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Effects of Ownership Concentration on the Performance of Austrian Listed Companies

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Abstract:
This paper applies panel data techniques to Austrian non-financial listed companies for investigating the managerial discretion hypothesis and asymmetric information. We analyse full population of non-financial companies listed on the Vienna Stock Exchange from 2007- 2020. Equipment investment is susceptible to cash flows, providing evidence that over-investment leads to returns on investment lower than cost of capital. $CF_{i,t-1}/K_{i,t-1}$ has a strongly positive effect in family-owned companies' constraints. Cash constraints prevent firms from attaining optimal investment level. $CF_{i,t-1}/K_{i,t-1}$ positively affects investment providing strong evidence that state-owned companies' managers exercise discretion while investing cash flows in sub-optimal projects. The effect of voting rights (VR) of ultimate shareholders on performance is an inverted U-curve with turning point at 49.8% VR concentration. Beyond this point downward slope provides strong evidence of entrenchment hypothesis, with negative entrenchment effect dominating the incentive effect. Ultimate shareholders' expropriation is detrimental for minority shareholders. Large shareholders' detrimental behaviour slows down growth of financial markets.

JEL classification: G3; L2
Keywords: corporate governance; managerial discretion hypothesis; Tobin's q; fixed Investment

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1 Introduction

Controlling the effects of ownership concentration on investment performance is important for industrialized countries such as Austria which is strategically located in Western Europe. Only if entrenchment effects of ownership and private benefits of control are reasonably low, will small minority shareholders feel safe to invest in the shares of listed companies. Only if the capital market institutions properly protect them from expropriation by the dominant largest shareholders will the equity market in Austria grow further, which among other factors, leads to higher economic growth.

Analyzing the effect of cash flow on fixed capital formation in publicly listed companies is vital for industrialized countries with strong corporate governance systems. The current study considers this research topic for Austria. In the microeconomic framework, managers have their own goals such as increasing the growth and size of the firm. They wish to pursue these goals even when it harms their shareholders (Marris, 1998). The firm's manager or the largest shareholder has discretion in allocating their internal cashflows. While investing they choose this source of finance over external sources i.e., bank loans or equity offerings (Jensen, 1986).

For the full population of all non-financial companies listed on the Vienna Stock Exchange, we investigate the research question how does a company's internal cash flow effect equipment investment. Using data from 2007 to 2020, we present strong evidence that cash flow positively affects investment in capital equipment, such as machinery. There is evidence of the managerial discretion hypothesis (Grabowski and Mueller, 1972; also, Jensen, 1986). The managerial discretion hypothesis (MDH) postulates that managers invest beyond the optimal level of investment to maximize the shareholders' wealth. Managers have incentives to cause their firms to grow beyond optimal size. They exercise enormous discretion while reinvesting cash flows and tend to over-invest. For companies owned by individuals or families, on the other hand, there is strong evidence of the cash constraints hypothesis.

Analysis of the effects of ownership concentration on performance is an important strand of the corporate governance literature since the pioneering research work of Morck et al. (1988). In a sample of US firms, they found that Tobin's q is non-monotonically related to managerial shareholdings, a positive relation holds for shareholding up to 5%, between 5% and 25%, a negative association dominates, after that a positive relation takes over once more. They interpreted the positive part of the relationship as being consistent with incentives becoming more and more aligned between outside shareholders and managers i.e., managerial shareholdings overcome the problem of separation of ownership and control. However, if managers begin to hold a substantial share in the company, it is almost impossible to replace them. Thus, there is a shareholding range where they destroy firm value more than they add. They become entrenched.

Ultimate shareholdings of Austrian listed companies are highly concentrated. This is the first study in Austria that analyzes the ultimate ownership

of the full population of all non-financial corporations listed on the Vienna Stock Exchange. In some cases, the largest ultimate shareholders by extremely concentrated shareholdings squeeze out minority shareholders. For example, in Bene AG, the holdings of all shareholders except for the principal shareholder (BGO Beteiligungsverwaltungs Gmbh) were transferred to this principal shareholder in return for a meager cash settlement, under section 1 of the Austrian Minority Shareholder Squeeze-Out Act (Gesellschafter-Ausschlussgesetz). Another example is Petro Welt Technologies AG. With the exception of its principal shareholder (Joma Industrial Source Corporation), the shareholdings of all shareholders were transferred to this principal shareholder in exchange for a meager cash settlement under section 1 of the Austrian Minority Shareholder Squeeze-Out Act. Thus, the largest ultimate shareholder expropriated firm value to the detriment of minority shareholders. This research analyzes the behavioral tendency of entrenched largest shareholders that leads to delisting of corporate entities under the above-mentioned Squeeze-Out Act, which is harms the interest of minority shareholders.

Our paper analyzes the ownership structures of the entire population of non-financial companies listed on the Vienna Stock Exchange. This is the first study in Austria that examines the relationship between ownership concentration and investment performance using data from 2007- 2020 for all non-financial companies listed on the Vienna Stock Exchange. It uses panel-data estimation methods for analyzing the effect of time series variation in ultimate ownership on corporate performance (see Demsetz and Lehn, 1985). The relationship between Tobin's q and voting rights' concentration is upward sloping till a turning point at 49.8%. Beyond 49.8% voting rights, the curve is steeply downward sloping. There is strong evidence of entrenchment of the largest ultimate shareholders and expropriation of minority shareholders. Doubt is raised that capital market institutions properly protect minority shareholders from expropriation because 51% of the firms fall in the downward sloping part of the curve.

Section 2 briefly overviews the investment-cash flow sensitivity literature and the literature on ownership structures and firm performance. Section 3 presents our hypothesis. Section 4 focuses on the problem of determining ultimate ownership. Section 5 comprises the methodology used to explore the managerial discretion hypothesis (MDH) evidence and presents the estimating equation for measuring the effects of ownership concentration on performance. In section 6, we describe the sources of information and report the summary statistics. Section 7 comprises in-depth analyses of our hypotheses on investment-cash flow sensitivity and results of panel estimations of ownership concentration on investment performance. Conclusions are drawn in the final section.

2 Literature Review

Tobin (1969) schematically illustrated the capital account approach for a closed economy. In his general accounting framework, a row may be labeled as demand deposits or producers' durable equipment, whereas col-

umns represent sectors of the economy that are constrained by their own wealth. Commercial banks, central banks, non-bank financial institutions, and the general public are examples of sectors. In this approach, financial policies and events mainly affect aggregate demand by changing the valuations of physical assets relative to their replacement costs. Monetary policies can accomplish such changes, but other exogenous events can too.

In a seminal article, Morck et al. (1988) analyze the effect of ownership concentration on the investment performance of 371 of Fortune 500 companies. Morck et al. (1988) use shareholdings of the board of directors as a proxy for managerial ownership and estimate a non-linear non-monotonic relationship (first up, then down, then up again) between ownership concentration and Tobin's q. McConnell and Servaes (1990), who study a large sample of US companies, report an inverted-U relationship between managerial ownership and Tobin's q. They observe only the first part of the inverted parabola. Short and Keasey (1999) use a sample of 225 listed companies from the United Kingdom to study the impact of ownership concentration on investment performance and report a non-linear relationship between the former and the latter.

Hayashi (1982) analyzes US corporations from 1953 to 1976 and finds that investment is a function of marginal q (the ratio of market value of an additional unit of capital to its replacement cost). He tests the conjecture put forward by Tobin and derives the optimal investment rate as a function of marginal q adjusted for tax purposes. A regression of the ratio of corporate investment to the total capital stock at replacement cost on marginal q gives a positive coefficient. He argues that marginal q and average q (the ratio of market value of capital to its replacement cost) are the same under the conditions that the firm is a price taker and firm's production and installation functions are homogeneous.

Demsetz and Lehn (1985) analyze the structure of corporate ownership for 511 US corporations for the period 1976-1980. They use the ownership measures, percentage of outstanding common equity owned by the five largest shareholders, percentage of shares owned by the 20 largest shareholders, and approximation of a Herfindahl Index. Using a sample of 511 companies from the US economy's major sectors such as utilities and financial institutions, they find that conceptually and empirically, corporate ownership structure varies systematically in ways consistent with value maximization.

Hoshi et al. (1991) present evidence for Japanese companies, which is consistent with the view that information and incentive problems in the capital market have important effects on corporate investment. They hypothesize that group firms are not subject to asymmetric information problems when financing their investments because other group members have access to information. Tobin's q is used as a proxy for investment prospects. The sample is divided into 176 independent and 121 group companies based on a refinement of the Keiretsuno Kenkyu's classification that focuses on a company's financial ties with financial institutions. Their dependent variable is depreciable assets divided by the capital stock. The measures of liquidity used are cash flow and short-term securities. Cash flow has a pos-

itive coefficient only in the investment equation for independent companies. Contrary to the over-investment hypothesis that predicts a negative coefficient for both interaction terms, the difference between liquidity coefficients of group companies and non-group companies is larger for firms with high Tobin's q.

Walker (2001) explores the effect of group membership on investment policies of Japanese companies. He uses a large sample of Japanese companies from 1993 to 1998 to analyze the determinants of the investment of group and independent companies. The investment of horizontal group members is less sensitive to growth opportunities and more sensitive to operating cash flow than is the investment level of independent firms. The measure of investment efficiency used is the product of the relative investment level and the level of growth opportunities. The Keiretsu provides strong evidence that industrial groups in Japan transfer capital between members. The investment patterns of Japanese group companies appear to be similar to the evidence of investment patterns in US conglomerates.

Fazzari et al. (1988) test the asymmetric information hypothesis by basing their test solely on the financial constraint part of the hypothesis. They divide a sample of 422 US companies into low, medium, and high retention ratio sub-samples and use them to estimate cash flow-investment equations, which also included Tobin's q to analyze differences in investment opportunities.

Vogt (1994) analyzes investment-cash flow sensitivity for a sample of 229 listed US firms. He analyzes the relationship between a firm's investment in capital equipment and cash flow, its value, while controlling for firm size. The analysis reports that cash flow financed growth by large low-dividend paying firms tends to be value destroying, while cash flow financed growth is value creating for small low-dividend paying firms. The influence of cash flow on investment is stronger for companies that have lower Tobin's q values. The effect of cash flow and firm value on research and development expenditure is also analyzed, which shows that research and development as a fraction of total assets is less for high-dividend paying firms than medium- and low-dividend paying firms.

According to the investment literature, there is a finance hierarchy in firms' financing patterns. Firstly, firms use cash flows to finance investments. Secondly, they take on debt and approach the equity market. Myers (1983) reports that US companies rely heavily on internal funds and debt to finance their investments. Myers (2002) reviews the theories of capital structure, pecking order theory, agency theory, capital structure irrelevance, and trade-off theory.

Banks are most important in corporate governance in Germany. Universal banks have played the kind of monitoring role for the companies that they lent to or owned shares in that the central management teams of multidivision form organizations were supposed to play in the UK and USA (Cable, 1985). Mueller and Yurtoglu (2000) estimate marginal q's on investments from cash flow, debt, and equity offerings for a large sample of companies from 38 countries. They categorize countries by economic and legal systems origins and report that marginal q on reinvested cash flows is lower

than one for some countries from all types of legal origins. In these cases, investments out of internal cash flows yield the worst performance. For other countries, again from all types of legal origin, marginal q's on debt and equity are equal to or greater than one. In these cases, this holds for investments out of debt and out of cash flows. Overall, countries with English-origin legal systems tend to perform better than others. Thus, external capital markets effectively force managers to earn marginal q's on debt and equity equal to or greater than one.

Marris (1998) reports that managers pursue excessive growth of firms even when it harms the interests of the shareholders (see also Kathuria and Mueller, 1995). Opler et al. (1999) examine the determinants and implications of cash holdings and marketable securities by listed U.S. firms for 1971-1994. They estimate cross-sectional regressions for each year and find that cash holdings decrease significantly with firm size, net working capital, leverage, whether a firm pays dividends, and whether it is regulated. A time series cross-sectional regression is used with year dummy variables, and a time-series cross sectional regression with year dummies where the variables are adjusted for industry, using dummy variables at the 2-digit SIC code level. Managerial ownership has a positive effect on cash holdings for low ownership. However, cash holdings do not increase further as ownership increases beyond 5%. This finding is consistent with managerial risk aversion, insofar as managers may wish to protect their human capital with a cash buffer. They also present regressions for the subsample of Standard and Poors (S&P) 500 firms that use derivatives. Cash holdings are independent of the use of derivatives. Their analyses indicate that firms with strong growth opportunities, riskier activities, and small firms hold more cash than other firms. The evidence described in this paper is consistent with the view that management of the firm accumulates cash if it has the opportunity to do so. The motivation for this behavior is that the precautionary motive is strong.

Franks and Mayer (2001) report very high levels of concentration of ownership in German corporations, particularly associated with holdings by other companies and families, and complex patterns of ownership involving pyramidal structures. The research article addresses whether distinctive ownership characteristics are related to effective corporate governance or exploitation of private benefits of control. Whereas there is no hostile takeover market in Germany, a substantial share stakes market superficially resembles an Anglo-American market for corporate control. However, it differs in two crucial respects. Firstly, it allows price discrimination between sellers of share blocks and other investors and, secondly, the overall gains to merger as reflected in bid premia are low in relation to those in the UK and US. The modest gains to changes to ownership are mirrored in board turnover that is low compared to takeovers in the UK and US, suggesting that control benefits for ownership changes in Germany are small compared to that elsewhere.

Gugler et al. (2004) analyze the effect of corporate governance institutions and ownership structures on investment performance by using a sample of more than 19,000 companies from 61 countries. They use marginal q

to measure performance and show that the origin of the legal system is the most critical determinant of performance. Companies in countries with a legal system of English origin earn at least equal to their costs of capital. However, companies in countries with civil law systems earn returns on investment below their costs of capital. Differences in performance related to a country's legal systems dominate differences related to ownership structures.

Carvalhal da Silva and Leal (2006) analyze the ownership structures and financials of 236 Brazilian companies. They report that Tobin's q and ROA are positively related to cash flow rights concentration and negatively related to voting rights concentration and to the separation of voting rights from cash flow rights. The sample companies controlled by the government, foreign, and institutional investors generally have significantly higher valuation and performance than those owned by families. Gugler (1998) analyzes the ownership structures of 600 largest Austrian non-financial corporations. Comparing the concentration of ownership across European countries reveals that ownership concentration in Austria is exceptionally high compared to other countries in Europe. Control in the domestic investor categories, banks, the state, and families/individuals reduces firm profitability significantly. Although, foreign control increases firm profitability, state control is detrimental to shareholder wealth maximization. From this perspective, ownership concentration seems excessive in Austria. According to the author, a more developed capital market, mainly a more developed stock exchange would surely help in the efficient financing and governing of Austrian corporations.

Tam and Tan (2007) analyze the ownership structures and performance of listed Malaysian companies from 1994 to 2001. In their study, state-owned companies have the highest concentration of ownership. Tobin's q and return on assets are used for measuring firm performance. According to them, ownership types (individuals, state, and foreign) have a significant impact on performance. However, the impact varies with the performance measure, the business conditions, and the socio-economic policy that influences the distribution of wealth in Malaysia.

Martinez, Stohr and Quiroga (2007) use a sample of 100 family-owned companies and 75 non-family-owned companies for evaluating the impact of family ownership on the performance of Chilean companies. According to them, family-owned companies perform significantly better in terms of both accounting performance and company value. However, the results of this study were based on mean comparison tests without proper controls for other effects.

According to Ceuto (2008), higher voting rights held by the dominant largest shareholders are associated with lower Tobin's q in 170 companies from Brazil, Chile, Columbia, Peru, and Venezuela. The ratio of cash flow rights to voting rights held by the dominant shareholder is significantly associated with higher Tobin's q values and this effect is twice as large in fixed effect regressions.

Hammadi (2010) explores the relationship between the ownership of controlling shareholders and the firm performance of Belgian-listed compa-

nies from 1991 to 1996. Firm performance is measured by Tobin's q. In her study, Tobin's q is regressed on the largest shareholder's concentration, firm size & age, leverage, and research and development. She finds that large shareholders in family-owned firms have a positive effect on performance. The analysis shows that largest shareholders have a negative effect of performance, and the presence of a second shareholder has no impact on performance.

Blanca et al. (2010) analyze insider ownership and firm performance of Spanish listed firms. They employ a large sample of Spanish listed companies for investigating the effect of insider ownership on performance and provide evidence of the convergence of interests and entrenchment effect. The empirical analyses suggest that insiders of Spanish family firms become entrenched at higher ownership levels.

Jin and Park (2015) analyze how the separation of cash flow and voting rights affects performance of firms affiliated with large family business groups. Analyzing data from Korean Chaebols from 2003 to 2010, they find that separation of cash flow and voting rights positively affects accounting performance but not market performance.

Yan et al. (2019) explore why and how political hierarchy shapes tax haven investments from emerging market economies. Central state-owned enterprises play crucial roles in strategic sectors such as petroleum, electricity generation, and postal services. Emerging market firms are classified into central state-owned enterprises (SOEs), local SOEs, private firms with political connections, and private firms without political connections. The sample analyzed comprises panel data of Chinese publicly listed companies for the period 2003-2013. This study uses a dummy variable, Tax Haven Propensity that assumes a value of one if a Multinational Enterprise (MNE) invests in a Tax Haven for a certain year and otherwise it equals zero. A Probit model is employed. In this study, Tax Haven Propensity is the dependent variable, whereas political status and market liberalization are the independent variables. The control variables used are leverage and growth. Tran and Le (2020) analyze the relationship between ownership concentration and performance for Vietnamese listed companies. They find a positive relation between ownership concentration and the riskiness of profitability. This finding is consistent with the argument that large shareholders owning controlling equity stakes promote the firm's risk-taking activities by weakening the strategic roles of risk-averse managers. In Vietnam's weak institutional framework, this empirical evidence advocates that private benefits appeal to dominant shareholders and encourage them to engage in risk-taking activities at the expense of minority investors.

Pasko et al. (2020) analyze the ownership concentration of agro-industrial companies in Ukraine and analyze its impact on firm performance. Although there are exceptions, there is a general tendency to hold large shareholding blocks of the founders or majority shareholders. They analyze a twin agency problem and argue that ownership concentration serves as a substitute for a weak corporate governance regime for protecting investor rights. The study has found no significant relationship between ownership concentration and performance, which is measured by earnings before in-

terest, depreciation, taxes, and amortization (EBIDTA), profit (loss) before tax, and Tobin's *q*.

To synthesize the findings of the reviewed literature on ownership concentration and investment performance, Morck et al. (1988) in a seminal study estimated an up-down-up relationship between ownership concentration and Tobin's *q* for 371 Fortune five hundred companies in the USA. Another pioneering study for US companies is McConnell and Servaes (1990), which reports an inverted-U relationship between managerial ownership and Tobin's *q*. Demsetz and Lehn (1985) conducted an in-depth analysis of corporate ownership for 511 US corporations from major sectors such as utilities and financial institutions. They found both conceptually and empirically that corporate ownership structure in the USA varies systematically in ways consistent with value maximization. Analyzing US corporations, Hayashi (1982) argues that marginal *q* and average *q* (the ratio of market value of capital to its replacement cost) are the same under the conditions that the firm is a price taker and its production and installation functions are homogeneous. For the United Kingdom, Short and Keasey (1999) report a non-linear relationship between ownership concentration and corporate investment performance.

For Japan, Hoshi et al. (1991) analyze information and incentive problems in the capital market. Employing cash flow and short-term securities as measures of liquidity, they find that cash flow has a positive coefficient only in the investment equation for independent companies. An important finding is that the difference between liquidity coefficients of the group and non-group companies is larger for firms with high Tobin's *q*. Walker (2001) analyzing a large sample of Japanese listed companies finds that investment of horizontal group members is less sensitive to growth opportunities and more sensitive to operating cash flow than is the investment level of independent firms. According to his research, the Japanese Keiretsu provides strong evidence that industrial groups in Japan transfer capital between members. Jin and Park (2015) analyze Korean Chaebols and find that separation of cash flow and voting rights positively affects accounting performance.

To summarize the findings of research studies on investment- cash flow sensitivity, a pioneering study is Fazzari et al. (1988) which presents investment- cash flow equations for US corporations, which also include Tobin's *q* for analyzing differences in investment opportunities. Vogt (1994) report that the effect of cash flow on investment is stronger for companies, which have lower Tobin's *q* values. They find that the ratio of research and development to total assets is less for high-dividend paying firms than medium- and low-dividend paying firms.

Cetenak and Vural (2015) investigate investment- cash flow sensitivity for Borsa Istanbul Manufacturing firms. They find strong investment cash flow sensitivity for the small business groups affiliated firms and non-affiliated independent firm. Opler et al. (1999) analyze determinants of cash holdings of listed US firms. They find that cash holdings decrease significantly with firm size, net working capital, leverage, and dividend payout ratio. Analyzing cash holdings in S&P 500 firms that use derivatives, the

authors find that cash holdings are independent of the use of derivatives. Their analyses report that firms with strong growth opportunities, riskier activities, and small firms hold more cash than other firms.

Cable (1985) is of the view that banks are most important in corporate governance in Germany. Franks and Mayer (2001) report very high levels of concentration of ownership in German corporations, particularly associated with holdings by other companies and families, and complex patterns of ownership involving pyramidal structures. Gugler et al. (2004) employ a large sample of listed firms from 61 countries to estimate returns on investments as compared to the costs of capital. According to them, companies in countries with a legal system of English origin earn at least equal to their costs of capital. However, companies in countries with civil law systems earn returns on investment below their costs of capital.

Carvalhal da Silva and Leal (2006) analyze ownership structures and performance of 236 Brazilian companies. They report that Tobin's *q* and ROA are positively related to cash flow rights concentration and negatively related to voting rights concentration and to the separation of voting rights from cash flow rights. Tam and Tan (2007) use Tobin's *q* and return on assets for measuring firm performance of Malaysian listed companies. According to their study, ownership is highly concentrated in state-owned companies. Ownership types (individuals, state, and foreign) have a significant impact on performance.

Gugler (1998) analyzes the ownership structures of the 600 largest Austrian corporations. His analysis reveals that ownership concentration in Austria is exceptionally high compared to other countries in Europe. Control in the domestic investor categories, banks, the state, and families/individuals reduces firm profitability significantly. Foreign control increases firm profitability. However, state control is detrimental to shareholder wealth maximization.

Martinez et al. (2007) analyze the impact of ownership on the performance of Chilean companies. In their study, family-owned companies perform significantly better in terms of both accounting performance and company value. Ceuto (2008) analyzes the ownership and performance of 170 companies from Brazil, Chile, Columbia, Peru, and Venezuela. The study shows that higher voting rights held by the dominant largest shareholders are associated with lower Tobin's *q*.

Hammadi (2010) analyzes ownership and firm performance for Belgian listed companies. She shows that large shareholders in family-owned firms have a positive effect on performance, which is measured by Tobin's *q*. Blanca et al. (2010) employ a large sample of Spanish-listed companies for providing evidence of the convergence of interests and entrenchment effect. Their analyses suggest that insiders of Spanish family firms become entrenched at higher ownership levels.

Pasko et al. (2020) examine ownership concentration and performance of agro-industrial companies in Ukraine. They have found no significant relationship between ownership concentration and performance, which is measured by EBITDA, profit before tax, and Tobin's *q*.

There is no recent study for Austria that estimates investment-cash flow regressions for providing evidence of the managerial discretion hypothesis (MDH) using the full population of non-financial listed companies, and in the case of family-owned firms- the cash constraints hypothesis.

Moreover, there is no study for Austria that conducts comprehensive analyses of ownership structures of Austrian listed companies employing the entire population of all non-financial companies listed on the Vienna Stock Exchange. This paper fills this gap for Austria by estimating the effects of ownership concentration on investment performance. In this study, we explore evidence that the largest ultimate shareholder or manager expropriates firm value to the detriment of minority shareholders.

3 *Hypotheses*

The managerial discretion hypothesis (MDH) postulates that managers of firms pursue their own objectives instead of maximizing the wealth of shareholders. Managers' own objectives are to increase the size or growth of their companies, even when growth is harmful to their shareholders (Marris, 1998). The pursuit of excessive growth is detrimental to shareholders. According to the MDH, managers could conceal the nature of investments in the firm for maximizing their own value (Yurtoglu, 2003). Therefore, they tend to invest beyond the optimal level of investment. This suggests the following hypothesis:

Hypothesis 1: Investment in capital equipment is highly sensitive to the firm's cash flow.

Notwithstanding this hypothesis, most listed firms in Austria have lucrative investment opportunities, and there is no disagreement over investment policies between the largest ultimate shareholders or managers and outside shareholders.

The entrenchment of ownership hypothesis predicts that a dominant large shareholder of a corporation who either runs the firm or sits on the supervisory board may have considerably high voting power that enables her to use the assets of the firm opportunistically (see Gugler, 1998, also see Morck et al. 1988).

This suggests the following hypothesis:

Hypothesis 2: High voting (control) rights of entrenched largest ultimate shareholders affect investment performance negatively, due to the negative entrenchment effect caused by concentrated shareholdings.

4 *Ownership Structure*

The ownership structures of Austrian listed companies are highly concentrated. The concentration of ownership is evident from Table 1, which

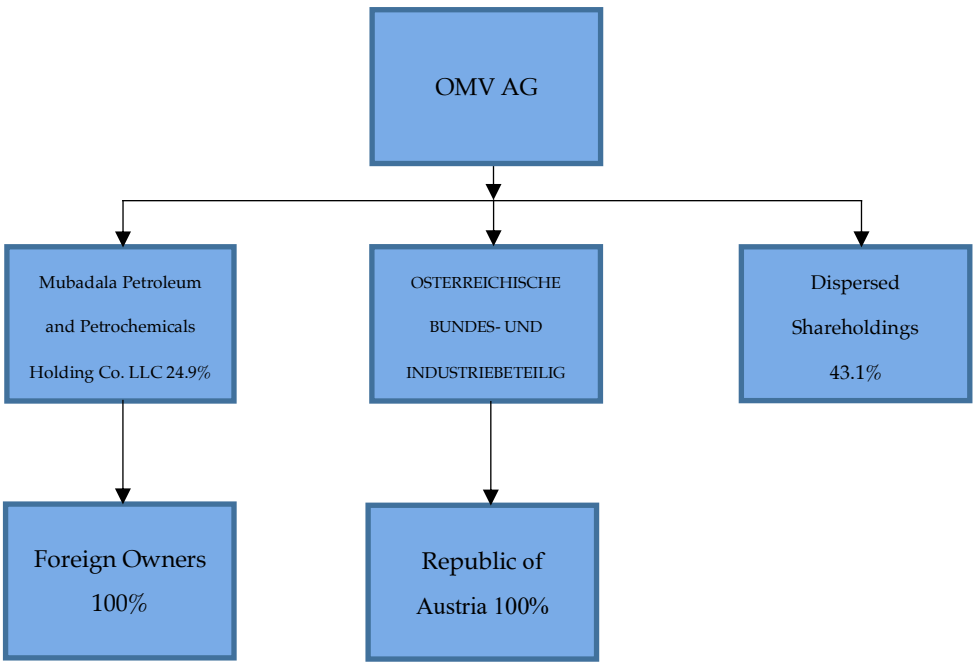
reports direct and ultimate ownership in Austria. The ownership structure of OMV AG is illustrated in Figure 1.

Table 1. Ownership and Control Structures of Austrian Listed Companies

	Direct Ownership Panel	Ultimate Ownership Panel				
	Largest Direct Shareholders	Largest Ultimate Shareholders[a]				
	Ownership Percentage	Voting[b] Rights (*VR*) %			Companies	
Ownership Identity	Mean	Mean	Median	SD	Number[c] (*N*)	% age
Listed Companies	57.88					
Holding Companies	51.46					
Families	25	44.24	38.47	24.21	14	52
State	31.50	48.38	40	22.28	3	11
Financial Inst.	10.25	20.25	20.25	-	2	7
Foreign	54.56	68.24	72.35	25.92	8	30
Total	52.45	52.03	51.87	24.85		

[a] Ultimate Shareholders of three firms in the sample are Dispersed Shareholders. [b] We do not report cash flow rights in tabular form because of a minimal deviation of cash flow rights from voting rights. [c] N represents the number of ultimately controlled firms by each of the Largest Ultimate Shareholders like State, Families, Foreign, and Financial Institutions.

Figure 1. Ownership Structure of OMV AG



The largest direct shareholder of OMV AG is Österreichische Bundes und Industriebeteiligungen Gmbh which has shareholding of 31.5%. Österreichische Bundes und Industriebeteiligungen Gmbh is fully owned by the state. The ultimate largest shareholder of OMV AG is the state. The Mubadala Petroleum and Petrochemicals Holding Co. LLC, United Arab Emirates, a foreign entity has shareholdings of 24.9%.

Table 1 reports the ownership concentration by the identity of direct and ultimate shareholders. The variable Ownership expresses the mean (median) of ownership whenever these entities are largest direct shareholders. The table 1 illustrates that ultimate ownership is a more meaningful concept than direct ownership. The median of largest ultimate shareholders' voting rights concentration is 51.87%.

Ultimate shareholdings are highly concentrated in Austria, which has a "bank-based" financing system, and concentration of ownership is an important feature in "bank-based" systems of finance.

5 Methods and Data

5.1 Model

The MDH expresses that the manager of a firm invests beyond the optimal level of investment that would maximize the firm's value (Marris, 1998). The underlying theory of the MDH is that managers could conceal the nature of investments in the firm to maximize their own welfare. This theory assumes that the firm has excess cash and is likely to pay dividends to maintain its share price high enough to avoid takeover (see Yurtoglu, 2003). The manager invests beyond the optimal level. Therefore, over-investment leads to a return on investment lower than the cost of capital.

Under the asymmetric information hypothesis, firms have investment opportunities promising returns higher than shareholders' opportunity costs, but they lack funds to finance them. However, the market underestimates these returns. Therefore, firms' shares are priced lower than they would be if the market was fully informed. Unless the firm's cash flow is greater than the optimal investment level, cash flow should have a positive coefficient in the investment equation under the asymmetric information hypothesis (AIH). Rather it should have a coefficient 1.0. The AIH stipulates that the firm is cash-constrained and it either does not pay dividends or pays low dividends. The AIH predicts that the firm under-invests. This implies that the return on investment is higher than the cost of capital (see Kathuria and Mueller, 1995 for a detailed theoretical discussion). The sensitivity of investment to cash flow of group firms could differ consistently from independent firms. Intuitively, group membership helps firms to cope with asymmetric information problems in the capital market. Firms in Japan hold shareholdings in group banks that provide an informational advantage and allow them to obtain financial resources from group banks in case of financial distress (see Hoshi et al.,1991, also see Yurtoglu, 2003 and Gugler et al.,2003).

Based on the aforesaid hypothesis, the estimating equation is devised. Cash flow is used to measure the liquidity of a firm. Tobin's q is used as a proxy of firm performance (refer to the appendix for definitions of variables). In order to control for firm size, investment (I_t) and cash flow (CF_t) are scaled by the firm's total stock of capital. The estimating equation of the firm fixed effects model in linear form is given as:

$$I_{i,t}/ K_{i,t-1}= \alpha + ß_1 CF_{i,t-1}/ K_{i,t-1}+ ß_2 q_{it} + \mu_t + v_{it} \quad (1)$$

Here $I_{i,t}/ K_{i,t-1}$ is the ratio of investment in year t to the capital stock in t-1, $CF_{i,t-1}/ K_{i,t-1}$ is the ratio of cash flow and capital stock, and qit denotes Tobin's q of company i in period t, μi denotes the unobserved firm-specific effect, and v_{it} is the error term.

Tobin's q is regressed on lagged voting rights (VR) as well as on the square of voting rights (VR^2), leverage (Lev), and company size (S). Initially, when the voting (control) rights increase they positively affect performance because of the incentive or convergence of interests' effect of ownership. However, for considerably larger voting (control) rights, they are hypothesized to affect performance negatively, due to the negative entrenchment effect caused by concentrated shareholdings. In summary, these effects may be reflected in a positive coefficient on VR and a negative coefficient on VR^2.

Leverage is hypothesized to positively affect firm performance because of the disciplinary role of debt. Gross Domestic Product (GDP) annual growth rate is employed as a control variable for analyzing the effect of fluctuations in the business cycle on firm performance. The estimating equation is written in linear form as follows:

$$q_{i,t}= \alpha_i + ß_1 VR_{i,t-1} + ß_2 VR^2_{i,t-1}+ ß_3 Lev_{i,t-1}+ ß_4 S_{i,t-1}+ ß_5 GDP_{g,\ t-1} + \mu_{i,t} \quad (2)$$

Here $q_{i,t}$ denotes Tobin's q of company i in period t, $VR_{i,t-1}$ denotes the voting rights of the largest ultimate shareholder in t-1, $VR^2_{i,t-1}$ is voting rights squared, Lev denotes leverage, S denotes company size, GDP_g denotes the annual growth rate in Austria's GDP and $\mu_{i,t}$ is the error term.

5.2 Data

We chose the full population of non-financial companies listed on the Vienna Stock Exchange for the econometric analyses. The financial and stock price data from 2007 to 2020 was prepared from ORBIS and Datastream databases.

The analysis uses unbalanced panels because all companies were not publicly- listed from 2007 to 2020.

Summary statistics of variables are reported in Table 2 (panel a).

The Sidak method is used for assessing the significance levels of the correlation coefficients reported in Table 2 (panel b) (Hamilton, 1992, pp. 171-

175). Finally, in this and the following tables ***, **, * denote significance levels of 1%, 5% and 10% respectively.

Table 2. Summary Statistics of Variables and Correlation Coefficients

a: Summary statistics

	I_t/K_{t-1}	CF_{t-1}/K_{t-1}	Tobin's q (q_{it-1})	Voting Rights (*VR*)	Leverage (*Lev)*	Size (*S*)	GDP Annual Growth (GDP_g)
Mean	0.06	0.10	1.19	52.03	0.62	7.14	0.7
(Median)	(0.05)	(0.08)	(1.09)	(51.87)	(0.61)	(6.44)	(1.5)

b: Matrix of Correlation Coefficients

	Tobin's *q*	*Voting Rights (VR)*	Leverage (Lev)	Size (S)
Voting Rights (*VR*)	-0.22***			
Leverage (Lev)	0.16***	-0.20**		
Size (*S*)	-0.14**	0.09	-0.09*	
GDP annual growth (GDP_g)	0.08	0.01	0.06	0.04

6 Results

The results are reported in Tables 3 and 4. The results are robust. Panel A of Table 3 reports that the effect of Tobin's q is positive and significant at the 5% level. The coefficient of liquidity, cash flow to capital stock ($CF_{i,t-1}/K_{i,t-1}$), is positive and significant at the 1% significance level. This implies that investment is highly sensitive to cash flow.

The restriction that the coefficient on $CF_{i,t-1}/K_{i,t-1}$ equals one can be rejected at the 1% significance level. There is strong evidence for our hypothesis that the manager or dominant largest shareholder exercises discretion while investing beyond the optimal investment level, which maximizes the value of the firm. The results validate the hypothesis on managerial discretion that managers or largest shareholders over-invest, which harms shareholder wealth maximization. They could conceal the nature of investments to enhance their welfare. In Panel B, we estimate equation (1) using panel observations in which $CF_{i,t-1}>0$.

The logic for running this panel regression excludes loss-making firms for calculating the coefficient on $CF_{i,t-1}/K_{i,t-1}$ ($\beta 1$). After excluding the observations for which $CF_{i,t-1}<0$, cash flow to capital stock ($CF_{i,t-1}/K_{i,t-1}$), is positive and significant at the 1% significance level that shows investment is sensitive to cash flow.The firm fixed effects regression (FE) reports that $CF_{i,t-1}/K_{i,t-1}$ is positive

and significant at the 1% level. Tobin's *q* is positive and significant at the 5% level.

Table 3. Investment – Cash Flow Sensitivity

Panel A: Cash Flow Sensitivity for Companies Listed on the Vienna Stock Exchange

$I_{i,t}/K_{i,t-1}$	Constant *C*oeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ *C*oeff. (SE)	q_{it-1} *C*oeff. (SE)	[a]	Adj.R^2	Observations (*J*)
	0.01	0.32***	0.01**	0.000	0.02	310
	(0.007)	(0.064)	(0.005)			

[a]p-value of a Wald restriction test for the H_0 that the coefficient on $CF_{i,t-1}/K_{i,t-1}$ equals 1.

Panel B: Cash Flow Sensitivity for Companies with Net Positive Cash Flows ($CF_{i,t-1}>0$)

$I_{i,t}/K_{i,t-1}$ for $CF_{i,t-1}>0$	Constant *C*oeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ *C*oeff. (SE)	q_{it-1} *C*oeff. (SE)	[a]	Adj.R^2 /Within R^2	Observations[b] (*P*)
Pooled	0.03	0.53***	0.02**		0.19	286
regression	(0.009)	(0.068)	(0.007)			
Firm Fixed	0.03	0.74***	0.03**	-0.75***	0.62	286
Effects	(0.015)	(0.036)	(0.017)			
Random	0.03	0.31***	0.08	0.000	0.61	286
Effects	(0.020)	(0.032)	(0.015)			
Chow F-statistic for data pooling		F-statistic Degrees of freedom			18.39*** (27, 256)	

[a]Effect covariate correlation; [b]Panel B excludes the loss-making firms

Panel B (i): **Industry Variation in Investment- Cash flow Sensitivity**

$I_{i,t}/K_{i,t-1}$	Constant *C*oeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ *C*oeff. (SE)	q_{it-1} *C*oeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ *IND_j (SE)	Adj.R^2	Observations
Full sample	0.018*	0.29***	0.01***		0.80	286
	(0.009)	(0.075)	(0.007)			
Real Estate				0.01		
				(0.092)		
Oil & Gas				0.78***		
Exploration				(0.078)		
Holding Company				0.14		
				(0.093)		
Telecommunication				0.33***		
				(0.092)		
Construction				0.29**		
				(0.121)		
Fruit Juice &				0.44***		
Confectionary				(0.092)		
Chemical				0.30**		
				(0.076)		
Pharmaceutical				0.22**		
				(0.099)		
Steel & Metal				0.55***		
Manufactures				(0.120)		

Fire-fighting Equipment	0.29
	(0.222)
Textile Garments	-0.42***
	(0.120)
Biscuit	-0.25*
Manufacturer	(0.132)
Airport	0.16
	(0.287)
Brewing	-0.11
	(0.188)
Cement Manufacturing	0.10
	(0.115)
Oilfield Equipment	0.24
	(0.158)
Light Manufacturing	0.05
	(0.153)

The null hypothesis of the Chow test for data pooling can be rejected, which implies that firm fixed effect is preferred over the pooled regression. The random effects regression is used, and the estimates are unchanged. We run the Hausman test to compare the firm fixed effects estimator to the random effects. It shows that the firm fixed effects estimator is preferred to the random effects estimator. However, we do not report it in tabular form to save space.

In Panel B (i), we interact $CF_{i,t-1}/K_{i,t-1}$ with industry dummy variables for analyzing variations in investment's sensitivity to cash flow across various industries. The coefficients on these interaction terms ($CF_{i,t-1}/K_{i,t-1}$*IND_j) are reported in Panel B (i). For oil and gas exploration, telecommunication, fruit juices & confectionary, steel & metal manufacturing industry, and highway toll company, the coefficients on interaction terms are positive and significant at the 1% level. Its interpretation is that cash flow has a more positive effect on fixed capital investments in these industries as compared to the refractory industry with Tobin's q constant. For construction, chemical and pharmaceutical manufacturing industries, the interaction term of industry dummy variable with $CF_{i,t-1}/K_{i,t-1}$ is positive but significant at the 5% level. Coefficient on the interaction term for the textile garments manufacturing is negative and significant at 1% level, whereas for biscuit manufacturing, it is negative and significant at 1%. We add industry dummy variables to equation (1) in Panel B (ii) for analyzing liquidity variations across different industries (results of Panel B are not reported in tabular form to save space). Dummy variable for the oil and gas exploration industry has a positive and significant coefficient, which indicates greater propensity to hold more liquidity. The coefficient on the dummy variable for the chemical industry is positive and significant at the 1% level indicating significantly greater propensity to hold more liquidity. Vehicles' motor manufacturing also has a greater propensity to hold liquidity as coefficient on its dummy variable is positive and significant. Telecommunication industry has a positive and significant coefficient indicating some evidence of higher propensity to hold liquidity. For the light manufacturing industry, the coefficient on the dummy variable is positive and significant at the 5% level. However, for the

biscuits and wafer manufacturing firms coefficient on the dummy variable is negative and significant at the 1% level. There is strong evidence of lower liquidity because for consumable items' manufacturers' funds are sometimes tied-up in the finished goods. The coefficient on pharmaceutical industry's dummy variable is negative and significant at the 1% level showing lower liquidity, which could be because of tunneling. Coefficient on dummy variable for fire- fighting equipment is negative and significant at the 1% level indicating significantly lower liquidity.

Panel C comprises panel-data estimations for the sample of family-owned firms (Table 4). The regression results are robust. Tobin's q is positive and significant at the 1% significance level. Family-owned firms suffer from cash constraints. Estimating equation (1) shows that $CF_{i,t-1}/K_{i,t-1}$ is positive and significant at the 1% significance level. The Wald restriction test null hypothesis that the coefficient on $CF_{i,t-1}/K_{i,t-1}$ equals 1 can be rejected at the 1% significance level. Thus, there is strong evidence of the cash constraints' hypothesis in family-owned firms. As per the cash constraints' hypothesis, cash constraints could prevent family-controlled firms from achieving the optimal investment level. State companies in Austria operate in vital industries of the economy such as oil and gas distribution, electricity generation, aerospace, and high technology industries.

Table 4. Investment - Cash flow Sensitivity: Family-owned Firms and State-owned Firms

Panel C: Family-owned Firms

$I_{i,t}/K_{i,t-1}$	Constant *C*oeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ *C*oeff. (SE)	q_{it-1} *C*oeff. (SE)	Adj.R^2	Observations
Full sample	0.05 (0.010)	0.45*** (0.062)	0.03*** (0.008)	0.24	159
Regression for $CF_{i,t-1}>0$	0.04 (0.010)	0.54*** (0.067)	0.03*** (0.008)	0.29	155

Panel D: State-owned Firms

$I_{i,t}/K_{i,t-1}$	Constant Coeff. (SE)	$CF_{i,t-1}/K_{i,t-1}$ Coeff. (SE)	q_{it-1} *C*oeff. (SE)	Adj. R^2/Within R^2	[a]	Observations
Pooled regression	13.32** (3.453)	0.40*** (0.095)	7.16*** (3.453)	0.44	0.786	39
Firm Fixed Effects	9.97** (4.086)	0.12 (0.140)	1.02 (3.146)	0.02		39
Random Effects	13.32*** (3.453)	0.40*** (0.095)	7.17*** (1.858)	0.02		39
Hausman Test	H_0: Coefficients estimated by the efficient random effects estimator are same as those estimated by the consistent fixed effects estimator					
Chi-square	test statistic					7.04*

[a] Effect covariate correlation; [b] Null distribution is chi-square (χ^2) with three degrees of freedom.

Panel D (Table 4) presents results of equation (1) for the state sample. The results are robust. Cash flow to capital stock (CFi,t-1/Ki,t-1) is positive and significant at the 1% significance level, which provides evidence that managers of state-owned firms exercise discretion while investing. They invest beyond the optimal level of investment. By virtue of the triple principal-agent problem in state companies, managers pursue their own goals. They

not only invest in sub-optimal investments but also over-invest (see Gugler et al. 2003, pp 142-143 for a discussion on the exercise of discretion by managers of state companies).

Random effects regression reports that $CF_{i,t-1}/K_{i,t-1}$ is positive and significant at the 1 percent significance level. Tobin's q is positive and significant at the 1% significance level. Hausman test is used for comparing the firm fixed effects estimator to the random effects. As per the Hausman test, the random effects estimator is preferred to the firm fixed effects.

Table 5 reports the impact of ownership concentration on firm value; results are robust. Voting rights (VR) is positive and significant at the 1% level, which implies incentives or convergence of interests' effect. Moreover, the voting rights squared (VR^2) is negative and significant at the 1% significance level, which provides strong evidence of the negative entrenchment effect of ultimate ownership. There is strong evidence for hypothesis 2. Leverage positively and significantly affects performance.

We run the firm fixed effects regression, which shows that VR is positive. The null hypothesis of the Chow test for data pooling cannot be rejected, which shows that the pooled regression is preferred to the firm fixed effects. The random effects regression reports that VR is positive and significant at a 5% level, whereas VR^2 negatively affects performance. There is substantial evidence of the entrenchment effect of ownership. We run the Hausman test to compare the firm fixed effects estimator to the random effects. The null hypothesis of the Hausman test cannot be rejected as the chi-square is insignificant, which shows that the random effects estimator is preferred to the firm fixed effects estimator.

We add the company size (S) variable to the estimating equation and run the regression. Estimating the regression shows that VR is positive and significant at the 1% level. VR^2 negatively and significantly affects performance, which provides strong evidence of the entrenchment of managers or the largest ultimate shareholders.

The evidence supports the entrenchment hypothesis, which states that a large shareholder who is either running the firm or sits on the supervisory board may have sufficiently high voting power so that he uses the assets of the firm opportunistically (see Gugler, 1998). The large shareholder is entrenched and possibly expropriates firm value (see Morck et al., 1988). Company size is negative and significant at the 1% level. Leverage positively and significantly affects performance. GDP annual growth rate positively but insignificantly affects performance. There is weak evidence of fluctuations in the business cycle affecting the firm performance.

We estimate the iterated generalized least squares (GLS) regression employing equation (2) and run the likelihood ratio (LR) test, which shows that there is no serial correlation in the panel data. The cluster robust estimator is preferred only when there is serial correlation in panel data (see Stock and Watson, 2006).

The relationship between Tobin's q and voting rights' concentration is graphed in Figure A.1 (refer to Figure A.1 in the appendix). The slope of the curve is zero at a voting rights concentration of 49.8% percent. Beyond 49.8 percent voting rights, the largest ultimate shareholders by virtue of concen-

trated shareholdings become entrenched which is detrimental to the interests of minority shareholders. As 51% of the firms fall under the downward sloping part of the curve, the empirical evidence shows largest ultimate shareholders expropriate that firm value.

Table 5: The Effects of Ultimate Ownership Concentration on Investment Performance of Austrian Listed Companies

Tobin's *q*	Pooled Regression Coefficient (SE)	Firm Fixed Effects Coefficient (SE)	Random Effects Coefficient (SE)	Pooled Regression Coefficient (SE)	Pooled Regression Coefficient (SE)
Voting rights (*VR*)	2.08*** (0.635)	2.98*** (1.449)	3.09** (1.396)	1.92*** (0.653)	1.86*** (0.652)
Voting rights squared (VR^2)	-2.09*** (0.540)	1.76 (3.799)	2.83** (1.230)	-1.94*** (0.556)	-1.90*** (0.556)
Leverage (*L*)	0.30*** (0.141)	-0.061 (0.132)	-0.02 (0.129)	0.29** (0.142)	0.28** (0.142)
Company size (*S*)				-0.01*** (0.002)	-0.007*** (0.002)
GDP annual growth (GDP_g)					1.05 (0.818)
Constant	0.57*** (0.197)	0.64 (0.628)	0.43 (0.368)	0.67*** (0.219)	0.68*** (0.219)
Obs. (P)	286	286	286	286	286
p-value (regression F)	0.000	0.000	0.000	0.000	0.000
Adj R^2/Within R^2	0.16	0.02	0.01	0.10	0.10
Hausman Test H_0: Coefficients estimated by the efficient random effects estimator are the same as those estimated by the consistent fixed effects estimator.					
Chi-square					451

7 Conclusions

This is the first research paper on Austria that analyzes ownership structures of the full population of all non-financial corporations listed on the Vienna Stock Exchange. The median of largest ultimate shareholders' voting rights concentration is 51.87 %, which reveals that ownership in Austria is highly concentrated. The Austrian listed companies exhibit a tremendously high concentration of ownership. The Austrian corporate landscape is characterized by bank-controlled pyramidal structures and state con-

trolled pyramidal structures, which could suffer from insufficient monitoring.

Firm fixed effects (FE) and random effects (RE) are estimated on unbalanced panel-data from 2007 to 2020. Panel-data estimations shows that cash flow to capital stock ($CF_{i,t-1}/K_{i,t-1}$) positively and significantly affects investment. After excluding the observations for which CFi,t-1/Ki,t-1 <0, cash flow to capital stock ($CF_{i,t-1}/K_{i,t-1}$), is positive and significant at the 1% significance level, which shows investment is sensitive to cash flow. Therefore, we provide strong evidence of the managerial discretion hypothesis (MDH), which hypothesizes that the dominant largest ultimate shareholders or managers invest beyond the optimal level of investment to maximize firm value. The analyses provide strong evidence for our hypothesis that investment in capital equipment is highly sensitive to firm's cash flows. Therefore, this study provides conclusive evidence that over-investment leads to returns on investment lower than the cost of capital. We analyze the variations in investment's sensitivity to cash flow across various industries in Austria by interacting cash flow to capital stock ($CF_{i,t-1}/ K_{i,t-1}$) with industry dummy variables. For the oil & gas exploration, telecommunication, fruit juices & confectionary, steel & metal industries, there is strong evidence that cash flow has a more positive effect on investment in capital equipment as compared to the refractory industry, with Tobin's *q* constant.

Industry dummy variables are used in the analyses to control for different propensity to hold liquidity across industries. We report strong evidence that oil and gas exploration, chemical, vehicle motor manufacturing, and telecommunication industries have greater propensity to hold liquidity as compared to the refractory industry.

Family-owned firms suffer from cash constraints. Panel estimations for the sample of family-owned firms report that the cash flow to the capital stock ratio ($CF_{i,t-1}/ K_{i,t-1}$) is positive and significant at the 1% significance level. Since the coefficient on $CF_{i,t-1}/ K_{i,t-1}$ is positive, there is strong evidence of the cash constraints hypothesis that prevents the family-owned firms from optimizing the investment levels. State companies in Austria operate in vital industries of the economy such as oil and gas distribution, electricity generation, aerospace, and high technology industries. For the state sample, $CF_{i,t-1}/ K_{i,t-1}$ is positive and significant at the 1% level, which provides strong evidence that managers of state-owned firms exercise discretion and invest beyond the optimal investment level. State companies suffer from a triple principal-agent problem (see Gugler et al., 2003). Managers in state firms pursue their own goals. They invest not only in sub-optimal investments but also beyond the optimal level of investment.

Estimating the effect of ultimate ownership concentration on the investment performance of Austrian-listed companies shows that voting rights (*VR*) unambiguously positively affect performance implying strong incentives for the largest ultimate shareholders or managers to optimize performance. Squared voting rights (VR^2) unambiguously negatively affect performance, which confirms that for concentrated levels of ultimate shareholdings, the largest ultimate shareholders become entrenched and possibly expropriate value that is detrimental to the minority shareholders. Lev-

erage positively and significantly affects performance providing evidence of the disciplinary role of debt.

This is the first research study on Austria that provides comprehensive examples of the behavioral tendency of entrenched largest shareholders, which leads to the delisting of corporate entities under the Austrian Minority Shareholder Act, which is harmful for the interests of small minority shareholders.

The relationship between Tobin's *q* and voting rights' concentration is an up-down curve with a turning point at 49.8 %. The inverted U-curve drawn in this research confirms the relationships estimated between ownership concentration and performance in previous studies such Short and Keasey (1999), who measured firm performance of corporations in the UK by using return on equity and market to book ratios, and estimated positive, negative, positive coefficients on directors' shareholdings, squared directors' shareholdings, and cubed directors' shareholdings respectively (see also Stulz, 1988).

Initially, the incentives or convergence of interests' effect strengthens as ultimate shareholdings become concentrated, which implies that the positive incentives effect of ownership dominates the negative entrenchment effect. The slope of the curve is zero at a voting right concentration of 49.8%. Beyond this point, the steep downward slope indicates strong evidence of the entrenchment hypothesis. The intuitive explanation of the downward sloping part of the curve is that the negative entrenchment effect dominates the incentives effect. 51% of the firms fall under the downward sloping part of the curve substantiating the evidence of the entrenchment of ultimate shareholders.

Although the corporate governance system is strong, ultimate shareholders in Austria expropriate firm value to the detriment of minority shareholders. Largest dominant shareholders' detrimental behavior, among other factors, lowers the confidence of listed companies outside minority shareholders in the stock exchange, which not only has repercussions for the efficient governance of Austrian corporations but also slows down the growth of Austria's financial markets.

The current research provides insights for future research on the effect of cash flow on fixed capital investments for important civil law legal systems in European countries like Switzerland, France, and Portugal. Moreover, our findings on expropriation by entrenched large dominant shareholders, which is harmful for small minority shareholders provide insights for analyzing the ownership structures of companies listed on the stock exchanges like the Zurich Stock Exchange, Paris Stock Exchange, and Portugal Stock Exchange as well as the impact of ownership concentration on the investment performance of non-financial companies listed on these stock exchanges.

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Appendix

Definitions

One-share- one vote principle: Each common ordinary share carries one vote.

Ultimate Ownership: Percentage equity ownership of a shareholder at the top of a pyramid including direct ownership and indirect ownership via other corporations.

Dispersed Shareholdings: Percentage of shares owned by individual shareholders in a publicly listed company.

Investment: Expenditure on capital equipment, machinery and other tangible fixed assets.

Cash flow: Profit before tax plus non-cash expenditures (depreciation and amortization) less corporate tax.

Tobin's *q*: The ratio of the market value of total assets of the company and book value.

Company Size: Natural logarithm of total assets.

Leverage: Total debt divided by the total assets.

Figure A.1. The Relationship between Tobin's q and the Voting Rights of Ultimate Shareholders