

VATT-KESKUSTELUALOITTEITA
VATT DISCUSSION PAPERS

447

ANTICIPATING
TAX CHANGES:
EVIDENCE FROM
THE FINNISH
CORPORATE
INCOME TAX
REFORM OF 2005

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This is substantially revised version of an earlier paper published in VATT Discussion Papers series (No. 426).

We are grateful to Jérôme Adda, Petri Böckerman, Tomi Kyyrä, Teemu Lyytikäinen, Matti Sarvimäki and Takis Venetoklis as well as seminar participants at the University of Uppsala, the Tax Forum of the Norwegian Research Council, the Annual Conference of the Finnish Economic Association and the Government Institute for Economic Research for their helpful comments. The financial support of the Nordic Tax Research Council is gratefully acknowledged.

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ISBN 978-951-561-779-8 (nid.)

ISBN 978-951-561-780-4 (PDF)

ISSN 0788-5016 (nid.)

ISSN 1795-3359 (PDF)

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Oy Nord Print Ab

Helsinki, July 2008

KARI, SEPPO – KARIKALLIO, HANNA – PIRTTILÄ, JUKKA: ANTICIPATING TAX CHANGES: EVIDENCE FROM THE FINNISH CORPORATE INCOME TAX REFORM OF 2005. Helsinki, VATT, Valtion taloudellinen tutkimuskeskus, Government Institute for Economic Research, 2008 (C, ISSN 0788-5016 (nid.), ISSN 1795-3359 (PDF) No 447). ISBN 978-951-561-779-8 (nid.), ISBN 978-951-561-780-4 (PDF).

Abstract: Using register-based panel data covering all Finnish firms in 1999–2004, we examine how corporations anticipated the 2005 dividend tax increase via changes in their dividend and investment policies. The Finnish capital and corporate income tax reform of 2005 creates a useful opportunity to measure this behaviour, since it involves exogenous variation in the tax treatment of different types of firms. The estimation results reveal that those firms that anticipated a dividend tax hike increased their dividend payouts in a statistically significant way. This increase was not accompanied by a reduction in investment activities, but rather was associated with increased indebtedness in non-listed firms. The results also suggest that the timing of dividend distributions probably offsets much of the potential for increased dividend tax revenue following the reform.

Key words: corporate income taxation, dividends, tax reform, anticipation effects

JEL Classification: H25, H32

Tiivistelmä: Tutkimuksessa tarkastellaan muutoksia yritysten osinko- ja investointipäätöksissä vuoden 2005 pääoma- ja yritysverouudistusta edeltävinä vuosina. Suomalaisten yritysten reagointia esityksiin osinkoverotuksen uudistamisesta selvitetään hyödyntämällä rekisteripohjaista yrityspaneelia, joka kattaa kaikki suomalaiset osakeyhtiöt. Vuoden 2005 pääoma- ja yritysverouudistus tarjoaa hyödyllisen tilaisuuden analysoida ennakoimiskäyttäytymisen suuruutta, koska kyseiseen verouudistukseen liittyy eksogeenista vaihtelua veromuutoksen suuruudessa yritysten välillä. Estimointitulosten mukaan yritykset, jotka ennakoivat osinkoverotuksensa kiristyvän, lisäsivät osingonjakoaan tilastollisesti merkitsevällä tavalla. Osinkojen kasvuun ei kuitenkaan yhdisty investointiaktiivisuuden lasku; sen sijaan listaamattomilla yrityksillä on nähtävissä velkaantuneisuuden lisääntymistä. Lisäksi tulosten mukaan osingonjaon ajoituksen suunnittelu tasoi-ttaa huomattavasti uudistuksella tavoiteltavaa osinkoverotulojen kasvua.

Asiasanat: Yritysverotus, osingot, verouudistus, ennakointivaikutukset

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1. Introduction

While the theoretical analysis of the impacts of taxing corporate income on dividend and investment behaviour is well developed, there is still considerable uncertainty about the empirical magnitudes of these effects. Recent studies have, nonetheless, successfully utilized policy reforms to isolate the causal impacts of tax changes. Such evidence is available, in particular, for the Anglo-Saxon countries (see, for instance, Bond et al. (2007) for UK evidence and Chetty and Saez (2005) and Auerbach and Hassett (2007) for the US).

This paper makes use of the Finnish corporate and capital income tax reform of 2005 to examine the impacts of dividend tax changes on dividend distributions and investments. The reform was the first major attempt to revise the tax rules for capital income since the tax reforms in the early 1990s, which introduced the dual income tax and the system of imputation credit. In particular, the 2005 reform led to increased taxation of dividends received by individual investors from Finnish listed firms.¹ The taxation of dividends paid to institutional investors or foreign owners was not changed. In closely held corporations, dividends up to a certain threshold level remained tax-free.² The 2005 reform therefore increased the dividend taxation of some, but not all enterprises, and the tax treatment was based on determinants, such as ownership structure, that were to a large extent exogenous to the firm at the time of the reform. All this suggests that the reform involved a substantial degree of exogenous variation in tax treatment, and it therefore opens up a promising avenue for empirical work. The reform can also be used to shed light on effects of dividend taxation under the dual income tax. This can serve as a guide to proper design of institutional details of the dual tax system, something that may be useful outside the Nordic countries as well.

In more detail, we investigate how firms – both listed and non-listed corporations with their domicile in Finland – changed their behaviour in anticipation of the 2005 tax reform in 2003 and 2004. We examine the changes in dividend distributions, real investment and debt financing, using register-based panel data covering all Finnish firms from 1999 to 2004.

The reasons why we focus on the announcement effects are threefold. First, it is of interest per se to learn to what extent firms minimize their tax burden over time. This behaviour is likely to be especially pronounced within corporate and capital income taxation, since the timing of investment decisions and dividend distributions can be altered more easily than, for example, individuals' labour supply. Based on experiences from the US 1986 tax reform, Slemrod (1992)

¹ The combined tax rate on distributed profit rose from 29 to 40.5 per cent.

² For more information on the exemption, see sec. 2.1.

proposes a three-tier hierarchy of behavioural responses to taxation, where the timing of tax payments is at the top (the biggest impacts), while real behavioural changes are at the bottom. Second, anticipatory responses may be problematic from the policy maker's point of view. They can reduce revenues and thus make the scope for efficiency-improving tax reforms narrower. Anticipatory responses can also differ in sign and size from the long-term effects, and this could be in contradiction to the original goals of the reforms.³ Third, in order to estimate the true impacts of the tax reform, it is important to obtain a proxy of to what extent the reform was anticipated. If this were not taken into account, one could mistakenly compare e.g. post-reform dividend levels to pre-reform values that are abnormally high because of anticipation behaviour.

How should we expect dividend tax changes to affect a firm's decisions? Auerbach (2003) and Gordon and Dietz (2006) survey the still unsettled theoretical literature on the subject. The so-called 'old view' of dividend taxation assumes that dividends are sticky and the marginal source of financing of investment is new share issues. It predicts that a tax change affects both investments and dividends. The 'new view' argues instead that dividend tax capitalizes into share values and is neutral with respect to investment and dividend decisions. This view relies on the assumption that the marginal source of financing is profits and dividends are determined as a residual item after investments. However, a temporary dividend tax change induces a timing effect regarding dividends and investments, and hence affects firms' behaviour also under the 'new view' model (Auerbach and Hassett 2007, Korinek and Stiglitz 2008). This case was discussed during the US 2003 tax reform debate,⁴ but the idea should be applicable also when a tax change is announced long before its actual implementation; the Finnish 2005 tax reform could be a case in point. In addition, under non-linear dividend tax schemes, the firm's cost of capital may be dependent on dividend taxation even under the 'new view' assumptions. Lindhe et al. (2004) and Hietala and Kari (2006) analyse such features of the Finnish dividend tax system.

The determinants of dividend distributions have been studied empirically, especially in the US and the UK. A large number of papers examine the impacts of tax reforms on firms' policies, in particular the tax reforms passed in the US in 1986 and 2003. In the Tax Reform Act of 1986 (TRA), the tax rates on ordinary income and capital gains were set at the same level. There was still a tax disadvantage with dividends because capital gains were only taxed on realization. Several studies argue that the TRA affected firms and that firms adjusted

³ Problems of anticipated tax policies have been addressed among others by Auerbach (1989), who argues that these may be in the opposite direction to the long-run effects of reforms. Alvarez et al. (1999) show analytically how an anticipated tax rate cut can lead to a sharp short-run increase in investments during the transitional period.

⁴ The US dividend tax cut was legislated to expire at the end of 2008.

dividend payout ratios subsequent to the passage of the TRA.⁵ In mid-2003 the tax rates on both dividends and capital gains were reduced for individual investors, thereby simplifying and greatly reducing the level of equity taxation (The Jobs and Growth Tax Relief Reconciliation Act of 2003). Chetty and Saez (2005) establish a causal link between the tax cut and increased dividend activity. They conclude that the tax cut led to increased dividend initiations. They also report that dividend increases are positively related to share ownership by managers.⁶ Bond, Devereux and Klemm (2007), in turn, examine the impacts of the dividend tax change in the UK in 1997. They find that the tax change led to a predictable change in the type of dividends but otherwise it had limited impacts on the overall level of dividends and investments, thus supporting the new view.

We proceed as follows. Section 2 presents the key features of the two proposals for the Finnish 2005 tax reform and derives theoretical hypotheses of how different firms would react to the reform. Section 3 describes the dataset and our empirical approach. The estimation results regarding whether dividend distributions by firms in different tax categories reacted in different ways are presented in Section 4. Section 5 examines how dividend changes were reflected in investment policies and debt decisions. Section 6 concludes.

⁵ Examples of studies of the US 1986 tax reform include Ben-Horim et al. (1987), Bolster and Janjigian (1991) and Casey et al. (1999).

⁶ Examples of other studies of the US tax reform of 2003 include Brown et al. (2004), Blouin et al. (2004), Nam et al. (2004).

2. Theoretical predictions based on the 2005 tax reform

2.1 The reform

Dividend taxation before the 2005 reform

A notable feature of Finnish income taxation is that it follows the Nordic dual income tax (DIT). In that system, personal capital income such as dividends, capital gains and rental income are taxed at a flat-rate tax. All other income is classified as earned income and taxed according to a progressive tax rate schedule.⁷ Prior to the 2005 tax reform the tax rate on capital income and corporate profits was 29 per cent⁸, while the top marginal tax rate (MTR) on earned income was around 55 per cent.

As to the taxation of dividends, Finland applied a full imputation system to relieve the double taxation of distributed profits. The system led to a zero effective tax rate on dividends at the shareholder level, due to equal tax rates on corporate profits and personal capital income. Dividends from non-listed corporations received special treatment, however. These dividends were split into capital income and earned income to curb income shifting caused by the wide tax rate gap between these income types. The proportion of dividends taxable as capital income (henceforth *normal dividend*) was calculated as a 9.585 per cent return on the firm's net assets. The residual part was taxed as earned income (henceforth *excess dividend*). This dividend split concerned all domestic corporations not quoted on the main list of the Helsinki Stock Exchange (HSE).

The 2002 Arvela report

In October 2002 a tax reform panel appointed by the Ministry of Finance and chaired by Mr. Lasse Arvela handed down its report on reforming the Finnish capital income taxation. Among its main proposals were reductions in capital income and corporate tax rates from 29 to 25 per cent and a move from the imputation system to full double taxation of dividends. The splitting of non-listed dividends would also have been abolished. The proposal would have meant a substantial increase in the taxation of dividends taxable as capital income from 29 per cent to 43.5 per cent. For those dividends then taxed as earned income, the proposal would have caused a potential reduction in the tax burden. (Table 2.1)

⁷ The total tax liability on earned income consists of several parts. Church tax, local income tax and sickness insurance contributions are paid at flat rates, while the central government income tax is progressive. There is an additional social security contribution paid by wage-earners on wage income.

⁸ The tax rate on capital income and corporate profits was 25 per cent in 1993–1995 and 28 per cent in 1996–1999.

The 2005 reform

The panel's tax reform model did not meet with the support of the Finnish government, which came up with its own blueprint in November 2003. The final bill passed by parliament in June 2004 and implemented as from 2005 closely followed the 2003 blueprint, especially in terms of dividend taxation.

Table 2.1 *Dividend taxation before and after the 2005 reform*

	Previous tax system	The Arvela proposal (announced 2002)	The 2005 reform (announced 2003)
Tax rate on corporate profits	29	25	26
Personal tax rate on capital income	29	25	28
Top MTR on earned income ⁹	55	55	55
Method of dividend taxation	full imputation	double taxation	partial relief
- taxable share of dividends	..	100	70
Splitting parameter (effective)	9.585	-	9
ETR ^a (nominal) on capital gains	12	13	14
Combined tax rate on dividends:			
Listed firms :			
HSE main list	29	43.5	40.5
OTC ^b list	29/55 ¹⁰	43.5	40.5
Non-listed firms			
Normal dividend < 90 t€	29	43.5	26
≥ 90 t€	29	43.5	40.5
Excess dividend (Top MTR)	55	-	55

^a Effective tax rate.

^b OTC (over the counter) refers to any other market place outside the HSE main list.

The government bill included the following features. The corporate tax rate was cut to 26 and the capital income tax rate to 28 per cent. Instead of full double taxation of dividends, the government chose a system of partial relief under which 70 per cent of dividends are included in the recipient's taxable capital income. The splitting system was maintained. A major exception from the main lines of the new dividend tax system was that normal dividends from non-listed corporations were made tax-exempt up to a fixed amount of 90,000 euros. Any amount beyond that was taxed according to the main rule. The 70 per cent rule was also applied to excess dividends. (Table 2.1)

⁹ Top MTR of 2004. Observe that neither the Arvela report nor the government proposal included cuts in the MTR on earned income. Some minor cuts were eventually implemented, however.

¹⁰ Prior to the 2005 reform, dividends from companies quoted on the OTC list were split into capital income and earned income.

2.2 Theoretical predictions

Dividend tax and the timing of dividends

It is widely agreed in tax literature that a constant dividend tax should not affect the timing of dividends of a mature corporation (Hartman 1985, Sinn 1987, Auerbach-Hasset 2007). This can be demonstrated by writing the expression for the value of the firm:

$$V_t = \int_t^{\infty} (1-\tau)D(s)e^{-\rho(s-t)} ds = (1-\tau) \int_t^{\infty} D(s)e^{-\rho(s-t)} ds ,$$

where τ is the rate of dividend tax, $D(s)$ is the dividend distribution at time s and ρ is the owner's discount rate. We observe that the firm's value depends on the tax term $(1-\tau)$ and the present value of dividends. Hence, the valuation of the firm is invariant to the timing of dividends.

If the tax rate unexpectedly changes, e.g. increases, the firm's value changes accordingly. This change still has no effect on the time pattern of dividends if the present value of dividends does not change.

One crucial assumption of this simple example is that the tax rate is expected to stay constant in the future. If we relax this assumption and consider an expected future increase in the dividend tax rate, occurring at time $t' > t$, we observe that the value of the firm is no longer independent of the timing of dividends. Assuming that the present value of dividends is unchanged, the firm's value can be raised by increasing distributions before and reducing them after the tax change. Auerbach and Hassett (2007) and Korinek and Stiglitz (2008) study this effect using inter-temporal models. They show that an anticipated tax hike increases distributions before the reform and may affect investments both before and after the reform.

Based on this short discussion it seems reasonable to expect that the Finnish 2005 tax reform caused anticipatory responses in pay-out behaviour during the transitory period before the implementation date.

Effects of the splitting system on dividends

The split of dividends from non-listed firms, a special feature of the Nordic DIT, has received some attention among tax economists. Lindhe et al. (2004) and Hietala and Kari (2006) show that the split affects investment incentives and may reduce the cost of capital to a low level. Kari and Karikallio (2007) discuss the implications of the splitting system for dividend distributions. They show that a non-listed corporation's optimal pay-out policy may well be to distribute exactly the maximum amount of normal dividends. This policy rule combined with

investment of the remainder of after-tax profits in financial assets is argued to be a value-maximizing way to avoid high taxes on earned income. Thus the pay-out policy of these firms is considerably affected by tax rules.

Hypotheses

To establish a causal role of the Finnish 2005 dividend tax increase, we exploit the fact that the tax changes only affected dividend income distributed to individuals. There was, however, considerable variation in the tax changes also within this dividend category (see sec. 2.1). The prime example of these is normal dividends from non-listed corporations, which remained tax exempt up to 90,000 euros. One further aspect affecting our hypotheses is that the ceiling for normal dividends makes dividend decisions very rigid for those non-listed firms for which this ceiling is binding. Thus we do not expect to see any anticipatory response among these firms.

In establishing our hypotheses we divide firms into five different groups depending on their stock market status, ownership structure and the amount of dividend distributions; that is, the classification is based on factors that are relevant to the expected effect of the tax change.

1. Corporations quoted on the main list of the HSE with the majority of shares owned by foreign or domestic institutional investors
2. Corporations quoted on the main list of the HSE with a large share of domestic ownership
3. Non-listed corporations with dividends taxed at the margin as earned income (excess dividend)¹¹
4. Non-listed corporations with dividends taxed at the margin as capital income (normal dividend), dividend payment below 90,000 euros before 2003
5. Non-listed corporations with dividends taxed at the margin as capital income (normal dividend), dividend payment 90,000 euros or more before 2003

The non-listed corporations above include firms quoted on the OTC list. The classification of companies into groups 1 and 2 was made on the basis of whether

¹¹ Put differently, the ceiling for dividends taxable as capital income is binding.

Finnish natural persons owned over 50 per cent of the company in 2004.¹² The Appendix A provides sensitivity analysis on how the regression results of this paper change under different cut-off levels for corporate group 5. The qualitative results are unaffected by small changes in the cut-off level.

The Arvela proposal became public in October 2002 and that of the Government proposal in November 2003. Considering that these two proposals differed very much in how they were expected to affect different groups of taxpayers, we build two different hypotheses. The first one reflects a response to the Arvela report and should be seen in dividends paid out of 2002 profits; the other relates to the response to the 2003 Government proposal and should be seen in dividend payments from 2003 profits.

Concerning the Arvela report, Table 2.1 suggests that in almost all cases, dividend taxation of individual shareholders would have increased. The exceptions are dividends taxable at the margin as earned income (excess dividend) by a natural person (group 3) and dividends received by a foreign investor or a Finnish institutional investor (group 1). Thus we hypothesize that the Arvela 2002 report induced an anticipating increase in dividend payments in companies in groups 2, 4 and 5. These groups are our first treatment groups, measured by our Treatment03 variable.

Again as seen from Table 2.1, the 2003 Government proposal raised the level of dividend taxation for listed companies with a large share of domestic ownership and for those non-listed companies which paid out dividends exceeding the 90,000 euro threshold. For the rest, the level of the tax burden was broadly unchanged. These latter cases include non-listed companies with dividends below the threshold and non-listed companies with dividends taxed at the margin as earned income (excess dividend). Hence we hypothesize that the 2003 Government proposal induced an increase in dividends in firms in groups 2 and 5. These are our second treatment groups, measured by our Treatment04 variable.

The classification of firms into groups 4 and 5 was made on the basis of the dividend level before the announcement of either reform. For the Arvela proposal, this definition is not important, since all dividends taxed as capital income would have become double-taxed. However, using the pre-reform period dividend level is very important when we examine the responses to the government tax bill in 2004. If the group assignment were made on the basis of the dividend level in that year, this explanatory variable would be partially the same as one of the dependent variables (dividends/assets), which would not make sense at all.

¹² We also tested the use of a proportional share of ownership by domestic individuals as a continuous variable in our estimation models. Those results did not differ significantly from those generated by using the share of ownership as a category variable.

3. Data and the empirical approach

The panel data employed contains information on the industrial sector, size, financial statement accounts and taxation of Finnish corporations in the period 1999–2004. This data was taken from the registers compiled by the Finnish Tax Authority. These registers cover the whole population of firms that pay taxes in Finland. Identification, income and tax return information on the principal shareholders of all dividend-distributing corporations is also available and it is possible to link the corporation and its principal shareholder.

In comparison to similar studies using smaller data sets, an important quality of our data is that there is no restriction on the size of the firm or the sector it operates in. It covers all Finnish firms that are subject to taxation and thus small firms make up the vast majority of the data. Table 3.1 presents some descriptive statistics of the key variables we used in our estimations. We classified firms into listed and non-listed firms. We also divided firms into treatment and control groups according to the final reform proposal. On average, listed firms that were affected by the tax reform were smaller than firms in the control group, whereas non-listed treated firms were bigger than the control firms. However, as will be seen below, the trends in their dividend distributions before announcing the reforms were very similar.

In Figures 3.1 and 3.2 we compare the pattern of median dividends between the treatment and control groups in the period of 1999–2004. Until 2003 the changes in median dividends were quite similar in both groups. The most interesting observation is a considerable increase in treatment group dividends compared to control group dividends in 2003 and 2004: both listed and non-listed corporations anticipated the 2005 dividend tax increase via changes in their dividend policies.

Table 3.1 Descriptive statistics 1999–2004

<i>Listed corporations</i>	Obs	Mean	Std. Dev.	Min	Max
Treatment group					
Dividend/assets	209	0.03	0.05	<0.001	0.38
Profit/assets	283	0.06	0.30	-0.55	0.65
Investment/assets	272	0.05	0.11	<0.001	1.32
Equity/debt	271	2.08	7.80	0.01	23.62
Growth rate	201	0.08	1.16	-0.31	0.97
ln(employment)	292	5.61	4.24	3.00	8.88
Debt/assets	236	0.20	0.16	<0.001	0.98
Control group					
Dividend/assets	314	0.08	0.14	<0.001	0.57
Profit/assets	327	0.09	0.33	-0.24	0.82
Investment/assets	427	0.06	0.22	<0.001	5.65
Equity/debt	397	1.21	9.18	<0.001	37.40
Growth rate	422	0.02	0.59	-0.76	0.81
ln(employment)	345	6.03	4.59	3.22	10.28
Debt/assets	392	0.27	0.21	<0.001	0.98
<i>Non-listed corporations</i>	Obs	Mean	Std. Dev.	Min	Max
Treatment group (2004)					
Dividend/assets	7360	0.06	0.20	<0.001	0.99
Profit/assets	7259	0.06	0.32	-0.49	0.67
Investment/assets	6647	0.07	0.21	<0.001	1.45
Equity/debt	7172	1.91	9.07	<0.001	46.78
Growth rate	7176	-0.004	0.10	-1.95	1.30
ln(employment)	7206	2.75	1.85	0	6.96
Debt/assets	7174	0.22	0.14	<0.001	1.00
Control group					
Dividend/assets	203621	0.04	0.20	<0.001	1.00
Profit/assets	453609	0.07	0.34	-0.70	0.86
Investment/assets	236324	0.09	0.24	<0.001	1.50
Equity/debt	396218	2.13	10.72	<0.001	89.91
Growth rate	317606	-0.003	0.59	-4.65	4.98
ln(employment)	316043	1.57	1.65	0	7.77
Debt/assets	396218	0.30	0.26	<0.001	1.00

Figure 3.1 *Median dividend in listed corporations*

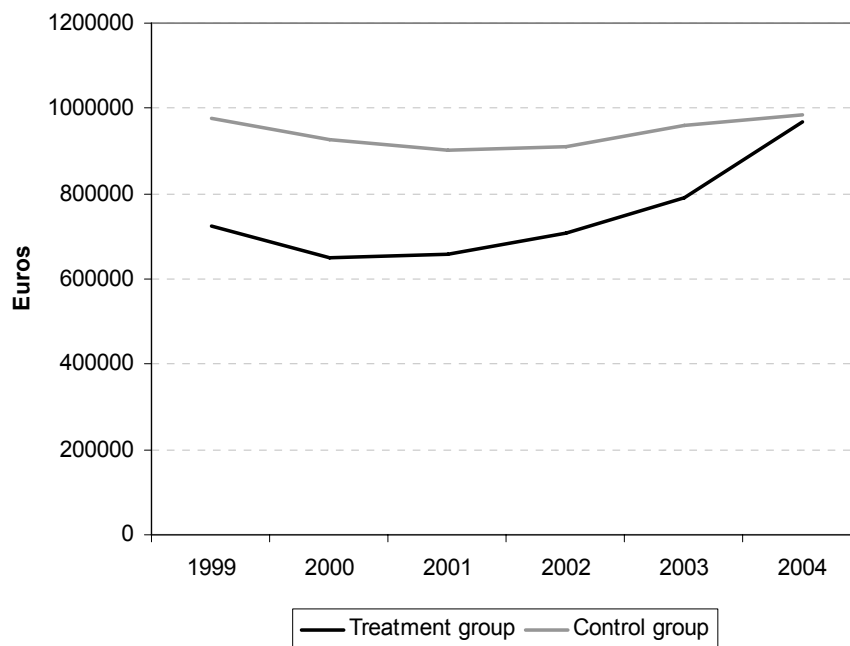
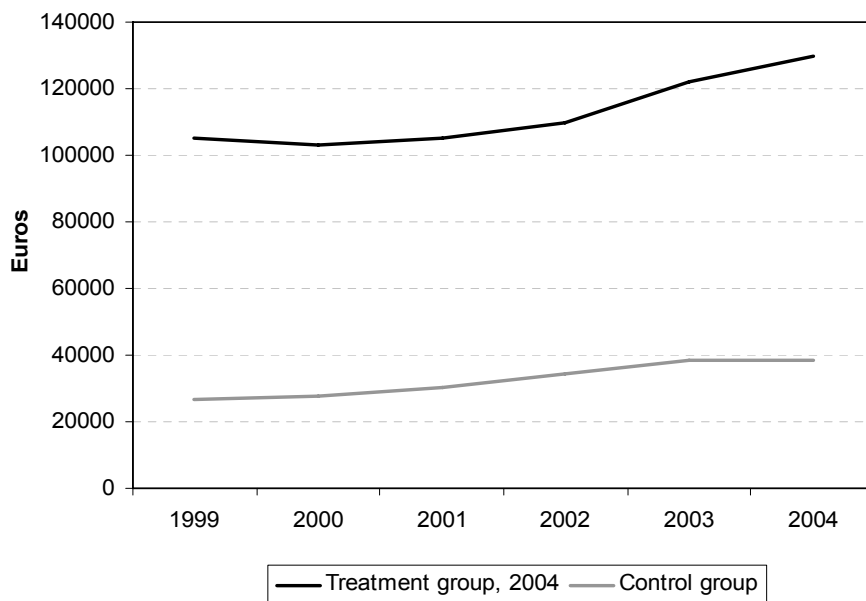


Figure 3.2 *Median dividend in non-listed corporations*



The Finnish 2005 tax reform allows us to use a simple difference-in-difference estimation strategy by providing exogenous variation in tax rate changes. We therefore estimate equations of the following type

$$(1) \quad d_{i,t} = \alpha_i + \beta_1 \text{treatment03}_i + \beta_2 \text{treatment04}_i + \gamma \text{year}_t + \delta X_{i,t} + \eta_1 \text{treatment03} * \text{year03}_{i,t} + \eta_2 \text{treatment04} * \text{year04}_{i,t} + \varepsilon_{i,t}$$

In Eq. (1), $d_{i,t}$ refers to the dependent variable of firm i at time t , which is either the dividend/assets, investment/assets or debt/assets ratio. As explained in Section 2, the variable *treatment03* is an indicator variable which takes the value of 1 if the firm is one whose dividend taxation would have increased under the Arvela proposal. *Treatment04* is an indicator of whether the firm is one whose dividend taxation would have increased under the final government tax bill.¹³ The year dummies are denoted by the variable *year*, and X refers to some additional control variables, discussed below. In some specifications, we also let the constant vary by firm and that is why it also has the subscript i . Our main interest is in the interaction variables *treatment03*year03* and *treatment04*year04* that measure the impact of the anticipated tax increase in 2003 (the Arvela proposal) and 2004 (the Government proposal).¹⁴

The identifying assumption is that other potential unobservable factors explaining dividend or investment behaviour affect the treatment and the control groups in the same way. Apart from the tax change, we do not see any other major factors that could have had a differential impact on firms differing in their ownership status and the dividend level over this time period. To further examine the credibility of our treatment/control group division, we estimated models where we used business profits as a dependent variable and the same set of explanatory and control variables as in our reported estimations. The idea is that the future tax increase variables should not affect business profits; if they did, there could be an unobserved variable that would coincide with the tax increase status and that could be the real reason (instead of the tax change) for possible impacts on dividends and investment. Business profit regressions did not produce significant coefficients for our treatment variables, which increases the confidence in interpreting the potential effects of tax changes on dividend and investment as causal impacts.¹⁵

¹³ We also estimated models using only one treatment variable, which was a combination of the Treatment03 and Treatment04 variables. The interaction of this variable with the years 2003 and 2004 was significant in all model specifications. Given this, the Arvela and government effects can be estimated together or separately. These results are available from the authors upon request.

¹⁴ In other words, *treatment03*year03* takes the value of 1 for firms in groups 2, 4 and 5 in 2003 and 0 for all other years and all other firms. The *treatment04*year04* variable takes the value of 1 for firms in groups 2 and 5 in 2004 and 0 for all other years and all other firms.

¹⁵ Again, these results are available from the authors upon request.

4. Estimation results for dividend distributions

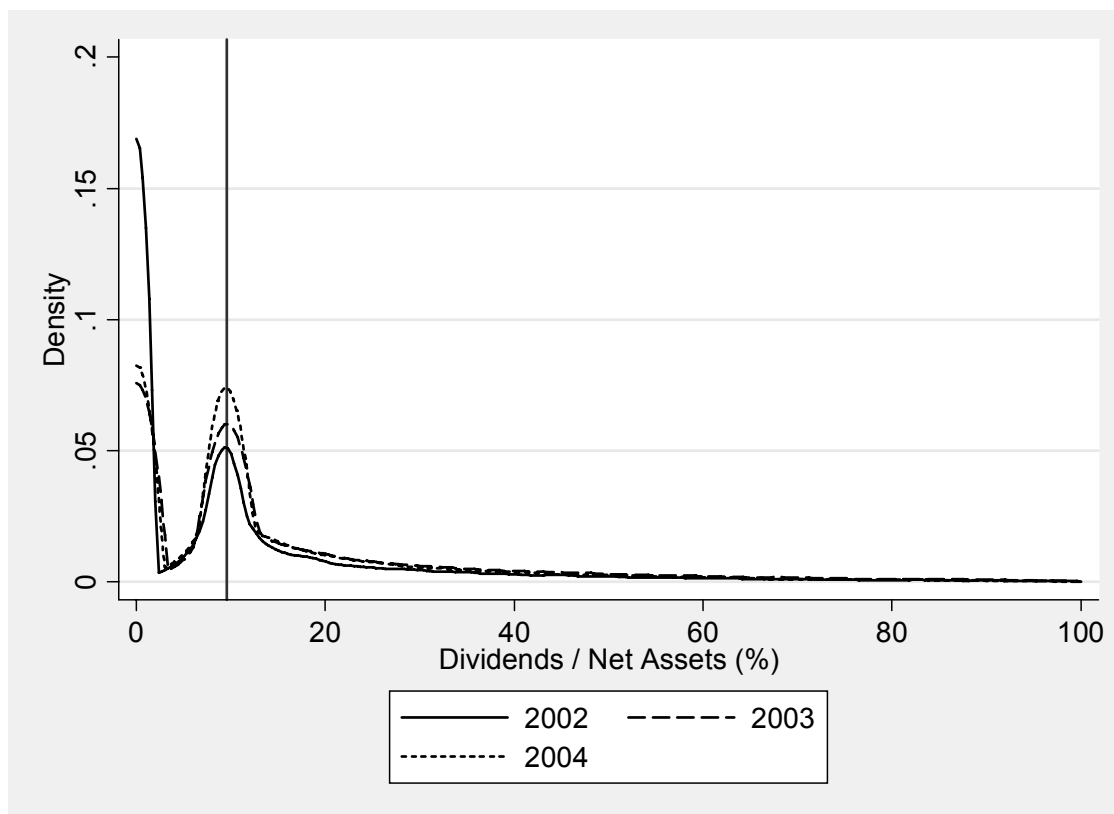
We follow Chetty and Saez (2004, 2005) and estimate both extensive and intensive responses in dividend payout policy. In our paper the extensive margin refers either to the initiation of dividend distributions by firms that had not paid dividends earlier or to a discrete change in the dividend policy of non-listed firms that had earlier paid dividends below the maximum amount of normal dividends. The idea behind the latter analysis is that the dividend-tax hike induced them to raise their dividends from a low level to the ‘tax-optimal’ level corresponding to the ceiling of normal dividends. These extensive margin responses are estimated by logit models. The intensive margin refers, in turn, to the actual amount of distributed dividends. For investment and debt equations, we only measure intensive margins.

4.1 Extensive models

We first investigate dividend initiations during the planning period of the tax reform in non-listed firms.¹⁶ If the anticipated tax increase affects dividend payments, we expect to see an increase in initiations prior to the reform. In Figure 4.1 we plot the distribution of dividends in 2002, 2003 and 2004. The figure clearly shows that the proportion of firms that do not distribute dividends drops from 2002 to 2003. What is also evident is that there are increases each year in the share of firms that distribute dividends roughly equal to the maximum amount that could be distributed tax free (illustrated by the vertical line).

¹⁶ Almost all listed firms have always distributed some dividends and therefore measuring new dividend distributions is of little importance.

Figure 4.1 *Distribution of dividends in non-listed corporations*



Next, we examine the initiation of dividend distributions by estimating a logit model, where the dependent variable takes the value of 1 if the firm initiates dividend distribution and 0 otherwise.

Our basic specification with group and time dummies is given in column (1) of Table 4.1. The group dummies are the two dummies, *treatment03* and *treatment04*, which capture the impact of belonging to the treatment group. In the other models, we investigate the robustness of these results. The model with a firm-specific dummy variable instead of the group dummies is given in column (2). This model is estimated as a linear probability model, since a panel logit model could suffer from the so-called incidental-parameters problem, leading to inconsistent estimates (Hsiao 2003, Ch. 7). The logit model is again used in the rest of the specifications. There, the firm dummy is replaced by the group dummies and we include the following control variables: a) a profit-to-assets ratio; b) 2-digit industry dummies; c) equity/debt ratio; d) location dummies (dividing the country into 10 administrative regions) and e) the logarithm of the number of employees. In every specification we have reported coefficients of the estimated models and marginal effects ($\partial y / \partial x$), which show directly the impact of

belonging to the group facing tax increases in 2003 and 2004 on the probability of dividend initiation.

Table 4.1 Initiation of dividend distributions in non-listed corporations

	(1)		(2)		(3)		(4)		(5)	
	Initiation	$\partial y/\partial x$	Initiation	$\partial y/\partial x$	Initiation	$\partial y/\partial x$	Initiation	$\partial y/\partial x$	Initiation	$\partial y/\partial x$
Treat03*year03	0.045 (1.80)	0.007 (1.82)	0.070 (21.49)**	0.070 (21.49)**	0.665 (23.31)**	0.069 (29.06)**	0.677 (23.71)**	0.070 (29.71)**	0.673 (23.55)**	0.070 (29.47)**
Treat04*year04	0.512 (7.18)**	0.069 (8.57)**	0.149 (24.64)**	0.149 (24.64)**	0.583 (7.27)**	0.061 (9.10)**	0.568 (7.08)**	0.059 (8.81)**	0.592 (7.39)**	0.061 (9.28)**
Profit/assets					7.798 (138.61)**		7.836 (138.65)**		7.808 (138.23)**	
Equity/debt					0.075 (84.41)**		0.074 (84.16)**		0.074 (83.06)**	
ln(employment)									-0.038 (8.43)**	
DUMMIES										
Group	yes				yes		yes		yes	
Firm			yes							
Year	yes		yes		yes		yes		yes	
Industry					yes		yes		yes	
Location							yes		yes	
Constant	-1.259 (15.60)**		-0.056 (6.89)**		-3.497 (36.85)**		-3.740 (39.13)**		-3.701 (38.67)**	
Obs	289713		289713		288689		288689		288689	
Pseudo R ²	0.02		0.10		0.19		0.19		0.19	

Robust z statistics in parentheses
* significant at 5%; ** significant at 1%

The results across specifications suggest that the number of firms distributing dividends increased as a response to both the Arvela tax plan in 2003 and the actual tax proposal in 2004. The magnitudes of the impacts of the actual plan and the Arvela plan are roughly similar; both increase the probability that a firm distributes dividends by 6–7 per cent depending on specification.¹⁷ These results represent responses of a moderate size to the tax proposals. The coefficients of the profit/asset and the equity/debt ratios are positive as expected; more profitable and less indebted firms find it easier to pay out dividends. The negative sign of the employment variable is perhaps more surprising. The signs

¹⁷ We interpret the marginal effects mainly based on specifications 1 and 3–5. This is because specification 2 is estimated as a linear probability model, which is in some sense a ‘wrong’ choice for limited dependent variable modelling.

of the profit/asset and the equity/debt ratios are the same in other dividend regressions below, whereas the sign of the employment variable is reversed in Table 4.2, suggesting that the relation between dividend policies and employment is not straightforward.

Table 4.2 Tax planning in non-listed corporations

	(1)	(2)	(3)	(4)	(5)					
	Tax planning $\partial y/\partial x$		Tax planning $\partial y/\partial x$		Tax planning $\partial y/\partial x$					
Treat03*year03	2.469 (41.00)**	0.105 (18.63)**	0.107 (66.58)**	0.107 (66.58)**	2.692 (40.35)**	0.056 (16.09)**	2.689 (40.31)**	0.056 (16.06)**	2.673 (40.08)**	0.055 (16.03)**
Treat04*year04	0.235 (1.52)	0.003 (1.37)	0.392 (22.63)**	0.392 (22.63)**	5.759 (25.53)**	0.624 (12.04)**	5.751 (25.50)**	0.621 (11.94)**	5.768 (25.53)**	0.625 (12.04)**
Profit/assets				9.884 (104.76)**		9.891 (104.60)**		9.940 (104.39)**		
Equity/debt				0.013 (11.00)**		0.013 (10.94)**		0.013 (11.19)**		
ln(employment)									0.086 (7.03)**	
DUMMIES										
Group	yes			yes		yes		yes		
Firm		yes								
Year	yes	yes		yes		yes		yes		
Industry				yes		yes		yes		
Location						yes		yes		
Constant	-4.491 (65.17)**	-0.002 (1.98)*		-6.513 (56.04)**		-6.603 (55.27)**		-6.718 (55.68)**		
Obs	289713	289713	289693	289693	289693	289693	289693	289693	289693	289693
Pseudo R ²	0.15	0.06	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.39

Robust z statistics in parentheses
* significant at 5%; ** significant at 1%

As well as initiating dividends payouts, firms were also able to exploit the tax advantages of the old system more efficiently just before the introduction of the new tax system. As discussed above, the old system seems to have created incentives for non-listed companies to distribute as dividends the maximum amount of normal dividends. Kari and Karikallio (2007) present evidence that a significant proportion of dividend-distributing non-listed corporations closely followed this rule in their payout policies.

Therefore we also examine whether the expected dividend tax change increased the probability of firms distributing the maximum amount of normal dividends. We run a logit specification where the dependent variable is equal to 1 if the firm started to distribute dividends equal to the ceiling of normal dividends and 0

otherwise. We use the same set of regressors and controls as in our earlier analyses (Table 4.2).

We find that much of the response in tax planning appeared in 2004; it was 60 per cent more probable that a firm would exploit the maximum amount of tax-free normal dividends if it foresaw an increase in dividend taxation after the reform. The first-round impacts in 2003 were much milder. The impact of the future tax increase on tax planning in 2004 is surprisingly large, although it does depend on conditioning the response on the control variables used.

We conclude that, in anticipation of a possible tax increase, firms took advantage of potential loopholes in the Finnish dividend tax system in force. We observe pre-reform increases in probabilities of initiation and of tax-planning, indicating that corporations prepared themselves for a tax increase.

4.2 Intensive models

In this subsection, we examine the change in the magnitude of dividends paid out. Thus our dependent variable is now continuous. We focus on firms that distributed dividends in every year of our sample and exclude firms with zero dividends paid out in some years.

Non-listed corporations

Table 4.3 below reports the results of the dividend regressions for non-listed corporations. The dummy variables and other controls are the same as earlier. The coefficients of the treatment variables are statistically significant in all model specifications. The results reveal that the amount of dividends increased in a significant way in firms that anticipated higher taxes in the future. This is valid both after the Arvela report and after the Government proposal.

From our data, the level of the dividend/asset variable before 2003 was 0.052. The mean treatment parameter was 0.007 in 2003 and 0.032 in 2004. Therefore, the mean increase in dividends consequent to the anticipated tax increase was 13 per cent in 2003 and 62 per cent in 2004. While it may not be surprising that firms reacted to the dividend tax hike, the magnitude of the increase is, in our view, quite considerable.

Finally, one may wonder what would happen to the results if the whole distribution is modelled at the same time. To test this, we include the zero values of dividends in the sample and estimate a standard Tobit model. These results, reported in Appendix B, are comparable to those reported in Table 4.3. Therefore, the choice of estimation technique does not seem to drive the results. Another potential worry is that the results could be sensitive to the presence of

outliers. We checked that the qualitative results stay the same when one utilizes the method of robust regression (see e.g. Rousseeuw and Leroy 1987), which gives less weight to observations with a large residual.

Table 4.3 Dividend responses in non-listed corporations

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Dividend/assets					
Treat03*year03	0.004 (2.04)*	0.009 (4.31)**	0.007 (3.23)**	0.007 (3.25)**	0.006 (3.00)**
Treat04*year04	0.012 (7.29)**	0.037 (27.09)**	0.040 (8.44)**	0.040 (8.51)**	0.033 (7.26)**
Profit/assets			0.319 (60.69)**	0.318 (60.66)**	0.316 (60.24)**
Equity/debt			0.001 (20.12)**	0.001 (20.07)**	0.001 (16.01)**
ln(employment)					-0.006 (33.17)**
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.058 (32.77)**	0.004 (1.66)	0.028 (24.79)**	0.028 (25.79)**	0.039 (28.83)**
Obs.	129437	129437	129437	129437	129437
R-squared	0.09	0.05	0.22	0.22	0.22
Robust t statistics in parentheses * significant at 5%; ** significant at 1%					

Listed corporations

The response to the dividend tax reform proposals may differ across listed and non-listed firms. The following part analyses the response by listed firms. Under the reform proposals, the greatest increase in dividend taxation was faced by listed companies with individual Finnish owners. On the other hand, listed companies owned by institutional or foreign shareholders did not face big changes in dividend taxation.

Table 4.4 summarizes the results of these estimations. The coefficients measuring the reaction in 2003 are statistically significant in all cases, whereas the additional impact from the government plan in 2004 is not significant, except for specification (2). Perhaps the reason is that for quoted firms, the contents of the Arvela plan and the government plan were essentially the same. Given that the mean of the dividends/assets ratio before 2003 was 0.037, the mean marginal

impact of the Arvela report on the amount of dividends distributed was 56 per cent. As in the case of non-listed companies, this is again a large response.

Table 4.4 Dividend responses in listed corporations

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Dividend/assets					
Treat03*year03	0.024 (3.73)**	0.025 (2.35)*	0.017 (2.56)**	0.018 (2.63)**	0.019 (2.66)**
Treat04*year04	0.005 (0.89)	0.044 (4.15)**	0.010 (1.58)	0.010 (1.43)	0.005 (0.73)
Profit/assets			0.374 (3.08)**	0.366 (2.99)**	0.373 (3.04)**
Equity/debt			0.004 (2.11)*	0.005 (2.17)*	0.003 (1.49)
ln(employment)					-0.010 (4.68)**
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.056 (5.74)**	0.063 (9.75)**	0.048 (1.16)	0.047 (1.10)	0.188 (3.63)**
Obs	529	529	529	529	529
R-squared	0.17	0.30	0.34	0.36	0.40
Robust t-statistics in parentheses * significant at 5%; ** significant at 1%					

4.3 Calculating losses in tax revenues

The value of the treatment parameters, together with the amount of dividends in the category of treated firms, enables us to give an estimate of the tax revenue losses the government suffered owing to the timing of the dividend decisions.

The idea is as follows. The treatment dummy variables tell to what extent firms that anticipated a tax increase advanced their dividend payments to the period before the tax reform. As we saw, the actual magnitude of these parameters varied from specification to specification. We therefore take the mean value of the treatment parameter values. The actual dividends paid out by the treated firms

in 2003 and 2004 include these additional dividends, and taking out the magnitude equal to the marginal effect of the mean of the treatment variable gives the value of the additional dividends. Without the tax reform, we assume that they would have not been paid before the reform. Therefore it is plausible to expect that these additional dividends were then missing from the tax base after the reform.

The value of the dividends in the listed and non-listed firms in the treated categories in 2003 and 2004 was roughly 1.1 billion euros, and the overall value of additional dividends was 240 million euros (See Table 4.5 below).

After the tax reform, 70% of this amount would have been taxed at the flat capital income tax rate of 28%. This means that the overall tax revenue loss would have amounted to 47 million euros. Before the reform, the government estimated that the overall increase in dividend tax receipts could be approximately 150 million euros per year. Therefore, the tax revenue loss took away 31 per cent of the increase in dividend tax revenues in the first year (if all losses were realized in that year). Whether this is a small or large revenue loss is, of course, debatable. But had the dividend tax increase been more wide-ranging than it actually was (because, in the end, only dividends exceeding 90,000 euros were taxable in non-listed companies), the euro amount of the revenue loss would have been larger as well.

Table 4.5 Estimating tax revenue losses

	Amount of dividends, t €		Mean treatment parameter, %		Increase in dividends, t €	
	2003	2004	2003	2004	2003	2004
Listed	507,479	367,383	56	not signif.	182,949	NA
Non-listed	120,895	109,656	13	62	13,908	41,967

5. Financing the additional dividends

Since dividends increased, the question arises of how this is reflected in the firms' other decisions. One possibility is that investments could have decreased. This could have happened for two reasons. First, if firms are liquidity-constrained, paying out some of their funds as dividends reduces their resources available for investments. Second, an increase in dividend taxation in the future may reduce incentives for investment even before the reform. This could happen if an investor foresees that an investment will provide a return after a few years, but the net-of-tax return on the investment is lowered because at the future period, dividends paid out from the profitable investment are already subject to heavier taxes. There are reasons to believe, however, that we should not observe a difference in investments between our treatment and control groups affected by this profitability channel. First, as explained in the introduction, according to the 'new view', dividend taxes do not affect investments by mature corporations. Second, Hietala and Kari (2006) analyse the tax rules for dividends from Finnish non-listed firms, and claim that the effects of the 2005 reform on the cost of capital for non-listed corporations is mixed and depends very much on the circumstances of the owner and the firm. However, the reform also includes elements, especially the corporate tax cut, which may have induced firms to shift investments to the transitory period. By advancing investments the firms could have aimed to increase depreciation deductions and hence postpone reporting of profits to the time after the tax cut. In sum, the reform could have affected investments through several channels. For the above reasons and the larger size of the dividend tax changes compared to the corporate tax cut, we expect that the main effect on investments probably operated through the cash flow channel. Even if investments did not react, the balance sheet position of firms could change as a result of increased dividends, increasing indebtedness, for example. In this section we will investigate the effects on both investments and indebtedness.

5.1 Investment responses

We first consider investment responses. The models are similar to those used in the dividend regressions, but we now also include one additional control variable: the growth rate in the firm's turnover. The results for listed firms are reported in Table 5.1 and the results for non-listed firms in Table 5.2.

Table 5.1 *Investment responses in listed corporations*

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Investment/assets					
Treat03*year03	-0.014 (1.18)	-0.021 (1.43)	-0.003 (0.22)	-0.005 (0.35)	-0.004 (0.29)
Treat04*year04	0.003 (0.57)	0.026 (1.97)	0.013 (1.42)	0.015 (1.37)	0.012 (1.15)
Profit/assets			-0.005 (0.08)	-0.030 (0.50)	-0.015 (0.25)
Growth rate			0.028 (1.58)	0.027 (1.54)	0.033 (1.78)
Equity/debt			0.119 (2.25)*	0.094 (1.98)	0.099 (2.02)*
ln(employment)					-0.008 (2.19)*
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.061 (5.57)**	0.059 (7.92)**	0.065 (2.79)**	0.923 (3.56)**	0.210 (3.77)**
Obs.	608	608	608	608	608
R-squared	0.16	0.24	0.31	0.32	0.32
Robust t-statistics in parentheses					
* significant at 5%; ** significant at 1%					

An interesting pattern in the investment results emerges. For both listed firms and non-listed firms in general, there appears to be no link between the anticipated tax change and investment prior to the reform. For non-listed firms, this result holds for the weighted regressions (as those shown in Table 5.2), where the firms' size (their turnover) is used as the weight. One possible explanation is that the level of investment is relatively inflexible in the short period of our analysis. Or the result may imply that investments can be financed by other sources of funds and therefore the treatment of dividends is not of paramount importance (as in the 'new view' of dividend taxation).

Table 5.2 Weighted investment responses in non-listed corporations

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Investment/assets, weighted by turnover					
Treat03*year03	-0.007 (0.45)	-0.032 (2.18)*	-0.023 (1.49)	-0.023 (1.51)	-0.022 (1.48)
Treat04*year04	-0.025 (1.73)	-0.021 (1.62)	-0.027 (1.54)	-0.025 (1.44)	-0.008 (0.46)
Profit/assets			0.070 (27.03)**	0.071 (27.33)**	0.066 (25.84)**
Equity/debt			-0.001 (14.06)**	-0.001 (13.90)**	-0.001 (17.89)**
Growth rate			-0.001 (1.06)	-0.001 (0.88)	0.003 (3.19)**
ln(employment)					-0.012 (46.38)**
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.088 (75.94)**	0.099 (99.94)**	0.081 (50.72)**	0.092 (59.01)**	0.109 (63.84)**
Obs.	156116	156116	156116	156116	156116
R-squared	0.04	0.46	0.27	0.27	0.28
Robust t-statistics in parentheses significant at 5%; ** significant at 1%					

However, when the smallest firms are given the same weight as all other firms, one obtains negative and statistically significant effects on investments from the tax change (see Appendix C).¹⁸ The reason is probably that the smallest control group firms are micro-sized, growing firms where investment-to-asset ratios are large anyway. For investment equations, we prefer the weighted estimation, since there the bigger (control group) firms get a larger weight. This is desirable since these firms are a closer comparison to the actual treated firms, which are relatively large.

The results for the control variables indicate that firms that are more profitable also invest more, whereas in the case of non-listed companies, firms with a high equity/debt ratio invest less. The latter finding may be due to the fact that many of the non-listed companies use loans to a significant degree for financing investment.

¹⁸ All other results reported in the paper remain qualitatively the same regardless of whether these weights are used or not.

5.2 Debt financing

Let us now consider the reaction in the debt/assets ratio. One of the motivations for the earlier tax reform in 1993, when Finland moved to a Nordic dual income tax system, was to increase the attractiveness of equity finance and to reduce the vulnerability of firms to external shocks. Without considering whether these incentives actually went too far – Lindhe et al. (2004) argue that the cost of capital in the form of equity was very low in the previous tax regime in Finland – the 2005 tax reform clearly reduced the incentives for reducing leverage for some firms (Hietala and Kari 2006). The debt regressions below reveal that in non-listed firms which anticipated tax increases, the stock of debt also increased. The increased dividend distributions were therefore partially funded by an increase in indebtedness. There was no similar effect in listed firms, which may more often have other items in their balance sheets to fund dividend distributions.

Table 5.3 Debt responses in listed corporations

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Debt/assets					
Treat03*year03	-0.024 (1.14)	-0.015 (0.81)	-0.023 (1.21)	-0.024 (1.21)	-0.024 (1.26)
Treat04*year04	-0.024 (1.50)	-0.034 (2.57)*	-0.015 (0.95)	-0.014 (0.87)	0.011 (0.73)
Profit/assets			-0.152 (2.27)*	-0.128 (1.90)	-0.145 (2.15)*
ln(employment)					0.007 (2.56)**
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.219 (21.64)**	0.211 (31.33)**	0.227 (7.35)**	0.164 (4.65)**	0.074 (1.46)
Obs.	623	623	623	623	623
R-squared	0.03	0.03	0.16	0.20	0.22
Robust t-statistics in parentheses					
* significant at 5%; ** significant at 1%					

Table 5.4 *Debt responses in non-listed corporations*

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Debt/assets					
Treat03*year03	0.096 (43.81)**	0.081 (36.88)**	0.092 (42.00)**	0.092 (41.93)**	0.092 (41.44)**
Treat04*year04	0.001 (0.05)	0.014 (3.76)**	0.002 (0.51)	0.002 (0.50)	0.004 (1.31)
Profit/assets			-0.366 (80.26)**	-0.366 (80.23)**	-0.365 (80.13)**
ln(employment)					0.011 (43.26)**
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.180 (39.20)**	0.225 (94.61)**	0.213 (43.81)**	0.213 (43.60)**	0.202 (41.16)**
Obs.	283885	283885	283885	283885	283885
R-squared	0.09	0.05	0.16	0.18	0.17
Robust t-statistics in parentheses * significant at 5%; ** significant at 1%					

6. Discussion

This paper examines how Finnish corporations adjusted their dividend distributions and investments in anticipation of the 2005 corporate and capital income tax reform. Since the reform treated different types of corporations in different ways, it involved exogenous variations to their tax treatment, offering an opportunity for promising empirical estimates. The results can be used to shed light on three distinct issues: the debate between the ‘old’ vs. the ‘new’ view of dividend taxation, the strength of anticipatory responses, and the design of the dual income tax. Since we have only measured reactions in the short term, the conclusions regarding the long-term effects should be seen as tentative.

We find that firms which anticipated increased tax on dividend distributions increased their dividend payouts in a statistically significant way prior to the reform. This took place both at the extensive margin and at the intensive margin. However, this was not reflected in a reduction in investment activity, except when the smallest firms carry the same weight as large firms in the control group. There is also evidence that in non-listed firms the increased dividend distributions were partially funded by increasing debt. Therefore, the tax linkage between dividends and financial structure appears to be more direct than that between dividends and investments. This behaviour can be, at least tentatively, seen as consistent with the ‘new view’ of dividend taxation, according to which the timing of dividends is adjusted, whereas investment behaviour remains unaffected.

Secondly, the results imply that while companies distributed abnormally high dividends before the reform, they tended to pay out abnormally low dividends after the reform. This tax planning behaviour therefore probably reduced dividend tax receipts for a few years after the reform. According to our calculations, the revenue losses amounted to roughly 30% of predicted annual investor-level dividend tax receipts. The Finnish capital income tax reform was publicly debated extensively and for quite a long time. This seems to have had both positive and negative effects. The public discussion might have corrected misguided policies in the first tax reform proposal, but it also made the tax reform vulnerable to lobbying. And during the process, firms found ample time to organize their financial structure to minimize their tax burden over time.

Finally, we find that the prospect of increased dividend taxation induced firms to make the most out of the tax-planning opportunities embodied in the Finnish version of the dual income tax system. In particular, more firms started to distribute dividends up to the maximum level of normal dividends taxed at the more lenient capital income tax rate. This suggests that the tax-planning incentives of the dual income tax system must indeed be taken seriously, and that

these incentives, as well as incentives on capital accumulation and financial structure, need to be designed in a more rigorous manner.

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Appendix A: Sensitivity analysis of estimation models in different definitions of corporate group number 5

Maximum dividend payment above		Initiation of Dividend Distribution				Tax Planning			
		coeff.	Robust z	$\partial y/\partial x$	Robust z	coeff.	Robust z	$\partial y/\partial x$	Robust z
70 000 €	Treatment03xYear03	0.651	(20.19)**	0.064	(17.12)**	1.701	(38.42)**	0.045	(16.26)**
	Treatment04xYear04	0.276	(3.48)**	0.030	(3.86)**	4.277	(11.76)**	0.502	(11.54)**
90 000€ ^a	Treatment03xYear03	0.673	(23.55)**	0.070	(29.47)**	2.673	(40.08)**	0.055	(16.03)**
	Treatment04xYear04	0.592	(7.39)**	0.061	(9.28)**	5.768	(25.53)**	0.625	(12.04)**
100 000 €	Treatment03xYear03	0.730	(29.13)**	0.094	(31.69)**	2.442	(32.46)**	0.056	(15.79)**
	Treatment04xYear04	0.643	(7.75)**	0.062	(8.15)**	6.029	(30.17)**	0.701	(14.15)**

Maximum dividend payment above		Dividend Responses		Investment Responses		Debt Responses	
		coeff.	Robust t	coeff.	Robust t	coeff.	Robust t
70 000 €	Treatment03xYear03	0.006	(2.71)**	-0.016	(2.00)*	0.087	(38.13)**
	Treatment04xYear04	0.029	(5.82)**	-0.008	(2.39)*	0.008	(2.62)**
90 000€ ^a	Treatment03xYear03	0.006	(3.00)**	-0.022	(1.48)	0.092	(41.44)**
	Treatment04xYear04	0.033	(7.26)**	-0.008	(0.46)	0.004	(1.31)
100 000 €	Treatment03xYear03	0.006	(2.89)**	-0.006	(1.89)	0.087	(38.50)**
	Treatment04xYear04	0.034	(3.37)**	-0.011	(1.91)	0.003	(1.04)

^a Used in the estimation results in the text

Note: Estimated models include the total control set

* significant at 5%; ** significant at 1%

Appendix B: Modelling the entire distribution by Tobit

Dividend responses in non-listed corporations (TOBIT)

	(1)	(3)	(4)	(5)
Dependent variable: Dividend/assets				
Treatment03*year03	0.026 (42.68)**	0.028 (48.26)**	0.028 (47.55)**	0.028 (47.64)**
Treatment04*year04	0.026 (11.81)**	0.018 (8.55)**	0.017 (8.20)**	0.019 (9.11)**
Profit/assets		0.327 (138.28)**	0.326 (138.18)**	0.325 (137.89)**
Equity/debt		0.0007 (24.72)**	0.0007 (24.04)**	0.0007 (22.77)**
ln(employment)				-0.003 (22.77)**
DUMMIES				
Group	yes	yes	yes	yes
Firm				
Year	yes	yes	yes	yes
Industry		yes	yes	yes
Location			yes	yes
Constant	0.021 (8.80)**	-0.010 (3.68)**	0.011 (4.11)**	0.008 (3.16)**
Obs.	177631	177631	177631	177631
R-squared	0.33	0.49	0.49	0.49
Robust t statistics in parentheses * significant at 5%; ** significant at 1%				

Appendix C: Investment results in non-listed corporations using non-weighted regressions

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Investment/assets					
Treatment03*year03	-0.021 (34.05)**	-0.007 (5.06)**	-0.003 (1.98)*	-0.003 (1.99)*	-0.004 (2.57)**
Treatment04*year04	-0.003 (1.44)	-0.005 (2.27)*	-0.008 (3.20)**	-0.008 (3.25)**	-0.001 (0.56)
Profit/assets			0.040 (8.89)**	0.041 (9.05)**	0.037 (8.23)**
Equity/debt			-0.001 (18.33)**	-0.001 (18.06)**	-0.001
	(21.22)**				
Growth rate			0.008 (8.75)**	0.008 (8.77)**	0.010
	(11.16)**				
ln(employment)					-0.010
	(41.56)**				
DUMMIES					
Group	yes		yes	yes	yes
Firm		yes			
Year	yes	yes	yes	yes	yes
Industry			yes	yes	yes
Location				yes	yes
Constant	0.103 (40.55)** (38.91)**	0.096 (37.79)**	0.095 (34.45)**	0.100 (35.50)**	0.110
Obs.	160805	160805	160805	160805	160805
R-squared	0.01	0.06	0.06	0.06	0.07
Robust t statistics in parentheses significant at 5%; ** significant at 1%					

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