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Labor or consumption taxes? An application with a dynamic general equilibrium model with heterogeneous agents☆

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ABSTRACT

This study analyzes the effects of tax reform that shifts tax burden from labor to consumption. In this context, I also deal with the issue of progressivity. Even though this kind of tax policy change has recently gained popularity, its positive effects are debatable while the offsetting effect of a consumption tax on labor supply makes the net output change rather ambiguous. I examine these effects using a dynamic general equilibrium model with heterogeneous agents. The model is calibrated to fit certain characteristics of the Finnish economy. In addition to output and employment effects, I study the tax reform's effect on income and wealth distribution. First, I find that eliminating progressivity in labor taxation increases output via increase in capital accumulation that comes, however, in expense of slightly more inequality. Then, tax reform that replaces progressive labor taxes with a flat-rate consumption tax leads to a significant rise in capital accumulation, a negligible change in labor supply and gross labor income distribution, but a relatively considerable increase in wealth concentration.

1. Introduction

In response to the long-run structural challenges and deficits accumulated by the current crisis, many western governments are intending to raise consumption taxes but trying to avoid higher labor taxes at the same time. In fact, the tendency is to lower labor taxes if the government's fiscal situation allows it. Also the Finnish government has many times highlighted the urgent need for this kind of tax reform, i.e. the reform that raises consumption taxes but decreases labor taxes. In addition to a change in the source of taxation, this kind of tax policy switch also contains another aspect: replacing a progressive tax with a flat tax. From the theoretical point of view, changing the structure of taxes can be seen as part of a larger issue, the design of optimal tax system. The theoretical underpinnings of the topic can be found e.g. in Mirrlees (2006), Salanié (2003) or Kaplow (2008). In macro context, tax structure changes have been analyzed using a variety of approaches. The important work has been done by Auerbach and Kotlikoff (1987) who consider changes in taxes in an overlapping generations setting with exogenous growth. Jones et al. (1993) study the issue in an infinite-horizon representative-agent framework with endogenous growth and Coleman (2000) in the context of optimal Ramsey tax policy.

Regardless of many theoretical articles concerning the topic, studies with a more empirical approach are harder to find. Auerbach (1996) estimates that various proposals to replace the current income tax system in the U.S. with a consumption tax would produce long-run output gains of 3.2% to 9.7%. Heer and Trede (2003) study the output and distribution effects of tax reforms in a general equilibrium model calibrated to fit the stylized facts of the German economy. In their study income taxes are replaced with a flat-rate tax or consumption taxes. Their results show a significant rise in output, negligible effects on labor income distribution, but quite considerable (negative) effects on wealth distribution. Nishiyama and Smetters (2005) also study a similar kind of tax reform, i.e. a reform in which a progressive income tax is replaced by a flat consumption tax. They use an overlapping-generations model in which agents face idiosyncratic wage shocks and longevity uncertainty. They find that the effects of the tax reform crucially depend on the insurability of the wage shocks. In a pure empirical study based on the cross sectional data of 22 OECD countries Kneller et al. (1999) find that by raising consumption taxes and declining labor and other distortionary taxes, considerable output and employment gains would be reached. Bleaney et al. (2001) use the same data and end up with the same conclusions. Unlike the previous investigation, they also try to eschew biases associated with incomplete specification of the government budget constraint and endogeneity of fiscal or investment variables. Tervala and Ganelli (2008) study the effects of a tax structure reform with an open

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economy DSGE (dynamic stochastic general equilibrium) model. They find modestly positive effects on growth in the long run when labor taxes are replaced with consumption taxes. However, the model they use does not include capital, and its calibration does not represent any particular country.[1]

While we have some international evidence of the effects of tax reforms, there are almost no empirical macro studies of the tax structure changes that use *Finnish data*. Only Kilponen and Vilmunen (2007) make an exception for this. They find that shifting taxes from labor towards consumption produces a significantly positive employment and GDP effect. Their study uses DSGE macromodel that also tries to capture the behavior of the pensioners. For this reason, the results are very sensitive to the assumptions made for labor supply. Hence we still know very little how a tax structure reform would affect the output and employment in Finland. And we know almost nothing about the distributional effects of the reform.

To understand the effects of labor and consumption taxes, I first discuss the theoretical aspects of direct and indirect taxation. Then, in order to assess these effects quantitatively, I apply a general equilibrium model with heterogeneous agents to compare three fiscal regimes: i) progressive labor taxes that correspond to the Finnish system, ii) flat-rate labor tax, and iii) only a consumption tax. That said, I utilize the aspects of the framework presented in Heer and Trede (2003) and Heer and Maussner (2009). Nevertheless, the model presented in this paper has many unique characteristics. Unlike these previous studies in which income taxes are levied similarly on capital and labor, my framework is the Finnish dual income tax system that treats capital and labor income separately. This allows me to focus purely on the comparison of labor taxes and consumption taxes. Also, I change the theoretical assumptions concerning the risk of unemployment and calibrate the model to fit the stylized facts of the Finnish economy.

The results show that replacing progressive labor taxes with a flat-rate labor tax produces a slightly larger economy with fractionally more inequality. The output effect is almost totally due to the increase in capital stock. In the second and main experiments I find that the tax reform that replaces progressive labor taxes with a flat consumption tax has only minor effects on labor supply and gross labor income distribution, a positive effect on capital stock, but a negative effect on wealth distribution (i.e. wealth concentration increases). The sensitivity analysis shows that with less risk averse agents, the contribution of capital to output effect decreases but wealth concentration increases more when compared to the benchmark results.

The paper is organized as follows. Section 2 discusses the theoretical aspects of labor and consumption taxes. Section 3 introduces the model I use for simulation, and in Section 4 the model parameters are calibrated. In Section 5 I discuss the results from different tax policies. Final section concludes.

2. Direct vs. indirect taxation

In recent years, tax reform that replaces labor taxes with consumption taxes has gained popularity among many politicians and economists. Consumption tax is regarded as the least distortionary instrument to collect more tax revenues or even as a "money machine" for government.[2] The common argument is that consumption taxes, unlike income taxes, do not discourage saving. The starting position for the reform looks very different across countries. This can be seen from the figure below, which shows the implicit tax rates on consumption and labor for 28 countries. For instance, one can find countries like Denmark and Italy that both have a high tax rate on labor but a totally different tax rate on consumption (Fig. 1).

A useful and simple framework to analyze the problem of direct vs. indirect taxes is provided for instance by Salanié (2003). He assumes that government can only use a linear tax on goods and wages, and considers the general equilibrium of a simple production economy. In this framework, it is possible to show that with no non-labor income, and no bequest, the tax on wages is completely equivalent to a uniform tax on goods.

However, if we extend the model to a deterministic discrete-time infinite horizon economy that also includes capital and government spending, the analysis gets more complicated. This kind of economy is studied by Coleman (2000). He analyzes Ramsey tax policy, i.e. the policy in which the allocations from the equilibrium maximize the utility attained by households. The model now consists of a large number of identical households who own all the factors of production, namely labor and capital, that they rent to firms at perfectly competitive rates. A government imposes flat-rate taxes on income from labor, consumption, and capital. In this model, households adjust their consumption and labor supply over time, as well as firms adjust their demands for investments and labor.

Coleman defines some constant $\overline{\tau}$, and chooses $\tau_t^c = \overline{\tau}$, $\tau_t^l = -\tau_t^c$, and $\tau_t^k = 0$. From that follows that he has a constant tax rate on consumption and a subsidy to labor at the rate imposed on consumption, and a zero tax rate on capital. In order to this tax policy to be optimal, $\overline{\tau}$ must satisfy the government budget constraint. Now it is possible to derive the result that in a dynamic economy in which the government has access to consumption and income tax rates, and in which the government is permitted to subsidy labor income, an optimal tax policy is indeed necessary to impose a positive tax on consumption but a subsidy on labor, and no tax on capital income. Nevertheless, this result holds only if the value of initial assets exceeds the value of government consumption, i.e. if

$$a_0 > \sum_{t=0}^{\infty} q_t g_{1t}, \tag{1}$$

where a_0 denotes the initial assets, q_t is a state price vector, and g_{1t} is government consumption.[3] The optimal tax policy reduces the amount the initial assets can purchase, so the consumption tax acts like a one-time lump-sum tax on initial assets less the value of government consumption. However, Auerbach and Kotlikoff (1987) discuss the ability of a consumption tax to tax existing assets. In their analysis, due to the distortive effects on labor supply, the offsetting effect on output of implementing only a consumption tax makes the net output change ambiguous. In fact, this is the core of the whole dilemma.

There is still one thing that makes the comparison of labor taxes and consumption taxes complicated: the fact that consumption tax is usually proportional but labor taxes progressive in the Western countries. Nishiyama and Smetters (2005) state that flattening tax rates tend to produce sizable long-run output gains across a range of models with deterministic wages. Salanié (2003) states that a proportional tax would also have obvious administrative advantages. It would simplify the tax returns and eliminate the situation in which a taxpayer pays more tax when his income varies over time compared to the situation when it is constant. It would also make pay-as-you-earn withholding systems simpler when the taxpayer has several income sources.

However, despite all these advantages, Salanié argues that most voters estimate that taxes should be progressive. This is mainly due to

[1] Also recent macro model simulation studies provide estimates for the effects of changing consumption or labor taxation, e.g. Forni et al. (2009) and Coenen et al. (2008) estimate a DSGE model for the Euro area and find that decreases in labor and consumption tax rates have sizeable effects on consumption and output. However these simulation studies are concerned with lowering tax rates in general, but not reforming their structure.

[2] For instance the discussion in the U.S. is surveyed by Carrol and Viard (2010).

[3] In Coleman's analysis is needed to rule out the arbitrage possibilities.