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Corporate Governance and Leverage: Evidence from a Natural Experiment

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Abstract

We argue that the recent corporate governance reform in the Netherlands provides a natural experiment to explore the impact of changes in corporate governance on financing policy. We find that, relative to a control sample of comparable firms outside the Netherlands, Dutch firms significantly reduced their leverage following the passage of the reform. Our findings are consistent with the view that corporate governance improvements reduce the value of debt as a disciplining device.

Keywords: Corporate Governance, Corporate Leverage, Financing Policy

JEL classification: G32, G34

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1. Introduction

The notion that debt can serve as a commitment device for managers to not waste corporate resources is central to the corporate finance literature (e.g., Jensen 1986, Stulz 1990, Zwiebel 1996). In Zwiebel's (1996) framework, for example, managers voluntarily choose debt to constrain their own future empire-building in an attempt to prevent *ex post* control changes. In view of this—and to the extent that debt and well-designed corporate governance structures are substitute mechanisms in mitigating agency problems—one would expect that firms with superior corporate governance have lower levels of debt. Testing this idea is challenging, however, as firm-specific corporate governance quality may be endogenous to financing policies. In this paper, we argue that a system-wide corporate governance reform, which is plausibly exogenous to the financing policies of individual firms, provides a natural experiment to overcome this endogeneity problem.[1]

We exploit the 2003 passage of a new corporate governance code in the Netherlands (the "Tabaksblat Code"). Starting from fiscal year 2004, listed companies whose registered office is in the Netherlands must refer to the code in their annual reports, and indicate to what extent they have complied with a set of corporate governance principles and best practice provisions (see Section 2 for a more detailed description of the code). Our basic hypothesis is that the corporate governance reform, by enhancing the process by which managers are controlled and monitored, alleviates agency conflicts between managers and shareholders. This should reduce the value of debt as a disciplining device, and hence result in a decrease in corporate leverage.

[1] A related literature exploits variations in state anti-takeover laws for identification purposes. See, among others, Garvey and Hanka (1999), Wald and Long (2007), and John and Litov (2009).

To test this proposition, we employ a difference-in-differences (DID) estimation approach.[2] Specifically, we explore how the leverage of Dutch firms changed after the passage of the reform, *relative* to a control sample of comparable firms outside the Netherlands that were not affected by the governance reform. Adopting a DID approach enables us to filter out contemporaneous influences on financing policies that cannot be attributed to the Dutch governance reform. We find that, relative to the control sample, Dutch firms significantly reduced their leverage following the passage of the reform. Our results are robust to using different leverage measures as well as an analysis of changes (i.e., first differences) in leverage. They are further robust to an industry and size matching of the treatment and control group firms.

2. The Dutch Corporate Governance Code

The Dutch corporate governance code ("Tabaksblat code") was published in December 2003 and became effective on January 1, 2004. The code has been developed by the so-called Corporate Governance Committee, chaired by Morris Tabaksblat, former CEO of Unilever, and comprised of representatives from the corporate world, Euronext Amsterdam, institutional investors, and academia, among others. The committee has been installed on the initiative of the Dutch government following the Ahold accounting scandal in early 2003. The timing of the events suggests that the code was developed and implemented within a relatively short timeframe. Similar to the swift development and implementation of the Sarbanes Oxley Act in the United States, the code can therefore be considered a largely unexpected and exogenous shock to the corporate governance practices of Dutch firms.

[2] The DID estimation approach is widely used in the labor economics literature (see Angrist and Krueger 1999 for an overview). For recent finance applications, see, e.g., Bertrand et al. (2007) and Huang (2008).

Legally, the Dutch government gave the corporate governance code a statutory basis by including a reference in the Dutch Civil Code.

The code consists of a set of corporate governance principles and best practice provisions (cf., Corporate Governance Committee 2003). The code, for example, contains provisions regarding the amount and structure of management board members' remuneration packages (e.g., a three year vesting period for stock options) and their disclosure, limits the number of supervisory board memberships of management board members, and mandates the immediate reporting of potential conflicts of interest between management board members and their respective companies. The code also asks that at least one member of the supervisory board is a financial expert, makes requirements for the independence of the members of the supervisory board and its committees, and limits the number of additional supervisory board mandates of supervisory board members. It also requests that the chairman of the supervisory board shall not be a former member of the management board of the company. Other provisions of the code refer, for example, to the rights and responsibilities of shareholders and to the auditing of financial reporting.

The code applies to listed companies whose registered office is in the Netherlands (the code does not apply to investment funds). As of fiscal year 2004, companies are required by law to comply with the code and to refer to it in a separate chapter of their annual reports. In this chapter firms need to indicate to what extent they have complied with the code's best practice provisions. If a company chooses not to comply with a best practice provision, it must report the provision and provide an explanation for non-compliance in its annual report ("comply-or-explain" principle). Survey evidence for the year 2005 suggests that the level of

compliance with the code is high, in particular, among firms that belong to the AEX (large-cap) and AMX (mid-cap) stock indexes (Akkermans et al. 2007).[3]

3. Data and Empirical Design

We gather data from Datastream-Worldscope for the period 2000-2007. The treatment group consists in first instance of non-financial firms that are listed on Euronext Amsterdam, belong to the AEX (large-cap) or AMX (mid-cap) stock indexes, and are incorporated in the Netherlands. The control group is based on the FTSEurofirst 300 stock index, an index of 300 large- and mid-cap European stocks. From this index, we exclude financials, firms that belong to the AEX or AMX stock indexes, and firms that are incorporated in the Netherlands but do not belong to the AEX or AMX stock indexes.[4] We add the latter group of firms to the group of treatment firms. This procedure yields a treatment group of 40 firms and a control group of 206 firms.

For each sample firm, we construct several measures of financial leverage: *Book Leverage* (book value of short term and long term debt over book value of assets), *Market Leverage* (book value of short term and long term debt over market value of equity and book value of short term and long term debt), *LT Debt to Assets* (book value of long term debt over book value of assets), *Debt to Capital* (book value of short term and long term debt over book value of equity and book value of short term and long term debt), and *LT Debt to Capital*

[3] For each best practice provision, Akkermans et al. (2007) determine the percentage of firms that comply with the provision and the percentage of firms that either comply or explain non-compliance. Among AEX firms, for example, the average percentage of firms that comply is about 90%, and the average percentage of firms that comply or explain non-compliance is about 97%. Best practice provisions referring to the remuneration of management board members (part II.2 of the code) show relatively low compliance levels, however. For example, only 23 percent of AEX firms comply with provision II.2.7, which stipulates that severance pay must not exceed one year's salary (however, all AEX firms either comply with this provision or explain non-compliance). Provision II.2.11, which asks that the main elements of the contract of a management board member shall be made public immediately after it is concluded is complied with by 38 percent of AEX firms, and only 54 percent of AEX firms comply with this provision or provide an explicit explanation for non-compliance.

[4] This applies, for example, to STMicroelectronics NV, which, while being listed on Euronext Paris, is incorporated in the Netherlands, and as such must comply with the Dutch Corporate Governance Code.

(book value of long term debt over book value of equity and book value of long and short term debt).

Trade-off theories of capital structure suggest that firms, when choosing their leverage ratios, trade off tax and agency benefits of debt against direct and indirect costs of financial distress (see Myers 2003 for a review of the capital structure literature). Financial distress costs tend to be lower for larger and more profitable firms and for firms with higher levels of liquidity and fewer growth opportunities. Highly profitable firms also have more taxable income to shield. Trade-off theories thus predict that firms with such characteristics should have higher leverage ratios. Likewise, firms where managerial agency problems are more pronounced—e.g., firms with high free cash-flows—should have more debt in their capital structures.

To account for these possible determinants of leverage choices, we construct a number of control variables, namely *Size* (measured as the natural log of assets, in Euros), *Growth Opportunities* (market to book value of equity), *Profitability* (EBITDA over assets), and *Liquidity* (current assets over current liabilities). We further control for *Tangibility* (measured as net PPE over assets), as higher levels of asset tangibility make it easier for firms to pledge collateral, which in turn enlarges their debt capacity. For example, Campello and Hackbarth (2008), within a real options framework where investment and financing decisions are determined simultaneously, find that investment in tangible assets helps to relax financing constraints and enhance firms' credit capacity. This, in turn, allows for additional investment, relaxing financing constraints even further. An overview of the variables we use in our analysis and their definitions is provided in Table 1.

Table 2 reports sample statistics. On average, the treatment firms are somewhat smaller and have lower levels of tangibility but are otherwise similar to the control firms.

Our main regression model is

$$Leverage_{it} = \alpha + \beta_1 \times Post_t + \beta_2 \times Treatment_i \times Post_t + Controls + v_i + u_{it}$$

where *t* denotes year, *i* denotes firm, *Post* is a dummy variable taking the value one if and only if *t*=2004 or later, and *Treatment* is a dummy variable taking the value one if and only if a firm belongs to the treatment group. The coefficient of the interaction dummy, *Treatment x Post*, captures the post 2003 change in the treatment firms' leverage *relative* to the control firms. The regressions are estimated with robust standard errors and firm fixed effects (except where indicated differently). To account for intra-firm autocorrelation in the panel, all standard errors are clustered at the firm level.

4. Results

Table 3 reports univariate results to illustrate the main finding of this paper. We report mean book leverage ratios for the firms in the treatment as well as control group, separately for the period pre-2004 and 2004 and later. The table shows that the treatment firms significantly reduced their leverage after 2003. More interestingly, if we look at the DID estimate, i.e., the change in leverage of the treatment firms *relative* to the change in leverage of the control firms, it turns out that the treatment firms reduced their leverage more heavily than the control firms. The DID estimate is also statistically significant. Overall, this suggests that, relative to the control group, Dutch firms reduced their leverage following the passage of the Dutch corporate governance reform.

Table 3 also reports changes in tangibility, profitability, and growth opportunities. Tangibility levels decreased for the treatment as well as control firms, suggesting potentially lower levels of pledgeable collateral and hence lower debt capacities. However, the DID estimate is statistically insignificant. Profitability increased for both types of firms, but the DID estimate is again not statistically significant. Lastly, neither the treatment nor the control firms experienced significant changes in growth opportunities, also not relative to each other.

A key assumption underlying our estimation approach is that the outcome variable of the treatment firms would have followed a similar trend as the outcome variable of the control firms if the treatment firms had not been subject to the corporate governance reform. While it is difficult to directly test the validity of this assumption, a common plausibility check is to verify whether the treatment and control firms' outcome variables followed a similar trend *prior* to the treatment. If, for example, the treatment firms increased their leverage by significantly more than the control firms prior to the treatment, then one might expect a stronger subsequent leverage reduction for the treatment firms even in the *absence* of the treatment. Figure 1, which plots the evolution of the average leverage ratios for the treatment and control firms, respectively, suggests that we can rule out this possibility. As is apparent from the figure, the leverage ratios of the treatment and control firms have been following a fairly similar trend until 2004. Subsequently, the treatment firms decreased their leverage more heavily than the control firms.

Regression results are reported in Table 4. Models (1) and (2) regress *Book Leverage* on the control variables and the *Post* time dummy. *Profitability* and the time dummy are significantly negatively correlated with leverage, whereas *Size*, *Growth Opportunities*, and *Liquidity* show a significant positive relation with leverage. Model (3) is the classic DID regression with controls and firm fixed effects. The coefficient of the interaction dummy,

Treatment x Post, is significant and negative, indicating that Dutch firms reduced their leverage after 2003, relative to the control firms. This is consistent with our univariate results reported above.

Models (4) to (10) present various robustness checks. Models (4) to (7) use our alternative measures of leverage, namely *Market Leverage*, *LT Debt to Assets*, *Debt to Capital*, and *LT Debt to Capital*. The DID estimates show that our results are robust to using different measure of leverage, with all our results being statistically significant at conventional levels. Model (8) includes firm age as an additional control and estimates a random effects model. Finally, as in, e.g., Garvey and Hanka (1999) and John and Litov (2009), we provide an analysis where we use—as a proxy for net debt issues— *changes* (i.e., first differences) in book leverage in our difference-in-differences tests, rather than *levels* of leverage (model (9)). The DID estimate again has the expected negative sign and is statistically significant.

Our regression results further suggest that firms that are larger, less profitable, and have more tangible assets have more debt in their capital structures. These results are consistent with the empirical evidence in Garvey and Hanka (1999), John and Litov (2009), Campello and Hackbarth (2008), and the evidence surveyed in Myers (2003). The results concerning size and tangibility are furthermore consistent with the predictions of trade-off theories of capital structure. The coefficients on our measures of growth opportunities and liquidity are not uniform across our specifications and do not provide conclusive evidence.

As a last robustness check, we conduct a matching analysis where we match each treatment firm with a similar control firm, based on industry (Worldscope Industry Code, Field 06011) and size. The matching was done *ex ante* for the year 2000, i.e., before the 2003 adoption of the Dutch corporate governance code. For each match, and separately for the before and after

periods, we calculate the difference between the average leverage ratio of the treatment firm and the average leverage ratio of the matched control firm. We then take averages across matches to obtain industry and size adjusted leverage measures for the before and after periods. We apply this procedure to all five leverage measures. Table 5 reports results. Positive numbers indicate that the leverage ratio of the treatment group is higher than that of the industry and size matched control group. Across all leverage measures, we again find that the reduction in leverage after 2003 was bigger for the treatment group firms compared to the industry and size matched control group firms. The change in leverage is significant for three of the five leverage measures and marginally insignificant for the other two.

5. Conclusion

This paper contributes to an open discussion on the effects of corporate governance on financing policy. While some empirical studies document that a negative relationship between managerial entrenchment and the use of debt finance (e.g. Garvey and Hanka, 1999) some more recent papers suggest the opposite (Wald and Long, 2007 and John and Litov, 2009). The present article contributes to this debate by analyzing the effect of a recent corporate governance reform in the Netherlands on the financial leverage of Dutch firms. We find that Dutch firms significantly reduced their leverage following the passage of reform. Our analysis is consistent with the view that corporate governance improvements reduce the value of debt as a managerial disciplining device. Our results are robust to using different leverage measures as well as an analysis of changes in leverage. They are further robust to an industry and size matching of the treatment and control group firms.

A potential concern towards our findings could be that our control firms may have also been subject to corporate governance reforms in their respective home countries. While possible, this, however, goes *against* finding an incremental effect of the Dutch corporate governance

reform. Thus, if anything, the absolute value of the incremental decrease in leverage of the treatment firms that we document should be biased downwards, rather than upwards.

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Table 1: Definition of Variables

This table defines the variables used in the empirical analysis. The source of the data is Datastream Worldscope.

Variable	Definition
Book Leverage	Total debt (long term plus short term debt) over total assets
Market Leverage	Total debt (long term plus short term debt) over market value of equity plus book value of long and short term debt
LT Debt to Assets	Long term debt over total assets
Debt to Capital	Total debt (long term plus short term debt) over book value of equity plus book value of long and short term debt
LT Debt to Capital	Long term debt over book value of equity plus book value of long and short term debt
Log(Size)	Logarithm of total assets (in 1000 Euro)
Growth Opportunities	Market to book ratio
Liquidity	Current assets over current liabilities
Tangibility	Net property, plant, and equipment over total assets
Profitability	EBITDA over total assets
Firm Age	The age of a firm in years, measured relative to the year in which a company was founded or, if this data is not available, relative to the year in which a firm was incorporated.
Treatment	Dummy that takes the value 1 if a firm belongs to the treatment group (see Section 3)
Post	Dummy that takes the value 1 for the years 2004 to 2007

Table 2: Summary Statistics

This table compares characteristics of the firms in the treatment and control group. Variables are defined in Table 1. The sample period is 2000 to 2007. The data source is Datastream Worldscope.

	Treatment Group						Control Group						t-test for difference
Variable	Obs.	Mean	Median	Std.dev.	10%	90%	Obs.	Mean	Median	Std.dev.	10%	90%	(p-value)
Book Leverage	272	0.300	0.272	0.194	0.107	0.488	1396	0.281	0.267	0.162	0.094	0.476	0.0797
Market Leverage	268	0.271	0.241	0.168	0.068	0.498	1365	0.276	0.241	0.189	0.058	0.546	0.6470
LT Debt to Assets	281	0.210	0.193	0.136	0.041	0.399	1420	0.203	0.184	0.142	0.041	0.369	0.3865
Debt to Capital	272	0.480	0.455	0.332	0.188	0.717	1396	0.495	0.435	0.627	0.152	0.726	0.7046
LT Debt to Capital	272	0.332	0.330	0.185	0.087	0.569	1396	0.360	0.309	0.533	0.067	0.564	0.3967
Log(Size)	302	14.6	14.5	1.5	13.0	16.7	1459	16.3	16.3	1.3	14.6	18.0	0.0000
Growth Opportunities	292	3.481	2.490	3.835	1.080	6.690	1438	3.086	2.410	22.391	1.060	6.610	0.7637
Liquidity	302	0.911	0.769	1.233	0.396	1.245	1447	0.963	0.870	0.540	0.488	1.497	0.2519
Tangibility	294	0.255	0.219	0.165	0.057	0.493	1443	0.310	0.273	0.202	0.077	0.616	0.0000
Profitability	290	0.084	0.091	0.108	0.021	0.158	1456	0.084	0.081	0.136	0.009	0.201	0.9245
Firm Age	264	74.2	49.0	53.1	20.0	136.0	1552	75.0	71.0	59.2	12.0	145.0	0.8360

Table 3: Univariate Analysis

This table compares book leverage, tangibility, profitability, and growth opportunities measures between the firms in the treatment and control group. The table reports mean values. The sample is separated into years before 2004 and after (i.e., 2004 or later). Starting from fiscal year 2004, listed companies whose registered office is in the Netherlands must refer to the code in their annual reports, and indicate to what extent they have complied with a set of corporate governance principles and best practice provisions. The variables are defined in Table 1. The sample period is 2000 to 2007. *** indicates significance at 1%, ** at 5%, and * at 10%.

Book Leverage			
	Treatment Group	Control Group	Difference (Treatment – Control)
Pre 2004	0.3336	0.2923	0.0413**
Post 2004	0.2693	0.2678	0.0016
			Diff in Diff
Difference (Post-Pre)	-0.0642***	-0.0245***	-0.0397*
Tangibility			
	Treatment Group	Control Group	Difference (Treatment – Control)
Pre 2004	0.2727	0.3292	-0.0565***
Post 2004	0.2374	0.2895	-0.0522***
			Diff in Diff
Difference (Post-Pre)	-0.0353*	-0.0397***	0.0044
Profitability			
	Treatment Group	Control Group	Difference (Treatment – Control)
Pre 2004	0.0696	0.0685	0.0012
Post 2004	0.0984	0.1001	-0.0017
			Diff in Diff
Difference (Post-Pre)	0.0287**	0.0317***	-0.0029
Growth Opportunities			
	Treatment Group	Control Group	Difference (Treatment – Control)
Pre 2004	3.7572	2.6591	1.0981
Post 2004	3.2082	3.5503	-0.3421
			Diff in Diff
Difference (Post-Pre)	-0.5489	0.8912	-1.4401

Table 4: Difference-in-Differences Regression Results

This table shows results of difference-in-differences regressions. Treatment is a dummy that takes the value 1 if a firm belongs to the treatment group. Post is a dummy that takes the value 1 for the years 2004 to 2007. The variables are defined in Table 1. All leverage and control variables are winsorized at 5%. Standard errors are heteroskedasticity robust and clustered at the firm level. T-statistics are reported in parenthesis. Intercepts are not reported. The sample period is 2000 to 2007. *** indicates significance at 1%, ** at 5%, and * at 10%.

	Book Leverage	Book Leverage	Book Leverage	Market Leverage	LT Debt to Assets	Debt to Capital	LT Debt to Capital	Book Leverage	Change Book Leverage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment * Post			-0.0226*	-0.0436***	-0.0245**	-0.0375*	-0.0323*	-0.0267**	-0.0075*
			(-1.80)	(-2.60)	(-2.08)	(-1.81)	(-1.70)	(-2.22)	(-1.70)
Post		-0.0178***	-0.0142**	-0.0293***	0.0073	-0.0076	0.0214**	-0.0118**	-0.0092***
		(-3.50)	(-2.59)	(-4.72)	(1.33)	(-0.84)	(2.52)	(-2.28)	(-2.99)
Log(Size)	0.0296**	0.0341**	0.0348**	0.0438***	0.0214	0.0292	0.0210	0.0255***	
	(2.10)	(2.38)	(2.43)	(3.44)	(1.56)	(1.12)	(0.90)	(3.09)	
Growth Opportunities	0.0058***	0.0060***	0.0059***	-0.0108***	0.0053***	0.0151***	0.0121***	0.0063***	
	(3.17)	(3.24)	(3.20)	(-5.21)	(2.68)	(4.06)	(3.58)	(3.66)	
Profitability	-0.4072***	-0.3660***	-0.3660***	-0.6359***	-0.3489***	-0.6590***	-0.6310***	-0.3710***	
	(-5.64)	(-5.00)	(-5.01)	(-8.51)	(-5.04)	(-4.53)	(-5.11)	(-5.37)	
Liquidity	0.0427**	0.0431**	0.0430**	0.0201	-0.0833***	0.0614**	-0.1185***	0.0562***	
	(2.29)	(2.29)	(2.29)	(1.12)	(-4.24)	(2.08)	(-4.09)	(3.58)	
Tangibility	0.0730	0.0180	0.0180	0.0362	0.0998	0.1113	0.2003*	0.0321	
	(0.94)	(0.24)	(0.24)	(0.49)	(1.51)	(0.77)	(1.67)	(0.72)	
Treatment								0.0596**	
								(2.38)	
Firm Age								-0.0001	
								(-1.09)	
Change Log(Size)									0.0443***
									(3.16)
Change Growth Opportunities									0.0035**
									(2.12)
Change Profitability									-0.3166***
									(-6.78)
Change Liquidity									0.0631***
									(4.16)
Change Tangibility									0.0711
									(1.21)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	NO	NO
Random Effects	NO	NO	NO	NO	NO	NO	NO	YES	NO
Clustering by Firm	YES	YES	YES	YES	YES	YES	YES	YES	YES
Obs.	1633	1633	1633	1619	1654	1633	1633	1561	1395
adj. R-sq	0.141	0.160	0.164	0.299	0.129	0.163	0.139	0.1601	0.175

Table 5: Results based on Industry and Size Matching

This table compares different measures of industry (Worldscope Industry Code, Field 06011) and size adjusted leverage, separately for the before and after periods. Positive numbers suggest that the leverage ratio of the treatment group is higher than that of the industry and size matched control group. The variables are defined in Table 1. The sample period is 2000 to 2007.

	Pre 2004	Post 2004	Difference (Post-Pre)	Difference significant? (p-value)
Book Leverage	0.0796	-0.0062	-0.0858	0.1147
Market Leverage	0.0941	0.0147	-0.0793	0.0783
LT Debt to Assets	0.0300	-0.0300	-0.0599	0.1573
Debt to Capital	0.1350	-0.1952	-0.3302	0.0225
LT Debt to Capital	0.0251	-0.2137	-0.2388	0.0660

Figure 1: Evolution of Leverage over Time

This figure shows the evolution of average book leverage ratios for firms in the treatment and control group over the period 2000 to 2007.