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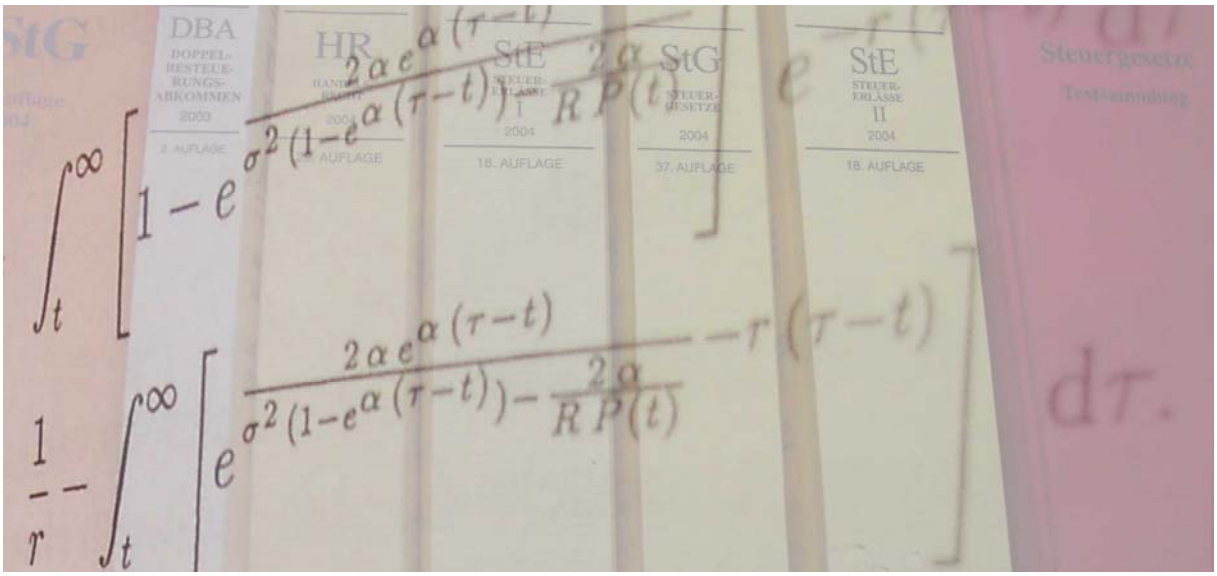

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The Effect of Germany's Tax Reform Act 2001 on Corporate Ownership - Insights from Disposals of Minority Blocks

Silke Rünger*

Abstract: The German tax reform act 2001 changed the corporate tax system from a full imputation system to a half income system. Along with this change, the taxation of equity investments changed as well. Using data on 459 disposals of minority blocks over the period 1997-2006, this paper analyzes the effect of TRA 2001 on the demand for corporate shares of different owner types and on corporate ownership concentration. We show that TRA 2001 was able to fulfill government's expectations about an increase in blocks bought by individual owners. With respect to ownership concentration, we find tax incentives not to be strong enough to lead to a reduction in overall concentration of corporate ownership.

Keywords: corporate ownership, marginal tax rate on equity, minority blocks, Germany

JEL classification: G11, G34, H24, H32

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1 Introduction

Promoted as the 'best Christmas gift in the history of the German stock index'[1] the German tax reform act (TRA) 2001 was believed to substantially alter the system of corporate control and corporate ownership in Germany. It changed the corporate tax system from a full imputation system to a half-income system, a classical corporate tax system with shareholder relief elements. Along with the change in the tax system, the taxation of equity investments for corporate and individual investors changed as well.

The taxation of equity investments can lead to two distortional effects, an allocation (clientele) effect and a timing effect. Whereas the first one distorts the investment decision itself, the second one distorts the decision about when to sell an existing investment. According to the allocation effect the taxation of equity influences the allocation of a shareholder's portfolio. Corporations can distribute their profits to shareholders either via dividends or share repurchases. The taxation of these two options is usually different; dividends are taxed on an annual basis, whereas share repurchases resulting in capital gains are taxed upon realization. Depending on the tax rates imposed, shareholders will either prefer assets with higher returns that are taxed upon realization or assets with higher dividend payments that are taxed on an annual basis. Changes in shareholder taxation will alter the allocation of a shareholder's portfolio and lead to a change in corporate ownership.[2]

By repealing the corporate capital gains tax, the German government was expecting an increase in disposals of corporate holdings leading to substantial changes in corporate ownership. Along with that, a reduction in the network of German corporations, connected mostly through minority blocks, was expected.

Whereas several papers have already analyzed the effect of TRA 2001 on single corporate divestiture choices[3], to the best of our knowledge, no paper has so far dealt with general ownership effects of TRA 2001. Our analysis differs from prior studies not only by evaluating the effects of TRA 2001 on the demand for corporate shares, but also by the fact that we can use a unique data set, where information about the seller and the acquirer of an owner block can be directly observed. In addition, our sample is not limited to listed corporations, but also includes investments in non-listed corporations, that form up the majority of German corporations.

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[1] See Schürmann (2005), p. 84.
[2] See Desai / Gentry (2004).
[3] See e.g. Gieralka / Drajewicz (2001), Edwards / Lang / Maydew / Shackelford (2004) and Watrin / Benhof (2008).

We are able to show that TRA 2001 was able to fulfill government's expectations about an increase in blocks bought by individual owners. It can also be shown, that corporate and individual owners have different preferences with respect to firm specific characteristics. Corporate owners prefer to hold blocks in non listed companies and to acquire blocks sold by non financial companies, whereas individual owners are more likely to hold blocks in listed companies and acquire blocks sold by financial companies. With respect to ownership concentration, we find tax incentives not to be strong enough to lead to a reduction in overall concentration of corporate ownership.

The remainder of this paper is organized as follows: Chapter 2 gives an overview of the legal background as well as prior research dealing with corporate ownership. Chapter 3 presents the investment model used in the paper, details about measurement issues related to ownership concentration and the research hypotheses. Our sample and the regression models used for archival analysis are carried out in chapter 4. Chapter 5 presents the results of our analysis, chapter 6 concludes.

2 Institutional Background and Prior Research

2.1 Institutional Background

By the beginning of the new century, the German network-orientated corporate governance model was characterized by the predominance of large shareholders and by the fact that large German banks acted as important shareholders in many industrial companies.[4] A term often used to describe this situation is 'Germany Inc.' (Deutschland AG). It refers to a network of German listed companies, especially the financial service providers Allianz, Commerzbank, Deutsche Bank, Dresdner Bank, Hypo-Vereinsbank and Munich Re, which was closely connected through board relations and capital cross-holdings.

Several studies have so far analyzed the distribution of control among German firms. Becht / Böhmer (1999) examine the distribution of voting blocks among 430 listed German corporations. Their results show a mean of the largest voting block of 58.9%; the second and third largest block do not add much voting power (9.8% taken together). Only a fifth of all German corporations has more than two owners. Voting blocks are found to be concentrated around the important control thresholds of 25%, 50% and 75%. Not surprisingly, German banks and insurance companies show the highest number of blocks

[4] See Shleifer / Vishny (1997).

held (Deutsche Bank 27 blocks, Allianz 25 blocks, Dresdner Bank and Munich Re 14 blocks each).[5] In an international survey, Becht / Röell (1999) compare ownership structures of listed corporations in eight European countries and the United States. They show that voting blocks are much larger in continental Europe compared to the United Kingdom and the United States. For 374 listed German corporations they find the largest block to be 52.1% on average. Only Italian corporations show a higher concentration, the largest voting block being 54.53%. For the UK sample the largest voting block accounted for only 9.9% on average and in the United States it was below the 5% disclosure threshold.[6]

The intense network of German cross-holdings and the high concentration of ownership was believed to cause several disadvantages for German firms. First of all, crossholdings lead to the fact, that control is limited and control mechanisms are only executed among the corporations in the network. For example, under German commercial law, a bank depositing shares for its clients is able to execute proxy voting rights in shareholders' meetings.[7] Due to this fact, in 1986 at the annual general meeting of Deutsche Bank the company itself accounted for nearly 48% of all present voting rights. It seems not surprising, that the high ownership concentration of German corporations was seen as a major obstacle for the development of the German capital market and even called a locational disadvantage for Germany.[8]

Growing international competition along with alternative ways of financing for industrial companies forced German banks to concentrate on their core competencies and rebalance their portfolios of industrial minority holdings. The fact that TRA 2001 completely repealed the taxation of corporate capital gains offered the possibility to realize a large amount of hidden reserves without diminishing shareholder value.[9] The disposal of corporate holdings was expected to increase the proportion of shares traded and thus the free float of securities.[10] Thus, an increase in blocks bought by individual investors along with a reduction in ownership concentration was expected.

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[5] See Becht / Böhmer (1999), p. 37f.
[6] See Becht / Röell (1999), p. 1052.
[7] Although voting instructions must be sought by law, studies have shown that only 2-3% of all shareholders give instructions about how to vote. See Becht / Böhmer (1999), p. 13.
[8] See Adams (1994), p. 152ff.
[9] See Beyer (2003), p. 122, Breuer (1998), p. 538, Frick / Lehmann (2004), p. 123 and Wieandt / Smith (2006), p. 14.
[10] See Cioffi (2002), p. 379.

2.2 Legal Background: The German Tax Reform Act 2001

The taxation of an equity investment is determined by the taxation on the level of the corporation and on the level of the shareholder. Corporations can distribute their profits to shareholders either via dividends or share repurchases, resulting in a capital gain for the investor. TRA 2001 changed the taxation on the corporate as well as on the shareholder level, including changes in the taxation of dividends as well as in the taxation of capital gains.

On the corporate level, the tax system was changed from a full imputation system to a half-income system, a classical corporate tax system with shareholder relief elements. In addition, the corporate tax rate τ_c was reduced from 40% for retained earnings and 30% for distributed earnings to a uniform rate of 25%.[11]

Under the full imputation system, dividends were taxed on the shareholder level at the dividend tax rate τ_d^{IMP} and corporate taxes paid were credited against the tax liability of the shareholder in order to avoid double taxation. If the shareholder was a German corporation (individual), dividends received were effectively taxed at the corporate (individual) tax rate τ_c^{IMP} (τ_i^{IMP}), due to the full imputation granted.

With the change from the full imputation system to the half-income system, dividends were taxed on the corporate level at the uniform tax rate τ_c^{HI}. In order to avoid double taxation of corporate earnings, intercorporate dividends became tax exempt on the shareholder level. Still, 5% of dividends received were classified as non-deductible expenditures, resulting in an overall tax burden for intercorporate dividends of $1.05 \cdot \tau_c^{HI}$. As a shareholder relief element for individual shareholders, only half of the dividends received were taxed at the ordinary income tax rate τ_i^{HI}. The tax rate for dividends received by individual investors was therefore determined as follows:

$$\tau_{d(indiv)}^{HI} = \tau_c^{HI} + (1 - \tau_c^{HI}) \cdot \tau_i^{HI} \cdot 0.5 \tag{1}$$

Under the full imputation system, capital gains realized by corporate shareholders were fully taxable, thus $\tau_{g(cor)}^{IMP} = \tau_c^{IMP}$. Because of the government's aim to tax dividends and capital gains at the same tax rate, corporate capital gains realized on the disposal of shares in domestic and foreign corporations became tax-exempt under the half-income

[11] Throughout this paper, we do not consider the German solidary surcharge. It accounts for 5.5% (1998: 7.5%) of the tax burden for corporations as well as individuals.

system.[12]

Capital gains realized by German individual investors were only taxable if an investment was classified as a substantial interest, defined as an investment above a certain threshold. TRA 2001 reduced this threshold from 10% to 1%. Under the full imputation system, capital gains realized on the disposal of substantial holdings were taxed at a reduced income tax rate, thus $\tau^{IMP}_{g(indiv)} = \tau^{IMP}_{i(red)}$. Under the half-income system, capital gains received by individual shareholders were aimed to be taxed at the same tax rate as dividends, thus $\tau^{HI}_{d(indiv)} = \tau^{HI}_{g(indiv)}$.

Two recent studies have empirically examined changes in corporate ownership of German firms. Kengelbach / Roos (2006) analyze the network of German corporate holdings over the period 1996-2004. According to their hypotheses a reduction in ownership concentration can be observed, if the amount of German subsidiary companies held by German parent companies or the amount of German companies with a majority blockholder or the mean of the largest voting block of German corporations or the amount of corporate crossholdings decreases over time.[13] Analyzing the ownership structures of German listed corporations, the authors find empirical evidence for all hypotheses.

Weber (2009) measures ownership concentration of German listed corporations by summing up the three largest voting blocks over the period 1999-2005. Besides a decrease in ownership concentration she finds the number of blocks held by individuals owners to rise, although the mean size of their blocks is falling.[14]

2.3 Prior Empirical Research

Prior empirical research has shown, that the ownership structure of a firm is endogenously determined by firm-specific characteristics and the firm's competitive environment.[15] In their seminal paper, Demsetz / Lehn (1985) empirically analyze the determinants of corporate ownership structures and find the following four firm-specific factors to systematically influence ownership concentration:

- **Size:** The larger a firm, the greater its market value and therefore the higher the price, an investor has to pay for a given fraction of the firm. In addition, a given

[12] Again, 5% of capital gains realized were classified as non-deductible expenditures for tax purposes.
[13] See Kengelbach / Roos (2006), p. 15.
[14] See Weber (2009), p. 60ff.
[15] See Short (1994).

degree of control requires a smaller share of the firm. Both these effects imply lower ownership concentration for larger firms.

- **Control Potential:** Control potential is defined as the wealth gain achievable through more effective monitoring of managerial performance by a firm's owner. Managerial behavior is more difficult to monitor if a firm operates in a less predictable environment. The noisier a firm's environment, the more concentrated ownership structures can be expected.

- **Regulation:** Regulation within an industry can be seen as a substitute for managerial control by owners. Ownership structures are therefore expected to be less concentrated in regulated industries.

- **Amenity Potential:** Shareholders who own a large fraction of shares of a firm are in the position to control for the management serving their interests. Despite the fact that shareholders want a firm to maximize its profit, they also might demand nonpecuniary income associated with firm specific characteristics. For firms with higher amenity potential, ownership structures are expected to be more concentrated.

Testing these factors for a sample of 511 listed US corporations shows that all variables have a significant influence and all coefficients have the expected sign. Based on the results of Demsetz / Lehn (1985), several other studies testing the determinants of ownership concentration for different countries have been published.[16] The variables used in these papers generally remain the four variables used by Demsetz / Lehn (1985). The only additional firm-specific factor used in several papers is firm age. Ownership concentration in younger firms is expected to be higher than in old firms since control is passed on from the founders to future shareholders.

Table 1 gives an overview of papers analyzing firm-specific determinants of corporate ownership for various countries. It shows the main variables used in the paper as well as whether these variables were found to have a significant influence on ownership concentration.

{Insert table 1 about here.}

[16] For details concerning these studies see Bergström / Rydquist (1990), Leech / Leahy (1991), Prowse (1992), Bohren / Odegaard (2001), Mak / Li (2001), Lamba / Stapledon (2001), Wojcik (2002), Pindado / de la Torre (2006), Madsen / Smith / Dilling-Hansen (2007) and Rogers / Borges / de Sousa Ribiero / de Sousa (2008).

Contrary to the approach of Demsetz / Lehn (1985) several papers contribute differences in corporate ownership structures to the legal framework of a country. These papers are either based on a cross-country setting or analyze legal changes in a single country.[17] La Porta / Lopez de Silanes / Shleifer / Vishny (1998) calculate corporate ownership concentration for 48 countries by summing up the three largest voting blocks. The results show that ownership concentration is a reaction to poor legal protection of shareholders.

Only a few papers have analyzed the influence of taxes on corporate ownership:

Dahlquist / Robertsson (2000) show, that taxes play an important role in determining foreign ownership in Swedish firms. According to their results foreign investors prefer large companies and companies paying low dividends. The latter effect is interpreted to be driven by the tax advantage of capital gains compared to dividend payments for foreign investors in Sweden.

The evolution of ownership concentration in the US is analyzed by Desai / Dharmapala / Fung (2007). The authors see taxes as a major determinant of corporate ownership structures, i.e. the increase in the progressivity of tax schedules. Time-series analysis starting in 1916 show that the increase in progressivity of the tax scheme has lead to greater diffusion of ownership.

La Porta / Lopez de Silanes / Shleifer (1999) analyze 27 the 20 largest and 10 smallest companies with a market capitalization of common equity of at least 500 million of 27 countries. Instead of measuring ownership concentration, the authors look for the presence of an ultimate owner, a controlling shareholder whose direct and indirect voting rights exceed 20%, and then control for factors influencing the presence of the ultimate owner. In the study two tax variables are taken into account, controlling for whether corporate dividends are taxed and whether consolidated accounting is permitted for tax purposes. The results show that both variables have no significant influence on the presence of an ultimate owner.

Holderness (2009) mentions two limitations regarding empirical ownership structure research. On the one hand, many international surveys use country averages instead of ownership concentration calculated with firm-level data. In addition, small samples of large, listed firms are used. This is problematic since it has been shown that ownership concentration is inversely related to firm size.

[17] See La Porta / Lopez de Silanes / Shleifer / Vishny (1998), La Porta / Lopez de Silanes / Shleifer (1999), Beny (2005), La Porta / Lopez de Silanes / Shleifer (2006), Roe (2006) or Djankov / La Porta / Lopez de Silanes / Shleifer (2008).

In this paper we are able to analyze the influence of a change in the tax system on corporate ownership using firm level data and a sample of listed and non-listed firms with no need of aggregation.

3 Model and Research Hypotheses

Due to the tax exemption for corporate capital gains, TRA 2001 was expected to increase the number of disposals of corporate shares and therefore lead to a higher supply of corporate shares starting in 2002.[18] On the other side, as has been shown in chapter 2.2, the taxation of shareholders, thus the taxation of the demand side for corporate shares, has changed as well. In this chapter we are going to show which tax induced demand-side effects were caused by TRA 2001 and why these effects are expected to influence corporate ownership in Germany.

3.1 The Investor's Marginal Tax Rate on Equity

The model presented in this chapter is based on the growth model introduced by Gordon / Shapiro (1956) and Gordon (1963), enriched by tax aspects by Gordon / MacKie-Mason (1990).[19]

We assume that an investor holding an equity investment receives a pre tax return of 1, that can be either generated by a dividend payment, a capital gain realized or a mixture of both. Integrating taxation, we assume that corporate profits are taxed at the corporate tax rate τ_c, dividends are taxed at the shareholder's dividend tax rate τ_d and capital gains are taxed at the shareholder's capital gains tax rate τ_g.[20] Depending on the tax system, corporate taxes may or may not be imputed. In general, the investors's marginal tax rate on equity is given by:

$$\tau_e = 1 - [(1 - \tau_c) \cdot (d \cdot (1 - \tau_d) + (1 - d) \cdot (1 - \tau_g))] \tag{2}$$

[18] For an analytical explanation see Edwards / Lang / Maydew / Shackelford (2004) or Watrin / Benhof (2008).

[19] For a general analysis of shareholder level taxation on investment decisions with different corporate tax regimes, see Sureth / Langeleh (2007).

[20] Papers often take into account the fact that capital gains are taxed only upon realization and taxation can be deferred until the end of the investment. Usually a factor α is integrated into the model to reduce the statutory tax rate for capital gains to an effective tax rate. Since this effect is the same for all type of owners and both tax regimes, we do not integrate it into the model for simplification.

Under the German full imputation system, taxes implied on the corporate level were fully imputed on the shareholder level. As a consequence, dividends were effectively taxed at the shareholder's marginal dividend tax rate. The investor's marginal tax rate on equity under the full imputation system is therefore given by

$$\tau_e^{IMP} = 1 - [(d \cdot (1 - \tau_d^{IMP})) + \theta \cdot ((1 - \tau_c^{IMP}) \cdot (1 - d) \cdot (1 - \tau_g^{IMP}))] \tag{3}$$

with

$\theta = 1$ for corporate shareholders and individual shareholders $> 10\%$ and

$\theta = 0$ for individual shareholders $\leq 10\%$.

Under the half-income system, taxes paid on the corporate level were no longer imputed on the shareholder level. As a shareholder relief element, dividends and capital gains became tax exempt for corporate investors and only half of the dividends and capital gains were taxable for individual investors (see chapter 2.2).

The investor's marginal tax rate on equity under the half income system is therefore given by

$$\tau_e^{HI} = 1 - [(1 - \tau_c^{HI}) \cdot (d \cdot (1 - \tau_d^{HI}) + \theta \cdot ((1 - d) \cdot (1 - \tau_g^{HI})))] \tag{4}$$

with

$\theta = 1$ for corporate shareholders and individual shareholders $> 1\%$ and

$\theta = 0$ for individual shareholders $\leq 1\%$.

Comparing equations 3 and 4 we can see, that the investor's marginal tax rate on equity depends on three aspects: taxes imposed on the corporate and shareholder level, the dividend payout ratio of the firm and the value of θ indicating whether capital gains are taxable or not.

In order to quantify the effects of TRA 2001 on the demand for corporate shares of single owner types, we calculate marginal tax rates on equity for corporate and individual owners and different dividend ratios. For the calculations we assume that corporate owners represent the ultimate owner for tax purposes. This corresponds with the view that corporate investors do not include the tax burden of their owners into the investment decision. For individual owners we only use the top statutory tax rate for the calculations.

This is due to the fact that several papers have shown that individuals owning corporate shares usually belong to the highest tax bracket, see Jacob (2010). Table 2 shows the results for the marginal tax rates on equity.

{Insert table 2 about here.}

As we can see from table 2, TRA 2001 lowered the marginal tax rate on equity for nearly all types of owners. Due to the lowering of the threshold for non-substantial interest from 10% to 1%, capital gains of individual owners within this bracket became fully taxable starting in 2002. As a result, this group faces a higher marginal tax rate on equity under the half income system than under the full imputation system for companies with dividend ratios below 25%. Additionally, we can see that for individual owners there is a clear tax incentive to hold blocks below the 10% (1%) threshold under the full imputation system (the half-income system).

With respect to different dividend payout ratios we find the marginal tax rate on equity to crucially depend on the dividend payout ratio of the firm under the full imputation system. For corporate owners and individual owners above the 10% threshold there is a clear tax clientele incentive to hold shares with high dividend payout ratios, whereas individual owners below the 10% threshold prefer shares with low dividend ratios. Contrary, the firm's payout policy is of minor importance under the half income system, since marginal tax rates for corporate owners and individual owners above the 1% threshold are unaffected by the firm's dividend payout ratio. Only for individual owners below the 1% threshold there is a tax clientele incentive to hold shares with low dividend ratios. This incentive is stronger than under the full imputation system, since marginal tax rates on equity are more sensitive with respect to d.

3.2 Measurement Issues

In order to be able to measure tax induced effects of TRA 2001 on corporate ownership, we look at two different distortional aspects.

On the one hand we quantify the effects of TRA 2001 on the demand for corporate shares by analyzing whether the number of blocks bought by different owner types has changed due to TRA 2001. On the other hand we measure the influence of TRA 2001 on general ownership concentration. These two aspects do not necessarily have to correspond. Consider e.g. the disposal of an owner block of 10%, which is sold by a corporate owner and acquired by an individual owner. In this case ownership concentration has not changed

since the size of the block remains unchanged. Still, the owner type has changed, since the proportion of blocks held by individual owners has increased. Given this difference, we have to analyze both aspects of corporate ownership changes separately in order to fully evaluate tax induced effects of TRA 2001 on corporate ownership.

Prior literature has measured ownership concentration with different concentration measures. The most commonly used concentration measure is a Herfindahl index, H, which is calculated by summing up the square of single shareholder blocks, a_i.

$$H = \sum_{i=1}^{N} a_i^2 \tag{5}$$

According to this definition the value of the Herfindahl index for a given corporation varies between $\frac{1}{N}$ and 1. The minimum value is achieved if blocks are equally distributed among shareholders and the maximum value is achieved if there is only one shareholder holding 100% of the company's shares. We will use the Herfindahl index as the concentration measure for an analysis of changes in ownership concentration.

3.3 Hypotheses Development

As we have seen in chapter 3.1, TRA 2001 lowered the marginal tax rates on equity for most types of owners. We expect the demand for corporate shares to rise, if marginal tax rates of owners are lower and therefore define the following research hypotheses:

Hypothesis 1a: The number of blocks bought by corporate owners is going to increase due to TRA 2001.

Hypothesis 1b: The number of blocks below the 1% threshold bought by individual owners is going to increase due to TRA 2001.

Hypothesis 1c: The number of blocks above the 10% threshold bought by individual owners is going to increase due to TRA 2001.

We have also seen, that the firm's payout policy has an important influence on the marginal tax rate on equity and therefore define the following research hypotheses with respect to the firm's dividend payout ratio d:

Hypothesis 2a: The number of blocks bought by corporate owners under the full imputation system is going to increase, the higher d.

Hypothesis 2c: The number of blocks above the 10% threshold bought by individual owners under the full imputation system is going to increase, the higher d.

Hypothesis 2b: The number of blocks below the 10% threshold bought by individual owners under the full imputation system is going to decrease, the higher d.

Hypothesis 2d: The number of blocks below the 1% threshold bought by individual owners under the half income system is going to decrease, the higher d.

As we have shown in chapter 3.2, we measure ownership concentration using the Herfindahl index. According to the Herfindahl approach ownership concentration decreases if a tax reform includes rules that lower the size of blocks demanded due to a lower tax rate on smaller blocks. TRA 2001 lowered the threshold for substantial interest from 10% to 1% for individual owners and therefore included a tax incentive for individual owners to demand smaller blocks. This also corresponds to the findings of Weber (2009) that the number of blocks held by individuals is rising after TRA 2001, although the mean size of the blocks is falling (see chapter 2.2). We therefore define the following research hypothesis concerning ownership concentration:

Hypothesis 3a: Ownership concentration is going to decrease due to TRA 2001.

We also define a general hypothesis concerning the relationship between an investor's marginal tax rate on equity and corporate ownership concentration. In line with the argumentation of La Porta / Lopez de Silanes / Shleifer (1999), we expect lower marginal tax rates on equity to increase the demand for equity investments and to raise the amount of owners on the market. As a result, the size of the block held by a single owner decreases and ownership concentration decreases as well.

Hypothesis 3b: Ownership concentration is going to decrease, the lower τ_e.

4 Research Design

4.1 Sample of Disposals

In order to test the hypotheses stated in chapter 3.3, we make use of the fact that German corporations have to disclose their ownership structure in their financial statements. Among the databases that provide information about ownership structures, we have chosen Amadeus and Osiris from Bureau van Dijk for this paper. These databases offer a very detailed ownership module listing the name of the owner, the percentage of direct

ownership and the country of the owner. In addition, both databases provide detailed company information including financial statement data.

We start the selection process in 1997, the first year detailed ownership information is available from the databases. In order to see which blocks have been sold, we track all available ownership blocks below the 25% threshold[21] held by German corporations. We end the search in the year 2006 and find 459 disposals of minority blocks during thesample period.[22] In order to account for different effects of the corporate tax regimes during the observation period, we define three tax portfolios. By doing so, we are able to distinguish between blocks where both, the acquisition and the disposal took place under the full imputation system (portfolio 1) or under the half income system (portfolio 3). In addition, we are able to separate the effects for blocks that have been acquired under the full imputation system, but sold under the half income system (portfolio 2). We refer to portfolio 2 as the short-term and to portfolio 3 as the long term effects of TRA 2001.

Table 3 shows the distribution of the sample disposals among the three tax portfolios. In addition, we distinguish between blocks sold by financial and non financial companies.[23]

{Insert table 3 about here.}

The highest number of disposals is found for portfolio 2, especially for blocks sold by financial companies. One reason why the amount of disposals belonging to portfolio 1 is rather low might be due to the fact, that TRA 2001 was first announced by the end of 1999. Therefore, companies might have deferred the disposal of blocks until the law became effective in 2002 in order to avoid capital gains taxation. This might also be an additional explanation for the majority of blocks sold by financial selling companies belonging to portfolio 2.

In addition to the definition of tax portfolios, we classify the disposals according to the type of the acquirer. We define four owner types: type 1 (German corporations), type 2 (German individuals), type 3 (foreigners) and type 4 (state). In addition, we split

[21] This level represents the blocking minority in Germany. According to the German Companies Act (AktG) anyone owning more than 25% in another company has substantial control rights, i.e. the right to block changes in the articles.

[22] If a company was liquidated during the year of the disposal, we do not include this disposal in the sample in order to avoid a liquidation bias.

[23] This is due to the fact that financial companies were believed to hold a high amount of minority blocks available for sale and were expected to benefit at most from the tax law change, see chapter 2. In addition, the acquisition and disposal of corporate shares is part of the core business for financial companies, but not for non financial companies.

owner type 2 into three further subgroups: type 2a (German individuals $\leq 1\%$), type 2b (German individuals $> 1\%$ and $\leq 10\%$) and type 2c (German individuals $> 10\%$).

Both of the databases list owners holding blocks above the threshold of 0.1% individually, whereas owners below this threshold are summed up and disclosed as free float. We therefore categorize free float as small owner blocks held by German individual owners $\leq$ 1% (owner type 2a).

4.2 Regression Models

We are going to run several regression models for the dynamic evaluation of the change in the demand for corporate shares of single owner types and the change in concentration of corporate ownership due to TRA 2001.

For the evaluation of the effect of TRA 2001 on the demand for corporate shares of single owner types, we run three different specifications of a probit model using the following dichotomous dependant variables:

$Za_{it} = 0$, if owner type = a
$Za_{it} = 1$ otherwise

with a equal to owner type 1, 2a and 2c (see chapter 4.1.

The regression model reads as follows:

$$Za_{it} = \alpha + \beta_1 \cdot PF2_{it} + \beta_2 \cdot PF3_{it} + \beta_3 \cdot d_{it} + \beta_4 \cdot d_{it}PF2_{it} + \beta_5 \cdot d_{it}PF3_{it} + \beta \cdot X'_{it} + \varepsilon_{it} \quad (6)$$

where Za_{it} is defined as shown before, $PF2_{it}$ and $PF3_{it}$ refer to the tax portfolios defined in chapter 4.1 and d_{it} is the percentage of the firm's profit distributed as dividends. As we have shown in chapter 3.1, we expect different effects for the dividend payout ratio under the full imputation and under the half income system. We therefore integrate the two interactive variables $d_{it}PF2_{it}$ and $d_{it}PF3_{it}$ in the regression model. X'_{it} is a vector of non-tax control variables.

Since not all of the companies in the sample are listed, we have to proxy the dividend ratio d_{it} of non-listed companies as a relationship of the company's profit after taxes $Prof_{it}$ and the change in the shareholder's funds of the company SF_{it} as follows:[24]

[24] Note that we assume that the dividend ratio is 0 if the companies realizes a loss after taxation. In addition, we assume constant dividend ratios over time.

$$d_{it} = \frac{Prof_{it} - (SF_{it} - SF_{it-1})}{Prof_{it}} \tag{7}$$

For all owner types analyzed we expect the number of blocks acquired after TRA 2001 to increase and therefore a positive coefficient for $PF2_{it}$ and $PF3_{it}$.

In addition, we expect a positive coefficient for d_{it} and a negative coefficient for $d_{it}PF2_{it}$ and $d_{it}PF3_{it}$ for corporate investors (owner type 1) and for individual owners > 10% (owner type 2c). For individual owners $\leq$ 1% (owner type 2a) we expect negative coefficients for d_{it}, $d_{it}PF2_{it}$ and $d_{it}PF3_{it}$.

The firm-specific control variables are taken from corporate ownership research shown in chapter 2.3.[25] The size of the company, $Size_{it}$ is measured as the value of total assets in the year of the disposal. Control potential, $lnContPot_{it}$, of the owners is measured as the estimated standard deviation of the company's profit over the three years prior to the disposal. Regulation, Reg_{it}, is a dummy variable taking the value 1 if the company belongs to the financial or utility industry (NACE 1.1. 2-digit codes 40, 41, 65 or 66). The age of the company, Age_{it} is measured in years at the time of the disposal. In addition, we control for differences between listed and non-listed companies, $Listed_{it}$, as well as for differences for the seller being a (non)financial company, NF_{it}, using dummy variables. Both of these controls refer to liquidity constraints indicating that for a listed company (a financial selling company), it will be easier to attract individual owners than for non listed companies (non financial selling companies).

We also control for macroeconomic factors that are expected to influence the demand for corporate shares. Melicher / Ledolter / D'Antonio (1983) have shown a negative correlation between the interest rate and aggregated M&A activity, since higher interest rates increase refinancing costs and thus decrease the demand of potential investors. In addition, the authors have shown that increasing stock prices are positively correlated with M&A activities. Since many other macroeconomic factors such as gross national income, market liquidity or yield curves are highly correlated with interest rates and (or) stock prices, we do not include further macroeconomic control variables. We measure the interest rate, $Interest_t$ as the German interbank 12 month offered rate. Stock prices, $Stock_t$, are measured as the yearly performance of the German stock index DAX.

[25] Note that we do not include the amenity potential of the firm in the analysis. This is due to the fact that none of the sample firms belongs to the industries (media, sports) defined to provide amenity potential to owners.

For the evaluation of the effect of TRA 2001 on ownership concentration we calculate a Herfindahl index for the sample firms before and after the disposal. One problem with the Herfindahl index is that information about the size of every single owner block is necessary. The databases usually provide this information, except in the case of free float. As has been mentioned in chapter 4.1, free float is defined as small blocks below the 0.1% threshold held by German individual investors. Thus, if a company's free float accounts for 5% this does not correspond to a single owner block accounting for 5%. Excluding free float blocks from the calculation and calculating concentration only for the remaining owners would lead to an increase of the Herfindahl index, if free float increases. This means, that the results would be biased. Excluding all companies with existing free float would also yield biased results, since companies with lower ownership concentration are systematically excluded from the sample.

One way to avoid biased results would be the use of a different concentration measure which does not require information about the size of all single owner blocks. An alternative measure that fulfills this criteria is the sum of the N largest voting blocks, where N can be randomly chosen. Unfortunately, as the study of Becht / Böhmer (1999) has shown, only a fifth of all German corporations has more than two owners. We therefore do not use alternative concentration measures in this paper. To be able to calculate the Herfindahl index for companies with free float, we split it up into single blocks and assume a size of 0.1% for each block.[26] Since the single blocks are squared for the calculation of the Herfindahl index, we can reduce the bias to a minimum and are still able to include companies with free float in the sample.

The main specification reads as follows:

$$\Delta H_{it} = \alpha + \beta_1 \cdot PF2_{it} + \beta_2 \cdot PF3_{it} + \beta_3 \cdot Cor_{it} + \beta_4 \cdot For_{it} + \beta_5 \cdot State_{it} + \beta \cdot X'_{it} + \varepsilon_{it} \quad (8)$$

ΔH_{it} represents the change in ownership concentration, $PF2_{it}$ and $PF3_{it}$ as well as Cor_{it}, For_{it} and $State_{it}$ refer to the tax portfolios and owner types defined in chapter 4.1 and X'_{it} is the vector of non-tax control variables used equation 6.

Using information about the tax portfolios and owner types can be seen as a proxy for the owner's marginal tax rate on equity τ_e. For a more general estimation we calculate a firm and owner specific marginal tax rate on equity and run the following alternative

[26] According to this definition a free float of e.g. 5% would be split up into 50 single blocks, assuming that free float consists of 50 single individual owners.

specification:

$$\Delta H_{it} = \alpha + \beta_1 \cdot \tau_e + \beta \cdot X'_{it} + \varepsilon_{it} \tag{9}$$

As the dependant variable, we use the change in the value of the Herfindahl index for company i calculated as follows:

$$\Delta H_{it} = \Delta(H_{it} - H_{it-1}) > 0 \tag{10}$$

Additionally, we include four dummy variables referring to the four owner types defined in chapter 4.1: corporate (Cor_{it}), individual ($Indiv_{it}$), foreign (For_{it}) and state ($State_{it}$). Since we only expect disposals to individual owners to have an influence on ownership concentration (see hypothesis 3a in chapter 3.3), we omit $Indiv_{it}$ as the reference category. Based on the results from chapter 3.1, we expect a negative coefficient (a reduction in ownership concentration) for $PF2_{it}$ and $PF3_{it}$. By contrast, we expect a positive coefficient for Cor_{it}, For_{it} and Gov_{it}.

We include two additional control variables compared equation 6: $Total_{it}$ is a dummy variable taking the value 1 if the block was bought by an existing owner, which after the transaction owns 100% (all) of the shares of the company. We expect a negative coefficient for $Total_{it}$. H_{it-1} is the absolute value of the Herfindahl index the year before the disposal and controls for different starting levels in ownership concentration.

For the alternative specification we expect a positive coefficient for τ_e, since higher marginal tax rates on equity are expected to lower the demand for blocks and therefore increase the absolute size of blocks held (see hypothesis 3b in chapter 3.3).

5 Empirical Results

In order to fully evaluate tax induced effects of TRA 2001 on changes in corporate ownership, the results are divided into two aspects (see chapter 3.2). The effects of TRA 2001 on the demand for corporate shares of single owner types is going to be analyzed in chapter 5.1, results on general ownership concentration are carried out in chapter 5.2.

5.1 Effects of TRA 2001 on the demand of single owner types

For the evaluation of the effects of TRA 2001 on the demand for corporate shares of single owner types we have divided the 459 disposals into the corresponding four owner types. The next table shows the distribution of the owner types among the three tax portfolios.

{Insert table 4 about here.}

As we can see from table 4, for all three portfolios the majority of blocks were bought by corporate owners. Still, the number of blocks bought by corporate owners is decreasing over time, resulting in lower values for portfolio 2 and 3 compared to portfolio 1. For individual owners we find the highest number of acquisitions in portfolio 2. The number of blocks bought by individual owners in portfolio 2 is more than four times the value of portfolio 1 and twice the value of portfolio 3. Foreigners or the state are only of minor importance among the owner groups observed.

Table 5 shows the distribution of single owner types among the three tax portfolios if we divide the sample according to whether the block was sold by a financial or non financial company. As we can see, disposals by financial selling companies differ substantially from disposals by non financial selling companies.

{Insert table 5 about here.}

The number of blocks acquired by individual or foreign owners is higher if the selling company belongs to the financial industry. Contrary, the number of blocks acquired by corporate owners is lower and the state is not acquiring blocks sold by financial companies at all. For portfolio 2 the majority of blocks sold by financial companies are bought by individual owners, whereas for portfolio 3 there are about as many blocks bought by individual owners as blocks bought by corporate owners. This clearly shows a short time increase of acquisitions by individual owners.

In order to get more detailed information about tax incentives for individual owners, we divide blocks bought by owner type number 2 into the three further subgroups 2a, 2b and 2c as defined in chapter 4.1.

{Insert table 6 about here.}

Taking a closer look at the subgroups of individual owners, we find individual owners holding blocks below the 1% threshold to acquire the majority of blocks in portfolio 1 and 2. As we can see from table 6, there is a sharp increase in the number of blocks bought by individual owners below the 1% threshold for portfolio 2. The number of blocks bought by individual owners below the 1% threshold for portfolio 3 is lower than for portfolio 2, but still higher than for portfolio 1. We therefore find evidence for both, a short and a long term increase in acquisitions by individual owners below the 1% threshold. The proportion of blocks acquired by individual owners above the 10% threshold is lower for portfolio 2 than for portfolio 1 and 3, indicating a short term decrease in demand. Still, comparing the values for portfolio 1 and 3, we do not find a long term change in the demand for corporate shares of individual owners above the 10% threshold. Contrary to our expectations, the number of owners below the 10% threshold and above the 1% threshold (holdings affected by the lowering of the threshold for substantial interest due to TRA 2001) is slightly increasing over time.

Table 7 shows summary statistics for the variables used in the regression analysis.

{Insert table 7 about here.}

Although the sample firms distribute only about a third of their profits via dividends on average, the high standard deviation shows that there is a lot of variation in their payout policy. About a quarter of all firms are listed companies; nearly 30% of the selling companies belong to the financial industry.

Table 8 shows the results for the estimation of equation 6.

{Insert table 8 about here.}

We find the probability of a corporate owner buying a block to be lower under the half income system than under the full imputation system. The coefficient for $PF2$ ($PF3$) indicates that the probability of a corporate owner buying a block under the half income system is about 13% (8%) lower than under the full imputation system. Since both coefficients are not significant, we do not find TRA 2001 to substantially lower the probability of a corporate owner buying a block. As we have expected, the dividend ratio of a firm has a positive influence on the decision to buy a block for corporate owners under the full imputation system. We find a preference for corporate owners to hold blocks in non listed companies and buy blocks from companies outside the financial sector. The probability

of a corporate owner buying a block is 40% lower, if the company is listed and 26% higher if the selling company is a non financial company.

The probability of an individual owner below the 1% threshold buying a block has significantly increased due to TRA 2001 in the short run. The coefficient for $PF2$ is significant at the 5% level and indicates, that the probability of an individual owner below the 1% threshold buying a block under the half income system is about 12% higher than under the full imputation system. We find the expected negative influence of the company's payout policy on the probability of an individual owner below the 1% threshold buying a block for both, the full imputation and half income system. Contrary to corporate owners we find individual owners below the 1% threshold to prefer to hold blocks in listed and companies and buy block from financial companies. The probability of an individual owner buying a block is 17% higher, if the company is listed and 12% lower if the selling company is a non financial company.

For individual owners above the 10% threshold we find the probability of buying a block to be lower under the half income system than under the full imputation system. The coefficient for $PF3$ is negative, but close to zero, indicating no significant change in demand due to TRA 2001 in the long run. Again, we find the expected influence of the firm's payout policy, since the coefficient of d is negative for the full imputation system.

Taken these results together, we can not find supporting evidence for hypothesis 1a and 1c, but are able to find support for hypothesis 1b, 2a, 2b, 2c and 2d.

5.2 Effects of TRA 2001 on ownership concentration

In order to test the dynamic effects of TRA 2001 on ownership concentration, we estimate equations 8 and 9.

Table 9 shows the distribution of the change in the Herfindahl index for the total sample as well as for the three tax portfolios and four owner types.

{Insert table 9 about here.}

As we can see from table 9, the mean value of the change in the Herfindahl index is positive for the total sample as well as for all tax portfolios. The mean value for portfolio 1 is close to zero, showing that disposals under the full imputation system did not affect ownership concentration on average . In contrast, the positive mean value for portfolio 2 and 3

indicates that disposals under the half income system increased ownership concentration on average.

Dividing the sample into the four owner types, we see that acquisitions by individual or foreign owners reduced ownership concentration on average, whereas acquisitions by corporate owners or the state did not. For blocks acquired by the state, we also see that all acquisitions were leading to an increase in ownership concentration, since even the minimum value is positive. The fact that disposals to individual owners were reducing ownership concentration corresponds with the lowering of the threshold for substantial interest due to TRA 2001.

Table 10 shows the results for the estimation of equations 8 and 9, applying a cross section OLS regression.

{Insert table 10 about here.}

As we would have expected from summary statistics, the coefficients for $PF2$ and $PF3$ are both positive. This means, that ownership concentration is higher for portfolio 2 and 3 than for portfolio 1 and is therefore an indicator that disposals of owner blocks under the half income systems were leading to more concentrated ownership structures. We thus do not find supporting evidence for hypothesis 3a.

Looking at different owner types, we find all of the coefficients to have the expected positive sign, but only acquisitions by corporate owners and by the state to significantly differ from acquisitions by individual owners. The positive coefficients show, that according to our hypothesis acquisitions by corporate or foreign owners and the state lead to a higher increase in ownership concentration than acquisitions by individual owners.

In line with the results from chapter 5.1, the coefficient for *Listed* (NF) is negative (positive) and significant, indicating that ownership concentration is lower if the company is listed or the selling company is a financial company.

For the alternative specification, we find the coefficient for τ_e to have a significant negative influence on ownership concentration. This is not what we have expected, but corresponds with the negative coefficients of $PF2$ and $PF3$ in the basis specification. We therefore do not find supporting evidence for hypothesis 3b.

5.3 Robustness Checks

The analysis of the effects of TRA 2001 on the demand for corporate shares of single owner types has shown mixed results. In addition, we are not able to detect a tax induced

decrease in ownership concentration of German corporations. We therefore apply several robustness checks to the results.

In order to check whether firm specific factors are driving the results for the demand of single owner types, we generate a vector of interactive variables by multiplying $PF2$ with all other non-tax control variables in the model. Non tabulated results for the extended regressions show, that results for individual owners remain unchanged. For corporate owners we find one factor to significantly drive the probability of buying the block, since the coefficient for $PF2NF$ is positive and significant. This is again an indicator for the fact, that corporate owners prefer to acquire blocks from companies outside the financial industry. The coefficient for $PF2$ still shows a negative sign, indicating that even when controlling for differences with respect to financial selling companies, the probability of a corporate owner acquiring a block is lower under the half income system.

We also generate a vector of interactive variables by multiplying $PF2$ with all other non-tax control variables in order to control for firm specific effects regarding ownership concentration, but find none of the firm specific factors to systematically influence ownership concentration under the half income system.

One crucial assumption we have to make for the calculation of the Herfindahl index is the treatment of free float (see chapter 4.2). Results in chapter 5.2 are based on the assumption that free float is split up into single blocks of 0.1% each. Since the databases do not report single blocks below this threshold, there is no problem of underestimating ownership concentration. We could still overestimate concentration, if free float blocks can be assumed to be smaller than 0.1%. We therefore repeat the regressions assuming that free float is split up into blocks of 0.01% and 0.001% each. Results remain unchanged.

90 out of the 459 sample companies (about 20%) belong to the electricity, gas, steam and hot water supply industry. Taking a closer look at companies from this industry, we find most of them to be municipal utilities. Although municipal utilities are private companies, they can be defined as operating semi-public according to their business structure. In addition, the number and size of blocks held by the state is higher for municipal utilities. In order to test whether the results are driven by ownership changes in the semi-public industry, we exclude all municipal utilities from the sample. Results remain unchanged.

For 51 observations (about 11%) the buyer of the block is holding 100% of the shares of the company after the acquisition, resulting in an obvious increase in ownership concentration. The investment decision of owners acquiring 100% of the shares of a company might be driven by strategical business reasons rather than tax aspects. We therefore repeat the regressions excluding disposals where $Total$ equals 1. This slightly decreases ownership

concentration for portfolio 2, but the coefficient is still positive and significant. Results for portfolio 3 and different owner groups remain unchanged.

6 Conclusion

The German TRA 2001 changed the corporate tax system from a full imputation system to a half-income system, a classical corporate tax system with shareholder relief elements. Along with the change in the tax system, the taxation of equity investments for corporate and individual investors changed as well. Whereas several papers have already analyzed the effect of TRA 2001, to the best of our knowledge, no paper has so far dealt with general ownership effects of TRA 2001.

In order to fully evaluate tax induced ownership effects, we look at two different distortional aspects. On the one hand we evaluate effects of TRA 2001 on the demand for corporate shares by analyzing whether the number of blocks bought by different owner types has changed due to TRA 2001. On the other hand we measure the influence of TRA 2001 on ownership concentration.

Calculating marginal tax rates on equity for different owner types, we show that corporate owners carry the lowest tax burden before and after the tax reform. For individual owners there is a clear tax incentive to hold shares below the 10% threshold for the full imputation system and below the 1% threshold for the half-income system. We therefore expect the number of blocks bought by corporate owners, by individual owners below the 1% threshold and by individual owners above the 10% threshold to increase due to TRA 2001. In addition, we expect the corporate dividend payout ratio to have a significant influence on the acquisition decision. Due to the lowering of the threshold for substantial interest for individual owners from 10% to 1%, we also expect a decrease in ownership concentration of German corporations.

We analyze 459 disposals of German minority blocks over the period 1997-2006 and categorize disposals into three tax portfolios according to the tax status of the seller and the buyer. Due to the definition of the three tax portfolios, we are able to distinguish between blocks where both, the acquisition and the disposal took place under the full imputation system or under the half income system. In addition, we are able to separate the effects for blocks that have been acquired under the full imputation system and sold under the half income system.

We find the probability of a corporate owner and of an individual owner above the 10% threshold buying a block to be lower under the half income system than under the full

imputation system. In addition, we find a preference for corporate owners to hold blocks in non listed companies and buy blocks from companies outside the financial sector. Contrary, the probability of an individual owner below the 1% threshold buying a block has significantly increased due to TRA 2001 in the short run. The coefficient for $PF2$ indicates, that the probability of an individual owner below the 1% threshold buying a block under the half income system is about 12% higher than under the full imputation system. Contrary to corporate owners, we find individual owners below the 1% threshold to prefer to hold blocks in listed companies and buy blocks from financial companies. For all three owner types, we find the expected influence of the company's dividend payout ratio on the acquisition decision.

In order to test the effects of TRA 2001 on ownership concentration we run a cross section OLS regression, taking a Herfindahl index as the measure of concentration. Contrary to our expectations, we we find a significant increase in ownership concentration due to TRA 2001.

We are able to show that TRA 2001 was able to fulfill government's expectations about an increase in blocks bought by individual owners. It can also be shown, that corporate and individual owners have different preferences with respect to firm specific characteristics: corporate owners prefer to hold blocks in non listed companies and buy blocks sold by non financial companies, whereas individual owners are more likely to hold shares in listed companies and buy blocks sold by financial companies. With respect to ownership concentration, we find tax incentives not to be strong enough to lead to a reduction in overall concentration of corporate ownership.

Appendix

		Independent Variables				
Authors	**Sample**	Size	Control Potential	Regulation	Amenity Potential	Age
Demsetz /Lehn (1985)	511 (US)	yes; -	yes; +	yes; -	yes; +	no
Bergstroem / Rydquist (1990)	204 (Sweden)	yes; -	yes; +	yes; -	no	no
Leech / Leahy (1991)	470 (UK)	yes; -	yes; +	no	no	yes; n.s.
Prowse (1992)	734 (Japan)	yes; -	yes; +	no	no	no
Bohren / Odegaard (2001)	1255 (Norway)	yes; -	no	yes; n.s.	no	yes; n.s.
Mak / Li (2001)	147 (Singapore)	yes; n.s.	yes; n.s.	yes; n.s.	no	no
Lamba / Stapledon (2001)	240 (Australia)	yes; -	yes; n.s.	yes; -	yes; +	yes; n.s.
Wojcik (2003)	454 (Germany)	yes; n.s.	no	yes; -	no	yes; n.s.
Pindado / de la Torre (2003)	135 (Spain)	yes; -	no	no	no	no
Madsen et al. (2007)	1201 (Denmark)	yes; -	yes; n.s.	no	no	yes; +
Rogers et al. (2008)	171 (Brazil)	yes; -	yes; +	yes; +	no	no

Table 1: Variables used in empirical ownership structure research as well as results of the papers. Independent variables refer to the five most commonly used variables in research, showing whether the variable has been used in the paper (yes/no). If the variable was used, it is shown whether it had no significant influence (n.s.), a significant positive (+) or a significant negative (-) influence on ownership concentration.

$d(\%)$	$\tau^{IMP}_{e(cor)}$	$\tau^{HI}_{e(cor)}$	$\tau^{IMP}_{e(indiv<10\%)}$	$\tau^{HI}_{e(indiv<1\%)}$	$\tau^{IMP}_{e(indiv\geq10\%)}$	$\tau^{HI}_{e(indiv\geq1\%)}$
0	0.640	0.259	0.400	0.250	0.682-0.658	0.432-0.407
0.1	0.616	0.259	0.413-0.408	0.268-0.266	0.667-0.641	0.432-0.407
0.2	0.592	0.259	0.426-0.417	0.286-0.281	0.652-0.623	0.432-0.407
0.3	0.568	0.259	0.439-0.425	0.305-0.297	0.636-0.606	0.432-0.407
0.4	0.544	0.259	0.452-0.434	0.323-0.313	0.621-0.589	0.432-0.407
0.5	0.520	0.259	0.465-0.442	0.341-0.329	0.606-0.571	0.432-0.407
0.6	0.496	0.259	0.478-0.451	0.359-0.344	0.591-0.554	0.432-0.407
0.7	0.472	0.259	0.491-0.459	0.377-0.360	0.576-0.537	0.432-0.407
0.8	0.448	0.259	0.504-0.468	0.395-0.376	0.560-0.520	0.432-0.407
0.9	0.424	0.259	0.517-0.476	0.414-0.392	0.545-0.502	0.432-0.407
1	0.400	0.259	0.530-0.485	0.432-0.407	0.530-0.485	0.432-0.407

Table 2: Marginal tax rate on equity (in %) for corporate and individual owners in Germany over the period 1998-2006, depending on the dividend payout ratio d. Note: The range of tax rates for individual owners is due to changes in the top statutory tax rate over time.

	PF 1	**PF 2**	**PF 3**	total
total	62	207	190	459
(%)	13.51%	45.10%	41.39%	100%
non-financial	56	125	149	330
(%)	16.97%	37.88%	45.15%	100%
financial	6	82	41	129
(%)	4.65%	63.56%	31.79%	100%

Table 3: Distribution of minority blocks among the three tax portfolios.

Owner Type	Portfolio 1	Portfolio 2	Portfolio 3
Corporate	85.48%	65.21%	80.53%
Individual	6.45%	28.51%	14.21%
Foreign	1.62%	4.34%	2.63%
State	6.45%	1.94%	2.63%
Total	100.00%	100.00%	100.00%

Table 4: Distribution of owner types among the three tax portfolios.

	Portfolio 1		Portfolio 2		Portfolio 3	
	NF	F	NF	F	NF	F
Corporate	87.50%	66.67%	92.80%	23.17%	89.26%	48.78%
Individual	3.57%	33.33%	2.40%	68.29%	5.37%	46.34%
Foreign	1.79%	0.00%	1.60%	8.54%	2.01%	4.88%
State	7.140%	0.00%	3.20%	0.00%	3.36%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 5: Distribution of disposals by owner groups among the three portfolios for F (financial) and NF (non-financial) selling companies.

	Portfolio 1		Portfolio 2		Portfolio 3	
Individual	number	%	number	%	number	%
<1%	1	1.61%	49	23.68%	16	8.43%
≥ 1% and <10%	1	1.61%	4	1.93%	7	2.10%
≥10%	2	3.23%	6	2.90%	7	3.68%
total	4	6.45%	69	28.51%	27	14.21%

Table 6: Distribution of individual owners among the three portfolios.

Variable	Mean	Std. Dev.	Min	Max	Obs.
d	0.3384	0.4077	0	1	459
Size	21600000	115000000	19	11300000000	459
ConPot	139073.3	561430.6	0.5773	4570715	459
Age	37.8605	40.8060	1	247	459
Reg	0.2766	0.4478	0	1	459
Listed	0.2483	0.4325	0	1	459
NF	0.7189	0.4500	0	1	459
Interest	3.1248	0.8019	2.278	5.188	459
Stock	5004.361	1163.739	2930.74	6561.63	459

Table 7: Summary statistics.

	Z1 (corporate)			**Z2a (individual $\leq$ 1%)**			**Z2c (individual $>$ 10%)**		
	Coeff.	(Std.err)	(Marg. Eff.)	**Coeff.**	(Std.err)	(Marg. Eff.)	**Coeff.**	(Std.err)	(Marg. Eff.)
PF2 (+)	-0.4483	0.3193	-0.1278	1.3976**	0.6827	0.1206	-0.4627	0.5768	-0.0085
PF3 (+)	-0.2720	0.3406	-0.0777	0.9404	0.7170	0.0761	-0.0561	0.5231	-0.0010
d (+/-)	0.0696	0.1452	0.0195	-0.1045	0.5326	-0.0066	0.3696	0.2458	0.0069
dPF2 (-)	-0.6911	0.1457	-0.0194	-0.1632	0.5338	-0.0104	-0.3397	0.2498	-0.0063
dPF3 (-)	-0.5361	0.1829	-0.0151	-0.1973	0.5493	-0.0126	-0.4567	0.2969	-0.0085
Size (-)	0.0000	0.0000	0.0000	-0.0000	0.0000	-0.0000	-0.0000	0.0000	-0.0000
ConPot (+)	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Age (+)	0.0048***	0.0020	0.0013	-0.0011	0.0021	-0.0007	-0.0097**	0.0046	-0.0001
Reg (-)	0.5580***	0.2268	0.1399	-0.5686	0.3981	-0.2095	-0.4233	0.4948	-0.0064
Listed (+)	-1.211***	0.2259	-0.4013	1.3569***	0.2974	0.1738	0.4601	0.3785	0.0117
NF (-)	0.8318***	0.2237	0.2632	-1.0822***	0.3229	-0.1150	-0.8073**	0.3906	-0.0255
Interest (-)	-2733	0.1720	-0.0767	-0.0471	0.2483	-0.0030	0.0401	0.2427	0.0007
Stock (+)	0.0002**	0.0001	0.0000	-0.2360	0.7506	-0.0151	0.4054	0.9443	0.0075
N		459			459			459	
R^2		0.3885			0.5356			0.2438	

Significance levels : $*$: 10% $**$: 5% $***$: 1%

Table 8: Estimation results for equation 6.

	Obs	Mean	Std. Dev.	Min	Max
total	459	0.0141283	0.2039373	-0.9777692	0.9677079
PF1	62	0.0008015	0.2361292	-0.9777692	0.6912500
PF2	207	0.0136548	0.2320837	-0.6607195	0.8080927
PF3	190	0.0166389	0.1551229	-0.7447016	0.9677079
Cor	341	0.0403777	0.2062282	-0.9777692	0.9677079
Indiv	90	-0.0864492	0.1695440	-0.7447016	0.4333690
For	15	-0.0090930	0.1956809	-0.4222780	0.3648000
State	13	0.1364887	0.1241351	0.0002000	0.4037488

Table 9: Summary statistics for the change in ownership concentration among portfolios and owner groups.

	est. of equation 8		est. of equation 9	
Variable	**Coeff.**	**(Std.Err.)**	**Coeff.**	**(Std.Err.)**
PF2 (–)	0.0526**	(0.0245)		
PF3 (–)	0.0339	(0.0248)		
d (–)	–0.0021*	(0.0011)		
Cor (+)	0.0801***	(0.0283)		
For (+)	0.0652	(0.0463)		
State (+)	0.0200***	(0.0537)		
τ_e (+)			-0.1128*	(0.0667)
lnSize (–)	-0.0131**	(0.0055)	-0.0137**	(0.0055)
lnConPot (+)	0.0214***	(0.0052)	0.0209***	(0.0052)
Reg (–)	-0.0161	(0.0180)	-0.0161	(0.0179)
Age (+)	0.0066**	(0.0072)	0.0105	(0.0071)
Listed (–)	-0.0951***	(0.0304)	-0.1204***	(0.0282)
NonFinancial (+)	0.0495*	(0.0264)	0.0683***	(0.0254)
Total (+)	0.3220***	(0.0280)	0.3224***	(0.2831)
H_{it} (–)	-0.3365***	(0.0317)	-0.3287***	(0.0319)
Interest (+)	0.0003	(0.0127)	0.0005	(0.0127)
Stock (–)	0.1212**	(0.0512)	0.1219**	(0.0497)
N	459		459	
R^2	0.4185		0.3961	
$F_{(16,442)}$	19.88			
$F_{(11,447)}$			26.66	

Significance levels : $*$: 10% $**$: 5% $***$: 1%

Table 10: Estimation results for equations 8 and 9.

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