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Investment Decisions Of The Polish Stock-listed Companies

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Abstract

It is often raised that enterprises in transition countries are cursed with credit constraints and insufficient capital. Regardless of whether this belief holds for the whole of the economy, the Agency Theory provides a useful both theoretical and empirical framework helping to verify the efficiency of investment decisions in case of companies for which 'objective' future cash-flow valuation is available. The assertion of managerial discretion has been verified empirically for many different countries with the analytical background provided by user cost of capital and Tobin's Q theories. This paper's contribution is the analysis of the Polish stock-listed companies behavior with the particular attention devoted to the corporate governance issues. We find that on average these companies overinvest relative to their opportunities, while this phenomenon is more severe in the case of even partial state ownership.

Key words: financial constraints, investments decisions, system GMM, Poland, stock-exchange, managerial discretion

JEL Codes: C23, E22, O31

1 Introduction

It has been often raised in public debates that transition economies suffer from a capital gap. Also on a more scientific level, some authors suggest that e.g. Polish entreprises are financially constrained, *cfr.* Konings, Rizov and Vandenbussche (2002). The problem is perceived as important to the extent that it limits the investment processes crucial for the economy growth as well as the catching up process. On the other hand, one is rarely able to quote any research providing either the estimated size of the gap or the measure of its consequences. Furthermore, the argument seems to be abused by some of the firms as well as government representatives.

In this paper we apply the methodology originally proposed by Vogt (1994) allowing to distinguish between these two explanations for the observed correlations between cash flows and investment spending. We use data on almost 200 Polish stock listed companies over the period

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1994-2006, relying on market valuation by Warsaw Stock Exchange. Applying empirically the notion of Tobin's Q we test whether Polish stock listed companies are financially constrained or exhibit managerial discretion. We distinguish between companies with at least partial state ownership and private ones, trying to ascertain if they differ in this respect.

Although the well known principal-agent model is a useful tool to describe the nature of the relation between the owners (principal) and managers (agents), one seems to be missing an important part of the picture. If the managerial discretion problem was a simple agency theoretic case, it would suffice to offer managers the property rights (reward them with shares). However, when property rights and decision rights are separated many more complex problems come to play. As pointed by organisational economists, *cfr.* Baker and Hall (2004) or Baker, Gibbons and Murphy (2008), designing a contract in which owner's rights are well protected is extremely difficult if not impossible. This problem has far reaching consequences. For example, as forcefully demonstrated by Malmendier and Tate (2004) - overconfident managers tend to overestimate the returns to their investment projects, while asserting external financing as excessively costly. It seems that managerial discretion may emerge as an institutional equilibrium outcome under some circumstances. Transition countries, lacking the tradition of transparency and little experience of the investors-owners may be viewed as especially welcoming environment to this kind of phenomenon.

The paper is organised as follows. Next section offers some theoretical background and literature review. In section 3 we move to describing data and empirical strategies. Section 4 describes the findings, while some policy implications are offered in concluding section.

2 Background of the research

Theory of firm states that if financial markets satisfy efficiency hypothesis there is no difference to the company whether it uses its own capital or borrows it. Thus, there is equivalence in financing and there should be no constraint on investment resulting from ownership. This seminal statement by Miller and Modigliani (1961) induced high confusion among the empirical economists. Namely, the postulated orthogonality of investment and cash flows did not find the support in data as early as in 1950s, *cfr.* Meyer and Kuh (1957). Cash flows and investment remain strongly correlated.

Two types of theoretical explanations where provided to explain this phenomenon. One, building on the information asymmetry and adverse selection arguments suggests that firms with positive Net Present Value investment opportunities will forgo profitable investment to avoid the excessive cost of external financing, as insiders are much better informed about the quality of the projets than external capital providers. This hypothesis by Myers and Majluf (1984) has been empirically verified by Fazzari, Hubbard and Petersen (1988b) as well as Himmelberg and Petersen (1994) proving that liquidity constraints determine the cash flows to be important determinants of investment decisions. This hypothesis may be interpreted positively in the sense that it is the inefficiency of the financial markets and not the firms that yields the results contradicting the Miller and Modigliani (1961) theory.

On the other hand, however, Jensen (1986) has raised the alternative explanation suggesting that agency problems might play an important role here. In particular, since the managers' utility may follow from other aspects that just remuneration (*e.g.* corporate jets, cars, new headquarters or prestigious but unprofitable engagements), one risks over-investment instead of

paying out dividends to shareholders.

Observing dependence of investment on company cash flows one needs to find a criterion allowing to attribute this result to one of potential reasons. The first being caused by information asymmetry and transaction costs induced by attempts to alleviate it has been developed in Costly-State-Verification (CSV) literature. This is to say that investment depend on cash flows because obtaining external financing is sometimes prohibitively costly. For this reason investment projects are only undertaken if internal financing is available. The latter option bases on the observation, that companies tend to spend as much as they can, regardless of potential profitability of this spending. Thus, they might actually overinvest needs, but will tend to overlook it if internal financing is available.

2.1 Theoretical foundations

Discussing the issue of investment one immediately faces the problem of defining the cost of capital. Under realistic assumptions and rather undemanding assumptions, *cfr.* (Romer 2001). one can derive - with the standard notation - the formula for a change in the stock of capital as:

$$\begin{aligned} \dot{k}(t) &= k_{t+1} - k_t + p_K(t) \cdot I_t - \sigma \cdot k_t + \frac{\dot{p}_K(t)}{p_K(t)} \cdot k_t \\ &= k_{t+1} - (1 - \sigma + \frac{\dot{p}_K(t)}{p_K(t)}) \cdot k_t + p_K(t) \cdot I_t. \end{aligned} \tag{1}$$

This formulation includes capital depreciation (σ) as well as the volatility of the capital goods prices ($\dot{p}_K(t)$) since both these elements affect the company's investment decisions. Profits in this approach are proportionally increasing in company's stock $k(t)$ and decreasing in the industry-wide capital stock $K(t)$.

If we introduce q_t defined as:

$$q_t = 1 + \frac{c'(I_t)}{p_K(t)} \tag{2}$$

we obtain a variable of interest, denoted in the literature as Tobin's Q (the so-called Q-theory of investment)[1]. It follows that q_t captures the value of an additional unit of investment at time $t+1$ perceived at time t. On the other hand, it is also valuable from the investor's point of view as it defines the value of the additional unit of investment if managed by this particular company.

One may easily observe that (2) reads as a sum of marginal future revenues of capital discounted to today. Thus, Tobin's Q sumarises all the information about the future that should be relevant to firms decision. More specifically, that is the present value of profits generated by an additional unit of capital and the market value of this investment. Similarly, (2) gives the marginal replacement cost. Alternatively one can state it captures the market evaluation of a unit of capital if managed by this particular company. Thus one can specify a rule of thumb for a 'good investment opportunity'. If Tobin's Q exceeds unity, investment should be implemented, whereas in all other cases despite possible profitability of this opportunity, investment should be forgone and the remaining cash flows should be 'returned' to the owner in the form of dividend. Consequently, it is the direct implication of the Q theory of investment that if managers are unable to find good investment projects they are obliged to distribute the cash flows among the

[1]Please, note that these solutions are different when compared to Romer (2001), since $p_K(t)$ is no longer normalised to unity and and total depreciation assumption is relaxed.

owners, while a good investment is specified as a one, for which Tobin's q exceeds 1. Therefore, a project might be good for one company at the same time being not good enough for another.

2.2 Empirical implementation of the Tobin's Q

The link between convex costs of adjustment and the Q theory of investment was made explicitly by Mussa (1977) in a deterministic framework and by Abel (1983) in a stochastic framework, though the papers based on convex adjustment costs focused on marginal Q—the ratio of the value of an additional unit of capital to its acquisition cost rather than the concept of average Q introduced by Tobin (1968)[2]. In general average Q is higher than marginal[3]. Assuming that the adjustment costs are only a function of investment we implicitly supposed decreasing returns to scale in the adjustment process. Hayashi (1982) has shown that if constant returns to scale are imposed, average and marginal Q are equivalent.

Apart from the problems concerning the relation between marginal and average Q there is also another drawback of using the latter, namely that the average Q no longer has its rule-of-thumb interpretation. Thus, one cannot look at the stock-listed companies, calculate their market-to-book-value ratios and unequivocally determine which of these companies should invest at all. Therefore, as suggested by by Jensen (1986) one needs to additional control for the importance of the corporate governance within companies. Vogt (1994) provided the theoretical foundations for the empirical specification of a model allowing to control for both financial constraints and agency problems. His proposed specification includes an interaction term and can be represented by:

$$(I/K)_{i,t} \quad = \quad \phi(X)_{i,t} + \gamma(CF/K)_{i,t} + \vartheta(CF/K \cdot Q) + \varepsilon_{i,t},$$

The rationale behind this specification is the following. The financial constraints result in under-investment, while corporate governance has the effect of over-investing managers. Therefore, for high Q companies investment should be high, and thus highly dependent upon the funds available. Consequently, a positive coefficient of ϑ is expected in support of the financial constraint hypothesis. Alternatively, for low Q companies, there is no reason to maintain high investment spending. Hence, larger dependence on the cash flows would suggest managerial discretion leading to a negative sign on the ϑ coefficient. To put it differently, a positive sign of its coefficient implies that firms with a higher Tobin's Q embody a higher cash-flow coefficient. This compares with higher liquidity constraints which is in line with the asymmetric-information problem. A negative coefficient is in line with managerial discretion, as the cash-flow-coefficient for lower Q-firms becomes higher.

This approach has been elaborated in a number of studies. The pioneering seems to be an analysis of the UK firms by Deveraux and Schianterelli (1990). They try to ascertain if

[2]The Q theory of investment focuses on marginal values, while these are usually unobtainable in reality. Hayashi (1982) bridged the gap between the concept of marginal Q dictated by the models based on convex adjustment costs and the concept of average Q, which is readily observable, by providing conditions, in a deterministic framework, under which marginal Q and average Q are equal. Abel and Eberly (1994) extended Hayashi (1982) analysis to the stochastic case and also analyzed the relationship between average Q and marginal Q in some special situations in which these two variables are not equal.

[3]On the other hand, also the opposite is possible, *i.e* average Q smaller than the marginal one. One can expect this result in the cases where a significant amount of capital becomes outmoded due to a technical advancement for example. Although the average replacement cost is relatively high, the marginal productivity growth may be even higher as each additional unit of new capital significantly raises the future profits.

different subsamples of firms assorted basing on proxies for the cost of external capital exhibit different cash-flow-investment sensitivities are. The proxies they apply are rather general firms characteristics, like firm size (measured by capital stock and a number of employees) as well as firms age (measured by a number of years since initial quotation) and industry (distinction between growing and declining). The results point to a higher cash-flow sensibility of investment in the case of large, young firms in expanding sectors.

Similar technique has been applied by Oliner and Rudebusch (1992), who perform an classical investment regression with interaction of cash flow and information asymmetry proxies (like the age of a firm, a dummy for being listed as well as stock trades by insiders). In addition they suggest proxies for agency costs (*e.g.* insider shareholding and ownership concentration) and transaction costs (namely, the firms' size)[4]. The results are not impressive to the extent that for the analysed set of US companies, all individual interaction terms turn out to be insignificant. Nevertheless, a compound measure of information asymmetry proxies prove statistically significant, which allows the authors to conclude that information problems inflate financial constraints.

Chirinko and Schaller (1995) follow the subsampling technique dividing companies basing on the criteria of age, concentration of ownership, industry and whether or not a company belongs to a group/alliance/holding. The cash flow constraints are most relevant for young firms, firms with dispersed ownership, independent firms and manufacturers[5].

These three studies have focused on the problem of external financial constraints due to asymmetric information. Hoshi, Kashyap and Scharfstein (1991) in turn analyse the impact of the *keiretsu* system on the odds of being financially constrainted. They find that the ones who rest outside a group are more sensitive to cash-flows in their investment decisions. Authors do not stop here going as far as to suggest the importance of over-investment risk through a differential impact of cash flow for firms with good and bad prospects. However, they are not able to find any statistical evidence in support of this thesis.

A follow-up study by Hadlock (1998) analyses the impact of insider ownership on the cash flow sensitivity of investment based on both free cash flow problems and asymmetric-information problems. He introduces a interaction term to the regression, combining insider ownership and cash-flows and he finds its coefficient to be positive for insider ownership below 5% and negative above henceforth. This suggest in his opinion that financial market imperfections dominate potential managerial discretion problems.

Although, Anglo-Saxon countries remain in the centre of interest for their capital market orientation, continental system with banks as main capital providers has been analysed in this framework as well. The European continent offers an interesting setting to consider determinants of investment under alternative structures. Kadapakkam, Kumar and Riddick (1998) study companies from six OECD countries (France and Germany, USA, UK, Canada and Japan). Size of the company has been chosen as a main selection criterion, while the results show that cash-flow investment sensitivity is highest amongst large firms.

At the same time, Gugler (1998) focused on only Austrian investment spending, empirically investigating links from the ownership structure to managerial discretion and/or asymmetric information problems. He finds bank controlled companies to be relatively unconstrained fi-

[4]For comparisons with Fazzari et al. (1988b) they also include dividend yields, but no additional conclusions emerge from this choice.

[5]Similar results may be found in Gilchrist and Himmelberg (1995) although their sampling criteria differ.

nancially, while family owned ones experience excessive problems in accessing external capital. Importantly, over-investment is particularly tense in the case of state controlled firms and pyramidal holdings.

This study has triggered a number of analyses of European reality. Haid and Weigand (2001) perform this research for Germany, finding positive link between the liquidity and investment in the case of owner-controlled companies as opposed to management-controlled companies experiencing no financial constraints. Audretsch and Eston (2002) also focus on Germany investigating stock-listed companies. However, they only use size as a subsampling criterion, finding that medium sized companies are discriminated relatively to small and largest entreprises. However, this study does not contribute to the managerial discretion/asymmetric information discussion. Van Ees and Garretsen (1994) continue the strand subsampling technique, analysing Dutch firms over the period 1984-1990. The authors define dividend payout ratio, the year of the initial public listing, size (fixed assets) and interlocking directorates with banks as selection criteria[6]. They find that the investment sensitivity to cash-flows is significantly positive in Dutch firms. No significant differences are found between subsamples based on dividends, years listed and size. Interlocks with banks are found to reduce the external finance constraints, which leads to the conclusion that bank relations may actually reduce asymmetric information problem. Finally, de Jong and Degryse (2001) approach the Dutch data on the time span 1993-1998. Interestingly, they are unable to use Vogt (1994) methodology as the interaction term he suggested turns out insignificant in all specifications. Thus, they proceed with sample split methodology. Although they do not confirm the results of the Van Ees and Garretsen (1994) about the benefits of bank involvement, they find higher cash flow sensitivity of investment in firms with low investment opportunities, which they interpret as an indication of managerial discretion problems. Specific to the Netherlands, firms with low shareholder influence posit a higher cash flow investment sensitivity. The relevance of asymmetric information is confirmed as smaller firms and firms from information sensitive industries show a larger cash flow investment sensitivity.

2.3 Some controversies over parametric approach

The approach that was initiated by Fazzari, Hubbard and Petersen (1988a) and later developed by Vogt (1994) and that is also used in the above mentioned studies has been criticized by Kaplan and Zingales (1997). They argue that, when examining in greater detail the data used by Fazzari et al. (1988a), their results do not support the presence of liquidity constraints. Kaplan and Zingales (1997) argue that the apparently financially constrained firms could have augmented their use of cash and lines of credit at a particular moment in time.

The discussion on the usefulness of cash flow investment sensitivities is continued in Fazzari, Hubbard and Petersen (2000) and Kaplan and Zingales (2000). Kaplan and Zingales show that the approach of defining subsamples based on an approximation of liquidity constraints, as advocated by Fazarii, Hubbard and Petersen should be interpreted with caution. However, the debate itself did not undermine the parametric approach. Kaplan and Zingales do not object to the finding, that some companies might be suffering from the managerial discretion problem. What they do in turn is to falsify the methodology of obtaining this findings on aggregate data. After this

[6]An interlocking directorate with a bank occurs when a managerial board member of an industrial firm holds a position on the managerial or supervisory board of a bank or when a managerial board member of a bank holds a position on the managerial or supervisory board of an industrial firm.

discussion between Kaplan and Zingales on one hand and Fazzari, Hubbard and Petersen on the other, extensive literature has emerged, where authors apply different techniques in the search for a proper discrimination technique[7].

For example, Cayseele van (2002) uses the signalling model to analyse Belgian small and medium enterprises. The taxing regulation in Belgium gives companies the opportunity to choose between immediately subtracting the R&D investment spending from revenues or distributing this redemption over five consecutive years. He suggests that if a company decides to account for the spending immediately in the same taxing year, this indicates that the investment is not perceived as particularly profitable by the tax payer. Consequently, Cayseele van (2002) uses the taxing choices as a signal of good investment opportunities. He analyses a panel of 889 Belgian companies on the time span of five years. His results largely confirm the managerial discretion hypothesis. However, some results indicate that when the managers and shareholders interests coincide, investments are less sensitive to cash flows.

Also Cincera (2002) focuses on Belgian firms. Using GMM and ECM he attempts to analyse the impact of financing constraints on both capital and R&D investment decisions. In particular, the extent to which these constraints differ across firms is investigated from different perspectives, *e.g.* industry sectors, firms' size and age, regions, domestic firms versus subsidiaries of foreign groups, quoted versus unquoted firms on the stock market. On the sample of 11 000 companies in the manufacturing sector over 1999-2001 he finds strong evidence of a positive impact of cash flow effects on the firms investment decisions. Unfortunately, he is not able to disentangle the sources of this effect with respect to its causes.

Konings et al. (2002) use the panel of more than 4,000 manufacturing firms consisting of comparable data for Poland, the Czech Republic, Bulgaria and Romania between 1994-1999. They find firms in Poland and the Czech Republic to be credit constrained, suggesting that capital markets are not functioning properly. In contrast firms in Bulgaria and Romania seem far less dependent on internal financing to invest. They interpret this result as evidence of stronger persistence of soft budget constraints in the group of slowly reforming transition countries. They too fail to discriminate between asymmetric information and managerial discretion as causes to the investment cash flow sensitivity.

Malmendier and Tate (2004) apply the tools of social psychology to analyse if the confidence of CEOs may have any impact on the investment strategies of companies. They forcefully demonstrate that overconfident managers tend to over-invest, regardless of the incentive schemes and companies managed by them are significantly more responsive to cash flows in their investment decisions. Thus, by choosing a confident CEO shareholders should be aware that this might aggravate the agency problems despite possible incentives.

Finally, Baker, Foley and Wurgler (2004) approach this problem in the international context. They outline and test two mispricing-based theories of FDI. The 'cheap assets' or fire-sale theory views FDI inflows as the purchase of undervalued host country assets, while the 'cheap capital' theory views FDI outflows as a natural use of the relatively low cost capital available to overvalued firms in the source country. The empirical results support the cheap capital view: FDI flows are unrelated to host country stock market valuations, as measured by the aggregate market-to-book-

[7]An additional reason for caution is discussed in recent studies by Erickson and Whited (2000) and Gomes (2001). The authors use simulation techniques and argue that measurement error in Q influences the cash flow investment sensitivity.

value ratio, but are strongly positively related to source country valuations and negatively related to future source country stock returns. The latter effects are most pronounced in the presence of capital account restrictions, suggesting that such restrictions limit cross-country arbitrage and thereby increase the potential for mispricing-driven FDI. This is strong though indirect evidence in support of the managerial discretion hypothesis[8].

Summarising these findings, any attempt to verify the managerial discretion hypothesis should incorporate (i) reasonable set of control variables to avoid spurious conclusions, (ii) resort to nonparametric techniques to cross-verify the findings and (iii) assure results are not sensitive to period and outliers inclusion. We pursue with describing in detail our empirical strategy in the subsequent section.

3 Empirical strategies and data

Basing on the literature reviewed above, approaching this kind of research one should control for age of the company, its size, the industry as well as bank involvement and potentially foreign ownership[9]. However, most of the above listed control variables have limited applicability for data of stock listed companies in transition economies, mostly because of the time span covered.

Firstly, Warsaw Stock Exchange was only founded in 1991 with initially less than twenty companies quoted. Moreover, very strong assumptions would need to be made about what "age" really stands for. In more mature market economies, one would consider the number of years a company is quoted. However, in transition context, state companies privatised through stock exchange tend to have shorter "stock age" than newly formed private enterprises, while their history frequently dates back to pre-war period. On the other hand, "actual age" would be misleading too, due to the transition context.

Secondly, three types of companies dominate on the market. There are relatively few big enterprises contributing to the WIG20 index of twenty biggest market participants. Their history on the market is highly differentiated as Initial Public Offering (IPO) was one of the privatisation methods - some of them entered the market as early as in 1991, while three went public only in 2003. The second group comprises average-sized majority of both static big privatised enterprises and dynamic private companies entering the stock exchange in search for investment funds. Lastly, there is also a minority of those who recently arrived to the market and whose role in trading is rather marginalised[10].

[8]On the theoretical grounds, Abel (2002) develops a theoretical model of Q theory of investment without any adjustment costs but with monopolistic power instead. He demonstrates that Tobin's Q exceeds one, even without any adjustment costs, for a firm that earns rents from monopoly power. This effect can be quantitatively small, which has been taken as evidence of very high adjustment costs in the empirical literature, but here is consistent with no adjustment costs at all. In addition, cash flow has a positive effect on investment, and this effect is larger for smaller, faster growing and more volatile firms, even though capital markets are perfect. These results provide a new theoretical foundation for Q theory and also cast doubt on evidence of financing constraints based on cash flow effects on investment.

[9]We are not aware of any research in this respect for Poland. Hussain and Nivorozhkin (1997) provide the only analysis of the capital structure of the Polish stock exchange we are aware of. Unfortunately, this paper dates back to 1997 and has largely descriptive character. More recently, Kowalewski, Stesyuk and Talavera (2007) inquire the dividend policies of Polish stock-listed companies, but they use a random effect tobit model. Tobin's Q turns out negative and significant in these equations.

[10]This typology is rather stable over time (less than 5% of companies on average change the group from year to year).

Additionally, data on bank involvement are not available. As regards the ownership, Polish law obliges the owners to inform publicly about the number of their shares only if they possess more than 5% of stocks. Thus, ownership data are only directionally reliable. Finally, there are many industries which are represented on the market by only one company, while only in three sectors there are more than 4 entreprises.

However, using the rationale supporting the use of each of these control variables we attempted introducing other measures and indicators that could help to address the problem of size, age and ownership. More specifically, we introduced a proxy for a size as well as foreign ownership. The variable of particular interest was naturally state participation among owners.

3.1 Data and estimating approach

We use a panel of 181 non-financial companies listed on the Warsaw Stock Exchange in the years 1995-2003. Data were taken from the annual reports of the Warsaw Stock Exchange Commission (accounting reports confirmed by an external auditor). Unreported variables were computed based on the data available[11].

INVESTMENT/ASSETS is our dependent variable. It is defined as a ratio of each years investment spending over total assets. Investment spending contains both fixed assets purchases and in intangibles. To measure the market evaluation of the companies investment opportunities (*TOBIN'S Q*) we applied a standard measure of market-to-book-value ratio (MBV). We used market capitalisation as the market value (number of shares in trading times their price at the end of each year). The book value was reported in annual accounting statements as the value of assets at the end of each year.

For obvious reasons the measure of cash flows has to enter the estimated equation (*CASH FLOW*). This variable too has been scaled by the total assets to eliminate the potential heterogeneity due to the size effects. We further included a variable suggested by Vogt (1994) allowing to discriminate between the two potential causes for cash flow investment sensitivity. The interaction variable *TOBIN'S Q * CF* will have a negative coefficient in the case of managerial discretion, while it should remain positive for financially constrained companies.

Two other variables typically have explanatory power in Q theory of investment equations, first being the change in working capital (working capital investment). As for the previous variables we scaled it by the replacement value of fixed assets (Δ *NWC*). The motivation for this variable is that firms may reduce their working capital (current assets minus current liabilities) to smooth fixed investments, (Fazzari and Petersen 1993). Controlling for Δ *NWC* allows to isolate the liquidity effect from the informational part of cash-flow, *cfr.* (Haid and Weigand 2001). In other words, a negative coefficient accompanied by an increase in the cash-flow-coefficient suggests that cash-flow does not capture investment opportunities. Note that working-capital investment may be endogenous, as it is a decision variable of the firm. Thus, we instrument the net working capital ratio with the previous period net working capital scaled by the adequate total assets, 2SLS as in (Fazzari and Petersen 1993). The second variable with explanatory power in Q equations is current sales adjusted for the size effects (the ratio of sales to total assets). This

[11] One should note that data have sometimes inconsistencies, while it is also likely that these discrepancies are not fully idiosyncratic. Missing and inconsistent data occur persistently for smaller companies, while for few larger they suggest purposeful action from the side of the reporting party (three of the identified nine were accused of misinforming the Warsaw Stock Exchange Commission and eventually were forced to pay the fine).

Table 1: Descriptive statistics

Variable	Total sample	State owned	Totally private
INVESTMENT/ASSETS	0.295	0.373	0.265
	(0.282)	(0.236)	(0.293)
TOBIN'S Q	0.448	0.334	0.493
	(0.7066)	(0.453)	(0.779)
SALES/ASSETS	1.84	1.305	2.050
	(5.60)	(6.521)	(6.578)
NET PROFIT/ASSETS	0.0369	0.0224	0.0425
	(0.148)	(0.108)	(0.1608)
STATE PRESENCE	0.217	1	0
	(0.413)	0	0
FOREIGN CEO	0.125	0.103	0.116
	(0.330)	(0.304)	(0.321)
NEW CEO	0.407	0.514	0.385
	(0.492)	(0.501)	(0.487)
*TOBIN'S Q * CF*	0.0021	0.0004	0.0028
	(0.0907)	(0.029)	(0.105)
CASH FLOW/ASSETS	1.12	0.45	0.0122
	(0.0799)	(0.050)	(0.089)
Δ *NWC/ASSETS*	0.341	0.441	0.301
	(0.525)	(0.373)	(0.568)
No. of observations	2 353	512	1 841
No. of groups	181		
Average no. of timeperiods	8.09		

Notes: Own computation, data from the Warsaw Stock Exchange, over period 1994-2006, for listed 181 companies.

variable too has been instrumented by its lagged value to take care of potential endogeneity problems.

To control for the presence of state representatives among the shareholders we introduced a *STATE PRESENCE* dummy variable taking the value of 1 if the state - directly or indirectly - may be found among the shareholders (even below the 5% level). These data are available from the Ministry of Economy annual reports. An actual share of owned stocks would have provided a much more refined measure. It would introduce however a strong limitation of direct ownership and underestimate the impact of privileged shares (in terms of voting or additional dividend rights).

Following the Vogt (1994) logic we have also constructed *STATE * Q* variable in order to capture the peculiarities of state owned firms. The intuition implies that a negative coefficient associated with this variable should signify that managerial discretion problems are more severe in the state owned companies.

Recognising the importance of environment stability, as well as changes in the strategy we decided to include also a *NEW CEO* dummy, as a proxy for changes within the organisation. A change among the board members indicates that shareholders executed their right to influence the policies adopted by their company - this is essentially the only instrument of control they enjoy in the case of dispersed ownership. Finally, to account for the corporate governance and corporate culture within a company we decided to include another proxy dummy, namely the *FOREIGN CEO*. Acknowledging the young age of Warsaw Stock Exchange and little experience of Polish CEOs with shareholders' relations management we assumed that perhaps presence of a foreigner in the board might suggest more experience as well as higher consciousness as to the obligations towards the owners. Table 1 denotes the basic descriptive statistics for the dataset.

3.2 Empirical strategies

As indicated above, the time series are relatively short, which influences the quality of the results. Theoretically, our preferred specification would be the one with a company as a grouping variable. However, either we obtain groups with 8.1 observations on average or else we would have been forced to limit the scope of the research to companies that have a longer history on the market. Since such a choice would be highly arbitrary, we chose to resort to the data available. The alternative strategy was to force alternative definition of the panel data set, grouping by year instead of grouping by company. Although this way is rather rare, since we are indeed interested in tracing the patterns of companies' behaviour and not the changes in these patterns across the stock exchange from year to year - this approach may be compared to estimating equation on a year-by-year basis and weighting the obtained results.

The panel data technique, while giving the chance to explore the properties of data sets otherwise unsuited for econometric analysis. As already discussed, some instrumentation is required, while in principle our preferred econometric specification is feasible generalised least squares (FGLS) with heteroscedasticity and autocorrelation consistent standard errors and panel-specific autocorrelation structure.

On the other hand, however, as argued by Cincera (2002) there are strong grounds to believe that instrumenting for sales and net working capital only may not be sufficient to capture the potential dynamic endogeneity. The best way to circumvent the potential bias of the estimators is to use the system GMM as developed by Arellano and Bond (1991). However, under this specification estimators remain susceptible to autocorrelation. Therefore, we resort to an estimator consistent under autocorrelation, as developed by Arellano and Bover (1995) and Blundell and Bond (1998).

The following equation was under scrutiny:

$$\begin{aligned} Investment_{i,t} &= \alpha + \beta ControlVariables_{i,t} \\ &+ \gamma CashFlow_{i,t} + \delta TobinsQ_{i,t} + \zeta CashFlowQ_{i,t} + \epsilon_{i,t}. \end{aligned} \tag{3}$$

The equation was estimated both in levels and in standardised terms using both IV GLS and system GMM. Standarisation allows to compare the strength of the impact among the predicting variables. The results remain essentially unaffected by the choice of the estimation method, which suggests the potential bias in GLS estimation is not large.

4 Empirical results

Table 2 reports the results. Odd column numbers correspond to the estimations on raw data, whereas even column numbers all non-dummy series were standardised before performing the estimation. This serves the purpose of comparing the magnitude of influence of particular variables, as with all series standardised to (0,1) distribution estimators can be directly compared. IV GLS is a fixed effect instrumental variable estimation allowing for robust standard errors even with heteroscedasticity and autocorrelation (Δ *NWC/SALES*, *NET PROFIT/ASSETS* and *SALES/ASSETS* have been instrumented with the use of lags). Thus, they contain 2SLS estimations to control for the potential endogeneity of these variables. Fixed effects models are supported by the Hausmann test. Finally, GMM corresponds to dynamic panel-data models

as developed by Arellano and Bover (1995) and Blundell and Bond (1998). This estimator is designed for datasets with many panels and few periods.

Table 2: Dependent variable: investment (company as a grouping variable)

VARIABLES	Company as a grouping variable				Year as a grouping variable			
	(1) IV GLS	(2) IV GLS	(3) GMM	(4) GMM	(1) IV GLS	(2) IV GLS	(3) GMM	(4) GMM
SALES/ASSETS	0.000297	0.00891	0.00345	0.00589	-0.0410	-0.814	-0.0523	-0.984
	(0.00822)	(0.0632)	(0.00832)	(0.163)	(0.0952)	(1.892)	(1.213)	(1.434)
Δ *NWC/SALES*	0.250***	0.465***	0.193***	0.595***	0.284***	0.529***	0.187***	0.447***
	(0.0319)	(0.0593)	(0.0672)	(0.0585)	(0.0263)	(0.0489)	(0.129)	(0.241)
NET PROFIT/ASSETS	-0.0956	-0.0502	-0.0763	-0.153*	-0.387*	-0.203*	-0.120	-0.0631
	(0.0893)	(0.0469)	(0.0542)	(0.098)	(0.199)	(0.1730)	(0.197)	(0.103)
TOBIN'S Q	0.124***	0.311***	0.142***	0.386***	0.0169***	0.0422***	0.0564***	0.141***
	(0.0225)	(0.0563)	(0.0235)	(0.0570)	(0.0214)	(0.0537)	(0.0443)	(0.111)
CASH FLOWS/ASSETS	-0.0834*	-0.236*	-0.0930***	-0.344***	-0.0289***	-0.00820*	0.0597**	0.0169*
	(0.188)	(0.0532)	(0.178)	(0.0547)	(0.004)	(0.006)	(0.004)	(0.012)
*TOBIN'S Q * CF*	-0.476***	-0.153***	-0.573***	-0.102**	-0.579***	-0.186***	-0.767***	-0.247***
	(0.133)	(0.0428)	(0.176)	(0.0451)	(0.203)	(0.0653)	(0.713)	(0.229)
FOREIGN CEO	-0.0271	-0.0961	0.123	-0.387*	-0.0309	-0.110	-0.0190	-0.0674
	(0.0569)	(0.202)	(0.186)	(0.224)	(0.0589)	(0.209)	(0.0153)	(0.0541)
NEW CEO	-0.0322*	0.114	-0.136*	0.00225	0.0175	-0.0619**	-0.0437*	-0.155*
	(0.0166)	(0.0696)	(0.981)	(0.0721)	(0.0315)	(0.112)	(0.0241)	(0.0854)
STATE PRESENCE	0.172*	0.611*	0.356***	1.377***	0.167***	0.0593***	0.0316***	0.112***
	(0.117)	(0.376)	(0.211)	(0.405)	(0.0472)	(0.167)	(0.0110)	(0.0391)
*STATE * Q*	-0.0275*	-0.0275**	-0.0448	-0.0448	-0.0359	-0.0358**	0.0891**	0.0890**
	(0.0094)	(0.0074)	(0.0705)	(0.0801)	(0.0621)	(0.0181)	(0.0408)	(0.0408)
Observations	2 353	2 353	2 353	2 353	898	898	898	898
Number of company	181	181	181	181	9	9	9	9
Hausman test	Fixed effects	Fixed effects			Fixed effects	Fixed effects		

Note: Standard errors reported in parentheses. Panel data GLS IV estimations with fixed effects.
All non-dummy variables in columns (2), (4), (6) and (8) were standardised.
***, ** and * denote significance levels of 1%, 5% and 10% respectively.

As visible in Table 2 there are reasonable grounds to believe in the managerial discretion hypothesis. Not only is *TOBIN'S Q * CF* estimator significant, but also bears a negative sign throughout all the specifications. Although, as suggested above, some claim that this method is not errorless in discriminating financially constrained companies against the affluent ones, the Vogt (1994) methodology seems to be robust to many possible data shortcomings. Furthermore, in our study it is highly significant, which cannot be attributed to any other characteristic of the data[12]. Also, the strength of the managerial discretion is found extremely high. It comes as second or third in terms of economic determinants of the investment decisions comparable to the impact of Tobin's Q.

The *STATE PRESENCE* and *STATE * Q* variables perform remarkably well. Companies with partly state ownership tend to invest more. Unfortunately, in most cases these spendings can be classified as over-investment. In all but one specification *STATE * Q* the estimators show consistently statistical significance and negative sign. The relatively large magnitude of the estimators seem to corroborate the hypothesis that state owned companies are strongly troubled by the managerial discretion problem.

The behaviour of the corporate governance indicator (*FOREIGN CEO*) seems discouraging in a sense that it does not seem to support the argumentation presented earlier. There can be two types of explanations to this observation. Firstly, foreign owners tend to extract profits indirectly, trying to realise returns to their investments without direct dividends. Secondly, due to the legislation, foreigners are rather rare (for example, they need to speak fluent Polish). Indeed, only 14% of the observations in the estimation are characterised by nonzero value of this dummy.

Also *NEW CEO* variable remains predominantly insignificant. When significant, it is negative, which implies that the changes in board may follow, among others, from discontent of shareholders, who find that their interests are not protected well enough. Although only marginally statistically significant, this finding suggests that in some companies shareholders are able to influence investment policies and extract appropriate dividends. On the other hand, however, we are unable to determine whether change in chief executive officer (CEO) occurs in most necessitating cases. Neither are we able to find support to the claim that this is in general feasible in other companies.

We have not found in the literature similar studies with standarisation procedures, which makes it impossible to compare the extent of managerial discretion in Poland to other countries. However, point estimates that high seems to suggest that this problem is severe. As we observe, for system GMM point estimators do not differ substantially from IV GLS regressions.

5 Conclusions

In this paper institutional analysis was applied in the form of an agency theory model. Principal (here: owner, shareholder) has delegated the ability to manage their property (here: stock listed companies) to agents (here: board of managers). Unlike typical principal-agent frameworks, potential misalignment of interests follows not from insufficient effort by agents, but from own goals and, sometimes, overconfidence. As indicated earlier, often IPO was a manner of privatisation. However, often state did not sell all its shares, retaining either privileged stocks (more voting

[12]For example, in (de Jong and Degryse 2001) this variable was not significant which has forced them to find another filter separating the financially constrained companies from the rest.

rights) or effectively control over the company (*via* concentrated ownership). Consequently, one should ask if these companies are troubled less or more by the agency problem.

In this paper we have identified presence of severe managerial discretion problem. We further demonstrated that this deficiency is more acute in the case of state owned companies, thus suggesting potential sources of corruption on the edge of business-government coexistence. State companies partially privatised discriminate their shareholders (state among others) more than totally private companies - government revenues from dividends are thus diminished. However, it does not seem reasonable to assume that state representatives on board or in controlling bodies have no awareness of this fact. Therefore, one can risk a hypothesis that these funds are extracted by state or state agencies in some other way suggesting low quality of institutions and potential sources of corruption.

In principle it is rather reasonable to believe that managers are fully aware of that which allows them to abuse their decisive power. This may be especially severe in case of efficient managers, who know their value to the company. Managerial discretion emerges then as an equilibrium solution, where shareholders trade-off dividends for efficiency of management. This may explain why newly chosen CEOs tend to lower investment regardless of company outlooks - the equilibrium has evidently been distorted and owners no longer agreed to the trade-off. Consequently, managerial discretion can also be viewed in terms of either confidence (managers know better what is good for the company and thus shareholders) or sense of impunity (managers effectively create value to the shareholders, so they try to participate in this increase above the level agreed with shareholders).

The overconfidence-based explanation for investment distortions has a number of novel policy implications. Traditional theories, which link investment-cash flow sensitivity to capital market imperfections or misaligned incentives, propose timely disclosure of corporate accounts or high-powered incentives as potential remedies. Findings of Malmendier and Tate (2004) suggest that these provisions may not suffice to address managerial discretion. A manager whose incentives are perfectly aligned and who does not face any informational asymmetries may still invest suboptimally if he is overconfident. He believes that he is acting in the best interest of shareholders. Thus, refined corporate governance structures, involving a more active board of directors or constraints on the use of internal funds, may be necessary to achieve first best investment levels.

On the other hand, excessive shareholders' control may also affect investment adversely by inducing managers to forgo good investment projects if it means hazarding short-term earnings targets. Results of Graham, Harvey and Rajgopal (2005) identify an economically significant deficiency of disclosure regulations in this respect. These two effects - *i.e.* overconfidence and excessive dependence on accounting statistics - seem to coexist though. This might suggest that defining appropriate incentive schemes to the managers is still a challenging problem even in economies where stock market is very much advanced.

On this landscape, research on Polish stock listed companies is still *tabula rasa* to a certain extent. One should be very cautious about deriving any conclusions from the above research though. Statistical properties of these results are far from being perfect for the reason of data availability and relatively short periods of observations.

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