

# THE NON-LINEAR RELATIONSHIP BETWEEN MANAGERIAL OWNERSHIP AND FIRM PERFORMANCE

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## Abstract

We investigate the relationship between operating performance and ownership structure using a sample of Italian IPO-firms in the period 1995-1999. Overall, we find that their performance declines after the IPO. We find evidence of a non-linear relationship between ownership and performance using different measures of operating performance and managerial ownership. This result supports the hypothesis of a combined effect of ownership on firm performance, with a positive effect at low and high levels of managerial ownership (alignment of interest hypothesis) and a negative effect at intermediate levels (entrenchment hypothesis).

**Keywords:** ownership structure, performance, corporate governance, initial public offerings

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## 1. Introduction

The present study concentrates on the relation between ownership structure and performance. Such connection has been the subject of an important and ongoing debate in the corporate finance literature. The debate goes back to the work of Berle and Means (1932), which suggests that an inverse correlation should be observed between the diffuseness of shareholdings and firm performance. More generally, the nature of the relation between ownership structure and firm's performance, have been the core issue in the corporate governance literature. Several studies have indeed examined the relationship between ownership structure and firm performance. The early analysis of the relation between the performance of firms and ownership was linear in form (see, for example, Downes and Heinkel, 1982); corporate performance was assumed to be an increasing function of managerial ownership in an incentive-alignment or in a signalling framework. On the other hand, and primarily on the base of the entrenchment hypothesis, the later analysis of managerial ownership has considered non-linear forms (see Morck et al., 1988; McConnell and Servaes, 1990). Finally, some researchers believe that there should not be a relation between ownership and corporate performance since ownership structure of a corporation should be thought as an endogenous outcome of decisions that reflect the influence of shareholders and of trading on the market for shares (see Demsetz, 1983).

Nevertheless, the empirical literature is largely inconclusive on the effects of ownership on corporate performance. The empirical studies about the relation between these variables seem indeed to have yielded conflicting results. Such studies, viewed in totality, do not give strong evidence by which to reject or not the hypothesis that firm performance and ownership are unrelated. Furthermore, differences abound across these studies, in measurements and sample used, in estimating technique applied, in whether and how they account for the endogeneity of ownership structure, and in results obtained.

In this paper, we investigate the relationship between ownership structure and operating performance for a sample of 66 companies that went public on the Italian stock exchange in the period 1995-1999. Coherently with previous studies on other markets (such as Jain and Kini, 1994; Kim et al., 2004; Wang, 2005) we document a sharp decline in post issue operating performance of Italian IPOs, as measured by return on assets (ROA), return on equity (ROE) and cash flows from operating activities over total assets (CFROA); this occurs in spite of high growth in total assets and capital expenditures.

Investigating the effect of equity retention of substantial shareholders and board members at the IPO, we find weak evidence of the theoretical prediction of Signalling and Agency Cost Theory. In other words, the IPOs characterised by higher equity retention do not seem to perform substantially better

than firms with lower levels of equity retention. This last finding is similar to that of Mikkelsen et al. (1997) and raises doubts about the existence of a linear relationship between managerial ownership and performance. Therefore, according to the Combined Theory (Morck et al., 1988), we test the hypothesis of a non-linear relationship where alignment and entrenchment coexist at different levels of managerial ownership. Through a multiple regression analysis, we find a non-linear relationship between ownership and performance, with a positive effect at low levels of managerial ownership and a negative effect at high levels.

Moreover, consistent with the earlier findings about the conclusions of the Combined Theory (Short and Keasey, 1999; Kim et al., 2004; Wang, 2005), we find also an evidence of three-level relationship (of alignment, entrenchment, alignment) between firm performance and managerial ownership. Indeed, we find a positive effect of managerial ownership both at low and high levels of ownership and a negative effect at intermediate levels. Finally, we test the hypothesis of endogeneity between ownership structure and firm performance (Demsetz and Villalonga, 2001) and find no clear-cut evidence supporting such hypothesis.

The remainder of this paper is arranged as follows. Section 2 presents the literature review and develops the theoretical hypothesis. Section 3 describes the sample and defines the variables. In Section 4 we describe the operating performance and the ownership structure of the sample at the IPO and the evolution in the post-issue period. Section 5 analyses the relationship between ownership changes at the IPO and post-issue operating performance testing the hypothesis of a non-linear relationship between managerial ownership and performance. Section 6 summarizes and concludes.

## 2. Literature review and research questions

The studies about the relationship between ownership and performance of listed companies around their public offerings are characterised by an empirical approach and focus on the effect of ownership (and ownership changes) on post-issue performance.

Nevertheless, the theoretical bases of this empirical investigation are connected to an important and ongoing debate in the corporate finance literature that goes back to the Berle and Means (1932) thesis. They suggest that an inverse correlation should be observed between the diffuseness of shareholdings and firm performance. Afterwards, Jensen and Meckling (1976) analyze the conflict of interest between managers and owners when the latter cannot costlessly monitor the performance of the managers. Their model implies that when managerial ownership is high, the

monitoring role of the board is decreased. In contrast, if managerial ownership is low, companies can set strong boards to monitor the management (Fama and Jensen, 1983; Jensen, 1993). Accordingly, the reduction in management ownership that occurs at the IPO may increase the agency problems. From a different perspective but with similar predictions, Leland e Pyle (1977) develop a model in which these original shareholders seek financing for projects whose true value is known only to them. By retaining a significant ownership stake in the firm, entrepreneurs can signal projects' quality since false representation can be costly (signalling hypothesis). Both the incentive alignment and the signalling hypothesis lead to the prediction that a larger level of managerial ownership should be related to a better firm performance.

*Hp 1: Corporate performance is an increasing function of managerial ownership*

Contrary to the incentive alignment and to the signalling hypothesis, Fama and Jensen (1983) point to the problem of managerial entrenchment, suggesting that both positive and negative effects arise from managerial ownership in companies (entrenchment hypothesis). Indeed, in a high information asymmetry environment, managers may indulge preferences for non-value-maximizing behaviour.

The entrenchment hypothesis predicts a negative relation between operating performance and managerial ownership. More equity ownership by the manager may decrease financial performance because managers with large ownership stakes may be so powerful that they do not have to consider other stakeholders interest. At certain levels of equity ownership, for instance, managers' consumption of perquisites or an attractive salary may outweigh the loss they suffer from a reduced value of the firm (Fama and Jensen, 1983).

More recent research accounts for both the incentive alignment and the entrenchment hypotheses by considering a non-linear relationship between managerial ownership and firm performance. Morck, Shleifer and Vishny (1988) argue that the performance effect of the incentive alignment argument dominates the performance effect of the entrenchment argument for low levels of managerial ownership.

The alignment hypothesis effects appear to be dominant within the 0 percent to 5 percent range of managerial ownership. The entrenchment effect is dominant within the 5 percent to 25 percent ownership range; and for still higher levels the picture is reversed back once again. These ownership turning points, however, must be arbitrarily pre-specified before their piece-wise regressions are executed. However, the hypothesis in the paper by Morck et al. (1988) is not based on a formal model.

As pointed out by Morck et al. (1988), the theoretical arguments alone cannot predict the relationship between ownership and performance, especially with regard to determining the ownership turning points where managerial incentives will switch from alignment to entrenchment, and back again to alignment.

Morck et al. argument does not predict a 'clean' bell-shaped relation between performance and ownership since performance starts to increase again with a sufficiently high level of ownership concentration. The reason for this prediction is that it fits the empirical findings of their paper. Morck et al.'s interpretation of their findings is that the entrenchment effect will dominate the incentive effect only for medium concentrated levels of management ownership. This is so because for low levels of managerial ownership it might not be reasonable to think that the manager is entrenched at all since his ownership stake is too small to give him any control whatsoever.

Furthermore, for very high levels of managerial ownership it seems reasonable that the manager may be 100% entrenched since he will be 100% in control for all very high levels of ownership. As a result, the entrenchment effect will only have an impact on performance for changes in the medium-concentration levels of ownership.

*H<sub>p</sub> 2. Corporate performance is a non-monotonous function of management ownership*

Finally, a different standpoint is taken from the theories of ownership structure endogeneity. These suggest that any kind of ownership structure is determined by financial performance in the sense that corporations with inefficient ownership structures will fail to survive in the long run. Demsetz (1983), Demsetz and Lehn (1985) and Kole and Lehn (1997) have argued for this kind of ownership structure endogeneity. In particular, Demsetz (1983) argues that the ownership structure of a corporation should be thought as an endogenous outcome of decisions that reflect the influence of shareholders and of trading on the market for shares.

When owners of a privately held company decide to sell shares, and when shareholders of a publicly held corporation agree to a new secondary distribution, they are, in effect, deciding to alter the ownership structure of their firms and, with high probability, to make that structure more diffuse. Subsequent trading of shares will reflect the desire of potential and existing owners to change their ownership stakes in the firm. In case of a corporate takeover, those who would be owners have a direct and dominating influence on the firm's ownership structure. In these ways, a firm's ownership structure reflects decisions made by those who own or who would own shares. The ownership structure that emerges, whether concentrated or diffuse, ought to

be influenced by the profit-maximizing interests of shareholders, so that, as a result, there should be no systematic relation between variations in ownership structure and variations in firm performance.

*H<sub>p</sub> 3: No effects of ownership structure on corporate performance (endogeneity)*

The empirical studies for established firms about the relation between ownership and performance seem to have yielded conflicting results. The early analysis of the relation between the performance of firms and ownership was linear in form (for example, Demsetz and Lehn, 1985), while the later analysis of managerial ownership has considered non-linear forms (Morck et al., 1988; McConnell and Servaes, 1990, 1995; Kole, 1995; Cho, 1998; Short and Keasy, 1999). The non-linear analysis follows from the two possible effects which influence the relation between a firm's performance and managerial ownership: alignment and entrenchment. McConnell and Servaes (1990) propose a quadratic model in which the coefficient on managerial ownership is expected to be positive while the coefficient on managerial ownership squared is expected to be negative. However, they cannot support Morck et al. (1988) entrenchment findings at the intermediate ownership level. Subsequently, Short and Keasey (1999) argue that a cubic model better describes the transition between alignment affects to entrenchment affects and back again to alignment. Here, the coefficients on ownership and ownership-cubed are expected to be positive, while the coefficient on ownership-squared is expected to be negative. Their evidence supports the cubic model of ownership structure to describe firm performance in established firms.

The study of the relationship between ownership and performance is of particular interest even for not established firms, and the typical companies going public. A change in ownership structure is indeed one of the major changes that take place when a firm goes public. In particular, the IPO literature assumes that if a cross-sectional relationship exists between ownership and performance, then a change in ownership should be similarly correlated with a change in performance: if managerial ownership is positively related to firm performance, then increases in managerial ownership should lead to increases in firm performance. Accordingly, Jain and Kini (1994) find a positive linear relationship between ownership and the change in firm performance. The more shares the original owners retain, the better the firm performance. Their evidence supports the alignment hypothesis.

However, Mikkelsen et al. (1997) reject this hypothesis while also using US data. Further, Mikkelsen et al. explicitly consider a non-linear relationship between the change in performance and insider-ownership by including the squared level of ownership stake (quadratic form) as an explanatory

variable for the change in performance, but this variable is also not significant. More recent analysis on the effect of ownership changes on post IPO performance accounts for both the alignment and entrenchment hypothesis and find a non-linear relationship between managerial ownership and performance, according to the Combined Theory (Keloharju and Kulp, 1996; Kim et al., 2004; Wang, 2005; Enqvist, 2005). In this paper, we provide further evidence on this issue by investigating the relation between ownership and performance for a sample of Italian IPOs in the period 1995-1999.

### 3. Sample and variable definition

#### *Sample description*

We study the companies that went public on the Italian stock exchange in the period 1995-1999. During this period, the stock market experienced a significant evolution with the privatization of the Exchange, the reform of listing requirements and the establishment of new markets and segments. Thanks also to the favourable momentum of the stock market indexes, culminated in 1999 and in the first months of 2000, Borsa Italiana experienced a sensible increase in the number of IPOs culminated with the burst of the new economy bubble. The period between 1995 and 1997 has been characterised by many small and medium size industrial firms going public, taking the opportunity of a positive market momentum and tax benefit granted by the "legge Tremonti".

Table 1 documents the IPO activity in Italy during the period under investigation. Like previous studies, we exclude from the sample financial companies, introductions (listings not accompanied by the sale of securities) and re-admissions<sup>1</sup>. The final sample is made of 66 IPO-firms. Most of them are general industrial or cyclical consumer goods companies. Information technology companies show the lowest fraction of secondary shares offered (existing shares sold by pre-IPO owners divided by newly issued shares). This evidence may be interpreted as a possible signal of companies going public with a low capitalization that use the IPO to raise new equity to finance the growth. On the other side, utilities seem to go public mainly to provide a divestment opportunity to existing shareholders, as their offer is made only of secondary shares. [See appendices, Table 1].

#### *Variables of Performance*

The tendency of newly public companies is to underperform in the long run. Beginning with Ritter (1991) and Loughran and Ritter (1995), the focus of

the empirical literature on the long run performance of IPO companies has almost always been on stock prices, with a few exceptions (for a review of the literature on this issue, see Ritter and Welch, 2002). In the US Jain and Kini (1994) and Mikkelsen et al. (1997) first compare the level of companies' profitability prior and after the IPO. They document that the accounting performance of the newly listed companies becomes worse after going public. More recently, this stream of literature has been enriched with similar studies on other markets (see, for instance, Cai and Wei, 1997; Kutsuna, Okamura and Cowling, 2002; Khurshed, Paleari and Vismara, 2003; Kim, Kitsabunnarat and Nofsinger, 2004; Wang, 2005) and this paper provide evidence for the Italian market. The literature proposes several theoretical explanations for the post-issue underperformance.

Among these, the most popular are the theory of "windows of opportunity" by Loughran and Ritter (1995), the window-dressing hypothesis by Teoh et al. (1998), as well as theory related to the change in ownership occurring at the IPO, as presented in the literature review in Section 2.

We measure the operating performance of the IPO firms using several measures.

ROA - Return On Assets - is defined scaling operating income by the book-value of assets. In this way, we measure the firm's efficiency in using assets to generate income to all providers of capital. This ratio is expected to decrease in particular at the year of the IPO, as a consequence of the capital inflow arising from the offer.

ROE - Return On Equity - measures the profitability of the firm from a shareholders' perspective by estimating the after-tax net income divided by book value of equity. ROE is particularly exposed the phenomenon of earnings management at the base of the window-dressing hypothesis.

CFROA - Cash Flow Return On Assets - evaluates the profitability in terms of cash flow on assets: cash flows from operating activities over total assets. This figure is less vulnerable to accounting manipulation and in particular it is subject to lesser artificial earnings inflations in the years prior to the IPO when discretionary accruals adjustments are often used, as shown by Teoh et al. (1998).

#### *Ownership variables*

A change in ownership structure is one of the major changes that take place when a firm goes public. In this paper, we provide evidence on ownership of equity prior going public and immediately after the IPO. Based on information in the offering prospectus, we document ownership of the substantial shareholders as well as of member of the board. Substantial shareholders (variable OWN\_SUBST) are identified as existing shareholders entitled of at least 3 percent of the

<sup>1</sup> Our unique dataset is collected combining data from offering prospectuses and annual reports for the years following the IPO.

firm's equity. Managerial ownership (variable OWN\_BOARD) is measured as the percentage of equity shares owned by directors. This measure includes ownership by directors via corporate vehicles (e.g. where directors' are majority shareholders in other firms which have direct ownership stakes in the particular firm under consideration). This definition of managerial ownership is consistent with that of Morck et al. (1988) who define managerial ownership as ownership by members of the board of directors<sup>2</sup>.

### Control variables

The Industrial Organization literature indicates that market imperfections (such as natural monopoly and collusion) and any kind of market power which prevents entry or pushes exits, are strongly correlated to firm's size and age (Agarwal and Gort, 2002; Audretsch and Lehmann, 2004). With reference to the IPO literature, Mikkelsen et al. (1997) find that size and age of their sample firms are related to operating performance. Whereas small and young companies underperform industry-matched firms in the few years after going public, larger and more established firms perform as well as industry-matched corporations. Hensler et al. (1997) find that the issuer's size and age at the time of the IPO are significantly positively related to the probability of survival. Audretsch and Lehmann (2004) find that only size is positively related to the likelihood of firm survival. Thus, firm size and age seem to be key factors when investigating the post-IPO firms' performance from several standpoints. To this extent, we consider as control variable the value of total assets for the year preceding the IPO as a measure for the firm size (SIZE), while the age (AGE) of a firm is measured in years since incorporation to the IPO.

Other influencing variables refer to the investment and financing policy of the firms going public. At the moment of the issue of new shares, firms decrease their leverage as a consequence of equity capital inflow raised through the issue of new shares. Indeed, *ceteris paribus*, the more the percentage of equity issued at the offering and the higher the proportion of primary over secondary shares is, the more the firms' leverage decreases. We take into account the leverage effect through the variable LEVE, defined as book value of short plus long term debt over total assets. Moreover, one of the reasons to go public is to overcome financial constraints and use the proceedings of the IPO to

improve their capital investments (Kim and Weisbach, 2005). To this extent, firms may view the IPO as a mean for implementing valuable new investments. We take into account this variable measuring the capital expenditures (CAPEX).

## 4. Operating performance and ownership structure at the IPO

### Operating performance

In this section, we investigate the evolution of the operating performance and of the ownership structure around the IPO. We analyse the effect of the IPO on the operating performance and report the median level of performance from the year preceding the IPO (-1) to three years after. As in Jain and Kini (1994), we calculate the change in operating performance during the year before the IPO to the year of the IPO and each of the three years after. Significance levels are tested using the Wilcoxon signed rank test.

The variable LEVE investigates the impact of the IPO on the level of indebtedness. We find a sensible decline in the year of the IPO and then a monotonic increase towards a level closed to the pre-IPO period (

Table 2). This result is similar to those of Mikkelsen et al. (1997) that find that the debt ratio of US IPOs falls considerably from year -1 to year +1 (64% to 40%), but then rises afterwards. The evolution of the size of terms is measured in terms of total assets (SIZE). The median levels of total assets are each year higher and the growth rates relative to year -1 are highly positive. Also the capital expenditures (CAPEX) show a sensible increase after the IPO, from a median level of 4.68 €m in the year before the IPO, to a maximum level of 16.5 €m in the second year after the IPO and then decline to 9.3 €m in the third year after the IPO. These evidences (decrease in debt ratio, increase in total assets and capital expenditures) may point to a motivation in the decision to go public related to overcome financial constraints and use the proceedings of the IPO to improve capital investments.

The operating performance is measured using three features: ROA, ROE and CFROA. ROA show a significant decrease after the IPO. The median ROA declines indeed from 15.6% in the year preceding the IPO to 10.6% three years after. The median changes in ROA relative to the year preceding the IPO are all statistically negative. Operating performance measured by operating cash flows divided by total assets (CFROA) also shows a decline in post IPO period. The firms are less profitable also from a shareholders' perspective: ROE declines from a level of 13.0% in the year -1, to 6.0% in the year +3.

<sup>2</sup> In contrast to the case of external shareholders, members of the board of directors must disclose the total holdings of their shares, regardless of the size of their shareholdings. Hence in the case of directors' shareholdings, there is no cut-off ownership level at which ownership is reported.

In summary, coherently with the previous studies on other market, we find evidence that IPO firms in Italy exhibit inferior post-IPO operating performance relative to the year prior going public. This occurs in spite of high growth in total assets and capital expenditures. Investment activity may be one of the causes of the decline in operating performance, but this variable does not fully explain the post-IPO operating performance. [See appendices, Table 2].

### Ownership structure

In our sample, companies are generally closely held by the controlling shareholders both before and after the IPO (the median value of OWN\_SUBST is still over 50% after the IPO). As reported in Table 3, substantial shareholders own 96.27% of equity capital before the IPO (86% on average) and 58% after the IPO (56% on average). The median change of the stakes of substantial shareholders at the IPO is 32%. Managerial ownership, measured as the percentage of equity shares owned by directors (OWN\_BOARD), shifts from 58% before the IPO (49% on average) to 41% after the IPO (35% on average), with a median change of 25%. [See appendices, Table 3].

### 5. Relationship between ownership and performance

In this section, we investigate the relationship between ownership structure and operating performance. The first type of analysis focuses on the relationship between ownership structure changes and post IPO changes in operating performance. We test the existence of a linear relationship between ownership variables and operating performance (Hypothesis 1). Then, according to the Combined Theory, we test Hypothesis 2, investigating the presence of a non-linear relationship between ownership structure (OWN\_SUBST and OWN\_BOARD) and operating performance (ROA, ROE, CFROA).

Both the Agency Cost Theory hypothesis (Jensen and Meckling, 1976) and the Signalling hypothesis (Leland and Pyle, 1977) suggest a superior level of operating performance for firms with higher ownership retained by substantial shareholders. To test this hypothesis, as to Jain and Kini (1994), we split our sample into two groups based on the median value of the change in ownership at the IPO by substantial shareholders (OWN\_SUBST: 32.19% as reported in Table 3) and by the board (OWN\_BOARD: 24.52%). The change in operating performance for the post-IPO period for the two groups is reported in Table 4 where are reported, for the two sub-samples, the changes in operating performance between the year preceding the IPO and years after the IPO. In Panel A the

sample is divided using the value of OWN\_SUBST median change at the IPO, while in Panel B the ownership variable used to split the sample is OWN\_BOARD median change.

Panel A shows a statistically significant difference between operating performance changes, only for CFROA from -1 to +2. In particular, the CFROA change for IPO with higher equity retention (OWN\_SUBST change at the IPO <32.19%) by substantial shareholders is -36%, in comparison to -84% for the low-retention sub-sample. Panel B shows a statistically significant difference between ROA changes (with the exception of the change to year +1). Similar results are obtained using ROE. In particular, the high retention group does not show a ROE decline from -1 to 0 in comparison to a decline of -14% for that year of the low retention group. We do not find instead any significant difference between the two sub-sample using CFROA and Capex/Total Assets (in Panel B). In summary, this analysis find weak evidence of the theoretical predictions of Signalling and Agency Cost Theory, but the results obtained are not as clear as those reported by Jain and Kini (1994). We investigate if the relationship between operating performance and changes in ownership structure is not linear. [See appendices, Table 4].

We use a regression model to take into account both the alignment and entrenchment hypothesis, in a way similar to Short and Keasey (1999). We test various forms of functional relationship between managerial ownership and operating performance. Specifically, we first consider a linear relationship (Hypothesis 1) between ownership structure (alternatively OWN\_SUBST or OWN\_BOARD) and operating performance after IPO (year +1, +2, +3). Then, we test two non-linear relationships (Hypothesis 2) using a quadratic (cubic) form, where the variable of ownership structure considered is squared (cubed). These models allow for three levels of ownership variable to have an effect on firm performance:

$$PERF = \alpha + \beta_1 OWN + \gamma_1 LEVE + \gamma_2 SIZE + \gamma_3 CAPEX + \gamma_4 AGE + \varepsilon \quad (1)$$

$$PERF = \alpha + \beta_1 OWN + \beta_2 OWN^2 + \gamma_1 LEVE + \gamma_2 SIZE + \gamma_3 CAPEX + \gamma_4 AGE + \varepsilon \quad (2)$$

$$PERF = \alpha + \beta_1 OWN + \beta_2 OWN^2 + \beta_3 OWN^3 + \gamma_1 LEVE + \gamma_2 SIZE + \gamma_3 CAPEX + \gamma_4 AGE + \varepsilon \quad (3)$$

Where, PERF can be equal to ROA, ROE and CFROA, while OWN represents the ownership stake (in percent) and refer to ownership by substantial shareholders or by the board of directors. OWN<sup>2</sup> and OWN<sup>3</sup> represent the quadratic and cubic forms, respectively. We control for firm debt ratio (LEVE), firm Size (SIZE), capital expenditures (CAPEX) and firm age (AGE).

We control for firm debt ratio, defined as book value of short plus long term debt over total assets, as suggested by Rajan (1992) and Pagano et al. (1998). We use firm age (calculated as the difference between the establishment year and the IPO year) and firm assets (calculated as total assets) as

Mikkelsen et al. (1997) suggest firm age and firm size can explain post-IPO operating performance. Indeed, they find that older and larger firms tend to have better performance. We also include capital expenditures, as previous research (such as Mork et al., 1988, McConnell and Servaes, 1990 and Kim et al., 2004) to test the role played by investments on firm performance.

The results of the regressions using OWN\_SUBST as ownership structure variable are reported in Table 5<sup>3</sup>. In Panel A the dependent variable is ROA, in Panel B the dependent variable is ROE and in Panel C the dependent variable is CFROA. In Model 1, where we consider a linear relationship between ownership and performance according to Hypothesis 1, we find that OWN is not significant using the different measures of operating performance. Instead, firms with a lower debt ratio experiment higher operating performances. This finding is consistent with the argument of Rajan (1992) and Pagano et al. (1998): the negative relationship between LEVE and post-IPO operating performance demonstrates that firms using less debt will experience a better transition, with regard to performance, as the firm goes public. One explanation for this finding may be that firms that move away from bank financing are becoming less conservative (Anderson and Makhija, 1999). Consistent with Kim et al. (2004) and Mikkelsen et al. (1997) we do not find evidence that older firms tend to have better performance relative to younger firms, and firm size also does not seem to play an important role either. These conclusions about control variables are confirmed in Model 2 and Model 3.

In Model 2, we include the quadratic form  $OWN^2$  to test a non-linear relationship between ownership and performance (Hypothesis 2). We find that the coefficient of OWN and  $OWN^2$  are statistically significant and of the expected signs for the different variables of performance. In particular the effect of OWN on performance is positive (alignment of interest hypothesis) for low levels of OWN and then the effect becomes negative (entrenchment hypothesis). The turning points obtained using ROA, ROE and CFROA are 56%, 60.6% and 56.6% respectively.

Entrenchment can occur at high levels of insider ownership, but at very high ownership levels, the agency costs may be lower because management is essentially the owner and external shareholders hold only a marginal stake of equity. We therefore test for three levels of OWN with a positive effect for low and high levels of ownership and a negative effect for intermediate levels of ownership (Model 3). The results confirm the theoretical prediction of a non-

linear relationship (of alignment, entrenchment, alignment) between firm performance and managerial ownership (Hypothesis 2). [See appendices, Table 5].

The estimated coefficients on all the ownership variables are statistically significant using CFROA as dependent variable. The results suggest that the turning point from alignment to entrenchment for substantial shareholders equity stake is 48%, while the turning point back to alignment is 74%. In our sample a fraction of 31% is in the low ownership category ( $OWN < 48%$ ) and a fraction of 24% is in the high ownership category ( $OWN > 74%$ ). Model 3 introduces additional information relative to Model 2 about firms with a very high ownership concentration, where agency costs seem to be lower (Yang and Sheu, 2006).

The three regression models are tested also using OWN\_BOARD as ownership structure variable. The results, reported in Table 6, are consistent with the conclusions obtained using OWN\_SUBST. In Model 1, we find that OWN is not significant using the different measures of operating performance. Instead firms with a lower debt ratio experiment higher operating performances. We also find weak evidence that firms with a higher level of CAPEX tend to have lower operating performance (CFROA) while firm size seems to be positively correlated to CFROA (Panel C).

In Model 2, we include the quadratic form  $OWN^2$  to test a non-linear relationship between ownership and performance and we find that the coefficient of OWN and  $OWN^2$  are statistically significant and of the expected signs for the different variables of performance. In detail, the effect of OWN on performance is positive (alignment of interest hypothesis) for low levels of OWN and then the effect becomes negative (entrenchment hypothesis). The turning points obtained using ROA, ROE and CFROA are 35.2%, 33.3% and 32.8% respectively. McConnell and Servaes (1995) using the same measure of managerial ownership found similar results. In Model 3 we test the possibility of a reduction of agency costs at very high levels of managerial ownership, when there is a near-perfect alignment between the manager and owner. Estimated coefficients on all the ownership variables are statistically significant using CFROA as dependent variable (Panel C of Table 6). The results suggest that the turning point from alignment to entrenchment for managerial ownership is 24%, while the turning point back to alignment is 71%. In our sample a fraction of 39% is in the low managerial ownership category and a fraction of 15% is in the high managerial ownership category.

In summary, according to hypothesis 2, we find evidence of a non-linear relationship between ownership and performance, with evidence of a positive effect at low levels of managerial ownership and a negative effect at high levels according to

<sup>3</sup> Performance levels refer to the first year after the IPO. The regressions are tested also for year +2 and +3, but the results are qualitatively similar to the reported results.

McConnell and Servaes (1990-1995). Using CFROA as dependent variable we find evidence of a positive effect of managerial ownership at low and high levels of ownership and a negative effect at intermediate levels, consistent with the earlier general findings about the conclusions of the Combined Theory (Short and Keasey, 1999; Kim et al., 2004; Wang, 2005). [See appendices, Table 6].

As argued by Demsetz (1983) and shown by Demsetz and Lehn (1985) and more recently by Demsetz and Villalonga (2001), ownership structure may be endogenous. To test this hypothesis (Hypothesis 3), we regress ownership variables (alternatively OWN\_SUBST or OWN\_BOARD) on operating performance (ROA) and on a series of control variables (LEVE, AGE, SIZE and CAPEX). We do not find evidence supporting the hypothesis of an endogenous ownership structure: neither the coefficient of ROA nor the coefficients of control variables are statistically significant<sup>4</sup>. Therefore, firm performance does not seem to significantly affect the ownership structure of the companies considered in this study.

## 6. Conclusions

Our study investigates the relationship between ownership structure and operating performance for a sample of 66 Italian IPOs. In particular, we test three hypotheses. According to the theoretical predictions of the Agency Cost Theory and the Signalling hypothesis, we test if corporate performance is an increasing function of managerial ownership (Hp 1: linear relationship). Then, according to the conclusions of the Combined Theory, we test the hypothesis of a non-monotonous function linking managerial ownership to operating performance (Hp 2: non-linear relationship). Finally, we verify if the relationship between ownership structure and firm performance is endogenous. In other words, the market responds to forces that create suitable ownership structures for firms, and this removes any predictable relation between empirically observed ownership structure and firm rates of return (Hp 3: endogeneity, no relationship).

We consider two measures of managerial ownership, the fraction of shares owned by the substantial shareholders and the fraction of shares owned by board members. We also consider different measures of operating performance. Overall, we document a sharp decline in post issue operating performance. The theoretical prediction of the Signalling and Agency Cost Theories are weakly supported: the IPOs characterised by higher equity retention do not seem to perform substantially better than firms with lower levels of equity retention. The endogeneity hypothesis (Hypothesis 3) is also not

clearly supported by our findings. Instead, we find evidence of a non-linear relationship between managerial ownership and performance, consistent with our Hypothesis 2. Managerial ownership seems therefore to have a positive effect on corporate performance at low levels and a negative effect at high levels. The story could anyway be more complicated and the entrenchment hypothesis can be mitigated by the incentive alignment for very high levels of managerial ownership. We find indeed evidence of a positive effect of managerial ownership at both low and high levels of ownership and a negative effect at intermediate levels. This is consistent with the general predictions from the Combined Theory (Short and Keasey, 1999; Kim et al., 2004; Wang, 2005) of a three-level relationship between ownership and firm performance. For low levels of managerial ownership, the effect of the incentive alignment hypothesis is prevailing, while entrenchment hypothesis is dominant at intermediate levels. The evidence is instead mixed at very high levels of managerial ownership, where the entrenchment and alignment effects seem to coexist.

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<sup>4</sup> For purposes of brevity, we do not report these results, but they are available upon request from the authors.



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## Appendices

**Table 1.** Descriptive statistics of the IPO sample: 1995-1999. Panel A: IPOs by year and issue type. Panel B: offering characteristic by business sector. Secondary shares (%) is the ratio of secondary shares as a proportion of the total number of shares sold in the offering; Equity issued (%) is the percentage of equity issued at the offering (number of shares offered over number of shares after the IPO).

Panel A: Sample								
Year	Admissions to the Italian Stock Exchange		Initial Public Offerings		Sample: IPOs by operating companies			
1995	14		11		9			
1996	14		12		10			
1997	14		10		10			
1998	25		15		14			
1999	37		27		23			
Total	104		75		66			
Panel B: IPOs characteristics by business sector								
FTSE Industrial sector	No obs.		Market Cap (€m)		Capital Raised (€m)		Secondary shares (%)	Equity issued (%)
Resources	2	3.0%	22,185	24.1%	2,838	11.8%	53.7	19.1
Basic Industries	5	7.6%	963	1.0%	281	1.2%	26.2	29.3
General Industrials	17	25.8%	2,148	2.3%	782	3.2%	38.1	40.1
Cyclical Consumer Goods	15	22.7%	2,492	2.7%	892	3.7%	50.9	37.3
Non-Cyc. Consumer Goods	7	10.6%	1,013	1.1%	397	1.6%	41.1	39.0
Cyclical Services	10	15.2%	6,381	6.9%	1,287	5.3%	43.1	35.4
Utilities	5	7.6%	55,888	60.6%	17,280	71.7%	100.0	37.9
Information Technologies	5	7.6%	1,168	1.3%	340	1.4%	17.0	38.2
New Market	6	9.1%	950	1.0%	266	1.1%	17.7	41.3
Total	66		9,2237		24,097		44.7	36.9

**Table 2.** Median levels of operating performance and median change between the operating performance during the year before the IPO ( $t = -1$ ) to the IPO year ( $t = 0$ ), and each of the 3 years after the IPO ( $t = +1, +2, +3$ ).

Year relative to the IPO	-1	0	1	2	3
No. obs.	65	66	66	66	66
LEVE (%)					
Median	64.5	47.3 ***	49.6	57.2 ***	60.4 *
Median change relative to year -1 (%)		-20.6 ***	-18.2 ***	-11.6 **	-7.9 *
SIZE (€m)					
Median	79.44	133.7 ***	1601.0 ***	188.6 ***	209.5 ***
Median change relative to year -1 (%)		35.7 ***	47.1 ***	65.4 ***	90.6 ***
CAPEX (€m)					
Median	4.68	10.5 ***	11.8 ***	16.5 ***	9.3 ***
Median change relative to year -1 (%)		68.5 ***	96.9 ***	80.2 ***	85.5 ***
ROA (%)					
Median	15.6	13.7	13.3 **	10.7 ***	10.6 ***
% positive obs.	95.4	93.9	90.9	93.9	92.4
Median change relative to year -1 (%)		-10.1 **	-17.7 **	-26.6 ***	-26.5 ***
ROE (%)					
Median	13.0	8.9 ***	7.9 **	8.1	6.0 **
% positive obs.	92.3	92.4	81.8	83.3	74.2
Median change relative to year -1 (%)		-30.1 ***	-42.1 ***	-52.0 ***	-55.0 ***
CFROA (%)					
Median	3.98	2.29	2.76**	3.59*	3.12
Median change relative to year -1 (%)		-40.38***	-50.83**	-44.1**	-49.02**

Significance levels are tested using the Wilcoxon signed rank test.

\* Statistically significant at the 10% level;

\*\* statistically significant at the 5% level;

\*\*\* statistically significant at the 1% level.

**Table 3.** Median and average levels of substantial shareholders stake and managerial ownership stake. In the last column is reported the median change at the IPO.

	Pre IPO	Post IPO	Change
<i>Panel A: Substantial shareholders (OWN_SUBST)</i>			
Median (%)	96.27	57.97	32.19
Average (%)	86.40	56.42	35.49
<i>Panel B: Managerial ownership (OWN_BOARD)</i>			
Median (%)	57.57	40.55	24.52
Average (%)	49.05	34.64	23.42

**Table 4.** Median changes of operating performance between the year preceding the IPO and the years +1, +2 and +3 after the IPO. The sample is divided into two groups based on the median value of ownership change of substantial shareholders (Panel A) and board members (Panel B).

	From -1 to 0			From -1 to +1			From -1 to +2			From -1 to +3		
<i>Panel A: Substantial shareholders (OWN_SUBST)</i>												
	<	>	W.	<	>	W.	<	>	W.	<	>	W.
ROA	-19.0	-3.6	—	-21.2	-16.4	—	-28.0	-26.1	—	-35.0	-17.3	—
ROE	-12.9	-2.0	—	-11.6	-4.1	—	-8.2	-3.2	—	-9.1	-6.5	—
CFROA	-24.2	-59.7	—	-48.4	-57.5	—	-36.1	-84.0	**	-57.3	-54.2	—
CAPEX / Total Assets	18.2	34.9	—	25.1	25.5	—	6.9	28.0	—	-6.4	-16.2	—
<i>Panel B: Managerial ownership (OWN_BOARD)</i>												
	<	>	W.	<	>	W.	<	>	W.	<	>	W.
ROA	-1.0	-20.0	**	-14.6	-22.6	—	-24.0	-30.7	**	-8.2	-35.0	**
ROE	0.0	-13.8	***	-2.2	-6.8	—	-1.7	-6.5	—	0.4	-11.9	**
CFROA	-42.5	-24.2	—	-41.1	-52.9	—	-53.1	-55.4	—	-49.0	-62.4	—
CAPEX / Total Assets	18.3	35.5	—	25.1	28.7	—	12.8	28.0	—	-6.1	-15.5	—

Significance levels are tested using the Wilcoxon signed rank test.

\* Statistically significant at the 10% level;

\*\* statistically significant at the 5% level;

\*\*\* statistically significant at the 1% level.

**Table 5.** Ordinary-least-squares regression coefficient estimates. The dependent variable is operating performance (alternatively ROA, ROE or CFROA) in year +1 where year 0 is the year of the IPO. OWN represents the equity stake (in percent) of substantial shareholders after the IPO. OWN<sup>2</sup> and OWN<sup>3</sup> represent the quadratic and cubic form respectively. LEVE is firm debt ratio, defined as book value of short plus long term debt over total assets. SIZE is firm Total Asset. CAPEX is defined as firm capital expenditures. AGE is the difference between the establishment year and the IPO year. Significance levels are reported in parenthesis. \* Statistically significant at the 10% level; \*\* statistically significant at the 5% level; \*\*\* statistically significant at the 1% level.

<i>Substantial shareholders (OWN_SUBST)</i>			
	Model 1	Model 2	Model 3
PERF = ROA			
Const	0.18 (0.013)**	-0.29 (0.093)*	-0.85 (0.211)
OWN	0.13 (0.14)	2.04 (0.002)***	5.50 (0.186)
OWN <sup>2</sup>	–	-1.82 (0.004)***	-8.59 (0.285)
OWN <sup>3</sup>	–	–	4.22 (0.398)
LEVE	-0.27 (0.002)***	-0.25 (0.002)***	-0.25 (0.002)***
SIZE	0.01 (0.364)	0.03 (0.910)	0.05 (0.867)
CAPEX	0.01 (0.514)	0.04 (0.786)	0.02 (0.892)
AGE	0.09 (0.774)	0.08 (0.787)	0.01 (0.951)
Obs	59	59	59
Adj R <sup>2</sup> (%)	18.43	29.86	29.47
F	3.49 (0.009)***	4.90(0.001)***	4.28(0.001)***
PERF = ROE			
Const	0.11 (0.371)	-0.34 (0.263)	-0.86 (0.362)
OWN	0.22 (0.157)	1.94 (0.073)*	5.03 (0.352)
OWN <sup>2</sup>	–	-1.60 (0.10)*	-7.36 (0.458)
OWN <sup>3</sup>	–	–	3.42 (0.559)
LEVE	-0.32 (0.035)**	-0.30 (0.040)**	-0.31 (0.040)**
SIZE	-0.00 (0.719)	-0.00 (0.806)	-0.00 (0.725)
CAPEX	0.00 (0.721)	0.00 (0.765)	0.00 (0.698)
AGE	-0.00 (0.242)	-0.00 (0.340)	-0.00 (0.329)
Obs	54	54	54
Adj R <sup>2</sup> (%)	6.80	10.01	8.74
F	1.77 (0.136)	2.21 (0.070)*	1.73 (0.127)
PERF = CFROA			
Const	0.09 (0.323)	0.28 (0.187)	-1.43 (0.032)**
OWN	0.10 (0.391)	1.54 (0.043)**	8.41 (0.029)**
OWN <sup>2</sup>	–	-1.36 (0.050)**	-14.25 (0.045)**
OWN <sup>3</sup>	–	–	7.70 (0.061)*
LEVE	-0.21 (0.061)*	-0.19 (0.083)*	-0.19 (0.073)*
SIZE	0.00 (0.930)	-0.00 (0.881)	-0.00 (0.729)
CAPEX	-0.00 (0.950)	0.00 (0.796)	0.00 (0.702)
AGE	0.00 (0.885)	0.00 (0.713)	0.00 (0.821)
Obs	58	58	58
Adj R <sup>2</sup> (%)	3.81	8.65	22.24
F	1.23 (0.307)	2.08 (0.084)*	4.05 (0.002)***

**Table 6.** Ordinary-least-squares regression coefficient estimates. The dependent variable is operating performance (alternatively ROA, ROE or CFROA) in year +1 where year 0 is the year of the IPO. OWN represents the equity stake (in percent) of board members after the IPO. OWN<sup>2</sup> and OWN<sup>3</sup> represent the quadratic and cubic form respectively. LEVE is firm debt ratio, defined as book value of short plus long term debt over total assets. SIZE is firm Total Asset. CAPEX is defined as firm capital expenditures. AGE is the difference between the establishment year and the IPO year. Significance levels are reported in parenthesis. \* Statistically significant at the 10% level; \*\* statistically significant at the 5% level; \*\*\* statistically significant at the 1% level.

<i>Managerial ownership (OWN_BOARD)</i>			
	Model 1	Model 2	Model 3
PERF = ROA			
Const	0.18 (0.001)***	0.17 (0.002)***	0.16 (0.003)***
OWN	0.025 (0.589)	0.43 (0.034)**	0.55 (0.289)
OWN <sup>2</sup>	–	-0.61(0.040)**	-1.03 (0.554)
OWN <sup>3</sup>	–	–	0.38 (0.805)
LEVE	-0.18 (0.019)**	-0.22(0.006)***	-0.22(0.006)***
SIZE	0.00 (0.354)	0.00 (0.260)	0.00 (0.253)
CAPEX	-0.00 (0.702)	-0.00 (0.823)	-0.00 (0.809)
AGE	0.00 (0.829)	0.00 (0.658)	0.00 (0.645)
Obs	57	57	57
Adj R <sup>2</sup> (%)	6.63	12.57	10.09
F	1.80 (0.130)	2.34 (0.045)**	1.98 (0.077)*
PERF = ROE			
Const	0.25 (0.000)***	0.24(0.000)***	0.24 (0.000)***
OWN	0.02 (0.695)	0.42( 0.057)*	0.11 (0.840)
OWN <sup>2</sup>	–	-0.63 (0.062)*	-0.51 (0.786)
OWN <sup>3</sup>	–	–	-1.01 (0.551)
LEVE	-0.29 (0.001)***	-0.32 (0.001)***	-0.32 (0.001)***
SIZE	0.00 (0.593)	0.00 (0.802)	0.00 (0.821)
CAPEX	-0.00 (0.668)	0.00 (0.917)	-0.00 (0.927)
AGE	0.00 (0.517)	0.00 (0.355)	0.00 (0.405)
Obs	60	60	60
Adj R <sup>2</sup> (%)	16.08	19.94	18.97
F	3.26 (0.012)**	3.45 (0.006)***	2.97 (0.011)**
PERF = CFROA			
Const	0.78 (0.000)***	0.69 (0.001)***	0.64(0.002)***
OWN	-0.03 (0.865)	1.69 (0.013)**	4.08 (0.017)**
OWN <sup>2</sup>	–	-2.57 (0.009)***	-11.28 (0.050)**
OWN <sup>3</sup>	–	–	7.93 (0.067)*
LEVE	0.31 (0.298)	0.26 (0.361)	0.22 (0.444)
SIZE	0.00 (0.029)**	0.00 (0.077)*	0.00 (0.054)*
CAPEX	-0.00 (0.018)**	-0.00 (0.059)*	-0.00 (0.042)**
AGE	-0.00 (0.540)	-0.00 (0.862)	0.00 (0.981)
Obs	60	60	60
Adj R <sup>2</sup> (%)	10.58	21.31	23.24
F	2.40 (0.049)**	3.44 (0.006)***	4.02 (0.005)***