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The Effect of Germany's Repeal of the Corporate Capital Gains Tax – Evidence from the Disposal of Corporate Minority Holdings

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Abstract

Germany's repeal of the corporate capital gains tax for the disposal of domestic holdings was expected to substantially change the system of corporate network holdings and corporate control. Based on a general divestiture model, we show that the probability of a disposal increased after the tax reform. Using a unique data set with no need to proxy for the disposal of corporate equity holdings, we analyze 354 German minority holdings over the period 1999-2007. We find significant higher disposal rates for 2002, the year the reform became effective. Further analyses reveal that this effect can be attributed to non-listed parent companies outside the financial sector, i.e. companies mainly ignored in prior research. Thus, our results also help to explain why prior research using event studies failed to detect a widespread market reaction of German firms.

Keywords: corporate capital gains, lock-in effect, corporate equity holdings, Germany

JEL classification: G11, G34, H25, H32

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 network holdings and corporate control in Germany. The repeal of the corporate capital gains tax of 40% for the disposal of domestic holdings was expected to substantially change the investment decisions of German corporations.

Prior to the reform 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.[2] A term often used to describe this situation is 'Germany Inc.' (Deutschland AG). It refers to a network of German listed companies, especially the six financial service providers Allianz, Commerzbank, Deutsche Bank, Dresdner Bank, Hypo-Vereinsbank and Munich Re, which was closely connected through capital cross-holdings and board relations.

Several studies have 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 held (Deutsche Bank 27 blocks, Allianz 25 blocks, Dresdner Bank and Munich Re 14 blocks each).[3] Comparing ownership structures of listed corporations in eight European countries and the United States Becht / Röell (1999) show that voting blocks are much larger in continental Europe than in 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 54.5%. For the UK sample the largest voting block accounted for only 9.9% on average and in the United States it is below the 5% disclosure threshold.[4]

The intense network of capital cross-holdings and the high concentration of ownership was believed to cause several disadvantages for German firms. First of all, crossholdings limit control since control mechanisms are only executed among the corporations in the network.

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[1] See Schürmann (2005), p. 84.
[2] See Shleifer / Vishny (1997), p. 740.
[3] See Becht / Böhmer (1999), p. 37f.
[4] See Becht / Röell (1999), p. 1052.

For example, under German commercial law, a bank depositing shares for its clients is able to execute proxy voting rights in shareholders' meetings.[5] 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.[6] At the same time, German financial service providers emphasized that the high corporate capital gains tax rate was a major obstacle in unwinding their industrial holdings.[7] German banks were owning a large number of holdings from traditional business relations going back to the post-war period of restructuring.[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 repeal of the corporate capital gains tax was expected to increase the trading volume of shares and the free float of German corporations.[10]

Using a unique data set with no need to proxy for the disposal of corporate holdings, we analyze tax-induced effects on the divestiture choice of German corporations over the period 1999-2007. Contrary to prior studies, our sample is not limited to listed corporations, but also includes data for non-listed corporations, that form up the majority of German corporations.

Our results show that in 2002 the probability of a disposal is significantly higher than during the other years of our observation period. We also find significant evidence that companies with better access to liquid markets have higher disposal rates. If we separate the effects only for the year 2002, we find parent companies from the financial industry to be selling significantly less than other companies. In addition, the disposals of listed

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[5] 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.

[6] See Adams (1994), p. 152.

[7] For example, in 2001, Dr. Schulte-Noelle, CEO of Allianz AG, confirmed that the repeal of the corporate capital gains taxation would lead to a substantial change in the company's management of corporate holdings. For the first time management of corporate holdings would be orientated solely by return perspectives and not motivated by tax planning. See Jäger (2001), p. 593.

[8] For a detailed historical analysis see Höpner / Krempel (2004) or Franks / Mayer / Wagner (2006).

[9] See Breuer (1998), p. 538 and Frick / Lehmann (2004), p. 123.

[10] See Cioffi (2002), p. 379.

parent companies are significantly below those of non-listed parent companies in 2002.

We find the taxation of corporate capital gains to have indeed impeded the unwinding of German holdings. The reason why prior research failed to detect this reaction might be attributed to the fact, that many studies were limited to German listed corporations; the influence of taxation on their divestiture choice appears to significantly differ from that of non-listed corporations.

The remainder of this paper is organized as follows: Chapter 2 gives an overview of the institutional background as well as prior research dealing with corporate capital gains taxation. Chapter 3 presents the divestiture model used in the paper and the research hypotheses. Our data sample and the regression models 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 The German Tax Reform Act 2001

Although taxes were believed to be one of the main reasons for the persistence of the German corporate network, the repeal of the corporate capital gains tax came as a surprise to the public. When Chancellor Schröder announced the tax reform package in December 1999, most public attention was given to the change in the corporate tax system from a full imputation system to a half income system. Only when the reform paper was posted on the website of the Finance Ministry, the repeal of the corporate capital gains tax achieved growing public interest. The stock market responded very positive to the announcement. The first day after the announcement, December 23rd 1999, the German stock index DAX rose by 4.5%.

TRA 2001 passed the Upper House of parliament half a year later in July 2000 and became effective on January 1st 2002. It changed the corporate tax system to a half income system, a classical corporate tax system with shareholder relief elements. Under the half income system it became necessary to tax-exempt intercorporate dividends in order to avoid double (or multiple) taxation of corporate earnings. 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 became tax-exempt, too. Prior to the tax reform capital gains were subject to corporate and local business tax, though corporate tax was credited against the income tax of shareholders. The repeal of the corporate capital gains tax was believed to be neutral with respect to tax revenue. Without a reduction, companies would not

have sold their holdings due to the high tax rates imposed. Thus, no tax revenues would have been raised in both systems.

In addition to the repeal of the corporate capital gains tax, TRA 2001 also reduced the general corporate tax rate from 40% for retained earnings and 30% for distributed earnings to a uniform rate of 25%.

2.2 Prior Empirical Research

Prior research has shown that the taxation of corporate capital gains causes two effects, described by Desai / Gentry (2004) as the allocation and the timing effect. These effects distort both the investment decision itself and the timing of the disposal of an existing investment. According to the allocation effect, changes in shareholder taxation alter the allocation of a shareholder's portfolio and lead to a change in corporate ownership. Since capital gains are usually taxed upon realization, taxpayers can defer tax payments by deferring the disposal of an asset (timing effect). In addition, taxation can be completely avoided if a taxpayer never sells the asset at all. Whenever a reduction of the corporate capital gains tax rate can be expected or long-term capital gains are taxed at a reduced rate, the timing of the disposal of assets becomes more important and the incentive to defer the tax liability increases. This is known as the lock-in effect of capital gains taxation.[11]

The lock-in effect can be attributed to the supply side of the stock market. Existing owners integrate the capital gains tax they have to pay when selling a share into their demanded price. A reduction of the capital gains tax rate lowers the selling price demanded by existing owners and increases the supply of shares.[12] At the demand side of the stock market, a capitalization effect can be found. Future shareholders integrate the taxation of capital gains into the price, they are willing to pay for a share. The higher the expected capital gains tax rate is, the lower is the price an investor is willing to pay for a share. Thus, a reduction of the capital gains tax rates will lead to an increasing demand for shares and shares will be traded at a higher price.[13] Dai / Maydew / Shackelford / Zhang (2008) show that both effects can be observed around a tax reform. Which of the two effects dominates depends on the time period observed. If a capital gains tax reduction is announced, the demand for stocks increases immediately as future shareholders are willing to pay a higher price for the shares because of the lower capital gains tax. Thus, around

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[11] See Desai / Gentry (2004), p. 9ff.
[12] See Dai / Maydew / Shackelford / Zhang (2008), p. 711.
[13] See Ayers / Li / Robinson (2008), p. 77.

the announcement day of a capital gains tax reform, stock prices rise and the capitalization effect dominates the lock-in effect. Only by the time the tax reform becomes effective, an existing shareholder is willing to sell the shares, leading to an increase in the supply of shares. Around the day a capital gains tax cut becomes effective, the lock-in effect dominates the capitalization effect.[14] TRA 2001 substantially lowered the lock-in effect for corporate equity investments and can therefore be expected to lead to an increase in the disposal of German holdings after the law became effective.

One common problem in measuring the effects of a capital gains tax reform is that the realization of capital gains cannot always be observed directly. Knowing when a realization of capital gains has taken place and quantifying the amount of capital gains realized is important because most countries tax capital gains upon realization. Only few studies were able to make use of aggregated data from federal income tax returns.[15] When data from federal income tax returns is not available, adequate proxies that measure the realization of capital gains have to be used. The two most commonly used proxies in prior empirical research have been trading volume[16] or changes in stock prices[17]. Both proxies use capital market data and are therefore applicable only to listed companies.

Gieralka / Drajewicz (2001) and Edwards / Lang / Maydew / Shackelford (2004) test the effects of the repeal of the corporate capital gains tax on the disposal of shares applying an event study approach. Assuming that the announcement of the tax reform was both surprising and occurred on a day when little other information likely affected market prices, the tax-exemption for capital gains must be reflected by stock prices immediately. Gieralka / Drajewicz (2001) calculate abnormal rates of return for 27 DAX-listed companies and find significant abnormal returns only for the first trading days after the announcement. Further investigations show that these abnormal returns are driven solely by the financial companies subsample. Edwards / Lang / Maydew / Shackelford (2004) calculate abnormal rates of return for the seven trading days centred around December 23rd 1999 and regress them on ownership structure characteristics of about 400 listed German corporations. Again results show significant abnormal returns only for the six

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[14] See Dai / Maydew / Shackelford / Zhang (2008), p. 710ff.
[15] Among these studies see Auerbach (1988), Auten / Burman / Randolph (1989), Burman / Randolph (1994), Eichner / Sinai (2000), Feldstein / Yitzhaki (1978), Feldstein / Slemrod / Yitzhaki (1980) or Mariger (1995).
[16] Studies using trading volume as a proxy are Henderson (1990), Ricketts / Walter (1997), Seida / Wempe (2000) or Slemrod (1982).
[17] Studies using stock price changes as a proxy are Amoako-Adu / Rashid / Stebbins (1992), Blouin / Smith-Raedy / Shackelford (2002), Blouin / Smith-Raedy / Shackelford (2003), Guenther / Willenborg (1999), Lang / Shackelford (2000) or Poterba / Weisbenner (2001).

largest German banks and insurance companies and their minority holdings in industrial firms; the companies that actually made up the centre of the Germany Inc. network. For all other companies no significant results can be found. Both studies conclude that the taxation of capital gains was not the binding constraint preventing the disposal of corporate crossholdings.

Empirical research dealing with the realization of corporate capital gains can take advantage of the fact that disclosed corporate financial data can be used as a proxy for the realization of corporate capital gains. Watrin / Benhof (2008) examine the impact of TRA 2001 using data from over 14,000 financial statements. To proxy for capital gains realized on the disposal of equity holdings, the authors use reported extraordinary income. Reported extraordinary income is found to be significantly higher in 2002, the year the capital gains tax was effectively eliminated. For a test group, consisting of German partnerships that were not affected by the tax reform, no significant changes in reported income for 2002 can be found. Contrary to the event study results, the authors conclude that taxes have been an important determinant of the divestiture decision. The extensive network of German crossholdings appears to have been persistent due to lock-in effects caused by high taxes on corporate capital gains.

All prior studies have to accept sample restrictions due to the data used: event studies are restricted to listed companies and therefore not suitable to quantify the effects on non-listed companies. In 2002, there were about 800 listed companies in Germany; they represented only a very small part, far below 1%, of all corporations. Using extraordinary income as a proxy for the realization of capital gains excludes financial companies, since the disposal of holdings is part of the ordinary business and therefore not reported as extraordinary income. Given the fact that financial companies are the only group with significant results in the event study approach, a research design that excludes financial companies is likely to reduce the explanatory power of the results.

In this paper we make use of a unique data set with no need to proxy for the disposal of corporate holdings. Contrary to prior studies, our sample is not limited to listed corporations, but also includes data for non-listed corporations, that form up the majority of German corporations. In addition, we are able to include financial and non-financial companies in our sample.

3   Model and Research Hypotheses

3.1   Divestiture Model

According to the general divestiture model a company will sell an equity holding only if the after-tax gain from selling (G_s) exceeds the after-tax present value from continuing to hold the share (PV_h).[18]

The after-tax gain from selling an investment is determined by the selling price P_s, the acquisition costs AC and the capital gains tax rate τ_g as follows:

$$G_s = P_s - [(P_s - AC) \cdot \tau_g]. \tag{3.1}$$

Contrary, the after-tax present value from continuing to hold the share (PV_h) to infinity, is determined by future dividend payments, Div, the combined corporate tax rate on dividends τ_d and a discount factor i as follows:

$$PV_h = \frac{Div \cdot (1 - \tau_d)}{i}. \tag{3.2}$$

Prior to 2002, German corporations were taxed according to a full imputation system and taxes paid by the subsidiary company were fully imputed to the parent company by means of a tax credit. As a result, dividends distributed were effectively taxed at the tax rate of the parent company, thus $\tau_d = \tau_{Pa}$. Substituting 3.1 and 3.2 using the tax rates applicable before 2002 one obtains

$$P_s - [(P_s - AC) \cdot 0.4] \geq \frac{Div \cdot (1 - 0.4)}{i}. \tag{3.3}$$

TRA 2001 repealed the taxation of corporate capital gains and changed the corporate tax system to a half income system. Under the half income system, intercorporate dividends became tax-exempt and were therefore effectively taxed at the subsidiary's tax rate, thus $\tau_d = \tau_{Sub}$. Substituting 3.1 and 3.2 using the tax rates applicable after 2001 one obtains

$$P_s \geq \frac{Div \cdot (1 - 0.25)}{i}. \tag{3.4}$$

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[18]   The model developed in this section follows Hillebrandt's approach, see Hillebrandt (2001).

Comparing equations (3.3) and (3.4) it can be shown that shares that would have been held under the imputation system are sold under the half income system. To proof this, we transform equation (3.3) with respect to P

$$P_s = \frac{Div}{i} - \frac{2}{3} \cdot AC \qquad (3.5)$$

and subtract equation (3.4) from equation (3.5). Now we obtain

$$\Delta P_s = 0.25 \cdot \frac{Div}{i} - \frac{2}{3} \cdot AC. \qquad (3.6)$$

If equation 3.6 is satisfied, the parent company is indifferent between holding or selling a share. In other words, if

$$\frac{Div}{i} - \frac{2}{3} \cdot AC > P_s > \frac{Div \cdot (1 - 0.25)}{i} \qquad (3.7)$$

a share that would have been hold under the full imputation system will be sold under the half income system.

Assuming that the acquisition costs are negligible small, because corporate holdings have been held for a very long time period[19], equation 3.6 reduces to

$$\Delta P_s = 0,25 \cdot \frac{Div}{i}. \qquad (3.8)$$

In this special case, ΔP_s is always positive, since Div can only take positive values, resulting in a disposal of the share after 2001.

3.2   Hypotheses Development

Based on the results from chapter 3.1 we expect an immediate increase in disposals of corporate equity holdings after the repeal of the corporate capital gains taxation. We derive the following research hypotheses:

Hypothesis 1a: The probability of a disposal of a corporate equity holding will be highest for the year 2002.

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[19]   Both Edwards / Lang / Maydew / Shackelford (2004) and Watrin / Benhof (2008) consider this special case.

Hypothesis 1b: The probability of a disposal of a corporate equity holding under the full imputation system will be lower than under the half income system.

As we have seen in chapter 3.1, the divestiture choice of German corporations also depends on the expected dividend payments of the subsidiary. The higher expected dividend payments, the more likely a parent company is going to hold the investment.

Hypothesis 2: The probability of a disposal of a corporate equity holdings is going to be lower, the higher expected dividends of the subsidiary company.

4   Research Design

4.1   Sample of Corporate Minority Holdings

As mentioned in chapter 2.2, the realization of capital gains can not be observed directly, unless federal income tax return data is available. We can make use of the fact that German corporations have to disclose their equity minority holdings in subsidiary companies. This gives us the opportunity to directly observe the disposal of corporate minority holdings with no need to proxy. Among the databases that provide information about German corporate minority holdings in subsidiary companies we use Amadeus and Osiris from Bureau van Dijk for this paper. These databases offer an ownership module listing the name and country of origin of the subsidiary company and the percentage of direct ownership on a yearly basis.

Since we are interested in detecting a tax-induced disposal of corporate holdings due to TRA 2001, we only consider corporate minority holdings that have already existed by the end of 1999, the year the tax reform was announced. For holdings that have been acquired after December 1999 information about a tax-free disposal has already been available. Since the tax reform became public the last week in December, we do not expect any acquisitions having taken place in 1999 after the announcement of the repeal.

We exclude all minority holdings where the subsidiary is a foreign corporation, since these holdings were not affected by the tax reform, and holdings where financial statement data is not available for the parent and (or) subsidiary company. We use only unconsolidated accounts since we are interested in the effects of the tax repeal on the decision of single parent companies and not in consolidated group effects. We end up with a final sample of 354 corporate minority holdings from 166 parent companies. Finally, we track the sample holdings on a yearly basis until 2007 and look for changes in direct ownership.

4.2   Regression Model

Although the structure of the sample is suitable for panel data analysis, we have to deal with the problem of right censoring, since holdings that have been disposed automatically drop out of our sample. This reduces the annual size of our sample on a systematical basis. To account for the right censoring problem, we carry out various specifications of a two-stage model as well as a survival time model.

The structure of the data allows us to observe both the event of a disposal as well as the volume of the disposal, given that a disposal occurs. The underlying economic process can therefore be defined as a corner-solution model where the participation (probability of a disposal) and the intensity (volume of the disposal) can be observed. One common way to deal with corner-solutions is the use of a tobit model. This model estimates both underlying processes at the same time and therefore reports only one coefficient for the participation and the intensity equation. In order to overcome this limitation, Cragg (1971) proposes a two hurdle model, which allows the outcomes to be determined by two separate processes.[20] First, the participation equation is estimated for the whole sample using a probit approach. In a second step, a truncated normal model is used to estimate the intensity equation only for positive outcomes. Not only does this approach allow for different coefficients of the explanatory variables, but also for different explanatory variables to be integrated in the two tiers of the model. Taking the tobit as the restricted model and the Cragg as the unrestricted model, the tobit model is rejected for our data at the 99% level using a χ^2 likelihood ratio test. We therefore use Cragg's approach and estimate a separate participation and intensity equation.

For the participation equation we define our dependant variable $Dispo_{it}$ as follows:

$Dispo_{it} = 0$, if no change in direct ownership occurred during year t
$Dispo_{it} = 1$ otherwise.

In order to deal with the censoring problem, we run a standard probit model (specification a), a random effects probit model to control for unobserved heterogeneity (specification b) and a dynamic random effects probit model to additionally control for state dependance (specification c).[21]

The participation equation reads as follows:

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[20]   See Cragg (1971).
[21]   For the estimation of the dynamic random effects probit model, we follow Wooldrigde (2005).

$$Dispo_{it} = \alpha + \beta_1 \cdot Y00/01_{it} + \beta_2 \cdot Y02_{it} + \beta_3 \cdot d_{it} + \beta \cdot X'_{it} + \varepsilon_{it} \tag{4.1}$$

For the intensity equation we multiply the size of the block sold by the book value of equity of the subsidiary company to obtain a proxy for the volume of the disposal.[22] *Volume* captures differences in the total value of a disposal, but is very sensitive to size effects, since disposals of large subsidiary companies can lead to outlier problems.

The intensity equation reads as follows:

$$Volume_{it} = \alpha + \beta_1 \cdot Y00/01_{it} + \beta_2 \cdot Y02_{it} + \beta_3 \cdot d_{it} + \beta \cdot X'_{it} + \varepsilon_{it} \tag{4.2}$$

In addition to the two-stage model, we estimate a survival analysis model in order to overcome the problem of right censoring. We can observe direct ownership only on a yearly basis, although disposals can occur on any day in between our observation dates. We have to derive an estimate of parameters describing the continuous time hazard, but taking into account the nature of the banded survival time data.[23] We therefore estimate the following log-logistic model:

$$Failure_{it} = \alpha + \beta_1 \cdot Y00/01_{it} + \beta_2 \cdot Y02_{it} + \beta_3 \cdot d_{it} + \beta \cdot X'_{it} + \varepsilon_{it} \tag{4.3}$$

For all equations, we use three tax variables and a vector X'_{it} of non-tax control variables.

In order to test whether timing effects have played a determining role in the divestiture process, we include two tax period indicator variables. $Y02_{it}$ is an indicator variable taking the value 1 for the year 2002 and zero otherwise. We use this variable to test whether the repeal of the corporate capital gains tax was followed by an immediate increase in disposals of corporate holdings. We expect a higher probability of disposals and higher disposal volumes and therefore a positive coefficient for $Y02_{it}$ (see hypothesis 1a). $Y00/01_{it}$ is an indicator variable taking the value 1 for the years 2000 and 2001 and zero otherwise. We use this variable to separate effects for the two tax regimes during our observation period (see hypothesis 1b). We expect a negative coefficient for $Y00/01_{it}$. As we have shown in chapter 3.1, expected dividends paid by the subsidiary company lower the probability of a

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[22] Since not all of our companies in the sample are listed companies, we cannot use the market value of equity. Both, Edwards / Lang / Maydew / Shackelford (2004) and Watrin / Benhof (2008) use the book value of equity as a proxy for the market value.

[23] See Jenkins (1995).

disposal. We therefore expect a negative coefficient for d_{it} (see hypothesis 2). We measure expected dividends as the mean of the observed dividend payments of the subsidiary firm over the last three years. Since not all of the companies in the sample are listed, we have to proxy the dividend ratio d_{it} of non-listed subsidiaries as a relationship of the difference in the company's profit after taxes $Prof_{it}$ and the change in the shareholder's funds of the company SF_{it} We assume that the dividend ratio is 0 if the companies realizes a loss after taxation.

A tax-induced disposal of corporate holdings might be limited to non-strategic holdings. In accordance with Edwards / Lang / Maydew / Shackelford (2004), we define non-strategic holdings to be holdings outside the parent's two-digit NACE code. Comparing the NACE codes of the parent and subsidiary company we generate an indicator variable, $SameInd_{it}$, that takes the value 1 if both companies belong to the same industry and 0 otherwise. We expect a higher disposal rate and volume for non-strategic holdings and therefore a negative coefficient for $SameInd_{it}$.

Our firm specific control variables include several characteristics of the parent and subsidiary company that influence the divestiture decision.

For the parent company, gains realized on the disposal of corporate holdings increase the company's profit and can be used in order to smooth earnings. We control for this incentive by including $ProfPa_{it}$, the parent company's profit, lagged by one year[24], in our model. We expect companies with lower profits or losses to have a higher incentive to use the disposal of shares as a method of earnings management and therefore a negative coefficient for $ProfPa_{it}$. Previous research has shown that the parent company's industry has an important impact on the divestiture decision. Parent companies from the financial industry are expected to benefit at most from the repeal of the corporate capital gains tax. We therefore include the indicator variable $FinPa_{it}$ that takes the value 1 if the parent company belongs to the financial industry (NACE 1.1 codes 65 and 66). We expect $FinPa_{it}$ to have a positive coefficient. We also test whether companies from the energy sector, belonging to a highly regulated industry, behave differently from other parent companies. We include $EnePa_{it}$, an indicator variable that takes the value 1 if the parent company belongs to the energy sector (NACE 1.1 code 40). In addition, we control for differences in the disposal behavior of listed an non-listed parent companies by including the indicator variable $ListedPa_{it}$.

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[24] Lagging the profit by one year is necessary since gains related to the disposal of shares would be included in the profit of the current year and therefore dilute this measure.

Relevant firm specific characteristics of the subsidiary are taken from ownership structure research results. Starting with the seminal paper of Demsetz / Lehn (1985)[25] several articles[26] have been published testing the hypothesis that the ownership structure of firms is endogenously determined by firm-specific factors. These articles have found the size, the control potential and the industry regulation of a company to influence its ownership structure.

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. This implies smaller ownership blocks for larger firms. We measure $SizeSub_{it}$ as the natural log of total assets of the subsidiary company. 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 larger ownership blocks can be expected. Control potential, $CPSub_{it}$, of the owners is measured as the estimated standard deviation of the company's profit over the last three years. Regulation within an industry can be seen as a substitute for managerial control by owners. Ownership blocks are therefore expected to be smaller in regulated industries. Demsetz / Lehn (1985) classify the financial and energy industries as highly regulated industries. We therefore generate an indicator variable $RegSub_{it}$ taking the value 1 if the subsidiary company belongs to either the financial or energy industry and 0 otherwise.

Furthermore, we expect the disposal of corporate holdings to depend on the parent company's ability to access liquid markets.[27] As a proxy for the access to liquid markets we use the size of the parent company, $SizePa_{it}$ and an indicator variable, $ListedSub_{it}$, that takes the value 1 if the subsidiary is listed and 0 otherwise. We measure size as the normal log of total assets of the parent company. We expect $SizePa_{it}$ and $ListedSub_{it}$ to have a positive coefficient.

We also control for macroeconomic factors that are expected to influence corporate M&A activity. 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 ac-

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[25] See Demsetz / Lehn (1985).
[26] Among them see Bergström / Rydquist (1990), Leech / Leahy (1991), Prowse (1992) and for a sample of German corporations Wojcik (2003).
[27] See Becht (1999), p. 1075.

tivities. 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 12 month German interbank offered rate. Stock prices, $Stock_t$, are measured as the yearly performance of the German stock index DAX.

5   Empirical Results

5.1   Summary Statistics

Our final sample, generated using the selection process described in chapter 4.1, includes 354 corporate holdings from 166 parent companies. 217 (61.30%) of the sample holdings are held by non-listed parent companies and 137 (38.70%) by listed parent companies. The size of the holdings at the beginning of our observation period (1999) varies between a minimum of 0.10% and the maximum of 25%. The mean value is 11.59% and slightly above the median of 10.06%. For parent companies, we find a high concentration among a few industries, confirmed by the fact that 70.81% of the parent companies belong to the top four industries in our sample. The industry with the highest number of parent companies is electricity, gas, steam and hot water supply (NACE 1.1. industry number 40), followed by the management of holding companies (NACE 1.1. industry number 74) and financial intermediation, except insurance and pension funding (NACE 1.1. industry number 65). The distribution of industries among the subsidiary companies shows a greater variety. We identify 42 different industries, compared to 29 for the parent companies. As for the parent companies, most subsidiary companies belong to the electricity, gas, steam and hot water supply industry. Companies from this sector do not only hold a high number of minority blocks, they are also frequently held by other companies via minority blocks.

For 102 holdings (28.81%) the parent and subsidiary company belong to the same 2-digit NACE industry. The largest number of holdings within the same industry can again be found for the electricity, gas, steam and hot water supply industry (62 holdings, 60.87%).

Table 1 shows the distribution of disposals over the observation period for the whole sample and for listed and non-listed parent companies separately.

{Insert table 1 about here.}

By the end of our observation period, 252 of the 354 holdings have been sold, resulting

in 269 disposals.[28] The highest number of transactions is found for the year 2002 (nearly 37.91%), the first year the repeal of the corporate capital gains tax became effective. In addition, 2002 is also the year with the highest number of disposals for both, listed and non-listed parent companies.

With respect to industries, parent companies from the management of holding companies sector show the highest number of disposals (63), followed by financial intermediation (57) and insurance companies (43). Although electricity supply is the industry with the most companies in our sample, it is only the fourth biggest industry by disposals (41). We also calculate a disposal rate for every parent company industry. The results show that companies from the insurance and financial industry have sold nearly all of their minority holdings (97.56% and 93.44%), making the financial sector the most intensive disposal industry. Parent companies from the electricity supply sector do not only show a low number of disposals, but also a very low disposal rate. Not even half of the holdings (45.56%) were sold until 2007. This is the lowest disposal rate among the top ten industries.

If we multiply the percentage of direct ownership by the market (book) value of equity of the subsidiary company, we obtain a proxy for the volume of the disposal (see chapter 4.2). Table 2 shows summary statistics for the volume of disposals for our total sample as well as for parent and subsidiary non-financial companies separately.

{Insert table 2 about here.}

For the total sample, 2005 is the year with the highest disposal volume, followed by 2007, 2003 and 2002. When analyzing disposal volumes in more detail, we find these numbers to be highly determined by the disposals of parent companies from the financial sector as shown by the second column in table 2. For example in 2007 about 7 billion of the total volume can be attributed to disposals by Allianz AG and Munich Re. Removing financial parent companies from our sample, we find 2002 to be the year with the highest disposal volume. The third column in table 2 shows the disposal volume that can be attributed to disposals of minority holdings held in subsidiary companies outside the financial sector. Again, we find 2002 to be the year with the highest disposal volume.

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[28]   The reason why the number of disposals is higher than the number of holdings sold can be explained by the fact that in a few cases holdings have not been sold in one disposal, but in several steps, causing two or more disposals for the same holding.

5.2 Regression Results

In order to test the dynamic effects of TRA 2001 on the disposal of corporate minority holdings, we estimate a two-stage Cragg model as well as a survival time model using data for the 354 holdings defined in chapter 4.1.

Table 3 shows the results for the estimation of the two-stage Cragg model:

{Insert table 3 about here.}

The coefficient for $Y02_{it}$ has the expected positive sign and is significant at the 1% level for all three alternative specifications of the participation equation. For the standard probit model, we find disposals for the year 2002 to be about 30% more likely than in all other years during our observation period. This is a clear indicator, that German corporations reacted immediately to the repeal of the corporate capital gains tax. With respect to hypothesis 1b, we find the expected negative coefficient for $Y00/01_{it}$. It is significant at the 1% level only for the random effects probit estimation and again an indicator for a severe lock-in effect caused by the taxation of corporate capital gains. In addition, we find dividend payout ratios to be negatively related to the probability of a disposal. The coefficient for d_{it} is negative and significant at the 10% (5%) level for the (random effects) probit estimation.

Among our control variables, the industry of the parent company appears to have a significant influence on the probability of a disposal. Surprisingly, we find disposals to be about 7.5% less likely if the parent companies is from the financial industry. This is contrary to our expectations, since financial companies were found to have the highest disposal rate among the industries in our sample. In addition, we find evidence for liquidity restrictions with respect to the probability of a disposal. Disposals are significantly more likely if the parent company is larger and the subsidiary is a listed corporation.

As we have seen from summary statistics in chapter 5.1, 2002 is only the year with the fourth largest disposal volume. This fact is primarily driven by disposals from parent companies from the financial sector that occurred in the years after 2002. We thus find a significant negative coefficient for both, $Y02_{it}$ and $Y00/01_{it}$ for the intensity equation. In line with our results, we find the coefficients for parent and subsidiary companies from the financial industry to have a positive sign, showing that disposal volumes are higher if financial companies are involved in the disposal. With respect to the overall disposal volume we only find supporting evidence for hypothesis 1b.

The results from the Cragg model might suffer from the problem of right censoring in the sample. Thus, we alternatively estimate a log-logistic survival times model. Table 4 shows the results for the estimation of the survival model.

{Insert table 4 about here.}

Again we find a positive and highly significant coefficient for $Y02_{it}$. The hazard ratio of 1.52 indicates that disposals for the year 2002 are about 52% more likely than for all other years in our sample. We do not find significant evidence for a lower disposal rate under the full imputation system if we account for right censoring. The hazard ratio of 1.04 for $Y00/01_{it}$ indicates that disposals under the full imputation system are roughly as likely as disposals under the half income system. This is an indicator for an immediate and short time lowering of the lock-in effect due to the repeal of corporate capital gains taxation. Also, the coefficient for d_{it} has the expected significant negative coefficient, showing that the expected trade off between dividends and capital gains leads to clientele effects that have to be taken into account when evaluating TRA 2001.

In order to see whether our results for $Y02_{it}$ are driven by firm-specific characteristics, we multiply $Y02_{it}$ with all firm specific non-tax control variables in our sample and re-estimate the survival time model. Non-tabulated results show that two firm specific characteristics are significantly driving the results for $Y02_{it}$: the coefficients for $Y02FinPa_{it}$ and $Y02ListedPa_{it}$ are both negative and significant at the 1% level. This shows, that although 2002 is found to be the year with the highest number of disposals, parent companies from the financial industry and listed parent companies were not reacting immediately to the lowering of the lock-in effect. Their disposal decision does not appear to be primarily determined by tax factors.

6 Conclusion

Due to the German TRA 2001 corporate capital gains realized on the disposal of domestic shares became tax-exempt by the beginning of 2002. Prior to 2002, the general corporate tax rate of 40% had to be applied. The repeal was expected to generate a widespread lowering of the lock-in effect and a major unwinding of German crossholdings.

Prior studies analyzing the effects of TRA 2001 have found different results. Event studies analyzing the effect on capital market returns fail to detect a widespread market reaction and only find companies from the financial sector to benefit from the tax exemption.

Contrary, analyses of financial report data show that disposals of corporate holdings are significantly higher for the year 2002 and conclude that there has been an immediate response to the tax exemption.

Our analysis differs from prior studies by using a unique data set with no need to proxy for the disposal of corporate minority holdings. In addition, our sample is not limited to listed corporations, but also includes data for non-listed corporations, that form up the majority of German corporations. For the years 1999-2007 we analyze the probability of a disposal and the corresponding disposal volume and find an immediate and widespread response to TRA 2001.

For the 354 holdings analyzed, 252 have been sold by the end of 2007. Most of the transactions (nearly 37.91%) have occurred in the year 2002, the first year the repeal of the corporate capital gains tax became effective. In addition, we find evidence of a severe lock-in effect, reflected by significantly lower probabilities of a disposal during the years 2000 and 2001.

Results remain unchanged if we explicitly account for the problem of right censoring using a survival time model. We find disposals for the year 2002 to be about 52% more likely than for all other years in the sample. In addition, we can show that the expected trade-off between dividends and capital gains leads to clientele effects that have to be taken into account when evaluating TRA 2001.

In order to see whether firm specific variables are driving the results for the year 2002, we include several interactive explanatory variables in the survival time model. We find parent companies from the financial industry and listed parent companies to be selling significantly less holdings in 2002. Taken these two results together we find no significant evidence for a tax-induced selling for listed companies nor for financial companies. These results might also help to explain why prior event studies could not detect a widespread market reaction.

We find the taxation of corporate capital gains to have indeed impeded the unwinding of German holdings. The reason why prior research failed to detect this reaction might be attributed to the fact, that many studies were limited to German listed corporations; the influence of taxation on their divestiture choices appears to be significantly different from that of non-listed corporation.

Appendix

year	number of disposals	listed	non-listed
2000	6	2	4
2001	34	6	28
2002	102	40	62
2003	37	8	29
2004	27	12	15
2005	35	10	25
2006	22	5	17
2007	6	1	5
total	269	84	185
% sold	75.99%	61.31%	85.25%

Table 1: Number of disposals of corporate minority holdings.

year	total disposal volume	parent non-financial	sub non-financial
2000	167.838	167.838	167.838
2001	1.487.037	152.150	152.150
2002	7.165.383	1.542.932	3.883.913
2003	7.545.304	462.426	1.839.596
2004	1.036.262	189.295	840.361
2005	10.080.896	223.435	2.363.707
2006	2.458.897	447.617	1.190.639
2007	9.267.274	260	260

Table 2: Volume of disposals of corporate minority holdings by year (in thd Euro).

two-stage Cragg model				
	participation equation			**intensity equation**
Specification	a		b	c	
Variable	**Coefficient** ME	**Coefficient**	**Coefficient**	**Coefficient**
	(Std.Err.)	(Std.Err.)	(Std.Err.)	(Std.Err.)
$Y02_{it}$ (+)	1.1322*** 0.3068	0.5399***	0.5770***	-730,429.7***
	(0.2089)	(0.0941)	(0.1210)	(198,443.8)
$Y00/01_{it}$ (−)	-0.1027 -0.0189	-0.5974***	-0.3137	-558,388.6***
	(0.1564)	(0.0976)	(0.2007)	(209,713.9)
d_{it} (−)	-0.1566* -0.0293	-0.1748**	-0.0706	-18,216.7
	(0.0905)	(0.0897)	(0.1189)	(134,534.0)
$SameInd_{it}$ (−)	0.0403 0.0197	0.0958	-0.0091	-748,318.4***
	(0.1084)	(0.1076)	(0.1243)	(273,281.2)
$ProfPa_{it}$ (−)	-0.0000 -0.0000	-0.0000	-0.0000	-0.03713
	(0.0000)	(0.0000)	(0.0000)	(0.0291)
$FinPa_{it}$ (+)	-0.4632*** -0.0755	-0.4649***	-0.3187	-482,679.2**
	(0.1606)	(0.1601)	(0.2046)	(253,049.7)
$EnePa_{it}$	-0.2664** -0.0465	-0.2527**	-0.3028**	-1,517,198*
	(0.1342)	(0.1325)	(0.1579)	(819,187.7)
$ListedPa_{it}$	0.1175 0.0224	0.1020	0.0971	-36,195.53
	(0.1063)	(0.1056)	(0.1215)	(112,989.3)
$SizeSub_{it}$ (+)	0.0446* 0.0083	0.0434*	0.5525***	492,130.5***
	(0.0237)	(0.0234)	(0.1706)	(65,474.56)
$CPSub_{it}$ (−)	-0.0000 -0.0000	-0.0000	-0.0000	-0.1337***
	(0.0000)	(0.0000)	(0.000)	(0.0238)
$RegSub_{it}$ (+)	0.0171 0.0032	0.0105	0.0977	-559,586.9***
	(0.1018)	(0.1009)	(0.1195)	(163,184.1)
$SizePa_{it}$ (+)	0.0664*** 0.0124	0.0666***	0.9311***	128,805.7***
	(0.0235)	(0.0233)	(0.2438)	(39,838.8)
$ListedSub_{it}$ (+)	0.2930*** 0.0604	0.3535***	0.3395***	474,187.9***
	(0.1120)	(0.1113)	(0.1282)	(162,792.5)
$Interest_t$ (−)	-0.4819*** -0.0902	-0.4417***	-0.1897	646,863.1***
	(0.1217)	(0.1827)	(0.1637)	(155,387.7)
$Stock_t$ (+)	0.0002*** 0.0000	0.0001***	0.0001*	-72.4
	(0.0000)	(0.0001)	(0.000)	(79.7)
N	1,808	1,808	1,438	1,808
χ^2	200.96	162.66	117.30	

Significance levels: ∗ 10%   ∗∗ 5%   ∗ ∗ ∗ 1%

Table 3: Estimation results for the Cragg model.

Survival Time model		
Variable	**Coefficient**	**Hazard Ratio**
	(Std.Err.)	
$Y02_{it}$ (+)	4.5800***	1.5217
	(0.3001)	
$Y00/01_{it}$ (−)	0.0424	1.0433
	(0.2876)	
d_{it} (−)	-0.2621*	0.7694
	(0.1441)	
$SameInd_{it}$ (−)	0.0198	1.0200
	(0.1757)	
$ProfPa_{it}$ (−)	-0.0000	1.0000
	(0.0000)	
$FinPa_{it}$ (+)	-0.0672	0.9349
	(0.2121)	
$EnePa_{it}$	-0.6553***	0.5192
	(0.2261)	
$ListedPa_{it}$	0.2544	1.2896
	(0.1741)	
$SizeSub_{it}$ (−)	-0.0119	0.0325
	(0.9881)	
$CPSub_{it}$ (+)	0.0000	1.0000
	(0.0000)	
$RegSub_{it}$ (−)	0.1450	1.1560
	(0.1610)	
$SizePa_{it}$ (+)	-0.0048	0.9951
	(0.0283)	
$ListedSub_{it}$ (+)	0.5106***	1.6663
	(0.1674)	
$Interest_t$ (−)	-0.9163***	0.3999
	(0.2181)	
$Stock_t$ (+)	0.0001	1.0000
	(0.0001)	
N	1,808	
χ^2	725.75	

Significance levels: ∗ 10%   ∗∗ 5%   ∗ ∗ ∗ 1%

Table 4: Estimation results for the survival time model.

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