Idiosyncratic Risk, Risk-Taking Incentives and the Link between Managerial Ownership and Firm Value

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First Version: June 2010

This version: July 2011

Abstract

We study the moral hazard problem that arises from risk averse managers having large equity holdings in their companies and strong risk-substitution incentives; that is, they pass up innovative projects with high firm-specific (idiosyncratic) risk in favor of standard projects that have greater aggregate (systematic) risk in an attempt to hedge their personal portfolio. We hypothesize that risk-substitution incentives may lead to suboptimal investment policies and, as a result, offset the well-documented alignment effect of managerial ownership, leading to a weak association between managerial ownership and firm value. Using parametric and semi-parametric estimation methods, we report convincing evidence for the existence of such an effect for the case of US firms. Our results suggest that managerial ownership affects firm value in a strong positive way only for low idiosyncratic risk companies that are not exposed to severe risk-substitution problems. For high idiosyncratic risk companies, which are normally characterized by stronger risk-substitution incentives, no such link exists.

JEL classification: G3; G32.

Keywords: Idiosyncratic Risk; Managerial Ownership; Firm Value, Semi-parametric estimation, Tobin's Q

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Abstract

We study the moral hazard problem that arises from risk averse managers having large equity holdings in their companies and strong risk-substitution incentives; that is, they pass up innovative projects with high firm-specific (idiosyncratic) risk in favor of standard projects that have greater aggregate (systematic) risk in an attempt to hedge their personal portfolio. We hypothesize that risk-substitution incentives may lead to suboptimal investment policies and, as a result, offset the well-documented alignment effect of managerial ownership, leading to a weak association between managerial ownership and firm value. Using parametric and semi-parametric estimation methods, we report convincing evidence for the existence of such an effect for the case of US firms. Our results suggest that managerial ownership affects firm value in a strong positive way only for low idiosyncratic risk companies that are not exposed to severe risk-substitution problems. For high idiosyncratic risk companies, which are normally characterized by stronger risk-substitution incentives, no such link exists.

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I. Introduction

It has long been recognized that separation between ownership and control in large corporations creates fundamental conflicts of interest among various groups of stakeholders (Berle and Means (1932), Jensen and Meckling (1976), Fama and Jensen (1983)). In the presence of asymmetric information and imperfect contractual relations between managers and shareholders, the former may have incentives to pursue their own interests at the expense of the latter. A potential remedy to this problem is to provide managers with equity stakes in their firms (Weisbach (1988), Jensen and Murphy (1990)). In particular, an increased level of managerial ownership eliminates perverse managerial actions such as insufficient effort, extravagant investment, entrenchment strategies and self-dealing.[1] A large number of studies provide evidence that is generally consistent with the alignment effect of managerial ownership (see Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Hermalin and Weisbach (1991), Himmelberg, Hubbard and Palia (1999), among others).

While large managerial shareholdings may insulate firms from agency-related problems, they do increase managers' exposure to firm specific (idiosyncratic) risk, rendering their investment portfolios under-diversified, contrary to the fundamental principle of modern portfolio theory and practice (Markowitz (1952) and Campbell (2006)). This increased exposure also hinders managers from hedging away their background risk that arises from the fact that their labour/entrepreneurial income also depends on their firms' performance. Utilizing the intertemporal portfolio choice framework of Merton (1973), Bodie, Merton and Samuelson (1992) and Heaton and Lucas (2000) have explicitly shown that optimal portfolios should also hedge away the background risk of labour/entrepreneurial income. To the contrary, large shareholdings actually expose managers even further to this background risk. In sum, managers

[1] Shleifer and Vishny (1997) and Tirole (2006) provide an analytical discussion on the various ways in which management may not act in the firm's best interest.

usually end up with under-diversified and non-tradable portfolios because they invest both human capital and large proportions of personal wealth in their firm (see also Zajak and Westphal (1994) and Beatty and Zajak (1995)).

This so-called "personal portfolio problem" could be addressed in the following two ways. First, risk-averse and under-diversified managers could potentially hedge their portfolio positions by selling short their own firm's stock, but such an action is costly or even prohibited due to regulatory and reputational issues associated with insider trading (Leland (1992), John and Lang (1991)). Second, managers of risky companies may engage in "risk- substitution". That is, they may choose to pass up innovative projects with high firm-specific risk in favour of standard projects that are characterized by greater aggregate (systematic) risk, which is hedgeable. Such risk-substitution behavior enables managers to be better diversified in their personal portfolios, but it may also lead to suboptimal investment decisions and lower firm valuation (Acharya and Bisin (2009) and Armstrong and Vashishtha (2011)).

Departing from earlier studies that often disregard managers' personal portfolio problem, this study explicitly recognizes risk-substitution as a direct cost associated with large managerial shareholdings. Unless the risk-substitution effect is properly accounted for, it may not be possible to reach a consensus on whether managerial ownership helps mitigate agency problems. In particular, drawing from agency theory and risk management practice, this study attempts to examine the role of idiosyncratic risk on the ownership-value relationship. We argue that, on the one hand, managerial ownership may have a positive impact on firm value due to the alignment effect, but, on the other hand, it may also have a negative impact due to the risk-substitution effect. To establish the contingent nature of this relationship, we hypothesize that the net effect of managerial ownership on firm value depends on the level of idiosyncratic risk

of each firm, which essentially determines the relative strength of the alignment and risk-substitution effects.

Drawing from the structural model of Acharya and Bisin (2009), we expect the risk-substitution effect to be more pronounced in firms with a high level of idiosyncratic risk. In such firms, it may be difficult to use ownership as an incentive to control managerial behavior due to the high idiosyncratic risk that managers are obliged to bear. On the contrary, ownership may prove a particularly useful mechanism to address managerial incentive problems in firms with a low level of idiosyncratic risk. This is because risk-substitution is not a major issue in low idiosyncratic risk firms (see Armstrong and Vashishtha (2011)). Based on these arguments, we expect that the positive link between managerial ownership and value is weaker (stronger) for firms with high (low) level of idiosyncratic risk.

Our study contributes to the literature on the ownership-firm value relationship by providing empirical evidence that managerial ownership may not always prove value-enhancing. Our results convincingly show that in companies with high idiosyncratic risk, managerial ownership does not necessarily impact firm value in a positive way due to risk-substitution incentives. We posit that maximal levels of managerial ownership are not necessarily optimal for all firms; rather it is the environment in which a firm operates that determines the relative strength of alignment and risk-substitution effects and hence, the net effect of managerial ownership on firm value. To this end, our study also aims at providing a potential explanation for the weak and often mixed evidence presented in earlier studies (see e.g., McConnell and Servaes (1990) vs. Demsetz and Villalonga (2001)). In particular, we argue that part of the conflicting evidence on the ownership-performance link may be related to the fact that earlier studies often neglect the risk-substitution effect of managerial ownership.

Moreover, the present study builds on earlier research that tests for nonlinearities in the ownership-firm value relationship (see for example, Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Hermalin and Weisbach (1991), Himmelberg, Hubbard and Palia (1999), Short and Keasey (1999), Cui and Mak (2002), Davies, Hillier, and McColgan (2005), Benson and Davidson (2009)). We employ both standard parametric models, which a priori impose a fixed number and/or location of turning points, but also semi-parametric models, which are more flexible, allow for the consideration of a wider range of non-linear behaviors and impose no pre-specified parametric form on the relationship. The implementation of semi-parametric estimation methods enables us to provide comprehensive evidence on the shape of the managerial ownership-firm value curve. By properly capturing for potential nonlinear effects, our analysis enables us to provide convincing evidence on whether there is a differential impact across firms with low and high idiosyncratic risk.

The paper proceeds as follows: Section II describes the empirical hypotheses tested in this study. Section III describes the data sources, variables' definitions and estimation methods employed. Section IV presents the empirical results while Section V reports several robustness checks. Finally, Section 5 concludes.

II. Empirical Hypotheses

The insights of agency theory have become a central focus of corporate governance research. It is presumed that conflicting interests between managers and shareholders arise from managerial incentives to pursue courses of action that are inconsistent with the interests of shareholders (Eisenhardt (1989) and Shleifer and Vishny (1997)). It is widely recognized that agency costs can be particularly severe in the following two cases. First, when an organization generates a substantial free cash flow that can be "dampened" through direct wealth

expropriation by managers (Jensen (1986) and Magill and Quinzii (2002)). This problem, often referred to as cash-flow expropriation problem, usually occurs in organizations run by managers that are primarily concerned with increasing their power and assets under control rather than investing in value maximizing projects.

Second, agency costs are high when risk averse managers have strong incentives to substitute the firm-specific risk of their cash flow for aggregate market or industry risk, abandoning potentially highly profitable projects (Acharya and Bisin (2009) and Armstrong and Vashishtha (2011)). Such incentives are generated because firm-specific risk is typically more difficult to hedge than aggregate risk (Jin (2002), Garvey and Milbourn (2003), Tian (2004) and Duan and Wei (2005)). For example, a manager can easily reduce her exposure to aggregate market risk implied by her firm's shareholdings by having a short position on the corresponding futures index. On the other hand, the only way to reduce her idiosyncratic risk exposure is to have a short position on her firm's stock; such a position is almost impossible to hold due to regulatory requirements, reputational costs or contractual agreements.

With respect to the cash flow expropriation problem, managerial ownership has been proposed as a potential solution. Jensen and Meckling's (1976) theory implies that firm value is a strictly positive function of the level of managerial shareholdings. Based on the predictions of this theory, a voluminous body of literature examines the link between managerial ownership and firm value by emphasizing the ability of managerial ownership to mitigate cash-flow expropriation problems (Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Hermalin and Weisbach (1991), Himmelberg, Hubbard and Palia (1999), Short and Keasey (1999), Cui and Mak (2002), Davies, Hillier, and McColgan (2005), Cheung and Wei (2006), Hu and Zhou (2008), Florackis, Kostakis and Ozkan (2009), Benson and Davidson (2009) and Margaritis and Psillaki (2010), among others). Nevertheless, relatively little attention has been

paid on the potential costs associated with large managerial shareholdings that make the risk-substitution effect more severe. Acharya and Bisin (2009) explicitly argue that the form of moral hazard that relates to risk substitution is largely ignored in empirical research. Our study attempts to fill in this gap.

In particular, we explicitly recognize the existence of both risk-substitution and cash-flow expropriation problems within a corporation and argue that the net effect of managerial ownership on firm value depends on the relative strength of these two effects. In the spirit of Acharya and Bisin (2009), we hypothesize that firms that are subject to a low level of idiosyncratic risk experience minimal risk-substitution problems. This is because, in this case, a large shareholding does not substantially increase managerial exposure to idiosyncratic risk and therefore managers are less concerned with identifying and adopting risk-substitution strategies**.** On the contrary, cash-flow expropriation problems may well be quite severe, and hence there are clear benefits of a large managerial shareholding. This leads to the following testable hypothesis with respect to the net impact of managerial ownership on firm value:

H1: For firms with a low level of idiosyncratic risk, managerial ownership affects firm value in a strong positive way.

In companies that are subject to a high level of idiosyncratic risk, however, cash-flow expropriation problems are rarely an issue. High risk companies are usually associated with high leverage and even financial constraints, and hence free cash flow misuse is subdued (Jensen (1989) and Holstrom and Tirole (2000)).[2] This implies that the alignment effect of managerial ownership may not be particularly strong in these firms. To the contrary, the existence of severe

[2] In particular, Jensen (1989) argues that free cash flow problems are minimal for growth companies whose profitable investment opportunities exceed the cash that they generate internally. On the contrary, in cash-rich and low-growth sectors such as steel, chemicals, tobacco, television and radio broadcasting (among others), the temptation on management to waste cash flow is often irresistible.

risk-substitution problems are driven by managers who take actions to diversify away the idiosyncratic component of corporate risk (Jin (2002) and Garvey and Milbourn (2003)). By engaging in risk-substitution, managers with substantial equity holdings load aggregate risk on their firm's projects and, in this way, reduce their own exposure to unhedgeable firm-specific risk (Acharya and Bisin (2009) and Armstrong and Vashishtha (2011)). In the absence of any strong alignment effect of managerial ownership, such risk-substitution results in a reduction in future cash flow and firm value. This leads to the following testable hypothesis with respect to the net impact of managerial ownership on firm value:

H2: For firms with a high level of idiosyncratic risk, the positive relationship between managerial ownership and firm value, if any, becomes considerably weaker.

III. Research Design

A. Data

The research uses data from different sources that cover the period 2001-2007. In particular, we use *Board Analyst* to obtain information on corporate board structure, ownership structure and several other board and director characteristics. We begin from year 2001 because data provided by *Board Analyst* are either unavailable or incomplete prior to that year. We match *Board Analyst* data at a company level with accounting and market data obtained from *Thomson DataStream*. These data are supplemented by information on excess market returns, the size and value factors, which are obtained by Kenneth French's online data library.[3] Starting with 2,295 companies that appear both in *Board Analyst* and *Thomson DataStream*, we impose several screening criteria to our dataset. First, we exclude firm-year observations with missing values for any of the key variables. Second, we exclude firm-year observations that lie outside

[3] This data library is accessible at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

the 1^{st} and 99^{th} range for each variable. Third, we remove from the dataset all non-US firms that are listed on NASDAQ, NYSE and AMEX, and also exclude ADRs, REITs, subsidiaries and OTC firms because of their different regulatory, reporting and administrative regimes. Data for all variables are reported in financial year end. To avoid issues that relate to endogeneity, we measure our dependent variable at time *t* while for the explanatory variables *t-1* values are used.[4] These criteria lead to a final sample that comprises of 1,969 firms and 7,295 firm-year observations.

B. Variables

This section presents the dependent and explanatory variables used in our empirical models. Detailed description for variable definitions and codes are provided in Table 1.

Firm Value/Performance: Tobin's Q is widely used in the literature as a proxy for firm value (see for example Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Short and Keasey (1997), Lins (2003), Davies, Hillier, and McColgan (2005), Wei, Xie and Zhang (2005)). In our study, we use measure Tobin's Q 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. For robustness purposes, we also utilize an accounting-based proxy of firm value, namely return on shareholder equity (RSE) as discussed in Section V.B.

Managerial Ownership: Since Jensen and Meckling's (1976) seminal study, managerial ownership has been suggested as a key determinant of firm value (e.g. Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), Cui and Mak (2002)). In our study, managerial ownership represents the main explanatory variable of firm value and is defined as the

[4] For robustness, we estimate our models after instrumenting only the managerial ownership variable (not all explanatory ones) using lagged values (see Coles, Daniel and Naveen (2008), p. 346 for a similar approach)). In all cases our results do not change.

percentage of shares held by the management and directors, as reported in the company's most recent proxy statement.

Idiosyncratic Risk: Recent research suggests that not all types of risk affect executives the same way (Tian (2004) and Duan and Wei (2005)). Under a manager's point of view, idiosyncratic risk is undesirable because it is typically more difficult to hedge than aggregate (systematic) risk (Jin (2002), Garvey and Milbourn (2003), Tian (2004) and Duan and Wei (2005)). This implies that the strength of risk-substitution incentives differs across firms with different exposures to idiosyncratic risk.

The idiosyncratic risk proxies utilized in our study are based on a set of widely used measures of stock returns' idiosyncratic volatility. For completeness, we also use measures of returns' idiosyncratic skewness and Value-at-Risk (VaR) for each firm, as analytically explained in Section V. To ensure the idiosyncratic nature of risk in each case, these estimates are adjusted by the industry median. Following Goyal and Santa-Clara (2003), Xu and Malkiel (2003) and Bali and Cakici (2008), our first two measures of idiosyncratic risk are defined as the standard deviation of the residuals derived by the CAPM and the Fama-French 3-factor model, respectively. In particular, we estimate the CAPM regression:

(1) $$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \varepsilon_{it}$$

where R_{it} is the return of stock *i* in period *t*, R_{ft} is the risk-free rate for period *t* and MKT_t is the excess market return, $(R_{mt} - R_{ft})$, in period *t*. Idiosyncratic risk of stock *i* under this model is measured as the standard deviation of residuals from (1), i.e., *ID_RISK (CAPM)*= $\sqrt{Var(\varepsilon_{it})}$.

We then estimate the 3-factor model of Fama-French (1993) for each stock *i*:

(2) $$R_{it} - R_{ft} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \varepsilon_{it}$$

where SMB_t and HML_t stand for the size and value risk factors respectively. Idiosyncratic risk of stock *i* is now measured as the standard deviation of residuals from (2), i.e., *ID_RISK (FAMA-FRENCH)*= $\sqrt{Var(\varepsilon_{it})}$. For these measures to be consistent with our data on firm value and managerial ownership, the estimation of *ID_RISK (CAPM)* and *ID_RISK (FAMA-FRENCH)* is performed on an annual basis using weekly observations. Weekly data for the excess market returns, the size and value factors have been obtained by Kenneth French's online data library. Firms that exhibit a high (low) standard deviation in the residual term are classified as high (low) idiosyncratic risk firms.[5]

Both proxies described above, *ID_RISK (CAPM)* and *ID_RISK (FAMA-FRENCH)*, are unconditional standard deviations of residuals from equations (1) and (2), respectively. However, it is likely for idiosyncratic risk to be time-varying. To capture the potentially time-varying nature of idiosyncratic risk, we follow Bali and Cakici (2008) and estimate the EGARCH(1,1) model of Nelson (1991), which parametrizes the conditional variance via the following asymmetric function:

$$(3) \qquad E(\varepsilon_{it}^2 \setminus \Omega_{t-1}) = \sigma_{it}^2 = \exp\left\{\theta_{0i} + \theta_{1i}\left(\frac{\varepsilon_{it-1}}{\sigma_{it-1}}\right) + \theta_{2i}\left(\left|\frac{\varepsilon_{it-1}}{\sigma_{it-1}}\right| - (2/\pi)^{1/2}\right) + \theta_{3i}\ln\sigma_{it-1}^2\right\}$$

where ε_{it} is the residual series derived from the Fama-French 3-factor model (2). To be consistent with unconditional models, the estimation of (3) is based on weekly data for each year. Companies are sorted into high idiosyncratic risk and low idiosyncratic risk groups

[5] In order to classify firms into low-risk and high-risk groups we use the 33th and the 67th percentiles as cut-off points. For robustness purposes, we also use the 25th and 75th percentiles. The results remain very similar in all cases (results available upon request).

according to the average conditional standard deviation of their returns' Fama-French residuals.[6] Our third proxy for idiosyncratic risk is denoted as *ID_RISK(EGARCH)*.

[Insert Table 1 about here]

Controls: A set of controls is used in our empirical models to "partial out" the effect of other variables on Tobin's Q. Following prior studies, our list of control variables includes both accounting measures (dividend, investment, cash holdings, firm size) and corporate governance measures (board structure, board size and a plethora of other board and director characteristics). Our complete list of control variables with their respective definitions is provided in Table 1. Analytical descriptive statistics for all the variables used in the empirical analysis are presented in Table 2.

[Insert Table 2 about here]

C. Methodology

This study employs both parametric and semi-parametric methods to examine the effect of managerial ownership on firm value. Following Jensen and Meckling (1976), the early studies on the subject assume a linear parametric form for all the explanatory variables by estimating the following equation:

$$E(Q / Man, X) = \beta' X + \delta Man \tag{4}$$

where Q denotes Tobin's Q, *Man* denotes managerial ownership and *X* is a vector that includes the set of control variables in the model. To allow for potential nonlinearities in the managerial ownership-firm value relationship, subsequent studies use executive ownership values up to the

[6] Similar to the case of unconditional models, for the classification we use the 33th and the 67th percentiles as cut-off points.

p^{th} power as regressors (see e.g., McConnell and Servaes (1990), Short and Keasey (1999), Cui and Mak (2002) and Davies, Hillier, and McColgan (2005)). Following this line of inquiry, our analysis considers the specification that is most widely used in the literature and best fits the data. Specifically, we allow for the conditional mean of *Q* to take the form:

$$E(Q / Man, X) = \beta' X + \delta_1 Man + \delta_2 Man^2 \quad (5)$$

To avoid potential criticism against the parameterization above, which is quite restrictive and not based on solid theoretical foundations, we also put forward a semi-parametric model. The semi-parametric model relaxes the functional form on *Man* but still controls for the other factors (in *X*) that determine firm value in a parametric way. In this case, the conditional mean of the model is given by:

$$E(Q / Man, X) = \beta' X + f(Man) \quad (6)$$

where $\beta' X$ represents the parametric component and $f(Man)$ the non-parametric one. The non-parametric component, $f(Man)$, is estimated using splines with optimal basis functions, a method discussed analytically in Keele (2008). The logic behind a spline is to estimate separate regression lines that are joined at the corresponding knots. An important advantage of the splines methodology, in comparison to the commonly used piecewise regressions, is that it does not pre-specify ad hoc cutoff points. The employed methodology minimizes the following objective function:

$$\min \left\{ \frac{1}{n} \sum_{i=1}^{n} (Q_i - f(Man_i) - \beta' X)^2 + \lambda J \right\} \quad (7)$$

where *J* represents the roughness of the function *f* and *n* denotes the number of observations.

The previous expression describes the trade-off between fitting perfectly the data (i.e. minimizing the squared residuals) and having the smoothest possible approximating function *f*.

This trade off is controlled by parameter λ. As $\lambda \to \infty$, the penalty assigned to the roughness of the function is so high that the optimal function, f, is of linear form, since, by definition, a linear function has zero roughness for the whole range of the dependent variable values. In this case, the minimization problem becomes identical to least squares. On the other extreme, if $\lambda \to 0$, then this methodology will provide a very rough approximating function f that essentially fits each individual observation.

Instead of using smoothing splines as in Engle et al. (1986), this study employs penalized regression splines. Even though these two approaches yield similar results in practice, penalized regression splines use fewer parameters and are, therefore, computationally more efficient. This choice implies that the objective function becomes:

$$\min \left\{ \frac{1}{n} \sum_{i=1}^{n} (Q_i - f(Man_i) - \beta' X)^2 + \lambda \int f''(Man_i) d(Man) \right\} \tag{8}$$

where $f(Man)$ is a thin plate regression spline and f'' stands for the second derivative of f. This spline is constructed by starting with the basis for a full thin plate spline and then truncating this basis in an optimal manner to obtain a low rank smoother. Details of this procedure are provided in Wood (2006). The roughness of the function $f(Man)$ is captured by its curvature $\int f''(Man) d(Man)$.

This is essentially a penalized likelihood maximization problem solved by Penalized Iteratively Reweighted Least Squares (P-IRLS) (see Keele (2008), ch. 5, for a description of the procedure). The selection of the optimal smoothing parameter λ is integrated in this procedure using the Generalized Cross Validation (GCV) criterion. According to this criterion, the optimal λ minimizes the following expression:

(9) $$GCV(\lambda) = \frac{RSS(\lambda)}{\left[1 - n^{-1} tr\left(S(\lambda)\right)\right]^2}$$

where $RSS(\lambda) = e'e$ is the sum of squared residuals of the estimated model for a given λ and $tr\left(S(\lambda)\right)$ is the trace of the projection matrix $S(\lambda)$ that satisfies $\hat{Q} = SQ$. For each of the models estimated in this study, the corresponding minimized GCV scores are also reported. For the estimation procedure, this study uses the *gam* function of the *mgcv* package in *R*.

This methodology also allows us to construct confidence bands for the fitted spline $\hat{Q} = SQ$. Its covariance matrix is given by $\text{cov}(\hat{Q}) = SS'\sigma^2$, where σ^2 is the residuals' variance. Given an unbiased estimator for this variance and a large sample size, we can form approximate 95% pointwise confidence interval bands, using ± 2 times the square root of $SS'\hat{\sigma}^2$. These confidence bands along with the fitted spline are illustrated in the Figures presented in the following Section.

Furthermore, this methodology enables us to test the statistical significance of the non-parametric component in the specified semi-parametric model. This is done via an *F*-test that compares the sum of squared residuals (RSS) of the semi-parametric model (unrestricted) with the RSS of the restricted model that excludes the non-parametric component altogether. The corresponding F statistic is given by:

(10) $$F = \frac{\left(RSS_{restricted} - RSS_{unrestricted}\right) / \left(tr(S) - 1\right)}{RSS_{unrestricted} / df_{res,unrestricted}}$$

where $df_{res} = n - tr(2S - SS')$. This test statistic under the null hypothesis of equal RSS follows an approximate F-distribution with $df_{res,restricted} - df_{res,unrestricted}$ and $df_{res,unrestricted}$ degrees of freedom.

IV. Results

The results presented in this section are based on a classification of firms into different groups according to their exposure to idiosyncratic risk. We use the three idiosyncratic risk indicators discussed in section III.B and report results for each case separately (Tables 3 to 5). In each case, Panel A reports results for low idiosyncratic risk firms while Panel B reports results for high idiosyncratic risk firms. To ensure robustness, we utilize both parametric and semi-parametric methods for our estimations. Appropriate statistical tests are carried out to evaluate the ability of each method to capture potential non-linearity.

Starting with Table 3, which reports the results for low idiosyncratic risk and high idiosyncratic risk firms as classified according to the variable *ID_RISK(CAPM)*, the parametric results clearly support both empirical hypotheses established in Section II. In particular, consistent with Hypothesis 1, managerial ownership exhibits a positive and statistically significant association with Tobin's Q for the case of low idiosyncratic risk companies; the estimated coefficient for the level managerial ownership term is 0.920 (t=2.16). This positive relationship turns into negative at higher levels of managerial ownership (i.e. the coefficient of the squared term of managerial ownership is found to be negative at -1.818 and statistically significant (t=-2.26)), which supports the entrenchment effect of managerial ownership. On the contrary, there is no evidence supporting a significant effect of managerial ownership on Tobin's Q for the case of high idiosyncratic risk firms, which is in line with Hypothesis 2. More specifically, as shown in Panel B, both the level and squared terms of managerial ownership

terms appear to be statistically insignificant (t=0.05 for the level term and t=0.34 for the squared term). The adjusted R^2 statistics show that the independent variables can explain 32.71% (23.91%) of the variation in firm value for the case of low idiosyncratic risk (high idiosyncratic risk) firms. The different explanatory power of the models is explained from the fact that managerial ownership does not play an important role in explaining firm value for high idiosyncratic risk firms (Panel B). The Wald statistic that tests the joint significance of the terms *Man* and Man^2 in the Tobin's Q models support the validity of this argument. In particular, the null hypothesis of both managerial ownership terms to equal zero cannot be rejected for the case of high idiosyncratic risk firms (p-value=0.39), while it is rejected at the 10% significance level for the case of low idiosyncratic risk firms (p-value=0.07).

[Insert Table 3 about here]

Examining the semi-parametric results, the estimated managerial ownership-firm value curve has a positive and relatively steep slope for the case of low idiosyncratic risk companies only for low ownership values (see Figure 1). The confidence bounds (dashed lines) are narrow for relatively low levels of managerial ownership (i.e. <10%), indicating the existence of a strong alignment effect. Such an effect may be followed by an entrenchment effect at higher levels of managerial ownership, but no strong conclusions can be drawn due to the large confidence bounds. Moreover, the F statistic strongly supports the hypothesis that managerial ownership plays an important role in the Tobin's Q equation (the F-test is statistically significant: p-value= 0.01).

For the group of high idiosyncratic risk companies, however, it seems that managerial ownership is not a significant determinant of firm value. As shown in Figure 2, the curve that depicts the link between managerial ownership and Tobin's Q does not conform to any

significant relationship between the two variables. In particular, the slope of the curve is not significantly different from zero, suggesting that even large changes in managerial ownership would have a minimal impact on Q. More importantly, this impact is not statistically significant as suggested by the large confidence bounds (dashed lines). Therefore, we conclude that there is no statistical significant link between managerial ownership and Tobin's Q for high idiosyncratic risk firms. This view is further supported by the fact that the null hypothesis that the smooth term is not statistically significant cannot be rejected since the *p*-value of the corresponding *F*-test is 0.21. The adjusted R^2 statistics further show that the parametric and non-parametric terms combined can explain about 23.10% of the variation in firm value for the case of high idiosyncratic risk firms, which is much lower from the 32.30% explained by the model for the case low idiosyncratic risk firms.

Overall, both parametric and semi-parametric methods suggest that the managerial ownership (at low levels) affects firm value in a strong positive way but this effect applies only for low idiosyncratic risk companies that are not exposed to severe risk-substitution problems. These results support Hypothesis 1 and 2.

[Insert Figures 1&2 about here]

In Table 4 we present the Tobin's Q models as estimated for low *ID_RISK(FAMA-FRENCH) and high ID_RISK(FAMA-FRENCH)* firms. Similar to Table 3, the results are supportive for Hypotheses 1 and 2. Based on the parametric estimates, it is found that the estimated coefficient on the level term of managerial ownership is positive at 0.76 and statistically significant (t=1.84) for the sample of low idiosyncratic risk companies, which supports Hypothesis 1. Additionally, there is some evidence that managers become entrenched at higher levels of managerial ownership, i.e., the squared term of managerial ownership takes a

negative coefficient that is also statistically significant (t=-1.90). Interestingly, these results do not hold for the case of high idiosyncratic risk firms. As shown in Panel B, there is no statistically significant association between both polynomials of managerial ownership and Tobin's Q, which is in line with Hypothesis 2. As expected, the adjusted R^2 statistic is much lower for the case of high idiosyncratic risk firms.

[Insert Table 4 about here]

As for the semi-parametric estimation, Figures 3 and 4 depict the net effect of managerial ownership on Tobin's Q for low idiosyncratic risk and high idiosyncratic risk companies, respectively. The semi-parametric results reinforce Hypotheses 1 and 2 and lead to the following two conclusions. First, firms that are exposed to a low level of idiosyncratic risk benefit from managerial ownership; there exists a strong alignment effect for managerial ownership for levels lower than 10% (the F test is highly significant with p=0.00). For ownership levels that are greater than 10%, there is a possibility of a turning point in the relationship and hence an entrenchment effect, but no strong inferences can be drawn due to the large confidence bounds. Second, there is no evidence of any alignment effect of managerial ownership for the case of high-risk firms as shown in Figure 4 and as confirmed by the corresponding F-test (p-value=0.13). Also, due to the irrelevance of the managerial ownership terms in the valuation model for high idiosyncratic risk firms, the specifications in Panel B exhibit a much lower explanatory power compared to the specifications for low idiosyncratic risk firms (Panel A).

[Insert Figures 3&4 about here]

Table 5 refers to the case where firms are assigned into low idiosyncratic risk and high idiosyncratic risk categories according to their conditional idiosyncratic standard deviation, estimated using an EGARCH(1,1) model (see equation (3)). The results remain qualitatively

similar to the ones reported using unconditional standard deviations of residuals from models (1) and (2). We find that the positive (and potentially nonlinear) impact of managerial ownership on Tobin's Q holds only for the case of low idiosyncratic risk firms (those with low *ID_RISK(EGARCH)* values) but not for the case of high idiosyncratic risk firms (those with high *ID_RISK(EGARCH)* values). These conclusions are drawn from using both parametric and semi-parametric models (see Panels A and B of Table 5 and Figures 5 and 6) and appropriate test statistics (e.g., the *F*-test shows that the null hypothesis that managerial ownership does not have any explanatory power in the Q equation is rejected for the case of low idiosyncratic firms (*p*-value=0.02) but cannot be rejected for the case of high idiosyncratic risk firms (*p*-value=0.19)).

[Insert Table 5 about here]

[Insert Figures 5&6 about here]

The results presented in Table 3 to 5 also yield several interesting findings with respect to the rest variables used as predictors of firm value. Starting with the accounting variables, investment and cash holding are strong predictors of Tobin's Q, both for the low idiosyncratic risk and high idiosyncratic risk companies. As expected, dividend also affects firm value in a positive way, but such effect is more pronounced for the case of low idiosyncratic risk companies. In line with prior literature, firm size enters with a positive coefficient in all specifications considered. Among the set of board /corporate governance characteristics considered, the variable OTHER_CEO_DIRECTORS has a negative and statistically coefficient in the models for high idiosyncratic risk firms. This finding suggests that, ceteris paribus, high-risk firms whose directors act as CEOs in other companies exhibit lower valuations compared to companies whose directors do not hold senior positions elsewhere. There is also some evidence

that busy directors result in lower firm valuations; the variable BUSY_ DIRECTORS has a negative coefficient though it is not statistically significant in all models considered (see Tables 3 to 5). Finally, our findings strongly support the well documented negative link between board size and Tobin's Q (i.e. the variable BOARDSIZE has a negative and statistically significant coefficient in all models presented in Tables 3 to 5).

V. Further Evidence

A. Idiosyncratic Skewness and Value-at-Risk

In addition to being averse to volatility, managers are likely to exhibit aversion to negative skewness and preference over positive skewness. Such a behavior has been termed as prudence by Kimball (1990) and it is linked to the precautionary motive of Leland (1968). It has been argued since Kraus and Litzenberger (1976) and empirically documented by Harvey and Siddique (2000) that skewness is an important dimension of risk. Recently, Mitton and Vorkink (2007) have shown that, apart from the systematic component of skewness (coskewness), shares' idiosyncratic skewness may be a priced risk factor too. To capture this dimension of idiosyncratic risk, we use an additional measure. Specifically, in line with Boyer, Mitton and Vorking (2009), we estimate idiosyncratic skewness as follows:

$$ID\_RISK\left(SKEWNESS\right) = \frac{1}{T}\frac{\sum_t \varepsilon_{it}^3}{\left(\sqrt{\frac{1}{T}\sum_t \varepsilon_{it}^2}\right)^3} \tag{11}$$

where ε_{it} stands for the residual series estimated from the Fama-French 3-factor model (equation (2)) and T refers to the numbers of weeks in each year (i.e., equation (2) is estimated on a yearly basis using weekly data).

Companies are assigned into each idiosyncratic risk group according to their ID_RISK(SKEWNESS) using the 33th and 67th percentiles as cut-off points. In particular, the firms with the most negative estimated values of *ID_RISK(SKEWNESS)* are classified as high idiosyncratic risk, since negative idiosyncratic skewness is the undesirable feature of stock returns that managers would be averse to, while the firms with the most positive estimated values of *ID_RISK(SKEWNESS)* are classified as low idiosyncratic risk, since managers would prefer to hold stocks with such a characteristic (see Mitton and Vorkink, 2007). Table 6 and Figures 7 and 8 present the corresponding estimation results for high (Panel A) and low (Panel B) idiosyncratic risk firms. The results corroborate those obtained using other measures of idiosyncratic risk. In particular, at low levels, managerial ownership leads to a strong alignment effect, but this holds only for the case of low idiosyncratic risk firms (most positive idiosyncratic skewness). For high idiosyncratic risk (most negative idiosyncratic skewness) firms, there is no convincing evidence to suggest that managerial ownership plays an important role in the Tobin's Q equation. These results hold under both parametric and semi-parametric estimation methods.

[Insert Table 6 about here]

[Insert Figures 7&8 about here]

For completeness, we also use a less sophisticated measure of idiosyncratic risk to accommodate the case where managers are loss averse (Dittmann, Maug and Spalt, 2010). In the spirit of Kahneman and Tversky (1979), managers may be particularly averse to losses relative to a reference point, and hence they would like to avoid holding stocks that exhibit extreme negative returns. To capture this dimension of risk, we use Value-at-Risk (VaR) that measures the potential loss in the value of a company's stock over a year, for a given confidence interval.

For the purpose of our analysis, we use weekly data and consider a 95% confidence interval.[7] Our Value-at-Risk measure is given by the expression:

$$VAR(95\%) = \frac{1}{T}\sum_t R_{it} + 1.96\sqrt{\frac{1}{T}\sum_t \left(R_{it} - \overline{R}\right)^2} \quad (12)$$

where R_{it} is the stock return for stock *i* at time *t* and $\overline{R}$ is average stock return. This measure is adjusted for industry to obtain the idiosyncratic component of Value-at-Risk (denoted as *ID_RISK(VAR)*).

The analysis of the effect of managerial ownership on Tobin's Q for low *ID_RISK(VAR)* and high *ID_RISK(VAR)* firms is presented in Table 7 and Figures 9 and 10. Once more the results are consistent with Hypotheses 1 and 2. In particular, in line with Hypothesis 1, managerial ownership (at low levels) exhibits a positive and statistically significant association with Tobin's Q for the case of low idiosyncratic risk companies. The alignment effect is followed by an entrenchment effect at higher levels of managerial ownership (i.e. the coefficient of the squared term of managerial ownership is found to be negative and statistically significant). Figure 9 also shows a strong positive link between managerial ownership and Tobin's Q for ownership levels lower than 10%. On the contrary, there is no evidence supporting a significant effect of managerial ownership on Tobin's Q for the case of high idiosyncratic risk firms, which is in line with Hypothesis 2. More specifically, as shown in Panel B, both the level and squared terms of managerial ownership terms appear to be statistically insignificant. Also, as shown in Figure 10, the curve that depicts the link between managerial ownership and Tobin's Q does not conform to any significant relationship between the two variables (i.e. the slope of the curve is not significantly different from zero and is associated with large confidence bounds).

[7] Our results remain the same after using 90% and 99% Value-at-Risk measures.

[Insert Table 7 about here]

[Insert Figures 9&10 about here]

B. Alternative Firm Value Indicators

In order to check the robustness of our results, we re-estimate our parametric and semi-parametric models after using an alternative proxy for firm value/performance, namely the Return on Shareholder Equity (RSE). The main difference between Tobin's Q and RSE is that while the former is marked-based measure, the latter is a purely accounting measure.[8] To this end, our analysis will provide insights into the conditional value of managerial ownership for the accounting performance of firms.

In Table 8 and Figures 11 and 12 we report the results for low idiosyncratic risk and high idiosyncratic risk firms as classified according to the variable *ID_RISK(CAPM)*. Most of the results corroborate those obtained using Tobin's Q as a proxy for firm value. In line with Hypothesis 1, managerial ownership exhibits a positive and statistically significant association with RSE for the case of low idiosyncratic risk companies; the estimated coefficient for the level managerial ownership term is 0.109 (t=2.04). This positive relationship turns into negative at higher levels of managerial ownership (i.e. the coefficient of the squared term of managerial ownership is found to be negative at -0.176 and marginally statistically significant (t=-1.77), which supports the entrenchment effect of managerial ownership. On the contrary, there is no evidence supporting a significant effect of managerial ownership on RSE for the case of high

[8] Wei, Xie and Zhang (2005) use an alternative performance measure, namely Return on Sales (ROS) in their study on the impact of ownership structure on firm value in China. Our results remain similar when ROS is used as a substitute for RSE (results available upon request). However, we prefer to present the results based on RSE so that our study is directly comparable to other US studies using RSE as proxy for performance (see e.g. Hutchinson and Gul (2004)).

idiosyncratic risk firms. The coefficient of the level managerial ownership term is actually negative and statistically insignificant for the case high idiosyncratic risk firms.

With respect to the semi-parametric results, the estimated ownership-performance curve has a positive slope at low levels of managerial ownership (i.e. <8%) for the case of low idiosyncratic risk companies (see Figure 11); the corresponding confidence bounds are narrow, indicating the existence of an alignment effect and supporting Hypothesis 1.However, such an effect is not present for the case of high idiosyncratic risk firms. The line that depicts the managerial ownership-RSE curve (see Figure 12) has a negative slope for low levels of managerial ownership. Also, there are several possible turning points thereafter. However, but no strong conclusions can be drawn due to the large confidence bounds. Overall, the evidence supports the view that the positive relationship between managerial ownership and firm value, if any, becomes considerably weaker for the case of firms exposed to a high level of idiosyncratic risk (Hypothesis 2). These findings hold when the variables ID_RISK (FAMA-FRENCH), ID_RISK (EGARCH), IND_RISK (SKEWNESS) and ID_RISK (VALUE-AT-RISK) are used to split firms into low idiosyncratic and high idiosyncratic risk firms (results available upon request).

Moving to the remaining variables, the RSE-based results highlight that common predictors of market-based performance value do not necessarily work for accounted-based performance. For example, although dividend and investment are important determinants of RSE for the case of low idiosyncratic firms, this is not the case for high idiosyncratic firms. Furthermore, in contrast to the findings presented in Tables 3 to 7, the negative impact of leverage is present only for the case of for high idiosyncratic firms and there is some weak evidence that leverage positively impacts on RSE for low idiosyncratic firms. In terms of the corporate governance attributes, board independence is positively associated to RSE in all

models considered. Also, our findings suggest that busy directors result in lower firm valuations but this effect holds only for the case of high idiosyncratic risk firms. Finally, the results show that the variable BOARDSIZE is negatively associated with RSE but not in a statistically significant way.

[Insert Table 8 about here]

[Insert Figures 11&12 about here]

5. Conclusions

This study examines the relationship between managerial ownership and firm value contingent upon firms' idiosyncratic risk. Borrowing insights from recent theoretical studies, we develop testable hypotheses based on the premise that large managerial shareholdings, apart from aligning the interests of managers with those of shareholders, they also create strong incentives for risk substitution. In particular, in an attempt to reduce their exposure to practically unhedgeable firm-specific (idiosyncratic) risk, managers pass up innovative projects with high firm-specific risk in favor of standard projects that have greater aggregate market or industry risk, which is hedgeable. While such behavior may be beneficial for managers, it leads to suboptimal corporate investment, and hence destroys firm value.

We carefully construct a dataset comprising 1,969 US listed companies on NYSE, AMEX and NASDAQ and test hypotheses regarding the shape of the ownership-value relationship using parametric and semi-parametric approaches. Our findings provide compelling evidence supporting the existence of a risk-substitution effect associated with large managerial shareholdings. In particular, the results are in line with our contingency argument that the effectiveness of managerial ownership as a mechanism to address agency problems is negligible for high idiosyncratic risk firms. On the contrary, managerial ownership seems to be a

particularly effective governance mechanism for the case of low idiosyncratic risk firms, though the relationship between managerial ownership and firm value is not necessarily linear. The latter finding implies that the use of tightly parameterized methods (e.g. regressions with higher order polynomials or piecewise regressions that assume a priori a fixed number and/or location of turning points) may fail to adequately capture the true nature of the relationship between managerial ownership and firm value.

Overall, examining the interactions between managerial ownership and idiosyncratic risk and how such interaction influences firm value, the current study responds to calls for further research on the complex ways in which internal governance mechanisms interact with other characteristics of firms (see e.g., Denis, 2001; Netter, Poulsen and Stegemoller, 2009). Our findings contribute to the current debate in the literature about whether the relation between ownership and performance is genuine (see Jensen and Meckling's agency theory) or spurious due to its endogenous nature (Agrawal and Knoeber, 1996; Demsetz and Villalonga, 2001; Bhagat and Bolton, 2008), the difficulty to properly incorporate in empirical models the costs that managers incur while trying to improve governance (Cheung and Wei, 2006), and the use of imperfect measures of managerial incentives such as pay-performance sensitivity rather than pay-performance elasticity (Benson and Davidson, 2009). The results of this study strongly suggest that future studies that attempt to determine the ownership-performance link should recognize the benefits but also the costs associated with large managerial shareholdings due to risk- substitution incentives. As Acharya and Bisin (2009) argue, the form of moral hazard that relates to risk-substitution is largely ignored in the extant empirical research. Moreover, our results illustrate that semi-parametric methods may prove particularly useful for subsequent studies on ownership structure and firm performance.

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TABLE 1
Variable Definitions

Variable Name	Definition	Data Items used
Tobin's Q	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	DataStream items: *MV, WC03501, WC03451, WC02999*
Return on Shareholder Equity (RSE)	The ratio of net income before preferred dividends minus preferred dividend requirement to last year's common equity	DataStream items: *WC08301*
MANAGERIAL OWNERSHIP	The percentage of shares held by the management and directors, as reported in the company's most recent proxy statement	Board Analyst item: *InsidersPctg*
ID_RISK(CAPM) (%)	The standard deviation of the residual series derived from the CAPM.	Datastream items: *RI* French's Risk Factors: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
ID_RISK(FAMA-FRENCH) (%)	The standard deviation of the residual series derived from the Fama-French three-factor model.	Datastream items: *RI* French's Risk Factors: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
ID_RISK(EGARCH) (%)	The average conditional variance of the residual series of the Fama-French three-factor model, as estimated using the EGARCH (1,1) model described in Section III.B.	Datastream items: *RI* French's Risk Factors: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
ID_RISK(SKEWNESS) (%)	The skewness of the residual series term of Fama-French 3-factor model. This is estimated through the formula: $ID\_RISK\left(SKEWNESS\right) = \frac{1}{T}\frac{\sum_t \varepsilon_{it}^3}{\left(\sqrt{\frac{1}{T}\sum_t \varepsilon_{it}^2}\right)^3}$ where T refers to the numbers of weeks in each year (estimated on a yearly basis using weekly data)	Datastream items: *RI* French's Risk Factors: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
ID_RISK(VALUE-AT-RISK) (%)	The potential loss in the value of a company's stock over a year, for a given confidence interval (Value-at Risk). For the purpose of our analysis, we use weekly data and consider a 95% confidence interval. Our Value-at-Risk measure is given by the expression below $VAR(95\%) = \frac{1}{T}\sum_t R_{it} + 1.96\sqrt{\frac{1}{T}\sum_t \left(R_{it} - \overline{R}\right)^2}$ where is the R_{it} is the stock return for stock *i* at time *t* and $\overline{R}$ is average stock return.	Datastream items: *RI*

Variable Name	Definition	Data Items used
DIVIDEND (%)	The ratio of total dividends to total assets	DataStream items: *WC18192, WC01701, WC02999*
INVESTMENT (%)	The ratio of capital expenditures to total assets	DataStream items: *WC04601, WC02999*
CASH HOLDING (%)	The ratio of cash holdings to total assets	DataStream items: *WC02001, WC02999*
FIRM_SIZE	The natural logarithm of the share price multiplied by the number of ordinary shares in issue	DataStream items: *MV*
STAGGERED_BOARD (%)	A dummy variable indicating a classified board voting structure where directors stand for re-election on a staggered schedule	Board Analyst item: *BdClassified*
OTHER_CEO_DIRECTORS (%)	The ratio of the number of directors on a board who are active CEOs of other public or private companies to the total number of directors on the board	Board Analyst item: *DirectorsActiveCEOs, DirectorsOutsideTotal, DirectorsInside*
NO_ATTEND_DIRECTORS (%)	The ratio of the number of directors that have failed to meet the board's minimum attendance standards to the total number of directors on the board.	Board Analyst item: *DirectorsFaile, DirectorsOutsideTotal, DirectorsInside*
INDEPENDENT_DIRECTORS (%)	The ratio of the number of all fully independent directors on a given board to the total number of directors on the board.	Board Analyst item: *DirectorsOutside, DirectorsOutsideTotal, DirectorsInside*
BUSY_ DIRECTORS (%)	The ratio of the number of directors with more than 4 corporate (public) directorships on a given board to the total number of directors on the board.	Board Analyst item: *DirectorsOver4Boards, DirectorsOutsideTotal, DirectorsInside*
EXPERIENCED_ DIRECTORS (%)	The ratio of all directors with tenure exceeding 15 years on a given board to the total number of directors on the board.	Board Analyst item: *DirectorsOver15YrsTenure, DirectorsOutsideTotal, DirectorsInside*
OUTSIDE_ DIRECTORS (%)	The ratio of the number of outside directors and the number of outside-related directors to the total number of directors on the board.	Board Analyst item: *DirectorsOutsideTotal, DirectorsInside*
OLD_ DIRECTORS (%)	The ratio of the number of all directors over the age of 70 on a given board to the total number of directors on the board	Board Analyst item: *DirectorsOver70, DirectorsOutsideTotal, DirectorsInside*
WOMEN_ DIRECTORS (%)	The ratio of the number of all female directors to the total number of directors on the board	Board Analyst item: *DirectorsWomen, DirectorsOutsideTotal, DirectorsInside*
BOARDSIZE	The number of total number of directors on the board	Board Analyst items: *DirectorsOutsideTotal, DirectorsInside*

TABLE 2
Variables-Descriptive Statistics

This Table presents analytical descriptive statistics for our firm value proxies, managerial ownership (our key explanatory variable), our five idiosyncratic risk proxies and all the control variables used in our analysis. Analytical definitions for all variables are provided in Table 1.

	Mean	***St. Dev.***	***Min***	***25%***	***Median***	***75%***	***Max***
Firm Value Proxies							
TOBIN'S Q	1.88	1.04	0.52	1.22	1.55	2.16	7.98
RSE	0.06	0.30	-3.44	0.03	0.11	0.18	0.93
Key Explanatory Variable							
MANAGERIAL OWNERSHIP (%)	14.58	15.25	0	3.14	7.90	22.08	64.84
Idiosyncratic Risk Proxies							
ID_RISK(CAPM) (%)	4.68	2.28	0.96	2.96	4.08	5.65	34.12
ID_RISK(FAMA-FRENCH) (%)	4.44	2.43	0.93	2.83	3.88	5.38	32.53
ID_RISK (EGARCH) (%)	4.54	4.19	1.01	2.85	3.91	5.42	290.3
ID_RISK (VAR) (%)	10.35	5.73	1.95	6.57	9.06	12.41	66.58
ID_RISK (SKEWNESS) (%)	-0.10	0.87	-6.51	-0.49	-0.03	0.39	4.49
Control Variables							
DIVIDEND (%)	1.05	1.78	0	0	0.11	1.54	19.31
INVESTMENT (%)	5.29	5.08	0	2.08	3.78	6.63	48.42
CASH HOLDING (%)	16.34	18.84	0	2.52	8.58	23.94	98.99
FIRM_SIZE	7.40	1.52	3.92	6.33	7.27	8.33	12.59
LEVERAGE (%)	22.72	18.55	0	5.03	21.93	34.76	98.82
STAGGERED_BOARD (%)	96.79	17.62	0	100	100	100	100
OTHER_CEO_DIRECTORS (%)	36.21	27.11	0	16.67	28.57	42.86	100
NO_ATTEND_DIRECTORS (%)	1.41	4.53	0	0	0	0	100
INDEPENDENT_DIRECTORS (%)	69.55	15.48	0	60	71.43	81.82	100
BUSY_ DIRECTORS (%)	9.82	12.23	0	0	7.69	16.67	90
EXPERIENCED_ DIRECTORS (%)	14.99	17.08	0	0	11.11	25	100
OUTSIDE_ DIRECTORS (%)	79.94	11.60	0	75	83.33	88.89	100
OLD_ DIRECTORS (%)	8.99	12.20	0	0	0	14.29	71.43
WOMEN_ DIRECTORS (%)	9.59	9.32	0	0	10	14.29	60.00
BOARDSIZE	8.97	2.31	3	7	9	10	21

TABLE 3
Parametric and Semi-parametric Results for firms with Low and High Idiosyncratic Risk [ID_RISK(CAPM)]

This Table presents evidence on the impact of managerial ownership on Tobin's Q for high idiosyncratic risk (Panel A) and low idiosyncratic risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(CAPM) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the *F*-test for the statistical significance of the non-parametric (smooth) term of managerial ownership in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant). For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 1 for low idiosyncratic risk firms and in Figure 2 for high idiosyncratic risk firms.

	Panel A: LOW ID_RISK(CAPM) *(Low Idiosyncratic Risk Firms)*		**Panel B: HIGH ID_RISK(CAPM)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	0.920 (2.16)**	***See Figure 1***	0.021 (0.05)	***See Figure 2***
MANAGERIAL OWNERSHIP_SQUARED	-1.818 (-2.26)**		0.257 (0.34)	
DIVIDEND	9.518 (7.06)***	9.733 (9.86)***	5.637 (3.22)***	5.635 (4.11)***
INVESTMENT	1.754 (4.20)***	1.714 (3.62)***	1.251 (3.30)***	1.251 (3.38)***
CASH HOLDING	1.704 (8.96)***	1.701 (11.47)***	1.725 (11.61)***	1.726 (14.99)***
FIRM_SIZE	0.277 (16.63)***	0.287 (17.94)***	0.173 (10.07)***	0.173 (10.81)***
LEVERAGE	-0.840 (-5.86)***	-0.856 (-6.38)***	-0.248 (-2.13)**	-0.248 (-2.32)**
STAGGERED_BOARD	0.162 (0.49)	0.155 (0.75)	0.018 (0.17)	0.017 (0.16)
OTHER_CEO_DIRECTORS	-0.099 (-0.89)	-0.090 (-0.84)	-0.324 (-4.87)***	-0.326 (-4.87)***
NO_ATTEND_DIRECTORS	0.227 (0.33)	0.236 (0.52)	0.059 (0.17)	0.056 (0.16)
INDEPENDENT_DIRECTORS	0.205 (1.50)	0.223 (1.57)	-0.214 (-1.21)	-0.212 (-1.19)
BUSY_ DIRECTORS	-0.736 (-5.89)***	0.721 (-5.26)***	-0.127 (-0.73)	-0.129 (-0.66)
EXPERIENCED_ DIRECTORS	-0.164 (-1.25)	-0.185 (-1.54)	0.165 (1.29)	0.162 (1.34)
OUTSIDE_ DIRECTORS	-0.065 (-0.27)	-0.069 (-0.28)	0.263 (1.29)	0.265 (1.05)
OLD_ DIRECTORS	-0.050 (-0.26)	-0.046 (-0.28)	0.256 (1.60)	0.256 (1.59)
WOMEN_ DIRECTORS	-0.084 (-0.35)	-0.053 (-0.24)	-0.041 (-0.17)	-0.038 (-0.17)
BOARDSIZE	-0.078 (-8.23)***	-0.078 (-8.04)***	-0.072 (-7.25)	-0.072 (-6.83)***
Intercept	-0.064 (-0.18)	-0.076 (-0.29)	0.925 (3.87)***	0.949 (4.56)***
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2383	2383	2383	2383
R^2 Adjusted	32.71%	32.30%	23.91%	23.10%
GCV Score	-	0.732	-	0.842
Wald/F-Test (p-values)	0.07	0.01	0.39	0.21

TABLE 4
Parametric and Semi-parametric Results for firms with Low and High Idiosyncratic Risk
[ID_RISK(FAMA-FRENCH)]

This table presents evidence on the impact of managerial ownership on Tobin's Q for high-risk (Panel A) and low-risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(FAMA-FRENCH) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the F-test for the statistical significance of the non-parametric (smooth) term of managerial ownershi in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant. For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 3 for low idiosyncratic risk firms and in Figure 4 for high idiosyncratic risk firms.

	Panel A: LOW ID_RISK(FF) *(Low Idiosyncratic Risk Firms)*		**Panel B: HIGH ID_RISK(FF)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	0.76 (1.84)*	***See Figure 3***	0.035 (0.08)	***See Figure 4***
MANAGERIAL OWNERSHIP_SQUARED	-1.530 (-1.90)*		0.291 (0.38)	
DIVIDEND	10.148 (7.61)***	10.403 (10.41)***	4.986 (3.17)***	4.983 (3.61)***
INVESTMENT	1.572 (3.73)***	1.530 (3.24)***	1.205 (3.22)***	1.204 (3.27)***
CASH HOLDING	1.665 (8.86)***	1.661 (11.35)***	1.704 (11.52)***	1.704 (14.81)***
FIRM_SIZE	0.274 (17.24)***	0.285 (18.07)***	0.174 (10.15)***	0.174 (10.85)***
LEVERAGE	-0.763 (-5.33)***	-0.779 (-5.88)***	-0.252 (-2.25)**	-0.253 (-2.35)**
STAGGERED_BOARD	0.181 (0.62)	0.170 (0.88)	0.035 (0.34)	0.034 (0.33)
OTHER_CEO_DIRECTORS	-0.028 (-0.26)	-0.017 (-0.17)	-0.334 (-5.02)***	-0.337 (-5.03)***
NO_ATTEND_DIRECTORS	0.332 (0.47)	0.345 (0.77)	0.081 (0.23)	0.076 (0.22)
INDEPENDENT_DIRECTORS	0.165 (1.21)	0.186 (1.31)	-0.293 (-1.54)	-0.291 (-1.64)
BUSY_ DIRECTORS	-0.751 (-5.92)***	-0.739 (-5.43)***	-0.138 (-0.78)	-0.134 (-0.71)
EXPERIENCED_ DIRECTORS	-0.163 (-1.27)	-0.185 (-1.56)	0.138 (1.07)	0.135 (1.12)
OUTSIDE_ DIRECTORS	-0.054 (-0.23)	-0.068 (-0.28)	0.264 (0.98)	0.266 (1.06)
OLD_ DIRECTORS	0.038 (0.20)	0.038 (0.23)	0.268 (1.65)	0.267 (1.65)
WOMEN_ DIRECTORS	-0.251 (-1.06)	-0.209 (-0.95)	-0.059 (-0.25)	-0.056 (-0.25)
BOARDSIZE	-0.077 (-8.33)***	-0.077 (-8.06)***	-0.066 (-6.69)***	-0.066 (-6.22)***
Intercept	-0.044 (-0.13)	-0.058 (-0.23)	0.092 (3.87)***	0.947 (4.58)***
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2383	2383	2383	2383
R^2 Adjusted	32.76%	32.40%	23.50%	22.70%
GCV Score	-	0.724	-	0.842
Wald/F-Test (p-value)	0.06	0.00	0.28	0.13

TABLE 5
Parametric and Semi-parametric Results for firms with Low and High Idiosyncratic Risk [ID_RISK(EGARCH)]

This table presents evidence on the impact of managerial ownership on Tobin's Q for high-risk (Panel A) and low-risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(EGARCH) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the F-test for the statistical significance of the non-parametric (smooth) term of managerial ownership in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant. For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 5 for low idiosyncratic risk firms and in Figure 6 for high idiosyncratic risk firms.

	Panel A: LOW ID_RISK(EGARCH) *(Low Idiosyncratic Risk Firms)*		**Panel B: HIGH ID_RISK(EGARCH)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	0.841 (2.05)**	***See Figure 5***	-0.039 (-0.09)	***See Figure 6***
MANAGERIAL OWNERSHIP_SQUARED	-1.523 (-1.94)*		0.381 (0.50)	
DIVIDEND	10.304 (7.86)***	10.469 (10.49)***	5.064 (2.96)***	5.060 (3.67)***
INVESTMENT	1.684 (4.05)***	1.638 (3.40)***	1.189 (3.17)***	1.187 (3.21)***
CASH HOLDING	1.690 (8.87)***	1.691 (11.37)***	1.714 (11.61)***	1.715 (14.86)***
FIRM_SIZE	0.268 (16.90)***	0.278 (17.42)***	0.176 (10.16)***	0.176 (11.03)***
LEVERAGE	-0.785 (-5.48)***	-0.800 (-5.99)***	-0.272 (-2.45)***	-0.273 (-2.54)**
STAGGERED_BOARD	0.199 (0.66)	0.189 (0.93)	0.020 (0.19)	0.017 (0.17)
OTHER_CEO_DIRECTORS	0.020 (0.20)	0.031 (0.30)	-0.321 (-4.76)***	-0.324 (-4.82)***
NO_ATTEND_DIRECTORS	0.546 (0.75)	0.555 (1.18)	0.391 (1.15)	0.388 (1.04)
INDEPENDENT_DIRECTORS	0.172 (1.24)	0.191 (1.33)	-0.268 (-1.43)	-0.265 (-1.51)
BUSY_ DIRECTORS	-0.731 (-5.64)***	-0.721 (-5.27)***	-0.102 (-0.57)	-0.096 (-0.50)
EXPERIENCED_ DIRECTORS	-0.092 (-0.70)	-0.112 (-0.93)	0.067 (0.51)	0.063 (0.52)
OUTSIDE_ DIRECTORS	-0.023 (-0.09)	-0.035 (-0.14)	0.302 (1.10)	0.305 (1.20)
OLD_ DIRECTORS	0.013 (0.07)	0.017 (0.10)	0.259 (1.58)	0.258 (1.59)
WOMEN_ DIRECTORS	-0.172 (-0.72)	-0.135 (-0.60)	-0.091 (-0.40)	-0.087 (-0.39)
BOARDSIZE	-0.075 (-8.22)***	-0.074 (-7.77)***	-0.069 (-6.93)***	-0.069 (-6.42)***
Intercept	-0.099 (-0.30)	-0.102 (-0.38)	0.903 (3.79)***	0.924 (4.47)***
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2383	2383	2383	2383
R^2 Adjusted	32.25%	31.80%	24.17%	23.40%
GCV Score	-	0.742	-	0.845
Wald/F-Test (p-value)	0.12	0.02	0.35	0.19

TABLE 6
Parametric and Semi-parametric Results for firms with Positive and Negative Idiosyncratic Skewness [ID_RISK(SKEWNESS)]

This table presents evidence on the impact of managerial ownership on Tobin's Q for high-risk (Panel A) and low-risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(SKEWNESS) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the F-test for the statistical significance of the non-parametric (smooth) term of managerial ownership in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant). For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 7 for low idiosyncratic risk firms and in Figure 8 for high idiosyncratic risk firms.

	Panel A: Most Positive ID_RISK(SKEWNESS) *(Low Idiosyncratic Risk Firms)*		**Panel B: Most Negative ID_RISK(SKEWNESS)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	1.253 (2.80)***	***See Figure 7***	0.709 (1.59)	***See Figure 8***
MANAGERIAL OWNERSHIP_SQUARED	-1.997 (-2.37)**		-0.869 (-1.06)	
DIVIDEND	8.147 (4.61)***	8.258 (6.44)***	6.994 (5.00)***	6.970 (6.55)***
INVESTMENT	2.208 (4.26)***	2.181 (4.83)***	1.090 (3.20)***	1.093 (2.71)***
CASH HOLDING	1.842 (11.07)***	1.846 (14.44)***	1.923 (11.07)***	1.924 (14.79)***
FIRM_SIZE	0.244 (14.02)***	0.252 (15.11)***	0.249 (14.54)***	0.248 (16.52)***
LEVERAGE	-0.325 (-2.41)**	-0.329 (-2.82)***	-0.514 (-4.51)***	-0.507 (-4.20)***
STAGGERED_BOARD	0.125 (0.72)	0.129 (0.83)	-0.061 (-0.46)	-0.056 (-0.46)
OTHER_CEO_DIRECTORS	-0.380 (-4.28)***	-0.367 (-3.93)***	-0.283 (-4.08)***	-0.278 (-3.99)
NO_ATTEND_DIRECTORS	0.308 (0.53)	0.300 (0.70)	0.332 (0.88)	0.330 (0.81)
INDEPENDENT_DIRECTORS	0.016 (0.10)	0.034 (0.21)	-0.077 (-0.48)	-0.086 (-0.56)
BUSY_ DIRECTORS	-0.053 (-0.29)	-0.051 (-0.30)	-0.382 (-2.26)**	-0.389 (-2.39)**
EXPERIENCED_ DIRECTORS	-0.111 (-0.83)	-0.129 (-1.01)	-0.014 (-0.11)	-0.004 (-0.04)
OUTSIDE_ DIRECTORS	-0.060 (-0.22)	-0.069 (-0.27)	0.120 (0.48)	0.110 (0.46)
OLD_ DIRECTORS	0.190 (1.02)	0.182 (1.07)	0.166 (1.01)	0.169 (1.08)
WOMEN_ DIRECTORS	-0.264 (-1.11)	-0.234 (-1.01)	-0.399 (-1.60)	-0.407 (-1.79)*
BOARDSIZE	-0.085 (-7.88)***	-0.086 (-8.13)***	-0.062 (-6.49)***	-0.062 (-6.32)***
Intercept	0.276 (1.08)	0.321 (1.33)	0.709 (1.59)	0.518 (2.50)**
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2383	2383	2383	2383
R^2 Adjusted	28.24%	27.70%	29.21%	28.40%
GCV Score	-	0.888	-	0.775
Wald/F-Test (p-value)	0.02	0.01	0.11	0.09

TABLE 7
Parametric and Semi-parametric Results for firms with Low and High Idiosyncratic Risk [ID_RISK(VAR)]

This table presents evidence on the impact of managerial ownership on Tobin's Q for high-risk (Panel A) and low-risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(VAR) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the F-test for the statistical significance of the non-parametric (smooth) term of managerial ownership in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant). For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 9 for low idiosyncratic risk firms and in Figure 10 for high idiosyncratic risk firms.

	Panel A: LOW ID_RISK(VAR) *(Low Idiosyncratic Risk Firms)*		**Panel B: HIGH ID_RISK(VAR)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	1.197 (2.70)***	***See Figure 9***	0.318 (0.75)	***See Figure10***
MANAGERIAL OWNERSHIP_SQUARED	-2.04 (-2.35)**		-0.111 (-0.15)	
DIVIDEND	8.916 (6.62)***	9.251 (8.86)***	5.854 (3.71)***	5.852 (4.55)***
INVESTMENT	2.380 (5.10)***	2.348 (4.88)***	1.144 (3.15)***	1.144 (3.10)***
CASH HOLDING	2.011 (9.59)***	2.014 (13.27)***	1.767 (12.19)***	1.767 (15.24)***
FIRM_SIZE	0.267 (15.86)***	0.281 (17.05)***	0.179 (10.38)***	0.178 (11.39)***
LEVERAGE	-0.741 (-5.03)***	-0.763 (-5.55)***	-0.378 (-3.58)***	-0.377 (-3.50)***
STAGGERED_BOARD	0.260 (0.83)	0.245 (1.17)	-0.021 (-0.21)	-0.021 (-0.20)
OTHER_CEO_DIRECTORS	-0.100 (-0.94)	-0.089 (-0.82)	-0.336 (-4.88)***	-0.335 (-5.02)***
NO_ATTEND_DIRECTORS	-0.013 (-0.02)	0.011 (0.02)	0.173 (0.49)	0.174 (0.50)
INDEPENDENT_DIRECTORS	0.227 (1.62)	0.242 (1.64)	-0.194 (-1.07)	-0.195 (-1.09)
BUSY_ DIRECTORS	-0.634 (-4.72)***	-0.626 (-4.44)***	-0.161 (-0.93)	-0.163 (-0.87)
EXPERIENCED_ DIRECTORS	-0.201 (-1.46)	-0.224 (-1.82)*	0.102 (0.81)	0.103 (0.85)
OUTSIDE_ DIRECTORS	-0.129 (-0.50)	-0.122 (-0.49)	0.420 (1.56)	0.419 (1.66)*
OLD_ DIRECTORS	0.178 (0.87)	0.174 (1.03)	0.304 (1.88)*	0.304 (1.87)*
WOMEN_ DIRECTORS	-0.122 (-0.49)	-0.066 (-0.29)	-0.176 (-0.75)	-0.177 (-0.77)
BOARDSIZE	-0.076 (-7.64)***	-0.076 (-7.70)***	-0.067 (-6.79)***	-0.067 (-6.34)***
Intercept	-0.170 (-0.49)	-0.172 (-0.63)	0.799 (3.33)***	0.854 (4.16)***
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2383	2383	2383	2383
R^2 Adjusted	32.87%	32.60%	25.02%	24.20%
GCV Score	-	0.774	-	0.844
Wald/F-Test	0.01	0.00	0.09	0.14

TABLE 8
RSE: Parametric and Semi-parametric Results for firms with Low and High Idiosyncratic Risk [ID_RISK(CAPM)]

This Table presents evidence on the impact of managerial ownership on Return on Shareholder Equity (RSE) for high idiosyncratic risk (Panel A) and low idiosyncratic risk (Panel B) companies. Companies are assigned into each risk group according to their ID_RISK(CAPM) using the 33th and 67th percentiles as cut-off points. *t*-values are given in parentheses. ***, ** and * indicate that the coefficient is statistically significant at the 1%, 5% and 10% level respectively. GCV stands for the Generalized Cross-Validation score of each model (see section III.C for details). *Wald* statistic (p-value) tests the null hypothesis that both terms of managerial ownership are equal to 0 in the parametric model. *F*-test (*p*-value) contains the *p*-value corresponding to the *F*-test for the statistical significance of the non-parametric (smooth) term of managerial ownership in the semi-parametric model (the null hypothesis is that that the smooth term is not statistically significant). For our semi-parametric models, the partial impact of managerial ownership on firm value is depicted in Figure 11 for low idiosyncratic risk firms and in Figure 12 for high idiosyncratic risk firms.

	Panel A: LOW ID_RISK(CAPM) *(Low Idiosyncratic Risk Firms)*		**Panel B: HIGH ID_RISK(CAPM)** *(High Idiosyncratic Risk Firms)*	
	Parametric	Semi-parametric	Parametric	Semi-parametric
MANAGERIAL OWNERSHIP	0.109 (2.04)**	***See Figure 11***	-0.008 (-0.43)	***See Figure 12***
MANAGERIAL OWNERSHIP_SQUARED	-0.176 (1.77)*		-0.159 (0.50)	
DIVIDEND	0.107 (6.35)***	0.110 (8.38***	0.346 (0.43)	0.327 (0.59)
INVESTMENT	0.205 (3.81)***	0.199 (5.94)***	-0.045 (-0.32)	-0.046 (-0.31)
CASH HOLDING	0.053 (2.53)**	0.052 (1.88)*	-0.215 (-3.72)***	-0.218 (-4.55)***
FIRM_SIZE	0.030 (15.47)***	0.031 (15.21)***	0.067 (10.15)***	0.067 (10.03)***
LEVERAGE	0.039 (1.72)*	0.037 (1.76)*	-0.399 (-6.23)***	-0.400 (-8.47)***
STAGGERED_BOARD	0.024 (1.27)	0.026 (0.93)	0.019 (0.57)	0.020 (0.49)
OTHER_CEO_DIRECTORS	-0.004 (-0.27)	-0.003 (-0.20)	-0.066 (-2.76)***	-0.066 (-2.40)**
NO_ATTEND_DIRECTORS	-0.017 (-0.26)	-0.015 (-0.27)	-0.207 (-1.13)	-0.205 (-1.44)
INDEPENDENT_DIRECTORS	0.078 (4.36)***	0.080 (4.41)***	0.172 (1.77)*	0.170 (2.31)**
BUSY_ DIRECTORS	-0.007 (-0.43)	-0.007 (-0.41)	-0.519 (-4.49)***	-0.521 (-6.46)***
EXPERIENCED_ DIRECTORS	0.001 (0.09)	0.001 (0.04)	0.073 (1.44)	-0.077 (1.56)
OUTSIDE_ DIRECTORS	-0.058 (-1.88)*	-0.059 (-1.91)*	-0.169 (-1.37)	-0.171 (-1.64)
OLD_ DIRECTORS	-0.002 (-0.77)	-0.001 (-0.67)	-0.071 (-1.24)	-0.070 (-1.06)
WOMEN_ DIRECTORS	0.005 (1.64)	0.005 (1.80)*	0.119 (1.35)	0.119 (1.29)
BOARDSIZE	-0.002 (-1.45)	-0.001 (-1.35)	-0.001 (-0.36)	-0.002 (-0.37)
Intercept	-0.196 (-6.37)***	-0.197 (5.57)***	-0.261 (-3.18)***	-0.265 (-3.14)***
Industry Dummies	**Yes**	**Yes**	**Yes**	**Yes**
Observations	2277	2277	2277	2277
R^2 Adjusted	23.42	22.90	14.91	14.10
GCV Score	-	110.91	-	1335.6
Wald/F-Test (p-values)	0.12	0.03	0.87	0.59

Figure 1

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **low standard deviation of residuals derived from the CAPM** *(low idiosyncratic risk)*

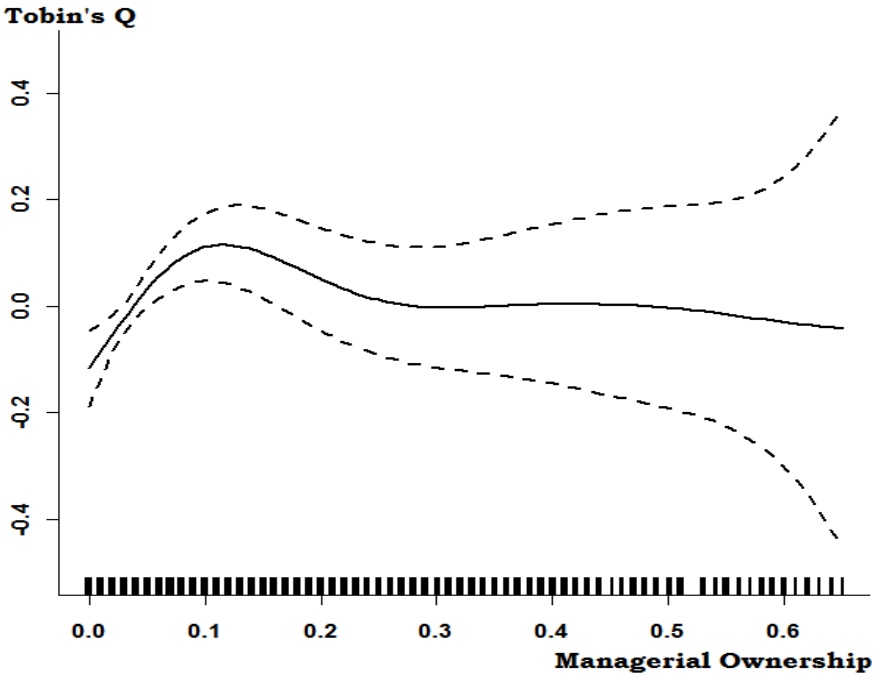

Figure 2

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **high standard deviation of residuals derived from the CAPM** *(high idiosyncratic risk)*

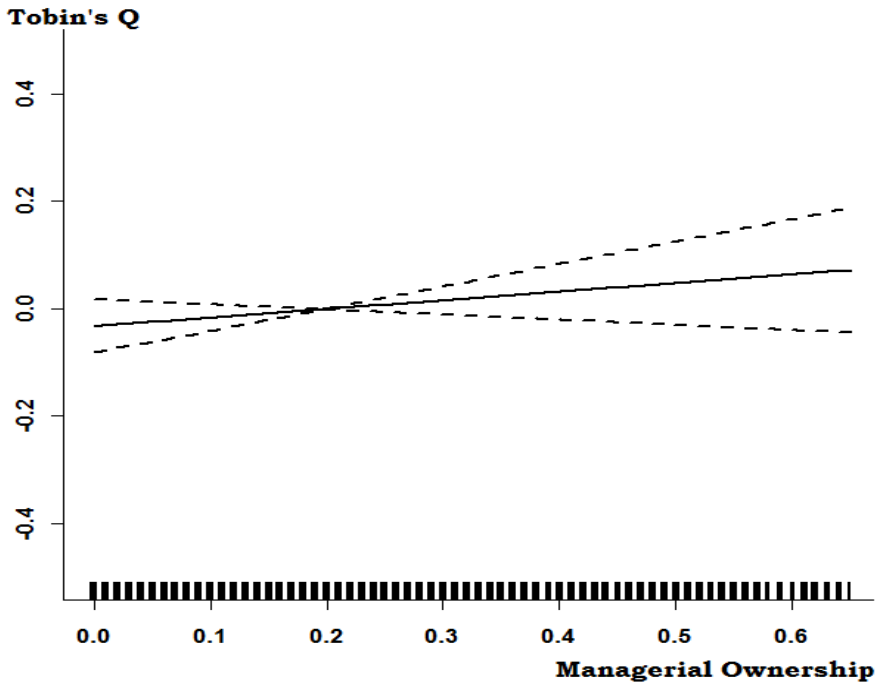

Figure 3

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **low standard deviation of residuals derived from the Fama-French model** *(low idiosyncratic risk)*

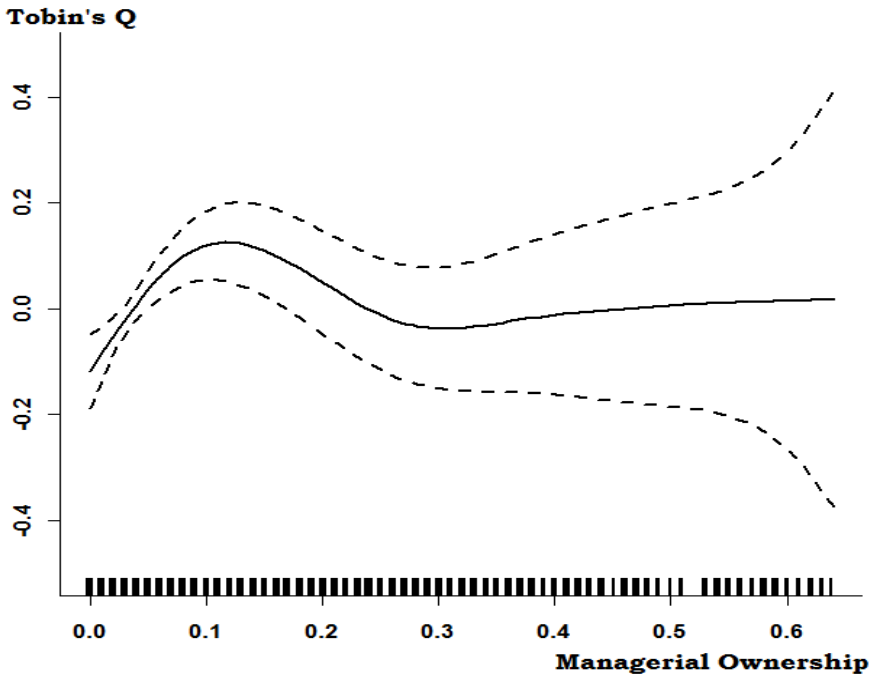

Figure 4

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **high standard deviation of residuals derived from the Fama-French model** *(high idiosyncratic risk)*

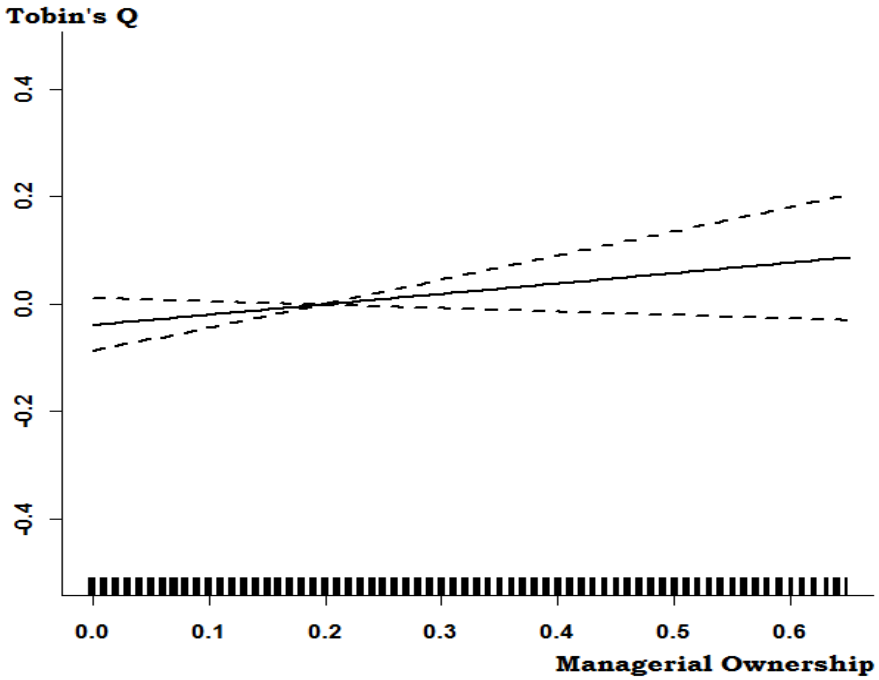

Figure 5

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **low average conditional standard deviation of Fama-French's model residuals, as estimated using an EGARCH (1,1) model** *(low idiosyncratic risk)*

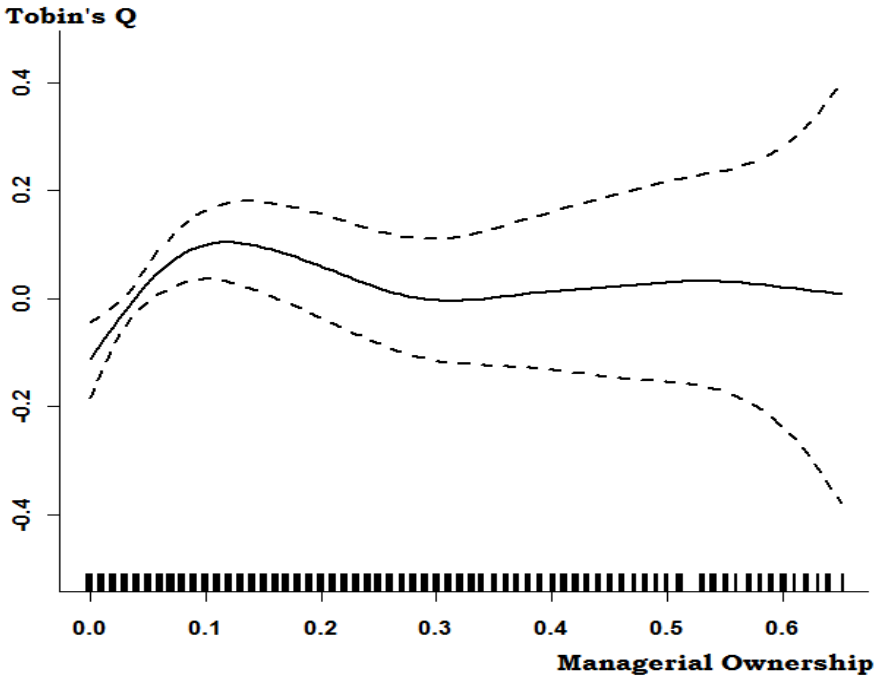

Figure 6

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **high average conditional standard deviation of Fama-French's model residuals, as estimated using an EGARCH (1,1) model** *(high idiosyncratic risk)*

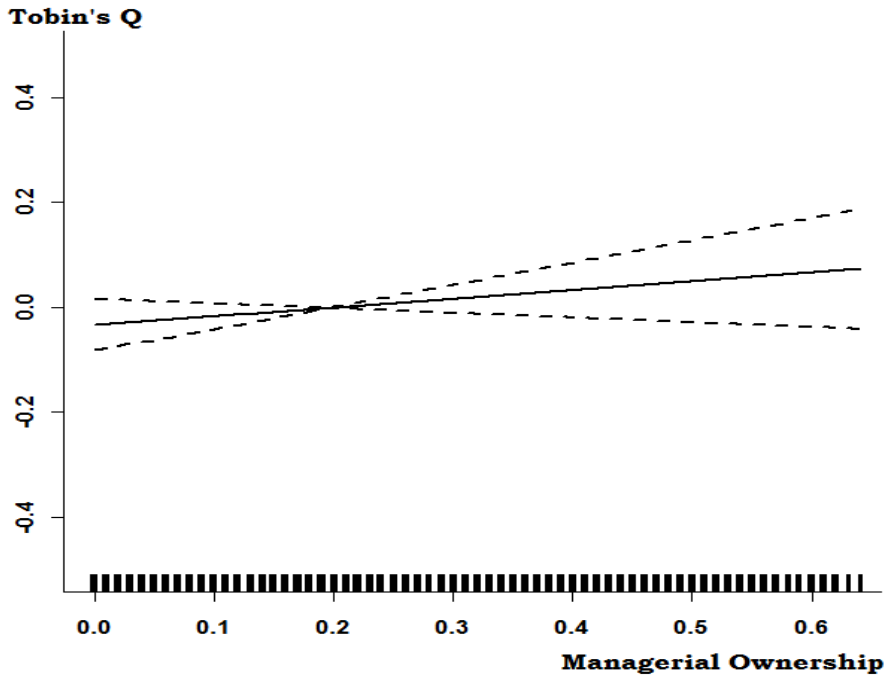

Figure 7

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **most positive idiosyncratic skewness of residuals derived from the Fama-French model** *(low idiosyncratic risk)*

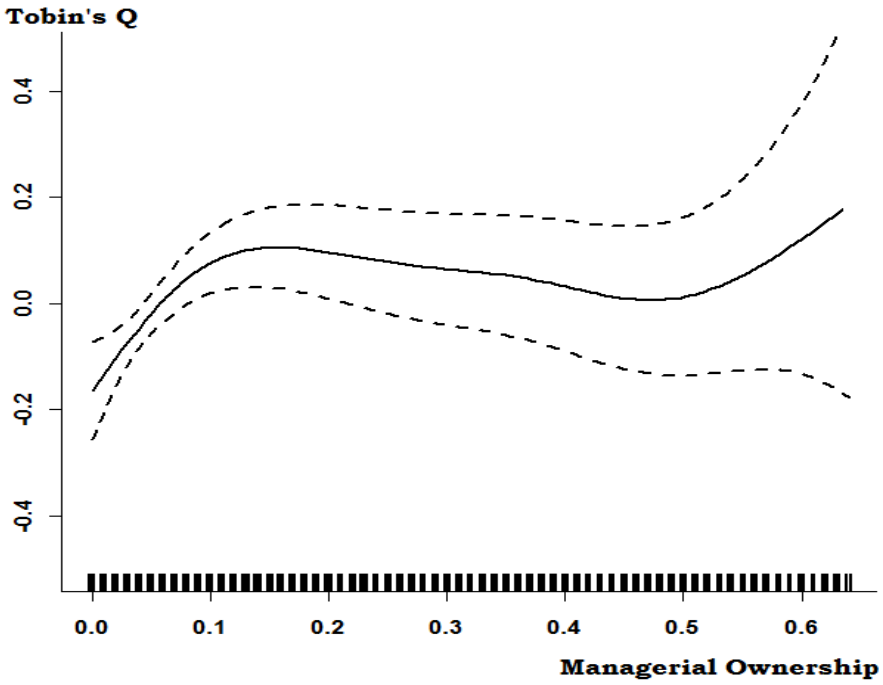

Figure 8

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **most negative idiosyncratic skewness of residuals derived from the Fama-French model** *(high idiosyncratic risk)*

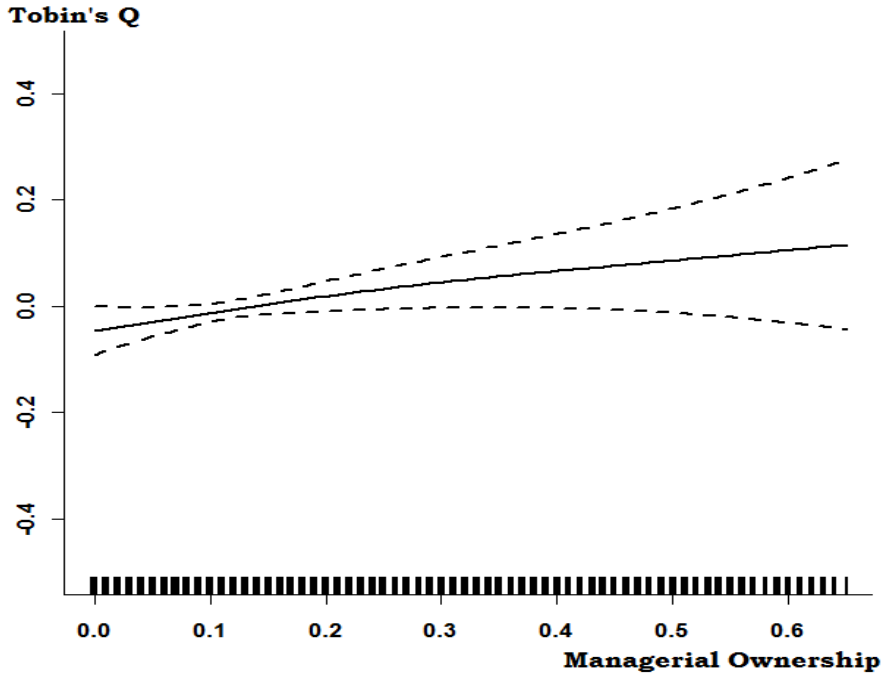

Figure 9

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **low industry-adjusted value-at-risk [ID_RISK(VAR)]** *(low idiosyncratic risk)*

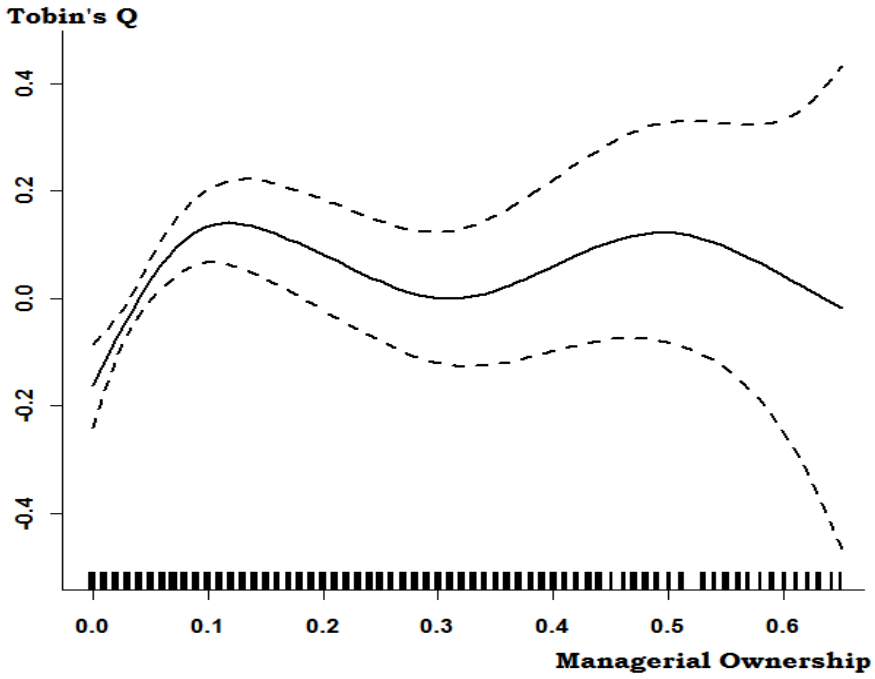

Figure 10

Semi-parametric estimate: The net effect of managerial ownership on Tobin's Q for firms with **high industry-adjusted value-at-risk [ID_RISK(VAR)]** *(high idiosyncratic risk)*

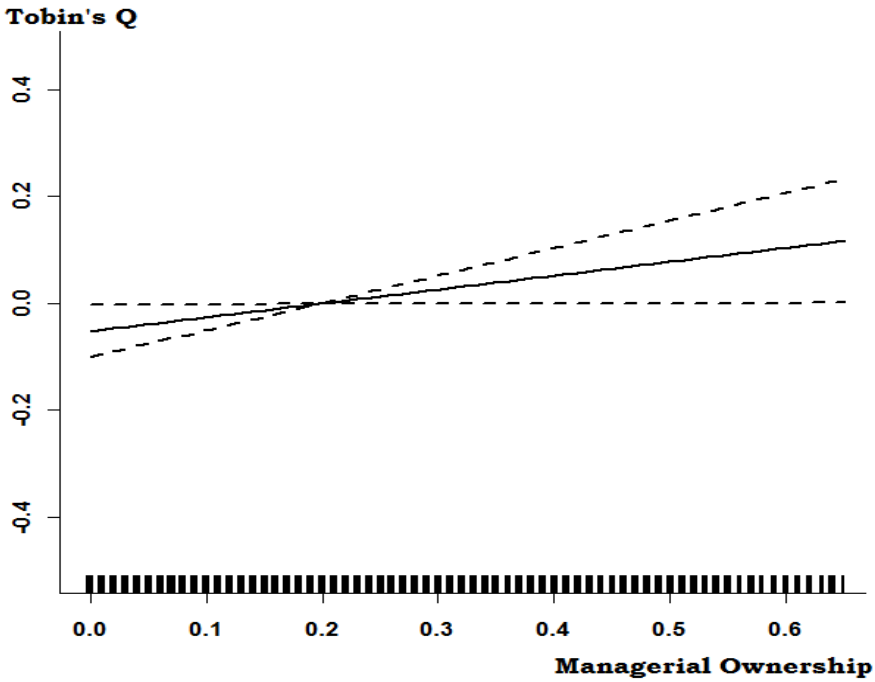

Figure 11

Semi-parametric estimate: The net effect of managerial ownership on Return on Shareholder Equity (RSE) for firms with **low standard deviation of residuals derived from the CAPM** *(low idiosyncratic risk)*

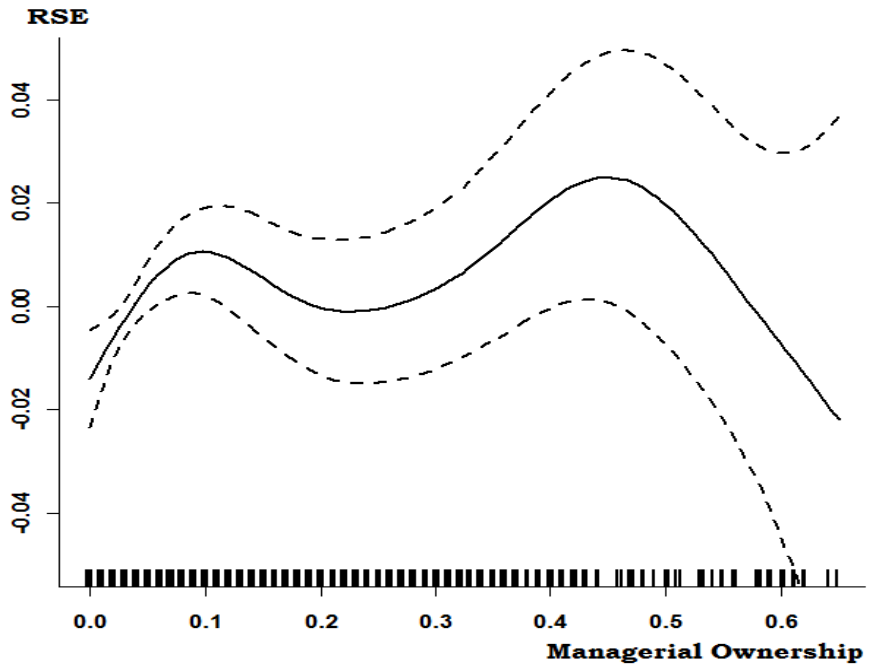

Figure 12

Semi-parametric estimate: The net effect of managerial ownership on Return on Shareholder Equity (RSE) for firms with **high standard deviation of residuals derived from the CAPM** *(high idiosyncratic risk)*