and in many ways radical solution to these problems.¹³ The largest change is that the public pension system switched from a defined benefit to a *notional defined contribution* (NDC) system. In the new system, workers have an individual account, which receives each year a pension contribution equal to 18.5 percent of their pensionable income. Now, instead of guaranteed benefits upon retirement, workers have guaranteed contributions credited each year to their accounts. It is *notional* because workers' accounts are only credited; actual assets are not set aside. Balances in the account earn a rate of return each year equal to annual growth in average wages. Upon retirement (after age 61) the individual's accumulated notional wealth is converted into an annuity dependent on the life expectancy of the individual's cohort.

A second innovation of the 1999 reform introduced limited individual control over the pension. Contributions equal to 16 percent points go into the national public pension fund, which is managed by the government. The remaining 2.5 percent contribution is mandatory; however, these funds are under the individual's control. Hence, the government will collect

¹² See Walker (1996) for an (unsuccessful) attempt to measure the effects of parental benefits on fertility and female employment. Fertility is not completely controllable and to the extent births are unplanned weakens entitlement effects on employment.

all revenues and disperse payouts, although the individual funds will be managed by private investment firms selected by the individual from an approved list of investment advisors. The last innovation is a significant broadening of the income base entering the public pension system. Besides earnings, the 1999 reforms recognized additional social insurance payments as part of the income base. This includes stipends to students pursuing post-secondary education and parental benefits. Indeed, child-rearing activities earn supplemental contributions, as does income while serving in the military.

The Swedish pension system remains a pay-as-you-go pension system as tax contributions paid by those currently working are used to finance the pension payments of those currently retired. At an 18.5 percent contribution rate, the system's designers expect the new pension system to deliver pension benefits at about the same level as the old system. An interesting political compromise rests with the 18.5 percent contribution rate. Consensus estimates within the public debate was that a 16 percent contribution would suffice to maintain the (then) existing level of pension benefits. Yet, to ensure income security, a higher contribution rate was accepted with the stipulation that the remaining funds were under individual control.

The new pension system represents a striking departure from Sweden's long history of guaranteed benefits and horizontal equity. Under the new system, different cohorts will receive different pensions for the same accumulated pension wealth as life expectancies change. Members of the same birth cohort will receive different pensions for the same life expectancy should the individuals retire in different years (and thus have the opportunity to accumulate different levels of pension wealth to annuitize at retirement). Finally, and most individual-specific, the individual accounts will accumulate wealth based on the individual's investment strategy. Individuals adopting more conservative portfolios may accrue less wealth than those who adopt more aggressive portfolios. Government oversight of the fund managers and restrictions on the types of investments permitted reduce this form of variability and it may be more symbolic than real. Yet, within a social insurance system founded on the

¹³ Like the previous system, the new pension system will be phased in over a number of birth cohorts; specifically, the birth cohorts 1938 to 1953.

notion of horizontal equity, in which “alikes are treated alike”, this source of individual level diversity is a striking departure from the traditional Swedish social insurance system.

Pensions and labor supply

There is a vast empirical literature on the old pension system¹⁴ and very little (because of its newness) on the 1999 pension reform. We note, however, that between 1999 and 2004, labor force participation rates increased among elderly (55-64). Future research will determine whether the work incentives created by the 1999 pension reform increased these rates. We offer some observations that suggest it may have.

The shift from the old defined benefit PAYG system to the notional defined contribution (NDC) system will induce both short-run and long-run effects on labor supply. In the long run as Lindbeck (2002) and Feldstein and Leibman (2002) show, a notional or quasi-funded benefit system can reduce the distortionary incentive effects caused by a tax on labor to finance benefits. That is, in a PAYG in which there is *no* relationship between taxes paid and benefits eventually received the implicit rate of return on tax contribution is minus 100%, and the deadweight loss reflects the entire pension tax on labor income. Under an NDC, taxes and benefits are related as taxes paid are returned as future benefits with an implicit rate of return equal to the growth rate of the population times the growth rate of labor income. If the implicit rate of return on pension contributions is close to the rate of return on other forms of savings the individual could otherwise make the distortion of labor supply is much reduced. Indeed, if the implicit rate of return exactly equals the return on other forms of savings then the distortion on labor supply is zero. Lindbeck and Persson (2003) show that for reasonable growth rates the reduction in the tax wedge on labor income could be as much as 10 percentage points. The reduction in marginal tax rates should therefore increase labor supply (via participation, hours, and quality). The reduction of deadweight loss generated by the NDC is potentially welfare improving for both “young” and “old” generations.¹⁵

¹⁴ See the various studies by Mårten Palme; e.g. Palme and Svensson (2004).

¹⁵ Importantly, the introduction of the defined contribution plan converts entitlements to contributions made rather than benefits to be paid. Hence, the government is protected from having to guarantee benefits in the presence of increasing life expectancies and below replacement birth rates.

The short-term labor supply incentive effects are more transparent. The switch from a defined-benefit to a defined contribution plan changes the nature of pension accruals. Under the NDC, another year of work will increase pension wealth because of the direct contribution from earnings, the return on accumulated contributions, and if the person is past normal retirement age, increased annuity values for shorter benefit period. In the defined benefit system, the pension depends on years of employment and average earnings over the highest 15 years of earnings. For someone with the same level of pension wealth and with fewer than 30 years of employment or with earnings above their 15th highest earnings, an additional year of employment would thus increase the annuity paid at retirement by increasing either the replacement rate or the average earnings (or both) used within the benefit formula. However, most workers near retirement age have worked for more than thirty years and thus under the defined benefit system have weak incentives to continue working. Therefore, the reformed Swedish pension plan now offers stronger work incentives, especially to those with persistent labor market attachment.

Yet, one cautionary remark is in order. Palme and Svensson (2002) estimate that approximately 20 percent of men and 27 percent of women exit the labor market via the social insurance programs. Under the 1999 reform social insurance income is pensionable and thus may exacerbate this tendency. Moreover, recent work on social norms suggests this problem is even more pernicious.

6. Other aspects of the tax base

So far, we have mainly focused on hours of work. From a tax revenue perspective, it is of interest to understand how and why taxation affects before-tax income. In addition, by extending the analysis to before-tax income, several additional mechanisms will appear; for instance, in addition to hours of work, before-tax income also reflects effort, occupational choice, wage formation and possibly also tax avoidance. We may, by Seldrod's hierarchy of response, expect taxable income to respond differently to tax policy changes in comparison with hours of work.

The relationship between marginal tax rates and before tax income

The literature on tax base determination, initiated by Lindsay (1987) and further developed by Feldstein (1995), offers an interesting complement to the traditional study of labor supply, since it allows us to address several aspects of behavior simultaneously. In other words, although the framework for studying tax base determination typically resembles the traditional labor supply model, it does not restrict its attention solely to hours of work. Depending on the definition of income, it may also (at least in principle) capture avoidance as well as the effects of tax policy on the gross wage rate, effort, occupational choice and savings. Therefore, part of the difference in results among studies is likely to be due to differences regarding the way in which income is measured, e.g. whether the analysis refers to taxable income or a broader income concept.

In their comprehensive study on tax base determination in the U.S., Gruber and Saez (2002) make a distinction between two income concepts; taxable income and broad income, where the latter is defined as the sum of all items that compose total income less capital gains.¹⁶ A basic hypothesis is that taxable income is more sensitive to marginal taxation than broad income, since changes in taxable income also reflect (some aspects of) tax avoidance. Indeed, this is precisely what Gruber and Saez find. First, the elasticity of taxable income with respect to the net tax rate (measured as one minus the marginal tax rate) is estimated to be around 0.4 on average.¹⁷ The corresponding elasticity for broad income is 0.07. Second, income effects are very small, implying that the uncompensated and compensated effects on before-tax income of a change in the net tax rate are similar. Third, the effect on taxable income of a change in the net tax rate appears to be strongest in the upper part of the income distribution.

¹⁶ Broad income contains wages, salaries and tips, interest income, dividends, alimony received, business income, total IRA distributions, total pensions and annuities, income reported on schedule E, farm income, unemployment income and other income.

¹⁷ This number is an average estimate in comparison with earlier literature. Studies concentrating on the upper part of the income distribution typically estimate a higher number. On the other hand, some earlier studies that do not refer to the U.S. seem to imply a much weaker relationship between marginal tax rates on taxable income; see for instance Aarbu and Thoresen (2001) and Sillamaa and Veall (2001).

There are several studies based on Swedish data dealing with the influence of marginal tax rates on before-tax income. Let us start by briefly discussing a paper by Ljunge and Ragan (2004). Instead of considering taxable income and broad income, respectively, as in the paper by Gruber and Saez, they focus their attention on the determinants of labor earnings. Although this choice of dependent variable means neglecting some of the possible effects of taxation due to tax avoidance, it will, nevertheless, reflect the joint effect of taxation on several interesting aspects of behavior. As such, we may expect the behavioral responses to be different from those presented for work hours. Ljunge and Ragan use panel data and focus on individuals aged 25-55 during 1989. Their study period is 1989-1994, meaning that attention is paid to the 1991 tax reform in terms of its effect on labor earnings. The results imply that the compensated elasticity of earnings with respect to the net tax rate is around 0.33 on average, which is a relatively large response (recall that the corresponding elasticity for taxable income in the U.S. is measured to be around 0.4 by Gruber and Saez). The uncompensated elasticity of labor earnings with respect to the net tax rate is estimated to be in the interval 0.25-0.33. In addition, there is considerable variation across groups. For instance, both low income earners and high income earners have higher estimated elasticities than income earners in the middle of the distribution. On average, the estimated behavioral response to the 1991 tax reform is an increase in earnings by 10-15 percent.

Using panel data for the years 1989 and 1992, and focusing on the age group 25-60 in 1989, Hansson (2004) estimates the elasticity of taxable labor income with respect to the net tax rate to be 0.43 or 0.57 on average depending on the choice of instruments for the net tax rate. She also finds that the relevant elasticity may differ considerably across groups (with women being more responsive than men; at least in one of the models). However, since she does not incorporate a measure of virtual income in the analysis, it is not clear whether the relevant elasticity estimate should be interpreted as a compensated or uncompensated effect. The results also appear to be somewhat sensitive to the use of estimation method (the choice of instrument for the marginal tax rate). Selén (2002) estimates a model similar to that of Gruber and Saez using data for the period 1989-1992. He concentrates the analysis to men in the age group 25-55 in 1989. His results imply a slightly lower estimate of the (compensated) elasticity of taxable income with respect to the net tax rate; in the interval 0.2-0.4. Finally,

Blomquist and Sehlin (2007) estimate how taxable labor earnings as well as the hourly gross wage rate depend on the net tax rate. By using data for 1981 and 1991, their preferred estimates imply that the elasticity of taxable earnings with respect to the net tax rate is 0.26 for men and 0.75 for women (again indicating that women respond more to tax policy than men), whereas the corresponding elasticities for the hourly gross wage rates are 0.20 and 0.33, respectively.¹⁸ We will return to the relationship between gross wage rates and the tax system below.

Although we believe that the study of how marginal tax rates affect before-tax income is interesting in the sense that it provides a broader view of tax responses than the traditional study of labor supply, it is important to be careful when interpreting these results. This is so for at least two reasons. First, this research area is relatively new by comparison; at least when applied to Swedish data. To be useful for purposes of policy evaluations and recommendations, these studies should be supplemented by additional research. Second, and more importantly, the theoretical foundations for the study of before tax income is not always convincing; the income supply model by Gruber and Saez is only one possible model, and it resembles the labor supply model ‘too much’ to provide a very interesting alternative. For instance, the income supply model is, itself, silent about important issues such as wage formation as well as about the opportunities and constraints underlying avoidance behavior. As a consequence, we may not learn much about the mechanisms underlying behavior by studying only the relationships discussed here.

Wages, taxes and tax progression

One reason as to why marginal income taxation causes a larger response in the tax base than in the hours of work was discussed in section 3, where we argued that individuals may adjust to taxation via tax avoidance which, in turn, tends to diminish the effects of taxation on hours of work. Alongside this explanation, empirical evidence also suggests that the wage formation

¹⁸ Blomquist and Sehlin also recognize that responses to tax policy are likely to be asymmetric; for instance, although a decrease in the marginal tax rate may lead to additional investments in human capital or a move towards jobs with higher wages, an increase in the marginal tax rate is not likely to lead to disinvestment in skills or moves

system may contribute to explain the apparently large effect on the tax base following the 1991 tax reform. If the pre-tax wage rates are determined by bargaining between unions and firms, which is common in European labor markets, standard models for wage setting, as well as some of the empirical evidence associated with them, predict that an increase (a decrease) in the marginal tax rate, with the average tax rate held constant, leads to decreased (increased) pre-tax wage rates.¹⁹ The intuition is based on a tradeoff (which the trade union is assumed to be facing) between the consumption wage per employed member and the number of employed members: a higher marginal tax rate tends to increase the opportunity cost of wage increases in terms of lost employment. On the other hand, a change in the average tax rate, with the marginal tax rate held constant, may either increase or decrease the pre-tax wage rate.

Let us discuss studies based on Swedish data. Holmlund and Kolm (1995) use data from the Swedish income distribution surveys, HINK, which include time series data for different income groups as well as micro level panel data.²⁰ In the panel data regressions, the results suggest that an increase in the marginal tax rate of 10 percentage points will reduce the pre-tax wage by about 4-6 percent for the average worker, with the average tax rate held constant, whereas the corresponding number in the time series regression is around -2.5 percent. There is also evidence suggesting that this effect is stronger among the highest income earners. Aronsson, Wickström and Brännlund (1997) estimate a union wage model based on panel data at the firm level for the Swedish pulp and paper industry. Their results imply that the elasticity of the pre-tax wage rate with respect to the marginal tax rate, with the average tax rate held constant, is -0.5 on average. The corresponding elasticity with respect to the average tax rate, with the marginal tax rate held constant, is estimated to be 0.5.

towards jobs with lower pay. Indeed, when reestimating their models using similar data for other time periods, they obtain results that differ substantially from those referred to above.

¹⁹ Normative implications of unionized labor markets are analyzed by e.g. Fuest and Huber (1997) and Aronsson and Sjögren (2004a, 2004b).

²⁰ Their model is essentially based on the seminal work by Lockwood and Manning (1993).

Despite arguments for caution,²¹ it is tempting to compare the results on tax progression and wage formation with those discussed earlier on the determinants of the hours of work and before tax income, respectively. Such a comparison provides at least one possible explanation as to why the labor earnings most likely increased more as a result of the 1991 income tax reform rather than an increase in the hours of work. In addition, this argument is further strengthened (yet from another perspective) by Blomquist and Sehlin (2007), where the difference between the tax base elasticity and the wage rate elasticity for men referred to above is very close to the typical labor supply elasticity estimated in earlier studies (indicating that the study of tax base determination gives results that are consistent with the labor supply literature). Interestingly, therefore, their results suggest that the response in labor earnings to a change in the marginal tax rate that is due to the response in the wage rate is more important than the response in the hours of work; at least for men.

7. Cross-country comparisons

Most earlier studies on work hours and, in particular, how hours of work respond to taxation, transfer payments and social insurance are based on within-country micro data. More recently, however, several studies²² have emerged with the explicit purpose of explaining cross-country differences with a focus on differences between Europe and the U.S. These differences have increased in general since the early 1970s and are now substantial: Americans tend to do much more market work than Europeans do. An important question is whether the differences in work hours between Europe and the U.S. can be explained by differences in taxation and transfer programs, or whether they are (mainly) attributable to other factors such as labor market institutions and legislation.

Differences between Europe and the U.S. with respect to work hours per person have been analyzed by e.g. Prescott (2004) and Olovsson (2004) in the context of numerical general

²¹ Note that these strong results are not fully confirmed by more recent research based on data for other countries. For instance, by using Danish data, Lockwood, Slök and Tranaes (2000) find evidence suggesting that the effects of higher tax progression on the pre-tax wage rate is income dependent. Similarly, Brunello, Parisi and Sonedda (2002) use Italian data and find the opposite effect in comparison with the Swedish studies referred to above; tax progression works to increase the pre-tax wage rate.

²² See e.g. Davis and Henrekson (2004), Prescott (2004), Olovsson (2004) and Alesina et al. (2005).

equilibrium models. From our perspective, the study by Olovsson is particularly interesting, as it deals explicitly with a comparison between Sweden and the U.S. Olovsson makes a distinction between market work and household production: the main difference between the two countries refers to how the households divide their time between market work and household production (more time is spent on market work and less time in household production in the U.S. in comparison with Sweden), whereas the total time spent working is about the same in both countries. Olovsson uses an intertemporal model of a competitive economy, where preference and production parameters are set to reflect Olovsson's assessment of estimates in the empirical literature, whereas the policy parameters are chosen either to reflect Sweden or the U.S. This enables him to compare how differences in public policy between the two countries affect the time spent in market work and household production, respectively. Adopting a long run perspective of comparing steady states, Olovsson shows that differences in public policy (and, in particular, income taxation) between the two countries can explain the differences with respect to how the households divide their time between market work and household production: high marginal tax rates in Sweden induce individuals to substitute from market to non-market production, with total hours of work virtually equal between the U.S. and Sweden. His model predicts a gradual reduction in the hours spent in market work in Sweden between 1960 and 1980, the direction of which is consistent with the observed behavior, although it overestimates the hours of market work per person at the beginning of the period (implying that the predicted reduction is greater than the reduction that actually took place).

Although it is likely that differences in tax policy between Sweden (or Europe in the paper by Prescott) and the U.S. give rise to differences in the hours of work per person, there are at least three problems with the analyses referred to above. First, the expenditure side of the government's budget is dealt with in a somewhat superficial way; neither Olovsson nor Prescott allows public consumption to enter the utility function, and both of them give the tax revenues (net of the useless public consumption) back to the consumers in the form of lump-sum transfers. The latter weakens the income effect, so that the substitution effect becomes dominant for the behavioral response to tax policy. Clearly, if the government spending (or part thereof) were not treated as a perfect substitute for private consumption, the income

effect would tend to offset the behavioral responses to tax policy; an argument also put forward in a comment by Ljungqvist (2005). Second, the social insurance system gives rise to its own incentives, which are likely to contribute to differences in the hours of work per person. For instance, differences between countries with respect to the generosity of unemployment benefits may imply differences in the incentives among the unemployed to actively search for employment. This aspect is particularly interesting in light of how the difference between Europe and the U.S. with regards to the hours of work per person refers to differences in terms of employment to population ratios. Although employment to population ratios are generally lower in Europe than in the U.S., the differences appear to be particularly large for the youngest and oldest age groups (see Gordon 2006). Generous unemployment benefits are likely to increase the reservation wage rates. Therefore, if human capital depreciates with unemployment, it becomes more difficult for the unemployed to find ‘acceptable’ jobs. This may, in turn, contribute to reduce the search intensity; see also Ljungqvist and Sargent (2006) as well as their contribution to this volume. As it is less beneficial for older than for younger individuals to re-invest, this also suggests that generous unemployment benefits may have a relatively strong effect on the incentives facing unemployed elderly. It is also consistent with the estimates by Palme and Svensson (2002) that unemployment is an important pathway to early retirement in Sweden. Third, the literature focusing on differences in tax policy between Europe and the U.S. as an explanation to differences in terms of the hours of work is often silent about the labor market structure; an issue to which we turn next.

Market structure and the role of unions

Is there econometric evidence in favor of the hypothesis that differences (between countries) in economic policy and, in particular, tax policy are related to differences in hours of market work? The answer is yes; there are studies showing a negative correlation between hours of work per person and the (average) marginal income tax rate. Alesina, Glaeser and Sacerdote (2005) discuss the possibility that these observed correlations may, to some extent, be due to a missing variables problem. Their study focuses on differences in labor market institutions between the U.S. and Europe: European labor markets are often characterized by trade unions

– which have a strong influence on wage formation and/or as a pressure group behind the economic policy – whereas the influence of trade unions is much weaker in the U.S. They use panel data for the OECD countries for the period 1960-1995. If they disregard the differences in labor market characteristics discussed above (in a way similar to earlier literature in this area), their results show a negative and significant relationship between the marginal tax rate and hours of work per person, which is consistent with the results mentioned above. However, by adding a measure of union density (the fraction of union members in the labor force) and a measure of employment protection, this significant result disappears; instead, both the union density and the employment protection variable show negative and significant relationships with hours of work. Therefore, it seems as if unionization and regulations better explain differences between Europe and the U.S. than does the tax system.

The idea that unions are able to affect work hours (either directly or indirectly via wage formation) becomes more plausible, the stronger the trade unions. Unions may engage in pressure group activities; due to differences in membership and/or political strength, the expected return from doing so is likely to have been greater in some of the major European countries than in the U.S. As such, unions may have had greater opportunity to affect market outcomes as well as legislation in Europe.

We do not want to draw strong conclusions from these results. This is so for several reasons. First, studies based on country level data cannot provide as detailed descriptions of incentive effects as the micro studies discussed before, meaning that direct comparisons are difficult. Second, although union wage setting and measures of regulations may correlate with hours of work per person at the country level, so does the marginal tax rate according to the results presented by Alesina, Glaeser and Sacerdote (2005). Therefore, it may very well be the case that the tax and transfer system, the social insurance system and institutional characteristics of the labor market all contribute to explain the differences with regards to work hours, and we are not yet able to establish which aspect is most important.

8. Summary and discussion

Sweden's diverse set of social insurance programs provide a high safety net for its citizens but require a high rate of taxation. Social insurance programs create their own disincentives for market work. Historically, Sweden's programs have been robust to individual malfeasance, yet there is emerging evidence that malfeasance is on the rise. The large and growing proportion of near-retirement population on disability and sickness insurance benefits is disturbing and may mask other structural problems in the labor market. Equally worrisome, it seems that the disability and sickness insurance programs are now entitlements rather than insurance.

The high tax rates necessary to fund the social insurance programs also create incentives against market work. The 1991 tax reform reduced marginal tax rates, but tax rates in Sweden remain high compared with non-Nordic European countries and particularly the United States. The econometric literature finds little evidence of high marginal tax rates reducing hours of work in Sweden. The literature offers a variety of reasons to explain why the distorting effects of high tax rates may not appear in hours of work. However, while taxes may not have very large effects on hours of work, there is emerging evidence that the high marginal tax rates do influence other choices affecting before-tax income. In the absence of any behavioral effects, an increase in the marginal income tax should have no effect on before-tax income. Recent estimates using Swedish data suggest that a ten percent increase in marginal tax rate reduces before-tax income by three to four percent.

International comparisons reveal that Swedes work fewer hours in the market than Americans do. The income guarantees offered by the social insurance programs and high marginal tax rates are certainly part of the explanation, though there is far from a consensus on their relative importance. And it is easy to recommend that tax rates be lowered or social insurance programs reduced. But doing so would miss the Swedish perspective on the "right level" of social insurance. A fruitful approach is to inquire whether the social insurance programs meet their original intent with the least social cost.

Sweden's 1991 tax reform and the 1999 pension reform increased incentives for market work. These reforms addressed politically contentious problems and illustrate Sweden's remarkable ability to find pragmatic public policy solutions. The challenge facing the Swedish welfare

system is to keep enough people working enough hours to fund its generous benefits. To preserve its high safety-net, Sweden will need to increase self-insurance of small (short-term) risks and may need to increase monitoring of benefits to limit free riding stemming from the apparent shift in norms away from market work.

Appendix

Table A1

Results for men

Study	Description	e_w	e_y
Blomquist (1983)	LNU 73, married men 25-55	0.08	-0.04
Blomquist and Hansson- Brusewitz (1990)	LNU 81, married men 25-55	(0.08, 0.12)	(-0.13, 0.02)
Flood and MaCurdy (1992)	HUS, married men 25-55	(-0.24, 0.2)	(-0.10, 0.04)
Aronsson and Palme (1998)	LNU 81, married couples 25-55	0.12	-0.03
Flood, Hansen and Wahlberg (2004)	HINK 1993, 1999, married couples, each spouse younger than 56	0.05	-
Blomquist, Ecklöf and Newey (2001)	LNU 73, 81 and 91, married men 25-55	0.075	-0.04

Results for women

Study	Description	e_w	e_y
Blomquist and Hansson- Brusewitz (1990)	LNU 81, married women 25-55	(0.38, 0.79)	(-0.24, -0.03)
Aronsson and Palme (1998)	LNU 81, married couples 25-55	0.44	-0.12
Flood, Hansen and Wahlberg (2004)	HINK 1993, 1999, married couples, each spouse younger than 56	0.1	-

Note: e_w measures the elasticity of the labor supply with respect to the own marginal wage rate, whereas e_y is the labor supply elasticity with respect to the virtual nonlabor income. In some of the studies, the authors estimate several variants of the model, and the numbers refer to the intervals for the point estimates.

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Figure 1

**Labor Force Participation by Age and Gender
United States and Sweden
1975-2004**

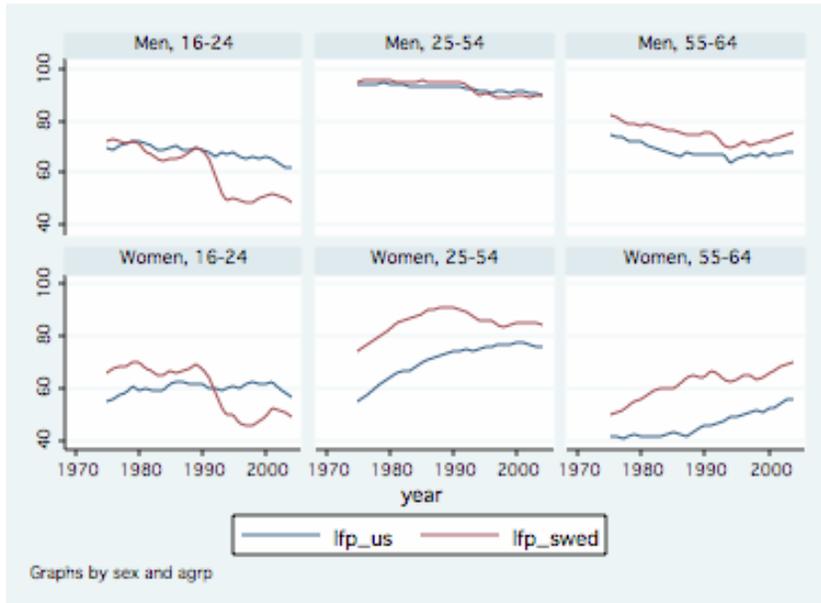


Figure 2

**Average Hours Worked Per Week By Age and Gender
United States and Sweden
1975-2004**

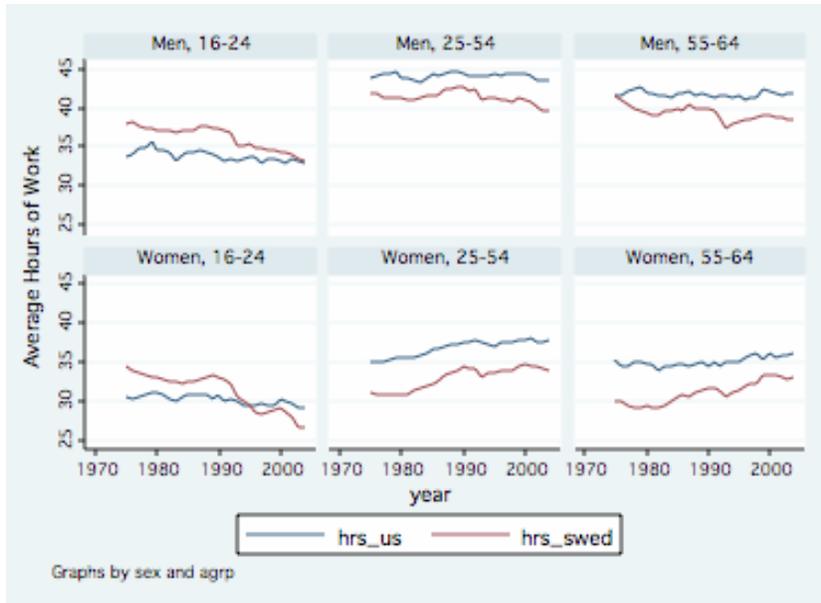
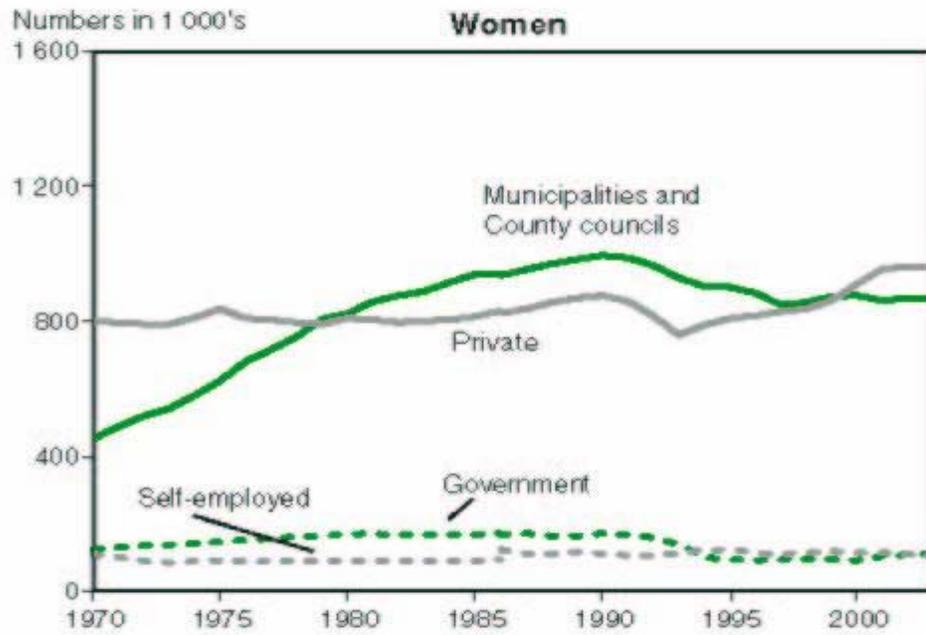


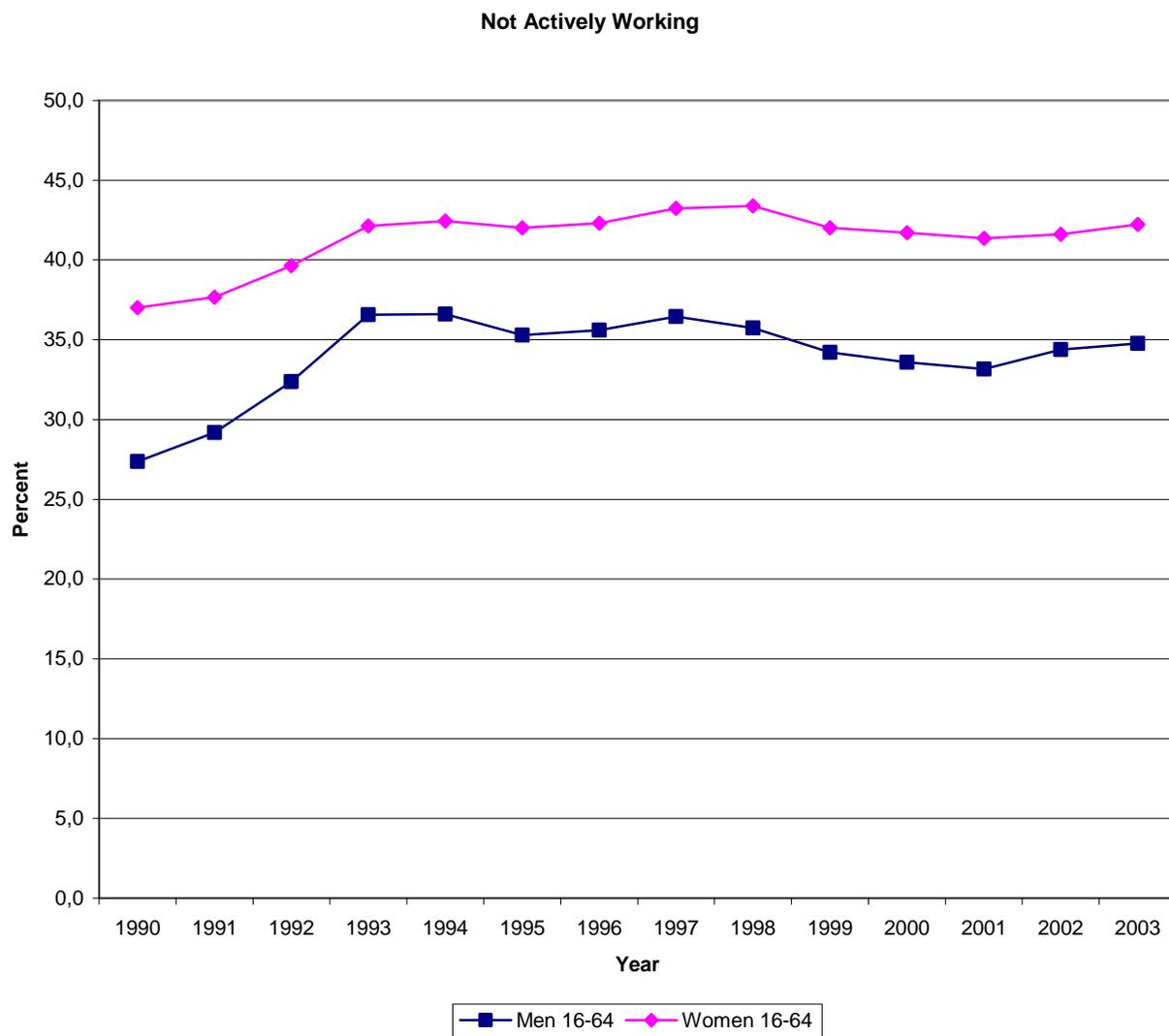
Figure 3
Number of Women Employed Ages 16-64
By Sector 1970-2003

Employed women aged 16–64 by sector 1970–2003



Source: Labour Force Surveys, SCB

Figure 4
Percent of the Population Age 16-64
Not at Work
1980-2003



Source: OECD country report for Sweden 2005.

Center for Demography and Ecology
University of Wisconsin
1180 Observatory Drive Rm. 4412
Madison, WI 53706-1393
U.S.A.
608/262-2182
FAX 608/262-8400
comments to: walker@ssc.wisc.edu
requests to: cdepubs@ssc.wisc.edu