Agency Costs, Ownership Structure and Corporate Governance Mechanisms in the UK

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Abstract

Recent empirical evidence indicates that debt capital and ownership structure can play a significant monitoring role within a firm [see for example, Ang et. al [J. Finance 55 (1999) 81] and Sign and Davidson [J. Banking and Finance 27 (2003) 5]]. In this paper, we empirically investigate the impact of debt financing, corporate ownership structure, board structure and executive compensation policy on the costs arising from agency conflicts mainly between managers and shareholders. The interactions among them in determining the magnitude of these conflicts are also tested. Our results strongly suggest that bank debt and managerial ownership constitute two of the most important governance devices for the UK companies. Also, ownership concentration and managerial compensation policy play an important role in mitigating agency conflicts of this sort. Finally, the results concerning potential interaction effects between the alterative governance mechanisms are striking. For instance, there is strong evidence that the role of bank debt as a governance device changes at different levels of managerial ownership.

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1. Introduction

Recent empirical evidence indicates that debt capital and ownership structure can play a significant monitoring role within a firm. For instance, Ang et. al (2000) and, Sign and Davidson (2003) examine the role of debt and ownership structure in mitigating agency problems for a sample of small and large firms respectively. The findings of these studies generally support the view that managerial ownership aligns managers' and shareholders' interests and, hence, it reduces agency costs that arise from the conflicts of interest of these two groups of claimholders. However, there is no consensus among the studies as far as the role of debt in mitigating such problems is concerned. Ang et. al (2000) point out that debt has an alleviating role whereas Sign and Davidson (2003) an aggravating one. The different findings of these studies may be due to the dissimilar impact of debt on firm's decisions in the case of small and large firms.

In this paper, we empirically investigate the impact of debt financing, corporate ownership structure, board structure and executive compensation structure on the costs arising from agency conflicts mainly between managers and shareholders. The interactions among them in determining the magnitude of these conflicts are also tested. For instance, we have a priori expectations that both bank debt and managerial ownership can effectively work as corporate governance devices. However, these two devices can work either as substitutes or as complementary in the alignment procedure. The inclusion of interaction terms in our regression equation allow us to test for such a potential. For example, we test whether the impact of debt capital on agency costs becomes weaker or not at higher levels of managerial ownership and vice versa. Specifically, we extend the studies by Ang et. al (2000) and, Sign and Davidson (2003) in the following ways:

Firstly, we provide evidence on the UK market, a market in which agency conflicts between managers and shareholders are expected to be severe. Several features of the UK corporate governance system, such as the poor monitoring performed by large shareholders, institutional investors and boards of directors as well as the inadequate external discipline, allow managers to be stronger and more entrenched and, therefore, enhance agency problems[2]. For example, the existing UK

[2] For analytical discussion about the characteristics of the prevailing corporate governance system in the UK see Ozkan and Ozkan (2003), Goergen and Rennebog (2000) and Faccio and Lasfer (2000) and Short and Keasey (1999).

takeover code, which makes accumulation of stock expensive, as well as the favourable law to the minority shareholders prevent individual investors from holding significant equity stakes and, therefore, restrict their monitoring ability. Institutional investors, who keep the largest portfolios in UK, are also insufficient monitors within a firm (Goergen and Rennebog, 2001; Faccio and Lasfer, 2000). This mainly happens because of the absence of potential coalitions of institutional investors that could easily control more than 30% of total shares and, in his way, influence management decisions. Instead, what happens in UK is that managers, the second largest group in terms of equity ownership, form this sort of coalitions and entrench themselves at the expense of other shareholders (Franks et. al, 2001). Similar to what happens with the cases of large shareholders and institutional investors and their weak monitoring roles, UK corporate boards are usually characterized as corporate devices that provide weak disciplinary function (see, for example, Franks et. al, 2001; Short and Keasey, 1999). In contrast to what happens in US, in the UK market boards are dominated by executive directors, executive and non-executive directors can sit on the same board and, also, the roles of the chairman of the board and the chief executive officer are usually not separated. Moreover, as Franks et al. argue, there are much less fiduciary obligations on directors in the UK in comparison to what happens in US. As a result, non-executive directors in UK play more of an advisory role than a disciplinary one.

Secondly, we analyze the impact of managerial ownership structure on agency costs between managers and shareholders by considering a non-linear relationship between the two. In the context of agency theory, introduced by Jensen and Meckling (1976), a manager who owns anything less than 100% of the residual cash flow rights of the firm has potential conflicts of interest with outside shareholders. Equity stakes to the hands of managers align managers' and outside shareholders' interests by setting a common target, the values maximization of the firm. In other words, managerial ownership and agency costs are negatively related (alignment effect). However, as Tirole (2001) points out, as managerial ownership continues to increase, managers start exerting insufficient effort, collecting private benefits and entrenching themselves at the expense of other investors (entrenchment effect). Therefore, relationship between the two is likely to be non-monotonic.

The idea of non-linearity has been tested before but only though performance (see Morck et al. 1988; Mc Connell and Servaes, 1990). The studies by Ang et al. (2000) and Sign and Davidson (2003) do not allow for a non linear relationship between

managerial ownership and their proxies for agency costs. Our analysis contributes in the sense that we test for the existence of such a non-linear relationship between managerial ownership and agency costs. In the spirit of Morck et al. (1988) and Mc Connell and Servaes (1990) we expect a U-shaped relationship between the two.

Our analysis also contributes in the sense that we take into account several features of ownership, board and compensation corporate structure that possibly affect agency costs and previous studies have ignored. Specifically, in addition to managerial ownership, we investigate the role of ownership concentration, size of the board, independence of the board and executive compensation on our proxy for agency costs. The literature strongly suggests that large shareholders can effectively exert proper management supervision and avoid managerial entrenchment (Shleifer and Vishny, 1986; Friend and Lang, 1988). Also, more independent boards of directors (boards with significant proportion of non-executive members and boards in which the roles of chief executive officer-CEO and chairman-COB are separated) can perform a similar function (Fama, 1980 and Fama and Jensen, 1983; Cadbury report, 1992[3]). Moreover, although the empirical evidence on that point is mixed, board size can enhance corporate performance (Pearce and Zahra, 1991). Finally, managerial compensation, either in the form of total salary or total remuneration package of the manager, works as an incentive mechanism that reduces conflicts between managers and shareholders (see Core et al., 2001; Murphy, 1999)

The third contribution of our work is that our empirical model captures potential interactions between the alternative corporate governance mechanisms. We estimate two alternative empirical specifications. In the first one, bank debt is considered to be the main corporate governance device. We know that bank debt performs a significant monitoring role within a firm (Diamond, 1991; Boyed and Prescott, 1986 and Berlin and Loyes, 1988). It is possible, however, its monitoring efficiency to vary across the different levels of managerial ownership, ownership concentration, ratio of non-executive directors, board size, managerial compensation and also across firms that have the roles of CEO and COB separated or not. We expect the negative association between bank debt and agency costs to be weaker at higher levels of ownership concentration, non-executive directors, board size, managerial compensation and also

[3] Issues like a more independent board with a significant proportion of non-executive directors and the roles of CEO and COB separated constitute some of the basic recommendations of the Cadbury Committee report issued in 1192 in the UK.

in firms that the role of CEO and COB separated in comparison to the firms that are not. This is because these corporate governance mechanisms work as substitute for bank debt in mitigating agency conflicts within the firm. As far as the interaction between managerial ownership and bank debt is concerned, what happens is more complicated given the non-linear nature of its relationship with agency costs. As managerial ownership increases, but before reaching very high levels, we expect the role of bank debt to become stronger. At these levels of managerial ownership, bank debt is the only corporate governance mechanism that is really efficient. As managerial ownership reaches high levels and becomes an efficient mechanism as well, the role of bank debt decreases i.e. the two mechanisms become substitutes in mitigating agency problems.

In the second empirical specification we assume that managerial ownership is the main corporate device[4]. As in the case of bank debt, the role of managerial ownership in mitigating agency problems may change at different levels of bank debt, ownership concentration, ratio of non-executive directors, board size, managerial compensation and also across firms that have the roles of CEO and COB or not. The difference with the previous case is that now we have to test more potential interaction effects given the non-linear role of managerial ownership. For instance, an increase in ownership concentration can change the impact of managerial ownership on agency costs differently in the case when managerial ownership is in low and in the case when it is in high levels.

Our results strongly suggest that bank debt and managerial ownership constitute two of the most important governance devices for the UK companies. Furthermore, ownership concentration and managerial compensation structure play an important role in mitigating agency conflicts between managers and shareholders. However, these results are not robust in all of our empirical specifications. Finally, the results concerning potential interactions between the alterative governance mechanisms are striking and suggest that interaction terms determine the magnitude of agency problems to a significant extent. For instance, there is strong evidence that the role of bank debt as a governance device changes at different levels of managerial ownership. Specifically, an increase in managerial ownership, before the latter reaches very high

[4] We have a priori expectations that bank debt and managerial ownership are the main corporate governance devices in UK. As mentioned above the other mechanisms re not expected to play any more significant role than what managerial ownership and bank debt do.

levels, makes the role of bank debt stronger. However, as managerial ownership reaches high levels and becomes an efficient mechanism, the role of bank debt decreases i.e. the two mechanisms work as substitutes in mitigating agency problems. Our sensitivity analysis confirms such a result.

The remainder of our paper is organized as follows: In section 2 we discuss the related theory and formulate our empirical hypotheses. Section 3 describes the way in which we constructed our sample and, also, presents several descriptive statistics of that. Section 4 presents the results of our univariate, multivariate and sensitivity analysis. Finally, section 5 concludes.

2. Agency costs, bank debt and ownership structure

2.1 Agency costs and bank debt

In an agency setting, there are usually severe conflicts of interest between managers and shareholders. These problems are related to consumption of perquisites by managers, expropriation of shareholders' wealth, managerial entrenchment and managerial engagement in non-maximizing behaviour (Jensen and Meckling, 1976). For instance, managers may have incentives to hold a large amount of cash reserves so as to pursue their own objectives and establish a reputation within the firm. The high amount of cash in the hands of managers usually leads them to wrong investment decisions, a fact that deteriorates corporate performance and creates agency conflicts between managers and shareholders. This is the problem of free cash flow as introduced by Jensen (1986). Information asymmetry between managers and shareholders increases uncertainty and, therefore, boosts agency conflicts of this sort. In general, the higher the asymmetric information, the more exposed to managers' expropriation behaviour that shareholders feel.

Debt servicing obligations help to discourage overinvestment of free cash flow by managers (Jensen, 1986; Stulz, 1990). The existence of debt in a firm's capital structure exerts pressure to managers in the sense that a specific level of performance has to be achieved so as the debt obligations to be met. Managers, then, cannot run the firm in their own unrestricted way. Under a different perspective, debt, by signalling managers' willingness to pay cash flows or to be monitored, helps in the reduction of problems related to asymmetric information. Debt provides a signal for good quality

for the firm and, therefore, decreases investors' uncertainty about the quality of their investments.

The fact that debt alleviates agency problems is particularly true for the case of bank debt. Bank debt is characterized by significant monitoring efficiency. In order to secure the outcome of their investments, banks require from managers to report results about firm performance honestly and run the business efficiently (Diamond, 1984, 1991; Boyed and Prescott, 1986 and Berlin and Loyes, 1988). Banks also have a comparative advantage in comparison to other lenders in their ability to access and process private information that is not publicly available (Fama, 1985; Yosha, 1995). As a result, banks can be viewed as performing a screening role employing private information that allows them to evaluate and monitor borrowers more effectively than other lenders.

In addition to its monitoring and screening role, bank debt incorporates a significant signalling characteristic which helps to the reduction of information asymmetry between managers and outside investors. A bank's willingness to provide a loan to a firm signals positive information about the firm. For instance, James (1987) and Mikkelson and Parch (1986) point out that the announcement of a bank credit agreement conveys positive news to the stock market about creditor's worthiness. Bank debt, conveys also an important renegotiation characteristic. Berlin and Mester (1992) argue that because banks are well informed and typically small in number, renegotiation of a loan is easier. A bank's willingness to renew a loan indicates the existence of a good relationship between the borrower and the creditor. That is a further good signal about the quality of the firm which makes outside investors to feel more secure. Moreover, the renegotiation characteristic reduces also potential underinvestment problems that firms may face.

To sum up, bank debt, by monitoring managers and signalling good quality about a firm, decreases information asymmetry and agency costs between managers and outside investors. For the case of the UK market bank debt is the major source of external financing and is used to a very high extent, much higher than that in markets like Germany and US (Corbett and Jenskinson, 1997)[5]. Therefore, we expect that to be a significant governance device in the UK market.

[5] The only developed country that uses bank debt

2.2 Agency costs and managerial ownership

The separation between ownership and control in modern corporations constitutes the starting point of a huge literature that investigates the impact of firm's ownership structure on agency costs and corporate performance. The idea of separation between ownership and control dates back to the seminal works by Smith (1976) and Berle and Means (1932). These two studies document that when ownership and control do not coincide, there are conflicts of interest between managers and shareholders. What is important for the firm then is to find ways to eliminate these conflicts i.e. to find efficient corporate governance mechanisms.

Jensen and Meckling (1976) model agency costs of this sort and conclude that a manager who owns anything less than 100% of the residual cash flow rights of the firm has potential conflicts of interest with the outside shareholders. Managerial ownership can align the interest between the two different groups of claimholders and, therefore, reduce the agency costs within the firm. According to Jensen and Meckling's (1976) model the relationship between managerial ownership and agency costs is linear and the optimal point for the firm is achieved when the managers acquires all of the shares of the firm.

The study by Jensen and Meckling (1976), one of the most quoted studies in social sciences, has attracted numerous researchers to examine the impact of managerial ownership and corporate performance. The majority of the studies carried out on that area, consistent to Jensen and Meckling's arguments, assume a linear relationship between the two variables. This view, however, has been challenged by other scholars that assume the presence of non-linearities (see for example Morck et. al, 1988; McConnel and Servaes, 1990,1995 and, Short and Keasey, 1999). At low levels of managerial ownership, managerial ownership aligns managers' and outside shareholders' interests by reducing managerial incentives for perk consumption, utilization of insufficient effort and engagement in non-maximizing projects (alignment effect). However, after some level of managerial ownership managers exert insufficient effort (e.g focus on external activities), collect private benefits (e.g. build empires or enjoy perks) and entrench themselves (e.g. undertake high risk projects or bend over backwards to resist a takeover) at the expense of other investors (entrenchment effect). Therefore, the relationship between managerial ownership and agency costs turns from negative to positive i.e. it is a non-linear U-shaped. The

ultimate effect of managerial ownership on firm value depends upon the trade-off between the alignment and entrenchment effects.

In the context of our analysis we propose a non-linear relationship between managerial ownership and agency costs. However, theory does not shed much light on the exact nature of the relationship between the two and, hence, we do not know which of the effects will dominate the other and in which levels of managerial ownership. We, therefore, carry out a preliminary investigation about the pattern of the relationship between managerial ownership and agency costs. Figure 1 presents the way in which the two variables are associated.

[Insert Figure 1 here]

Our inverse proxy for agency costs, the ratio of annual sales to total assets (or asset utilization ratio), is related with managerial ownership in a non-monotonic way. Although the graph does not clearly suggest a specific functional form (e.g. squared or cubic) between the two, there is preliminary evidence about the existence of a non-linear relationship. In particular, at low levels of managerial ownership (<6%) asset utilization ratio shows a very low variability. After managerial ownership reaches higher levels (>6%), the relationship between managerial ownership and asset utilization ratio is U-shaped. In the beginning, as managerial ownership increases, asset utilization ratio decreases[6]. However, after managerial ownership exceeds the 40% level, the two variables are positively related. Consequently, our preliminary investigation points to a non-linear relationship between managerial ownership and asset utilization ratio. The precise functional form of the relationship, however, is still open to debate.

2.2 Agency costs and ownership concentration

There is an important strand of literature that examines the role of large shareholders in mitigating agency problems between managers and shareholders (e.g. Shleifer and Vishny, 1986; Shleifer and Vishny, 1997 and Friend and Lang, 1988). Shareholders with substantial stakes have incentives to monitor management and, hence, protect

[6] For instance, when managerial ownership increases and lies between 12% and 40%, the utilization ratio rapidly decreases.

their investments. In general, the higher the stake that large investors hold, the stronger their incentives to supervise management.

Although monitoring by large shareholders may reduce agency problems associated with managers, it may also harm the firm by enhancing conflicts between large and minority shareholders. When large shareholders gain nearly full control of a corporation, they are engaged in self dealing expropriation procedures at the expense of minority shareholders (Shleifer and Vishny, 1997). Any expropriation incentives are stronger in cases when law does not effectively protect minority shareholders and the diversity between cash and control rights of large shareholders is huge (Grossman and Hart, 1985).

Ownership concentration may have several other effects on agency costs beyond the power to monitor. On the one hand, large shareholders may prevent the possibility of a takeover bid (Shleifer and Vishny, 1986; Bukart, 1995). Such a characteristic reduces agency costs between managers and shareholders in the sense managers feel safer about their positions and there is no need for attempting to achieve such a safety by building empires or misusing firm's resources. On the other side, large shareholders may have an opposite effect on agency costs. The existence of concentrated holdings decreases diversification, market liquidation and stock's ability to grow and, therefore, increases the incentives of large shareholders for expropriation procedures.

In the context of the UK market, the existing takeover code (the City Code on Takeovers and Mergers) and the favourable law to the minority shareholders creates obstacles to building controlling stakes. Any ownership concentration is apparent either to the hands of private block holders (e.g. family firms) which are limited in number or to the hands of institutional investors, who constitute the largest group in terms of equity ownership in UK and is a more common case in UK. On the one hand, private block holders are considered to perform a monitoring role although they are small in number. For instance, founding family ownership combines undiversified holdings and desire to pass the firm onto subsequent generations. Then, family shareholders are more likely than other shareholders to have value maximization objectives (Anderson et al., 2002). On the other hand, institutional investors, despite their high equity stakes, are insufficient monitors within a firm due to lack of internal information and monitoring expertise (Faccio and Lasfer, 2000 and Goergen and Rennebog (in press)). Such a passive behaviour of institutional investors may indicate

that the role of ownership concentration in mitigating agency problems is of limited importance for the case of the UK firms. However, as Goergen and Rennebog (2001) point out, even if institutional investors do not publicly intervene, they act behind the scenes. Their expertise seems to increase along time. They tend to become more active by getting a closer relationship with UK firms. Consequently, ownership concentration in UK, either in the form of private block ownership or in the form of institutional ownership, can be an effective corporate governance mechanism (Tylecote et al., 2002 and Malin, 1996).

2.3 Agency costs and Board of Directors

Corporate governance research recognizes the essential role performed by the board of directors in monitoring management (Fama and Jensen, 1983; Weisbach, 1988 and Jensen, 1993). The effectiveness of a board as a corporate governance mechanism depends on its size and composition. Large boards are usually more diversified and, hence, work better than the small non-diversified ones (Carder, Simkins and Simpson, 2002 and Pearce and Zahra, 1992). Others argue that large boards are less effective than small boards since they are less flexible (Yermack, 1996 and Eisenberg et al., 1998)

The composition of a board is also important. There are two components that characterize the independence of a board, the proportion of non-executive directors on it and the separated roles of Chief Executive Officer CEO and Chairman of the Board (COB) or not. Board with a significant proportion of non executive directors can limit the exercise of managerial discretion by exploiting their monitoring ability so as to protect their reputations as effective and independent decision makers. Consistent to that view, Brickley and James (1987), Byrd and Hickman (1992) and Rosenstein and Wyatt (1990) propose a positive relationship between the percentage of non-executive directors on the board and corporate performance. This view, though, has been challenged by other researchers who believe that non-executive directors are characterized by lack of information about the firm and, hence, their role is more advisory rather than monitoring (Agrawal and Knoeker, 1996 and Hermalin and Weisbach, 1991). As far as the separation between the role of CEO and COB is concerned, it is believed that separated roles can lead to better board performance and, hence, less agency conflicts. The Cadbury (1992) report on corporate governance

stretches this issue and recommends that CEO and COB should be two distinct jobs. Firms should comply with that recommendation for their own benefit. A decision not to combine these roles should be publicly explained.

In the context of the UK market we expect that the higher the size of a board the better it works. We form such an expectation since we believe that the problem with the boards in UK is their low diversification and the high dependence on executive directors. We also expect non-executive directors to exert an advisory instead of a monitoring role. We form such an expectation given that, in contrast to what happens in US, legislation in UK encourages non-executive directors to be inactive since there are not significant fiduciary obligations on them. Non-activism is strengthened by the relatively low number of non-executive directors – on average 33% of the total board (Franks et al., 2001). Indeed, empirical studies by Franks et al. (2001) and Letza et al. (2002) confirm this view by providing evidence on a non-disciplinary role of non-executive directors in UK. Finally, we expect that UK firms that have the roles of CEO and COB separated are characterised by superior board efficiency and, therefore, they face less agency problems.

2.4 Agency costs and Managerial Compensation

Another important component of corporate governance is the compensation package that is provided to managers of a firm. Recent studies by Core et al. (2001) and Murphy (1999) conclude that, given the information asymmetry between managers and shareholders, compensation contacts can motivate managers to take actions that maximize shareholders' wealth. However, managerial compensation is considered to be a debated component of corporate governance. On the one hand, an increase in managerial compensation may lead to a reduction in agency costs that arise between managers and shareholders. A manager who is satisfied with his compensation package will be less likely, ceteris paribus, to utilize insufficient effort or perform expropriation behaviour and, hence, risk the loss of his job. In other words, compensation package works as a mechanism that aligns the interests of managers with those of shareholders. On the other hand, managerial compensation, especially when it reaches extremely high levels, works as an "infectious greed" which creates

an environment ripe for abuse[7]. For instance, remuneration packages usually include benefits such as the use of private jet, golf club membership, entertainment and other expenses, apartment purchase etc. In such cases, there are significant conflicts of interest between managers and shareholders.

Concerns about excessive compensation packages and their negative impact on corporate performance have lead to the establishment of basic recommendations in the form of "best practises" in which firms should comply so as the problem with excessive compensation to be diminished. In the case of the UK market, for example, one of the basic recommendations of the Cadbury (1992) report was the establishment of an independent compensation committee. Also, in a posterior report, the Greenbury (1995) report, specific propositions about remuneration issues were made. For example, an issue that was stretched was the rate of increase in managerial compensation. In the case of the US market, the set of "best practises" includes, among others, the establishment of a compensation committee so as transparency and disclosure to be guaranteed (same practise an in the UK) and the substitution of stock options as compensation components with other tools that promote the long term value of the company[8].

Indeed, the composition of the compensation package of a manager is very important since it determines whether real incentives fro maximization behaviour are established or not. In the past, the compensation package was mainly in the form of cash salary and bonus. Nowadays, the components of compensation structure have been increased in number and may include annual performance bonus, fringe benefits, stock (e.g. preference shares), stock options, stock appreciation rights, phantom shares and other deferred compensation mechanisms like qualified retirement plans[9]. The question that emerges then is which of these mechanisms is more efficient in establishing managerial incentives for good quality decision making. Several researchers argue that managers are risk averse and prefer cash compensation for security reasons (Baker and Hall, 1998; Himmelberg et al., 1999). Compensation mechanisms like stock or stock options add a significant amount of risk in managers' utility function. For example, in cases when stock markets are in recession, stock options may go out-of-money and, therefore, they cannot motivate managers at all.

[7] www.cfoweb.com
[8] See www.cfoweb.com for an analytical discussion on the "best practises" in US.
[9] See Lynch and Perry (2003) for an analytical discussion.

Others, like Murthy (1985), Jensen and Murthy (1990) and Hall and Liebman (1998), argue that better incentives for the managers are created under the presence stock and stock option in the hands of managers. This can be explained because stock options stock options add convexity to managers' payoff function and also because they bear significant financial accounting advantages[10].

In our paper, we include two variables related to managerial compensation as determinants of the agency costs that arise between managers and shareholders. First, we include the total salary (in logarithm) that is paid to managers. Second, given the importance of the composition of the compensation package, we include the total remuneration package that is paid to managers. It is the sum of salary, bonus, options and other benefits paid to managers.

2.5 Interaction effects

A very straightforward way to perform our empirical is to estimate the following econometric model:

$$\begin{aligned} Agency = {} & a_1 + a_2 Bank + a_3 MAN + a_4 MAN^2 + a_5 CONCENTR \\ & + a_6 BOARD\ SIZE + a_7 NON\text{-}EXEC + a_8 CEO\ DUMMY \\ & + a_9 REMUNERATION + a_{10} AGE + a_{11} FIRM\ ZIZE \\ & + a_{12} MKTBOOK + industry\ dummies + error, \end{aligned} \quad (1)$$

In such a framework we have:

$$\frac{\partial Agency}{\partial Bank} = a_2 \quad \text{and} \quad \frac{\partial^2 Agency}{\partial (Bank)^2} = 0$$

and also,

$$\frac{\partial Agency}{\partial Man} = a_3 + a_4 \text{Man} \quad \text{and} \quad \frac{\partial^2 Agency}{\partial (Man)^2} = a_4$$

i.e. all variables, except for managerial ownership, are related to agency costs in a linear way. Also, the relationship between bank debt (or managerial ownership) and agency costs does not depend upon the values that the other variables take. However, a model of this sort does not take into account the existence of any interaction effects.

[10] See Lynch and Perry (2003)

In the context of our analysis we go further by allowing potential interaction among the corporate governance devices. This can be done with the inclusion of multiplicative terms in our regression equation (see Jaccard et al., 1990). We estimate two alternative empirical specifications. In the first one, we assume that bank debt is the main corporate governance device in the UK and that its impact of agency costs changes at different levels of managerial ownership, ownership concentration, ratio of non-executive directors, board size, managerial compensation and also across firms that have the roles of CEO and COB separated or not. This model is the following:

$$\begin{aligned} Agency = {} & b_1 + b_2 Bank + b_3 MAN + b_4 MAN^2 + b_5 Bank*MAN \\ & + b_6 Bank*MAN^2 + b_7 Bank*CONCENTR + b_8 Bank*BOARD\ SIZE \\ & + b_9 Bank*NON\text{-}EXEC + b_{10} Bank*CEO\ DUMMY \\ & + b_{11} Bank*REMUNERATION + \mathbf{bX} + error, \end{aligned} \qquad (2)$$

where **X** is the matrix of the variables that are included in model (1) but not in model (2) and **b** the vector f the underlying coefficients. In this model, starting with the managerial ownership case, we assume that the relationship between bank debt and agency costs changes at different levels of managerial ownership. We expect that bank debt becomes more significant after in increase in managerial ownership, provided that the latter does not reach very high levels i.e. coefficient b_5 is expected to be positive. Given the inefficiency of managerial ownership at those levels, bank debt has a unique role within the firm in alleviating agency problems. However, at higher levels of managerial ownership bank debt and managerial ownership become substitute mechanisms. Therefore, the role of bank debt is expected to become weaker i.e. coefficient b_6 is expected to be negative. As far as the other governance devices are concerned, given that they do not indicate any non-liner features[11] and that they are really effective in alleviating agency problems, they can just be considered as substitute mechanisms to bank debt. An increase in their value, which signifies an increase in their effectiveness, causes a decrease in the effectiveness of bank debt. Specifically, we expect the negative association between bank debt and agency costs to become weaker for firms with higher ownership concentration, higher board size, higher proportion of non-executive directors, separated roles of CEO and COB and

[11] We formulate our model being based on a priori expectations. Suggestions for potential non-linearity concern only the case of managerial ownership. For the other variables there is no any theory or strong expectations to suggest something similar. Also, after performing a graphical analysis similar to what we did with the managerial ownership case, we did not find any strong evidence to support the existence of non-linearity.

higher executive compensation. Therefore we expect coefficients b_7 to b_{11} to be negative.

In our second empirical specification we expect managerial ownership to constitute the leading governance device. The model which is estimated is the following:

$$\begin{aligned} Agency = {} & c_1 + c_2 MAN + c_3 MAN^2 + c_4 Bank*MAN + \\ & + c_5 Bank*MAN^2 + c_6 MAN*CONCENTR + c_7 MAN^2*CONCENTR \\ & + c_8 MAN*BOARD\ SIZE + c_9 MAN^2*BOARD\ SIZE \\ & + c_{10} MAN*NON\text{-}EXEC + c_{11} MAN^2*NON\text{-}EXEC \\ & + c_{12} MAN*CEO\_DUMMY + c_{13}\, MAN^2*CEO\_DUMMY \\ & + c_{14} MAN*REMUNER. + c_{15} MAN^2*REMUNER. + \mathbf{cX_2} + e, \quad (3) \end{aligned}$$

, where $\mathbf{X_2}$ is the matrix of the variables that are included in model (1) but not in model (3) and **c** the vector f the underlying coefficients. In that case, , the role of managerial ownership in mitigating agency problems may change at different levels of bank debt, ownership concentration, ratio of non-executive directors, board size, managerial compensation and also across firms that have the roles of CEO and COB or not. Given that bank debt, ownership concentration, ratio of non-executive directors, board size, managerial compensation work all as substitute with managerial ownership only when managerial ownership is at high levels, we expect coefficients c_5, c_7, c_9, c_{11}, c_{13} and c_{15} to be negative whereas the coefficients c_4 , c_6 , c_8, c_{10}, c_{12} and c_{14} to be positive.

3. Data and Research Design

3.1 Sample

For our principal empirical analysis we use a sample of publicly traded UK firms for the year 2002. For our sensitivity analysis, though, we use a sample with data for the period 1997-2001. Accounting data are collected by Datastream database in the following way: First, financial firms were excluded from the sample. Second, missing firm-year observations for any variable in the model during the sample period were dropped. Third, observations that exceeded the 1st and 99st percentile values were also dropped so as to avoid the problem with extreme values.

Data about managerial ownership variable were collected both by Hemscott and Datastream. Firms indicating significant differences in crosschecking were excluded

from the sample. Data for ownership concentration were exclusively collected from Datasteam. Finally, about the board structure (e.g. size of board, composition of board), executive compensation structure (e.g. managers' salary and total remuneration package) were collected by Hemscott. The same criteria, as in accounting data, are imposed on ownership data as well. Those criteria have provided as with a total of 440 firms for our cross section analysis.

3.2 Dependent Variable

In both studies by Ang et al. (2000) and Sign and Davidson (2003) the ratio of annual sales to total assets, a measure for asset utilization, is used as an independent variable. However, Sign and Davidson, rather than using Ang's et al. (2000) ratio of operation expenses to sales, they use the ratio of selling, general and administrative expenses (SG&A) to total sales as an alternative dependent variable. They argue that the SG&A expenses are a clearer indication for higher managerial discretion in comparison to operating expenses. In both studies, the ratio of SG&A expenses to total sales is used as a proxy while the ratio of total sales to total assets (or asset turnover) as an a inverse proxy for agency costs.

In our analysis, we use only the ratio of annual sales to total assets (or Asset Turnover or Asset Utilization ratio) as an inverse proxy for agency costs for the following reasons: First, data for operating expenses or SG&A of UK firms are not available from Datastream. Secondly, the empirical results of Ang et al. (2000) and Sign and Davidson (2003) demonstrate a very weak association between corporate governance mechanisms and agency costs, measured as operating or SG&A expenses. This makes us suspicious about the validity of such a proxy for agency costs.

3.3 Independent Variables

Our independent variables include bank debt, managerial ownership, ownership concentration, board size, a variable which shows the proportion of non-executive directors on the board, a dummy variable which takes the value of 1 if the roles of chairman of the board (COB) and chief executive officer (CEO) are not separated and, finally, an executive compensation variable. Analytical definitions for these variables are given in table 1. The relationship between them and our agency costs measure, the ratio of annual sales to total assets or asset turnover, is explained in section 2.

Several control variables are also included in our empirical model[12]. We use firm size, the market-to-book value and industry values in the right hand side of our regression. Firm size may deteriorate asset turnover given the high asymmetric information that characterizes large firms. It may also improve asset turnover due to scope economies and synergy across difference business lines. Similarly, market-to-book value can be either positively or negatively related to agency costs. A high market-to-book value may indicate underinvestment problems. However, it may also indicate high quality and reputation on organizational issues within the firm. Finally, in our model we control for industry membership since there is a possibility for different industries to adopt particular corporate governance practises. We use 15 industry dummy variables in our model. Definitions for the control variables are also given in table 1.

3.4 Sample Characteristics

Table 2 reports the descriptive statistics for the main variables used in our analysis. It reveals that the average asset turnover ratio for the firms of our sample is 1.21. Although not directly comparable, such a value is in line with what Sign and Davidson report for the specific variable. The mean (median) bank debt is 60.07% (76.63%). These values are generally in line with those reported by other studies for the UK market that use bank debt in their analysis. For instance Ozkan and Ozkan (2003) report mean and median values of 57% and 63.4% respectively. The notable difference in median value is attributable to the different sample periods used in the two studies. After calculating the median value of bank debt for the period 1997-2001, we report a much lower median value (very close to what Ozkan and Ozkan do)

As far as the other variables are concerned, the mean (median) value for managerial ownership is 15.6% (8.35%). The average ownership concentration is 40.53%, the average board size is composed by 5.7 members and the average proportion of non-executive directors is 44.7%. Finally, the results for control variables are also in line with what other analyses report. For instance we find that the mean (median) value for total assets and market-to-book value are 11.09 (11.20) and 1.36 (1.1) respectively.

[12] Definitions are also given in table 1.

4. Empirical Results

4.1 Univariate analysis

In this section we provide some preliminary results regarding the effectiveness of the corporate governance mechanisms used in our model. In table 3 we report univariate mean comparison test results of the sample firm subgroups categorized on the basis of above and below median values for bank debt, ownership structure, board structure, compensation structure and control variables. Columns (1), (2) and (3) present results for 2002. Bank debt appears to be an efficient governance device since firms with above median bank debt have higher asset turnover than firms with below mean bank debt (1.30 against 1.13). The difference is statistically significant to the 1% level. Also it seems that firms with higher ownership concentration, proportion of non-executive directors and executive remuneration do better in terms of asset utilization in comparison to firms with lower ownership concentration, proportion of non-executive directors and executive remuneration respectively. However, the difference in mean values is not statistically significant. As far as managerial ownership in concerned, the mean values between the two sub-samples are very close to each other. This either indicates the minor role of managerial ownership in mitigating agency problems or misspecification problems and the existence of potential nonlinearity to the relationship between managerial ownership and agency costs.

Columns (4), (5) and (6) report similar analysis for the period 1997-2001, a period we use so as to carry out part of our sensitivity analysis (section 4.3). In that case all the variables are calculated as averages for the period 1997-2001, with one exception. Managerial ownership is calculated as the average managerial ownership for the period 2000-2001. The majority of the results reported in those columns are in line with the hypothesized predictions. However, they are found to be statistically insignificant.

As a second part of our univariate analysis we provide correlation analysis. The results of the Pearson's Correlation for the 440 firms of our sample are reported in table 5. Asset turnover is clearly positively correlated to bank debt and managerial ownership. All the other independent variables are also positively related to asset turnover with one exception. Board size id found to be negatively correlated. This is consistent with the studies that support the idea that large boards are less effective

than small boards (see Yermack, 1996 and Eisenberg et al., 1998). In general, the results of the correlation matrix are in line with the hypothesized signs.

4.2 Multivariate analysis

In this section ordinary least squares regression is used to test the theoretical hypotheses analyzed in section 2. Before stating the evaluation of the estimated coefficients it is important to report the results of some econometric tests that were carried out and concern our empirical models. Our models were not found to suffer from any heteroscedasticity or error- autocorrelation problems. As far as the heteroscedasticity is concerned, since it is a usual problem in cross section analysis, we carry out two tests to check for it. We use both squares and cross products so as to construt the auxiliary regression. In both cases the null hypothesis for homoscadasticity cannot be rejected (prob.>0.05). Similar to the homoscedasticity null hypothesis, the null hypothesis for no error-autocorrelation cannot be rejected as well (prob.>0.05). Finally, we carry out the RESET test for misspecification of the mean function[13]. For one more time, the null hypothesis for no misspecification cannot be rejected. All these things provide encouraging evidence for the stability of our empirical models.

In table 5 we present the results of the models that are based on our first empirical specification. In that case,, models (1) to (5), we assume that bank debt is the leading corporate governance device in the UK market and that its role as a corporate governance mechanism can change at different levels of managerial ownership, ownership concentration, ratio of non-executive directors, board size, managerial compensation and also across firms that have the roles of CEO and COB separated or not. Model (5) constitutes our main econometric model.

The results show that, bank debt and asset turnover are positively related in all of the models (1) to (5). The coefficient of bank debt is statistically insignificant in models (1) and (4) but highly statistically significant (at the 1% level) in models (2), (3) and in our basic model (model 5). These results provide strong evidence that bank debt effectively alleviates agency problems between managers and shareholders. The results also demonstrate a negative association between managerial ownership and

[13] To be more accurate, Ramsey's RESET test checks for underspecification of the mean function by using OLS estimates of the initial model as extra regressors in the regression equation.

asset turnover at low levels of managerial ownership. This possibly means that at low levels that at low levels of managerial ownership, the low equity stakes that managers hold are inadequate in motivating them to work harder. Instead, the fact that managers own some share capital enhances the consumption of perquisites and, in general, increases agency problems between them and outside investors of the firm. The negative association between the two, however, turns to positive at higher levels of managerial ownership since the coefficient for the squared managerial ownership (MAN^2) is positive and statistically significant. This result suggests that managerial ownership becomes an efficient corporate governance mechanism after a specific level[14]. Our results, also, show that ownership concentration has a significant role in alleviating agency conflicts. Furthermore, the coefficients for the variables related to board structure of the board were found to be statistically insignificant in the majority of the models (10) to (5). The insignificant coefficient for the proportion of non-executive directors may be an indication for the advisory (and not monitoring) role that non-executive directors perform in UK.

The results concerning potential interaction effects between alterative governance mechanisms are striking and, in general, in line with the hypothesized signs. At low levels of managerial ownership, an increase in managerial ownership seems to make the role of debt in mitigating agency problems stronger (the coefficient BANK* MAN is positive and statistically significant). This means that bank debt has a unique role in mitigates agency problems at these levels of managerial ownership. However, at higher levels of managerial ownership the role of bank debt decreases due to the substitutability between the two mechanisms. The coefficient of the interaction term BANK* MAN^2 is negative and statistically significant at the 1% level. A similar result is obtained for the ownership concentration. The significant and negative coefficient of the interaction term BANK*CONCENTR shows that bank debt and ownership concentration work as substitute devices in mitigating agency problems.

In table 6 we report the results that concern our second empirical specification (models 6-10). In these models managerial ownership (and not bank debt) is considered to be the main governance device in the UK market. As in the case of our first empirical specification (models 1-5), managerial ownership and agency costs are

[14] In general, our results managerial ownership are against the traditional view that managerial ownership is value enhancing at low levels and value destroying at higher levels. However, there is not any significant theoretical argument to comment upon the exact functional form.

found to be related in a non-linear way. However the results are not robust in all of the models 6-10. Similarly the positive coefficient for bank debt is not statistically significant. In table 6 tha variables that are strongly statistically significant are BOARD SIZE, CEO_DUMMY and REMUNERATION. Specifically, board size is found to be negatively related to asset turnover. Also, our results suggest that firms in which the roles of CEO and COB are not separated have lower asset turnover than firms in which the two roles are separated. On the contrary, firms that offer to manager a high remuneration package are characterized by lower agency problems than firms that do not offer them attractive packages. As far as the results for control variables are concerned, the negative association between ASSET and Asset turnover can be explained by the fact that large firms usually have complicated ownership structure and agency problems can easily be established. On the contrary, small firms (e.g. family firms) do not have problems of this sort. Finally, the results for AGE and MKTBOOK indicate that firms older firms and firms with higher growth opportunities are characterized by better asset utilization ratios in comparison to low-growth and young firms.

The results about the interaction terms in that empirical specification are interesting but they do not appear to be as significant as in the case of our first empirical specification (models 1-5). For instance, the negative and statistically significant coefficient of the term MAN^2*BANK shows the potential substitutability between bank debt and managerial ownership. However, the robustness of such a result is reduced by the fact that the coefficients for the terms MAN, MAN^2 and BANK are not statistically significant i.e. interaction terms may be meaningless given that the variables themselves are not statistically significant. The rest of the interaction terms, with exception the terms CEO_DUMMY*MAN and CEO_DUMMY*MAN^2, do not indicate any robust statistical significance. The statistically significant coefficients of the terms CEO_DUMMY*MAN and CEO_DUMMY*MAN^2 point out that the effectiveness of managerial ownership as a governance mechanism is different between firms in which the roles of CEO and COB are separated or not.

4.3 Sensitivity Analysis

As a complementary test for the robustness of our results, we estimate some additional empirical models. In those models the dependent variable is measured in

2002, while for each of firm characteristics (except for managerial ownership) we use the average values over the period 1997-2001 (and 1998-2001 in some models). Using averages in the way we construct our explanatory variables helps in mitigating potential problems that may arise due to short-term fluctuations and extreme values in our data. Also, using past values reduces the likelihood of observed relations reflecting the effects asset turnover on firm specific factors (see Ozkan and Ozkan, 2003 and Rajan and Zingales, 1995 for a similar methodology).

Managerial ownership is not measured for the period 1997-2001 but either for the period 2000-2001 or for the period 2000-2002 (depending on the model). Given that managerial ownership is considered to be stable over time, we do not expect that to cause any significant bias in our results (see Ozkan and Ozkan, 2003). Several researchers have commented upon the persistency characteristic of ownership structure (e.g. La Porta et al., 2002)

The results presented in table 7 confirm the existence of a non-linear relationship between managerial ownership and agency costs. The coefficients of MAN and MAN^2 are statistically significant in all of our models. Also, the two interaction terms that interrelate bank debt and managerial ownership are in line with the hypothesized signs and statistically significant in all the estimated models. In general, despite the fact bank debt appears to be statistical insignificant in these models, the results of table 7 assist in validating the results reported in table 5 and 6. The fact that bank debt appears to be insignificant can be explained by the fact that models 11-13 may be mispecified i.e. several corporate governance variables, related to ownership structure, have been excluded from those models due to data unavailability. In fact, the RESET test for misspecification indicated potential omitted variable problems in those models.

5. Conclusion

In this paper we examine the effectiveness of the alternative corporate governance mechanisms and devices in mitigating agency problems in the UK market. In particular, we empirically investigate the impact of debt financing, corporate ownership structure, board structure and executive compensation structure on the costs arising from agency conflicts mainly between managers and shareholders. The interactions among them in determining the magnitude of these conflicts are also tested.

Our results strongly suggest that bank debt and managerial ownership constitute two of the most important governance devices for the UK companies. Bank debt is linearly and positively related to our inverse proxy for agency costs, the ratio of total sales to total assets (or asset turnover). Managerial ownership, though, is related to asset turnover in a non-liner way. At low levels of managerial ownership, managerial ownership and asset turnover are negatively related i.e. managerial ownership is not an efficient governance mechanism However, when the latter reaches high enough levels the relationship turns from negative to positive i.e. it becomes an efficient mechanism. Our results also suggest that ownership concentration and managerial compensation policy play also an important role in mitigating agency conflicts of this sort. However, these results are not robust in all of our empirical specifications.

Finally, the results concerning potential interaction effects between the alterative governance mechanisms are striking. In our first empirical specification, in which we assume that bank debt is the leading governance device in the UK, there is strong evidence that the role of bank debt as a governance device changes at different levels of managerial ownership. Specifically, an increase in managerial ownership, before that reaches very high levels, makes the role of bank debt stronger. This is the case since at these levels of managerial ownership bank debt is the only corporate governance device that is really efficient. As managerial ownership reaches high levels and becomes an efficient mechanism, the role of bank debt decreases i.e. the two mechanisms work as substitutes in mitigating agency problems. In our second empirical specification, in which managerial ownership is considered to be the leading governance mechanism, there is some evidence about the substitutability of the two mechanisms. Despite the fact that the results in this specification are not very robust, our sensitivity analysis confirms the substitutability effect between the two mechanisms

In total, the results of our paper suggest that any study that attempts to analyze the empirical determinants of agency costs or corporate performance should take into account potential interactions between the alternative corporate governance mechanisms or devices. This is also the case for studies that analyze corporate policy decisions. For instance, we know that both managerial ownership and ownership concentration affect the capital structure decision of a firm (see Brailsford et al., 2001) However, there is a high possibility for the two variables to interact before affecting the capital structure choice.

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List of Tables and Figures

Figure 1

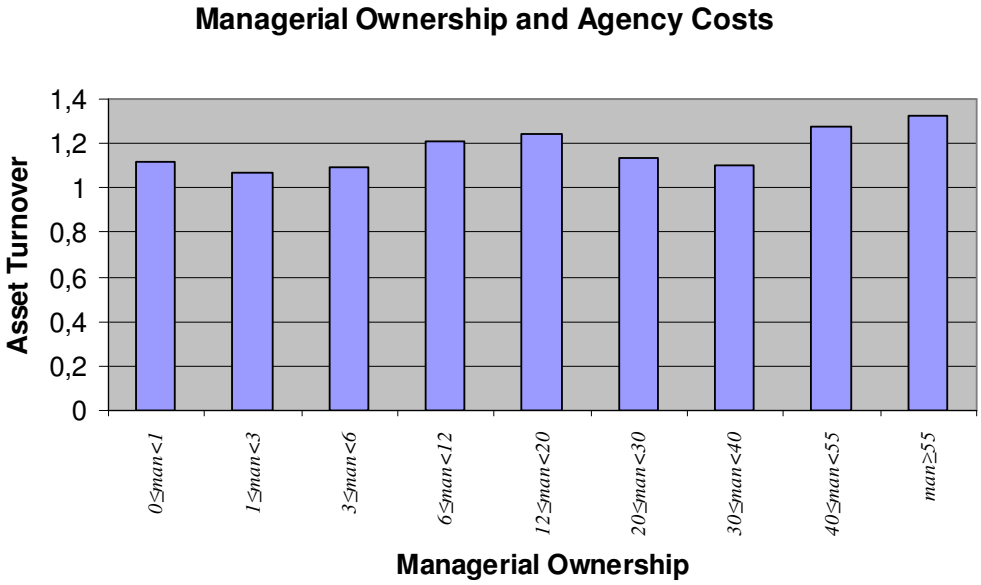

Table 1

Variables, definitions and sources

Variable	Definition	Source
ASSET TURNOVER	The ratio of annual sales to total assets	Datasteam
Ownership structure		
MAN	The percentage of equity ownership by directors	Datastream
MAN^2	The square of the percentage of equity ownership by directors	Datastream
CONCENTR.	The sum of the stakes of all-firm's shareholders with equity ownership greater than 3%.	Hemscott
Board structure		
NON-EXEC.	The ratio of the number of non-executive directors to the number of executive directors	Hemscott
BOARD SIZE	The total number of directors on the board	Hemscott
CEO_DUMMY	A dummy variable that takes the value of 1 when the roles of CEO and COB are not separated and 0 otherwise	Hemscott

Compens. Structure		
SALARY	The total salary paid to managers (in logarithm)	Hemscott
REMUNERATION	The sum of total salary, bonuses, options and other benefits paid to managers (in logarithm)	Hemscott
Capital structure		
BANK	The ratio of bank to total debt	Datasteam
Control Variables		
ASSETS	Total assets (in logarithm)	Datasteam
SALES	Total sales (in logarithm)	Datasteam
AGE	Years since the listed date (in logarithm)	London Stock Exchange
MKTBOOK	The ratio of Book value of total assets minus the book value of equity plus the market value of equity to book value of assets	Datasteam

Datastream database provides both accounting data for firms and data for managerial ownership.
Hemscott database provides analytical data for the shareholdings of directors, the structure of the boards, executive compensation and remuneration (www.hemscott.net).
Finally, the *London Stock Exchange* webpage supplies data for firm age, firm share in market capitalization and other firm characteristics (www.londonstockexchange.com)

Table 2
Descriptive Statistics (N=632)

	Mean	Min	25%	Median	75%	Max
ASSET TURNOVER	1.214	0	0.613	1.099	1.582	7.586
Ownership structure						
MAN	15.60	0	0.975	8.35	23.92	80.7
CONCENTR.	40.53	3.74	25.01	39.63	53.45	98.39
Board structure						
NON-EXEC.	0.447	0.111	0.333	0.428	0.571	0.857
BOARD SIZE	5.725	2	4	5.5	7	15
Compens. Structure						
SALARY	13.20	10.34	12.81	13.22	13.67	14.72
REMUNERATION	13.51	10.34	13.08	13.54	14.01	15.64
Capital structure						
BANK	60.07	0	13.63	76.63	98.22	100
Control Variables						
ASSETS (LOG)	11.09	6.02	10.13	11.20	12.20	14.26
AGE (LOG)	2.37	0	1.61	2.64	3.37	4.41
MKTBOOK	1.36	0.210	0.86	1.1	1.47	9.3

ASSET TURNOVER is the ratio of annual sales to total assets. MAN is the percentage of equity ownership by directors. CONCENTR is the sum of the stakes of all-firm's shareholders with equity ownership greater than 3%.. NON-EXEC is the ratio of the number of non-executive directors to the number of executive directors. BOARD SIZE is the total number of directors on the board. SALARY is the total salary paid to managers. REMUNERATION is the sum of total salary, bonuses, options and other benefits paid to managers BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. AGE is the logarithm of years since the listed date. MKTBOOK is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table 3
Mean comparison of agency costs- analyzing high (above median) versus low (below median) ownership, capital structure, board structure and compensation structure characteristics

	2002			Pooled 1998-2001		
Ownership and board characteristic	Asset turnover mean of above variable median	Asset turnover mean of below variable median	Mean comparison t-stat.	Asset turnover mean of above variable median	Asset turnover mean of below variable median	Mean comparison t-stat.
Ownership structure						
MAN	1.23	1.19	-0.44	1.35	1.27	1.18
CONCENTR.	1.28	1.15	-1.56	-	-	-
Board structure						
BOARD SIZE	1.15	1.28	1.53	-	-	-
NON-EXEC.	1.26	1.16	-1.14	-	-	-
Compenst. structure						
REMUNARATION	1.27	1.16	-1.36	-	-	-
SALARY	1.22	1.21	-0.06	-	-	-
Capital structure						
BANK	1.30	1.13	-2.09*	1.30	1.27	0.21
Control Variables						
ASSETS	1.17	1.25	0.99	1.23	1.35	1.14
MKTBOOK	1.34	1.09	-3.20*	1.35	1.23	1.12
AGE	1.26	1.17	-1.20	1.28	1.19	-1.23

In the case when we perform the mean comparison for the pooled sample, all variables (except managerial ownership) are measured as mean of the period 1998-2001. Managerial ownership is measured over the period 2000-2001. ASSET TURNOVER is the ratio of annual sales to total assets. MAN is the percentage of equity ownership by directors. CONCENTR is the sum of the stakes of all-firm's shareholders with equity ownership greater than 3%.. NON-EXEC is the ratio of the number of non-executive directors to the number of executive directors. BOARD SIZE is the total number of directors on the board. SALARY is the total salary paid to managers. REMUNERATION is the sum of total salary, bonuses, options and other benefits paid to managers BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. AGE is the logarithm of years since the listed date. MKTBOOK is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table 4
Pearson Correlation matrix (N=632)

	ASSET TURN	MAN	CONC ENTR	BOARD SIZE	NON-EXEC	REMU NAR.	SALA RY	BANK
Asset Turnover	1.000	0.037	0.076	-0.100	0.077	0.063	0.037	0.109
MAN	0.037	1.000	-0.229	-0.091	-0.061	-0.242	-0.225	-0.103
CONCENT	0.076	0.037	1.000	-0.129	0.079	-0.021	-0.059	0.069
BOARD SIZE	-0.100	-0.091	-0.129	1.000	-0.117	0.478	0.522	0.047
NON-EXEC	0.076	-0.061	0.079	-0.117	1.000	-0.076	-0.083	-0.086
REMUNAR	0.063	-2.42	-0.021	0.478	-0.076	1.000	0.956	0.117
SALARY	0.037	-0.225	-0.059	0.522	-0.083	0.956	1.000	0.109
BANK	0.109	-0.103	0.069	0.047	-0.086	0.117	0.109	1.000
ASSET	-0.100	-0.393	0.014	0.374	0.029	0.722	0.725	0.204
MRTBOOK	0.089	0.082	-0.022	0.048	-0.114	0.007	0.008	-0.126
AGE	0.086	-0.282	0.045	0.087	0.067	0.237	0.234	0.173

	ASSET	MRTBOOK	AGE
Asset turnover	-0.100	0.089	0.086
MAN	-0.393	0.082	-0.252
CONCENT	0.014	-0.022	0.045
BOARD SIZE	0.374	0.048	0.087
NON-EXEC	0.029	-0.114	0.067
REMUNAR	0.722	0.077	0.237
SALARY	0.725	0.008	0.234
BANK	0.204	-0.126	0.173
ASSET	1.000	-0.209	0.386
MRTBOOK	-0.209	1.000	-0.298
AGE	0.386	-0.298	1.000

ASSET TURNOVER is the ratio of annual sales to total assets. MAN is the percentage of equity ownership by directors. CONCENTR is the sum of the stakes of all-firm's shareholders with equity ownership greater than 3%.. NON-EXEC is the ratio of the number of non-executive directors to the number of executive directors. BOARD SIZE is the total number of directors on the board. SALARY is the total salary paid to managers. REMUNERATION is the sum of total salary, bonuses, options and other benefits paid to managers BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. AGE is the logarithm of years since the listed date. MKTBOOK is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table 5
Cross sectional regressions of agency costs on ownership variables and other firm characteristics

Dependent Variable: Ratio of annual sales to total assets (proxy for agency costs)						
Independent variables	Predicted sign	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
Constant		-2.249 (-1.92)*	-1.188 (-1.82)*	-2.07 (-2.00)**	-2.46 (-2.27)**	-3.65 (-2.47)**
Ownership structure						
MAN	-	-0.010 (-1.66)*	-0.010 (-1.60)	-0.021 (-2.05)**	-0.023 (-2.25)**	-0.020 (-1.93)*
MAN^2	+	0.0001 (1.81)*	0.0001 (1.77)*	0.0004 (3.10)***	0.0005 (3.30)***	0.0005 (3.04)***
CONCENTR.	+	0.002 (1.16)	0.001 (0.910)	0005 (1.60)	0.008 (2.15)**	0.008 (2.10)**
Board structure						
BOARD SIZE	-	-0.337 (-2.43)**	-0.312 (-2.33)**	-0.313 (-2.35)**	0.050 (0.217)	-0.059 (-0.236)
NON-EXEC	+/-	0.670 (2.70)***	0.678 (2.74)***	0.597 (2.42)***	0.044 (0.953)	0.492 (1.05)
CEO_DUMMY	-	-0.013 (-0.09)	-0.045 (-0.30)	-0.041 (-0.27)	0.310 (1.25)	0.289 (1.16)
Compens. structure						
REMUNERATION	+		0.387 (4.67)***	0.376 (4.56)***	0.357 (4.33)***	0.453 (3.92)***
SALARY.	+	0.424 (4.20)***				
Capital structure						
BANK	+	0.002 (2.52)**	0.002 (2.56)**	0.005 (1.76)*	0.015 (2.23)**	0.037 (1.92)*
Control Variables						
ASSETS	+/-	-0.205 (-4.79)***	-0.215 (-5.09)***	-0.208 (-4.94)***	-0.201 (-4.79***	-0.199 (-4.72)**
MKTBOOK	+/-	0.104 (2.44)**	0.098 (2.31)**	0.114 (2.70)***	0.123 (2.89)***	0.129 (3.02)***
AGE	+/-	0.113 (2.74)***	0.114 (2.78)***	0.129 (3.13)***	0.124 (3.03)***	0.125 (3.05)***
Interaction terms						
BANK*MAN	+			0.0002 (1.53)	0.0001 (1.70)*	0.002 (1.34)
BANK* MAN^2	-			-0.00086 (-2.59)***	-0.00023 (-2.76)***	-0.000058 (-2.47)***
BANK*CONCENTR.	-			-0.00005 (-1.10)	0.00005 (-1.70)*	-0.00085 (-1.69)*
BANK*BOARD SIZE	-				-0.006 (-1.97)**	-0.004 (-1.23)
BANK*NON-EXEC	-				0.001 (0.273)	0.001 (0.175)
BANK*CEO_DUMMY	+				-0.006 (-1.91)*	-0.006 (-1.88)*

Table 5 continues

BANK*REMUNAR.	-					-0.001 (-1.19)
Industry Dummies						
R^2		0.200	0.207	0.232	0.245	0.247
Number of firms						

This table presents cross-sectional regressions predicting asset turnover. All the variables are measured in 2002. The dependent variable asset turnover, the ratio of total sales to total assets. The independent variables are the following: MAN is the percentage of equity ownership by directors. MAN^2 is the square of the percentage of equity ownership by directors. CONCENTR is the sum of the stakes of all-firm's shareholders with equity ownership greater than 3%. BOARD SIZE is the total number of directors on the board. NON-EXEC is the ratio of the number of non-executive directors to the number of executive directors. SALARY is the total salary paid to managers. REMUNERATION is the sum of total salary, bonuses, options and other benefits paid to managers BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. MKTBOOK is the ratio of Book value of total assets minus the book value of equity plus the market value of equity to book value of assets. All regressions include industry dummies. Standard errors are reported in parentheses. ***, ** and * indicate coefficient is significant at the 1%, 5% and 10% respectively.

Table 6

Cross sectional regressions of agency costs on ownership variables and other firm characteristics

Dependent Variable: Ratio of annual sales to total assets (proxy for agency costs)						
Independent variables	Predicted sign	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
Constant		-0.420 (-0.37)	-0.864 (-0.77)	-1.84 (-1.78)	-0.884 (-0.82)	-1.33 (-0.969)
Ownership structure						
MAN	-	-0.076 (-1.86)*	0.010 (-1.58)	-0.022 (-1.49)	-0.083 (-2.10)**	0.0609 (0.523)
MAN^2	+	0.0002 (2.15)**	-0.0007 (-1.14)	0.0004 (2.04)**	0.0009 (1.55)	-0.0021 (-1.14)
CONCENTR.	+	0.0002 (0.109)	0.0007 (0.321)	0.001 (0.338)	0.001 (0.362)	0.0012 (0.421)
Board structure						
BOARD SIZE	-	-0.422 (-2.52)**	-0.361 (-2.43)**	-0.336 (-2.52)**	-0.499 (-2.79)***	-0.560 (-2.92)***
NON-EXEC	+/-	-0.088 (-0.27)	0.261 (0.930)	0.592 (2.40)**	-0.208 (-0.55)	-0.292 (-0.769)
CEO_DUMMY	-	-0.138 (-0.55)	-0.028 (-0.149)	-0.036 (-0.239)	-0.574 (-1.65)*	-0.598 (-1.72)*
Compens. structure						
REMUNERATION	+	0.307 (3.09)***	0.309 (3.39)***	0.388 (4.72)***	0.361 (4.31)***	0.391 (3.65)***
SALARY.	+					
Capital structure						
BANK	+	0.0038 (2.91)***	0.0038 (3.42)***	0.002 (1.50)	0.001 (1.10)	0.001 (1.04)

Table 6 continues

ASSETS	+/-	-0.196 (-4.61)***	-0.190 (-4.39)***	-0.218 (-5.19)***	-0.203 (-4.70)***	-0.190 (-4.35)***
MKTBOOK	+/-	0.117 (2.76)***	0.116 (2.75)***	0.109 (2.57)***	0.123 (2.91)***	0.128 (3.03)
AGE	+/-	0.117 (2.84)***	0.119 (2.89)***	0.126 (3.06)***	0.126 (3.08)***	0.126 (3.07)***
Interaction terms						
MAN *BANK	+	-0.00008 (-1.56)		0.0002 (1.84)*	0.0002 (1.84)*	0.0002 (1.84)*
MAN^2 * BANK	-		-0.00001 (-2.25)**	-0.00006 (-2.90)***	-0.00006 (-2.50)**	-0.00006 (-2.50)**
MAN*CONCENTR.	+	0.00004 (0.474)		-0.00005 (-0.182)	-0.00005 (-0.18)	-0.00005 (-0.20)
MAN^2 * CONCENTR	-		0.000008 (0.612)	0.00002 (0.649)	0.00002 (0.47)	0.00002 (0.44)
MAN * BOARD SIZE	+/-	0.0045 (0.640)			0.017 (0.89)	0.0345 (1.52)
MAN^2 * BOARD SIZE	+/-		-0.00009 (0.07)		-0.0001 (-0.55)	-0.0005 (-1.36)
MAN * NON-EXEC	**+/-**	0.0462 (3.42)***			0.061 (1.63)	0.079 (2.05)**
MAN^2 * NON-EXEC	**+/-**		0.0005 (2.48)**		-0.0003 (-0.526)	-0.0007 (-1.14)
MAN * CEO_DUMMY	**-**	0.0053 (0.65)			0.049 (1.81)*	0.053 (1.94)*
MAN^2 * CEO_DUMM	**+**		0.00001 (0.12)		-0.0007 (-1.60)	-0.0007 (-1.78)*
MAN * REMUNERAT	**+**	0.0028 (0.88)				-0.0133 (-1.37)
MAN^2 * REMUNERAT	**-**		0.00005 (1.02)			0.0002 (1.77)*
Industry Dummies						
R^2		0.246	0.247	0.235	0.262	0.269
Number of firms						

This table presents cross-sectional regressions predicting asset turnover. All the variables are measured in 2002. The dependent variable asset turnover, the ratio of total sales to total assets. The independent variables are the following: MAN is the percentage of equity ownership by directors. MAN^2 is the square of the percentage of equity ownership by directors. CONCENTR is the sum of the stakes of all-firm's shareholders with equity ownership greater than 3%. BOARD SIZE is the total number of directors on the board. NON-EXEC is the ratio of the number of non-executive directors to the number of executive directors. SALARY is the total salary paid to managers. REMUNERATION is the sum of total salary, bonuses, options and other benefits paid to managers BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. MKTBOOK is the ratio of Book value of total assets minus the book value of equity plus the market value of equity to book value of assets. All regressions include industry dummies. Standard errors are reported in parentheses. ***, ** and * indicate coefficient is significant at the 1%, 5% and 10% respectively.

Table 7
Cross sectional regressions of agency costs on ownership variables and other firm characteristics

Dependent Variable: Ratio of annual sales to total assets (proxy for agency costs)

		Panel A	Panel B	
Independent variables	Predicted sign	Model (11)	Model (12)	Model (13)
Constant		2.11	3.50	2.36
Ownership variables				
MAN	-	-0.036	-0.036	-0.043
		(-1.71)*	(-1.89)*	(-2.23)**
MAN^2	+	0.0006	0.0006*	0.0007
		(1.65)*	(1.82)	(2.11)**
Capital structure				
BANK	+	-0.0005	-0.0002	-0.0006
		(-0.21)	(-0.105)	(-0.281)
Control Variables				
ASSETS	+/-	-0.025	-0.045	-0.037
		(-0.65)	(-1.26)	(-1.03)
MKTBOOK	+/-		-0.18	
			(-2.98)***	
Interaction terms				
BANK*MAN	+	0.0004	0.0004	0.0005
		(1.81)*	(1.86)*	(2.22)**
BANK* MAN^2	-	-0.00007	-0.00007	-0.00009
		(-1.69)*	(-1.71)*	(-1.99)**
Industry Dummies		Yes	Yes	Yes
R^2		9.73	14.8	12.5
Number of firms		352	361	361

This table presents cross-sectional regressions predicting asset turnover. In panel A Asset turnover is calculated for 2002. MAN and MAN^2 as averages for the period 2000-2001. All the other variables as averages for 1997-2001. In panel B asset turnover is calculated for 2002. MAN and MAN^2 as averages for the period 2001-2002. All the other variables as averages for 1998-2001. The dependent variable is the asset turnover, the ratio of total sales to total assets. The independent variables are the following: MAN is the percentage of equity ownership by directors. MAN^2 is the square of the percentage of equity ownership by directors. BANK is the ratio of bank to total debt. ASSETS is the logarithm of total assets. MKTBOOK is the ratio of Book value of total assets minus the book value of equity plus the market value of equity to book value of assets. All regressions include industry dummies. Standard errors are reported in parentheses. ***, ** and * indicate coefficient is significant at the 1%, 5% and 10% respectively.