Do Equity Tax Shields Increase Equity Ratios?

The Austrian Case

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Abstract:

The goal of this article is to analyze the impact of equity tax shield provisions, that prevailed in Austria from 2000 to 2004, on the capital structure of firms. We use data from Reuters and Datastream and perform fixed effects panel regression. We find that, in contrast to the goal of the tax reform, there was a significant increase in neither the book value equity ratio nor the market value equity ratio. For the capital structure at book values we even find an increase in the debt ratio. We observe that the firms followed the incentive immanent in the Austrian tax system to increase the volatility of capital structure with respect to the book value capital structure but not with respect to the market value capital structure.

Apart from equity tax shields our study tries to identify non-tax related determinants (e.g. profitability, size, market-to-book ratio, fixed assets to total assets ratio, autocorrelation) and by this to confirm or falsify the agency theory, the pecking order theory and the tradeoff theory. This is done both for the book value capital structure and for the market value capital structure, where we see substantial differences between the book value capital structure and the market value capital structure determinants. In both cases we detect a strongly significant autocorrelation. For market value capital structure, we falsify the debt substitution hypothesis of DeAngelo/Masulis (1980).

Keywords: capital structure, tradeoff theory, tax shields

JEL Classification Codes: P43, E62, H25, H32, G32

1. Introduction

The choice of the capital structure is one of the key decisions of a financial manager. The optimal capital structure is the structure that maximizes the value of the firm. Literature shows that taxes, transaction costs, bankruptcy costs and principal agent problems are the main drivers of the optimal capital structure (e.g. Grossman/Hart (1983) and Rajan/Zingales (1995)). This paper focuses on the impact of taxes on the capital structure selected by the firms.[1]

From a macroeconomic point of view firms should have sufficient equity, as equity provides a buffer against crises. In light of the potential consequences of the implementation of the Basel accord on capital adequacy and the recent financial crisis, the perception of the need for equity finance has even increased. “Standard” tax systems, however, create adverse capital structure incentives: The deductibility of debt interest payments from the tax base of companies makes debt finance more attractive, thereby distorting financing decisions as well as investment decisions of corporations.

To compensate for this, in the last two decades several countries implemented tax systems that allowed the deduction of equity tax shields, i.e. imputed (fictitious) interest on equity, from the corporate income tax base. In general, equity interest does not remain untaxed, but it is taxed at a lower rate compared to ordinary income. These tax regimes therefore resemble (and are sometimes even referred to as) "Dual Income Tax Regimes" in which part of the businesses earnings (in this case the imputed equity interest) is taxed at a reduced rate. A tax regime, where imputed interest on equity is fully excluded from taxation, can be seen as a special case with a zero tax rate for the imputed interest on equity and is referred to as “Allowance for Corporate Equity” (ACE) systems or “Interest Adjusted Income Tax” (IAIT) systems. For a description of the theoretical attractions of ACE systems see also Fehr/Wiegard (2001) and Keen/King (2002).

Countries that introduced tax regimes with equity tax shields are Denmark, Sweden, Norway and Finland (see Soerensen, 1998 and 2001), Brazil (see Del Castillo et al. (2003), Carvalho

[1] Haugen/Senbet (1978), Brennan/Schwartz (1978) and Kruschwitz et al. (2005) raise arguments against the importance of bankruptcy costs. Agency aspects are included implicitly in our study by means of control variables.

de Mesquita/Lara (2004) or Solano et al. (2004)), parts of Bosnia-Herzegovina (see Rose (2004)) and Belgium from the fiscal year 2007 on (see Hinnekens (2005)). Additional examples of tax regimes with equity tax shields that existed over a limited period of time are the former tax systems in Croatia (see Rose/Wiswesser (1998)) and Italy (see Valente (1997), Smith/Valente (1998) and Bordignon/Giannini/Panteghini (2001)). For further details on the design of tax systems with equity tax shields in various countries see also Frühwirth/Schwaiger (2006) and Klemm (2007).

Allowing interest on the full amount of equity creates a big burden for the public budget, that has to be compensated e.g. by enormous cuts of public expenses (deconstruction of the social welfare state) or by an increase in the corporate tax rates, in indirect taxes or in the taxation of labour. Therefore, as a variant the Austrian government, between the years 2000 and 2004, provided a softer tax incentive to stimulate equity, namely to allow equity tax shields only on the equity in excess of a reference level of equity ("incremental equity").

As the goal of the Austrian provision was to increase the equity ratio of firms, the first goal of this study is to find out if a government can motivate firms to increase equity ratios by allowing equity tax shields on the incremental equity. One would tend to believe that an incentive like this has to cause higher equity ratios. Klemm (2007), however, showed that equity tax shields (with some similarities to the Austrian system) introduced in 1996 in Brazil caused the equity ratios even to decline rather than to increase.[2] Moreover, it is controversial if taxes have an impact at all on the capital structures selected by firms. For instance, Bradley/Jarrel/Kim (1984), Kim/Sorensen (1986), Titman/Wessels (1988) or MacKie-Mason (1990) find that the impact of taxes on the capital structure is rather minor, whereas other literature as Alworth/Arachi (2001) or Previtero (2003) show that taxes have an influence. This provides arguments to investigate the effects of equity tax shields allowed in Austria on the capital structure of Austrian firms.

The impact of equity tax shields on the capital structure has been analyzed in several empirical studies. Staderini (2001), Previtero (2003) and Bontempi/Giannini/Golinelli (2004) analyzed the Italian system and found that equity tax shields reduced debt ratios. As stated above Klemm (2007) investigated the Brazilian tax system and surprisingly came to the opposite result. Radulescu/Stimmelmayr (2007) performed a simulation study for Germany

[2] see Klemm (2007), p. 20

and found that the introduction of equity tax shields in Germany would also reduce debt ratios.

Our study differs from these studies in several ways: First, Austrian tax system is different from the tax systems analyzed in these papers, as equity tax shields are based only on incremental equity. By this, our study is the first empirical study that analyzes the impact of incremental equity tax shields on the capital structure. Second, in contrast to existing literature on the impact of equity tax shields we do not only investigate the impact on the book value capital structure but also on the market value capital structure. This is consistent with Lasfer (1995), Graham (1999), Baker/Wurgler (2002) and Korajczyk/Levy (2003), who investigate determinants of the capital structure at market values. This enables to compare the effects of equity tax shields on market value capital structure vs. book value capital structure, which in turn can give an indication to what extent the results of existing literature on the impact of equity tax shields on the capital structure that is based on book value capital structures also holds for market value capital structures. Third, we use a relatively new definition of capital structure suggested by Welch (2007).

We find that, in contrast to the aim of the tax system, there was a significant increase in neither the book value equity ratio nor the market value equity ratio. For the equity ratios at book values we even find an increase in the debt ratio. Allowing tax shields only on the increment of equity, the Austrian tax system provides an incentive to increase the volatility of the capital structure. We can confirm that the firms followed this incentive with respect to the book value capital structure, but not with respect to the market value capital structure. Apart from equity tax shields our study tries to confirm or falsify the agency theory, the pecking order theory and the tradeoff theory both for book value capital structures and for market value capital structures. Moreover, we detect a strongly significant autocorrelation of the capital structure. As regards the market value capital structure, we falsify the debt substitution hypothesis of DeAngelo/Masulis (1980). Finally, our study shows strong differences between the determinants of book value capital structure vs. market value capital structure.

This paper is organized as follows: Section 2 describes the Austrian equity tax shield provisions from 2000 to 2004, Section 3 describes and motivates the research questions, Section 4 explains both methodology and data, Section 5 delivers our results, and, finally, Section 6 concludes.

2. The Austrian Provisions Allowing Equity Tax Shields

The Austrian tax system allowing equity tax shields from 2000 to 2004 has been described by Genser (2002).

The system allowed for fictitious interest on the equity increase over a year to be deducted from the corporate income tax base of that year. The equity interest was calculated in the following way: The applicable interest rate on equity was set by a directive of the Austrian Federal Minister of Finance at a rate corresponding to the average of secondary market yields for all issuers on the domestic bond market from January to December, increased by 0.8 percentage points. This interest rate was applied to the equity increase („incremental equity“) of the corresponding year. The Austrian Income Tax Act defined the incremental equity in year *t* as the difference between the weighted average equity over year *t* (calculated on a daily basis) and the maximum of the weighted average equity of the previous seven years. Claiming interest on the incremental equity was at the discretion of the business. Therefore, in years when the equity increase was negative, the business has not claimed any equity tax shields. The resulting interest on incremental equity was deducted from the corporate tax base as an operating expense. The amount deducted was to be recorded as ‘special earnings’, which were to be taxed at a rate of 25% instead of the “standard” corporate tax rate of 34%. In each individual year, firms had the option whether or not to claim equity tax shields. Following data provided by Statistik Austria equity tax shields were used by 169, 192, 168, 138 and 115 corporations (German *Aktiengesellschaft*) in 2000, 2001, 2002, 2003 and 2004 respectively. Due to a general tax cut these equity tax shields have become redundant from 2004 on.

As Bogner/Frühwirth/Höger (2002) showed, this tax system was not sufficient to eliminate the preferential treatment of debt over equity. The advantage of such a system, however, was that it significantly reduced the tax loss of the fiscal authorities. Thus, allowing fictitious interest on the incremental equity can be seen as a compromise between a neutral tax system (with interest on the level of equity) and the reduction of the tax loss of fiscal authorities.

3. Hypotheses and Research Questions

This paper investigates the following questions:

1) Can a government motivate firms to increase equity ratios by allowing equity tax shields on the incremental equity, i.e. do firms increase their equity ratios in response to the introduction of equity tax shields?

The first intuition (having a rational financial manager in mind) is that equity tax shields should increase equity ratios. However, there are some studies that show that tax provisions may have only minor impact on the capital structure (Bradley/Jarrel/Kim (1984), Kim/Sorensen (1986), Titman/Wessels (1988), MacKie-Mason (1990)). Also, the status quo bias (see Samuelson/Zeckhauser (1988)) implies that even after tax changes firms may stick to the "old" capital structure. Furthermore, Klemm (2007) showed that equity tax shields in Brazil caused equity ratios even to decline rather than to increase.

2) Does the capital structure selected depend on the level of the equity interest rate?

Can the government increase firms' equity ratios by increasing the fictitious equity interest rate?

3) How did the capital structure evolve after equity tax shields have been introduced?

Is the equity tax shield effect permanent or rather transitory over the equity tax shield window (i.e. is there a diminishing effect over these four years)?

4) Is there a difference between the impact of equity tax shields on the capital structure at book values vs. at market values?

This question is especially important as all authors that previously analyzed the impact of equity tax shields on the capital structure studied the book value capital structure. By contrast, Welch (2004) strongly argues in favor of analyzing the market value capital structure instead of book values. Therefore, we investigate the impact on the book value capital structure and on the market value capital structure. This also gives an indication to what extent the results of existing literature on the impact of equity tax shields based on the book value capital structure also hold for the market value capital structure.

5). Is there an impact of equity tax shields based on incremental equity on the volatility of capital structures?

The hypothesis is that, as equity tax shields are only calculated on the increase of equity, these provisions embedd an incentive to strongly raise equity in year *t* (in order to claim high equity tax shields in year *t*), then strongly reduce equity in year *t*+1 (in order to reduce the reference level for the years after *t*), strongly increase equity in year *t*+2 (in order to claim high equity tax shields) and so on. It goes without saying that this incentive is limited by transaction costs of capital structure changes. Nevertheless, unless transaction costs exceed the gain from excessive capital structure volatility, the volatility of the capital structure should increase.

Finally, we will also answer other questions on the capital structure choice of Austrian firms that are unrelated to equity tax shields. By this we add evidence from the Austrian market on non-tax determinants, including profitability and growth opportunities, of the capital structure, whether non-debt tax shields replace debt tax shields ("debt substitution hypothesis" of De Angelo/Masulis (1980)) and whether different capital structure theories like the pecking order theory, the tradeoff theory or the agency theory can be verified. Even though these questions have been analyzed for several countries already, analyzing these questions with the Austrian dataset makes sense as Austria provides an environment very different from other countries (e.g. USA/U.K.) in several aspects: Austria is a small open economy with a very dominant banking system (housebanks) and therefore different corporate governance rules. Also, it has a smaller capital market with lower liquidity and investor protection compared to USA/U.K.[3]

4. Methodology and Data

4.1 Sample

The sample period includes balance sheet years starting from January 1, 1996 to December 31, 2007. Thus, it contains the equity tax shields window (business years starting between January 1, 2000, and December 31, 2004), a window before the introduction of equity tax shields (business years starting between January 1, 1996, and December 31, 1999) and a window after the abandonment (business years starting between January 1, 2005, and December 31, 2007).

Our sample contains all companies available in Reuters (both Ltd. ("GmbH") and plc. ("AG", "SE")) with headquarters in Austria. This sample selection criterion restricts the universe of

[3] Although the capital market orientation has increased in Austria over the last decade, the stage of development of the capital market is still not comparable to capital market oriented countries like USA and U.K.

investigated companies to 150. We removed from this sample all companies without any observation available in the equity tax shields window, giving 121 companies. A detailed list of these firms can be seen in Appendix 1. This is also the sample for the regressions envolving the book value capital structure. For the regressions of the market value capital structure, we had to further restrict our sample by eliminating those firms that were not listed on a stock exchange (inside or outside Austria) until December 31, 2004. Thereby we also excluded all Ltd. (GmbH). This resulted in 75 companies for the market value regressions. Altogether, we have 1452 firmyears in our sample for the book value capital structure regressions and 900 firmyears for the market value capital structure regressions.[4]

4.2 Dependent Variables

Welch (2007) warns about common flaws in capital structure studies and makes two suggestions to improve the validity of capital structure studies:

1. The market value capital structure should be used instead of the book value capital structure.[5]

2. Standard literature (e.g. Rajan/Zingales (1995), Alworth/Arachi (2001), Baker/Wurgler (2002), Graham (2003)) uses financial debt divided by total assets. However, the total liabilities-to-assets ratio should be preferred over the total-debt-to assets ratio because the former is internally consistent in the sense that a higher measure implies a higher leverage (the opposite of this ratio is the equity ratio and not a non-debt liability + equity ratio).

A further argument for these suggestions is that it is this ratio that enters the weighted average cost of capital. We follow the suggestion by Welch (2007) and use the total liabilities-to-assets ratio instead of the debt ratio. Note that, consistent with Welch (2007) this broad definition of the numerator also includes pension obligations, deferred taxes, payables (notes payable, accounts payable, and income tax payable), accruals etc. and we include both in the numerator and in the denominator long-term and short-term assets/liabilities.

[4] We have to admit that use of Reuters data may cause a survivorship bias if capital structure or capital structure determinants also have an impact on the probabilities that firms appear and disappear. However, as pointed out by Welch (2007), this problem is difficult to remedy, especially as from our database we do not get the information about the number and characteristics of firms leaving the market. Moreover, in the capital structure study of Welch (2004) survivorship bias is not an issue of first-order importance.

[5] see page 10 in Welch (2007): "I would also claim that the common use of book values rather than market values is a mistake".

In contrast to Welch (2007), who suggests to classify minority interest as liabilities, we classify minority interest as equity. This is based on the following arguments: While under US GAAP, the minority interest can be reported in the liabilities section, the equity section or the "mezzanine section" of the balance sheet, under IFRS, the minority interest is reported in the equity section. Our main argument, however, to classify minority interest as equity is that in this study we want to analyze the effect of tax shields on the capital structure and that there are no debt tax shields involved with minority interest.

As already pointed out, the complete literature investigating the impact of equity tax shields investigates the book value capital structure. To ensure comparability with these studies we also investigate a book value total liabilities-to-assets ratio (*DR_BV*):

$$DR\_BV = \frac{Total\ Liabilities\ (BS)}{Total\ Assets\ (BS)}$$

(BS) = from balance sheet

In addition we follow Welch (2007) using market value total liabilities-to-assets ratios. To be more precise, we use market values of equity and book values of debt, which is in line with Baker/Wurgler (2004), Welch (2007), and Frühwirth/Schneider/Sögner (2009).[6] To obtain the market values of equity we multiplied the stock price with the number of shares outstanding. Both components were taken from Reuters, however, in some cases we had to use Datatream to obtain this information.

We define the market value total liabilities-to-assets ratio (*DR_MV*) as

$$DR\_MV = \frac{Total\ Liabilities\ (BS)}{No.\ of\ Shares\ (BSD)\ *\ Share\_Price\ (BSD)\ +\ Total\ Liabilities\ (BS)\ +\ Minority\ Interest\ (BS)}$$

(*BSD*) = on Balance Sheet Day

In line with Welch (2007), we truncated the total liabilities-to-assets ratios of less than 0% or more than 100% at 0 and 1, respectively.

4.3 Candidates for Capital Structure Determinants

[6] Altmann (1984) is one of a few papers that suggests to use market values also for debt. However, as in Austria most of the liabilities are taken out in the form of non-traded loans we followed most of the literature that assumes for debt that the book value equals the market value.

4.3.1 Tax Variables

The first tax variable is non-debt tax shields. As it is possible to replace debt by other non-debt tax shields (e.g. depreciation or tax credits), the higher the non-debt tax shields, the less debt is required to reduce taxes ("debt substitution hypothesis" by DeAngelo/Masulis (1980)). As a result companies with large non-debt tax shields are supposed to have smaller total liabilities-to-assets ratios. We define

$$NDTS = \frac{Depreciation\,\&\,Amortization}{Operating\_Result + Depreciation\,\&\,Amortization}$$

Our second tax variable is the equity interest rate, *EQRATE*, equal to values announced by the Directive of the Austrian Minister of Finance between 2000 and 2004, and set to 0 otherwise. The hypothesis, derived from the tradeoff theory adjusted to the equity tax shield regime, is that the higher the equity interest rate is, the smaller the total liabilities-to-assets ratio should be. A significant negative impact of the total liabilities-to-assets ratio also shows that the Austrian equity interest provisions managed to increase the equity ratios.

4.3.2 Non-Tax Variables

In addition to taxes, a large number of capital structure determinants has been proposed by literature:

Many empirical studies (e.g. Rajan/Zingales (1995), Frank/Goyal (2003) or Welch (2007)) provide evidence, that profitability has an impact on leverage. We use for profitability the return on assets, *ROA*, defined as the ratio Operating Result/Total Assets (see Graham (1999) or Welch (2004)). According to the tradeoff theory, this variable should have a positive impact on the total liabilities-to-assets ratio, as higher profitability increases the debt capacity of the firm as a result of the lower probability of the bankruptcy, while the pecking order theory states that there should be a negative impact. Asymmetric information between equity- and debtholders makes companies prefer to use retained earnings to finance the investment activity. As long as internal sources allow financing investment projects, companies do not use external financing. This argument is in line with the pecking order theory introduced by Myers (1984).

Another widely used explanatory variable for capital structure is size. Following tradeoff theory, large companies can use diversification to reduce their business risk. This in turn allows them to raise debt at favourable terms (Graham (1999). Therefore size is assumed to have a positive impact on leverage. We define size by Log[Total Assets] (see e.g. Antoniou/Guney/Paudyal (2006) or Welch (2007)).

As Rajan/Zingales (1995), Barclay/Smith/Watts (1995) and Welch (2007) show that the debt ratio is a decreasing function of the Market-to-Book ratio, we also use the market to book ratio as a determinant.

$$MBR = \frac{No.\ of\ Shares\ (BSD)\ *\ Share\_Price\ (BSD)\ +\ Total\ Liabilities\ (BS)\ +\ Minority\ Interest\ (BS)}{Total\ Assets\ (BS)}$$

The Market-to-Book ratio can be seen as a proxy for growth opportunities (see Ozkan (2000) or Antoniou/Guney/Paudyal (2006)). According to the agency theory, if growth opportunities increase, equityholders would require a decrease in debt ratio in order to decrease the flow of benefits to debtholders.

Another variable determining the capital structure is the collateral value of a firm's assets. Firms that are subject to an information asymmetry problem often prefer debt over equity financing. If the firm is in financial distress, it is harder to benefit from less liquid assets because their market value depends strongly on the going concern issue. Therefore, firms with assets to be collateralized are expected to use more debt than equity (see Myers/Majluf (1984) or Long/Maliz (1985)). In addition, firms tend to match the maturities of different asset classes and use long term debt to finance fixed assets and short term debt to finance current assets. Therefore, liquidity of different classes of assets can be used to determine the debt capacity of a firm. As a proxy for the collateral value we use the fixed-assets-to-total assets ratio (*FATA*):

$$FATA = \frac{Fixed\ Assets}{Total\ Assets}$$

According to the tradeoff theory, an increase in the fixed-assets-to-total assets ratio increases the tangibility of assets and should therefore increase the total liabilities-to-assets ratio, while according to the agency theory (see Grossman/Hart (1983)) the higher the fixed-assets-to-total

assets ratio the smaller the total liabilities-to-assets ratio. If the fixed-assets-to-total assets ratio decreases, agency costs are higher and shareholders need more debt to monitor the management.

Finally, to account for any autocorrelation we also include the total liabilities-to-assets ratios with a lag of one period (see Bontempi/Giannini/Golinelli (2004), Welch (2004)).

Table 1 shows the summary statistics of all dependent and independent variables, Table 2 shows correlations between the variables.

Table 1: Summary statistics

		Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Independent Variables	*ROA*	0.060218	0.060308	0.207653	-0.277152	0.053219	-1.189.599	9.559.167
	SIZE	2.020.622	1.998.728	2.508.816	1.478.591	1.784.326	0.107978	2.901.639
	FATA	0.521655	0.503312	0.950654	0.005462	0.223663	-0.135358	2.839.443
	EQRATE	0.018615	0.000000	0.062000	0.000000	0.025150	0.672776	1.586.368
	NDTS	0.426027	0.386826	3.591.476	-2.858.805	0.454895	0.658852	2.255.804
	MBR	2.501.268	1.048.590	7.194.816	0.283258	7.971.890	7.031.658	5.377.549
Dep. Var.	*DR_BV*	0.605726	0.607247	1.000.000	0.052234	0.182927	-0.069850	2.882.443
	DR_MV	0.583602	0.585730	0.994948	0.007614	0.277617	-0.297725	1.994.207

Table 2: Correlations (1996 -2007; 2256 Observations)

	DR_BV	*DR_MV*	*ROA*	*SIZE*	*FATA*	*EQRATE*	*NDTS*	*MBR*
DR_BV	1.000000	0.495774	-0.071594	0.344776	-0.166143	0.033655	0.058657	-0.011268
DR_MV		1.000000	-0.025461	0.395128	-0.044947	0.154292	0.105864	-0.385034
ROA			1.000000	0.111103	0.054159	-0.107768	-0.362215	-0.054247
SIZE				1.000000	0.209148	-0.074240	-0.100038	-0.148681
FATA					1.000000	-0.010861	0.025357	0.139160
EQRATE						1.000000	0.179785	-0.063924
NDTS							1.000000	-0.121377
MBR								1.000000

As shown in Table 2 the predictor variables show very small correlation. In addition, we computed the Variance Inflation Factor (Crutchley/Hansen (1989)). This analysis also showed that there is no multicollinearity problem in our data set.

4.4 Regression Model

From the previous sections the following regression setting results:

$$\Delta DR\_BV_t = \beta_0 + \beta_1\ \Delta NDTS_{i,t} + \beta_2\ \Delta EQRATE_{i,t} + \beta_3\ \Delta ROA_{i,t} + \beta_4\ \Delta SIZE_{i,t} + \beta_5\ \Delta MBR_{i,t} + \beta_6\ \Delta FATA_{i,t} + \beta_7\ \Delta DR\_BV_{t-1} + \varepsilon_{i,t} \quad (1)$$

$$\Delta DR\_MV_t = \beta_0 + \beta_1\ \Delta NDTS_{i,t} + \beta_2\ \Delta EQRATE_{i,t} + \beta_3\ \Delta ROA_{i,t} + \beta_4\ \Delta SIZE_{i,t} + \beta_5\ \Delta MBR_{i,t} + \beta_6\ \Delta FATA_{i,t} + \beta_7\ \Delta DR\_MV_{t-1} + \varepsilon_{i,t} \quad (2)$$

Δ relates to the first differences, i to the firm and t to the year. We used first differences instead of levels to avoid non-stationarity problems.

We perform a panel regression with firm-specific fixed effects (see Wooldridge (2003) or Greene (2003)). Fixed effects models enable to control for variables that are not or cannot be measured. They treat unobserved differences between firms as a set of fixed parameters that can either be directly estimated, or partialed out of the estimating equations. In a fixed effects model the unobserved or omitted variables are allowed to have any correlations with the observed (analyzed) variables (which turns out to be equivalent to treating the unobserved variables as fixed parameters). A fixed effects regression allows to control for omitted variables that differ between cross sections but are constant over time. It enables to use the changes in the variables over time to estimate the effects of the independent variables on the dependent variable. One advantage of a fixed effects regression is that the fixed effects estimator is unbiased, because the error term should be uncorrelated with each explanatory variable across all time periods. A fixed effects model assumes that the unobservable/omitted effect is a parameter to be estimated for each cross-section i. The intercepts for each i are estimated using dummy variables for each cross-sectional observation along with the explanatory variables. These firm-specific dummy variables control for all stable characteristics of analyzed firms. Note that with this fixed effects regression setting the intercept absorbs any firm-specific effects, too. By the firm-specific fixed effects regression we implicitly include a set of variables that also determine the capital structure of a firm. This includes to a large extent the business risk (often approximated by earnings volatility), age and the number of employees, ownership structure (agency theory) and industry (see Welch (2007)).

For both regression settings (1) and (2), we performed a model selection: We started the analysis including in the model all previous mentioned explanatory variables and stepwise eliminated respective variables to obtain the best fit of the model in terms of adjusted R^2, significance of the explanatory variables, Akaike and Schwarz Information Criterion. In a final step we controlled for multicollinearity using Variance Inflation Factors (VIF). The resulting models as well as the regression results are shown in Section 5.

5. Results

5.1 Book Value Capital Structure

Table 3 shows the results of our book value capital structure regression:

Table 3: Results – Book Value Capital Structure

Dependent Variable: *ΔDR_BV*
Observations: 422

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.012696	0.010777	-1.178131	0.2396
ΔROA	-0.722949	0.284000	-2.545596	0.0114
ΔSIZE	0.059660	0.032177	1.854155	0.0646
ΔFATA	-1.451446	0.220743	-6.575268	0.0000
ΔEQRATE	1.138166	0.720449	1.579800	0.1151
ΔDR_BV_{t-1}	-0.505297	0.027872	-18.12953	0.0000

R-squared	0.631383	Mean dependent var	-0.022075
Adjusted R-squared	0.529734	S.D. dependent var	0.456177
S.E. of regression	0.312828	Akaike info criterion	0.703779
Sum squared resid	32.29421	Schwarz criterion	1.585628
Log likelihood	-56.49729	Hannan-Quinn criter.	1.052259
F-statistic	6.211400	Durbin-Watson stat	1.319172
Prob(F-statistic)	0.000000		

Although the coefficient of *EQRATE* is not highly significant, the positive sign of this parameter is against our intuition, because it implies that the higher the equity interest rate is, the lower the equity ratio is. This finding corresponds to the results of Klemm (2007). Apart from equity tax shields, our results confirm the agency theory, as *FATA* has a negative impact on the total liabilities-to-assets ratio, and the pecking order theory, as the profitability (*ROA*) has a negative impact on the total liabilities-to-assets ratio. For the tradeoff theory we obtain

inconclusive results: *SIZE* has a positive impact on the total liabilities-to-assets ratio (which is consistent with the tradeoff theory), whereas *ROA* has a negative impact on the total liabilities-to-assets ratio (in contrast to the tradeoff theory). The strongly significant negative autocorrelation shows a non-monotonic evolution of the capital structure (decreases follow increases that follow decreases …). All other candidates listed in Section 4.3 turned out to reduce the quality of the model so that we eliminated them from the regression model.

In a next step we want to find out how the book value capital structure developed during the equity tax shield window. For this purpose we add to the predictors in Table 3 a dummy variable that has a value of 1 in all equity tax shield years and 0 in all other years. As we are regressing differences of the total liabilities-to-assets ratio, a regression on this dummy variable shows the evolution during the equity tax shield window. Table 4 shows the results:

Table 4: Results – Book Value Capital Structure – Including Dummy Variable

Dependent Variable: *ΔDR_BV*
Observations: 422

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.022018	0.016623	-1.324576	0.1862
ΔROA	-0.721517	0.284184	-2.538909	0.0116
ΔSIZE	0.057604	0.032315	1.782598	0.0756
ΔFATA	-1.445697	0.221025	-6.540862	0.0000
ΔEQRATE	0.974713	0.754271	1.292259	0.1972
DUMMY	0.019401	0.026325	0.736968	0.4617
ΔDR_BV_{t-1}	-0.505577	0.027900	-18.12076	0.0000

R-squared	0.631990	Mean dependent var	-0.022075
Adjusted R-squared	0.529082	S.D. dependent var	0.456177
S.E. of regression	0.313045	Akaike info criterion	0.706869
Sum squared resid	32.24099	Schwarz criterion	1.598304
Log likelihood	-56.14932	Hannan-Quinn criter.	1.059137
F-statistic	6.141280	Durbin-Watson stat	1.320188
Prob(F-statistic)	0.000000		

We see that (with the exception of the equity interest rate) the parameter values of the variables in the Table 3 regression hardly change. The additional dummy variable is insignificant but obviously absorbs some information that was previously included in *EQRATE*. Altogether, we cannot observe any time trend in the book value capital structure during the equity tax shield window.

5.2 Market Value Capital Structure

The regression of the market value capital structure shows the following picture:

Table 5: Results – Market Value Capital Structure

Dependent Variable: *ΔDR_MV*
Observations: 106

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.064531	0.015532	-4.154654	0.0001
ΔNDTS	0.039652	0.016248	2.440401	0.0176
ΔROA	-0.507895	0.347046	-1.463481	0.1486
ΔFATA	0.061508	0.270805	0.227130	0.8211
ΔEQRATE	-0.191598	0.711299	-0.269363	0.7886
ΔSIZE	0.075758	0.043263	1.751091	0.0850
ΔMBR	-0.092880	0.021928	-4.235622	0.0001
ΔDR_MV_{t-1}	0.113946	0.021538	5.290371	0.0000

R-squared	0.527526	Mean dependent var	-0.023522
Adjusted R-squared	0.173170	S.D. dependent var	0.118722
S.E. of regression	0.107954	Akaike info criterion	-1.315398
Sum squared resid	0.699240	Schwarz criterion	-0.159566
Log likelihood	115.7161	Hannan-Quinn criter.	-0.846933
F-statistic	1.488689	Durbin-Watson stat	3.670393
Prob(F-statistic)	0.074641		

We can observe no significant impact of equity tax shields. Apart from that, in contrast to the book value regression, the negative sign of *EQRATE* is in line with intution. The higher the equity interest rate allowed by the government, the higher the equity ratio. In addition, the total liabilities-to-assets ratio increases with increasing non-debt tax shields which is against the debt substitution hypothesis of DeAngelo/Masulis (1980). Moreover, there is a positive autocorrelation. Our results provide inconclusive results for the tradeoff theory: On the one hand, in line with the tradeoff theory *SIZE* has a positive impact and *FATA* has a positive (although insignificant) impact on the total liabilities-to-assets ratio. On the other hand, we observe a (weakly significant) negative impact of *ROA* in contrast to the tradeoff theory. Concerning the pecking order theory we see a weakly significant confirmation due to the negative impact of *ROA*. For the agency theory we also find inconclusive results: On the one hand, we have a positive impact of the fixed assets-to-total assets ratio falsifying the agency theory, but on the other hand we find confirmation from the negative impact of the market-to-book ratio.

Again, we want to find out how the market value capital structure developed over time during the equity tax shield window by adding the dummy variable described in the previous section to the predictors in Table 6.

Table 6: Results – Market Value Capital Structure – Including Dummy Variable

Dependent Variable: *ΔDR_MV*
Observations: 106

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.083075	0.017248	-4.816645	0.0000
ΔNDTS	0.032731	0.016164	2.024937	0.0474
ΔROA	-0.474468	0.339263	-1.398525	0.1672
ΔFATA	-0.024940	0.267259	-0.093318	0.9260
ΔEQRATE	-1.128898	0.805994	-1.400628	0.1666
DUMMY	0.075822	0.034333	2.208444	0.0311
ΔSIZE	0.095639	0.042897	2.229499	0.0296
ΔMBR	-0.078201	0.022128	-3.534108	0.0008
ΔDR_MV_{t-1}	0.099173	0.026805	3.699802	0.0005

R-squared	0.563058	Mean dependent var	-0.023522
Adjusted R-squared	0.222391	S.D. dependent var	0.118722
S.E. of regression	0.104691	Akaike info criterion	-1.374713
Sum squared resid	0.646654	Schwarz criterion	-0.193755
Log likelihood	119.8598	Hannan-Quinn criter.	-0.896064
F-statistic	1.652812	Durbin-Watson stat	3.768646
Prob(F-statistic)	0.034489		

Again, the parameter values for the variables other than the equity interest rate change only weakly by introducing this dummy. However, the significance of the equity interest rate is far higher now. It is counteracted by the dummy variable introduced. The strongly significant positive parameter for the dummy variable together with the negative impact of the equity interest rate shows that with the introduction of equity tax shields the market value debt ratios were reduced, however in the five years after the introduction of equity tax shields there was a strongly significant rebound with a positive time trend in the debt ratio.

Let us compare the results from the market value regressions with those of the book value regressions: In general, our study shows strong differences between the determinants of the book value capital structure and those of the capital structure at market values. The fixed assets-to-total assets ratio has a negative impact on the book value total liabilities-to-assets ratio but an insignificant impact on the market value total liabilities-to-assets ratio. The lagged

capital structure has a strongly significant negative impact on the book value total liabilities-to-assets ratio but a strongly significant positive impact on the market value total liabilities-to-assets ratio. The equity interest rate has a positive impact on the book value total liabilities-to-assets ratio and a negative impact on the market value total liabilities-to-assets ratio.

Finally, note that in terms of adjusted R^2, our book value and market value regressions are in line with existing literature that performs panel data regressions. For instance, Alworth/Arachi (2001) show an adjusted R^2 of around 10%, Bontempi et. al. (2005) of around 10%, and Klemm (2007) of 10-36%.

5.3 Impact of the Austrian Provisions on the Volatility of Capital Structures

As described in Section 3 our hypothesis is that due to the Austrian provisions not only the level but also the volatility of the capitals structure changed. There is a tradeoff between equity tax shields and transaction costs envolved with any change in the capital structure. The higher the equity interest rate, the stronger the incentive for high capital structure volatility. The higher the transaction costs, the lower the incentive for high capital structure volatility.

To test this hypothesis, we use the following methodology: Our proxy for the volatility of the capital structure is the absolut value of the change in the total liabilities-to-assets ratio over the last year. As we are regressing differences on differences we use as the dependent variable differences of this volatility proxy. We use the same dependent variables as in the previous subsections.

Let us start with our results for the book value capital structure.

Table 7 shows a significant positive impact of the equity interest rate (and thereby of the equity tax shield provisions) on the capital structure volatility which confirms our hypothesis. In a next step we want to check if this hypothesis can be confirmed also for the market value capital structure:

Table 7: Results – Volatility of the Book Value Capital Structure

Dependent Variable: *ΔVOLA_BV*
Observations: 347

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.017354	0.012456	-1.393273	0.1647
ΔROA	-0.655227	0.401541	-1.631779	0.1039
ΔSIZE	0.076154	0.041975	1.814283	0.0708
ΔFATA	-3.123713	0.289449	-10.79191	0.0000
ΔEQRATE	1.620747	0.824514	1.965699	0.0504
ΔDR_BV_{t-1}	-0.622998	0.035126	-17.73597	0.0000

R-squared	0.612895	Mean dependent var	-0.024031
Adjusted R-squared	0.490728	S.D. dependent var	0.494787
S.E. of regression	0.353097	Akaike info criterion	0.962829
Sum squared resid	32.79010	Schwarz criterion	1.894654
Log likelihood	-83.05078	Hannan-Quinn criter.	1.333845
F-statistic	5.016887	Durbin-Watson stat	1.270592
Prob(F-statistic)	0.000000		

Table 8: Results – Volatility of the Market Value Capital Structure

Dependent Variable: *ΔVOLA_MV*
Observations: 95

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002678	0.013842	0.193468	0.8473
ΔNDTS	0.011171	0.098302	0.113644	0.9100
ΔROA	0.710820	0.707607	1.004540	0.3198
ΔFATA	-0.750533	0.317498	-2.363901	0.0219
ΔEQRATE	-0.363278	0.548453	-0.662369	0.5107
ΔSIZE	-0.039782	0.077708	-0.511940	0.6109
ΔMBR	0.002660	0.016172	0.164477	0.8700
ΔDR_MV_{t-1}	-0.828093	0.111776	-7.408490	0.0000

R-squared	0.616072	Mean dependent var	-0.002227
Adjusted R-squared	0.305976	S.D. dependent var	0.155233
S.E. of regression	0.129322	Akaike info criterion	-0.950396
Sum squared resid	0.869654	Schwarz criterion	0.205569
Log likelihood	88.14382	Hannan-Quinn criter.	-0.483299
F-statistic	1.986713	Durbin-Watson stat	3.837922
Prob(F-statistic)	0.009553		

In contrast to the book value capital structure, Table 8 shows an insignificant and negative impact of the equity interest rate on the market value capital structure volatility which falsifies the hypothesis for the market value capital structure.

6. Conclusions

Our study provides several interesting results: First, in contrast to the assumption of rational financial managers, we see a weakly significant decrease in the equity ratios at book values after the introduction of equity tax shields. In line with the assumption of rational financial managers the equity ratios at market values increased with a very weak significance with the introduction of equity tax shields but in the five years afterwards there was a downward tendency that cannot be explained by other predictor variables in our regression setting (including the equity interest rate). So, there can be observed only a transitory and minimal effect of equity tax shields.

This shows that it is hard for the government to increase the companies' equity ratios with provisions as stipulated in the Austrian system allowing equity tax shields on incremental equity. A comparison with existing literature for the Italian tax system shows that one should rather allow equity interest on the equity level. This finding is important, as some authors propose to establish a system with equity tax shields for other countries, too (e.g. the Institute for Fiscal Studies for the United Kingdom, Keuschnigg (2004) and Keuschnigg and Dietz (2004) for Switzerland, Wagner and Wenger (1999), Arbeitsgemeinschaft Selbständiger Unternehmen (2000), Rose (2003) and the German Council of Economic Experts (in 2004 and 2005/06) for Germany).

We also investigate the impact of the Austrian tax system on the capital structure volatility. We find a significant positive impact on the volatility of the book value capital structure, which is in line with the incentive provided by allowing tax shields on the increment of equity, but an insignificant impact on the market value capital structure.

Apart from equity tax shields our analysis of the book value capital structure confirms the agency theory and the pecking order theory and brings inconclusive results for the tradeoff theory. Moreover, we find a highly significant negative autocorrelation.

As regards the market value capital structure, we falsify the debt substitution hypothesis of DeAngelo/Masulis (1980), find a weak confirmation of the pecking order theory and get inconclusive results for the agency theory and the tradeoff theory. In addition, we observe a highly significant positive autocorrelation.

In general, our study shows strong differences between the determinants of book value capital structure vs. market value capital structure. The fixed assets-to-total assets ratio has a negative impact on the book value total liabilities-to-assets ratio but an insignificant impact on the market value total liabilities-to-assets ratio. The lagged capital structure has a strongly significant negative impact on the book value total liabilities-to-assets ratio but a highly significant positive impact on the market value total liabilities-to-assets ratio. The equity interest rate has a positive impact on the book value total liabilities-to-assets ratio and negative impact on the market value total liabilities-to-assets ratio. Thus, the regression of the book value capital structure on determinants as is done often in literature is not sufficient. Thus, existing studies on the impact of equity tax shields should be seen in a different light and the impact of equity tax shields should be also judged analyzing the market value capital structures.

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Appendix

Appendix 1: Sample

No.	Company Name	GICS* Sector	Legal form	Exchange listed (y/n)
1	Erste Bank der Oesterreichischen Sparkassen AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y
2	Bank fuer Tirol und Vorarlberg AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y
3	Schlumberger AG	Consumer Staples/Food Beverage & Tobacco/Beverages/Distillers & Vintners	AG	Y
4	Allgemeine Baugesellschaft - A. Porr AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	Y
5	BKS Bank AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y
6	Ottakringer Brauerei AG	Consumer Staples/Food Beverage & Tobacco/Beverages/Brewers	AG	Y
7	Oberbank AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y
8	OMV AG	Energy/Energy/Oil & Gas/Integrated Oil & Gas	AG	Y
9	TG Holding AG		AG	Y
10	Wiener Staedtische Versicherung AG	Financials/Insurance/Insurance/Multi-line Insurance	AG	Y
11	CAT oil AG	Energy/Energy/Energy Equipment & Services/Oil & Gas Drilling	AG	Y
12	Verbund (Osterreichische Elektrizitatswirtschafts AG)	Utilities/Utilities/Electric Utilities/Electric Utilities	AG	Y
13	Mayr-Melnhof Karton AG	Materials/Materials/Containers & Packaging/Paper Packaging	AG	Y
14	BOEHLER UDDEHOLM AG	Materials/Materials/Metals & Mining/Steel	AG	Y
15	IMMOEAST Immobilien Anlagen AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
16	bwin Interactive Entertainment AG	Consumer Discretionary/Consumer Services/Hotels Restaurants & Leisure/Casinos & Gaming	AG	Y

17	Telekom Austria AG	Telecommunication Services/Telecommunication Services/Diversified Telecommunication Services/Integrated Telecommunication Services	AG	Y
18	Wienerberger AG	Industrials/Capital Goods/Building Products/Building Products	AG	Y
19	Flughafen Wien AG	Industrials/Transportation/Transportation Infrastructure/Airport Services	AG	Y
20	Intercell AG	Health Care/Pharmaceuticals, Biotechnology & Life Sciences/Biotechnology/Biotechnology	AG	Y
21	AT&S Austria Technologie & Systemtechnik AG	Information Technology/Technology Hardware & Equipment/Electronic Equipment & Instruments/Electronic Equipment Manufacturers	AG	Y
22	Pankl Racing Systems AG	Consumer Discretionary/Automobiles & Components/Auto Components/Auto Parts & Equipment	AG	Y
23	S&T System Integration & Technology Distribution AG	Information Technology/Software & Services/IT Services/IT Consulting & Other Services	AG	Y
24	Schoeller-Bleckmann Oilfield Equipment AG	Energy/Energy/Energy Equipment & Services/Oil & Gas Equipment & Services	AG	Y
25	Raiffeisen International Bank Holding AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y
26	Immofinanz AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
27	Fabasoft AG	Information Technology/Software & Services/Software/Application Software	AG	Y
28	update software AG	Information Technology/Software & Services/Software/Application Software	AG	Y
29	SkyEurope Holding AG	Industrials/Transportation/Airlines/Airlines	AG	Y
30	Sanochemia Pharmazeutica AG	Health Care/Pharmaceuticals, Biotechnology & Life Sciences/Pharmaceuticals/Pharmaceuticals	AG	Y
31	BWT AG	Industrials/Commercial Services & Supplies/Commercial Services & Supplies/Environmental & Facilities Services	AG	Y
32	Plaut AG	Information Technology/Software & Services/IT Services/IT Consulting & Other Services	AG	Y
33	RHI AG	Materials/Materials/Construction Materials/Construction Materials	AG	Y

34	Andritz AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	Y
35	Sparkasse Immobilien AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
36	Christ Water Technology AG	Industrials/Commercial Services & Supplies/Commercial Services & Supplies/Environmental & Facilities Services	AG	Y
37	Zumtobel AG	Industrials/Capital Goods/Electrical Equipment/Electrical Components & Equipment	AG	Y
38	Strabag SE	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	SE	Y
39	Palfinger AG	Industrials/Capital Goods/Machinery/Construction & Farm Machinery & Heavy Trucks	AG	Y
40	voestalpine AG	Materials/Materials/Metals & Mining/Steel	AG	Y
41	Austrian Airlines AG	Industrials/Transportation/Airlines/Airlines	AG	Y
42	Eybl International AG	Consumer Discretionary/Automobiles & Components/Auto Components/Auto Parts & Equipment	AG	Y
43	JoWooD Productions Software AG	Information Technology/Software & Services/Software/Home Entertainment Software	AG	Y
44	BioDiesel International AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	Y
45	Gericom AG	Information Technology/Technology Hardware & Equipment/Computers & Peripherals/Computer Hardware	AG	N
46	Lenzing AG	Materials/Materials/Chemicals/Commodity Chemicals	AG	N
47	Beko Holding AG	Information Technology/Software & Services/Software/Application Software	AG	Y
48	HTI High Tech Industries AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	Y
49	Wolford AG	Consumer Discretionary/Consumer Durables & Apparel/Textiles, Apparel and Luxury Goods/Apparel, Accessories and Luxury Goods	AG	Y
50	AVW Invest AG	Financials/Diversified Financials/Capital Markets/Asset Management & Custody Banks	AG	Y
51	Osterreichische Post AG	Industrials/Transportation/Air Freight & Logistics/Air Freight & Logistics	AG	Y
52	A-TEC Industries AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	Y

53	EVN AG	Utilities/Utilities/Electric Utilities/Electric Utilities	AG	Y
54	Warimpex Finanz- und Beteiligungs AG	Consumer Discretionary/Consumer Services/Hotels Restaurants & Leisure/Hotels, Resorts & Cruise Lines	AG	Y
55	Constantia Packaging AG	Materials/Materials/Containers & Packaging/Paper Packaging	AG	Y
56	Rosenbauer International AG	Industrials/Capital Goods/Machinery/Construction & Farm Machinery & Heavy Trucks	AG	Y
57	KTM Power Sports AG	Consumer Discretionary/Automobiles & Components/Automobiles/Motorcycle Manufacturers	AG	Y
58	Conwert Immobilien Invest SE	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	SE	Y
59	ECO Business Immobilien AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
60	Brain Force Holding AG	Information Technology/Software & Services/Software/Application Software	AG	Y
61	DO & CO Restaurants & Catering AG	Consumer Discretionary/Consumer Services/Hotels Restaurants & Leisure/Restaurants	AG	Y
62	CA Immobilien Anlagen AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
63	Unternehmens Invest AG	Financials/Diversified Financials/Diversified Financial Services/Specialized Finance	AG	Y
64	UNIQA Versicherungen AG	Financials/Insurance/Insurance/Multi-line Insurance	AG	Y
65	Frauenthal Holding AG	Industrials/Capital Goods/Electrical Equipment/Electrical Components & Equipment	AG	N
66	HIRSCH Servo AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	N
67	Kapsch TrafficCom AG	Information Technology/Technology Hardware & Equipment/Electronic Equipment & Instruments/Electronic Equipment Manufacturers	AG	Y
68	SW Umwelttechnik Stoiser & Wolschner AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	N
69	Agrana Beteiligungs AG	Consumer Staples/Food Beverage & Tobacco/Food Products/Agricultural Products	AG	Y
70	Semperit AG Holding	Consumer Discretionary/Automobiles & Components/Auto Components/Tires & Rubber	AG	Y

71	Webfreetv.com Multimedia Dienstleistungs AG	Consumer Discretionary/Media/Media/Movies & Entertainment	AG	N
72	Burgenland Holding AG	Utilities/Utilities/Multi-Utilities/Multi-Utilities	AG	N
73	C-Quadrat Investment AG		AG	Y
74	CA Immobilien International AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	N
75	ATB Austria Antriebstechnik AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	Y
76	Miba AG	Consumer Discretionary/Automobiles & Components/Auto Components/Auto Parts & Equipment	AG	Y
77	Polytec Holding AG	Consumer Discretionary/Automobiles & Components/Auto Components/Auto Parts & Equipment	AG	Y
78	BENE AG	Industrials/Commercial Services & Supplies/Commercial Services & Supplies/Office Services & Supplies	AG	N
79	Feratel Media Technologies AG	Information Technology/Technology Hardware & Equipment/Electronic Equipment & Instruments/Electronic Equipment Manufacturers	AG	Y
80	TeleTrader.com Software AG	Information Technology/Software & Services/Software/Application Software	AG	N
81	Teak Holz International AG	Materials/Materials/Paper & Forest Products/Forest Products	AG	Y
82	UBM Realitaetenentwicklung AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	N
83	Linz Textil Holding AG	Consumer Discretionary/Consumer Durables & Apparel/Textiles, Apparel and Luxury Goods/Textiles	AG	Y
84	Inku AG	Consumer Discretionary/Consumer Durables & Apparel/Household Durables/Home Furnishings	AG	Y
85	HTA Beteiligungs-Invest AG		AG	N
86	Private Equity Performance Beteiligung AG		AG	N
87	Vorarlberger Kraftwerke AG	Utilities/Utilities/Independent Power Producers & Energy Traders/Independent Power Producers & Energy Traders	AG	Y
88	Wiener Privatbank Immobilieninvest AG	Financials/Diversified Financials/Capital Markets/Investment Banking & Brokerage	AG	Y
89	phion AG	Materials/Materials/Metals & Mining/Diversified Metals & Mining	AG	N

90	Rath AG	Materials/Materials/Construction Materials/Construction Materials	AG	N
91	Euromarketing AG		AG	Y
92	Maschinenfabrik Heid AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	Y
93	Josef Manner & Co AG	Consumer Staples/Food Beverage & Tobacco/Food Products/Packaged Foods & Meats	AG	Y
94	Stadlauer Malzfabrik AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
95	austriamicrosystems AG	Information Technology/Semiconductors & Semiconductor Equipment/Semiconductors & Semiconductor Equipment/Semiconductors	AG	Y
96	Qino Flagship AG		AG	Y
97	Binder & Co AG		AG	Y
98	Meinl Airports International AG	Industrials/Transportation/Transportation Infrastructure/Airport Services	AG	Y
99	Bank Austria Creditanstalt AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	N
100	AVW Immobilien AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	N
101	Austria Email AG	Consumer Discretionary/Consumer Durables & Apparel/Household Durables/Household Appliances	AG	Y
102	Bank Austria Creditanstalt Wohnbaubank AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	N
103	Management Trust Holding AG	Industrials/Capital Goods/Machinery/Industrial Machinery	AG	N
104	MCB Agricole Holding AG		AG	Y
105	ATHOS Immobilien AG	Financials/Real Estate/Real Estate Management & Development/Real Estate Management & Development	AG	Y
106	Hutter & Schrantz	Industrials/Capital Goods/Building Products/Building Products	GmbH	N
107	Anmathe Beteiligungs AG		AG	Y
108	E T V Holding AG		AG	Y
109	Imperial Hotels AG	Consumer Discretionary/Consumer Services/Hotels Restaurants & Leisure/Hotels, Resorts & Cruise Lines	AG	Y
110	Ragusa Beteiligungs AG		AG	Y

111	SLAV Handel, Vertretung und Beteiligung AG		AG	N
112	L.A.I. BETEILIGUNGS-INVEST AG (AUST)		AG	N
113	A B Effectenbeteiligungen AG		AG	Y
114	Pankl and Hofmann AG		AG	Y
115	Generali Holding Vienna AG		AG	N
116	Bauholding Strabag SE	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	SE	Y
117	IPO Board.Net AG		AG	N
118	Prime Site Immobilien AG		AG	Y
119	CPI Thes Immobilien AG		AG	N
120	CEE Immobilien AG		AG	Y
121	Life Settlement Holding AG		AG	Y
122	Breitenfeld AG		AG	Y
123	Oesterreichische Volksbanken AG	Financials/Banks/Commercial Banks/Regional Banks	AG	Y
124	CPI Immobilien AG		AG	N
125	PLA Eurologistics AG		AG	Y
126	Topcall International AG		AG	Y
127	Hutter & Schrantz Stahlbau AG		AG	N
128	Raiffeisen Centropa Invest Verwaltungs und Beteiligungs AG		AG	N
129	Central European Franchise Group Ltd			N
130	ENV AG		AG	N
131	Maculan Holding AG	Industrials/Capital Goods/Construction & Engineering/Construction & Engineering	AG	Y
132	Oesterreichische Brau Beteiligungs AG	Consumer Staples/Food Beverage & Tobacco/Beverages/Brewers	AG	Y
133	Cybertron		AG	Y
134	Vogel & Noot Waermetechnik	Industrials/Capital Goods/Building Products/Building Products	AG	Y
135	HVB Alter Financial Products AG		AG	N
136	Vorarlberger Landes-und Hypothekenbank AG	Financials/Banks/Commercial Banks/Diversified Banks	AG	Y

137	Vorarlberger Volksbank GmbH	Financials/Banks/Commercial Banks/Diversified Banks	GmbH	N
138	Jenbacher Transportsysteme AG		AG	Y
139	KTM Sportmotorcycle AG		AG	Y
140	Steyr-Daimler-Puch AG		AG	Y
141	Capexit II CEE Private Equity Invest AG		AG	Y
142	Beteiligungs und Wohnungsanlagen GmbH & Co OEG		GmbH	N
143	CPI Wachstums Immobilien AG		AG	N
144	Yline Internet Business Services AG		AG	N
145	Kreco Realitaeten AG		AG	Y
146	Raiffeisenlandesbank Oberoesterreich AG		AG	Y
147	Hypo Alpe-Adria-Bank AG		AG	Y
148	Saubermacher Dienstleistungs AG		AG	Y
149	Austria Tabak		GmbH	N
150	SPRINGER INVESTMENT		GmbH	N

*Global Industry Classification Standard (GICS)