The ownership-performance relationship semi-parametrically revisited*

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Abstract

There is no consensus in the corporate finance literature on the exact nature of the relationship between managerial ownership and performance. There are mainly two reasons for this. First, there is very little or no justification as to why there should be a resurgence of the alignment and entrenchment effects of managerial ownership at intermediate and high levels of managerial ownership. Second, fully parametric methods, which are extensively used in studies on the ownership-performance relationship, may erroneously point to complex non-linear effects of managerial ownership on corporate performance. What possibly happens is that high-order polynomials, which are widely used to detect the non-linear impact of ownership, simply captures local stationary points in the ownership-performance curve. The analysis of this paper adopts a semi-parametric approach to sidestep concerns associated with the potential misspecification of parametric models. It also enables us to consider a wider array of non-linear behavior. Our investigation provides strong evidence only on the initial alignment effect of managerial ownership (i.e. for levels lower than 15%). Although supporting the existence of a non-linear relationship, the results, contrary to recent studies, do not indicate a specific functional form for the ownership-performance curve throughout the whole range of managerial ownership.

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1 Introduction

The effect of managerial ownership on corporate performance has been subject of an extensive investigation in the corporate finance literature, both theoretically and empirically. The theoretical discussions on the subject focus on the problems associated with the separation between ownership and control (Berle and Means, 1932) and the misaligned incentives between managers and shareholders, which results in a loss in firm value (Jensen and Meckling, 1976). In a significant strand of the literature managerial ownership emerges as a potential solution to the managerial agency problem. Jensen and Meckling argue that the ideal level of managerial ownership is 100 percent, pointing to a linear relationship between managerial holdings and performance. However, it is argued that the effect of managerial ownership on performance can be non-linear (see, e.g., Morck et al., 1988 among others). In particular, managerial ownership can help align the interests of managers with those of shareholders by constraining the consumption of perks and the engagement in sub-optimal investment policies (incentive-alignment effect). However, managerial ownership is not always a safe bet for resolving agency issues. Several studies demonstrate that at higher levels of managerial ownership managers exert insufficient effort, collect private benefits and entrench themselves, leading to a negative relationship between managerial ownership and performance (entrenchment effect).

Despite many valuable insights provided in earlier theoretical studies there is no consensus in the empirical literature on the exact nature of the relationship between managerial ownership and corporate performance. McConnell and Servaes (1990) provide evidence that supports both the alignment and entrenchment effects of managerial ownership, leading to an inverse U-shaped relationship between managerial ownership and performance. In a similar spirit, Morck et al. (1988) and Short and Keasey (1998) observe an alignment behavior at low levels of managerial ownership, an entrenchment behavior at intermediate levels of managerial owner-

ship as well as the resurgence of an alignment behavior at high levels of managerial ownership. Several other studies employ even more complicated functional forms to describe the relationship between managerial ownership and corporate performance. For example, Hermalin and Weisbach (1991) find an inverse W-shaped relationship, Cui and Mak (2002) report a W-shaped relationship whereas Davies et al. (2005) use a quintic structure that leads to a two-hump managerial ownership-performance curve.

In this paper, we argue that there are mainly two reasons for the lack of consensus in the existing literature on the nature of the relationship between ownership and performance. First, there is clearly very little or no support in the theoretical literature for the view that there should be resurgence of the alignment and entrenchment effects of managerial ownership at intermediate and high levels of managerial ownership. Second, the empirical models in the literature mostly use tightly parameterized techniques (e.g. regressions with higher order polynomials or piecewise regressions), which explicitly assume a fixed number and/or location of turning points. We argue that these approaches are inadequate to fully capture the true non-linear nature of the effect of managerial ownership on firm performance. What possibly happens is that high-order polynomials simply captures local stationary points in the ownership-performance curve, erroneously pointing to complex non-linear effects of managerial ownership. Moreover, as discussed above, the number and location of turning points in the ownership-performance curve is far from fixed given the lack of strong theoretical justification.[1]

The main motivation of this paper stems from the inconsistent findings among earlier studies and the drawbacks in the methodologies employed by them. In an attempt to provide more insights into the nature of the ownership-performance re-

[1]Some alternative explanations for the conflicting findings of performance studies concern with the "endogeneity arguement" (Demsetz and Lehn, 1985 and the "adjustment costs arguement" (Cheung and Wei, 2006) and the use of different dependent variables as proxies for corporate performance (Palia and Lichtenberg, 1999).

lationship, this paper therefore suggests the implementation of a non-parametric approach, which helps overcome the methodological inadequacies which we mentioned above. The main advantage of the non-parametric approach is that it imposes no pre-specified parametric form on the relationship and, therefore, enables the extraction of the maximum possible information from the data. As a result, it captures more efficiently the true nature of the managerial ownership-performance relationship. It has been suggested (see, for example, Engle et al., 1986) that the case for a non-parametric specification is even stronger when the relationship under examination is highly non-linear.[2] Given the complex non-linear structures recently suggested in the literature, the ownership-performance curve constitutes an ideal framework to employ this methodology. Furthermore, a non-parametric approach is not as sensitive as ordinary least squares to the presence of outliers, enhancing more robust conclusions for the whole range of managerial ownership levels. In particular, the present study puts forward a semi-parametric estimation, which combines the features of the non-parametric and the parametric approaches. This flexible specification inherits the advantages of the non-parametric techniques, allowing us also to impose a parametric form on specific explanatory variables.

The empirical investigation is conducted using a large sample of UK listed firms over the period 2000-2004. Large shareholdings by financial institutions, which usually have a limited role in corporate governance, infrequent use of takeover defences, lack of legal restrictions on stock ownership and weak monitoring function provided by corporate board of directors are generally thought to be the main characteristics of the UK governance system.[3]All these features point to a significant degree of managerial discretion and, therefore, large managerial agency costs. To this end, the relationship between managerial ownership and performance for UK firms, if

[2]See also Bertinelli and Strobl, 2005 and Barrios et al., 2005 for the application of semi-parametric methods in different contexts.

[3]For an analytical discussion on the UK governance system see Short and Keasey (1998), Franks et al. (2001) and Ozkan and Ozkan (2004).

any, is expected to be highly non-linear and, as a result, semi-parametric techniques are expected to be more efficient than fully parametric techniques in capturing that relationship.

Our findings are in line with our predictions, casting doubt on the standard approaches to investigate the ownership-performance link. The results support the existence of a non-monotonic relationship between managerial ownership and corporate performance. It is, however, shown that only the initial alignment effect of managerial ownership is strongly supported by the data. Moreover, the alignment effect is observed only for levels lower than 15 percent. The evidence is far from conclusive for managerial ownership levels greater than 15 percent. The latter finding contrasts with previous findings in the literature, which, as mentioned above, indicate a specific complex relationship between managerial ownership and performance at intermediate and high levels of managerial ownership (for evidence from UK firms see Short and Keasey, 1998 and Davies et al., 2005).

For ease of comparison, we also utilize a standard parametric approach using the same sample. The results of the fully parametric models strongly support the initial alignment and entrenchment effects of managerial ownership, providing, though, mixed evidence regarding the subsequent turning points in the ownership-performance curve. Most importantly, the results are very sensitive to the order of the specified polynomial for the managerial ownership level. This confirms our concerns about the appropriateness of fully parametric methods in detecting the non-linearity on the ownership-performance relationship.

The remainder of the paper is organized as follows. Section 2 discusses the methodology utilized in this study. Section 3 describes the dataset and the variables whereas section 4 presents the empirical findings. Finally, section 5 concludes.

2 Methodology

This section outlines the semi-parametric estimation procedure and makes the comparison with the fully parametric techniques. Let us denote corporate performance by Q and executive ownership by $Exec$.[4] We collect all the other explanatory variables into a vector X, which has 1 as its first element, in order to allow for a constant in our model specification. Following Jensen and Meckling (1976), the opening studies investigating the empirical determinants of corporate performance assume a linear parametric form for all the explanatory variables by estimating the following equation:

$$E(Q \mid Exec, X) = \beta' X + \gamma Exec \tag{1}$$

To allow for potential nonlinearity in the executive ownership-performance relationship, subsequent studies use executive ownership values up to the p^{th} power as regressors. Such a specification implies that the conditional mean of Q can be written as:

$$E(Q \mid Exec, X) = \beta' X + \sum_{i=1}^{p} \gamma_i (Exec)^i \tag{2}$$

This specification nests most of the earlier studies. For example, McConnell and Servaes (1990) estimate equation 2 by using p=2 whereas Short and Keasey (1998) set p=3. Subsequent studies include even higher order polynomials to capture more complex non-linear structures (e.g. Cui and Mak (2002) use p=4 and Davies et al. (2005) use p=5).

This study puts forward a semi-parametric model, which allows us to relax the functional form on $Exec$ and still control for the other factors that determine corporate performance. In this case, the conditional mean of our model is given by:

[4] In this study, we restrict our attention to the amount of shares held by executive directors rather than focusing on the total level of managerial ownership. Executive directors are more likely to become entrenched. Therefore, we use the term executive ownership instead of managerial ownership.

$$E(Q \mid Exec, X) = \beta^{'} X + f(Exec) \tag{3}$$

where $\beta^{'} X$ represents the parametric component, $f(Exec)$ the non-parametric one. The non-parametric component $f(Exec)$ is estimated using regression splines.[5] This methodology minimizes the following objective function:

$$\min\{\frac{1}{n}\sum_{i=1}^{n}(Q_i - f(Exec) - \beta^{'} X)^2 + \lambda J\} \tag{4}$$

where J represents the roughness of the function f and n the number of observations. Consequently, this expression exhibits the trade-off between fitting perfectly the data (the first term of the expression) and having a smooth approximating function f (the second term). This trade-off is controlled by the parameter λ. As $\lambda \rightarrow \infty$, the penalty to the roughness of the function is so high that the optimal function f is of linear form, since a linear function has zero roughness for the whole range of the dependent variable values. In this case, the minimization problem becomes identical to OLS. On the other extreme, if $\lambda \rightarrow 0$, then this methodology will provide a very rough approximating function f, which essentially fits each individual observation.

The optimal value of λ is chosen using Generalized Cross Validation (GCV). According to this criterion, the optimal λ minimizes the following expression:

$$GCV(\lambda) = RSS(\lambda)/(1 - (1/n)tr[A(\lambda)])^2 \tag{5}$$

where $RSS(\lambda) = e^{'} e$ is the Sum of Squared Residuals and $tr[A(\lambda)]$ is the trace of the projection matrix $A(\lambda)$, which satisfies $\widehat{Q} = A(\lambda)Q$ and $e = (I - A(\lambda))Q$. Instead of using smoothing splines as in Engle et al. (1986), we employ penalized regression splines. Even though the two approaches yield very similar results in practice, penalized regression splines use fewer parameters and are, therefore, computationally

[5] An analytical discussion on the regression splines methodology is provided in Härdle (1990).

more efficient.[6]

3 Data and Variables

For the empirical analysis we use a large sample of UK listed firms over the period 2000-2004. Data on the market value of equity, book value of equity, total assets, total debt and industry classification are obtained from Datastream. We use the Hemscott Guru Academic to obtain detailed information on firms' board and ownership structure. We restrict our attention to non-financial firms because of the specific characteristics of the financial ratios of financial firms. We also drop the values for each variable that lies outside the 1^{st} and the 99^{th} percentiles. These criteria left us with 1,010 firms for the present analysis.

Corporate performance is measured as the ratio of the book value of assets minus the book value of equity plus the market value of equity to the book value of assets (Tobin's Q).[7] We regress Tobin's Q against a set of variables. The first variable included in our model as a regressor is $Exec$, which represents the percentage of shares held by executive directors. In the parametric analysis we also include the terms $Exec^2$, $Exec^3$, $Exec^4$and $Exec^5$as regressors, which stand for the second, third, fourth and fifth power of $Exec$, respectively, to allow for the possible non-linearity.

Several variables related to the board structure of firms are also likely to influence corporate performance. In particular, as Yermack (1996) points out, large boards make coordination, communication and decision making more cumbersome

[6] An analytic treatment for the properties and the implementation of this methodology is provided in Wood (2003). For robustness purposes, in addition to the Wood's thin plate regression spline, we use the cubic regression spline methodology and get similar results (results not reported).

[7] This measure has been extensively used in corporate finance literature as proxy for corporate performance. For robustness purposes, we also measure Tobin's Q as the ratio of market value of equity plus the book value of preference shares plus the book value of debt, all divided by total assets. The results are qualitatively similar.

than it is in small boards, which leads to a negative relationship between board size and performance. On the other hand, boards with significant proportion of non-executive directors and separated roles between the chief executive officer (CEO) and the chairman of the board (COB) can perform a significant monitoring function. Consequently, they can limit the exercise of managerial discretion (Byrd and Hickman, 1992 and Rosestein and Wyatt, 1990). To control for these effects, we include the following variables in the model: BOARDSIZE, which is the number of directors on the board (in logarithm), NON-EXEC, which is the ratio of the number of non-executive directors to the total number of directors, and CEO_DUMMY, which is a dummy variable that takes the value of 1 when the roles of CEO and COB are not separated and 0 otherwise.

The variable CONCENTR, which represents the percentage sum of stakes of all shareholders with equity ownership greater than 3 percent, is also included to capture the impact of ownership concentration on corporate performance. As it has been long realized, large shareholders have both the incentive and the ability to monitor management, protecting, hence, their investment (Shleifer and Vishny, 1986).[8] Finally, following earlier studies on the subject (see, for example, Short and Keasey, 1999 and Davies et al., 2005), we control for size and leverage differences by including the variables LEVERAGE, which is the ratio of total debt to total assets and SIZE, which is firm's size proxied by the market value of equity (in logarithm), in the model. Industry dummies are also incorporated to capture industry specific effects.

Table 1 provides descriptive statistics for the variables used in our analysis. The mean value for Tobin's Q is 2.10, whereas the executive ownership has a mean of 13.89 percent. The ownership concentration reaches, on average, the level of 34.61 percent. Moreover, the average proportion of non-executive directors is 47.65 percent

[8]See, for example, Dahya et. al., 1998 for the importance of ownership concentration in corporate governance in the UK.

and the average board size is 6.84 directors. We were able to identify 131 firms out of the final 1,010 in which the roles of CEO and COB were not separated. Regarding the accounting variables, the average leverage ratio is 18 percent and the average market capitalization is £639 million. In general, the descriptive statistics are in line with those reported by other studies for UK firms (see, *inter alia*, Davies et al., 2005; Ozkan and Ozkan, 2004 and Short and Keasey, 1998).

4 Empirical Results

This section presents our empirical findings. For comparability purposes, we start by utilizing a parametric approach, which is similar to the one used in earlier studies. Then, we report the results derived from the semi-parametric analysis.

4.1 Parametric Analysis

In panel A of Table 2 we present the results of the parametric cross-sectional analysis. To control for potential endogeneity problems we follow the methodology proposed by Rajan and Zingales (1995). In particular, we measure the dependent variable in year 2004, while for the independent variables we use average values over the period 2000-2003. We start by estimating a linear specification (model 1). The results point to a positive and statistically significant (at 1 percent level) relationship between executive ownership and corporate performance. This can be taken as evidence for the conjecture that executive ownership help align the interests of executive directors with those of shareholders, leading to an improved corporate performance (Jensen and Meckling, 1976).[9]

[9]The results concerning the remaining coefficients in that model are in line with our expectations. Consistent with the view that large boards make coordination, communication and decision-making more cumbersome relative to small boards, we find a negative relationship between board size and Tobin's Q. The results also reject the hypothesis that non-executive directors and large shareholders play a significant role in the governance of UK firms (i.e. the coefficients of NON-EXEC and CONCENTR are not statistically different from zero), which is in line with recent

In Model 2 we attempt to capture the non-linear relationship between executive ownership and Tobin's Q by including the square term of executive ownership, $Exec^2$, as regressor (i.e. we set p=2 in equation 2). The results provide strong support for both the alignment and the entrenchment hypotheses (the coefficients of the variables $Exec$ and $Exec^2$ are statistically significant at 1 percent level). In particular, we find that the ownership-performance curve slopes upward until executive ownership reaches the level of 38.6 percent and then slopes downward. This turning point is almost identical to the turning point reported in McConnell and Servaes (1990) for US firms. Model 3, which sets p=3, allows for a cubic relationship between executive ownership and Tobin's Q. Consistent with the findings in Short and Keasey (1998), we find that the terms $Exec, Exec^2$and $Exec^3$ are positive, negative and positive, respectively, all statistically significant, pointing to a cubic relationship between executive ownership and Tobin's Q. However, the turning points identified in our model (28.18 percent and 64.54 percent) differ significantly from the ones reported in Short and Keasey (12.99 percent and 41.99 percent).

In Model 4, which sets p=4, we find that only the terms $Exec$ and $Exec^2$ are statistically significant, which is against the cubic relationship indicated by model 3 but consistent with the curvilinear relationship indicated by model 2. Finally, the results of model 5, which includes the 5^{th} power of executive ownership in the model, support the quintic structure proposed by Davies et al. (2005). Specifically, we observe the following four turning points in the curve: 13.39 percent, 24.53 percent, 48.76 percent and 72.26 percent. Except for the first turning point, the rest are very close to the ones reported in Davies et al. (2005) (7.01 percent, 26.0 percent, 51.4 percent and 75.7 percent). Despite the strong statistical significance of the coefficients, one should be cautious though in interpreting the results of model

findings in Short and Keasey (1999) and Ozkan and Ozkan (2004). The rest of the coefficients, except for the CEO_DUMMY, which is negative and significant as expected, have the hypothesized signs but they are statistically insignificant.

5 as strong evidence for a non-linear relationship between executive ownership and Tobin's Q. Specifically, the last increasing part of the ownership-performance curve is supported by a very limited number of observations (n= 4 firms). Additionally, the findings concerning the last turning point (i.e. for levels of executive ownership greater than 72.26 percent) do not lead to strong policy implications given the limited number of existing companies with such high levels of executive ownership.

Overall, the parametric analysis shows that different econometric specifications lead to different inferences regarding the ownership-performance relationship. Specifically, while models 2 and 4 point to a curvilinear relationship, models 3 and 5 point to a cubic and quintic relationship respectively. Additionally, different models support considerably different turning points and, more importantly, some of the effects (e.g. the alignment effect for executive ownership levels greater than 72.26 percent of model 5) are supported only by a limited number of observations, which leaves no space for the discussion of any policy implications. Such conflicting findings raise doubts about the appropriateness of using arbitrarily (i..e. in the absence of strong theoretical basis) higher-order executive ownership polynomials in a performance model for testing the non-linear aspect of executive ownership.

4.2 Semi-Parametric Analysis

A first application of the semi-parametric method is to formally test whether the relationship between executive ownership and Tobin's Q is non-linear. This test compares the Residual Sum of Squares (RSS) of the linear parametric model (equation 1) with that of the most flexible specification (equation 3) adjusted for the corresponding degrees of freedom. The F-test shows that the null hypothesis of equal RSS is rejected at least at 1 percent level. Therefore, the results of this test verify that the relationship between executive ownership and Tobin's Q is non-linear indeed.

Once we have demonstrated its non-linear form, we proceed to the analysis of the nature of this relationship. Figure 1 presents the net effect of executive ownership on performance as derived by the semi-parametric estimate and the corresponding confidence bounds.[10] The results clearly point to a non-linear relationship between executive ownership and Tobin's Q. Specifically, we observe the existence of a strong alignment effect for executive ownership levels lower than 15 percent (region A) and several turning points in the estimated curve thereafter. The results, however, do not lead to strong conclusions on the relationship between executive ownership and Tobin's Q for intermediate and high levels of executive ownership due to the large confidence bounds. That is, although we actually observe a slight decline in the curve in regions B and D and a slight increase in regions C and E, these changes are combined with large confidence bounds and, in some cases, with a small number of observations (especially in regions D and E). The latter finding contradicts recent research showing a complex non-linear structure for the ownership-performance curve throughout the whole range of executive ownership.[11]

Regarding the rest of the variables, the semi-parametric method yielded almost identical coefficients with those obtained from the fully parametric models (see Panel B of Table 2). Specifically, there is evidence that board size is significantly negatively related with Tobin's Q. We also find that firms, in which the CEO and the COB roles are separated, display higher Tobin's Q ratios, *ceteris paribus*. The remaining coefficients have the hypothesized signs but they are statistically insignificant.

In summary, the semi-parametric analysis provides strong evidence on the align-

[10] The rest of the results of the semi-paranetric specification are presented in Panel B of Table 2.

[11] To determine the extent to which the results are sensitive to the choice of dependent variable, the model is re-estimated using an alternative Tobin's Q ratio, namely the market capitalization plus total debt to total assets (see Weir et al., 2002 and Davies et al., 2005). The results are quantitatively similar with the ones obtained so far. Furthermore, in addition to market performance, we put forward an accounting proxy of corporate performance, the return on assets (ratio of total earnings before interests and taxes to total assets). The results (not reported) do not change materially with respect the impact of executive ownership on performance. However, the coefficient of board size becomes significant at the 5% rather than the 10% level. Also, the coefficients of the leverage and size variables become significant at the 5% and 1% levels respectivelly.

ment effect of executive ownership but it does not support a specific complex non-linear relationship between executive ownership and corporate performance for intermediate and high levels of executive ownership, as recently proposed by Cui and Mak (2002) and Davies et al. (2005). The results also indicate several turning points in the ownership-performance curve. Consistent with our earlier discussion, it seems that high-order polynomials employed in parametric specifications simply capture local stationary points in the ownership-performance curve. This suggests that, significant estimated coefficients of these higher-order terms should not be used to draw strong inferences regarding the impact of directors' holdings on corporate performance.

5 Concluding remarks

Existing empirical studies on the impact of managerial ownership on performance often utilize fully parametric techniques. In these studies, the potential non-linear relation between ownership and performance is usually captured by including higher order executive ownership polynomials in the performance equation. To this end, statistically significant coefficients of these polynomials are perceived as evidence for a specific non-linear relationship between executive ownership and corporate performance. This paper argues that fully parametric techniques are not appropriate to investigate the exact nature of this relationship.

The main novelty of this study is that it sets a new perspective in the ownership-performance relationship by putting forward a semi-parametric approach which helps sidestep concerns associated with fully parametric methods. The results of the semi-parametric analysis provide strong evidence for a non-linear relationship between executive ownership and Tobin's Q, but not of a specific form throughout the whole range of managerial ownership levels. The only effect that is strogly supported by the data is the initial alignment effect of executive owneship (for levels

lower than 15 percent). The highly non-linear shape of the estimated curve indicates that strong conclusions drawn on the basis of fully parametric models may be erroneous. Such an argument becomes important given the lack of a strong theoretical basis for the resurgence of alignment and entrenchment effects. Our findings suggests that it may not be appropriate to pre-specify a fixed number and/or location of turning points. Additionally, it is desirable to report confidence bounds as well as the number of firms corresponding to each of the increasing and decreasing parts of the curve.

We argue that this study serves as a first attempt to document the non-linear relationship between corporate performance and its determining factors by using a more appropriate and efficient empirical approach. However, there is still scope for further research on the topic. For example, future research could employ a fully non-parametric approach, relaxing the assumption of linearity for the rest of the factors. Another possibility is incorporate potential interrelations between the alternative corporate governance mechanisms available to firms rather than treating managerial ownership as an independent determinant of corporate performance. It is likely that potential interrelations between corporate governance mechanisms partly explain why our results do not support a strong entrenchment effect (or the resurgence of alignment and entrenchment effects) for specific levels of managerial ownership. Controlling for such interrelations is crucial for the case of UK firms given the recent evidence by Young (2000), Weir et a. (2002), Peasnell et al. (2003), Florackis (2005) and Lasfer (2006) that several internal and external corporate governance mechanisms work as substitutes in mitigating agency related problems

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List of Tables and Figures

TABLE 1: DESCRIPTIVE STATISTICS

	Mean	Min	25%	Median	75%	Max
TOBIN'S Q	2.10	0.17	1.08	1.47	2.25	18.43
BOARD SIZE	6.84	3	5.25	6.5	8	18.25
NON-EXEC	47.65	0	38.83	47.88	56.82	1
CEO	0.13	0	0	0	0	1
CONCENTR	34.61	0	20.06	33.21	48.53	84.85
EXEC	13.89	0	0.44	5.62	21.1	83.4
LEVERAGE	0.18	0	0.05	0.15	0.29	0.92
SIZE	3.99	0.8	2.40	3.73	5.27	10.8

Notes: Definitions for all the variables are provided in Section 3

TABLE 2: CROSS SECTIONAL REGRESSIONS PREDICTING TOBIN'S Q

Dependent Variable: **Tobin's Q**

	Panel A (parametric)					*Panel B* (semi-parametric)
Indep. Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CONSTANT	2.264 (5.88)***	1.856 (4.81)***	1.687 (4.38)***	1.561 (4.09)***	1.352 (3.51)***	1.773 (3.55)***
BOARDSIZE	-0.076 (−2.27)**	-0.082 (−2.42)**	-0.080 (−2.38)**	-0.078 (−2.34)**	-0.076 (−2.29)**	-0.078 (−1.85)*
NON-EXEC	0.001 (0.21)	0.004 (0.92)	0.004 (0.91)	0.005 (1.05)	0.006 (1.28)	0.005 (0.93)
CEO_DUMMY	-0.338 (−2.02)**	-0.401 (2.41)**	-0.401 (−2.41)**	-0.408 (−2.42)**	-0.417 (−2.47)**	-0.415 (−2.09)**
CONCENTR	5.9e-4 (0.15)	3.6e-4 (0.10)	4.4e-4 (0.12)	-4.9e-4 (−0.13)	6.9e-4 (0.18)	4.9e-4 (0.14)
LEVERAGE	0.005 (0.82)	0.059 (0.90)	0.060 (0.91)	0.006 (0.95)	0.006 (0.98)	0.006 (1.55)
SIZE	0.015 (0.36)	0.045 (1.03)	0.056 (1.26)	0.061 (1.38)	0.070 (1.57)	0.060 (0.21)
$Exec$	0.013 (2.66)***	0.051 (4.29)***	0.086 (3.31)***	0.123 (2.80)**	0.219 (3.62)***	See Figure 1
$Exec^2$	-	-6.6e-4 (−3.45)***	-0.002 (−2.21)**	-0.005 (−1.75)*	-0.016 (−2.94)***	-
$Exec^3$	-	-	0.1e-4 (1.70)*	0.8e-4 (1.28)	5.3e-4 (2.75)***	-
$Exec^4$	-	-	-	-4.5e-7 (−1.04)	-7.5e-6 (−2.69)***	-
$Exec^5$	-	-	-	-	3.8e-8 (2.67)***	-
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R^2(adj.)	4.23	5.28	5.48	5.52	5.84	5.91
Number of firms	1010	1010	1010	1010	1010	1010

Notes: This tables presents the results from the Parametric (Panel A, models 1-5) and Semi-pametric regressions (Panel B, model 6)) predicting Tobin's Q. Definitions for all the variables are provided in Section 3. All regressions include industry dummies. t statistics are reported in parentheses. For the estimation we use robust to heteroscedasticity standard errors. ***, ** and * indicate coefficient is significant at the 1%, 5% and 10 % levels respectively

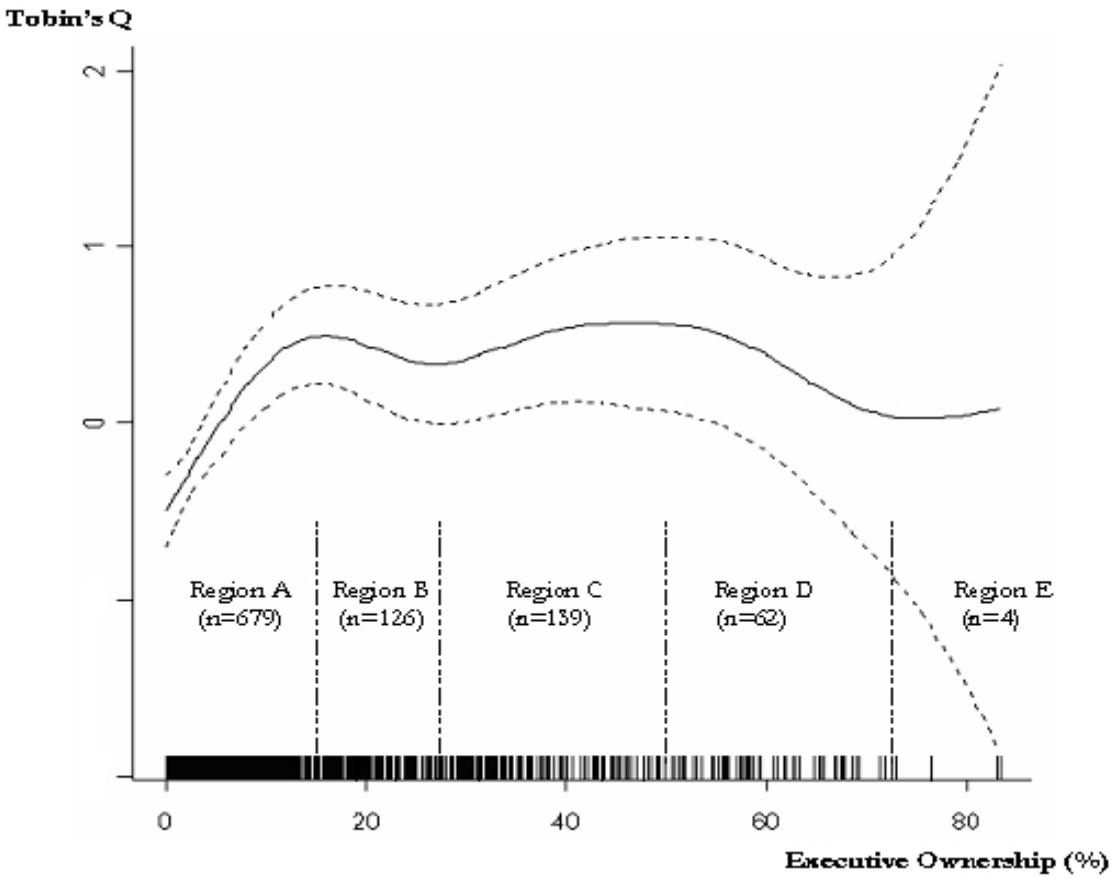

FIGURE 1: The net effect of executive ownership on Tobin's Q (semiparametric estimate). The continuous line corresponds to the estimate whereas the dotted lines correspond to the confidence bounds.