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Abstract

In this study we explore how a firm-level dividend tax on redistributed foreign profits affects the financial decisions of a multinational enterprise (MNE). We examine this by using evidence from a recent tax reform in Finland. The so-called equalization tax (EQT) used to be a regular element of European imputation systems, designed to ensure that dividends were not paid out of untaxed profits. Theoretical analyses have suggested that EQT may distort several financial decisions of MNEs. We find a 23 percent increase in dividend payments and a similar increase in repatriated foreign profits after the repeal of EQT among Finnish MNEs. We also find evidence that the reported profits increased among foreign subsidiaries of Finnish MNEs, which indicates an effect on profit-shifting. No change in investment was detected.

JEL-Codes: H250, F230, H320.

Keywords: taxation, multinational firms, firm behavior.

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1 Introduction

The growing importance of multinational enterprises (MNEs) and their remarkable ability to exploit cross-country tax differences have led to a growing interest in international tax design issues. As a result, a considerable body of new research has emerged addressing the responses of MNEs to taxes. However, there are only a few empirical studies that use policy evaluation methods to analyze the effects of taxes on the behavior of MNEs. In this study our aim is to contribute to this field of research by examining how MNEs responded to the repeal of a firm-level tax on redistributed foreign profits in Finland. We find evidence of large effects on dividend distributions and profit repatriations, and also some evidence of effects on profit shifting.

Due to the changes in the global economic environment, it is no surprise that several OECD countries have reformed their corporate tax systems in recent years. Tax rate cuts, special regimes for income from intellectual property and new anti-avoidance measures, such as limitations on interest deductions are some examples. In the early 2000's a further trend in Europe was to switch from the system of imputation credit to classical corporate tax with reduced tax rates. This includes the four largest EU Member States as well as Ireland, Norway and Finland. The European trend can be explained by a tougher stance of the European institutions towards national dividend tax systems (European Commission, 2003). This development culminated in a series of rulings by the European Court of Justice (ECJ) where certain key aspects of imputation systems were found to be inconsistent with the EU Treaties.¹

One of the challenged features of European imputation systems was the so-called equalization tax (EQT) and its counterparts. The aim of these measures was to protect domestic tax revenues by ensuring that no dividends can be distributed from profits which are not subject to domestic corporate tax. EQT served this goal by levying an extra corporate-level tax if dividends were financed from tax-exempt profits. An EQT liability was especially common in cases where a company had foreign-source income which was tax-exempt to relieve international double taxation. The consequent extra tax burden on foreign profits and its potential harmful effects on economic activity were recognized in the European tax coordination debate (Ruding Committee (1992)), but also by national governments, which soon implemented amendments to their tax rules (see e.g. Weichenrieder (1994) and Freeman and Griffith (1993)).

In this study we use the Finnish tax reform of 2005, which abolished EQT, as a natural experiment to examine the behavioral responses of MNEs to taxes. Our difference-in-differences approach compares firms which faced a high risk of being liable to pay EQT on distributed dividends (MNEs) with other large firms which were not at risk of EQT liability before the reform. Because of the opportunity to use valid policy evaluation methods, rarely used in previous empirical literature studying the effects of taxation on the behavior of MNEs, we believe that our study offers a novel contribution to this field of public economics.²

¹Some well-known studies have suggested that personal-level double tax reliefs are non-optimal in an open economy (e.g. Boadway and Bruce, 1992, and Fuest and Huber, 2000). This view might have been a further reason for the repeal of the imputation systems. As regards Finland, however, this view did not have much foothold in the tax policy debate prior to its 2005 tax reform.

²We also aim to contribute to the empirical analyses of the Finnish 2005 tax reform. Kari, Karikallio and Pirttilä (2008 and 2009) examine the effects, but both studies concentrate only on owner-level changes in dividend taxation and ignore the changes in company-level tax structures such as EQT.

Our main interest lies in the effects of EQT on dividends, investments and the use of alternative channels to repatriate foreign profits from abroad. The firm-level data based on tax returns allow us to examine closely various decisions by companies. In considering profit-shifting responses we apply data for Swedish and Finnish-based corporate groups included in the Amadeus database.

How should we expect taxes on dividend payments to affect MNEs' financial decisions? Public economics literature includes two well-known opposite hypotheses on the effects of dividend taxes. The 'new view' claims that these taxes will capitalize into share prices, but have no effects on investment or dividend payments. The 'old view' predicts that dividends and investment are dependent on dividend taxes. The so-called Hartman-Sinn hypothesis is an application of the 'new view' to the international environment. It suggests that foreign investments and dividend repatriations are independent of any potential tax liability due to repatriation of the profits (Sinn (1987)). Subsequent research has tried to challenge and test this view, especially considering the payout policies of MNEs. Desai, Foley and Hines (2001, 2007), Bellak and Leibrecht (2010), Dharmapala, Foley and Forbes (2011), Faulkender and Petersen (2012) analyze the effects of repatriation taxes empirically and argue that they have an influence on repatriations but also on cash holdings and investment location. Desai et al. (2001, 2007) observe that repatriations are nonetheless fairly persistent and explain this by referring to information asymmetries and monitoring motives.

Besides traditional dividend tax issues, previous literature has also addressed several aspects of imputation systems. Freeman and Griffith (1993) provide a policy discussion on the effects of 'surplus ACT', the British variant of EQT. Devereux and Freeman (1995) analyze how imputation systems affect international investment flows. In this paper we draw the hypotheses for our empirical analysis from a simple theoretical model that builds on the standard MNE model incorporating dividend taxation, and follows the ideas of Kari and Ylä-Liedenpohja (2005). Our theoretical results show that EQT creates an extra tax cost for dividend payments financed from foreign-source profits, which results in changes in the MNEs' dividend, investment and repatriation policies.

Consistent with our theoretical predictions, we find that affected firms increased their dividend payments considerably, by approximately 23 percent. We also observe an increase in foreign intra-company dividends after the repeal of EQT as well as an increase in the profits of foreign subsidiaries of Finnish MNEs. We interpret these findings to imply that MNEs changed their profit repatriation strategies due to the reform. Many Finnish MNEs seem to have switched their method of repatriation of profits from transfer pricing to intra-company dividends.

In our results we do not observe changes in the level of real or financial investments. This result is interesting, since our theory suggested that if the MNE cannot fully accommodate the EQT liability through profit shifting, it should do so through investments. On the other hand, the zero-result is consistent with theory if the tax-planning opportunities of MNEs are substantial.

Our results concerning dividend and investment decisions appear to be in line with earlier empirical literature. The articles by Bond, Chennells and Devereux (1996), and Bond, Devereux and Klemm (2007) on the effects of the UK imputation system are closest to the questions examined in this paper. Both find

changes in dividend distribution, but no effects on investment. The implications of imputation systems for the international profit-shifting have not been studied empirically before.³ The results of our study confirm that domestic dividend tax rules matter for the behavior of MNEs. Dividend taxes seem to affect both dividend payouts by MNEs and intra-company financial flows within MNEs.

According to Slemrod’s (1992, 1995) hierarchy of responses to taxation, the timing of transactions and financial responses are the most sensitive decisions while least severe in terms of welfare implications. Instead, real decisions, such as investment responses, are least sensitive but most detrimental. As we do not detect any real effects, we interpret that the efficiency losses caused by EQT were not large. However, this conclusion may be premature, since our focus is only on the direct effect on investments of treated firms. Chetty and Saez (2010) suggest that dividend taxes may have further efficiency implications through reduced reallocation of investment funds. Our results of reduced dividends may therefore imply that EQT had efficiency losses, not directly, but through reallocation. A further caveat of our approach is that we focus solely on short-run responses.

The paper proceeds as follows. Section 2 introduces an overview of the elements of the tax system in question. Section 3 presents the theoretical background and the hypotheses to be tested in our empirical analysis. Section 4 is devoted to empirical analysis and section 5 presents the conclusions.

2 The taxation of dividends in Finland

2.1 The Finnish imputation system

From 1990 to 2004 Finland applied an imputation system of corporate taxes to remove the double taxation of dividends. In the Finnish application, corporation tax paid on distributed profits was fully credited against the shareholder’s tax on dividend income with the result that dividends were only subject to the marginal tax rate of the owner.⁴ Following its European predecessors in France, Germany and the UK, equalization tax (EQT) was an elementary part of the system. The operational principle of EQT was to make sure that no dividends entitled to imputation credit were distributed out of profits not subject to the full domestic corporate tax.

In Finland the EQT liability was due if the so called minimum corporate tax (MT) exceeded preliminary corporate tax (CT). MT was equal to the imputation credit granted to the shareholder and it was calculated $MT_t = \omega G_t$ for a given year t , where G_t represents the amount of annual dividend payments, $\omega = a/(1 - a)$ is an imputation factor, and a is the rate of imputation credit. In the Finnish imputation system corporate tax was fully credited to shareholders ($a=\tau$) which implies $\omega = \tau/(1 - \tau)$.⁵ Preliminary corporate tax

³There is, of course, a large empirical literature that studies the effects of taxes on international profit-shifting more generally, reviewed recently in Heckemeyer and Overesch (2013) and Dharmapala (2014).

⁴Until 1992 Finland had a global income tax where all earned and capital income (incl. dividends) was taxed jointly at a progressive tax schedule. From the beginning of 1993, Finland switched to dual income tax (DIT), where earned income is subject to a progressive schedule, while all capital income is taxed at a low flat rate (for more on DIT, see Sørensen, 2005). The flat rate was 25 percent from 1993 to 1995, 28 percent from 1996 to 1999, and 29 percent from 2000 to 2004.

⁵To give more intuition, observe that in Finland as in most other imputation systems, the tax credit granted for the shareholder was calculated based on the grossed-up dividend $G_t/(1 - a)$. The amount of credit was then calculated by factoring the grossed-up dividend by imputation rate a . This implies that in a full imputation system, where $a=\tau$, the grossed-up dividend was equal

was defined $CT_t = \tau * \hat{\Pi}$, where $\hat{\Pi}$ is taxable profit. The amount levied as EQT was calculated simply by $EQT_t = \max(MT_t - CT_t, 0)$. Observe the implication that dividends distributed from entirely exempt profit triggered additional EQT at rate $\tau_e = \omega = \tau/(1 - \tau)$. Henceforth we call τ_e the rate of EQT.

Next we illustrate how EQT works by means of an example. Assume a MNE consisting of a parent company resident in Finland and a subsidiary resident in Germany. The parent's pre-tax profit is 100, of which 50 is the result of foreign-source dividends. These dividends are tax-exempt in Finland because of the exemption method applied to relieve international double taxation. The rest of the pre-tax profit, 50, is earned from business operations in Finland and is subject to corporate tax at a rate of 29 percent. Hence the MNE's corporate tax liability owed to the Finnish government is 14.5.

If the MNE distributes no more than 35.5, i.e. it distributes all of the taxable domestic profit after taxes, no EQT liability is due. However, if the dividend payments exceed 35.5, the MNE pays 29/(1-0.29) cents in EQT for every euro exceeding the threshold. If the parent company distributes its entire after-tax profit (including the foreign dividend repatriated from its German subsidiary), its domestic EQT liability is 14.5.

An additional complicating aspect must be mentioned. As in other countries applying imputation systems, there was an inter-temporal smoothing mechanism. Due to the volatility of profits it was not seen to be reasonable to levy EQT if dividend distribution exceeds annual taxable profits in a year when profits are exceptionally low. In order to avoid this, the regime allowed taxes on profits from previous years to be taken into account. To implement this idea a concept of tax surpluses (TS_t) was introduced. TS_t were calculated as follows:

$$TS_t = \sum_{s=t-10}^{t-1} \max(CT_s - MT_s, 0), \quad (2.1)$$

where t refers to the current fiscal year. Where old tax surpluses were required to reduce the equalization tax liability, the oldest unused tax surpluses were used first (first-in-first-out rule).

Taking into account these additional aspects, EQT was calculated:

$$EQT_t = \max(MT_t - (CT_t + TS_t), 0).$$

Thus EQT was due if the minimum tax was greater than the sum of preliminary corporate tax and tax surpluses for the past ten years.

2.2 The 2005 tax reform

As from January 1, 2005, Finland implemented a large tax reform which replaced the full imputation system by partial double taxation of distributed profits. Under the new regime, 70 percent of dividends were included in the recipient's taxable capital income. The other major elements of the reform were modest cuts in tax rates on corporate profits and capital income⁶, changes in the tax treatment of corporate capital gains and

to the distributed profit before taxes.

⁶The corporate tax rate was reduced from 29 to 26 percent and the tax rate on personal capital income from 29 to 28 percent.

losses, and the repeal of the taxation of individual net wealth (for more details, see Kari et al., 2008).

In the old regime, dividends were effectively exempt from personal-level taxation. In that environment, EQT had an important role in avoiding situations where distributed profits were not subject to any tax. The reform meant an increase in dividend taxation. In particular, it introduced personal-level taxation of dividends at a fairly high effective rate of 19.6 percent. Therefore the legislator saw no significant role for EQT any more, and it was abolished.

The key components of the reform package were first presented by the government on November 13, 2003. The detailed bill was launched in May, 2004 and it was passed by the parliament on June 24, 2004. The law was signed by the president on July 30 and its implementation started as from January 1, 2005.⁷

Hence it took seven months from the announcement of the rough blueprint to the enactment of the law and 13 months to its implementation. For EQT the delay was even shorter since its repeal was first announced when the government launched the bill in May 2004. We conclude that the preparation of the law proceeded relatively quickly. The delay certainly provided firms and their owners with some room for adjusting behavior before the reform as explained and analyzed in Kari et al. (2008). However, as regards EQT this room was relatively restricted.

The repeal of the Finnish imputation system has been widely seen as a response to a shift in the stance of EU tax policy towards national dividend tax reliefs. This policy change was first reflected in EU soft law (e.g. European Commission (2003)), and it culminated in a series of rulings by the ECJ which regarded certain key aspects of national double tax reliefs as being incompatible with the free movement of capital principle of the EC treaty. The first ECJ case directly dealing with imputation credit in personal taxation was the complaint brought against the Finnish government by Mr Manninen, a Finnish resident who had dividend income from a Swedish company. Under the Finnish tax rules, foreign-source dividends were taxable income but did not give entitlement to imputation credit. In its decision, on 7 September 2004, the ECJ held that the Finnish imputation system violated the EC Treaty (Case C-319/02).⁸ The decision was only delivered three months after the Finnish reform was signed into law. The government, however, had anticipated the decision correctly: the government bill justifies the repeal on the grounds of contradiction with EU tax law. Observe that the objections did not concern EQT directly. The repeal of EQT was rather a quietly implemented consequence of the abolition of the imputation system.

3 Theoretical predictions

We will construct the hypotheses for our empirical analysis by considering EQT in a dynamic MNE model.⁹ The economic consequences of the repeal of the EQT are analyzed by comparing the MNE's steady-state

⁷Law 566/2004.

⁸Two comparable later decisions were: in the Fokus case, the EFTA court decided that Norway must extend its imputation credit to foreign shareholders (EFTA case E-1/04, judgement on November 23, 2004). In the Meilicke case, the ECJ ruled in line with the Manninen decision that imputation credit must be given to foreign-source dividends (Case C-292/04, judgment given on March 6, 2007). For a review of the ECJ's decisions, see Graetz and Warren (2007).

⁹The model builds on the standard MNE model of Alworth (1988) and Sinn (1993), and follows Weichenrieder (1994, 1998) and Kari and Ylä-Liedenpohja (2005) in modeling dividend taxation. Altshuler and Grubert (2003) discuss the limitations of the standard model, particularly the narrow set of financial flows between a parent and its single affiliate.

policies with and without EQT. We show that EQT creates an extra tax cost for dividend payments financed from foreign-source profits, which has many implications for the MNE's financial decisions. The presentation draws much on Kari and Ylä-Liedenpohja (2005).¹⁰

3.1 The dynamic MNE model with EQT

Consider a value-maximizing MNE that operates in two countries. The parent company and its shareholders are residents in the home country (h-country), and its single, wholly owned subsidiary operates in a foreign country (f-country). The parent produces at home using capital K as the only production factor. Let $\Pi(K)$ be operating profits with standard properties $\Pi' > 0$ and $\Pi'' < 0$. The parent's budget constraint is¹¹

$$\Pi(K) + Q + D^* + C = G + I + T, \quad (3.1)$$

where the sources of funds are domestic profits $\Pi(K)$, proceeds from new share issues Q , foreign-source intra-company dividends D^* , and profits of foreign origin shifted from the subsidiary to the parent C . We leave out debt finance to simplify the analysis. Funds are spent on dividend distributions G , h-country investment I and h-country taxes T .

The subsidiary's budget constraint is

$$\Pi^* = D^* + C + c(C) + T^*. \quad (3.2)$$

The subsidiary earns an exogenous operating profit Π^* which is used for dividend repatriations D^* for the parent, profit-shifting via transfer pricing C and f-country taxes T^* .¹² Profit-shifting causes administrative and efficiency costs $c(C)$ with the properties $c' > 0$, $c'' > 0$.

The MNE chooses dividends, h-country investments, equity issues, intra-company dividends and shifted profits to maximize the present value of the after-tax net cash flow from the company to its owners:

$$\max_{\{G, Q, C, D^*\}} V = \int_{t_0}^{\infty} (\gamma G - Q) e^{-\rho(t-t_0)} dt, \quad (3.3)$$

where γG with $\gamma = (1 - \tau_p)/(1 - a)$ denotes after-tax dividends received by the shareholder. τ_p is the tax rate on capital income and a is the rate of imputation credit. For full imputation $a = \tau$ and for partial imputation $0 < a < \tau$, where τ is the rate of corporate tax. We assume $\tau_p \geq \tau$, which implies $\gamma \leq 1$. ρ is the after-tax discount rate. To simplify, we assume no capital gains taxation.¹³

¹⁰More thorough theoretical analysis is presented in a working paper version of this paper, Harju and Kari (2011).

¹¹The starred variables refer to the f-country.

¹²Observe that the amount of foreign profits repatriated to the parent is exogenous in the model. Therefore the only issue, related to the MNE's repatriation policy, is the form in which (dividends or shifted profits) foreign profits are repatriated. While certainly interesting, the conditions for deferral are beyond the scope of this paper. As Harju and Kari (2011) show, EQT has no effects on the f-country steady-state stock of capital.

¹³In 2000, 13 OECD member states had an imputation system. Eight of these countries granted full credit ($a = \tau$) and five partial credit ($a < \tau$). In 10 countries the top marginal tax rate on dividend income exceeded the corporate tax rate ($\tau_p > \tau$) and in three countries the tax rate on dividend income equaled the corporate tax rate ($\tau_p = \tau$). Interestingly, all these countries with a unified tax rate gave full credit, implying $\gamma = 1$. The other 10 countries had $\gamma < 1$ either because of partial credit or a high personal tax rate compared to the corporate tax rate or both. Finland was among the countries where full imputation was combined with equal tax rates. (OECD Tax Data Base, Table II.4, Year 2000; <http://www.oecd.org/tax/tax-policy/tax->

The first step to model EQT in this framework is to split dividends G into two parts

$$G = D + D_e, \quad (3.4)$$

where D denotes dividends financed from after-tax domestic profits (normal dividends) and D_e refers to the part of dividends exceeding the amount of domestic profits and thus triggering an equalization tax payment (excess dividends).

We constrain normal dividends D to the h-country taxable profit after taxes:

$$D \leq (1 - \tau)\hat{\Pi} \quad \text{with } \hat{\Pi} = [\Pi(K) + C]. \quad (3.5)$$

Observe that $\hat{\Pi}$ includes C , i.e. profits earned in the f-country but shifted to the h-country using transfer pricing. If the firm distributes more than its after-tax profit, it must set $D_e > 0$ and is then liable to pay EQT.

The parent's and the subsidiary's taxes T and T^* are defined as

$$T = \tau[\Pi(K) + C] + \tau_e D_e, \quad T^* = \tau^*[\Pi^* - C - c(C)], \quad (3.6)$$

where T consists of the domestic corporation tax at rate τ and EQT at rate $\tau_e = a/(1-a)$. The h-country is assumed to grant international double-tax relief using the exemption method. Hence the repatriated dividend D^* received by the parent from the subsidiary is tax-exempt and does not show up in T . The subsidiary's taxes T^* consist of the f-country corporation tax (at rate τ^*), the base of which is profits from local production less income shifted to the parent, including costs.

3.2 The MNE's optimal policy

Consider now the MNE's optimal policy in the presence of EQT. It is reasonable to start with the financing decisions of the parent and then move to investment and repatriation policies. We use a heuristic approach here to demonstrate the effects of EQT. A formal derivation is given in Harju and Kari (2011).

In our model there are three sources for financing additional h-country investments: domestic profits (normal dividends), repatriated foreign profits (excess dividends), and new share issues. A useful way to consider the effects of tax rules on financing decisions is to compare the costs of small increases in financing while keeping the effect on investment constant.¹⁴ If the parent decides to retain one euro of its domestic profits after corporate taxes, the shareholder forgoes γ after taxes. The firm's cost of finance is reduced by the owner's dividend tax net of imputation credit.

The corresponding cost of retaining one euro of foreign profits is $\gamma/(1 + \tau_e)$.¹⁵ Now the owner's income is again reduced by owner-level taxes but also by EQT. Finally, the cost for new equity is 1 since equity capital

database.htm)

¹⁴More formally, compare the partial differentials of the Lagrangean in respect of dividend variables and new equity, see appendix in Harju and Kari (2011).

¹⁵If the firm redistributes one euro of foreign profits (before EQT), the firm distributes $D_e = 1/(1 + \tau_e)$ and pays $\tau_e D_e = \tau_e/(1 + \tau_e)$ in EQT. The owner's net income after personal taxes is then $\gamma/(1 + \tau_e)$.

can be invested in and withdrawn from a corporation without tax implications.

Using the assumption $\gamma \leq 1$, we may draw the following “pecking order” for the alternative financing forms:

$$\textit{foreign profits} \succ \textit{domestic profits} \succsim \textit{new equity}$$

Foreign profits are unambiguously the most preferred form of financing, while domestic profits are preferred or equal to new equity, depending on the value of γ .¹⁶ The position of foreign profits as the most favored source is solely determined by EQT.¹⁷

Consider next the effects of EQT on the parent’s investment. This can be accomplished by deriving the cost of capital of real investment financed from foreign repatriated profits. Investing one euro of retained profits gives the parent an income flow of $(1-\tau)\Pi'$ after corporate tax. Assuming the net return is distributed as dividends, the owner receives an income flow of $(1-\tau)\Pi'\gamma$, the present value of which is $(1-\tau)\Pi'\gamma/\rho$. This gives the contribution of the investment to the market value of the MNE. In equilibrium the costs and benefits of the investment equal. Therefore, by equating the investment’s marginal value to its cost ($\gamma/(1+\tau_e)$), and by solving for the marginal return on capital, we obtain the MNE’s long-run cost of capital in the presence of EQT:

$$\Pi'(K) = \frac{\rho}{(1-\tau)(1+\tau_e)}. \quad (3.7)$$

Without EQT but retaining other features of the tax system, the condition is $\Pi'(K) = \rho/(1-\tau)$. By comparing this to equation (3.7), we may conclude that EQT lowers the h-country cost of capital below the benchmark level and hence increases investments. In the case of a full imputation system $\tau_e = \tau/(1-\tau)$ the condition (3.7) becomes $\Pi'(K) = \rho$. Now the cost of capital corresponds to the owner’s after-tax interest rate, which reflects strong investment incentives.

The intuition of these results is straightforward: EQT affects the costs and returns of investment differently. It reduces the costs, but, unlike a standard dividend tax, leaves the returns on investment intact. Therefore its effects do not cancel out but rather lead to a rise in incentives to invest.

Kari and Ylä-Liedenpohja (2005) extend the model to include the parent’s investments in financial assets, F , yielding a return at a fixed rate $i = r$. In this case the firm does not accept a return on real investments lower than the market interest rate. The optimal stock of real capital is determined by the condition $\Pi'(K) = r$. After this size of K is reached, all repatriated foreign profits are invested in financial assets $dF/dt = D^*$. Financial assets grow constantly and only h-country profits are distributed; these now include the returns on financial investments, $G = D = \Pi(K) + iF$.¹⁸

The intuition of this result is that by investing the repatriated foreign profits in the h-country, the parent,

¹⁶In a partial imputation system ($a < \tau$), domestic profits are strictly preferred to new equity. In full imputation ($a = \tau$) with $\tau_p = \tau$, indifference occurs.

¹⁷Observe that without the imputation system ($s = \tau_e = 0$), but retaining other aspects of the model, the pecking order becomes *foreign profits* \approx *domestic profits* \succ *new equity*.

¹⁸Previously, Weichenrieder (1994, 1998) has reported similar behavior in his analyses of the German dividend tax system.

in a way, transforms these profits into domestic profits, which can be paid out without EQT liability (Kari and Ylä-Liedenpohja 2005, Altshuler and Grubert 2003). For the present study, the key implication is that EQT effectively establishes an upper limit on dividend distributions which an optimizing firm never surpasses.

The MNE has two alternative ways to repatriate foreign profits, intra-company dividends, D^* and profit-shifting using transfer pricing, C . We disregarded the latter alternative but we now perform an analysis of it. The incentives to use transfer pricing rather than dividends can again be examined by considering the costs and benefits of a policy change where intra-company dividends before foreign corporate tax are reduced by one euro and the transfer-priced profit increased correspondingly.

If this change is performed, the shareholder forgoes a dividend net of tax of $(1 - \tau^*)\gamma/(1 + \tau_e)$. In this expression the owner's income is reduced first by foreign corporate tax (τ^*), then by EQT after the foreign-source dividend is redistributed (τ_e) and, finally, by personal-level dividend taxes net of imputation credit γ . The reduction in foreign dividends enables the MNE to increase the profit shifted to the h-country by one euro. This raises the shareholder's net income by $(1 - \tau)\gamma$. The dividend is only subject to h-country corporate tax (τ) and owner-level dividend taxes γ . No f-country corporate tax or EQT is paid because the profit, even if earned abroad, is reported in the h-country. There is a further source of costs caused by the policy change, namely administrative and efficiency costs from profit-shifting $c(C)$, assumed to grow at an increasing rate. For simplicity we assume that this cost is close to zero for the very small change in shifted profits. Hence we start by focusing on the first two components of costs and benefits.¹⁹ We obtain the following condition:

$$\frac{1 - \tau^*}{1 + \tau^e} \begin{Bmatrix} < \\ = \\ > \end{Bmatrix} (1 - \tau) \iff D^* \begin{Bmatrix} \gamma \\ \approx \\ \gamma \end{Bmatrix} C. \quad (3.8)$$

The left-hand side of the tax rate condition gives the relative value of distributed profit when the profit is reported abroad and repatriated as intra-company dividends D^* . The right-hand side is the value when profit is transferred to the h-country using profit-shifting and reported there. If the right-hand side is greater than the left-hand side, then the transfer pricing channel is preferred and vice versa.

Without EQT, the MNE chooses transfer pricing if the h-country tax rate is lower than the f-country rate. Profits will be reported in the country with the lowest tax burden. With EQT the relative sizes of τ and τ^* still matter but now EQT increases the probability of profit-shifting being used. In the case of full imputation, $a = \tau$, the condition boils down to $\tau^* > 0$, implying that transfer pricing dominates at all positive rates of foreign corporate tax.

Until now we have studied the MNE's investment and repatriation policies separately. To consider their possible links, let us return to the original model where profit-shifting inflicts non-tax costs. Assume the net-tax benefit from shifting profits is positive, case “<” in condition (3.8). We obtain two alternative policies: the first is an internal equilibrium, where the marginal costs and benefits balance at a level lower than foreign

¹⁹A broader analysis is given in the appendix of Harju and Kari (2011).

profit. A share of profits is repatriated using profit-shifting and the rest as an intra-company dividend. In this case the parent still faces an extra incentive to invest caused by EQT. The second alternative is a corner solution, where the non-tax cost is low compared to the net-tax benefit. The whole foreign profit is repatriated by profit-shifting, with the consequence that investment is not affected at all. Hence, in our model, the firm has two alternative methods to avoid EQT liability, investing foreign-source dividends and profit-shifting. If the firm's ability to use profit-shifting is substantial, there is no effect on investment.

However, there is always a possibility that our theoretical model might not take into account all relevant aspects which might affect the decisions of MNEs. For example, if investments in foreign financial assets were allowed in the model, the MNE might try to avoid EQT by abstaining from repatriating profits and instead investing the funds in foreign financial assets. This channel of response is discussed in Altshuler and Grubert (2003).

The results derived above from the MNE model provide us with the following behavioral hypotheses for the empirical analysis concentrating on payout policies. Because of the repeal of EQT as from 2005 we expect Finnish MNEs to have:

- increased their dividends to shareholders,
- increased intra-company dividends,
- decreased profit-shifting as a way of repatriating profits from abroad²⁰, and
- decreased domestic investment.

For investment effects the predictions of our model are not that clear because tax planning and additional investment are two competing means of avoiding EQT. If tax planning is difficult and causes high costs, we expect to see a decrease in investment, but if the costs are low, tax planning responses may crowd out investment effects. Non-tax issues may, of course, matter as well. For example, investments might be insensitive to tax changes if the firm had an easy access to outside finance and the returns on investment were high.

4 Empirical analysis

4.1 Method

We apply a standard difference-in-difference (DD) method to estimate the changes in the behavior of firms in response to the abolition of EQT in 2005. The treatment group consists of all Finnish MNEs operating during 2000–2007. In our main estimations the control group consists of other large Finnish corporations

²⁰Observe that the repeal of EQT did not necessarily lead to a change in the optimal form of repatriation. The outcome may well depend on the relative sizes of foreign and domestic tax rates after the reform. To illustrate this, assume that the non-tax costs of profits shifting were low. For subsidiaries located in low-tax countries with $\tau^* < \tau$, the reform changed the optimal means of repatriating profits from profit shifting to intra company dividends. Instead, for firms with $\tau^* > \tau$, the dominant strategy did not change. The optimal way of repatriation was transfer pricing before and after the reform. In the empirical part we test this more precise prediction by splitting the sample by tax rates.

with only domestic subsidiaries. When we investigate profit-shifting responses, we use Swedish multinationals and their subsidiaries as our control group. This is justifiable since Swedish MNEs were not subject to any major policy reforms during our examination period.

The estimated DD equation is the following

$$\text{Log}(Y_{it}) = \theta \text{controls}_{it} + \beta_1 \text{treat}_i + \beta_2 \text{after}_t + \beta_3 \text{treat}_i * \text{after}_t + \eta_i + \varepsilon_{it}, \quad (4.1)$$

where Y refers to the dependent variable in firm i at time t . We have several dependent variables in our analysis: dividend payments, real investments, financial investments, repatriated profits and reported profits at home and abroad, which are all in a logarithmic form to deal with the skewed outcomes.²¹ The variable treat_i is a dummy variable with a value of one if the firm is a Finnish MNE and zero otherwise, and after_t is a time dummy with a value of zero before and one after the 2005 reform. In some specifications we also replace after_t by year dummies to investigate the yearly responses. In the baseline analysis, controls_{it} include the number of employees, sales and equity in natural logarithmic form. η_i is the firm-specific constant term and ε_{it} is the i.i.d. error term.

The main interest lies in the coefficient β_3 of the interaction variable ($\text{treat}_i * \text{after}_t$) in equation (4.1). This describes the impact of the 2005 reform on treated firms relative to the control group (average treatment effect for the treated, ATT), if the DD assumptions hold. The main assumption of the DD method is the parallel time trends assumption meaning that the variable of interest should behave similarly in the treatment and control groups over time if the policy change had not been introduced. The method also requires no self-selection to the groups and no differences in transitory shocks during the examination period. If these assumptions hold, we are able to write the DD estimator as follows:

$$\hat{\beta}_3 = (\bar{Y}_{1a} - \bar{Y}_{1b}) - (\bar{Y}_{0a} - \bar{Y}_{0b}),$$

where \bar{Y}_{gt} is the log of the average outcome value over group g at time t . Here a and b refer to the post and pre-reform periods and 1 and 0 to the treatment and control groups respectively. The policy impact β_3 in equation (4.1) is the expected value of parameter $\hat{\beta}_3$ (see e.g. Blundell and Costa Dias (2009)).

We use a firm fixed-effect strategy. In our case, the fixed-effect model can be seen as a better option than, for example, the random effect model or pooled OLS because it allows correlation between the firm component (η_i) and the regressors.²² Additionally, all models assume that the error term is not correlated with the regressors and there is no perfect multicollinearity of regressors (full rank condition).

An additional challenge is to produce appropriate standard errors. The problem is emphasized in two separate papers by Bertrand, Duflo and Mullainathan (2004), and Cameron, Gelbach and Miller (2008). The

²¹The standard practice in empirical corporate finance literature is that firm-level outcome variables, such as dividends and investments, are scaled by lagged tangible assets. Based on the predictions of the model (section 3) we expect to see changes in the levels of several outcomes. Therefore we choose not to follow the scaling approach. However, in order to assess the consequences of this choice, we conducted robustness analysis by scaling the firm-level dividend payments and other outcomes by firm's lagged (t-1) tangible capital. The results are economically and statistically similar with our baseline results. These results are discussed more thoroughly in section 4.7.

²²We offer test results supporting the fixed-effect strategy in the end of section 4.7. Estimates of other methods are available upon request.

problem arises when the number of groups used in the estimations is small. This could happen, for example, in a case where an unobserved shock affects the behavior of groups differently. These papers propose several options to help solving this problem: Bertrand et al. propose using a block bootstrap method and Cameron et al. propose applying a wild bootstrap method. In this paper we apply industry-level clusters with a block bootstrap. As a robustness check we also apply a wild bootstrap method with the industry clusters. In addition, as a further robustness check, we use municipality-level clusters with both block and wild bootstrap methods.

4.2 Identification issues

We recognize four issues which might hamper our identification. The first is the potential anticipation responses of firms to the announcement of a reform before its actual implementation. In this case the before-after setting of our analysis is less clear-cut. The second potential worry is that the firms in the treatment and control groups responded differently to the other changes of the tax reform of 2005 (TR2005). The third issue is that the reform may not have been exogenous but rather an endogenous response to economic conditions. The last issue relates to the selection of firms in the control and treatment groups. In the following we argue that these issues are not too serious for our identification.

Anticipation could be a problem because TR2005 was announced already in November 2003, as the reform by itself was implemented from the beginning of 2005. In figure 1 we plot the average annual log of dividends in the control and treatment groups from 2000 to 2007 to describe how well our main identifying assumption of parallel time trends holds in practice. The figure shows that there was an increase in means in both groups in 2003, which, in line with the study by Kari et al. (2008), reflects the expected general tightening of personal dividend taxes.

The difference in means of dividends appears to be very stable until 2002. However, the means seem to diverge in 2003 and the difference is even larger in 2004. This suggests that some anticipation might have happened before implementation of the reform. Right after the reform in 2005, the difference between the means of dividend payments is already statistically significant.²³

We suggest two options to solve the anticipation question. The first approach is to test whether or not the parallel time trend assumption holds by considering yearly responses before the 2005 reform was implemented. Alternatively we may drop the observations for 2003 and 2004 from our data and use 2000–2002 as the pre-reform period, and thus examine how robust our main results are. The conclusion from these two approaches is that we do not detect any proof of anticipation behavior. Hence it does not seem to constitute a problem for our identification strategy. We consider the anticipation issue in our result section in more detail.

As to the second issue, we believe that the control and treatment groups faced the other changes in TR2005 apart from the abolition of EQT in a broadly similar manner. Kari et al. (2009) studied these other changes and did not find any response after 2005 among large listed firms. Thus we believe that the abolition of EQT was the major element of the 2005 reform that affected large firms.

²³In the appendix, figures A2, A3 and A4 show the average trends for the other main outcomes in the paper.

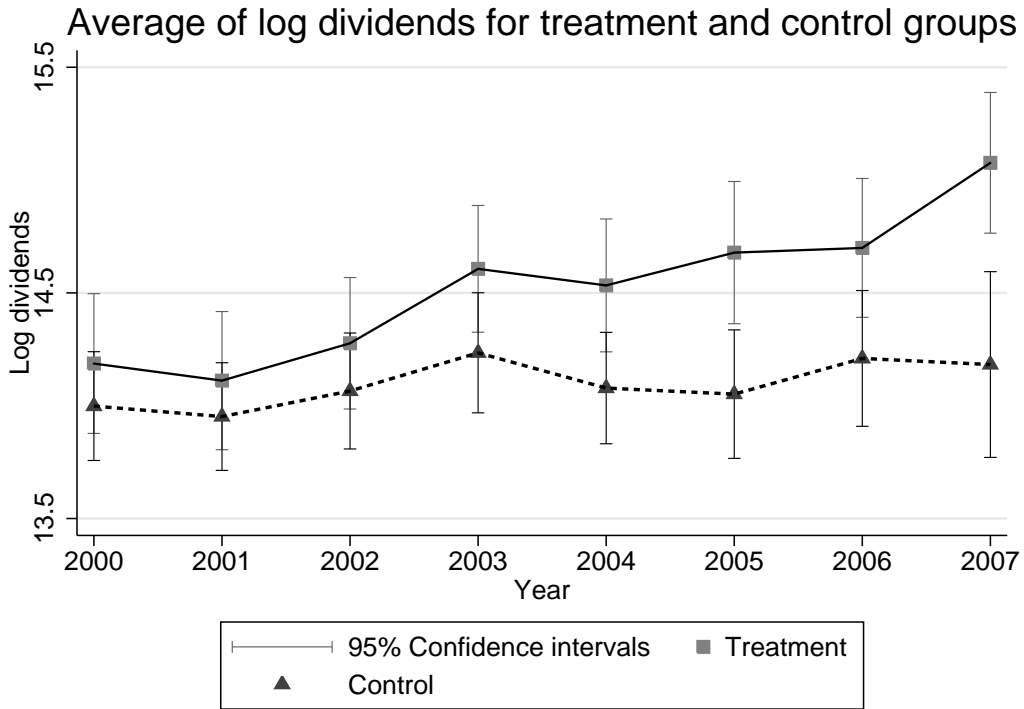


Figure 1: Average log of dividends: treatment and control groups

Thirdly, the DD method assumes that the policy change is exogenous to economic agents. Otherwise the method would offer biased impact estimates. Thus the 2005 reform should not have been implemented on the grounds of economic conditions (for example to boost MNEs' economic activity). As we reported in section 2.2, the main reason for the government's decision to repeal the imputation system were pressures from the side of the EU institutions, which held corresponding tax systems to be inconsistent with the EC Treaty. The law drafting process proceeded fairly quickly: it only took 13 months from the rough blueprint and 7 months from the government bill to the implementation of the new law. We conclude that the legislative change was a reaction to outside pressures and it was implemented promptly with little discretion in timing.

The fourth possible identification problem is the choice of the control group. The DD method assumes that the control group is chosen exogenously. We use pre-reform (years 2000–2002) information to identify the treatment and control groups, and thus we do not allow the reform to affect the construction of the groups. Also, according to the descriptive statistics (in table 1), the control and treatment groups seem to be relatively equal in size. Thus we believe that our control group is a good counterfactual for the treatment group.

To assess the robustness of our results, we will use Amadeus data to investigate behavioral changes by subsidiaries with different control group assumptions. However, our primary data do not allow us to perform similar robustness checks. Section 4.7 presents all the other relevant robustness check results.

4.3 Data and descriptive statistics

Our primary data come from the Finnish Tax Administration and include information on the financial statements and taxation of all Finnish corporations for the period 2000–2007. We use data in an unbalanced panel form. As the abolition of EQT mainly affected large firms with international operations, we exclude small firms from our analysis. The final data we use in our baseline analysis include only Finnish MNEs (treatment) and Finnish corporations that have only domestic subsidiaries (control).

We also make use of the Amadeus database. Amadeus provides unconsolidated financial accounting data on European firms. In this study the Amadeus data are used for two purposes: first, to identify Finnish MNEs, and second, to investigate changes in profit-shifting. The version which we apply in the analysis is only part of the total Amadeus, including 1.5 million firms and the sample period is 2000–2006. Thus the information we have is incomplete for the after the 2005 reform period, and we should be careful when interpreting these results.

Table 1 presents the descriptive statistics of the most important variables of the main data set. All variables are in logarithmic form. *Divid* represents the log of distributed dividends calculated for each individual firm. *Divid* includes all dividends that the firm has distributed within a year including all regular and one-off dividend payments to its owners. The variable *Invest* refers to real investments, *Profit* represents taxable profits, *F Invest* refers to financial investments, *Divid Inc* is for profits repatriated by firms during the financial year, *Equity* is the sum of fixed assets held at the end of the tax year, *Employees* is the number of employees and *Sales* represents the turnover during the fiscal year. Real investments refer here to investments made by firms in fixed assets during the fiscal year and financial investments represent investments in liquid assets, including bonds and stocks. As can be seen, the firms in the control and treatment groups are broadly of equal size, which is important for our analysis. In the appendix, figure A1 plots the averages of the main control variables over time to further emphasize that the groups are relatively similar to each other.²⁴

Treatment								
Stats	<i>Divid</i>	<i>Invest</i>	<i>Profit</i>	<i>F Invest</i>	<i>Divid Inc</i>	<i>Equity</i>	<i>Employees</i>	<i>Sales</i>
Mean	14.519	13.085	14.028	14.229	12.490	16.011	4.682	16.482
SD	2.281	2.434	2.672	2.845	3.220	2.377	1.820	2.245
N	1,731	3,076	2,598	700	3,383	3,272	3,348	3,163
Control								
Stats	<i>Divid</i>	<i>Invest</i>	<i>Profit</i>	<i>F Invest</i>	<i>Divid Inc</i>	<i>Equity</i>	<i>Employees</i>	<i>Sales</i>
Mean	14.089	13.210	14.090	14.366	12.054	15.960	5.442	16.812
SD	1.890	2.359	1.986	2.509	2.546	1.896	1.587	2.052
N	1,455	1,806	1,620	502	1,901	1,860	1,909	1,832

Table 1: Descriptive statistics for the data 2000–2007: treatment and control groups

We introduce figure 2 to illustrate that there was considerable bunching at the tax threshold of EQT before the 2005 reform. The figure plots the share of minimum tax relative to the sum of corporate tax and tax surpluses (μ) in our sample of Finnish MNEs in 2000–2003. μ can be interpreted as the ratio of

²⁴Similarly, table A1 in the appendix shows the descriptive statistics for the Amadeus data we apply as a second data set. Also table A2 in the appendix shows the mean of turnover for the treatment and control groups by main industry codes to show that the groups are also comparable by that characteristic.

distributed dividends to undistributed profit for current and previous years. The firm was obliged to pay EQT if $\mu > 1$, otherwise not. The figure shows a noticeable spike around the tax kink ($\mu = 1$) in the otherwise smooth distribution. This may imply that a considerable number of firms adjusted their dividend payments at precisely the level where they could avoid the extra tax burden of EQT. We interpret this as giving initial evidence that firms responded to the incentives created by the EQT.

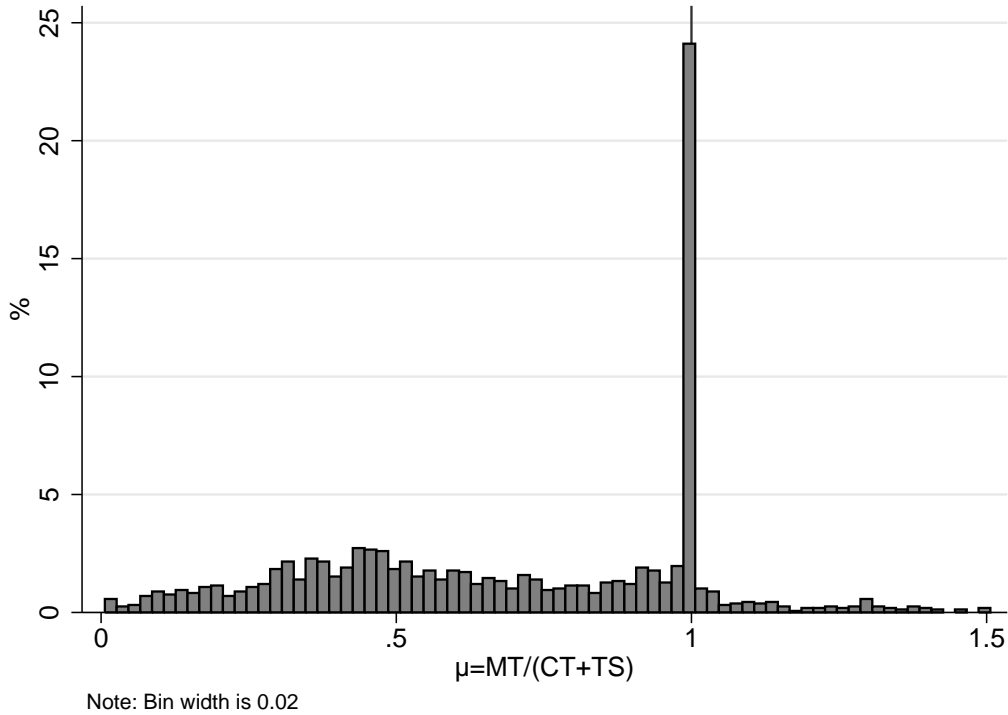


Figure 2: Liability of firms to pay EQT (years 2000–2003)

4.4 Results on dividend payments

We use the DD method to analyze the effects of the abolition of the EQT on MNEs' behavior compared to other large domestic firms. The estimations are made using an unbalanced panel for the years from 2000 to 2007 and the estimation strategy used is a fixed-effect model.

The results concerning dividend payments are shown in table 2. The first two columns capture the total effect of the 2005 reform on the log of dividend payments. The coefficients in columns (3) and (4) are estimated similarly to those in columns (1) and (2), but excluding the years 2003 and 2004 from the data. The odd columns give the results without any control variables and the even columns for the estimates with the full set of controls.

In accordance with theoretical predictions, the results suggest that the firms in the treatment group increased their dividend payments relative to the control group after the 2005 reform. We find that the estimate of the interaction term 'after' (refers here to the years 2005, 2006 and 2007) multiplied by the treatment group dummy variable is positive and significant with and without control variables (see columns

(1) and (2)). As the dependent variable is in a logarithmic form and we are using a linear model, the estimate of the interaction variable can be interpreted as a percentage change among the treated firms. The estimate suggests that the average increase in dividend payments by MNEs was approximately 23 percent. This effect is relatively large and comparable to the results found in previous literature studying MNEs and similar tax changes (Bond et al. (1996), and Bond et al. (2007)).²⁵

As stated above, there are reasons to believe that some MNEs may have anticipated the repeal of EQT in 2004 and even in 2003. We test the relevance of this issue by performing robustness checks excluding the years 2003 and 2004 from the data. The estimates in columns (3) and (4) of table 2 without data for the years 2003 and 2004 are slightly smaller than our main results in columns (1) and (2). However, the estimates are not statistically different from the baseline estimates. Hence we conclude that we do not observe anticipation effects.²⁶ This underpins our main identification assumption of parallel time trends. More robustness checks for the estimations are presented in section 4.7.

	(1)	(2)	(3)	(4)
VARIABLES	Log(D)	Log(D)	Log(D)	Log(D)
After*Treatment	0.233**	0.231**	0.222*	0.209*
	(0.106)	(0.100)	(0.119)	(0.113)
Firm effects	X	X	X	X
Year	X	X	X	X
Full control set		X		X
Observations	2,835	2,835	2,069	2,069
R-squared	0.022	0.057	0.045	0.066
Number of groups	548	548	534	534

Note: The dependent variable is the log of dividend payments in all columns and all columns are estimated with firm-level fixed effects and year dummies. In every column the comparison is made between Finnish MNEs and other large Finnish companies. Columns (1) and (3) estimated without firm-level control variables and columns (2) and (4) estimated with full set of control variables including the number of employees, sales and equity. In columns (1) and (2) the time period used is 2000-2007 and in columns (3) and (4) 2000-2007 without years 2003 and 2004. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Estimation results: dependent variable is the log of dividend payments

Figure 3 shows more explicitly the changes in logarithmic dividend payments (before vs. after the reform) in both the treatment and control groups. The motivation for presenting the figure is to show the distribution of changes in dividend payments from which the baseline average results come from (presented in columns (1) and (2) in table 2). In the figure, we first pooled the data into before (2000–2004) and after periods (2005–2007). Then we calculated the changes in average logarithmic dividend payments for each firm between these pooled periods. Thus the figure presents the distribution of firm-level changes in dividend payments between pooled before and after periods.

The figure shows that there are very large changes in dividend payments over time in both groups as it is common for firms to have even 100% increases in dividend payments (number 1 in the horizontal axis refers

²⁵One potential further channel of response is the change in share repurchases among MNEs. EQT might have increased share repurchases before 2005 because it made dividends a relatively expensive way of transferring funds to shareholders. Therefore we would expect to see a reduction in these purchases among treated MNEs post-2005. Unfortunately, we have no data on share purchases and, therefore, we are unable to take this potentially important behavioral margin into account in our study. However, we estimated the size of equity capital among treated firms before and after the reform, and found no significant change. We interpret this to suggest that share repurchases have not been an important channel of response to EQT.

²⁶In addition, we have tested anticipation effects by considering yearly responses of treatment group before the 2005 reform was implemented. We do not find any statistically significant anticipation effects either in these examinations. These results are presented in a working paper version of this paper, Harju and Kari (2011).

to a 100% increase in dividends and so on). However, the figure suggests that almost the entire distribution of changes among treatment firms is shifted more to the right compared to the control group, implying that among treated firms the dividend payments clearly increased after the 2005 reform compared to the control group. It is also clear that many of the firms increased their dividend payments considerably as increases between 50% and 200% are very common.

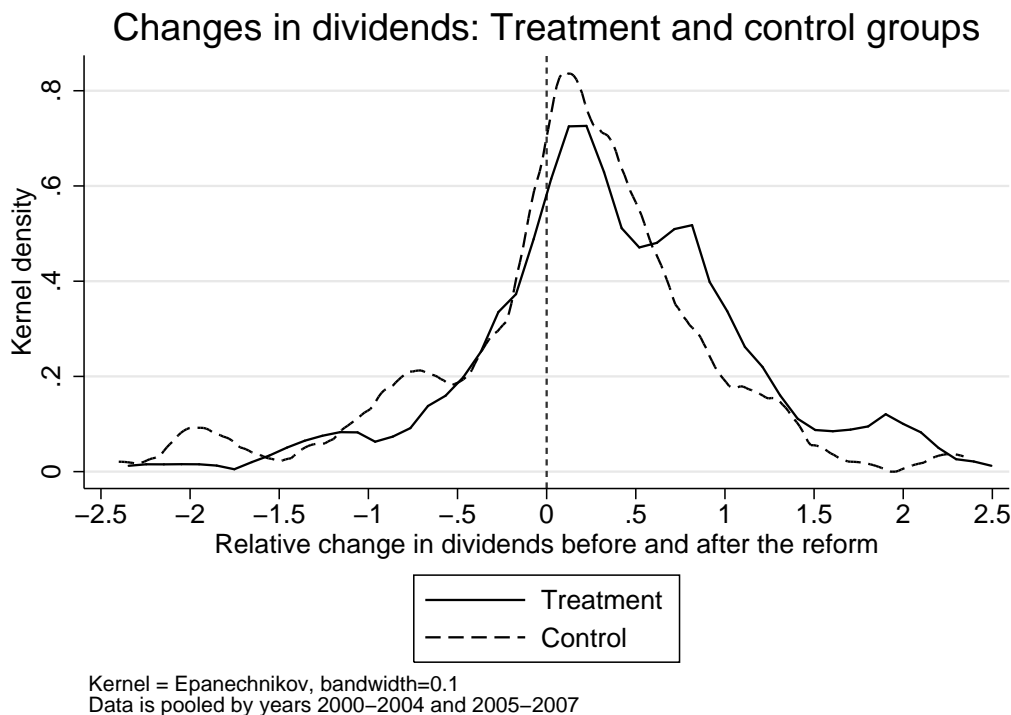


Figure 3: The distribution of relative changes in dividend payments before and after the 2005 reform for treatment and control groups

Our particularly rich data set provides us opportunities to study the heterogeneity of the results. Assessing heterogeneity in responses will give us a deeper understanding of firms' behavior. In the following we first consider whether those with the highest risk of being liable to pay EQT responded more than those with a low risk. One useful proxy for the size of this risk (and at the same time a proxy for the changes in the tax incentives due to the reform) is the level of (pre-reform) tax surpluses. The hypothesis is that firms with a low level of tax surpluses were affected most by the abolition of EQT because they were closest to the margin to pay EQT from the distributed dividends. First we split the data by the size of the pre-reform tax surpluses into four quarters (for the concept of tax surpluses, see section 2 equation (2.1)). Then we interact the DD variable with these quarters to investigate the heterogeneous responses. Column (1) in table 3 offers the results concerning the effect on dividend payments. The interaction term of DD and the smallest tax surplus quarter is omitted in this regression.

The estimate of the main DD variable represents the effect on dividend payments for the parents with the smallest pre-reform tax surpluses. This response is very sizable, implying an over 50 percent increase in

dividend payments. The interaction variables with the two highest quarters and the main DD effect have opposite signs and are broadly similar in size. Thus the heterogeneity results show that the parent firms which had the smallest tax surpluses before the 2005 reform increased their dividend payments the most. Also, those parents with above-median pre-reform tax surpluses changed their dividend payments only little, if at all. Therefore, the results suggest that the entire response comes from those firms that had the highest incentive to increase their dividends after the reform.

In the second column of table 3 we examine the responses by the size of pre-reform equity, which is a measure of firms' distributable profits. One might expect this division to produce heterogeneity in the responses as the amount of distributable profits directly affects the firms' dividend payment decisions. We observe clearly that the parent firms in the three lowest quarters of pre-reform equity increased their dividend payments the most after the 2005 reform. At the same time parents in the highest quarter did not change their dividend payments at all. This result implies that only those parents with the smallest pre-reform equity levels responded to the 2005 reform.²⁷

VARIABLES	(1) Log(D)	(2) Log(D)
DD	0.517*** (0.142)	0.428*** (0.137)
Omitted: smallest quartile of pre-reform tax surplus		
2nd quarter*	-0.164 (0.152)	
3rd quarter*	-0.394** (0.159)	
4th quarter*	-0.407** (0.171)	
Omitted: smallest quartile of pre-reform equity		
2nd quarter*		-0.202 (0.141)
3rd quarter*		-0.249 (0.154)
4th quarter*		-0.409** (0.206)
Observations	2,835	2,712
R-squared	0.050	0.048
Number of groups	525	524

The dependent variable is the log of dividend payments in both columns, and both columns are estimated with firm-level fixed effects and year dummies. In both columns the comparison is made between Finnish MNEs and other large Finnish companies. Columns estimated with full set of control variables including the number of employees, sales and equity. The time period used is 2000-2007. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Heterogeneous results for dividend payments by the size of the pre-reform tax surplus and equity with the full set of controls

²⁷We also performed other heterogeneity analyses. We developed indicators to describe the extent of MNEs' international operations and use these to examine the heterogeneity of the results. We do not detect heterogeneity in the responses based on these characteristics. However, these indicators are not perfect as we have no direct variables to measure the extent of international operations. We have only data on financial transactions between parents and subsidiaries, but we are not able to detect how much of these transactions are from overseas. Thus these indicators include a lot of national transactions (between Finnish subsidiaries and parents) and do not necessarily capture the extent of multinational operations. We also divided the sample by the main industry classifications and estimated the model similarly as before. We did not find any statistically significant changes in responses by main industries. Similarly, we used the location of the parent to divide the sample. Also, in this case we did not find any heterogeneous changes in any outcomes.

4.5 Transactions within the MNE

In section 3 we discussed the incentive effects of EQT on intra-company dividends and profit-shifting by MNEs. The analysis suggested an increase in dividend repatriations and a decrease in profit-shifting after the repeal of EQT in 2005.

To investigate the effects on intra-company dividends we are forced to use a variable describing all dividend income received from domestic and foreign subsidiaries as well as minority shareholdings. Therefore this variable measures repatriated dividends from foreign subsidiaries imprecisely. However, the 2005 tax reform did not change the taxation of domestic dividends. And even if there had been some changes we have no reason to believe that they would have affected our treatment and control groups differently. We use the same estimation strategy and the same set of control variables as before (see equation 4.1). The dependent variable is now the log of dividend income.

The results are in table 4. In both columns (1) and (2) the coefficients are positive and statistically significant at the 10% level without and with control variables. Thus it seems that dividend income to parents increased among the treated companies compared to the control group after the 2005 reform. The magnitude of this response is high, an increase of approximately 23 percent. Thus, in line with the predictions of our theoretical analysis, the abolition of EQT also affected intra-firm transactions of MNEs.

In columns (3) and (4) we provide the heterogeneity results for dividend income similarly as for dividend payouts previously (in table 3). We observe that the estimates are insignificant, column (3). However, the lowest tax surplus quarter seems to have the highest point estimate and all the interaction estimates are clearly negative. This suggests that firms that with the lowest tax surpluses increased the repatriation of dividends from their subsidiaries. Nevertheless, all the estimates in these specifications are clearly statistically insignificant, and therefore this offers only suggestive evidence. In column (4) the main DD effect is positive and weakly statistically significant, suggesting that dividend repatriations increased among firms with the lowest pre-reform equity levels. Among other firms these interaction estimates are negative. The interpretation of these results is that only those parents with small pre-reform equity levels responded to the 2005 reform by increasing repatriated dividend income from subsidiaries. We will return to the interpretation of dividend income responses at the end of this section.

VARIABLES	(1)	(2)	(3)	(4)
	Log(Div inc)	Log(Div inc)	Log(Div inc)	Log(Div inc)
After*Treatment	0.261**	0.228*	0.346	0.383*
	(0.129)	(0.127)	(0.292)	(0.196)
Omitted: 1st tax surplus quartile				
2nd quarter*			-0.284	
DD			(0.307)	
3rd quarter*			-0.268	
DD			(0.360)	
4th quarter*			-0.249	
DD			(0.291)	
Omitted: 1st equity quartile				
2nd quarter*				-0.283
DD				(0.233)
3rd quarter*				-0.495*
DD				(0.270)
4th quarter*				-0.491**
DD				(0.211)
Firm effects	X	X	X	X
Year	X	X	X	X
Full control set		X	X	X
Observations	4,645	4,645	4,435	4,498
R-squared	0.045	0.128	0.152	0.125
Number of groups	681	681	626	648

The dependent variable is the log of dividend income in all columns, and all columns are estimated with firm-level fixed effects and year dummies. In every column the comparison is made between Finnish MNEs and other large Finnish companies. Column (1) estimated without firm-level control variables and columns (2)-(4) estimated with full set of control variables including the number of employees, sales and equity. The time period used is 2000-2007. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Estimation results: dependent variable the log of dividend income

One additional prediction of our theoretical analysis was that the reform should have affected profit-shifting activity of MNEs. The empirical literature on tax-motivated profit-shifting includes several different approaches to identify these effects. While one group of studies follows an indirect strategy by measuring the impact of tax rate differences on the profitability of foreign subsidiaries (e.g. Hines and Rice, 1994, and Huizinga and Laeven, 2008), various studies examine more directly the effects of taxes on transfer prices and financial structures (e.g. Bartelsman and Beetsma (2003); Clausing (2003); Huizinga, Laeven and Nicodeme (2008)).

In this paper our approach is more close to the indirect measurement of profit-shifting. We use the Amadeus database for the years 2000-2006. The data include financial information on national enterprises and MNEs, including their subsidiaries and parent companies. The profit variable used in our analysis is earnings before interest and taxes (EBIT), which is commonly used in related studies (e.g. Huizinga and Laeven (2008)). Our estimation strategy is as earlier, see equation (4.1). The controls include the cost of employees, fixed assets and operating revenue. The variable after refers to the years 2005 and 2006. As mentioned in the data description section, these results should be interpreted with caution.

First we estimate the effects of the 2005 reform on the EBIT of subsidiaries of Finnish MNEs. As noted in the theory section, we expect to detect an increase in subsidiaries' EBIT because the reform decreased or abolished altogether the tax incentive to shift profits from foreign countries to the home country. To offer

credible estimates we use two different groups of firms as controls. The first group comprises the European subsidiaries of Swedish-based MNEs. The second control group is formed from domestic subsidiaries of Finnish corporate groups which do not have overseas operations. The variable *treat* equals one if the foreign (European) subsidiary is owned by a Finnish MNE and zero otherwise. Again the main identifying assumption is that the control and treatment groups have parallel trends before intervention, see the discussion in the method section.²⁸

The results are given in table 5. The first four columns contain the results for the estimations using the subsidiaries of Swedish MNEs as the control group and the last two columns give the results for the estimations with the subsidiaries of Finnish MNEs as the control group. The first and fifth columns contain the results for specifications without controls and the other columns provide estimates for models with a full set of controls.

The point estimates in columns 2 and 6 imply that the EBIT of subsidiaries of Finnish MNEs rose slightly compared to EBIT in the control groups. The estimates suggest an increase in EBIT of 12 percent among all subsidiaries of Finnish MNEs, and the estimates are seemingly stable irrespective of the control group applied. However, the estimates are only statistically significant at the 10% level when applying the full set of controls. Considering this and the data problems, we have to be careful in interpreting the estimates.

However, the tax incentives to shift profits also depend on the corporate tax rate in the home country of the subsidiary.²⁹ For those subsidiaries of Finnish MNEs that are located in countries with a higher corporate tax rate than the corporate tax rate in Finland ($t^* > t$), the tax incentive to shift profits from a subsidiary to the parent company is still relevant after the abolition of EQT. Thus for this group of subsidiaries the tax incentive to shift profits did not change dramatically. Instead, for subsidiaries that are located in countries with a corporate tax rate lower than the corporate tax rate in Finland ($t^* < t$), the profit-shifting incentive vanished altogether after the abolition of EQT. Therefore it is likely that the latter group would react more to the reform than the former in terms of profit-shifting. We test this hypothesis by splitting the data into subsidiaries located in countries that have higher corporate tax rates than in Finland ($t^* > t$), and those that have lower corporate tax rates than in Finland ($t^* < t$). Columns (3) and (4) in table 5 offer estimates with a full set of control variables, using the same specification as in column (2) and using the subsidiaries of Swedish MNEs as a control group for the splitted samples.

We find support for the hypothesis that EBIT increases after the abolition of EQT among those subsidiaries of Finnish MNEs that have a lower corporate tax rate in their home country than in Finland (column (4)). We also find that among other subsidiaries there is no change in EBIT after the reform (column (3)). This implies that those subsidiaries that faced the most abrupt change in their tax incentives started to report more profits in their home countries. This provides further evidence that MNEs actually used profit-shifting as a way to avoid being liable to pay EQT.

²⁸Figure A4 in the appendix describes the mean of log EBIT in the treatment and two control groups over time. Although there seems to be a clear difference in the levels of log EBIT such that the subsidiaries of Swedish MNEs and the subsidiaries of Finnish corporate groups are, on average, smaller than the subsidiaries of Finnish MNEs, the parallel pre-reform time trend assumption between groups seems to hold relatively well.

²⁹We would like to thank the anonymous referee for pointing this out.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Control: Swedish subsidiaries			Control: Finnish subsidiaries		
	All Log(EBIT)	All Log(EBIT)	Split: $t^* \geq t$ Log(EBIT)	Split: $t^* < t$ Log(EBIT)	All Log(EBIT)	All Log(EBIT)
After*Treatment	0.113 (0.077)	0.121* (0.062)	0.028 (0.094)	0.207** (0.087)	0.117 (0.072)	0.119* (0.067)
Firm	X	X	X	X	X	X
Year	X	X	X	X	X	X
Full control set		X	X	X		X
Observations	13,414	13,414	9,307	4,107	12,537	12,537
R-squared	0.035	0.199	0.198	0.215	0.034	0.085
Number of groups	3,196	3,196	2,256	940	2,706	2,706

The dependent variable is the log of earnings before interest and taxes (EBIT) in all columns and all columns are estimated with firm-level fixed effects and year dummies. In columns (1) - (4) the comparison is made between the subsidiaries of Finnish MNEs and the subsidiaries of Swedish MNEs. In columns (5) and (6) the comparison is made between the subsidiaries of Finnish MNEs and the subsidiaries of other large Finnish domestic firms. Columns (1) and (5) estimated without firm-level control variables and columns (2) - (4) and (6) estimated with full set of control variables including the cost of employees, fixed assets and operating revenue. In all columns the time period used is 2000-2006. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Estimation results: dependent variable the log of EBIT (subsidiary)

We are also interested in the impact of the 2005 reform on the parent companies' profits. However, we cannot make a clear prediction of the sign of the response as we are forced to use EBIT as the only outcome variable. It includes both profits from sales and dividend income. If MNEs used intra-firm transactions to shift profits from foreign sources to Finland before the reform, this should decrease the EBIT of the parent companies after the reform. On the other hand, if there is an increase in parents' dividend income, this would increase EBIT after the reform. If both of these changes were equal in size, the response in terms of the total profits of MNEs' parents (EBIT) would be zero.

To estimate the change in parent companies' profits we apply the same method as above and use EBIT from the Amadeus database to measure profits. Swedish MNEs are used as the control group. The results are given in table 6, where the first column is without and the second is with control variables.

The point estimates are negative even though neither of them is statistically significant. Hence there is no evidence of a change in the accounting profits reported by the parent companies of Finnish MNEs after the 2005 reform. The most valid point estimate, in column 2, is quantitatively very close to zero and the clustered standard error is large, implying that the 95 percent confidence interval captures a lot of both negative and positive values.

VARIABLES	(1)	(2)
	Log(EBIT)	Log(EBIT)
After*Treatment	-0.037	-0.030
	(0.098)	(0.076)
Firm	X	X
Year	X	X
Full control set		X
Observations	3,935	3,935
R-squared	0.020	0.229
Number of groups	851	851

The dependent variable is the log of earnings before interest and taxes in both columns and columns are estimated with firm-level fixed effects and year dummies. In both columns the comparison is made between the parents of Finnish MNEs and the parents of Swedish MNEs. Column (1) estimated without firm-level control variables and column (2) estimated with full set of control variables including the cost of employees, fixed assets and operating revenue. In both columns the time period used is 2000-2006. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6: Estimation results: dependent variable the log of profits (parents)

Another channel for shifting profits is debt-shifting, which makes use of intra-company lending contracts to transfer profits between different units of MNEs. Our theoretical model suggests that, before the reform, parents of Finnish MNEs had an incentive to act as creditors, lending funds to their foreign subsidiaries. Following this pattern, MNEs were able to transfer taxable profits to Finland. The repeal of EQT removed this incentive and, therefore, we would expect to see a reduction in the amount of such loan contracts after the reform. Our above analysis examining profit-shifting using the EBIT variable is not able to take debt-shifting responses into account. However, to remedy this shortcoming, we estimated the changes in the debt stocks of foreign subsidiaries of Finnish MNEs using foreign subsidiaries of Swedish MNEs as the control group. We find no significant change in the level of debt stocks among the foreign subsidiaries of Finnish MNEs. We interpret this to suggest that the profit-shifting response to EQT was mainly channeled through transfer-pricing rather than debt-shifting.

In this section, we have studied how MNEs' intra-company dividends and profits reported by foreign subsidiaries responded to the repeal of EQT. We observed an increase in dividend income as well as an increase in the EBIT of foreign subsidiaries. We interpret these results as indicating that firms switched from profit-shifting to openly distributed dividends as a response to the 2005 reform. This suggests that MNEs regarded these two means of repatriating as substitutes. The observation that there was no change in parents' profits is also well in line with this view. If the reduction in shifted profits and the increase in dividends were roughly equal in size, we should not have observed any change in parents' profits.

4.6 Results for investments

Our model in section 3 suggests that EQT may also increase investments in the parent's home country. Yet, we argued that efficient tax planning using profit-shifting of deferral repatriations may crowd out the effects of investment. Thus, with some provisions related to tax-planning opportunities, we expect to see a decrease in investments after the repeal of EQT among Finnish MNEs.

The estimates of the real investment impacts are given in table 7. The dependent variable, log of real investments, describes the Finnish-based parent firm's annual investments in machinery, equipment and

buildings. The estimation applies the same method and also the same set of controls as previously, see equation (4.1).³⁰ The estimate in the first column is performed without controls and the one in the second column is with the full set of control variables.

The estimated coefficient of the interaction variable is positive without controls and negative after including controls. Both estimates are clearly statistically insignificant. The small size of the point estimates further stresses the conclusion that the abolition of EQT did not change the real investments of Finnish MNEs.

Table 7 also gives the heterogeneity results for real investments in columns (3) and (4). These heterogeneity results are the result of exactly the same approach as presented in columns (1) and (2) in table 3. It seems evident that we do not find any statistically significant heterogeneity results in real investments. These results suggest that investments are not affected by the tax change we examine. This is also well in line with the previous literature concerning firms and dividend taxation in general, where the responses are usually found to be zero on investments.

VARIABLES	(1) Log(Invest)	(2) Log(Invest)	(3) Log(Invest)	(4) Log(Invest)
After*Treatment	0.053 (0.089)	-0.024 (0.086)	-0.070 (0.203)	0.121 (0.159)
Omitted: 1st tax surplus quartile				
2nd quarter*			0.379 (0.262)	
DD				
3rd quarter*			0.237 (0.260)	
DD				
4th quarter*			0.085 (0.212)	
DD				
Omitted: 1st equity quartile				
2nd quarter*				-0.022 (0.219)
DD				
3rd quarter*				-0.073 (0.253)
DD				
4th quarter*				0.033 (0.193)
DD				
Firm effects	X	X	X	X
Year	X	X	X	X
Full control set		X	X	X
Observations	4,364	4,364	4,173	4,229
R-squared	0.000	0.068	0.067	0.066
Number of groups	670	670	618	534

The dependent variable is the log of new investments in all columns and all columns are estimated with firm-level fixed effects and year dummies. In every column the comparison is made between Finnish MNEs and other large Finnish companies. Column (1) estimated without firm-level control variables and columns (2)-(4) are estimated with full set of control variables including the number of employees, sales and equity. The time period used is 2000-2007. Block-bootstrapped standard errors in parentheses with industry-level clusters. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Estimation results: dependent variable the log of real investments

Another way to use repatriated foreign profits with a similar effect on EQT liability was to invest in financial assets in the parent's home country, implying a decrease in these investments after the repeal of

³⁰Figure A2 shows average real investments over time for the control and treatment groups.

EQT. We estimated these effects with several different definitions for financial assets and using the same approach as above. The estimations did not give any responses among the treated firms.³¹

We conclude that EQT seems not to have affected Finnish MNEs' investment decisions, at least in the short run. Our results are similar to those reported by studies closest to the questions we are interested in (Bond et al. (1996, 2007)). The result of no investment response is in fact consistent with our theoretical model when the MNE is able to fully avoid EQT either by profit-shifting or by deferring repatriations. We indeed observed active tax-planning in the form of income-shifting as reported in the previous section.

4.7 Robustness checks

Next we provide the robustness checks for the results. First, we made a placebo treatment three years before the actual 2005 reform for all outcome variables. In this setting we compare all the outcome variables between the treatment and control groups and pretend that the reform took place from the beginning of 2002. In particular, the time period in these placebo tests is from 2000 to 2003, the years 2000 and 2001 representing the before period and 2002 and 2003 the after period. Table 8 shows the results with exactly the same specification and control set as presented previously (see equation 4.1). None of the placebo estimates are statistically significant, which gives credibility for our identification strategy.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Log(Div)	Log(Inv)	Log(Div Inc)	Log(EBIT)	Log(EBIT)
PlaceboDD	-0.061	-0.042	0.050	-0.075	-0.000
	(0.070)	(0.100)	(0.085)	(0.081)	(0.091)
Number of groups	548	670	681	3,196	851

The dependents and comparisons are by columns: 1) Log of dividend payments: comparison between Finnish MNEs and other large Finnish companies, 2) Log of real investments: comparison between Finnish MNEs and other large Finnish companies, 3) Log of dividend income: comparison between Finnish MNEs and other large Finnish companies, 4) Log of EBIT: comparison between the subsidiaries of Finnish MNEs and the subsidiaries of Swedish MNEs, and 5) Log of EBIT: comparison between Finnish MNEs and Swedish MNEs. Block-bootstrapped standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Placebo results with the full set of controls for all the dependents presented above

We also performed another placebo treatment similarly as described above but using only the time period from 2005 to 2007 and pretending that the reform took place from the beginning of 2007. This also produced zero results for all outcomes similarly as in table 8.

As discussed in section 4.1 in footnote 21, in traditional corporate finance literature it is common that the firm-level outcome variables are scaled by its lagged tangible capital assets. As a robustness check, we also estimated the baseline results with using this type of outcome variables. We find a statistically significant increase in the dividend payments divided by lagged tangible capital assets among the treated MNEs after the reform. The magnitude of the result is also comparable to our baseline results as we observe 29 percent increase in this outcome. For investments (divided by lagged tangible capital assets), we find no changes among the treatment group after the 2005 reform compared to the control group. Therefore, our results seem to be robust also for using these scaled outcomes.

One potential concern in our empirical strategy might be the use of logarithmic outcomes and independent

³¹The results are available upon request.

variables in the analysis. As we are interested in MNEs this is not a substantial problem because all of these firms are very large, having e.g. very few zero observations. However, we estimated the specifications without taking logarithms as well. The results are similar in size or even greater relative to our main estimates but less precise because of the large variation in variables. Thus we use logarithmic variables in our main analysis to reduce the variation in the data and to offer results that are not very dependent on a few observations.

Another issue is that the estimation sample varies across the outcome variables we use. We also made estimations for firms that have only positive dividend payments and in that way kept a constant amount of firms in every specification. This does not change the results much. We also performed estimations using a balanced panel. The point estimates are similar to those with an unbalanced panel but the standard errors are larger as we have fewer observations.

In addition, we also tested the anticipation effects for all the other outcome variables as well as dividend payments (table 2 shows the anticipation results for dividend payments). The results suggest no clear anticipation effects on other outcomes. However, the log of dividend income increased already in 2003 and 2004 compared to the previous years among the treated group. These effects are not significant even at the 10% level, but still the coefficients are similar in size as in the main estimations in table 4. This suggests that some MNEs might have anticipated the 2005 reform by increasing repatriated dividends from their foreign subsidiaries already before the reform. This is also visible in figure A3 in the appendix.

We also used a wild bootstrap strategy to calculate the standard errors for the estimates with industry clusters. This does not affect the interpretation much. It seems that the block bootstrap strategy produces higher standard errors in most cases, and thus we apply it in the main results. We also used the block bootstrap method with municipality-level clusters and also with the interaction of the industry and municipality-level clusters. These did not change the interpretations of the results.

Finally, the Hausman test suggests using the firm-level fixed effect model instead of the random effect model. For example, in the main estimations in table 2, the null hypothesis of firm-specific effects uncorrelated with the regressors is rejected at the level of 899.22 ($\chi^2(5)$). However, it seems that the coefficient of interest is not very sensitive to the method used. In addition, the results with pooled OLS are also very much in line with the baseline fixed-effect estimates.

5 Conclusions

We use the abolition of equalization tax (EQT) in Finland in 2005 as a natural experiment to analyze the effects of taxes on the behavior of multinational enterprises (MNEs). EQT was a common element of European imputation systems, which were largely repealed because the European Court of Justice considered them inconsistent with the EU Treaties.

Theoretical analyses have shown that EQT treats dividends distributed from domestic and foreign-source profits differently, and therefore, distorts various financial decisions of MNEs. We estimate the effects of EQT applying a difference-in-differences method commonly used in policy evaluation studies and utilizing unique micro data including information on the tax returns of all Finnish businesses. Consistent with our theoretical

predictions, we find substantial evidence of the effect on dividend payments of MNEs. We estimate that the 2005 reform increased MNEs' dividend payments by 23 percent on average. Our results provide similar evidence as in previous empirical literature (for general dividend taxes, see e.g. Chetty and Saez, 2005, and Poterba, 2004, and for EQT, see Bond et al., 1996). We also find that the effect is largest among parents with the highest incentive to increase dividend payments due to the reform.

We also observe an increase in foreign intra-company dividends as well as a modest increase in the profits of foreign subsidiaries of Finnish MNEs. Both results are consistent with the predictions of the theoretical model and suggest a switch from profit-shifting to openly distributed intra-company dividends. We do not observe any evidence of a drop in home-country real or financial investments. Such behavior is consistent with our theoretical model in the limited case where the MNE is able to fully avoid EQT by using profit-shifting. The strong dividend response suggests, however, that EQT was not fully accommodated by shifting profits. A further potential way to explain this result is that the theoretical model does not include some important decisions of MNEs. One example might be the possibility to defer repatriations of foreign profits by investing in foreign assets (Altshuler and Grubert, 2003). A further study could consider this issue more closely.

In order to assess our results from the point of view of efficiency implications we follow Slemrod's (1992, 1995) hierarchy of behavioral responses to taxation. Slemrod suggests the following order: timing of economic transactions, financial repackaging of transactions and real decisions. In our empirical analysis we found that EQT affected dividend payments and intra-company financial flows but had no effects on domestic real investment. In Slemrod's hierarchy these types of responses are the second severe in terms of welfare. This tends to suggest that the efficiency implications of EQT were not large. However, this conclusion may be premature, since our focus was only on the direct effect on investments of treated firms. Chetty and Saez (2010) suggest that dividend taxes may have further efficiency implications through weakened reallocation of investment funds. A further caveat is that our focus is solely on short-run responses.

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Appendix

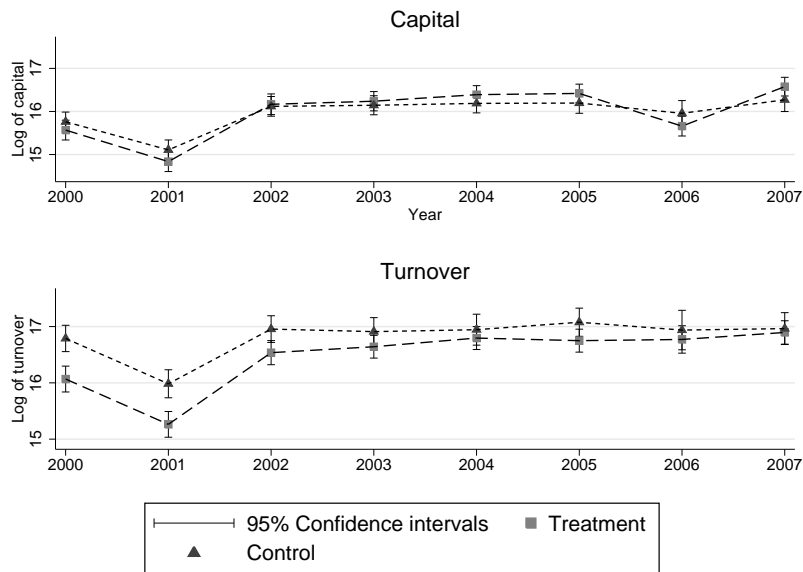


Figure A1: Average of log capital and turnover over time: treatment and control groups

VARS.	EBIT	Costs of empl.	Fixed assets	Operating rev.
Foreign subsidiaries of Finnish MNEs				
Mean	13.763	14.568	14.591	16.757
SD	2.268	1.959	2.820	2.050
N	5,379	5,897	5,897	5,897
Foreign subsidiaries of Swedish MNEs				
Mean	13.259	14.335	13.627	16.105
SD	1.925	1.689	2.633	1.719
N	8,036	11,906	11,906	11,906
Domestic subsidiaries of Finnish corporations				
Mean	12.663	13.685	13.308	15.341
SD	1.731	1.603	2.314	1.557
N	7,069	10,122	10,122	10,122
Finnish MNE parents				
Mean	15.094	15.745	16.731	17.396
SD	2.140	1.644	2.602	2.051
N	1,544	1,803	1,803	1,803
Swedish MNE parents				
Mean	14.834	15.564	16.071	17.483
SD	1.839	1.640	2.386	1.794
N	2,389	4,018	4,018	4,018

Table A1: Amadeus data 2000–2006: Descriptive statistics

Average of log real investments for treatment and control groups

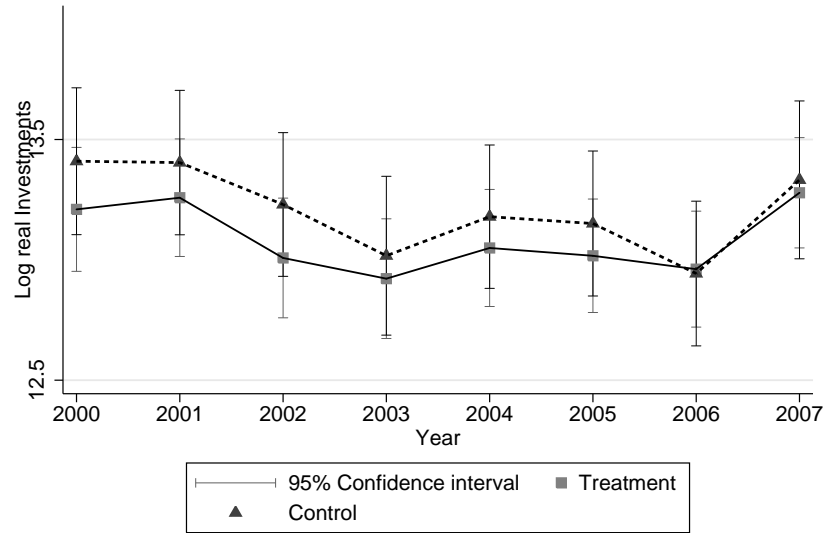


Figure A2: Average of log real investments over time: treatment and control groups

Industry classification	Treatment		Control	
	Mean	N	Mean	N
Manufacturing	17.22	619	17.32	349
Electricity, gas and water supply	17.26	39	18.08	82
Construction	17.50	35	17.88	66
Wholesale and retail sale	16.70	282	18.04	205
Transport, storage and communication	16.48	138	16.32	106
Financial intermediary	15.04	67	15.56	73
Real estate and business activities	15.65	279	15.88	251
Other	16.68	120	15.85	132

Table A2: Turnover by the main industrial classifications for treatment and control groups

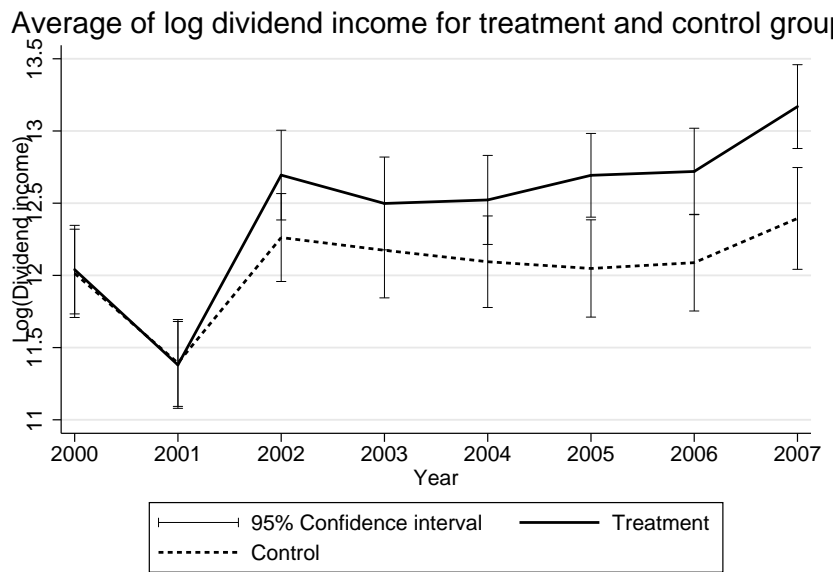


Figure A3: Average of log dividend income over time: treatment and control groups

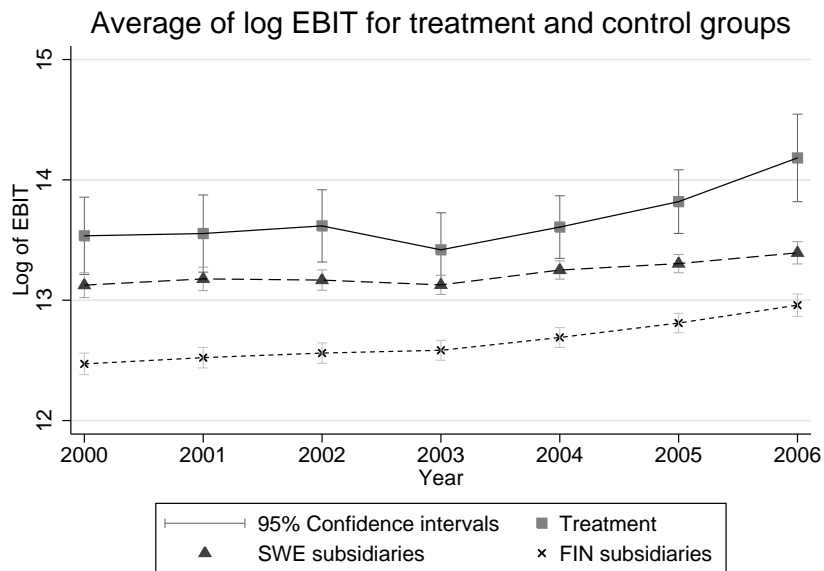


Figure A4: Average of log EBIT over time: treatment and control groups