Estimating labour supply elasticities based on cross-country micro data: A bridge between micro and macro estimates?

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ABSTRACT

The Nordic model relies on high tax rates to finance an extensive welfare state. If labour supply elasticities are large, the burden of financing the model can be large even if, arguably, the practice of providing subsidised goods that support labour supply is likely to mitigate these effects. We utilise repeated cross sections of micro data from several countries, including the four major Nordic countries, available from the Luxembourg Income Study, LIS, to estimate labour supply elasticities, both at the intensive and extensive margins. The data span over four decades and include a large number of tax reform episodes, with tax rate variation arising both from cross-sectional and country-level differences. Using these data, we investigate whether micro and macro estimates differ in a systematic way. The results do not provide strong support for the view that elasticities at the macro level would be higher than the corresponding micro elasticities.

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1. Introduction

The size of the public sector in the Nordic countries is among the largest in the world. Since tax distortions may rise with the tax rate, the burden of financing the public sector can become large. Recent macroeconomic research also suggests that the overall impacts of taxes on employment at the country level could be much greater than what has been previously thought based on microeconometric evidence. If this were true, the Nordic countries would find it increasingly difficult to sustain their welfare states. In this paper, we examine rigorously whether the macro labour supply estimates are, in fact, higher than the micro estimates. While macro point estimates tend to be higher than our micro estimates, our results do not support the view, expressed in the recent macro research, that macro estimates are much larger than the micro estimates. In addition, the micro-level hours and participation elasticities with respect to net wages we obtain are modest for the Nordic countries in our sample. This can be partly due to the Nordic arrangement of subsidising goods that are important in conjunction with labour supply, such as childcare, which may counteract some of the harmful effects of taxation on work effort and employment

(see, e.g., Olovsson (2009); Ragan (2013); Rogerson (2007)). All this points to the conclusion that high tax rates do not necessarily seriously endanger the high effort and employment rates that are important for the functioning of the welfare state.

An influential study within the macro tradition is Prescott (2004), who suggests that tax differences explain virtually all the differences in working hours between the U.S. and Europe. Large elasticities are also needed for conventional macro models to match the empirical fluctuations in aggregate employment over business cycles. Sometimes macro studies are based on simple cross-country comparisons and they do not typically pay attention to endogeneity issues, such as the possibility that if the economy performs badly and unemployment rises, countries need to raise taxes to balance budgets. And they often omit other potential explanatory variables that could affect employment.[1]

There is, however, a large discrepancy between this macroeconomic work and much of the modern microeconometric evidence on the impact of taxation on labour supply and taxable income. The micro evidence is nowadays based on careful examination of how individuals

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[1] Nickell (2003) concludes that, when other potential explanations for employment behaviour, such as differences in wage setting frameworks and social security systems, are accounted for, a 10% difference in taxes on labour income reduces overall labour input provided via the market by 2% of the population of working age.

react to tax reforms, which, it has been argued, can more plausibly identify the causal effects of tax changes on taxpayer behaviour. It is summarised by Meghir and Phillips (2010) in their chapter for the authoritative treatment of tax research in the Mirrlees Review. They conclude that, while labour market participation decisions can be quite elastic with respect to the take-home pay when working versus when unemployed (the 'extensive margin'), the working hours of those who already work (the 'intensive margin') are typically quite unresponsive to tax rates. While taxable income estimates are typically higher than estimates of working hour responses (for a recent survey, see Saez et al. (2012)) even taxable income responses are typically modest; typical estimates of taxable income elasticities with respect to the net-of-tax rate (=1-marginal tax rate) are around 0.2–0.5.

But it is not clear either that the micro estimates provide the correct estimates of the long-run effects of taxes on labour supply behaviour. There are now several recent papers that aim to explain why micro and macro estimates differ so significantly. Chetty (2012) provides a possible solution building on optimization frictions. While micro evidence has paid a lot of attention to carefully estimating the causal effects of specific tax changes, these tax changes are often too small to generate really large society-wide impacts. If there are frictions related to re-optimisation of labour supply and income generation, it may not be worthwhile for individuals to react to small tax changes. Then estimates based on micro data can be downwards biased. Tax differences between countries, by contrast, are often so large that, at least in the long run, the economy and the individuals have reacted to those optimally. In Chetty et al. (2011a), the authors demonstrate that if taxation of households creates economy-wide structures, employers are likely to cater to employees' desires by offering compensation packages that suit the majority of the workforce. They also provide evidence from Denmark, where many taxpayers (and in particular in occupations where compensation packages can be tailored well) bunch at income levels where they just avoid paying an increased state-level marginal tax rate. Chetty et al. (2011a) also show how smaller tax changes, which do not affect all tax payers, generate much smaller behavioural elasticities than a single large increase in the marginal tax rate at the country level.

A second explanation is related to indivisible labour and varying responses along the intensive and extensive margins. A key paper in this strand of research is Rogerson and Wallenius (2009), which introduces the extensive margin to an otherwise standard macro model and demonstrate how the presence of fixed costs generates a realistic life-cycle profile of labour supply. While taxation might not matter so much for the hour choice of the working-age population, it can have a sizeable impact on the length of working life, so that at the aggregate level hours become quite responsive to tax changes.

A third explanation, building on Imai and Keane (2004), relies on the way human capital formation interacts with taxation. In a learning-by-doing framework, taxation can have significant long-run consequences, because if it leads to lower working hours in a current period, it also depresses wages in later periods. Therefore the cumulative distortionary effect of taxation, which matters at a macro level, could be much higher than what a typical static micro estimate would suggest.

The differences between micro and macro elasticities can also be linked to the work on social norms and the welfare state of Lindbeck et al. (1999). If individuals suffer from a stigma when living off benefits and this stigma is decreasing in the share of the population on benefits, it is conceivable that tax increases first reduce one's work effort marginally. However, gradually that has an externality on others via the social norm and in the end the overall, macro, effect is greater than the initially measured micro response.

Finally, even if the majority of micro-level labour supply studies would imply fairly small elasticities at the intensive margin, some of the elasticity of taxable income studies, surveyed recently by Saez et al. (2012), find much larger elasticities, especially at the top of the income distribution. However, these elasticities capture effects such as

income shifting behaviour and cannot be directly used to predict cross-country differences in employment.[2]

Despite this emerging research, the issue is far from settled. This is reflected in the conclusions in two recent surveys on the topic by leading researchers in the field. Chetty et al. (2012) conclude that

> "Based on our reading of the micro evidence, we recommend calibrating macro models to match Hicksian elasticities of 0.3 on the intensive and 0.25 on the extensive margin,"

which would lead to a combined macro elasticity of approximately 0.5. By contrast, Keane and Rogerson (2012) argue that

> "In our view, the literature we have described can credibly support a view that compensated and intertemporal elasticities at the macro level fall in the range of 1 to 2 that is typically assumed in macro general equilibrium models."

Since reliable evidence on the impacts of tax changes on working hours is one of the most important pieces of knowledge that economic policymakers need, there is an urgent need for further research that could help us understand the differences between these recommendations.

The purpose of this paper is to shed new light on this micro–macro controversy by estimating labour supply elasticities using micro-level data from several industrialised countries. Building on high-quality, harmonised, and comparable data from the Luxembourg Income Study (LIS), we employ the repeated cross-section estimation method developed by Blundell et al. (1998) to estimate the elasticity of working hours and participation at the micro level, macro level and at an intermediate level with the tax variation arising from both cross-sectional and cross-country sources.

The value-added of the paper is the following. First, the data span over several decades and countries and contain a large number of tax reform episodes, including major tax reforms, which means that there is good scope for reliable estimation. Additionally, tax changes have taken place across the whole income distribution, not only among top income earners. Second, we use the same estimator and harmonised data to estimate micro and macro elasticities.[3] We can compare if micro elasticities are in fact smaller than macro elasticities, without differences in methodology confounding the potential differences in micro estimates from different countries or differences between micro and macro level reactions. Third, at the macro level, the model is also correctly specified (from the point of view of a static labour supply model), since we actually use mean marginal tax rates and virtual incomes from the data, rather than artificial constructs or average tax rates. In addition, the marginal tax rate we use also includes (in our main specifications) not only the increase in tax liability but also reductions in transfers and benefits; that is, we use the theoretically correct effective marginal tax rates.[4] And fourth, we provide separate analyses of the intensive and extensive margins, estimated both at the micro and macro levels.

The topic is of key importance to the Nordic model – the public sectors in the Nordic countries are among the largest in the world and since tax distortions, other things equal, rise with the tax rate, the burden of financing the public sector could be very large.[5] But as we already

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[2] Piketty et al. (2014) estimate top income elasticities using macro data.

[3] We follow Chetty et al. (2012) and refer to macro elasticities if the source of the tax variation used in explaining labour supply is cross-country comparisons; micro elasticities refer to findings identified from cross-sectional variation within a country.

[4] We also compare our macro estimates to the standard ways, used earlier in the literature, to estimate country-level responses to taxation.

[5] The well-known revenue-maximising top marginal tax rate for Pareto-distributed top incomes is given by the formula $1/(1 + a \times e)$ where a is the Pareto–Lorenz coefficient and e is the elasticity of taxable income. With a typical Nordic value of a equal to approximately 2, the marginal tax rate on top incomes should not exceed 20% if the elasticity is as high as 2, which belongs to the interval recommended by Keane and Rogerson (2012). The top marginal tax rate (including commodity taxes) in Sweden is currently around 70% (Pirttilä and Selin, 2011). These differences dramatically highlight the issues at stake.