Do Directors Have a Use-By Date?

Examining the Impact of Board Tenure on Firm Performance

Joshua Livnat
Stern School of Business Administration
New York University
and
Quantitative Management Associates
2 Gateway Plaza, Newark, NJ 07102, USA
Email: jlivnat@stern.nyu.edu

Gavin Smith
Quantitative Management Associates
2 Gateway Plaza, Newark, NJ 07102, USA
Email: gavin.smith@prudential.com

Kate Suslava
Rutgers Business School – Newark and New Brunswick
Department of Accounting and Information Systems
1 Washington Park, Newark, NJ 07102, USA
Email: suslava@scarletmail.rutgers.edu

Martin Tarlie
Quantitative Management Associates
2 Gateway Plaza, Newark, NJ 07102, USA
Email: martin.tarlie@qmassociates.com

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ABSTRACT

Corporate boards serve the important functions of monitoring and advising management. We examine whether corporate boards consisting of longer-serving directors are better able to fulfill these functions due to the firm-specific knowledge accumulation, or whether director performance suffers due to the deterioration of their technical knowledge and/or due to the decreasing independence of the board from managers. Using a sample of up to 3,000 firms over an 18-year period, our evidence suggests that board tenure is positively related to forward-looking measures of market value, with the relationship reversing after about nine years on average. The detrimental effect of longer board tenure on market value (after an initial period of positive effects) is stronger for high growth firms, which is consistent with the deterioration of the board members' ability to advise on the technical matters of firms' operations.

Keywords: *board tenure; firm value; abnormal returns; growth firms.*

JEL Classifications: G32, G34, G38, M41.

Data Availability: Data used in this study are available from public sources identified in the study.

I. INTRODUCTION

The length of time company directors stay on board ("board tenure") is a controversial issue that has attracted the attention of professional investors, regulators, and academics. The call by institutional investors for board "refreshment" – allowing new members to enter the board – is driven by the desire for a more diverse mix of board members and by the conventional wisdom that long-serving board members become entrenched[1]. The thinking is that entrenchment leads to cozy relationships between board members and executives, thereby diminishing the ability of board members to effectively represent shareholders' interests. A regulatory solution to this issue would be to limit director tenure by imposing a tenure limit. Unfortunately, existing empirical findings on the overall value relevance of board tenure and the optimal length of board tenure are scarce and inconclusive.

The corporate governance literature that examines the relationship between board tenure and firm market value is scant and characterized by inconsistent findings. Some studies find that longer board tenure is detrimental to firm value, as it leads to the decrease of board independence (Vafeas 2003), governance problems (Berberich 2011), and lack of critical thinking by board members (Coles et al. 2015). On the other hand, a different stream of literature finds that board tenure is improving board's functionality, as longer-tenured board members are less susceptible to pressure by managers ((Beasley 1996) and (Schnake et al. 2005)), are more knowledgeable about company operations (Rutherford 2007), and are more likely to curb opportunistic behavior by managers ((Hamouda et al. 2013) and (Dou et al. 2015)). One potential reason for the inconsistent empirical findings may be related to the limited sample sizes used by these studies. Most existing studies are

[1] Some recent news articles about investors' concern regarding the length of directors' tenure include Frances (2016), Murphy (2016), Stein (2016), and Vekshin (2015).

limited to case studies, extreme cases (i.e. companies with fraud or financial statement restatements), and specific industries. Another possible explanation for the inconsistent results is endogeneity of board selection, as board members might prefer to stay longer on the board of a better-performing company, or that good companies might be reluctant to refresh a board when things are not "broken". This leads to strikingly opposite results even when researchers use very similar samples for their testing. For example, using the sample of S&P 1,500 firms, Dou et al. (2015) finds that extended tenure is favorable for company performance. However, Huang (2013), using the same sample of firms over the same period, finds that beyond a certain threshold board tenure becomes detrimental to firm value.

Our framework for analyzing board tenure[2] is based on the assumption that board members serve three main functions: (i) they monitor management, (ii) they advise management on specific technologies or processes (such as marketing and supply chain issues) important to the firm, and (iii) they advise management on general business issues. We expect that the monitoring function is likely to deteriorate with longer tenure, while advising on general business issues is likely to remain stable or even improve with longer tenure. We also assume that advising management on specific technologies and processes deteriorates with longer tenure because the required technologies or processes change over time, and the technical expertise of some board members is not likely to keep up with the pace of technological change. This latter effect is likely to be especially pronounced for fast-growing firms.

[2] Our measure of board tenure is the **average** board tenure of all the board members of a given company, at a given year; therefore, our predictions and tests relate to this overall measure of board tenure and not to the tenure of the individual directors.

To better understand board tenure, we consider its relationship to (i) firm market value, as measured by market-to-book, and (ii) stock returns. For the market-to-book ratio, we find that longer average board tenure is positively related to contemporaneous and future firm market values. However, this relationship reverses at a certain point, roughly after eight to nine years of average board tenure. Beyond this "benchmark" for the average board tenure there is deterioration in valuation, and this deterioration is significantly faster for growing firms.

For the stock return-based tests, we examine the relationship between board tenure and future stock returns. We find that board tenure is reflected in stock returns in a similar manner to market values and that the deteriorating effect of long board tenure is more pronounced for dynamic, growing firms. We also find that an investment strategy that goes long on stocks of companies with long board tenure (more than 12 years of average tenure) and sells companies with short board tenure (less than two years of average tenure) earns statistically significant abnormal returns of 0.31 percent per month.

Our results are consistent with an inverted U shape for Tobin's Q established by Huang (2013). He finds that nine years is a point in director's tenure after which the relationship between the board tenure and firm value starts to deteriorate. Our study is different from Huang (2013) in several important ways. First, we are using a much larger sample – up to 3,000 firms over an 18-year period, while he limits his sample to firms in S&P 1,500 over 12 year period. Second, we show that the relationship between board tenure and firm value is reflected in forward-looking measures of equity value - next-period market-to-book and next month abnormal returns, while Huang (2013) uses a contemporaneous measure of firm value only.

We contribute to the literature along several dimensions. First, our large sample, consisting of up to 3,000 individual firms in a given year, is the largest sample used to-date to test the relevance of board tenure. Second, in contrast to other studies, we provide empirical evidence of the relationship between board tenure and current market value, future market value, and future stock returns. Using forward-looking measures of firm value addresses the endogeneity concerns hovering over prior studies. Finally, we analyze the empirical evidence within the context of the monitoring and advisory functions of the board. Finally, we show that firm attributes, such as growth rate, impacts the optimal average board tenure, suggesting that a uniform regulation limiting board tenure across companies and at all times may not be desirable.

The remainder of our paper is organized as follows. In Section II, we discuss the prior literature in the area. In Section III, we develop the hypotheses. In Section IV, we describe the research design and the data used in the study. In Section V, we present the empirical results on the impact of board tenure on firm value and returns and how this relationship changes for growth firms. Section VI provides additional robustness tests on the relationship of firm value and board tenure. Section VII concludes.

II. PRIOR LITERATURE

There is a substantial literature on the importance of tenure in explaining the performance of decision makers in different professions. For mutual fund managers, Chevalier (1999) finds that longer tenure helps them retain their job, as these managers are less likely to be terminated based on their performance, compared to younger portfolio managers. This "entrenchment" of longer-tenured managers stems from their higher than average performance early in their career: in effect, they are branded as having superior skills and abilities going forward. However, their outperformance is mainly due to chance and later results in mean reversion (Porter et al. 2012). For credit analysts, tenure matters when it comes to their tenure covering specific firms for the rating agency: their optimism increases and accuracy decreases with tenure covering the firm (Fracassi et al. 2015). Auditors' tenure contribute to firm value up to a certain point in time, as reflected in equity risk premium, with the relationship reversing at the extreme values of tenure (Boone et al. (2008). CEO tenure is negatively affecting firm performance in the dynamic industries because with prolonged tenure CEOs tend to develop a relatively fixed paradigm as to how a firm should be managed and are unwilling to accept new information and initiate strategic changes (McClelland et al. 2012). Politicians seem to be more effective in the later periods of their tenure, as elections draw nearer. Ghosh (2006) finds that both property crimes and violent crimes in India go up in the initial years of an incumbent politician's tenure and then decline in the later periods of their tenure, closer to re-election. Tenure does not seem to matter when it comes to academic performance. For example, Li et al. (2010) find that the productivity (total number of papers) and impact (citations of papers) of the economics and finance faculty from top twenty-five schools remains consistent before and after they attain tenure.

When it comes to the board members, prior studies examine the value relevance of board tenure indirectly, through the lens of two main board functions – monitoring and advising. Some papers in the area look at the link between the length of board tenure and the Board's ability to monitor management ((Vafeas 2003), (Berberich et al. 2011), (Beasley 1996), (Rutherford et al. 2007), (Sharma 2011), (Schnake et al. 2005)), while others look at the link between tenure and Board's ability to advise managers ((Muller-Kahle et al. 2011), (Howton 2006), (Hamouda et al. 2011), (Coles et al. 2015)). Still, some other studies examine both ((Dou et al. 2015), (Huang 2013), (Donoher et al. 2007)). The assumption underlying this approach is that if tenure improves the way the board functions, this will also enhance firm value.

Empirical papers find contradictory results when it comes to examining the relation between tenure and board's monitoring function. Some researchers argue that seasoned board members over time become more and more friendly with managers ("management friendliness" hypothesis) and lose their ability to objectively examine managers' actions, thus decreasing the level of board independence and contributing to the erosion of firm value. Board tenure is thus viewed as a proxy for the extent to which outside directors are affiliated with management. For example, Vafeas (2003) claims that in time directors might be co-opted by managers as directors become less mobile and less employable. He finds that directors who stay on the board the longest are significantly more likely to have a fiduciary relation to the firm (so called "grey directors" – bankers, consultants), are more likely to be affiliated with managers from the beginning of their board tenure, and tend to have more power and more equity ownership in the firm. Finally, he finds that this lack of independence is positively related to the amount of CEO's salary. Following similar argument about the increasing lack of oversight by complacent board members, Berberich et al. (2011) find a positive association between director tenure and the probability that a company will

experience some governance problems, such as bankruptcies, major litigations, major accounting restatements, or corporate scandals.

On the other hand, another stream of literature in the area extends an argument that longer-tenured board members are in better position to scrutinize senior managers, are less susceptible to peer pressure, and are less likely to be controlled by managers. These papers view tenure as a mechanism that would increase the level of board's independence and, therefore, enhances the value of the firm. Two event studies ((Beasley 1996) and (Schnake et al. 2005)) examine firms with corporate governance problems: Beasley (1996) looks at firms with cases of fraud while Schnake et al. (2005) examine firms with 10-K investigations. Both studies find that the years of service increase the outside directors' ability to monitor managers more effectively to prevent fraud or 10-K investigations. An association study by Sharma (2011) examines the role of board tenure in controlling managerial discretion over the use of excess cash flow as measured by the dividend payout policy. She argues that dividend policy is one area where conflicts between management and shareholders may occur and the board is the ultimate internal governance mechanism charged with protecting shareholders' interests. She finds that the tenure of independent directors is positively related to the likelihood of a dividend payout. Bonini et al. (2015) find some evidence that longer-tenured board members (with tenure over 20 years) are better at monitoring management actions because they gather and store valuable information about the firm and can share it with other independent directors. They find that such firms are more profitable and have higher market value.

Similarly, researchers that examine how tenure affects board's advisory function find inconsistent results. On one hand, an argument is made that longer tenure of board members allows them to learn more information about the operations of the company, makes it easier for them to understand

financial reports and, as a result, provide more informed advice to the management team. This, in turn, should result in a better-run firm. Studies that examine information-gathering practices of board members provide some support for this line of argument. For example, Rutherford et al. (2007) find that longer-tenured boards exchange information more frequently, as measured by the number of board committees. Additionally, a group of studies provide empirical evidence that better informed boards, as proxied by board tenure, provide better advice to managers that enhances the value of the firm. For instance, Muller-Kahle et al. (2011) show that financial service companies that chose to specialize in subprime lending and, and as a result, were negatively affected by subprime loan defaults had board members with less tenure, as compared to "smart" firms that avoided these risky business practices. Howton (2006) finds that firms with longer tenure boards are more likely to survive after an IPO vs. firms that fail or are acquired, and Hamouda et al. (2013) show that more seasoned boards are more likely to curb predatory insider trading practices around share repurchase announcements.

On the other hand, some studies of the relation between tenure and advisory function of the board hypothesize that board members might become complacent and stop learning about the firm's operations the longer they stay on board. For instance, Coles et al. (2015) introduce a measure of *groupthink* – a way of thinking by cohesive groups where peer-pressure overrides the need for critical thinking. In the study *groupthink* is proxied by the length and the degree of overlap of board tenure. The study does not find support for the blanket prediction that *groupthink* has a negative effect on value for all types of firms, as measured by contemporaneous Tobin Q. However, the study does find evidence that the effect of groupthink on firm value is negative in dynamic industries, firms with smaller boards, and in firms that have boards with fewer outside connections. This is consistent with the idea that, holding group cohesion constant, the tendency

to suffer from groupthink is harder to overcome in smaller boards and in boards with fewer outside connections.

Several studies in the area look at the interaction of both monitoring and advisory functions with board tenure and study how it is reflected in firm value. The findings of these studies are, similarly, inconclusive and vary depending on the sample and methods employed. For example, a recent study by Dou et al. (2015) finds that directors' performance improves with the extended tenure. They find that longer-serving directors have a higher level of commitment, are better at controlling CEO turnover and CEO pay, have smaller likelihood of intentionally misreporting earnings, and are also more likely to restrict the expansion of resources under CEO control (acquisitions are more rare and of higher quality). However, Huang (2013), a study that uses practically the same sample (firms in S&P 1,500) over the same period as Dou et al. (2015), concludes that the relationship between board tenure and contemporaneous firm value (measured by Tobin Q) is in the shape of an inverted U that reaches a peak at about nine years. He finds that the value of companies rises in the first nine years, as directors acquire firm-specific knowledge early in their tenure. However, this continues only up to a certain threshold of tenure beyond which independence losses outweigh the learning gains and board tenure becomes detrimental to firm value.

In sum, the studies that examine the relationship between firm value and board tenure are inconclusive and contradictory. The findings are highly sensitive to the sample, the time period of the study and the specific methodology employed. Also, most studies concentrate on extreme cases (for example, cases of fraud or accounting restatements) or on specific industries, which limit the sample size and bring into question the generalization of these results to other scenarios.

Furthermore, none of these studies investigate the relationship of board tenure with forward-looking indicators of firm value.

III. HYPOTHESIS DEVELOPMENT

Board tenure is a unique observable characteristic of a director's experience with a specific company. We assume that companies want to retain directors for some time because their ability to monitor and to advise increases, at least initially, as they acquire more knowledge about the company. Furthermore, replacing directors too frequently is costly in the time and resources a new director needs to learn about the company. Longer board tenure also signals to the markets that the company is stable and is not subject to board "refreshment" efforts by activist investors. We expect that the market rewards such companies, reflected in a "stability" premium and resulting in a positive relationship between board tenure and both market value and stock returns of these more stable firms.

Our claim establishes a relationship between board tenure and market value for an average company. In order to understand the kind of relationship that companies with longer or shorter tenure of its board members will have, we turn to examine the functions of board members and how these functions are expected to change through tenure/ passage of time.

Board members serve three main functions (i) monitor managers' performance, (ii) advise managers on general business matters (for example, acquisitions, strategic directions, compensation packages or hiring decisions), and (iii) advise managers on technical aspects of the company's business (for example, specifics of supply chain organization or a marketing campaign).

Exhibit 1 Board Tenure and Firm Value

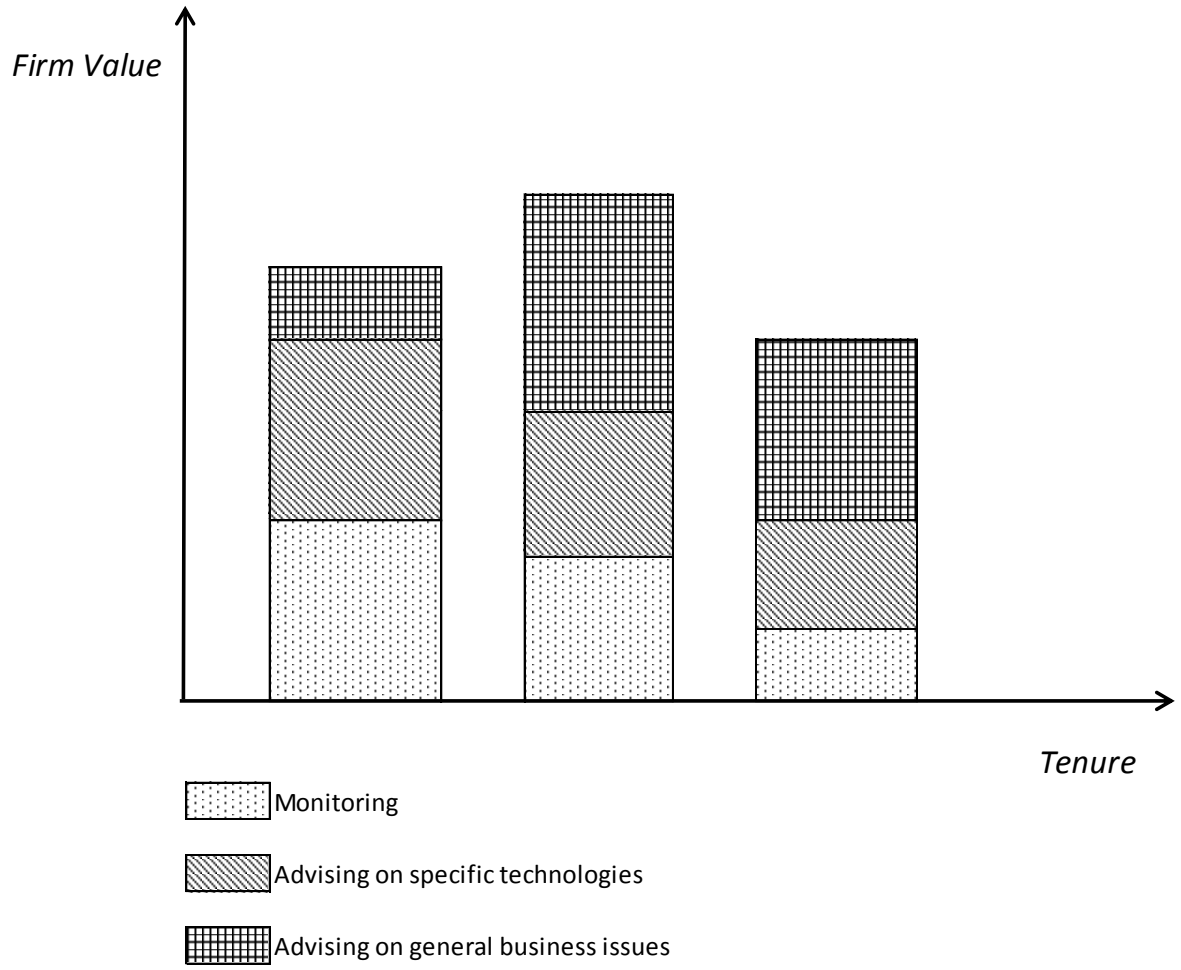

Exhibit 1 illustrates our expectation of how these three functions contribute to firm value as tenure changes. Following *management friendliness* theory (Vafeas 2003), we assume that the monitoring function of board members deteriorates with length of service, as board members become more affiliated with managers and more entrenched in their position. Deteriorating monitoring allows managers to act opportunistically (e.g. empire building), resulting in lower firm value.

In terms of general business advice, we assume that board members already have some prior knowledge about how companies are organized, how mergers and acquisitions are carried out, and how companies make financing decisions. As board members join the board of a new company

they adjust this general business knowledge to the specifics of the company and contribute to firm value by providing advice to managers. We assume that the general business knowledge that board members acquire throughout their tenure increases initially, but then stabilizes at some point, as board members have learned all they can about managers' personalities and the specific issues to the firm.

Some board members are also involved in technical decisions that managers make, i.e. they advise on firm specific technologies. We assume that when board members join the board they have some innovative ideas about company operations that they might have accumulated in their previous employment or other board appointments. For example, they might have suggestions to managers as to how re-organize a supply chain process or launch an effective marketing campaign. When it comes to technical expertise on technologies or processes that board members can advise on, we predict that this function will begin to deteriorate beyond a certain point, because board members may run out of new ideas or their specific expertise may become obsolete as company technology process changes. This deterioration should be especially pronounced in fast-growing firms, where innovation is key to the survival of a company and the need for specific expertise is changing rapidly.

Following the reasoning outlined above, we state our hypotheses in the following form:

H1: The relationship between board tenure and firm value is initially positive.

H2: Beyond a certain point of director tenure, due to the decrease of directors' independence and their knowledge of specific technologies and processes, board tenure contributes negatively to firm value.

H3: The negative effect of long board tenure on firm value is especially pronounced for fast-growing companies.

IV. RESEARCH DESIGN AND DATA

To test our hypotheses, we focus on the relationship between board tenure and two measures of firm performance: 1) firm value, as proxied by market-to-book; and 2) stock returns.

A. Firm Value And Board Tenure

We examine the relationship between firm value and board tenure in both a univariate and a multivariate setting. In the univariate case, we rank all firms in our sample into deciles based on the average board tenure ("tenure deciles"). We also industry adjust the measure of firm value by subtracting, annually, the median market-to-book for the firm's industry using the Fama-French 48-industry classification. We then examine the median values of the industry-adjusted market-to-book values across different tenure deciles.

Next we examine the relationship between board tenure and firm value in a multivariate setting. To do this we estimate variations of the following model:

$$Market/\,Book_{it} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it} \quad (1)$$

We calculate our main variable of interest, *Tenure*, by taking the average board tenure of all board members for each firm for each year. In order to account for the expected non-monotonic relationship of a particular form of board tenure and market value, we also include a squared *Tenure* term.

We also include control variables that capture both firm and board characteristics previously shown to be related to firm value. For board controls we include *Board size*, the number of directors on the board, *Average Age*, the age of directors on the board, *Connections*, the number

of boards a director is serving on, including the firm board, *Before CEO*, the proportion of the board members that have served with a previous CEO, and *Affiliated Directors*, the percentage of key executives on the board. (Yermack 1996) establishes the value relevance of board size. We add *Average Age* as a control variable to disentangle the effect of board tenure from the director's age. Well-connected boards add to firm value by providing better advice to managers, due to for information transmission between companies (Larcker 2013); *Connections* is a control variable for this enhanced advisory function due to the board centrality. (Dou et al. 2015) argue that directors that have worked with previous CEOs are better-placed to monitor the performance of current CEO. In order to control for the improved monitoring function of these directors, we include *Before CEO* as our additional board control. *Affiliated Directors* controls for the level of board independence, which we hold constant for the purpose of our study.

For firm controls, we use Annual sales (*Sales12m*), firm age (*Firm Age*), and number of segments (*SegNum*) to control for size and complexity, which may affect the advisory roles of board members. Growth opportunities of the firms are captured by *Intangible*s (scaled by Total Assets), *Leverage* (scaled by Total Assets), and *R&D* intensity (scaled by Sales). Firm profitability is controlled by two *ROA* variables – one for current and one for next period. We also include *StdRet*, standard deviation of returns, as another proxy for firm stability. We rely on prior studies to select firm and board controls, such as Hermalin and Weisbach (1988), Denis and Sarin (1999), Bhagat and Black (2001), and Baker and Gompers (2003).

Model (1) is first estimated as a panel regression where we also include industry and year fixed effects. We then run annual cross-sectional regressions and calculate the time-series average of the coefficients and report t-statistics using the time-series standard error of the mean. For the cross-sectional regressions we also include industry fixed effects. Industry effects are based on the 48

industry classification of Fama-French. By estimating cross-sectional regressions we can also examine the stability of any relationship between board tenure and firm value through time.

A common concern in empirical corporate governance research is the impact of reverse causality. We perform additional tests in order to address potential endogeneity problems that may confound the interpretation of our results. The concern of endogeneity arises from a possibility that directors might be interested in staying longer on the boards of better performing firms, or that firms with good performance might be reluctant to "refresh" the board, a *do-not-fix-what-ain't-broken* line of reasoning. Following Hermalin and Weisbach (1991), we use forward (instead of contemporaneous) values of market-to-book as a dependent variable in model (1). Following and Rajgopal and Shevlin (2002), we also use contemporaneous values of market-to-book as an additional dependent variable.

Next, we test the effect of the growth option on the value relevance of board tenure using panel regressions and Fama and MacBeth (1973) style regressions on firm-level data. We modify model (1) by adding an interaction of growth option proxies with a squared *Tenure* term and by including the growth option proxy as a control variable. Specifically, we estimate:

$$\begin{aligned} Market/\,Book_{it} \\ &= \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Tenure_{it}^2 \times Growth\ Proxy \\ &+ Growth\ Proxy\ Dummy + Board\ Controls_{it} + Firm\ Controls_{it} \\ &+ \epsilon_{it} \end{aligned} \quad (2)$$

Industry and year fixed effects are included as per model (1).When estimating model (2) we use four proxies for firm growth options: (i) *R&D,* an indicator variable equal to one if the firm's ratio of research and development expenses to sales is over the 75th percentile value for all firms for that year. We choose the 75th percentile value because the median R&D for all firms is zero. The level of R&D captures the extent of resources that company dedicates to the development of new

products. (ii) *SalesGrowth1*, an indicator variable equal to one if firm's sales growth is above the median value of other firms for the year. Sales growth captures the scale of growth experienced by the company. (iii) *SalesGrowth3*, an indicator variable equal to one if firm's three-year sales growth is above the median value of other firms for the year. We use *SalesGrowth3* to capture longer-run growth effects. (iv) *Fluidity*, an indicator variable equal to one if firm's Fluidity score is above the median value of other firms for the year. Fluidity score is a measure developed by Hoberg, Phillips, and Prabhala (2014) based on a text analysis of firms' product descriptions in their annual financial statements. Hoberg et al. argue that fluidity scores capture changes in rival firms' products and reflect the pressures firms face from the competitor firms.

B. Stock Returns And Board Tenure

In our second set of tests we investigate the relationship between *Tenure* and stock returns. All of these return based tests focus on the ability of board tenure to explain future one month stock returns. Evaluating the ability of board tenure to explain future stock returns is a strong test to further address concerns surrounding causality and endogeneity.

In our first set of stock return tests, we perform simple univariate sorts of stocks based on board tenure, and examine the pattern of excess stock returns. This allows us to examine any linear and non-linear relationship between board tenure and future stock returns. Each month we separate all firms into quintiles and deciles based on *Tenure*. To do this we carry forward the board tenure measure computed at the end of a calendar year over the next 12 months. We use three different measures of abnormal stock returns. First, *X_RET* is the excess stock return, defined as the monthly raw stock return in excess of the capitalization-weighted market return. Second, *DGTW_RET* is the characteristic adjusted excess return of a stock computed using the Daniel et al. (1997)

methodology. In Daniel's approach, *DGTW_RET* is the buy and hold return on a security minus the capitalization-weighted average buy and hold return on a portfolio of firms with similar size (three groups), B/M (three groups) and 11-month momentum (three groups). Third, *FF_RET* is a measure of risk adjusted return, defined as the intercept of a four-factor model that includes three Fama-French factors and momentum (see Fama and French (1993) and Carhart (1997)):

$$Rp_t - Rf_t = a + b \cdot [Rm_t - Rf_t] + s \cdot SMB_t + h \cdot HML_t + u \cdot UMD_t + e_t \quad (3)$$

In our second set of stock return tests, we examine the relationship between firm abnormal returns (*DGTW_RET*) and *Tenure* in a multivariate setting. We use a Fama and MacBeth (1973) style regression model, including board and firm controls:

$$DGTW\_RET_{it+1} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it} \quad (4)$$

The Board Controls and Firm Controls are the same as described in Section A. Each month end, we estimate the cross-sectional regression model (4). We then calculate the time-series average of the coefficients and report t-statistics using the time-series standard error of the mean coefficient.

In our third set of stock return tests, we examine the value relevance of board tenure for predicting stock returns of high growth firms using Fama-MacBeth-style regressions on firm-level data similar to (2):

$$\begin{aligned} DGTW_{RET\,it+1} &= \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Tenure_{it}^2 \times Growth\ Proxy \\ &+ Growth\ Proxy\ Dummy + Board\ Controls_{it} + Firm\ Controls_{it} \\ &+ \epsilon_{it} \end{aligned} \quad (5)$$

We use five proxies for firm growth options as defined above and add *Market-to-Book* as an additional proxy for growth. *Market-to-Book* is an indicator variable equal to one if firm's market-

to-book ratio is above the median value of other firms for the year. Market-to-book ratio is higher for high growth firms as market price is factoring a higher expected future growth for the firm and a higher return on its assets.

The board data in this study is from *Capital IQ*. It is extracted from the WRDS's CIQ_Professional table, which includes data about professionals associated with various organizations. We first extract observations with valid Company ID, which is used to link to the Compustat and CRSP databases, with a valid PersonID, so we can link the individual across years and companies, and a valid start year. For each individual-company position we require the first year the individual has been in that position. An individual may begin as an executive at the company in 1987, and then elected to the board in 1998. We use 1998 to calculate that person's tenure in 1999 (one year) onwards, so e.g. in 2005 that person's tenure is seven years. The average board tenure is the mean tenure of all board members in that year. We use as board members only individuals who have the following titles (Profunctionname in the table): "Chairman of the Board", "Co-Chairman of the Board", and "Member of the Board of Directors".[3] The dataset includes additional items such as an end-date for the individual-company position, year the individual was born, whether the individual is a current board member, and the year in which the firm was founded. If the end-year is missing and the individual is a current board member, we set the end-year to be 2015. If the end-year is missing and the individual is not a current board member, we set the end-year to equal the start year, which would tend to induce a bias towards a shorter board tenure. We also delete observations where the start year is earlier than the year the firm was founded or is prior to 1945. To test our procedures, we examine the data for four companies, two large and two small companies in the late 1990's and in the late 2010's against the proxy statements available in the

[3] Some companies have advisory boards, so it is important to focus on members of the board of directors.

SEC EDGAR database. We found a very high accuracy for the latter years, and some missing board members (less than 25 percent) for the early years. Thus, we use in the study data from 1996 onwards. We also require that sample firms would have been founded at least five years before we begin tracking their board tenure. Also, to reduce the bias caused by smaller firms, we require a market value in excess of $100 million, and a minimum of three members on the board.

After identifying the initial eligible firms, we match the Capital IQ's CompanyID to Compustat's GVKEY, and extract various accounting data from the *Compustat Point-in-Time Database*[4] and stock return data from *CRSP*. At each month-end, we use the information that was actually available on the Compustat files at that month-end. Thus, it is not necessary to lag the annual financial information by four months, as is typically done by prior research. We exclude companies incorporated outside the US, and require a positive book value.

We obtain the measures of product market fluidity from the online data provided by Hoberg and Phillips (http://cwis.usc.edu/projects/industrydata/industryconcen.htm). The data provides the fluidity score for each firm-year. Fluidity score is derived from the descriptions of general business in the firms' annual financial statements, and it reflects tactics adopted by the competitor firms. Fluidity score is higher when the words in the firm's business description overlap more with the words of the rivals' business description.

Throughout our research we standardize accounting and stock return variables to a normal distribution, bound between plus and minus three. We take this approach to deal with outliers in the data. While winsorizing is another approach, we find this standardization approach is more

[4] Charter Oak Compustat Add-On Database reports preliminary, un-restated, first-reported earnings filed with the SEC. This eliminates the discontinuities that result from subsequent restatements and provides a more accurate picture as to what fundamentals the company disclosed to investors at a particular point in time.

effective in dealing with data distribution issues. For all other level based variables we use the natural logarithm to manage outliers.

V. RESULTS

A. Summary Statistics

Figure 1 plots the firm-year observations for our sample. Our final sample comprises of 525,312 firm-month observations, with 650 individual firms at the beginning of our sample period (year 1996) going up to 3,266 in 2006 and coming down after the financial crisis with 3,094 individual firms in 2014.

Insert Figure 1 here

Table 1 presents important characteristics of companies in our sample, their boards, as well as growth proxies. An average firm in our sample has sales of $4.5 billion, book value of $2.7 billion and market capitalization of $6.3 billion. On average, directors serve on the board for seven years (6.9 mean and 6.3 median), boards have eight directors on average, the average director's age is 58 years, sits on two boards, about 30 percent of board members have worked with the previous CEO, and 10 percent of board members are managers.

Insert Table 1 here

In terms of our proxies for growth, for *SalesGrowth1*, *SalesGrowth3*, *MB* and *Fluidity*, we concentrate on the median values because this is the measure of central tendency that we use to identify high-growth firms. The median value for sales growth is 9 percent, for *MB* is 2.1, and for product market fluidity is 6.6. When it comes to R&D, high-growth firms in the 75th percentile of R&D/Sales ratio have 3 percent of R&D as percentage of sales.

Examining the correlations of *Tenure* with firm characteristics, we note that firms with longer-tenured board members are older (correlation of 31 percent with *Firm Age*) and more profitable firms (7 percent correlation with ROA). Consistent with our expectations, *Tenure* is also negatively correlated with the standard deviation of returns (correlation -16 percent). All this confirms the hypothesis that board tenure is a proxy for firm stability. The correlation of *Tenure* and our proxies for firm growth are negative, which is consistent with the hypothesis that higher *Tenure* is more damaging to high-growth firms. Panel B reports the correlation between our various proxies for growth. As expected, these variables are mostly positively correlated.

B. Board Tenure and Firm Value

Univariate Evidence

Our first prediction is that board tenure is positively related to firm value up to a certain point in the director's tenure. However, due to the deterioration of board members ability to be independent and advise management on the technical aspects of the company business, we expect this relationship to reverse in the later stages of director's tenure. Figure 2 and 3 show the results of testing this hypothesis.

Insert Figure 2 and Figure 3 here

First, we rank firms each year into deciles based on the firm's *Tenure*. Figure 2 plots the average decile values for *Tenure* (in years). The length of director tenure ranges from less than 2 years (first decile) to more than 14 years (highest decile). Second, we investigate how firm value measured by industry-adjusted market-to-book ratio will change across the length of director tenure: refer to Figure 3 for the corresponding plot. The shape of the curve of Market-to-Book rankings is consistent with our predictions. Firm value is increasing through the seventh decile;

however, somewhere around eighth and ninth decile (about nine years), the market-to-book value starts to decrease.

Multivariate Evidence

Next, we test our hypothesis in a multivariate setting. Table 2 (Panel A) presents the results of panel regressions for model (1). In regression (1), we estimate the relationship between market-to-book and board tenure. The coefficient on board tenure is positive though insignificant. This is not surprising when interpreted in conjunction with Figure 3. If one takes the slope from decile one to decile ten, the gradient is almost flat. However, in regression (2) we now include a squared tenure term to capture our hypothesized non-linear effect (and what is found in our univariate analysis). In regression (2) the coefficient on *Tenure* is positive, while the coefficient on the squared *Tenure* term is negative. Both are significant at the 99 percent level. As we include further controls in regression (3) and (4), we observe a modest reduction in the coefficients for *Tenure* and squared *Tenure* term – though they remain significant at the 99 percent level. This confirms our prediction that, on average, board tenure is positively related to firm value, but the contribution to firm value begins decreasing at some point; longer board tenure beyond that point becomes a drag on firm valuation.

Insert Table 2 here

The coefficients on firm controls in the regression are consistent with our expectations: controls for size (*Sales, SegNum*) are negative and significant, while controls for growth (*Intangibles, Leverage, R&D, and ROA*) are positive and significant. Consistent with our expectations, *StdRet*, our additional control for stability, is negative and significant. Turning to board controls, we find that *Average Age* is negatively related to market value, which is consistent with the expected

associations in the corporate governance literature that old directors will be less active in monitoring managers' performance (e.g., Core et al. 1999). However, for *Board Size* and *Affiliated Directors* we find positive relationship, which is contrary to the associations established in prior corporate governance studies. For example, Yermack (1996) suggests that bigger boards perform worse than firms with smaller boards, and Klein (1998) argues that the presence of affiliated directors on the board is compromising the independence of the board. Here it should be noted our sample and time frame for analysis differ significantly from Yermack and Klein. We also observe positive and significant coefficient for *Connections*, which is consistent with prior literature (Larcker (2013)). The proportion of board members that served with prior CEO/ CEOs does not seem to matter: *Before CEO* is positive, but not statistically significant.

As a robustness check, we examine model (1) cross-sectionally for each year in our sample. The coefficients from the annual regressions, as well as average coefficients and Fama-Macbeth t-statistics are reported in Table 2 Panel B. We only show the coefficients and t-statistics for *Tenure* and *Tenure Squared*; however we indicate for each regression whether industry, firm, and board controls are included. Similar to our panel regression results we continue to observe a positive and significant coefficient for *Tenure* and negative and significant coefficient for the squared *Tenure* term for most years in our sample, with the exception of 1996-1999, the beginning period of the database construction. This is not unexpected, as the database has smaller sample size and might be prone to errors in the early years of data collection. What is striking about this result is that the strength of the relationship between board tenure and the market value of a firm has shown no signs of weakening in the later part of our sample.

Insert Table 2 here

We recognize that our results might be affected by possible endogeneity of our board quality constructs. As an attempt at addressing endogeneity concerns, we estimate the statistical association between *Tenure* and firm value using next-period market-to-book as a dependent variable. The results (presented in Table 3) continue to confirm our prediction of a positive relationship between *Tenure* and firm value (positive and significant coefficient for *Tenure*), with the relationship deteriorating beyond a certain point (negative and significant coefficient for the squared term). The results in Table 3 suggest that our findings in Table 2 are robust to potential econometric problems induced by endogenous independent variables. Furthermore, it reveals that while board tenure effects are associated with contemporaneous market-to-book, the market does not appear to fully appreciate the importance of board tenure and the positive effect of tenure persists in the forward-looking measure of equity value. This finding strengthens our expectation that the positive effect of board tenure is also reflected in stock returns.

Insert Table 3 here

High-Growth Firms Evidence

The results of our analysis of value relevance of board tenure for growth firms are presented in Table 4 (Panel A shows the results of panel regression and Panel B – Fama-MacBeth style regressions). The results indicate that tenure is negatively related to firm value for high-growth firms: the coefficients on the interaction of all growth proxy dummies and the squared *Tenure* term are negative for all proxies and significant in three out of four cases. In all four specifications, *Tenure* remains positively associated with firm value, while the squared *Tenure* term remains negative, which is consistent with our previous findings. Overall, the results in Table 4 provide evidence that confirms our prediction that longer *Tenure* is detrimental to the market value of high growth firms beyond a certain point. Our growth option analysis provides some evidence that the

relationship between board tenure and firm value can be further refined by factoring in additional firm-specific attributes.

Insert Table 4 here

C. Board Tenure and Stock Returns

The analysis presented in Section B suggests that increasing board tenure is positively related to firm value up to a certain point, after which board tenure becomes a drag on firm valuation. This relationship holds for both contemporaneous and forward-looking measure of market value. The latter finding in particular suggests that a similar relationship may hold for stock returns. If so, this would allow for a portfolio strategy that exploits the information content of board tenure. We investigate this further by studying the hypothetical portfolio returns investors could have generated by buying firms with certain board tenure attributes.

Univariate Evidence

The first two columns in Table 5 presents average abnormal monthly returns (*X_RET* and *DGTW_RET*) for quintiles and deciles of portfolios formed based on *Tenure*. Both *X_RET* and *DGTW_RET* are increasing monotonically to the middle of the *Tenure* range. Highest *X_RET* is at third quintile and fifth decile (0.51 percent monthly return), and highest *DGTW_RET* is similarly attributed to the third quintile and fifth decile (0.35 percent monthly return for the third quintile and 0.37 percent for the fifth decile). In quintiles four through five and deciles six through ten, both *X_RET* and *DGTW_RET* start to decline. The magnitude of the spread return earned by investor who takes a long position in the highest quintile/ decile of stocks ranked on *Tenure* and a short position in the lowest groups range from 0.17 percent to 0.31 percent per month (with 0.31 percent statistically significant at 10 percent level). However, it appears a more appealing strategy would be to go long on the firms in the middle groups of stock sorted on tenure, while shorting

firms within the lowest *Tenure* group (monthly returns on this strategy would be up to 0.73 percent for *X_RET* and 0.48 percent for *DGTW_XRET*).

Our second measure of abnormal returns is the intercept (*FF_RET*) of a four-factor model that includes three Fama-French factors and momentum, as specified in (3). The intercept from these regressions follows a pattern that is similar to that of *X_RET* and *DGTW_RET*. Panel A of Table 5 shows *FF_RET* for quintiles of *Tenure* portfolios and Panel B – for the deciles. The intercept has the highest value for the third quintile and fifth decile: 0.31 percent per month (with t-statistics between 3.38 and 2.93).

Insert Table 5 here

Figure 4 plots *X_RET*, *DGTW_RET* and *FF_RET* for the deciles of portfolios formed on board tenure. For all three measures the pattern is similar to the inverted U-shape for market value observed in Figure 3. These results verify that the relationship observed between board tenure and firm value is also reflected in various measures of excess stock returns.

Insert Figure 4 here

Multivariate Evidence

Next we test whether the relationship between stock returns and board tenure holds in a multivariate setting. Following Fama and MacBeth (1973), we regress characteristic-adjusted excess returns (*DGTW_RET*) on *Tenure* and the squared *Tenure* term, including firm, board and industry controls, as specified in model (4). We use time-series means and t-statistics for statistical inference.

As Table 6 reveals, the coefficient on *Tenure* is positive and significant across all specifications, verifying an overall positive relationship between *Tenure* and excess returns. For regression (1), we find that in a univariate regression board tenure is positively related to future returns and is significant, unlike our findings for market-to-book. Figure 4 highlights why this is the case. If we look at the slope between decile one and decile ten, the gradient is positive.

Insert Table 6 here

The relationship between board tenure and future returns can be strengthened by including a quadratic tenure term. In regression (2) we include a squared board tenure term and find the coefficient on board tenure is now four times the size as the comparable coefficient in regression (1). Moreover, the squared term in regression (2) is negative and significant at the 99 percent level. Once we control for firm and board effects, the board tenure coefficients and significance are only modestly reduced, demonstrating the strength of the result. This confirms our prediction that board tenure is a positive for firms up to a certain point; however, after that further benefits do not arise for shareholders.

High-Growth Firms Evidence

We now revisit our predictions that growth options of a firm impact the importance of board tenure. We investigate whether the evidence from Table 4 suggesting that long board tenure is especially damaging to the market value of high-growth companies also holds for stock returns. Table 7 repeats the analysis performed in Table 4, adding one more proxy for growth – *Market-to-Book*, for stock returns. Specifically, we regress our measure of excess stock returns (*DGTW_RET*) on the interaction of the squared *Tenure* term and the growth dummy, keeping all other controls used in model (4). The results in Table 7 are consistent with the evidence uncovered previously in Table

4: the coefficient on the interaction variable is negative in three out of five specifications. *Tenure* is consistently positive and significant, while the squared term remains negative and significant.

Insert Table 7 here

VI. ROBUSTNESS TESTS

Our research is not without inherent limitations. This section presents the results of additional tests to check the robustness of the main results. Specifically, we consider whether our results are driven by: 1) sample selection, 2) our design of board tenure measure, 3) behavior of executive board members, 4) our selection of linear model to capture nonlinear relationship between firm value and board tenure, and 5) adverse selection of long-tenured board members. Additionally, in order to align our monthly return tests with the tests that use book-to-market as a dependent variable, we perform tests of the relationship between board tenure and stock returns by using annual stock returns as our dependent variable.

A. Sample Selection

Our results might be driven by the sample selection. First, we have fewer observations in the early years of our sample. Additionally, it is possible that the database started counting the length of tenure from the point of time that a director is added to the database. This would bias tenure in the early years of our sample to be smaller. In order to address this concern, we separate our sample into two groups: a group of observations for the period of 1996-2003 and a group of observations for the period of 2004-2014. We test whether the relationship between board tenure and firm value and monthly returns holds for the two groups: Panel A of Table 8 reports the regression results. For both sub-periods we find results that are consistent with our main findings. In particular, board tenure is positively related to firm value up to a certain point in tenure, at which point this positive

relationship reverses. This reversal is reflected in the negative coefficient of the squared *Tenure* term.

Insert Table 8 here

The relationship between board tenure and firm value may also change with firm size, consistent with the well-documented size anomaly (e.g., Fama and French (1993, 2014)). To ensure that the paper's results are not driven by small-cap stocks, we re-perform our tests on the sub-samples of large-cap and small-cap stocks (we define large-cap companies as companies with market capitalization larger than the median market capitalization for the full sample for each year). The results in Panel A of Table 8 show that our findings hold both for large-cap and small-cap stocks: the board tenure has an inverted U-shape relationship with firm value for both sub-samples.

B. Our Design Of Board Tenure Measure

Another concern is that our main explanatory variable might be misspecified. Bonini et al. (2015) argue that using the average to capture the effect of long board tenure of the directors might be confounding the effect of a single long tenure, as it gets diluted by the tenure of the other board members with short or average tenures. To ensure that the paper's results are not driven by our choice of the main explanatory variable, we perform several additional robustness checks.

First, we replace the average board tenure with the median board tenure in our tests. Panel B1 of Table 8 presents the results of our baseline regression, using median as our main explanatory variable (*Med Tenure*). The coefficient on *Med Tenure* is positive and significant at 99 percent level, while the coefficient on the squared term is negative and significant. In the unreported results we also find that using median board tenure results also shows that the negative effect of the

squared term is especially pronounced for high-growth firms. The results show that our findings are robust to using median as an alternative main explanatory variable.

Insert Table 8 here

Second, in order to further address the criticism that average board tenure might be a noisy measure, we examine whether our results are robust to different levels of standard deviation of board tenure. We separate our sample based on the median value of standard deviation of board tenure and re-run our baseline regression for the two sub-samples. Panel B1 shows the results for firms with high and low standard deviation of board tenure. *Tenure* and *Tenure Squared* terms retain their signs consistent with the main findings both for companies with high and low standard deviations of board tenure.

Finally, we test the effect of long board tenure on firm performance by using the proportion of long-serving directors as a dependent variable. For each company, we calculate the number of directors with tenure greater than 15 years ("long-serving directors") and divide it by the total number of directors on the board in that year. We re-run regression (1) replacing average board tenure terms with the percentage of long-serving directors. The resulting coefficient on the dependent variable of interest is negative and significant at 99 percent level, which supports our earlier conclusion that extreme terms of board tenure are detrimental to the firm values.

Our main results might also be driven by companies with extremely low board tenure. As can be seen in Figure 3, companies that belong to the first decile of the average board tenure have significantly lower market-to-book than the ones in deciles two or decile three. In order to address the criticism that our results might be driven by these outliers, we re-run our main results excluding firms that fall into decile one of average board tenure. First column of Panel B2 shows that our

results still hold if we restrict our test sample in this way: *Tenure* and *Tenure Squared* terms retain their signs and remain statistically significant at 99 percent. We further test the sensitivity of our results to the presence of low board-tenure companies in our sample by excluding firms both in decile one and two from our sample: the results are presented in column two of Panel B2. Even though the statistical significance of both *Tenure* and *Tenure Squared* terms weakens, the direction of the relationship between them and firm value remains unchanged.

C. Behavior Of Executive Board Members

Board members who are also executives at the firm might be behaving differently from the board members who are outsiders. Insiders might have different motivation compared to the outsiders due to their compensation and job security being directly tied to the firm, and their motivation might also have a different dynamic over their board tenure. A number of studies in management literature, for example, show that firm's performance generally improves at the initial periods of CEO tenure; however, after some time they become more risk-averse and entrenched in their positions, which leads to the downturn in firm performance ((McDonald et al. 2003), (Miller 1991), (McClelland et al. 2012)). In order to address a concern that our results might be driven by the behavior of insiders, we use average board tenure of only outsiders as our main explanatory variable (*Tenure Out*). We also examine how a square term of *Tenure Out* affects firm value. As can be seen from Panel C of Table 8, our main results hold when we use average tenure of only outsiders as our main explanatory variable: *Tenure* is positive and significant and *Tenure Squared* remains negative.

Insert Table 8 here

D. Use Of Linear Model

Standard linear model might be inappropriate to capture the relationship between firm value and a corporate governance construct due to potential nonlinearities between corporate governance measures and other variables. In order to address this concern, we perform an additional test to confirm that the reversal in the relationship between board tenure and firm value is correctly captured by the squared *Tenure* term.

To further verify the non-linear relationship between board tenure and the market value of a firm in a multivariate setting, we partition our sample into two groups. Each year, we create a high board tenure group of firms, and a corresponding low board tenure group. High and low board tenure is defined as the 75^{th} percentile of board tenure for that year. We then estimate model (1) as a panel regression, and also in a cross-sectional form, for each group of firms. We modify model (1) by excluding the squared board tenure term. The reason for this is that we capture the point where the linear relationship between board tenure and firm value changes by creating the two groups of firms. Panel D of Table 8 presents the results of our test. What we find is that for our low board tenure sample, board tenure is positively and significantly related to firm value. However, for our high board tenure sample, board tenure is negatively and significantly related to firm value. These results confirm our findings that board tenure and firm value are positively related with the relationship reversing at longer terms of board tenure.

Insert Table 8 here

E. Adverse Selection Of Long-Tenured Board Members

It may be argued that long-tenured board members remain on their boards because they are not offered better board memberships, and therefore cannot upgrade their board memberships into

more prestigious boards (similar to the lemon argument by Akerlof (1970)). To assess whether this is the case, we identify all cases in our universe where a board member has added another board membership during the year. We then compare the new board membership to an average of the prior board memberships.

In the unreported results, we find that the new firm that is added is typically smaller in terms of market value than the average firm in which the board member had membership in the prior year. It also is less profitable in terms of ROE, net income scaled by book value of equity, and has a lower B/M (book to market value of equity) ratio. We find a similar pattern when a board membership is dropped. The dropped firm is typically smaller and has lower ROE and B/M ratio than the remaining firms in which the board member retains membership.

We also examine the average tenure of board members who added one more board membership, and compare it to the average tenure of all other board members in the same firms. We find that the person who added a board membership had a board tenure that was shorter than the average of other members by just 0.3 years. Thus, our data does not support the conjecture that inferior board members remain on the board because they are not offered better opportunities.

F. Board Tenure And Annual Stock Returns

Our tests of board tenure and monthly stock returns are consistent with the prevailing asset pricing methodology. However, it can be argued that because board tenure variable is measured annually, next year annual stock returns might be a more appropriate dependent variable for the tests. To address this, we re-run our tests of stock returns and board tenure using excess annual stock returns as a dependent variable. Table 9 presents the results for all four specifications. *Tenure* term remains positive and significant, as we add firm and board controls, while *Tenure Squared* is consistently

negative and significant in most specifications. These results confirm our prior findings regarding the relationship between board tenure and stock returns.

Insert Table 9 here

VII. CONCLUSIONS

Understanding the relationship between average board tenure and firm value is of fundamental importance to practitioners, academics and regulators. Calls of institutional and activist investors to "refresh the boards" and limit director tenure are shaping the regulatory environment. But these actions are not supported by a consistent set of results in the corporate governance literature.

This paper studies the value relevance of board tenure using the largest sample of firms compared to previous studies in the literature. We find considerable support for the notion that longer board tenure is positively related to stock returns, as well as contemporaneous and future firm value. The market rewards firms with stable boards with a 'stability' premium. However, over time, the effectiveness of two primary board functions – monitoring management and technological advice – deteriorates. The deterioration in monitoring is due to long-tenured board members becoming less vigilant, and the deterioration in technological advice is due to board members not keeping pace with the technical changes in the company's business.

Effectiveness peaks at tenures of about nine years, at which point long-tenured board members begin to become a drag on the company valuation relative to the nine year tenure. This reduction in effectiveness is especially pronounced for high-growth firms for which up-to-date technical knowledge is especially important for the company's success.

We add to the existing literature in a number of ways. First, our findings are less prone to the biases that characterize prior studies in the area. First, our large sample of firms across 18 years and

various industries addresses some of the small sample issues of prior studies. Second, we use forward-looking measures of firm value to test the value-relevance of board tenure. This not only addresses the so-called endogeneity problem, but also suggests a viable portfolio strategy based on the length of board tenure. Finally, we provide an analytical framework based the monitoring and advisory functions that is consistent with empirical evidence and partially explains the nonlinear relationship between board tenure and firm value.

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Figure 1 Sample Size and Average/ Median Board Tenure

Figure 1 plots the number of firms over the sample period. We require firms to be founded at least five years before we begin tracking their board tenure. Also, we require a market value in excess of $100 million, a minimum of three members on the board, and a positive book value.

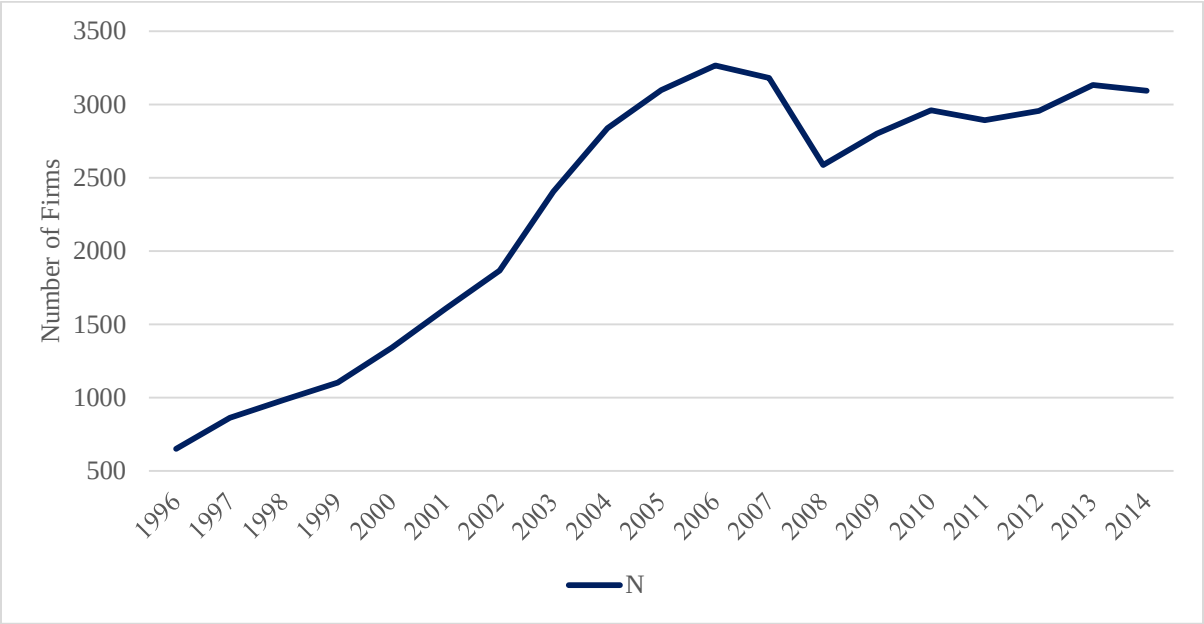

Figure 2 Average and Median Board Tenure by Deciles

Figure 2 plots average and median board tenure (in years) for groups of firms formed based on board tenure. We rank firms each year into deciles based on the board tenure for each firm. The average and median tenure is calculated for each decile.

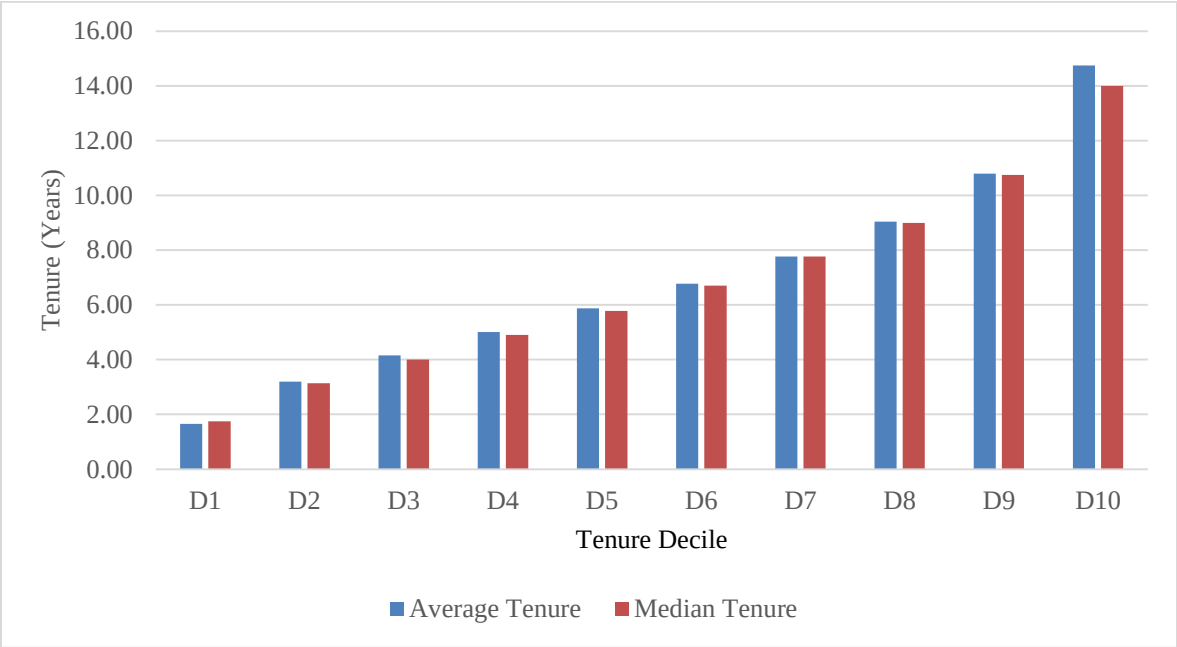

Figure 3 Market-to-Book Sorted by Tenure Deciles

Figure 3 plots median Market-to-Book value for portfolios of firms formed based on the board tenure. Market-to-Book values are annually adjusted by subtracting the median value for the industry, using Fama-French 48 industry classifications. Tenure groups are formed by ranking firms each year into deciles based on the average board tenure for the firm.

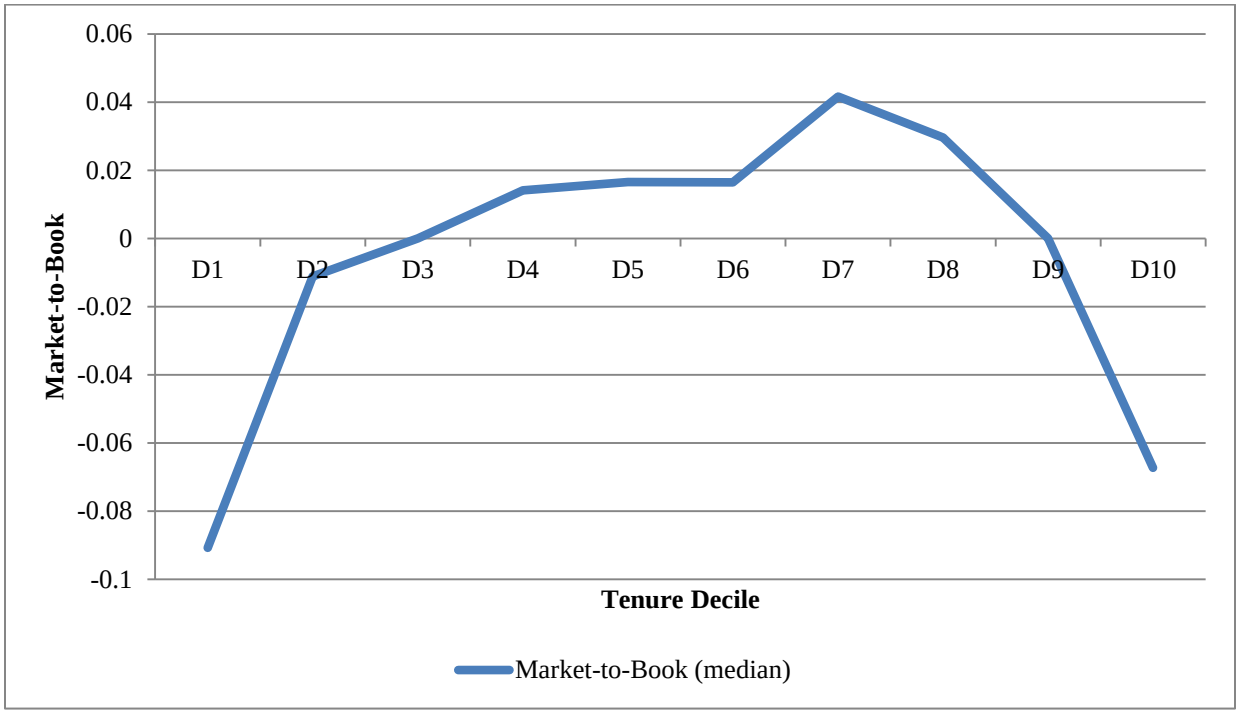

Figure 4 Excess Returns on Firms Sorted by Tenure Deciles

Figure 4 plots excess returns, characteristic adjusted returns, and risk-adjusted returns for portfolios of firms formed based on the average board tenure. The deciles are formed by ranking firms each month into deciles based on the average board tenure for the firm.

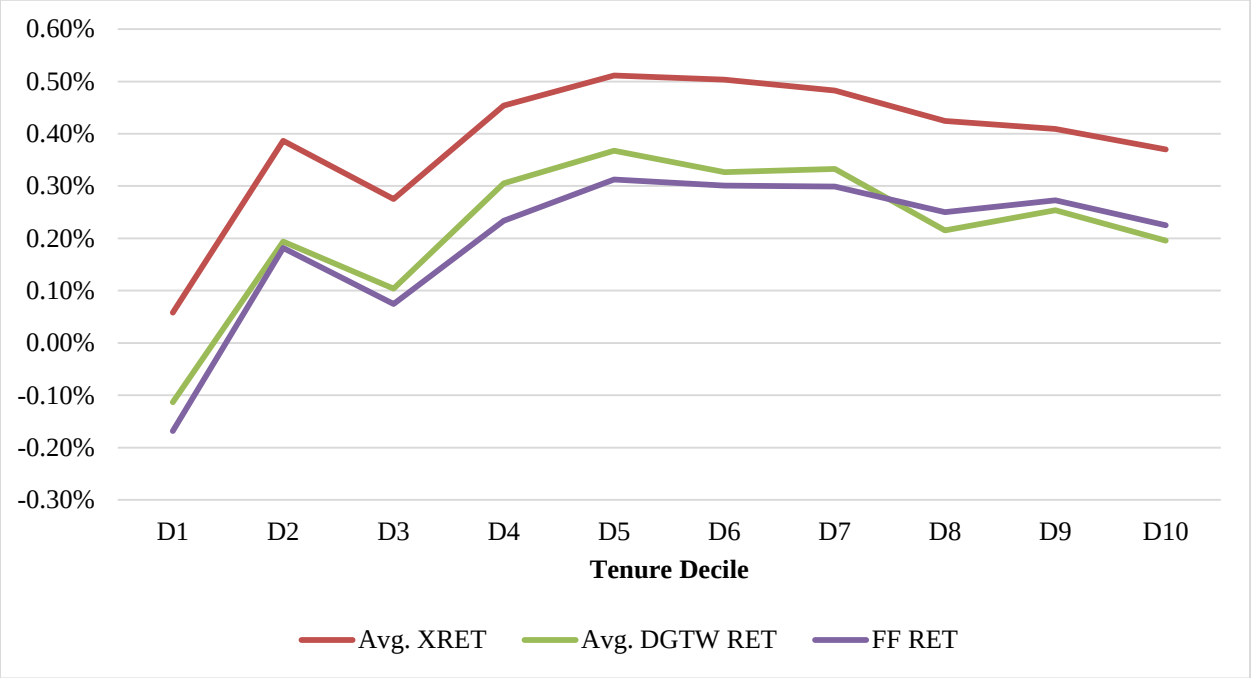

Table 1
Descriptive Statistics and Correlations

The table below provides descriptive statistics for our key variables. The sample consists of all firms on *Capital IQ* database for the years 1996-2014. The board information is from Capital IQ, financial information is from Compustat, and market information is from the CRSP database. *Tenure* is the average of the tenure of all directors sitting on the board. An individual director's tenure is calculated as the year of annual meeting minus the start year of directorship minus any breaks in the service of directorship. *Med Tenure* is the median of the tenure of all directors sitting on the board. *Std Tenure* is the standard deviation of the tenure of all directors sitting on the board. *Tenure Out* the average board tenure calculated just for board members who are not executives. *Average Age* is the average age of all board members. *Board Size* is the number of directors. We require that firms in our sample have board size greater or equal to three. *Affiliated directors* is the proportion of directors who are either managers of the company or are affiliated with the management team. *Connections* is the average number of boards the board members serve on (including the firm observation). *Before CEO* is the proportion of directors who started as board members before the current CEO. *Market cap* is the market value of equity. *Book value* is the book value of equity. *Book-to-market* is book value of equity divided by the market value of equity. *RET* are the one-month ahead buy and hold security returns from CRSP. *DGTW RET* are one-month ahead abnormal returns calculated as the monthly buy and hold security returns from CRSP minus the value-weighted average buy and hold return on securities with the same size (market capitalization, 3 groups), Book/Market (3 groups) and 11-month momentum (3 groups). *StdRet* is the standard deviation of daily stock returns during the prior calendar year. *Firm Age* (years) is the number of years since the firm is first listed in CRSP database. *Sales* are 12-month sales for a company. *SegNum* is the number of business segments. *Intangibles* are total intangible assets divided by lagged total assets. *Leverage* is long-term and short-term debt divided by lagged total assets. *ROA* is operating income before depreciation over the prior four quarters divided by lagged total asset. *R&D* is R&D expenditures from the prior four quarters divided by sales from the prior four quarters. *Sales Growth1* is the growth in the most recent four quarters of sales over the previous four quarters. *Sales Growth3* is growth of the most recent four quarters of sales over the corresponding period three years ago. *Fluidity* is the fluidity score obtained from the online data (http://cwis.usc.edu/projects/industrydata/industryconcen.htm) provided by Hoberg and Phillips. *Market-to-book* is market value of equity divided by book value of equity. The Correlation column reports correlation between board tenure and other variables. ***, **,* denote significance at 1%, 5% and 10% level.

Panel A: Descriptive statistics

	N	Mean	Median	Std Dev	p25	p75	Correlation
Board Characteristics							
Tenure (years)	525,312	6.90	6.33	3.81	4.14	9.00	
Med Tenure (years)	525,312	6.03	5.00	4.07	3.00	8.00	0.8575***
Std Tenure (years)	525,282	5.36	4.75	3.29	2.90	7.20	0.7936***
Tenure Out (years)	525,300	6.82	6.25	3.79	4.08	9.00	0.9747***
Average Age (years)	525,097	58.41	58.80	4.87	55.45	61.73	0.4641***
Board Size	525,312	8.36	8.00	2.74	6.00	10.00	0.1051***
Affiliated directors %	525,312	0.10	0.11	0.07	0.00	0.14	-0.0748***
Connections	525,312	1.93	1.80	0.78	1.33	2.36	-0.1320***
Before CEO %	525,312	0.28	0.20	0.30	0.00	0.55	0.1745***
Firm Characteristics							
Market cap	525,312	6,300.48	913.90	22,021.61	317.05	3,265.18	0.0188***
Book value	525,312	2,728.81	426.86	10,517.02	156.25	1,402.00	0.0534***
Book-to-market	525,312	0.59	0.47	1.67	0.28	0.72	0.0608***
RET	525,312	0.01	0.01	0.14	-0.05	0.07	0.0159***
DGTW RET	525,312	0.00	0.00	0.13	-0.06	0.05	0.0156***
StdRet	484,895	0.03	0.02	0.01	0.02	0.03	-0.1572***
Firm Age (years)	525,312	48.67	33.00	40.25	17.00	74.00	0.3150***
Sales	511,906	4,508.53	678.46	17,090.75	204.45	2,453.15	0.0524***
SegNum	429,326	2.66	2.00	1.85	1.00	4.00	0.1068***
Intangibles	486,057	0.75	0.84	0.25	0.62	0.95	0.0063***
Leverage	511,906	0.19	0.15	0.19	0.00	0.31	-0.0184***
ROA_t	523,787	0.09	0.10	0.16	0.04	0.16	0.0711***
ROA_{t+1}	520,587	0.09	0.10	0.16	0.04	0.17	0.0738***

Panel A: Descriptive statistics (continued)

	N	Mean	Median	Std Dev	p25	p75	Correlation
Growth Proxies							
R&D	511,906	0.06	0.00	0.18	0.00	0.03	-0.1233***
Sales Growth1	489,001	0.13	0.09	0.25	0.00	0.22	-0.1228***
Sales Growth3	489,001	0.56	0.32	0.77	0.06	0.81	-0.1855***
Fluidity	426,549	7.35	6.60	3.99	4.47	9.36	-0.1534***
Market-to-Book	525,312	3.08	2.13	3.12	1.38	3.48	-0.0608***

Panel B: Correlations for Growth Proxies

	R&D	Sales Growth1	Sales Growth3	Fluidity	Market-to-Book
R&D	1				
Sales Growth1	0.08***	1			
Sales Growth3	0.10***	0.60***	1		
Fluidity	0.21***	0.10***	0.14***	1	
Market-to-Book	0.26***	0.22***	0.19***	-0.0197***	1

Table 2
Impact of Board Tenure on Contemporaneous Firm Market Value

The table reports regression results of contemporaneous market-to-book on director, firm, and board characteristics. The regression specification is as follows: $Market/\ Book_{it} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$ In all regression iterations the dependent variable is contemporaneous market-to-book ratio. *Tenure* is the average of the tenure of all directors sitting on the board. An individual director's tenure is calculated as the year of annual meeting minus the start year of directorship minus any breaks in the service of directorship. *Firm Age* (years) is the number of years since the firm is first listed in CRSP database. *Sales* are 12-month sales for a company. *SegNum* is the number of business segments. *Intangibles* are total intangible assets divided by lagged total assets. *Leverage* is long-term and short-term debt divided by lagged total assets. *R&D* is R&D expenditures from the prior four quarters divided by sales from the prior four quarters. *ROA* is operating income before depreciation over the prior four quarters divided by lagged total asset. *StdRet* is the standard deviation of daily stock returns during the prior calendar year. *Average Age* is the average age of all board members. *Board Size* is the number of directors. We require that firms in our sample have board size greater or equal to three. *Connections* is the average number of boards the board members serve on (including the firm observation). *Before CEO* is the proportion of directors who started as board members before the current CEO. *Affiliated directors* is the proportion of directors who are either managers of the company or are affiliated with the management team. *Stand* denotes that for regression purposes a variable was normalized using the Blom function which transforms a variable to a normal distribution with a range between plus and minus three. In Panel B we chose to show only the coefficients on *Log* (*Tenure)* and Log $(Tenure)^2$ with all other controls suppressed. In Panel B the t-statistic for the average coefficient is computed using the Fama and Macbeth methodology. Fama and French's 48 industry definitions are used for the industry fixed effects. The T-statistics are in parentheses and statistically significant terms are bolded. ***, **,* denote significance at 1%, 5% and 10% level.

Panel A: Panel regression

	Dependent Variable = Contemporaneous Market/ Book Ratio (stand.)			
	1	2	3	4
Log (Tenure)	0.0031	0.5512***	0.3997***	0.2938***
	(0.28)	**(10.18)**	**(7.84)**	**(5.75)**
Log $(Tenure)^2$		-0.1484***	-0.1207***	-0.0799***
		(-10.34)	**(-8.90)**	**(-5.83)**
Log (Firm Age)			0.0057	0.0043
			(0.76)	(0.56)
Log (Sales)			-0.0308***	-0.0560***
			(-8.18)	**(-13.67)**
Log (SegNum)			-0.0722***	-0.0737***
			(-5.77)	**(-5.93)**
Intangibles (stand.)			0.0351***	0.0249***
			(4.11)	**(2.93)**
Leverage (stand.)			0.0629***	0.0569***
			(10.79)	**(9.80)**
R&D (stand.)			0.3324***	0.3086***
			(32.73)	**(30.36)**
ROA_t (stand.)			0.3860***	0.3917***
			(39.66)	**(40.43)**
ROA_{t-1} (stand.)			-0.0316***	-0.0269***
			(-3.30)	**(-2.82)**
StdRet (stand.)			-0.0316***	-0.0274***
			(-4.74)	**(-4.12)**
Log (Average Age)				-0.3897***
				(-5.63)
Log (Board Size)				0.1232***
				(4.93)
Log (Connections)				0.4492***
				(18.41)
Before CEO %				0.0195
				(1.12)
Affiliated Directors %				0.2881***
				(4.01)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	31,253	31,253	31,253	31,253

Panel B: Annual Cross-Sectional Regressions

	Log (Tenure)			Log (Tenure)^2		
Year	2	3	4	2	3	4
1996	-0.3097	-0.1733	-0.1976	0.0399	-0.0064	0.0084
	(-0.98)	(-0.57)	(-0.65)	(0.47)	(-0.08)	(0.10)
1997	-0.0710	-0.1894	-0.1738	-0.0054	0.0276	0.0287
	(-0.23)	(-0.66)	(-0.60)	(-0.06)	(0.36)	(0.36)
1998	0.3218	0.2266	0.1380	-0.1224*	-0.0891	-0.0492
	(1.35)	(1.02)	(0.62)	**(-1.84)**	(-1.43)	(-0.77)
1999	0.2431	-0.0603	-0.1411	-0.0905	-0.0050	0.0263
	(0.95)	(-0.26)	(-0.61)	(-1.29)	(-0.08)	(0.41)
2000	0.5279**	0.4178**	0.3518	-0.1591**	-0.1135*	-0.0873
	(2.20)	**(1.85)**	(1.55)	**(-2.46)**	**(-1.86)**	(-1.42)
2001	0.6047***	0.3347	0.3085	-0.1759***	-0.1083*	-0.0905
	(2.69)	(1.62)	(1.49)	**(-2.84)**	**(-1.90)**	(-1.58)
2002	0.5970***	0.3358*	0.2920	-0.1514***	-0.0947*	-0.0778
	(3.04)	**(1.86)**	(1.62)	**(-2.76)**	**(-1.87)**	(-1.53)
2003	0.6810***	0.3581*	0.2242	-0.1598***	-0.0998*	-0.0482
	(3.25)	**(1.90)**	(1.19)	**(-2.77)**	**(-1.91)**	(-0.91)
2004	0.5143***	0.4096**	0.2783	-0.1608***	-0.1313***	-0.0806*
	(2.83)	**(2.37)**	(1.60)	**(-3.22)**	**(-2.76)**	**(-1.67)**
2005	0.7230***	0.5413***	0.4142**	-0.2015***	-0.1681***	-0.1176**
	(3.36)	**(2.67)**	**(2.03)**	**(-3.48)**	**(-3.07)**	**(-2.12)**
2006	0.7655***	0.7355***	0.5979***	-0.2281***	-0.2274***	-0.1779***
	(3.76)	**(3.80)**	**(3.07)**	**(-4.19)**	**(-4.38)**	**(-3.39)**
2007	0.5472***	0.4501**	0.3696*	-0.1627***	-0.1479***	-0.1083**
	(2.60)	**(2.26)**	**(1.85)**	**(-2.91)**	**(-2.78)**	**(-2.02)**
2008	0.5976***	0.4669**	0.3745*	-0.1657***	-0.1448***	-0.1001*
	(2.65)	**(2.20)**	**(1.76)**	**(-2.78)**	**(-2.59)**	**(-1.77)**
2009	0.6358**	0.4563**	0.3255	-0.1471**	-0.1205**	-0.0659
	(2.54)	**(2.02)**	(1.42)	**(-2.28)**	**(-2.07)**	(-1.11)
2010	0.5184**	0.3343	0.1125	-0.1418**	-0.1094*	-0.0343
	(1.98)	(1.36)	(0.46)	**(-2.13)**	**(-1.75)**	(-0.55)
2011	1.3888***	1.1230***	0.9823***	-0.3282***	-0.2798***	-0.2292***
	(5.08)	**(4.40)**	**(3.82)**	**(-4.81)**	**(-4.39)**	**(-3.56)**
2012	0.9143***	0.7846***	0.6836***	-0.2093***	-0.1974***	-0.1618***
	(3.53)	**(3.28)**	**(2.82)**	**(-3.21)**	**(-3.28)**	**(-2.64)**
2013	1.1246***	1.1072***	0.9663***	-0.2550***	-0.2721***	-0.2210***
	(4.18)	**(4.40)**	**(3.82)**	**(-3.80)**	**(-4.32)**	**(-3.47)**
2014	1.2334*	0.6786	0.3594	-0.3340*	-0.2048	-0.0925
	(1.70)	(0.97)	(0.51)	**(-1.90)**	(-1.20)	(-0.54)
Average	0.6083**	0.4388***	0.3298***	-0.1663***	-0.1312***	-0.0884***
	(6.55)	**(5.36)**	**(4.43)**	**(-8.03)**	**(-6.86)**	**(-5.30)**
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	No	Yes	Yes	No	Yes	Yes
Board Controls	No	No	Yes	No	No	Yes
N	31,253	31,253	31,253	31,253	31,253	31,253

Table 3
Impact of Board Tenure on the Next Year Firm Market Value

The table reports regression results of forward market-to-book on director, firm, and board characteristics. The regression specification is as follows: $Market/\ Book_{it+1} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$ In all regression iterations the dependent variable is the next-year market-to-book ratio. In all regressions we also control for current year market-to-book. *Tenure* is the average of the tenure of all directors sitting on the board. An individual director's tenure is calculated as the year of annual meeting minus the start year of directorship minus any breaks in the service of directorship. *Firm Age* (years) is the number of years since the firm is first listed in CRSP database. *Sales* are 12-month sales for a company. *SegNum* is the number of business segments. *Intangibles* are total intangible assets divided by lagged total assets. *Leverage* is long-term and short-term debt divided by lagged total assets. *R&D* is R&D expenditures from the prior four quarters divided by sales from the prior four quarters. *ROA* is operating income before depreciation over the prior four quarters divided by lagged total asset. *StdRet* is the standard deviation of daily stock returns during the prior calendar year. *Average Age* is the average age of all board members. *Board Size* is the number of directors. We require that firms in our sample have board size greater or equal to three. *Connections* is the average number of boards the board members serve on (including the firm observation). *Before CEO* is the proportion of directors who started as board members before the current CEO. *Affiliated directors is* the proportion of directors who are either managers of the company or are affiliated with the management team. *Stand* denotes that for regression purposes a variable was normalized by subtracting the cross-sectional mean for each year and dividing by the cross-sectional standard deviation for each year. Industry fixed effect is at Fama French's 48 industries classification. The T-statistics are in parentheses and statistically significant terms are bolded. ***, **,* denote significance at 1%, 5% and 10% level.

	Dependent Variable = Forward Market/ Book (stand.)			
	1	2	3	4
Log (Tenure)	0.0338***	0.1669***	0.1491***	0.1316***
	(5.07)	**(5.07)**	**(4.52)**	**(3.96)**
Log (Tenure)^2		-0.0361***	-0.0327***	-0.0268***
		(-4.12)	**(-3.73)**	**(-3.01)**
Market/Book (stand.)	0.8092***	0.8084***	0.8041***	0.8023***
	(235.13)	**(234.56)**	**(219.23)**	**(217.43)**
Log (Firm Age)			0.0069	0.0058
			(1.41)	(1.16)
Log (Sales)			0.0167***	0.0132***
			(6.85)	**(4.91)**
Log (SegNum)			-0.0162**	-0.0166**
			(-1.99)	**(-2.05)**
Intangibles (stand.)			-0.0233***	-0.0247***
			(-4.21)	**(-4.46)**
Leverage (stand.)			0.0047	0.0041
			(1.25)	(1.09)
R&D (stand.)			0.0236***	0.0210***
			(3.53)	**(3.12)**
ROA$_t$ (stand.)			-0.0216***	-0.0200***
			(-3.35)	**(-3.10)**
ROA$_{t-1}$ (stand.)			0.0369***	0.0375***
			(5.96)	**(6.06)**
StdRet (stand.)			-0.0008	-0.0003
			(-0.19)	(-0.07)
Log (Average Age)				-0.0411
				(-0.91)
Log (Board Size)				0.0201
				(1.24)
Log (Connections)				0.0597***
				(3.73)
Before CEO %				0.0176
				(1.55)
Affiliated Directors %				0.0688
				(1.47)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	30,722	30,722	30,722	30,722

Table 4

Impact of Growth Options on the Value Relevance of Board Tenure: Market Valuation Evidence

The table below reports regression results where the dependent variable is contemporaneous market-to-book ratio. In each column we report results of the following specification that includes one of our four proxies for firm growth: $Market/Book_{it} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Tenure_{it}^2 \times Growth\ Proxy + Growth\ Proxy\ Dummy + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$. We use four proxies for firm growth: (i) *R&D*, which is an indicator variable equal to one if the firm's ratio of R&D expenses to sales is over the 75th percentile value for all firms for that year. (ii) *SalesGrowth1*, which is an indicator variable equal to one if the firm's sales growth in the most recent four quarters over the previous four quarters is above the median value of other firms for the year. (iii) *SalesGrowth3*, which is an indicator variable equal to one if the firm's sales growth of the most recent four quarters over the corresponding period three years ago is above the median value of other firms for the year. (iv) *Fluidity* is an indicator variable equal to one if firm's *Fluidity* score is above the median value of other firms for the year. *Fluidity* is the fluidity score obtained from the online data (http://cwis.usc.edu/projects/industrydata/industryconcen.htm) provided by Hoberg and Phillips. All other control variables are as defined in Table 2. In the interest of conciseness, we report only the results on the key independent variables. Panel A reports the results of panel regression. Industry fixed effect is at Fama French's 48 industries classification. The T-statistics are in parentheses and statistically significant terms are bolded. Panel B reports the results of Fama-MacBeth style regressions. Panel B reports average coefficients from 19 annual cross-sectional regressions. The averages are time-series means with t-statistics (in parentheses) corresponding to the standard error of the mean; statistically significant terms are bolded. *N* denotes the average number of cross-sectional observations. ***, **,* denote significance at 1%, 5% and 10% level.

Panel A: Panel Regression

	Dependent Variable = Contemporaneous Market to Book (stand.)			
	Growth Option Proxy =			
	R&D	Sales Growth1	Sales Growth3	Fluidity
Growth × Log (Tenure)^2	-0.0225***	-0.0138***	-0.0020	-0.0096*
	(-3.54)	**(-2.62)**	(-0.37)	**(-1.70)**
Log (Tenure)	0.3174***	0.2638***	0.2909***	0.2858***
	(6.16)	**(5.23)**	**(5.72)**	**(5.58)**
Log (Tenure)^2	-0.0814***	-0.0682***	-0.0791***	-0.0746***
	(-5.89)	**(-4.98)**	**(-5.75)**	**(-5.40)**
Growth Option Proxy	0.4587***	0.3650***	0.2001***	0.0797***
	(15.18)	**(15.25)**	**(8.22)**	**(3.12)**
Firm Controls	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes
Observations	31,253	31,253	31,253	31,253

Panel B: Fama-MacBeth Regression

	Dependent Variable = Contemporaneous Market to Book (stand.)			
	Growth Option Proxy =			
	R&D	Sales Growth1	Sales Growth3	Fluidity
Growth × Log (Tenure)^2	-0.0298***	-0.0082	0.0028	-0.0131
	(-5.69)	(-1.09)	(0.47)	(-1.47)
Log (Tenure)	0.4307***	0.3650***	0.3869***	0.3697***
	(5.18)	**(4.58)**	**(5.15)**	**(4.88)**
Log (Tenure)^2	-0.1159***	-0.1031***	-0.1124***	-0.1022***
	(-5.94)	**(-5.71)**	**(-6.72)**	**(-6.16)**
Growth Option Proxy	0.5101***	0.3373***	0.1941***	0.0871*
	(12.66)	**(9.87)**	**(6.77)**	**(2.07)**
Firm Controls	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes
Observations	1,616	1,616	1,616	1,616

Table 5

Abnormal Stocks Returns to Portfolios Sorted by Board Tenure

The first two columns presents average monthly excess returns (*X_RET*) and characteristic adjusted returns (*DGTW_RET*) for quintiles and deciles of portfolios formed based on *Tenure*. *X_RET* are the monthly buy and hold security returns from CRSP in excess the value weighted market portfolio. *DGTW_RET* are characteristic adjusted returns calculated as the monthly buy and hold security returns from CRSP minus the value-weighted average buy and hold return on securities with the same size (market capitalization, 3 groups), Book/Market (3 groups) and 11-month momentum (3 groups). The remaining columns show the results of Fama-French regressions for quintiles and deciles of portfolios formed based on *Tenure*. The regressions have the following specification:

$$Rp_t - Rf_t = FF\_RET + b \cdot [Rm_t - Rf_t] + s \cdot SMB_t + h \cdot HML_t + u \cdot UMD_t + e_t$$

Dependent variables are portfolio returns, *Rpt*, in excess of the one-month Treasury bill rate, *Rf*, observed at the beginning of the month. The intercept denotes the risk adjusted return, *FF_RET*. Each month we form equal-weighted portfolios of all sample firms based the length of directors' tenure (*Tenure*). The three Fama-French factors are zero investment portfolios representing the excess return of the market, *Rm-Rf*, the difference between a portfolio of ''small'' stocks and ''big'' stocks, *SMB*; and the difference between a portfolio of ''high'' book-to-market stocks and ''low'' book-to-market stocks, *HML*. The fourth factor, *UMD*, is the difference between a portfolio of stocks with high past one-year returns minus a portfolio of stocks with low past one-year returns. The number of monthly observations is denoted by *N* and *t*-statistics are in parentheses; statistically significant terms are bolded.

			Fama-French Regressions					
	Average X_RET	Average DGTW _RET	Intercept (FF_RET)	Rm - Rf	SMB	HML	UMD	R^2/ N
A: Tenure: Quintile Portfolios								
1 (Low)	0.22%	0.04%	0.00%	1.1104	0.6619	0.2794	-0.1732	0.9271
	(1.07)	(0.31)	(0.04)	**(39.28)**	**(18.36)**	**(7.26)**	**(-7.47)**	222
2	0.36%	0.20%	0.15%	1.0712	0.5511	0.3625	-0.1119	0.9302
	(2.10)	**(1.91)**	(1.44)	**(42.36)**	**(17.09)**	**(10.53)**	**(-5.40)**	222
3	0.51%	0.35%	0.31%	1.0084	0.5395	0.4336	-0.0794	0.9420
	(3.17)	**(3.14)**	**(3.38)**	**(47.08)**	**(19.75)**	**(14.87)**	**(-4.52)**	222
4	0.45%	0.27%	0.27%	0.9901	0.4511	0.4808	-0.0807	0.9483
	(3.05)	**(2.73)**	**(3.36)**	**(51.26)**	**(18.32)**	**(18.28)**	**(-5.10)**	222
5 (High)	0.39%	0.22%	0.25%	0.9030	0.4776	0.5360	-0.0959	0.9371
	(2.40)	**(1.92)**	**(2.91)**	**(44.66)**	**(18.53)**	**(19.47)**	**(-5.79)**	222
High - Low	0.17%	0.19%	0.04%	-0.2077	-0.1811	0.2533	0.0736	0.4579
	(0.94)	(1.33)	(0.30)	**(-6.42)**	**(-4.39)**	**(5.75)**	**(2.77)**	222
B: Tenure: Decile Portfolios								
1 (Low)	0.06%	-0.11%	-0.17%	1.1372	0.6700	0.2375	-0.1658	0.9069
	(0.26)	(-0.79)	(-1.21)	**(34.43)**	**(15.91)**	**(5.28)**	**(-6.12)**	222
2	0.39%	0.19%	0.18%	1.0844	0.6544	0.3215	-0.1800	0.9210
	(1.89)	(1.55)	(1.49)	**(37.51)**	**(17.75)**	**(8.17)**	**(-7.59)**	222
3	0.27%	0.10%	0.07%	1.0807	0.5390	0.3444	-0.1330	0.9087
	(1.49)	(0.87)	(0.60)	**(36.49)**	**(14.28)**	**(8.54)**	**(-5.48)**	222
4	0.45%	0.31%	0.23%	1.0614	0.5627	0.3813	-0.0914	0.9254
	(2.60)	**(2.65)**	**(2.13)**	**(40.97)**	**(17.03)**	**(10.81)**	**(-4.30)**	222
5	0.51%	0.37%	0.31%	1.0114	0.5515	0.4364	-0.0965	0.9230
	(2.97)	**(3.06)**	**(2.93)**	**(40.06)**	**(17.13)**	**(12.70)**	**(-4.56)**	222
6	0.50%	0.33%	0.30%	1.0062	0.5242	0.4317	-0.0631	0.9383
	(3.19)	**(2.85)**	**(3.26)**	**(46.00)**	**(18.79)**	**(14.49)**	**(-3.52)**	222
7	0.48%	0.33%	0.30%	0.9913	0.4311	0.4849	-0.0628	0.9345
	(3.19)	**(3.14)**	**(3.27)**	**(45.78)**	**(15.61)**	**(16.45)**	**(-3.54)**	222
8	0.42%	0.22%	0.25%	0.9895	0.4699	0.4765	-0.0989	0.9372
	(2.70)	**(1.95)**	**(2.73)**	**(45.65)**	**(17.00)**	**(16.15)**	**(-5.56)**	222
9	0.41%	0.25%	0.27%	0.9102	0.4857	0.5109	-0.1065	0.9321
	(2.52)	**(2.09)**	**(3.03)**	**(42.69)**	**(17.87)**	**(17.60)**	**(-6.09)**	222
10	0.37%	0.20%	0.23%	0.8958	0.4699	0.5617	-0.0856	0.9116
	(2.15)	(1.55)	**(2.22)**	**(37.30)**	**(15.35)**	**(17.18)**	**(-4.35)**	222
High – Low	0.31%	0.31%	0.19%	-0.2416	-0.1969	0.3211	0.0766	0.4242
	(1.43)	**(1.71)**	(1.11)	**(-5.94)**	**(-3.80)**	**(5.80)**	**(2.30)**	222

Table 6
Fama-MacBeth Cross-Sectional Regressions of Monthly Stock Returns

The table reports regression results estimating variations of the following regression: $DGTW\_RET_{it+1} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$ In all regression iterations the dependent variable is the one-month ahead excess stock return – *DGTW_RET* (characteristic adjusted returns calculated as the monthly buy and hold security returns from CRSP minus the value-weighted average buy and hold return on securities with the same size (market capitalization, 3 groups), Book/Market (3 groups) and 11-month momentum (3 groups)). *Tenure* is the average of the tenure of all directors sitting on the board. An individual director's tenure is calculated as the year of annual meeting minus the start year of directorship minus any breaks in the service of directorship. *Firm Age* (years) is the number of years since the firm is first listed in CRSP database. *SegNum* is the number of business segments. *Intangibles* are total intangible assets divided by lagged total assets. *Leverage* is long-term and short-term debt divided by lagged total assets. *R&D* is R&D expenditures from the prior four quarters divided by sales from the prior four quarters. *ROA* is operating income before depreciation over the prior four quarters divided by lagged total asset. *StdRet* is the standard deviation of daily stock returns during the prior calendar year. *Average Age* is the average age of all board members. *Board Size* is the number of directors. We require that firms in our sample have board size greater or equal to three. *Connections* is the average number of boards the board members serve on (including the firm observation). *Before CEO* is the proportion of directors who started as board members before the current CEO. *Affiliated directors is* the proportion of directors who are either managers of the company or are affiliated with the management team. *DGTW_RET* is winsorized at 99% and 1%. The table reports average coefficients from 227 monthly cross-sectional regressions. The averages are time-series means with t-statistics (in parentheses) computed using the standard error of the mean; statistically significant terms are bolded. *N* denotes the average number of cross-sectional observations. Industry fixed effect is at Fama French's 48 industries classification. ***, **,* denote significance at 1%, 5% and 10% level.

	Dependent Variable = DGTW_RET			
	1	2	3	4
Log (Tenure)	0.0020***	0.0084***	0.0071***	0.0062***
	(3.10)	**(3.79)**	**(3.24)**	**(2.78)**
Log (Tenure)^2		-0.0017***	-0.0015***	-0.0011*
		(-3.06)	**(-2.70)**	**(-1.92)**
Log (Firm Age)			-0.0006	-0.0005
			(-1.41)	(-1.48)
Log (SegNum)			0.0005	0.0004
			(0.95)	(0.72)
Intangibles (stand.)			-0.0004	-0.0005
			(-0.88)	(-1.00)
Leverage (stand.)			0.0002	0.0001
			(0.44)	(0.19)
R&D (stand.)			0.0003	0.0001
			(0.33)	(0.17)
ROA (stand.)			0.0021***	0.0020***
			(2.85)	**(2.77)**
ROA_{t-1} (stand.)			0.0000	0.0000
			(-0.06)	(0.01)
StdRet (stand.)			-0.0003	-0.0002
			(-0.43)	(-0.30)
Log (Average Age)				-0.0048
				(-1.46)
Log (Board Size)				-0.0002
				(-0.13)
Log (Connections)				0.0030**
				(2.34)
Before CEO %				0.0007
				(0.86)
Affiliated Directors %				0.0028
				(0.76)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	1,620	1,620	1,620	1,620

Table 7
Impact of Growth Options on the Value Relevance of Board Tenure: Stock Return Evidence

The table below reports regression results where the dependent variable, *DGTW_RET*, is one month ahead excess stock return (characteristic adjusted returns calculated as the monthly buy and hold security returns from CRSP minus the value-weighted average buy and hold return on securities with the same size (market capitalization, 3 groups), Book/Market (3 groups) and 11-month momentum (3 groups)). In each column we report results of the following specification that includes one of our five proxies for firm growth:

$$DGTW\_RET_{it+1} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Tenure_{it}^2 \times Growth\ Proxy + Growth\ Proxy\ Dummy + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$$

We use five proxies for firm growth: (i) *M/B* is an indicator variable equal to one if firm's market-to-book ratio is above the median value of other firms for the year. (ii) *R&D*, which is an indicator variable equal to one if the firm's ratio of R&D expenses to sales is over the 75th percentile value for all firms for that year. (iii) *SalesGrowth1*, which is an indicator variable equal to one if the firm's sales growth in the most recent four quarters over the previous four quarters is above the median value of other firms for the year. (iv) *SalesGrowth3*, which is an indicator variable equal to one if the firm's sales growth of the most recent four quarters over the corresponding period three years ago is above the median value of other firms for the year. (v) *Fluidity* is an indicator variable equal to one if firm's *Fluidity* score is above the median value of other firms for the year. *Fluidity* is the fluidity score obtained from the online data (http://cwis.usc.edu/projects/industrydata/industryconcen.htm) provided by Hoberg and Phillips. All other control variables are as defined in Table 6. In the interest of conciseness, we report only the results on the key independent variables. *DGTW_RET* is winsorized at 99% and 1%. The table reports average coefficients from 227 monthly cross-sectional regressions. The averages are time-series means with t-statistics (in parentheses) corresponding to the standard error of the mean; statistically significant terms are bolded. *N* denotes the average number of cross-sectional observations. Industry fixed effect is at Fama French's 48 industries classification. ***, **,* denote significance at 1%, 5% and 10% level.

	Dependent Variable = DGTW_RET				
	Growth Option Proxy =				
	M/B	R&D	Sales Growth1	Sales Growth3	Fluidity
Growth × Log (Tenure)^2	-0.0004*	-0.0001	0.0001	0.0002	-0.0001
	(-1.71)	(-0.38)	(0.28)	(0.99)	(-0.58)
Log (Tenure)	0.0063***	0.0061***	0.0061***	0.0062***	0.0062***
	(2.85)	**(2.75)**	**(2.73)**	**(2.75)**	**(2.78)**
Log (Tenure)^2	-0.0009	-0.0010*	-0.0011*	-0.0012**	-0.0010*
	(-1.55)	**(-1.84)**	**(-1.89)**	**(-2.08)**	**(-1.82)**
Growth Option Proxy	-0.0012	0.0012	-0.0008	-0.0018	0.0012
	(-0.88)	(0.73)	(-0.72)	(-1.48)	(1.03)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Board Controls	Yes	Yes	Yes	Yes	Yes
N	1,620	1,620	1,620	1,620	1,620

Table 8
Robustness Tests: Market-to-Book Evidence

The table reports regression results of contemporaneous market-to-book on director, firm, and board characteristics. Dependent variable is Market/ Book and is normalized using the Blom function which transforms a variable to a normal distribution with a range between plus and minus three. Unless otherwise stated, the regressions contain same set of control variables as in Table 2 Column 4. Panel A separates our sample in two ways: the earlier period (1996-2003) vs. later period (2004-2014) and large-cap stocks vs. small-cap stocks. Panel B1 uses median board tenure (*Med Tenure*) and its square in the regression as an alternative measure of board tenure, and it also tests the robustness of our results to the standard deviation of board tenure (*High Std Tenure* vs. *Low Std Tenure*). Panel B2 omits two groups of companies: column one excludes companies that are ranked into the decile one of average board tenure and column two excludes companies that are ranked into decile one or two of average board tenure. Panel C uses average tenure of directors who are not executives (*Tenure Out*) and its square in the regression. Panel D separates our sample in high and low board tenure stocks and omits squared tenure term in the regression to test the robustness of linear model use. In the interest of conciseness, we report only the results on the key independent variables. All other control variables are as defined in Table 2. Fama and French's 48 industry definitions are used for the industry fixed effects. The T-statistics are in parentheses and statistically significant terms are bolded. ***, **,* denote significance at 1%, 5% and 10% level.

Panel A: Sample Selection.

	1996-2003 period	2004-2014 period	Large-Cap	Small-Cap
Log (Tenure)	0.1003	0.4967***	0.2262***	0.3345***
	(1.21)	**(5.89)**	**(3.69)**	**(4.61)**
Log (Tenure)^2	-0.0362*	-0.1263	-0.0489***	-0.1010
	(-2.04)	**(-6.63)**	**(-2.96)**	**(-5.20)**
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	8,024	23,226	16,296	14,957

Panel B1: Design of Board Tenure Measure.

	Median Tenure	High Std Tenure	Low Std Tenure
Log (Tenure)	0.1048***	0.2934	0.1215
	(3.20)	(1.42)	(1.56)
Log (Tenure)^2	-0.0270***	-0.0901*	-0.0072
	(-2.81)	**(-2.00)**	(-0.29)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
N	31,253	16,044	15,209

Panel B2: Design of Board Tenure Measure.

	Excluding D1	Excluding D1-D2
Log (Tenure)	0.4199***	0.2527
	(3.83)	**(1.61)**
Log (Tenure)^2	-0.1088***	-0.0740**
	(-4.15)	**(-2.08)**
Year FE	Yes	Yes
Industry FE	Yes	Yes
N	28,625	25,572

Panel C: Behavior of Executive Board Members.

	Tenure Out
Log (Tenure)	0.2419***
	(4.91)
Log (Tenure)^2	-0.0679***
	(-5.09)
Year FE	Yes
Industry FE	Yes
N	31,253

Panel D: Use of Linear Model.

	High Board Tenure	Low Board Tenure
Log (Tenure)	-0.2059***	0.1290***
	(-3.77)	**(6.88)**
Year FE	Yes	Yes
Industry FE	Yes	Yes
N	7,842	23,411

Table 9
Robustness Tests: Annual Stock Returns Evidence

The table reports regression results estimating variations of the following regression: $DGTW\_RET_{it+1} = \beta_1 Tenure_{it} + \beta_2 Tenure_{it}^2 + Board\ Controls_{it} + Firm\ Controls_{it} + \epsilon_{it}$. In all regression iterations the dependent variable is the one-year ahead excess stock return – *DGTW_RET* (characteristic adjusted returns calculated as the annual buy and hold security returns from CRSP minus the value-weighted average buy and hold return on securities with the same size (market capitalization, 3 groups), Book/Market (3 groups) and 11-month momentum (3 groups)). All independent variables are as defined in Table 6. In the interest of conciseness, we report only the results on the key independent variables. *DGTW_RET* is winsorized at 99% and 1%. The table reports average coefficients from 18 annual cross-sectional regressions. The averages are time-series means with t-statistics (in parentheses) corresponding to the standard error of the mean; statistically significant terms are bolded. *N* denotes the average number of cross-sectional observations. Industry fixed effect is at Fama French's 48 industries classification. ***, **,* denote significance at 1%, 5% and 10% level.

	Dependent Variable = DGTW_RET			
	1	2	3	4
Log (Tenure)	0.0300***	0.1108***	0.0964***	0.0800**
	(2.92)	**(3.40)**	**(3.02)**	**(2.60)**
Log (Tenure)^2		-0.0211***	-0.0180**	-0.0102
		(-2.77)	**(-2.53)**	**(-1.54)**
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	1,620	1,620	1,620	1,620