

Income Shifting within a Dual Income Tax System: Evidence from the Finnish Tax Reform of 1993*

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Abstract

Dual income tax systems can suffer from income that shifts from progressively taxed labour income to capital income, which is taxed at a lower, flat rate. This paper empirically examines the 1993 Finnish dual income tax reform, which radically reduced the marginal tax rates on capital income for some, but not all, taxpayers. We measure how overall taxable income and the relative shares of capital income and labour income reacted to the reform. We find that the reform led to a small positive impact on overall taxable income, but part of the positive response was probably offset by income shifting among the self-employed.

Keywords: Taxable income; tax avoidance; dual tax system

JEL classification: C21; H21; H31

I. Introduction

Dual income tax systems—with a progressive tax on earned income and a proportional tax on capital income—were first implemented in four Nordic countries (Denmark, Finland, Norway, and Sweden) through a number of tax reforms from 1987 to 1993. But these tax systems also appear to be increasingly popular in other countries. In Germany, the Council of Economic Experts suggested in 2003 that Germany ought to move towards a dual income tax. And in the US in 2005, the President's Advisory Panel on Federal Tax Reform proposed two alternative plans to simplify the US federal tax code. One of these proposals, the Growth and Investment Tax

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Plan, is essentially a type of dual income tax, with an individual level, flat 15 percent tax on dividends, interests, and capital gains.

As is made clear in recent overviews by Boadway (2004) and Sørensen (2005b), the dual income tax system no doubt has several merits. It allows for a more favourable tax treatment of capital income, which can be desirable from the efficiency point of view. The system also treats different sorts of capital income in a neutral way, thus avoiding the myriad tax concessions for some types of reported capital income typically involved in comprehensive income tax systems. And it also serves as a way of reacting to capital income tax competition.

In the Nordic countries with more than 10 years of experience of the system, an increasing concern has emerged about what is often called the Achilles' heel of the dual income tax (i.e., the incentives the system creates for tax avoidance through income shifting), especially within small firms—see, for instance, the discussion by Sandmo (2005). Owing to a large gap between the marginal tax rate on labour income and capital income, high-income earning individuals may try to shift part of their labour income tax base into the capital income tax base. This possibility tends to increase the efficiency costs of the tax system, and it may also erode the intended progressivity of taxation. If the threat of tax base manipulation is severe enough, one may need to reconsider the optimal way of setting capital income taxes. Indeed, Christiansen and Tuomala (2008) show that in circumstances where a zero tax on capital income would in principle be optimal, the government may still want to tax capital income to prevent income shifting.

The purpose of this paper is to assess how the different personal income tax bases reacted to changes in marginal tax rates in the Finnish dual tax reform of 1993.¹ In particular, we are interested in how vulnerable the dual income tax system is to income-shifting activities. We use a representative panel that contains rich information on individual taxpayers before and after the reform. The reform radically reduced the marginal tax rates on capital income to some but not all taxpayers, whereas the variation in the change in the marginal tax rates on labour income was considerably lower. We distinguish between “real” responses (i.e., adjustments in savings and labour supply) and income shifting responses by comparing the income growth of individuals with and without access to income-shifting technologies (self-employed and employees²).

¹ According to a descriptive study by Riihelä *et al.* (2005), there was actually a strong increase in capital income after the 1993 dual tax reform, in particular among top income earners.

² For brevity, we refer to all entrepreneurs as self-employed in what follows. This concept includes active owners of sole proprietorships, active owners of business partnerships and active owners of closely held corporations.

Our key finding is that there are sharp differences in the way in which the two groups reacted to the dual tax reform. Employees exhibit modest, if any, responses to the dramatic cuts in marginal tax rates on capital income when we include our full set of control variables. The self-employed, on the other hand, who faced opportunities to manipulate the tax base, significantly increased their capital income. Since we have been unable to discern any corresponding surge in their total income, we interpret this growth as an indication of income shifting. Among employees, however, we observe a marked response in taxable labour and overall income to the small changes in marginal tax rates on labour income that occurred between 1992 and 1995. The elasticity estimates that fall in the range of 0.2–0.4 are close to earlier estimates obtained both on Scandinavian and US data with similar methods.

The paper is organised as follows. Section II provides a literature background while Section III briefly describes the Finnish tax reform in 1993. Section IV builds a small theoretical framework to help concentrate the thoughts on the key behavioural mechanisms and discusses our empirical approach. Section V presents the data and explains issues related to the construction of tax bases and different measures of marginal tax rates. The estimation results from the main specifications are presented in Section VI, while Section VII analyses the robustness of the results. Section VIII concludes the paper.

II. Related Literature

The way in which we assess the reform in this paper builds on an empirical analysis of how changes in marginal tax rates affected overall (taxable) income and, in particular, the composition of income (earned income vs. capital income). Our approach is closely related to the literature on the elasticity of taxable income, along the lines of Feldstein (1995), Gruber and Saez (2002), and a large amount of recent research,³ in which overall taxable income is regressed on the net-of-tax rate (one minus the marginal tax rate). However, in contrast to earlier studies in this literature, we will have to consider *two* separate income tax bases and net-of-tax rates.

While marginal tax rates on capital income can also influence labour supply, it is suspected that the key real behavioural change is related to savings behaviour. But especially in the short run, the taxpayer can also react through income shifting between the two differently treated tax bases. Therefore, even though our study is restricted to the personal income tax base, our paper is also related to the literature on income shifting between

³ This research has recently been summarised by Saez *et al.* (2009).

the personal and corporate tax base, where the key references include Gordon and MacKie-Mason (1994), Gordon and Slemrod (2000), and de Mooij and Nicodème (2008). Stephens and Ward-Batts (2004) analyse a related issue of how couples reallocated their asset holdings, after the UK moved to separate filing in family taxation, to utilise the different marginal tax rates between husbands and wives. The possibility of income shifting in the US tax system is also taken into account in Carroll and Hrung (2005) where it is calculated that income shifting may offset 22–37 percent of the overall increase in taxable income owing to tax changes.

Previous studies on Nordic dual income tax reforms—see, e.g., Sørensen (1998), Kari (1999), and Lindhe *et al.* (2002, 2004)—have also discussed the incentives for the owners of small businesses to transform labour income into capital income. Our work is also connected to a number of earlier taxable income studies on the Scandinavian tax systems. Aarbu and Thoresen (2001) and Thoresen (2004) examine the tax changes in Norway, whereas Selén (2004), Ljunge and Ragan (2006), Hansson (2007), Holmlund and Söderström (2007), and Blomquist and Selin (2010) focus on the Swedish tax system. However, none of them focuses on the composition of labour and capital income and income shifting between the bases. In addition, Fjaerli (2004) utilises the change towards the dual tax system when measuring the impacts of tax incentives on household debt, based on panel data from Norway. Finally, using Norwegian firm-level data, Fjaerli and Lund (2001) have undertaken a study showing that the choice between the owner's wages and dividends under the Norwegian dual income tax is driven by both tax and non-tax factors, such as rights to social benefits.

III. The Finnish Tax Reform of 1993

The Finnish tax reform is particularly suitable for examining the impacts of a dual tax reform, since the gap that emerged between the marginal tax rates on labour vs. capital income was the greatest in the Finnish case (Sørensen, 1998, Table 1). Until the end of 1992, Finland had a global income tax, where all income was, in principle, treated in the same way. Taking into account proportional local tax rates and relevant statutory surcharges, the highest marginal income tax rate was 63 percent in 1992 and 1995.

Although much of the income was taxed non-linearly in 1992, there were considerable differences across income sources as the tax deductions differed. Two key deductions, which were also subject to a change in the tax reform of 1993, were a deduction for interest expenses and an exempt level of capital income. Interest expenses were deductible to roughly 75 percent of the interest payments on loans for owner-occupied housing up

to EUR 3,400. According to the regulations on the exempt level of capital income, taxpayers could also deduct roughly 50 percent of many types of capital income, like dividends that were not subject to the imputation system and interest income that was not taxed at source, once more up to EUR 3,400. This meant that up to a certain level, capital income was subject to a lower—but still progressive—marginal tax rate than labour income.⁴

In 1990, Finland adopted an imputation system for dividends: an amount corresponding to the profit tax paid by the corporation was deducted from the tax of the individual shareholder. The system was retained in the 1993 reform. Since the new flat corporate profit tax rate of 25 percent now always equalled the flat tax on capital income, the imputation credit fully offset the personal tax on dividends after the reform. With respect to personal taxation, the two key ingredients of the 1993 reform were as follows:

- The progressive central government income tax schedule was now only relevant for earned income (labour income, social security benefits, etc.). As capital income was removed from the labour income tax base, those with a positive capital income *ceteris paribus* faced lower labour marginal tax rates after the reform. Conversely, those with a negative capital income saw higher marginal tax rates for labour income. In principle, all forms of capital income (dividends, rents, interest income, capital gains, etc.) were subject to a flat tax of 25 percent.
- The deduction of interest expenses was replaced by a two-part system. Interest payments became deductible against capital income. When the taxpayer had insufficient capital income to claim deductions on interest payments, a credit for a deficit in capital income emerged. This was a deduction granted from the *tax* on earned income on the basis of expenses incurred in acquiring income, interest expenses, or certain forms of financial losses. This move also considerably reduced the tax-favoured position of loans related to owner-occupied housing. Only 25 percent of the interest payments on these loans, up to a limit that depended on family type, could be deducted from the tax on labour income. Furthermore, the allowance on the basis of capital income was abolished.

⁴ The effective tax rate also differed for different types of capital income. A large amount of interest income was subject to a smaller source-based tax. The income from these accounts was not included in the recorded personal tax base, neither before nor after the reform, and therefore our dataset does not contain information on income that is subject to source-based tax. The source-based withholding tax rate was set equal to the personal capital income tax rate of 25 percent after the reform.

Altogether, these moves meant that there was a significant gap between the marginal tax rate on labour and capital income for many of the taxpayers—for taxpayers with the highest marginal tax rate, the difference was almost 38 percentage points. For individuals with a high marginal tax rate in 1992, there was a significant drop in the marginal tax rate on capital income, whereas the change was much smaller for individuals with a low income.

To prevent income shifting between the two differently taxed income bases, reported business and dividend income were split into one labour income and one capital income component by the tax authorities. Business income from sole proprietorships and partnerships was divided such that an amount corresponding to a certain fraction, 15 percent, of the net worth of the enterprise was taxed as capital income and the residual as labour income. Dividends from companies not listed on the stock exchange were split in a similar manner as business income, also based on the net worth of the company.

However, the Finnish version of the dual income tax left some opportunities for income shifting that are explored by Lindhe *et al.* (2002, 2004). They note that the Finnish version of the dual income tax distorts the owner's financial decisions towards lowering the cost of capital more than the Swedish and Norwegian systems. Some forms of income shifting were available for both the self-employed taxed at the personal level (sole proprietors, partnership owners) and firms taxed as separate entities (closely held corporations). As further explained in Appendix A, the owner-manager of a closely held company could transform salaries into retained profits and thereby increase the future income share taxed as capital income. This is one of several reasons why the reform also favoured incorporations.⁵ In addition, proprietors could reduce their overall tax bill by shifting low-yielding non-business assets into the business sphere, as also described in Appendix A.

To sum up, owner-managers who had previously only reported labour income or modest dividend income could save on their tax bill by taking out more capital income after the reform. In the empirical analysis below, we are able to detect this simple form of income shifting. Since we lack enterprise-level data on net worth prior to the reform, we cannot directly observe increases in the net worth of the companies, but the observed responses in taxable income could reflect the type of income shifting described in the last part of Appendix A.

⁵ According to Statistics Finland, the share of incorporations from all firms increased from roughly 30 percent in 1992 to 40 percent in 1995.

IV. Theoretical Framework and Empirical Approach

A Simple Model

The following simple model is intended to shed some light on our empirical approach. Suppose that a representative individual maximises the well-behaved utility function $U = U(C, X, L)$, where C is present consumption, X future consumption, and L leisure. We assume that the individual is located on linear segments both on the labour and capital income tax functions. In the absence of income shifting, the budget constraint can be written as

$$C + X/[1 + (1 - t_c)r] = (1 - t_l)w(\bar{L} - L) + R,$$

where t_l is the marginal tax rate on labour income, t_c is the marginal tax rate on capital income, r is the interest rate, \bar{L} is the time constraint, w is the hourly wage rate, and R is virtual income. Literally, this model is, of course, a two-period model with zero hours of work in the second period. Now, suppose that the individual has the opportunity to shift his or her income between the labour and the capital income tax base. If there were no costs associated with income shifting, the utility-maximising agent would shift his or her entire income to the more leniently taxed base. In reality, we could not expect this to be the case. Let $\kappa \in (0, 1]$ be a summarising parameter for the exogenous factors determining the cost of income shifting. These could be considered as individual characteristics, such as self-employment status. We introduce a cost function into the budget constraint, $\Gamma(\eta; \kappa)$, where η is the amount of income shifted.⁶ We assume $\Gamma(\eta; \kappa)$ to be decreasing in κ and increasing in η . For simplicity, suppose that the cost function takes the following form: $\Gamma = \Psi(\eta)/\kappa$. The budget constraint can now be written

$$C + \frac{1}{1+r}X + m(K + \eta) = w(\bar{L} - L) - t_l[w(\bar{L} - L) - \eta] - \frac{\Psi(\eta)}{\kappa} + R, \quad (1)$$

where $m = t_c/[1 + (1 - t_c)r]$ can be interpreted as the present value of the marginal tax rate on capital income and $K = rX/(1 + r)$ as the present value of interest income. The consumer maximises utility with respect to C , X , L , and η . The first-order condition for η can be written as

$$\psi'(\eta) = \kappa(t_l - m). \quad (2)$$

The marginal cost of income shifting is equal to the marginal benefit of income shifting, which, in turn, is equal to the difference between the

⁶ See Slemrod (1994, 2001) for theoretical studies where avoidance opportunities represented by a cost function are present.

marginal tax rates on labour income and capital income times the parameter κ that determines the cost of income shifting. In a linearised version of the model, the marginal cost can be expressed as $\theta = \kappa(t_l - m)$, directly entering the optimisation problem of the individual. Henceforth, we will denote reported labour income by LI and reported capital income by CI . Expressing hours worked as $H = \bar{L} - L$, we can write the optimal taxable income functions as follows:

$$LI^* = wH^*[t_l, t_c, \kappa, r, w, R] - \eta^*[t_l, t_c, \kappa, r, w, R], \quad (3)$$

$$CI^* = K^*[t_l, t_c, \kappa, r, w, R] + \eta^*[t_l, t_c, \kappa, r, w, R]. \quad (4)$$

In this study we will measure LI^* , CI^* , and its sum TI^* . Both LI^* and CI^* will entail real responses; that is, substitution among the arguments in the utility function and income shifting. Generally, the key parameters can be expected to have an effect on both components of the taxable income functions.

Empirical Method

At a general level, when estimating (3) and (4) we will start from the following linear equation:

$$I_s = \alpha_0 s + \tau'_s \alpha_1 + s \times (\mathbf{x}' \alpha_2 + \mathbf{q}' \alpha_3) + (\mathbf{x}' \alpha_4 + \mathbf{q}' \alpha_5) + \varepsilon_s, \quad (5)$$

where the dependent variable I is one of our three income measures, CI , LI , or TI ; s is a linear time trend, τ is a vector of tax variables, \mathbf{x} is a vector of individual specific time-invariant observable characteristics, \mathbf{q} is a vector of unobservable traits, and ε is the error term. A key feature of (5) is that non-tax factors are not only assumed to have an independent effect on I but they may also interact with the time trend. Differentiating (5) yields

$$I_{s+1} - I_s = \alpha_0 + (\tau_{s+1} - \tau_s)' \alpha_1 + \mathbf{x}' \alpha_2 + \mathbf{q}' \alpha_3 + (\varepsilon_{s+1} - \varepsilon_s). \quad (6)$$

As noted by Blomquist and Selin (2010), insofar as unobservable heterogeneity interacts with the time effect, it does not cancel out when differentiating. Thus, as long as \mathbf{q} is correlated with other covariates in (6), an omitted-variables bias might occur if \mathbf{q} is not considered in the estimation. We will address this omitted-variables bias by adding first-period income, I_s , to the set of regressors in (6). Since I_s is partly determined by \mathbf{q} in (5), it may serve as a proxy variable for \mathbf{q} .⁷ It has been recognised

⁷ A complicating fact is, of course, that I_s is also determined by ε_s in (5) such that I_s as a regressor might be correlated with $(\varepsilon_{s+1} - \varepsilon_s)$ in (6). Unfortunately, this is difficult to avoid with data from two years only; see Blomquist and Selin (2010) for an approach with data

in previous studies—for example, Moffitt and Wilhelm (2000), Gruber and Saez (2002), and Kopczuk (2005)—that a strong mean-reversion effect is typically present in the data; those with very low first-period incomes tend to have considerably higher incomes in the second period and vice versa. A standard procedure has therefore been to control for first-period income—and the results are generally very sensitive to this. Therefore, in practice, our approach to a large extent coincides with previous papers, even though our motivation is somewhat more general.

As is well known, it is a requirement for validity in the standard linear regression model that the regressors are orthogonal to the error term. This assumption is certainly violated here, since the tax variables ($\tau'_{s+1} - \tau'_s$) are direct functions of the dependent income variable. Following Auten and Carroll (1999) and many subsequent papers on the elasticity of taxable income, we will construct instruments by calculating marginal tax rates and tax payments using information about period s . As explained in Appendix B, we have computed our instruments for the net-of-tax rates and the tax bills in period $s + 1$ in a manner that reflects plausibly exogenous tax law changes. We will use these first-differenced simulated tax variables as instruments in common two-stage-least-squares, 2SLS, regressions.

However, as emphasised by Moffitt and Wilhelm (2000), there is still a possibility that transitory changes in income might invalidate our instruments, which are functions of first-period income I_s and, accordingly, also of ε_s . Thus, there might be a correlation between the instrument and $\varepsilon_{s+1} - \varepsilon_s$. In the empirical application, we have attempted to mitigate this source of bias by restricting our sample to those individuals who did not receive any unemployment benefits in 1992 or 1995. The presumption is that these individuals are less likely to be exposed to transitory shocks in income in one of the years.

In the empirical model, κ in the theoretical model above is represented by a dummy variable, *SELF*, for self-employment status based on its pre-reform value. The marginal cost of income shifting is represented by the two interaction terms *SELF* * $(1 - t_l)$ and *SELF* * $(1 - t_c)$. In other words, we let the self-employment status interact with both tax rates separately. This allows for a more general functional form for income shifting rather than directly looking at the difference between the two marginal tax rates as in the theoretical model. The change in total tax payments, where the imputation credit paid by the firm is also included, is added to the independent variables in order to provide a rough measure of the virtual income

from many years. However, it should be noted that we share this problem with previous work in this literature that for other reasons control for first-period income; for example, Moffitt and Wilhelm (2000), Gruber and Saez (2002), and Kopczuk (2005).

term R .⁸ The linear time effect s in (5) captures the effect of the common changes in the interest rate, r , in (3) and (4).⁹

Dummy variables for gender, marital status, secondary school, academic degree, having at least one child, and living in the Helsinki area are added to the regressions in order to control for observable characteristics whose effects on income acquisition might be non-constant over time. Further, continuous variables for age and squared age are included. We also allow the first-period income control to interact with *SELF*, as Finland recovered from a deep recession during the period of study. It can then be expected that employees and the self-employed react differently to dramatic changes in the macroeconomic environment. Finally, we adhere to the well-established convention to use log–log specifications and net-of-tax rates, $(1 - t_c)$ and $(1 - t_l)$, rather than marginal tax rates as regressors. Then, (6) becomes

$$\begin{aligned} \Delta \log I_{s+1} = & \beta_0 + \sum_{i=c,l} \beta_{1i} \Delta \log(1 - t_{is+1}) + \sum_{i=c,l} \beta_{2i} \text{SELF} * \Delta \log(1 - t_{is+1}) \\ & + \beta_3 \Delta \log \text{TAX}_{s+1} + \beta_4 \text{controls} + \beta_5 \log I_s \\ & + \beta_6 \text{SELF} * \log I_s + (\varepsilon_{s+1} - \varepsilon_s), \end{aligned} \quad (7)$$

where $\Delta \log \text{TAX}$ denotes the change in the log of the overall tax payment, which serves as a proxy for income effect. This variable is also instrumented by calculating it based on the pre-reform income level taxed according to post-reform rules.

Estimating (7) is rather straightforward for *LI* and *TI*. With respect to *CI*, however, the problem is that many people have negative values for this variable; that is, their interest payments exceed the return to capital. Thus, we need to estimate the equation for *CI* without taking logs:

$$\begin{aligned} \Delta CI_{s+1} = & \beta_0 + \sum_{i=c,l} \beta_{1i} \Delta(1 - t_{is+1}) + \sum_{i=c,l} \beta_{2i} \text{SELF} * \Delta(1 - t_{is+1}) \\ & + \beta_3 \Delta \text{TAX}_{s+1} + \beta_4 \text{controls} + \beta_5 CI_s + \beta_6 \text{SELF} * CI_s \\ & + (\varepsilon_{s+1} - \varepsilon_s). \end{aligned} \quad (8)$$

⁸ The standard approach in the literature—see, for example, Gruber and Saez (2002) and Kopczuk (2005)—is to capture the income effect by the change in disposable income before and after the reform. However, with only one difference, it is very difficult to identify changes in disposable income from other covariates that are closely correlated to the change in disposable income. On the other hand, it has been possible to isolate the effects of total tax payments, which are very closely correlated to changes in disposable income.

⁹ Different people might face different interest rates, but these differences are unobservable to us. However, since we deal with regressions in difference forms, if interest rate heterogeneity does not vary over time, its influence is “washed out” from our analysis.

The second problem is that, as explained in Section III above, almost all variation in the net-of-tax rate on labour income, $(1 - t_l)$, is a function of the amount of capital income, CI , in 1992. Since the tax rate change is to such a large degree a function of CI in 1992, it is certainly correlated with the error term. Therefore, when we obtain our instrument for the net-of-tax rate on labour income, we impose capital income in 1992 to be equal to zero in all specifications. This procedure removes a potential source of correlation between the instruments and the error term, but it still generates instruments that are highly correlated with the endogenous regressors. As explained above, when we construct our instruments for the net-of-tax rate regressors, we otherwise compute the 1995 marginal tax rates based on the 1992 values of the income variable. In addition to the key models (7) and (8), we also estimate a number of alternative specifications to test the robustness of the results.

V. Description of Data

Our dataset is based on all individuals in the Income Distribution Survey (IDS) of Statistics Finland, 1992. The IDS is a representative sample of Finnish households, based on both interview and register data. Most of the income data and all tax data are based on registers. We create a panel of these individuals by gathering their register-based tax data from 1995. Three-year time spans are typically used in the elasticity of the taxable income literature. Since, as stated above, we do not want transition out of and into unemployment to blur our analysis, we exclude individuals who received unemployment benefits in 1992 or 1995. By similar reasoning, we also omit retired individuals; that is, we exclude those aged above 62 in 1992. As a consequence, our final sample contains 9,844 taxpayers; 1,288 of these were self-employed in 1992. We identify self-employment status from survey variables in the 1992 wave of the IDS. Again, the self-employed individuals also include active owners of closely held corporations. The proportion of self-employed is highest at the bottom and top deciles, while it is lower in the middle of the income distribution.

The main difficulty in data construction is to ensure that the tax base has been corrected as well as possible for changes in the legal definitions of the tax base. With a non-constant definition of the tax base, the effects of changes in the tax rate and changes in the tax base would be mixed. The task is demanding in the present context, as both the legislation covering the division of income into labour and capital income and statistical classification changed. Appendix B describes in detail how these issues have been addressed.

Figure 1 depicts mean overall changes between 1992 and 1995 in capital income, CI , and labour income, LI , for employees and self-employed. The

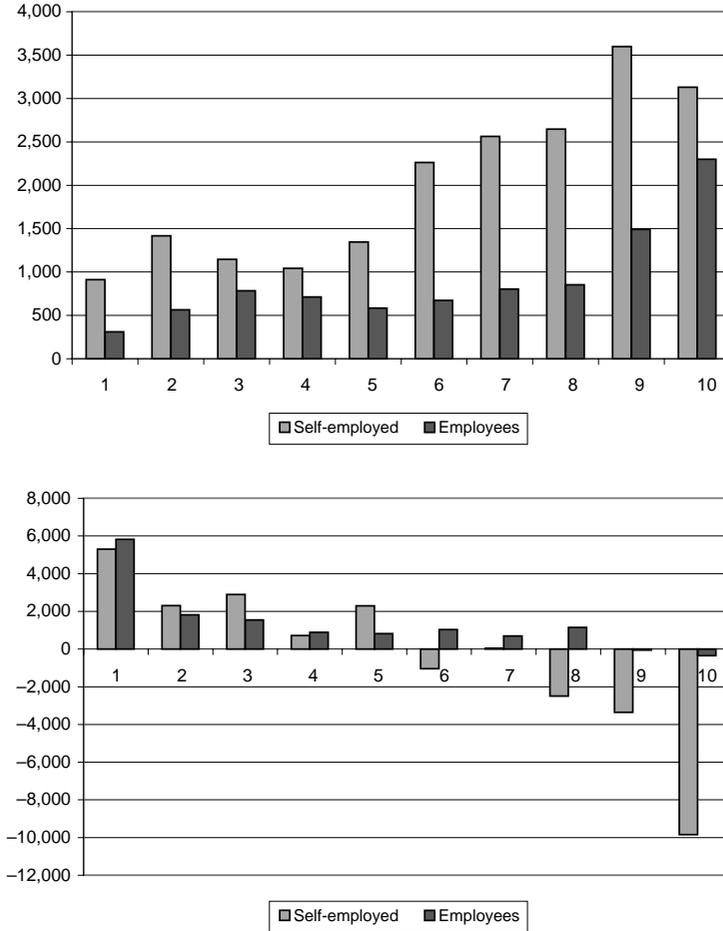


Fig. 1. Mean change in capital income (upper panel) and mean change in labour income (lower panel), in EUR, from 1992 to 1995 by decile. Deciles are based on total income in 1992

upper part of Figure 1 illustrates the fact that capital income increased at the top of the income distribution both for employees and self-employed, but the increase was more pronounced for the self-employed. According to the lower panel, the opposite holds for labour income: *LI decreased* substantially for the self-employed in the highest deciles, especially in the 10th decile, where there was actually a slight decrease also for employees.

There might also be some concern that if the tax change were anticipated by the taxpayers, capital income would be at an abnormally low level in 1992. Although we do not observe the same individuals as in our sample,

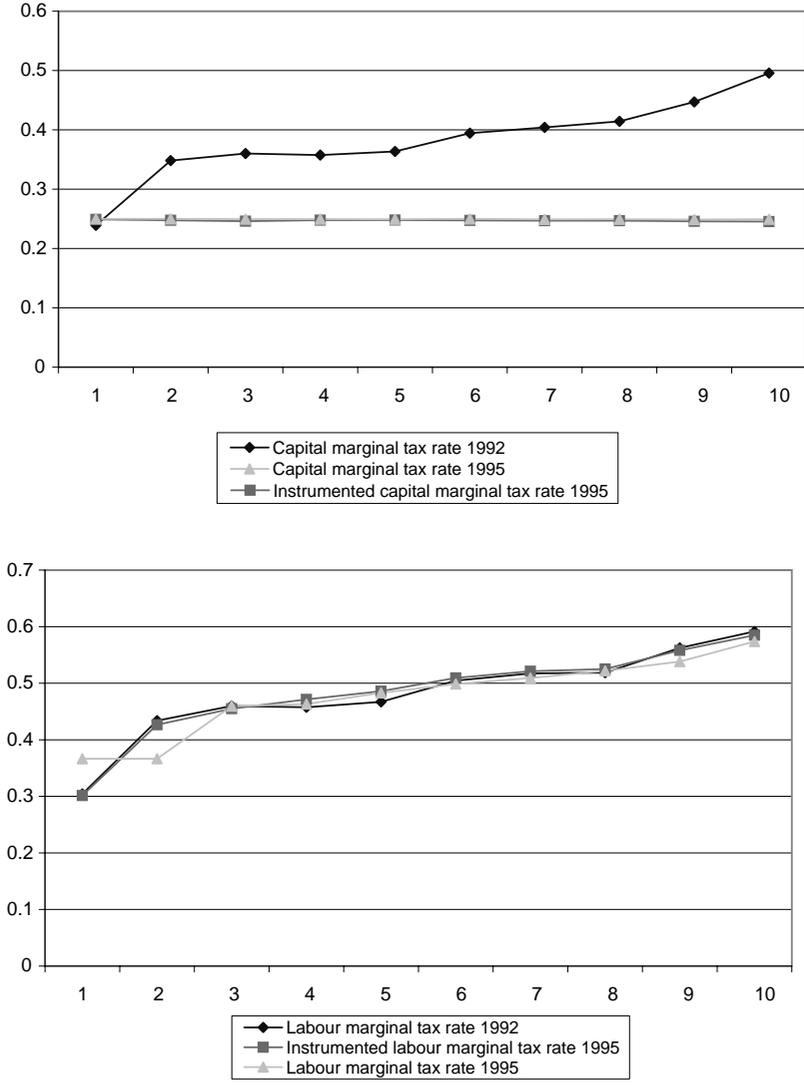


Fig. 2. Marginal tax rates on capital income (upper panel) and labour income (lower panel) by deciles based on total income in 1992

we have looked at this issue using descriptive statistics from previous waves of the Income Distribution Surveys (1990 and 1991). When capital gains are excluded (as in our analysis), there is no downward shift in taxable capital income before the reform.

Table 1. 2SLS results. Dependent variable: the change in capital income

	All	Self-employed	Employees	10th decile	1st to 9th decile
$\Delta(1 - t_c)$	-772.518 (1,032.133)	14,821.722 (4,537.875)***	-656.336 (1,032.042)	1,717.497 (3,989.633)	313.587 (866.701)
	-0.565 <i>-0.023</i>	58.620 <i>0.456</i>	-0.906 <i>-0.020</i>	2.666 <i>0.017</i>	0.203 <i>0.011</i>
SELF*	16,113.042			45,730.688	8,020.464
$\Delta(1 - t_c)$	(4,396.473)***			(14,606.585)***	(3,939.960)**
	1.564 <i>0.063</i>			11.913 <i>0.076</i>	0.667 <i>0.038</i>
$\Delta(1 - t_l)$	4,458.665 (2,409.054)*	-13,928.373 (10,079.279)	4,705.384 (2,386.131)**	-30,525.886 (41,301.509)	-1,351.664 (1,675.931)
	2.731 <i>0.112</i>	-48.700 <i>-0.378</i>	2.421 <i>0.116</i>	-38.440 <i>-0.246</i>	-0.734 <i>-0.041</i>
SELF*	-19,824.915			-80,812.961	-15,248.873
$\Delta(1 - t_l)$	(9,493.623)**			(137,240.333)	(8,818.316)*
	-1.691 <i>-0.069</i>			-18.457 <i>-0.118</i>	-1.127 <i>-0.063</i>
ΔTAX	-0.188 (0.078)**	-0.193 (0.093)**	-0.152 (0.145)	-0.271 (0.232)	-0.209 (0.132)
	-1.612 <i>-0.066</i>	-10.010 <i>-0.078</i>	-1.085 <i>-0.052</i>	-20.292 <i>-0.123</i>	-1.147 <i>-0.065</i>
Observations	9,844	1,288	8,556	984	8,860

Notes: Elasticities evaluated at mean absolute capital income in 1992 for the relevant subsample in bold face. Elasticities evaluated at mean labour income in 1992 for the relevant subsample in italics. All specifications include first-period income controls, a set of demographic control variables, and occupational dummies. Robust standard errors in parentheses. *Denotes significance at 10%, **significance at 5%, and ***significance at 1%. The unit of measurement is EUR.

The marginal tax rates are depicted in Figure 2. There was no clear change in the marginal tax rate on labour income. For marginal tax rates on capital income, there was a significant reduction for most individuals. The effect was especially marked in the highest decile. Issues in the computation of marginal tax rates are covered in Appendix B.

VI. Empirical Results

In this section, we report results from our preferred models. All preferred models include controls for first-period income and the full set of other control variables. The consequences of deviating from the baseline specifications are discussed in Section VII. The results from the basic model of the change in capital income (ΔCI) can be seen in Table 1. In addition to the marginal effects, where the unit of measurement is euro, we also report implied elasticities. We have evaluated the elasticities at the absolute mean values of 1992 for capital income (in bold) and total

income (in italics). See Pirttilä and Selin (2008) for full reports from the regressions.

Column 1 in Table 1 displays the results for the whole sample. The direct effect of the change in the capital net-of-tax rate $\Delta(1 - t_c)$ on the change in capital income is not statistically significant. The interaction term, however, suggests that only the capital income of the self-employed reacted positively to the reform. Moreover, in column 2, where we estimate the model separately for self-employed, we obtain quite similar results with respect to the marginal effects: a one percentage point increase in the net-of-tax rate on capital income is associated with an approximately EUR 150 increase in capital income for the self-employed. In contrast, we do not find any increase among employees. As the absolute mean value of capital income in 1992 is very small, it is trickier to interpret the results in terms of percentage changes. The magnitude of the elasticities varies substantially across models and is also extremely dependent on which income measure is used for evaluation.

The results for cross-price elasticities (i.e., the impact of the change in the net-of-tax rate on labour income) are interesting. When employees have an increase in the take-home portion of their labour income, they also increase their capital income, which is indicative of a real positive response to the change in the marginal tax rates on labour income between the two years. But the corresponding effect on the self-employed is actually negative. This is well in line with income-shifting motivations: when labour income becomes taxed more leniently, it is less desirable to report income as capital income. Gruber and Saez (2002, p. 20) noted that the effect of disposable income on unearned income might be positive. From this perspective, the sign of the coefficient for ΔTAX makes sense.

The proportion of self-employed is the largest at the bottom and top deciles in our sample. Structural differences might be expected between these groups of self-employed. In particular, many high-income self-employed individuals are managers of larger enterprises, while their low-income counterparts are more likely to run small proprietorships with more modest capabilities to manipulate the tax base. Therefore, we have estimated separate models for the 10th decile and the rest of the sample. The results, which are reported in columns 4 and 5 of Table 1, are noteworthy. For the top-decile sample (column 4), the coefficient for the interaction term is about three times larger than the corresponding coefficient for the whole sample. For the residual sample, the coefficient for the interaction term is now much smaller. This suggests that the overall results are to a non-negligible degree driven by the self-employed in the top decile.

The self-employed can react by increasing their capital income for other reasons than income shifting; for example, because of the increased use of capital in the firms they own. However, it is not clear why this increase

is related to specific firms whose owners' tax rates decreased the most. If there are time-invariant unobserved factors that affect income acquisition, these do not confound our estimates since we estimate our models in first differences. Moreover, notice that we control for various personal characteristics, such as age, sex, family status, and education level, factors that may relate differently to income acquisition at different points in time. Finally, we have also controlled for unobserved heterogeneity that interacts with the time factor in a flexible way: we have included both lagged income and an interaction term for lagged income and self-employment status. Thus, we find it most plausible that the observed responsiveness in capital income among the self-employed is due to income shifting between differently taxed bases.

To obtain a very rough idea of the fiscal implications of this kind of income shifting, we conducted some simple "back-of-the-envelope" calculations. To this end, we looked at what the capital income level in 1995 would have been, given that the coefficients for the interaction terms $SELF * \Delta(1 - t_c)$ and $SELF * \Delta(1 - t_l)$ had been zero in the specification reported in column 1 of Table 1.¹⁰ It turned out that the total amount of capital income was approximately EUR 100 million lower in the underlying population when the two coefficients were set to zero.¹¹ While making the assumption that this amount would have been taxed according to the mean marginal tax rate on labour income in the sample (0.51) instead of the mean marginal tax rate on capital income (0.25), we found that the loss of tax revenues was approximately EUR 25 million in 1995. Needless to say, this figure should be interpreted with caution for several reasons.

In Table 2, attention is turned to the reaction of change in the log of labour income. The columns correspond to the same division of the sample as in the capital income regressions. The results suggest that an increase in the net-of-tax rate on labour income had a positive and significant effect on labour income. The elasticity for the whole sample, which is in the order of 0.3, falls between earlier estimates of the elasticity of taxable income based on Norwegian and Swedish data—Aarbu and Thoresen (2001) and Hansson (2007), respectively. The elasticity is higher among taxpayers in the highest decile. This is also consistent with earlier US evidence, for

¹⁰ To be able to predict the 1995 level of capital income, we re-estimated the model as a fixed-effects model in such a way that it was computationally equivalent with the first-differenced model reported here. To obtain these predictions, we imposed the normalisation that the mean value of the fixed effects is zero.

¹¹ First, we predicted the level of capital income in 1995 in the sample, given that the coefficients for the interaction terms are zero and used the survey probability weights to estimate the total amount of capital income in the underlying population. Second, in a similar way, we used our estimates in column 1 of Table 1 to estimate the amount of capital income in the total population.

Table 2. 2SLS regression results. Dependent variable: the change in logged labour income

	All	Self-employed	Employees	10th decile	1st to 9th decile
$\Delta \log(1 - t_c)$	0.010 (0.014)	0.076 (0.125)	0.010 (0.014)	0.021 (0.014)	-0.013 (0.018)
$SELF * \Delta \log(1 - t_c)$	0.077 (0.146)			-0.112 (0.097)	0.155 (0.381)
$\Delta \log(1 - t_l)$	0.325 (0.069)***	-0.103 (0.958)	0.310 (0.068)***	1.018 (0.429)**	0.242 (0.062)***
$SELF * \Delta \log(1 - t_l)$	-0.617 (1.213)			-0.614 (0.814)	-0.909 (2.501)
$\Delta \log TAX$	0.145 (0.030)***	0.182 (0.065)***	0.126 (0.032)***	0.609 (0.072)***	0.123 (0.035)***
Observations	9,844	1,288	8,556	984	8,860

Notes: All specifications include first-period income controls, a set of demographic control variables, and occupational dummies. Robust standard errors in parentheses. *Denotes significance at 10%, **significance at 5%, and ***significance at 1%.

instance by Gruber and Saez (2002), on differences in elasticities between people at different income levels.

If one wanted to interpret these results from the income-shifting point of view, the coefficient for the term $SELF * \Delta \log(1 - t_c)$ should be negative (the larger the drop in the tax rate on capital income, the larger the decrease in labour income). However, the coefficient for this term is only negative for the 10th decile subsample. This is surprising given, for instance, the information from Figure 1 where labour income also drops for self-employed in other income classes. The fact that the coefficient is positive for the whole sample must be regarded as a caveat to the extent of income shifting. The estimate of our proxy for the income effect has the expected sign: when the overall log tax payment ($\Delta \log TAX$) increases (i.e., net-of-tax income goes down) individuals are willing to work more to earn more labour income.

Results on the change in the log of total income are reported in Table 3. Column 1 reveals that the cut in the tax rate on capital income had a positive impact on the total taxable income for the whole sample, but the elasticity is very small. Since labour income forms the bulk of total income, it is also understandable that an increase in the net-of-tax rate on labour income leads to an increase in total income, since a similar increase took place for labour income. The same can be said about the effect of the $\Delta \log TAX$ variable.

It is especially noteworthy that the total taxable income for employees responds to the small variation in marginal tax rates on labour income, but that the same does not hold for the self-employed (columns 2 and

Table 3. 2SLS regression results. Dependent variable: the change in logged total income

	All	Self-employed	Employees	10th decile	1st to 9th decile
$\Delta \log(1 - t_c)$	0.042 (0.015)***	0.341 (0.564)	0.041 (0.015)***	0.008 (0.010)	0.028 (0.018)
$SELF * \Delta \log(1 - t_c)$	0.277 (0.536)			0.091 (0.023)***	0.434 (1.501)
$\Delta \log(1 - t_l)$	0.205 (0.066)***	-2.428 (6.157)	0.197 (0.062)***	-0.179 (0.185)	0.142 (0.070)**
$SELF * \Delta \log(1 - t_l)$	-2.507 (5.963)			-0.076 (0.348)	-3.263 (10.944)
$\Delta \log TAX$	0.141 (0.069)**	0.196 (0.251)	0.128 (0.034)***	0.637 (0.035)***	0.119 (0.109)
Observations	9,844	1,288	8,556	984	8,860

Notes: All specifications include first-period income controls, a set of demographic control variables, and occupational dummies. Robust standard errors in parentheses. *Denotes significance at 10%, **significance at 5%, and ***significance at 1%.

3 of Table 3). When looking at the response of overall taxable income, it can be noted that there was a significant but modest positive impact among the employees. However, despite the significant positive effect on capital income, the total income of the self-employed did not increase in a statistically significant way. While the lack of significance can partly be due to the smaller number of observations in the regression for the self-employed, this result can also reflect the tendency to reduce the share of labour income from total income among the self-employed. If the labour income of the self-employed had risen in a similar way to that among other taxpayers, total income should also have increased. On balance, it seems that income shifting might have played a role for the response of the self-employed. A caveat to this finding is that there was also an increase in the total income of the self-employed among the 10th decile (columns 4 and 5 of Table 3).

VII. Robustness of Results

We have also conducted a host of robustness checks. For the sake of saving space, they are not fully reported here, but the results can be obtained from us upon request.

First, as in the earlier literature on taxable income elasticity, controlling for base year income (as a control for reversion to the mean) is important. Without this, the results are less reliable. Second, the exclusion of the change in total tax payment does not change the results concerning the marginal tax variables. Nor does dropping all the other control variables (apart from first-period income) we use in the basic specification.

We have also run regressions where observations are weighted with total income along the lines suggested by Gruber and Saez (2002). The use of income weights is normally motivated on the grounds that the results then better reflect the revenue-raising capability of the government. When income weights are used, there is an increase (to 0.6) in the elasticities of labour income with respect to the change in the tax rate on labour income relative to the non-weighted regressions reported in the previous section. Since income weights increase the relative importance of high-income observations, it is not surprising—given the message of column 4 of Table 3—that the interaction term for the tax rate on capital income becomes significant in the regression for total income with income weights. At the same time, it must be remembered that this phenomenon can also be due to a simultaneous increase in factor income inequality.

Finally, there might be some concern as to whether the way in which we imposed the marginal tax rates on capital income on those taxpayers who did not have capital income is correct. This procedure is described in Appendix B. To obtain a view on this, we developed an alternative way of measuring capital income: we predicted capital income based on the value of individuals with similar characteristics with respect to age, sex, education, labour income, etc., and used the predicted value of capital income for those who were otherwise similar but did not have any capital income. It appeared that when the marginal tax rates on capital income are calculated this way, their 1992 values tend to be somewhat higher. This is understandable, given that some people get higher values of capital income in the imputation method. Therefore, there is also an increase in the aggregate drop in the marginal tax rate on capital income. In all essential respects, the qualitative regression results remained the same with some minor changes in the values of the coefficients.

VIII. Conclusion

Using individual-level data, this paper examined the taxable income responses to the Finnish dual income tax reform of 1993. The reform implied that labour income continued to be taxed on a progressive scale, whereas capital income was subject to a flat tax rate from 1993 and onwards. For individuals with high capital income, the reform brought a considerable reduction in the marginal tax rate on capital income. Therefore, the reform could have changed the incentives to save, but it also meant that there was an increase in the incentive to shift labour income to the more leniently taxed capital income.

We find that there are marked differences in responses between employees and self-employed. Among employees, no clear increase in capital income can be discerned. In contrast, the reform led to an increase in

capital income among many of the self-employed. A plausible explanation is that the self-employed have more leeway in manipulating the tax base and, thus, it is less costly for them to shift labour income into the capital income tax base. One reason for the different reactions between the two groups can arguably be income shifting. A caveat to this interpretation is, however, that we do not find any statistically significant drop in labour income among the self-employed as compared to employees.

However, also notice that we could not capture all income-shifting activities, such as tax-induced changes in the capital structure, due to data limitations. Although taxable income elasticity is, in principle, a very good overall measure of tax distortions, it does not capture behavioural responses outside the personal tax base. In this sense, we may have missed detecting some part of the income-shifting activities.

Therefore, it appears that while the dual income tax reform might potentially have had positive efficiency gains, part of the benefits was probably offset by increased income-shifting activities. This has important implications for the design of tax policy. Some have argued that the income-shifting concerns are severe enough to warrant a move towards flat or comprehensive income tax systems. But it must also be borne in mind that the Nordic dual tax systems have varied substantially in the details of tax design. Lindhe *et al.* (2002) point out that the Finnish version of the dual income tax has created particularly strong incentives for income shifting, whereas the new design in the Norwegian tax system (Sørensen, 2005a) is better sheltered against harmful tax planning. What this means is that any dual income tax is not necessarily desirable; once more, the devil lies in the details of the design of a tax system.

Appendix A¹²

Taxation of Self-employed Individuals

For sole proprietorships and partnerships, all income is taxed at the personal level. In 1992, all income not exceeding a certain monetary limit (depending on family type) was treated as labour income and the residual as capital income. After the reform, 15 percent of the *net worth* of the firm (i.e., business assets minus the stock of business debt) was treated as capital income. After the reform, labour income was defined as net profits (i.e., gross profits of the firm minus interest payments of total debts) minus the share of the net worth that is taxed as capital income.

One way for the self-employed individual to convert labour income into capital income after the 1993 dual income tax reform was to shift assets and debts between the business sphere and the private sphere (Hagen and Sørensen, 1998). To more formally illustrate these opportunities, we adopt the following notation: Π = business

¹² These appendices were added due to most helpful input by a referee.

profits before interest and taxes, D^b = business debt, D^p = private debt, A^b = business assets, A^p = private assets, k = imputed return on business activity, ρ = actual rate of return on private assets, r = interest rate on debts, T = total tax liability, T' = total marginal tax rate, t_l = average tax rate on labour income, t'_l = marginal tax rate on labour income, t_c = marginal tax rate on capital income (constant under the dual income tax).

We now assume that the self-employed individual does not earn any wage income outside his or her own firm and that all returns to “private assets” are taxed as capital income.

$$T = \overbrace{t_l [\Pi - rD^b - k(A^b - D^b)]}^{\text{tax bill on business income}} + \underbrace{t_c k(A^b - D^b)}_{\substack{\text{tax bill on private} \\ \text{net capital income}}} + \underbrace{t_c(\rho A^p - rD^p)}_{\text{tax bill on private net capital income}}. \tag{A1}$$

Suppose now that the self-employed shifts one unit of his or her private assets into the business sphere so that $dA^b = 1$ and $dA^p = -1$.

Suppose further that these shifted assets still yield the rate of return ρ . The taxable business profit, Π , of the self-employed will then increase by the amount ρ , while his or her “private” net capital income will drop by a corresponding amount. According to (A1) the net effect of the tax bill will be

$$T' = t'_l(\rho - k) + t_c(k - \rho) = (t'_l - t_c)(\rho - k). \tag{A2}$$

Suppose that $k > \rho$ and $t'_l > t_c$. Equation (A2) then shows that the self-employed can reduce their total tax bill by shifting low-yielding private assets—defined as assets with a rate of return below the imputed rate of return on business equity—into the business sphere.

Now, suppose that the self-employed individual shifts one unit of debt from the private sphere to the business sphere so that $dD^b = 1$ and $dD^p = -1$. According to (A1), this will generate the following change in the total tax bill:

$$T' = t'_l(k - r) + t_c(r - k) = (t'_l - t_c)(k - r). \tag{A3}$$

Given that $k > r$, which is most likely in the Finnish case, and that $t'_l > t_c$, the self-employed individual can reduce his or her tax liability by shifting business debt into the private sphere.

Taxation of Owners of Closely Held Corporations

The owners of closely held corporations were able to reduce their tax bills by taking out dividends instead of wage income, but the amount of dividends that could be distributed with no tax liabilities at the personal level was limited by the net wealth of the corporation. This opened up an incentive to expand net wealth. Here, we demonstrate how this could be achieved with a strategy wherein the owner retains profits inside the firm and pays them out in the following period, when a larger part of the profit can be taxed at a smaller rate since net wealth has increased.

The owner keeps the after-tax profit of one unit $(1 - t_c)$ in the firm.¹³ In the next period, the return of this money, $(1 - t_c)r$, is paid out as dividends. The tax bill on this will be

$$T = \tau k(1 - t_c) + t'_i(r - k)(1 - t_c). \quad (\text{A4})$$

The first part of the tax bill is the taxes paid on the imputed rate of return, and the latter part on the dividend income that exceeds this imputed return, is taxable as labour income.

The total after-tax wealth in the second period following this investment is

$$\pi_1 = (1 + r)(1 - t_c) - T = [1 + r(1 - t'_i) + k(t'_i - t_c)](1 - t_c). \quad (\text{A5})$$

An alternative strategy is to take out the money in the first period as labour income and invest it in the capital market. For simplicity, assuming that the return of this investment is also r , the after-tax wealth in the second period is then

$$\pi_2 = (1 - t'_i)[1 + r(1 - t_c)], \quad (\text{A6})$$

where the idea is that this investment can only be made from money that is available after having paid the personal level income tax, t'_i .

The gain from retaining the funds in the firm (i.e., converting labour income into capital income) is given by the difference between the yields of these two strategies:

$$G = \pi_1 - \pi_2 = (t'_i - t_c)[1 + k(1 - t_c)], \quad (\text{A7})$$

which is positive for individuals whose marginal tax rate on labour income exceeds the tax rate on capital income. The gain is also larger as the marginal tax rate on labour income increases.

In a similar way it can be shown that the gain from retaining funds inside the firm *before* the tax reform is

$$G_0 = (t'_i - t_c)[1 + r(1 - t'_i)]. \quad (\text{A8})$$

For the typical owner-manager of a closely held company, one would have $t'_i > t_c$ and $k > r$. It then follows from (A7) and (A8) that the tax reform increased the taxpayer's gain from conversion of labour income into capital income through deferral of dividend payments.

Appendix B. Tax Base Construction and Tax Rate Calculation

The following issues arise. First, we exclude forest income (since there was a major change in forest taxation with the old system still in parallel use) and capital gains. Capital gains are especially problematic since taxpayers did not need to report all of these prior to the tax reform. Furthermore, the legislation governing the presumed acquisition costs was changed. Omitting capital gains is also justified within a short-run analysis, as the timing of their realisation is particularly sensitive to the tax reform. By symmetry, we also exclude realised losses. Second, we exclude imputed income

¹³ Note that the corporate income tax rate was equal to the capital income tax rate in the Finnish system.

from owner-occupied housing from the 1992 income, since it was no longer included after the reform.

Third, there were changes in the legislation concerning the division of business income between earned income and capital income. In 1992, all business income for sole proprietors was seen as earned income up to a certain monetary limit (which depended on family type). From 1993, the division was based on the net worth of the firm. Income equal to 15 percent of the net worth of the enterprise was regarded as business income, and the rest was taxed as earned income. Unfortunately, information on the net worth is only available after the reform. In order to create as constant a tax base as possible, we have subtracted the imputed share of the net worth from the capital income tax base in 1995 (and added this amount back to the labour income tax base). Unfortunately, due to data limitations, it was not possible to add deductions for the costs of acquiring labour income to our labour income measure, *LI*.

The marginal tax rates are calculated using a new Finnish microsimulation model JUTTA. For capital income, for instance, the marginal tax rate is calculated by increasing all capital income by 1 percent, keeping the shares of different forms of capital income constant. The tax rate for labour income is calculated in the same manner. Two special cases deserve to be mentioned. First, a large number of individuals lack positive capital income but claim deductions for interest payments. For these, the marginal tax rate on capital income is calculated by decreasing mortgage interest payments by 1 percent. Second, many individuals neither have positive nor negative capital income. Their marginal tax rate on capital income is set equal to the rate at which they can claim interest deductions, which was the most common form of capital income in both years. In general, when we construct our instruments we apply the 1995 tax law to the 1992 income variables.

Note that, in both years, we include the tax paid on dividends at the firm level into the measure of the individual's tax burden. In 1992, the marginal tax rates on capital increased by income, whereas in 1995 the tax schedule was completely flat. However, since the taxpayer could only be credited for the deficit in capital income up to a certain amount (depending on marital status and the number of children; see Section III), a small number of individuals had zero marginal tax rates on capital income in 1995. This is also why we instrument for the change in the marginal tax rate on capital income.

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