# TWO ESSAYS ON EMPIRICAL FINANCE

A Dissertation

by

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ABSTRACT

The dissertation consists of two chapters. The first chapter studies the effect of ownership by long-term passive institutions on CEO compensation duration. I exploit the exogenous variation in passive ownership associated with Russell Index reconstitutions to establish a causal link between passive institution ownership and CEO compensation duration. A one-standard-deviation increase in passive ownership leads to a 0.61-standard-deviation increase in compensation duration. To identify the channels through which passive institutions affect CEO compensation duration, I examine their proxy voting behavior. Increased passive ownership leads to a greater number of shareholder-sponsored compensation proposals, and passive institutions vote to support these proposals. Moreover, passive institutions decrease (increase) voting support on say-on-pay proposals when CEO compensation duration decreases (increases). Finally, I show suggestive evidence of behind-the-scenes engagement by passive institutions to influence CEO compensation duration. Overall, my findings indicate that passive institutions influence CEO compensation duration to align CEOs' incentive horizons with their own long-term investment horizons.

The second chapter studies whether value of corporate voting rights can explain (predict) future stock returns. Measuring value of corporate voting rights using options, we find that firms with higher value of voting rights experience lower future returns. Constructing portfolios based on an option-based measure of the value of voting rights yields average return spreads of about 80 basis points per month, and the return differences persist up to 12 months. Our results cannot be explained by models of informed trading, nor by liquidity, short-sale constraints or other factors known to affect stock prices. An alternative measure of vote value for dual class firms generates similar results. Our findings highlight the importance of the vote component of stock prices in understanding the cross section of stock returns.

DEDICATION

To my father and my mother.

ACKNOWLEDGMENTS

I am greatly indebted to my advisor, Shane Johnson, for his guidance, patience, and encouragement throughout finishing my dissertation and doctoral degree. Without his help, I would have not been able to complete this long and difficult journey. I was motivated enlightened by his immense knowledge and invaluable input in every step of my research.

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## CONTRIBUTORS AND FUNDING SOURCES

### Contributors

This work was supervised by a dissertation committee consisting of Professor Shane Johnson, Christa Bouwman, and Hwagyun Kim of the Department of Finance and Professor Nate Sharp of the Department of Accounting.

The work in Chapter two is collaborated with Professor Hwagyun Kim and Mahdi Mohseni of the Department of Finance.

All other work conducted for the dissertation was completed by the student independently.

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# 1. INTRODUCTION

The dramatic increase in passive institution ownership in U.S. corporations in recent years begs the question of their role as monitoring shareholders in corporations. Mixed evidence exists in the literature. Some find that the growing size of passive institutions has improved corporate governance in firms while some argue the opposite (Appel et al. (2016b), Schmidt and Fahlenbrach (2017)). As part of this stream of literature, the first chapter of this dissertation studies the effect of passive ownership on corporate governance, specifically the horizon of executive compensation.

My goal here is more specific in that I examine passive institutions' role as long-term investors with voting power. Passive institutions usually hold sizable stakes in firms and they do not frequently churn their portfolios. Hence, they are long-term shareholders with large voting power. Moreover, their investment horizons can be permanent as long as the firm stays in the benchmark index. In other words, passive institutions can be "permanent shareholders of the firm."

Given that passive institutions are long-term shareholders with large stakes, the question I address in the first chapter is whether managerial incentive contracts change accordingly when there are more shares held by passive institutions. Executive compensation is one of the most important tools for corporate governance. Whether companies reward executives in a way that aligns their incentives with those of shareholders is at the heart of corporate finance research. I aim to establish the causal effects of passive ownership and CEO compensation duration by exploiting exogenous variations in passive ownership due to Russell index reconstitutions.

Moreover, I aim to establish the channels through which passive institutions affect CEO compensation durations by examining their proxy voting behavior. Passive institutions are evolving to fully exercise their fiduciary duties in proxy voting given their significant ownership increase in U.S. firms recently. Passive institutions usually hold large stakes in firms, and these sizable stakes grant voting power to influence management if needed. In order to establish the channels through which passive institutions affect CEO incentive horizons, I observe their proxy voting behavior on compensation-related agendas when their holdings increase in the firm. My analysis also includes voting behavior of passive institutions on Say-on-Pay proposals, which SEC has required firms to include in their proxy materials since 2011. I believe my analyses shed new light on the role of passive institutions not only as long-term investors but also as voting shareholders.

The second chapter expands the role of the corporate value of votes in understanding the sources of variations in asset prices. A common share consists of two component: cash flow rights and voting rights (Manne (1964)). As we have seen in the first chapter, the rights to vote is valuable to investors; it can be used to monitor/influence management, replace management or even to directly take part in the firm's operating decisions (Burkart et al. (2000)). Voting rights give the ability to wield disciplinary pressure when managerial efficiency improvement is needed. Moreover, resolutions can be made via the voting process in contested situations (Cox and Roden (2002), Easterbrook and Fischel (1991)).

Nevertheless, given its importance to investors, it is surprising to note that the existing asset pricing studies largely ignore the vote component in understanding the sources of variation in stock returns. Investors interested in control can accumulate votes with a series of small open-market transactions (Zingales (1995)). The market demand for corporate control allows the value of votes to be included in observed share prices. We explore such variations in the vote component of stock prices to examine whether it can explain the cross-section of stock returns. We find that a high value of vote portfolios predicts lower future stock returns, and this result is independent of various known factors affecting stock returns. Given our findings that there is the unconditional predictability of the vote component in stock returns, it implies that votes can be key to understanding the variations in asset prices.

## 2. PASSIVE INSTITUTIONS AND LONG CEO COMPENSATION DURATION

### 2.1 Introduction and Literature Review

The amount of money invested in passive institutions has exploded in recent years, leading to a dramatic increase in the ownership of U.S. firms by passive institutions. However, the extent to which they engage with portfolio firms to monitor management as voting shareholders remains uncertain.[1] Given the index-tracking investment strategy of passive institutions, some argue that they do not have enough incentives to understand their portfolio companies in depth and therefore should not have voting rights. Conversely, large index funds have been evolving and increasingly emphasize improving corporate governance and exercising their fiduciary duties through proxy voting in their portfolio firms. Unlike other active institutions, which can express their dissatisfaction by selling a company's shares, passive institutions cannot sell their shares as long as the company remains in the relevant index. Because of this constraint, passive institutions do not frequently churn their portfolios, and hence they are "the ultimate long-term investors that provide patient capital" to companies.[2]

In this paper, I examine whether passive institutions affect the incentive contracts of CEOs to better align CEOs' incentive horizons with their own long-term investment horizons using their voting power. Managers face constant pressure to choose between short- and long-term objectives (Graham et al. (2005)), and the pressure to focus on short-term goals can put the long-term value of the firm at risk.[3] Thus, a long-term focused compensation plan is essential for encouraging

[1]The size of passive ownership in U.S. firms in recent years, often collectively exceeding the shares held by actively managed funds, allows passive institutions to wield their growing clout over important corporate governance issues. However, there is mixed evidence on the effect of passive institutions on corporate governance (Appel et al. (2016b) and Schmidt and Fahlenbrach (2017)).

[2]See a letter from BlackRock's CEO, Laurence Fink, to the leaders of public companies urging a focus on long-term value: `https://www.nytimes.com/interactive/2018/01/16/business/dealbook/document-BlackRock-s-Laurence-Fink-Urges-C-E-O-s-to-Focus.html`. Additionally, see an article in *Wall Street Journal*. Krause, Sarah, David Benoit, and Tom McGinty Oct. 24, 2006, Meet the New Corporate Power Brokers: Passive Investors: `https://www.wsj.com/articles/the-new-corporate-power-brokers-passive-investors-1477320101`

[3] In a survey by Graham et al. (2005) on the financial reporting decisions of executives, some respondents mentioned being willing to "give up real cash flow by delaying new projects and capital expenditure for the sake of reporting expected accounting numbers". When short-term investors become major shareholders, this distortion can

managers to allocate effort and investment decisions to promote the long-term success of the firm. I hypothesize that passive institutions, being the ultimate long-term investors, work to lengthen CEO compensation duration to align CEOs' incentive horizons with their own long-term investment horizons.[4] I not only examine the effect of passive institutions on compensation durations, but I also aim to shed light on *how*. Given that passive institutions own large stakes in firms, I observe their proxy voting behavior on compensation-related proposals and say-on-pay (SOP) proposals to establish channels through which passive institutions influence the incentive horizons of CEOs. Furthermore, I attempt to shed light on the behind-the-scenes engagement by passive institutions (McCahery et al. (2016)) by exploring whether the voting support in uncontested board of director elections is related to CEO compensation duration changes.

One challenge to capturing the effect of passive institutions on CEO compensation duration is the endogenous nature of the ownership structure. I overcome this challenge by using Russell index assignments as plausibly exogenous shocks to passive ownership. Despite the extant usage of the index reconstitution setting as a plausibly exogenous shock to the ownership structure (Appel et al. (2016b), Appel et al. (2018), Boone and White (2015), Bird and Karolyi (2016), Crane et al. (2016), Chang et al. (2014), and Schmidt and Fahlenbrach (2017)), there is an ongoing debate over the correct estimation framework to exploit the setting. For example, some use sharp/fuzzy regression discontinuity (RD) framework in exploiting the Russell reconstitution setting (Boone and White (2015), Bird and Karolyi (2016), and Crane et al. (2016)), whereas the others use an instrumental variable approach (Appel et al. (2016b), Schmidt and Fahlenbrach (2017)). Given that Russell indexes are value-weighted indexes, all studies exploit a sharp increase in passive ownership when a firm moves to the top of the Russell 2000 index or around the cutoff point of Russell 2000 index. Specifically, I use the actual assignment to the Russell 2000 index as an instrument for passive ownership with a two-stage least squares estimation (2SLS) framework to identify the

be exacerbated (Beyer et al. (2014), Bolton et al. (2006), Froot et al. (1992), Hotchkiss and Strickland (2003).)

[4] Only recently have a few researchers introduced an incentive horizon measure by incorporating the vesting schedule of stocks and options awarded to CEOs using grant-level data (Chi et al. (2011), Edmans et al. (2013), Gopalan et al. (2014)). I use the CEO compensation duration measure proposed by Gopalan et al. (2014) to capture the incentive horizons of the CEO. A detailed description of the measure is available in Appendix A.

causal relationship (Appel et al. (2016b), Schmidt and Fahlenbrach (2017)). I discuss the validity and advantage of using the Russell 2000 index assignment as an instrument for passive ownership in the methods section in greater detail.

Using Russell index reconstitution as a credibly exogenous shock to passive ownership, I find that a one-standard-deviation increase in passive ownership leads to a 0.61-standard-deviation increase in compensation duration. The increase translates to an approximate lengthening of six and a half months in the vesting schedule of stocks and options granted to CEOs. This result implies that firms with increased ownership by passive institutions, increase compensation duration to align CEOs' incentive horizons with the long-term investment horizons of passive institutions. More generally, my results show how a change in shareholder composition is associated with changes in CEOs' incentive contracts to align managerial incentives along the horizon or time dimension.

Having established the causal relation, I next examine *how* passive institutions affect compensation duration. A naive null hypothesis is that the very presence of increased ownership by passive institutions causes firms to alter compensation duration, even with no actions from the institutions. The alternative on which I focus is that the passive institutions act to lead firms to increase compensation duration. McCahery et al. (2016) show in a survey that the two most widely used intervention strategies by institutional investors are "voting against management" and "communicating with top management."[5] As passive ownership increases, passive institutions can provide more voting support for agendas aligned with their interests. Moreover, as passive institutions obtain more voting shares, they can use voting power as a bargaining tool to negotiate and communicate behind-the-scenes with management. Based on this argument, the remaining part of the paper aims to establish channels through which passive institutions affect compensation duration and document the role of passive institutions as voting shareholders that influence managerial incentives.

I first examine the proxy voting behavior of passive institutions on shareholder-sponsored com-

[5]Of course one can argue that passive institutions do not have enough incentive (capacity) to engage in their large number of portfolio firms. "Engagement" can have many different meanings, encompassing a range of activities from informal conversation to a series of one-to-one meetings with companies (Blackrock (2014)). A relevant discussion is available in the "Passive Investors but Active owners" section in Azar et al. (2018).

pensation proposals. Shareholder proposals can be an effective governance mechanism to convey shareholders' expectation to management and bring certain issues to public (Levit and Malenko (2011), Flammer and Bansal (2017)). With voting as a potential channel through which passive institutions affect CEO incentive contracts, I hypothesize that an increase in ownership by passive institutions leads to a greater number of shareholder-sponsored compensation proposals. Consistent with the above hypothesis, I find a 5.9% point increase in the likelihood that the firm sees an increase (over prior years) in the number of shareholder-sponsored compensation proposals when there is a one-standard-deviation increase in passive ownership. This effect is economically significant, given that the unconditional mean of seeing an increase in the shareholder-sponsored compensation proposal is 1.1%.

Furthermore, using fund-level voting data, I show that passive funds are 22.3% more likely to vote in support of shareholder-sponsored compensation proposals when a portfolio firm switches to the top of the Russell 2000 index. The result is significant after controlling for Institutional Shareholder Services (ISS) recommendations for the proposals, which implies that passive funds vote actively beyond the recommendation provided by the ISS. Especially, passive funds vote more strongly to support shareholder compensation proposals when active funds in the same fund family also cast votes on the proposal (40.6% more likely to support for shareholder-sponsored compensation proposals when at least one active fund votes together). Combined, passive institutions use their voting power to influence CEO compensation duration and the voting channel is strengthened when other funds in the same fund family also vote in the same proposal.

Then, I explore how passive institutions vote on SOP proposals depending on CEO compensation duration changes. The Dodd-Frank Act mandated firms to include an SOP proposal in their annual proxy meeting to provide shareholders with a means to communicate with management on executive compensation issues .[6] SOP voting serves as a low-cost monitoring opportunity, even for small institutional shareholders (Schwartz-ziv and Wermers (2017)). If passive institutions are

[6]Shareholders have been able to use SOP votes to express their opinions on executive compensation-related issues or overall firm performance through an advisory voting process since 2011. Prior research shows that an SOP is beneficial to shareholders and a value-creating mechanism (Aggarwal et al. (2018), Denis et al. (2017), Ferri and Maber (2013), and Iliev and Vitanova (2017)).

utilizing their voting shares to express their (dis)satisfaction, they should vote in greater support of SOP proposals when CEO compensation duration increases than when it does not increase.

Using a sub-sample of fund-level voting data on SOP proposals, I find that when a portfolio firm switches to the Russell 2000 index and decreases (increases) its CEO compensation duration compare to the previous year, passive funds are 6.2% (6.3%) more likely to decrease (increase) support for SOP agenda than in portfolio firms that switch to Russell 2000 index with no decrease (increase) in durations. The effect is strengthened when at least one active fund in the same fund-family vote together in the same SOP proposal. This result provides supporting evidence that passive institutions utilize their increased voting power to monitor management in SOP proposal; proxy voting is used as a means to express opinions by passive institutions.

Last, I investigate passive institutions' voting support in uncontested board of director elections and its effect on CEO compensation duration to gain insights on the behind-the-scenes engagement employed by passive institutions. Usually, institutions vote against a company's proposals when direct engagement has failed (Blackrock (2014)). In other words, if behind-the-scenes engagement were successful, we would expect there to be a positive association between voting support and CEO compensation duration. Moreover, given that the director voting outcome is not negligible, passive institutions can use their voting power as a bargaining tool at the negotiation table.[7] I find that when a firm switches to the top of the Russell 2000 index and when the firm receives above-median supporting votes from passive institutions in uncontested board of director elections, the CEO compensation duration increases by 0.43 years more than it does for firms switching to the Russell 2000 index and receiving fewer supporting votes. With the caveat that behind-the-scenes engagement is inherently unobservable so that evidence can only be suggestive, a positive correlation between passive institutions' director voting support and compensation duration suggests that the voting power is a potential bargaining tool in communicating with management behind closed doors to influence compensation duration.

[7]Empirical evidence exists to support that the voting outcome in director elections has real consequences; director career concerns (Grundfest (2003), Aggarwal et al. (2018)), director turnover, firm performances (Del Guercio et al. (2008)).

My findings contribute to the recent literature on the impact of passive institutions on corporate governance. Whether passive institutions improve corporate governance remains a matter of debate. Appel et al. (2016b) argue that passive institutions are active owners that exert influence to improve corporate governance. In contrast, Schmidt and Fahlenbrach (2017) find that greater ownership by passive institutions leads to an increase in CEO power and fewer new independent directors. My results highlight the role of passive institutions as long-term investors that influence incentive horizon of CEOs through their voting power. I provide evidence of active voting by passive institutions, especially when active funds in the same fund-family vote together. Overall, despite the notion that passive institutions are passive owners of the firm, my findings suggest that passive institutions are not purely passive owners. My findings corroborate the findings of Appel et al. (2016b), and Appel et al. (2018); passive investors work to lengthen CEO compensation duration to align managerial incentives to their own long-term investment horizons.

Moreover, this paper fills a gap in the literature that examines the effect of institutional investment horizons on various firm outcomes. With the presence of more short-term investors, managers allocate effort to focus more closely on short-term goals (Bushee (1998) and Bushee (2001)). Harford et al. (2018) find that long-term investors (defined as indexers) strengthen governance, restrain managerial misbehavior, discourage investment, encourage payouts and increase innovation. Many others show that long-term investors have a comparative advantage in monitoring managers (Borochin and Yang (2017), Gaspar et al. (2006), Chen et al. (2007), and Gaspar et al. (2012)). My findings that passive investors work to lengthen CEOs' pay durations shed light on the channel, i.e., *how* long-term institutions affect managerial behavior to focus on long-term goals. In a contemporaneous paper, Lel and Tepe (2018) find that long-term investors incentivize managers with long pay duration. My paper differs along several dimensions. First, I focus on passive institutions, adding to the recent growing literature on the role of passive institution as monitoring shareholder. Second, I exploit Russell index reconstitution as a plausibly exogenous shock to passive ownership to establish a causal effect. Third, I document on *channels* through which passive institutions work to lengthen CEO compensation duration, which is not documented in their paper.

Finally, this paper contributes to the burgeoning literature on the voice channel employed by institutional investors, in particular, on proxy voting.[8] Iliev and Lowry (2015) find that mutual funds vote differently from ISS recommendations when the benefits of doing so are high. He et al. (2017) and Matvos and Ostrovsky (2010) examine the effects of cross-ownership and peer effects on heterogeneity in mutual funds' proxy voting. None of these prior studies relates institutional proxy voting to the investment horizons of institutions. I focus on how the proxy voting decisions of passive institutions, as long-term investors, affect compensation-related proposals when their ownership increases. Following the increased attention recently devoted to the role of passive institutions as voting shareholders, my evidence is complementary to Iliev and Lowry (2015): when benefits of voting are high, passive institutions become active voters. More importantly, I emphasize passive institutions' use of proxy voting as the channel through which they influence managerial incentive horizons.

## 2.2 Sample, Data and Methods

In this section, I explain how I construct the sample, the data, and the variables that are used throughout the paper. I use stock-level mutual fund holdings data to capture passive ownership. Russell index membership, shareholder proposals, CEO compensation duration and investor turnover are measured at the firm level. I also use mutual fund proxy voting results at the fund-family, portfolio firm, and proposal voting level. Lastly, I describe the methodology for using the Russell index assignment as an instrument.

[8]Many of the studies in the literature on mutual fund proxy voting consider the effect of business ties between mutual funds and their portfolio firms on voting decisions (Davis and Kim (2007), Ashraf et al. (2012) and CvijanoviĆ et al. (2016)). Related to shareholder voting, Aggarwal et al. (2018) provide evidence on the power of shareholder votes in director elections. Schwartz-ziv and Wermers (2017) document that small institutions participate in low-cost monitoring by voting against management in SOP proposals. Appel et al. (2016b) and Crane et al. (2016) find firms receive more against votes from shareholders after Russell index reconstitution on governance agendas, but they do not show how passive institutions actually vote on those governance agendas.

### 2.2.1 Sample, Data and Descriptive Statistics

I obtain data from various sources. The Russell index data, including information on the Russell 1000, 2000, and 3000E index constituents and float-adjusted market capitalization, are from FTSE Russell Investments; CEO compensation duration data are from Incentive Lab; passive ownership and investor horizons are calculated using Thomson Reuters and the CRSP Mutual Fund database; shareholder (management)-sponsored compensation proposals, passive institutions' proxy voting records, and voting support in director elections (SOP proposals) are all from ISS Voting Analytics. More details on the sample, variables used in the analyses and summary statistics are presented below.

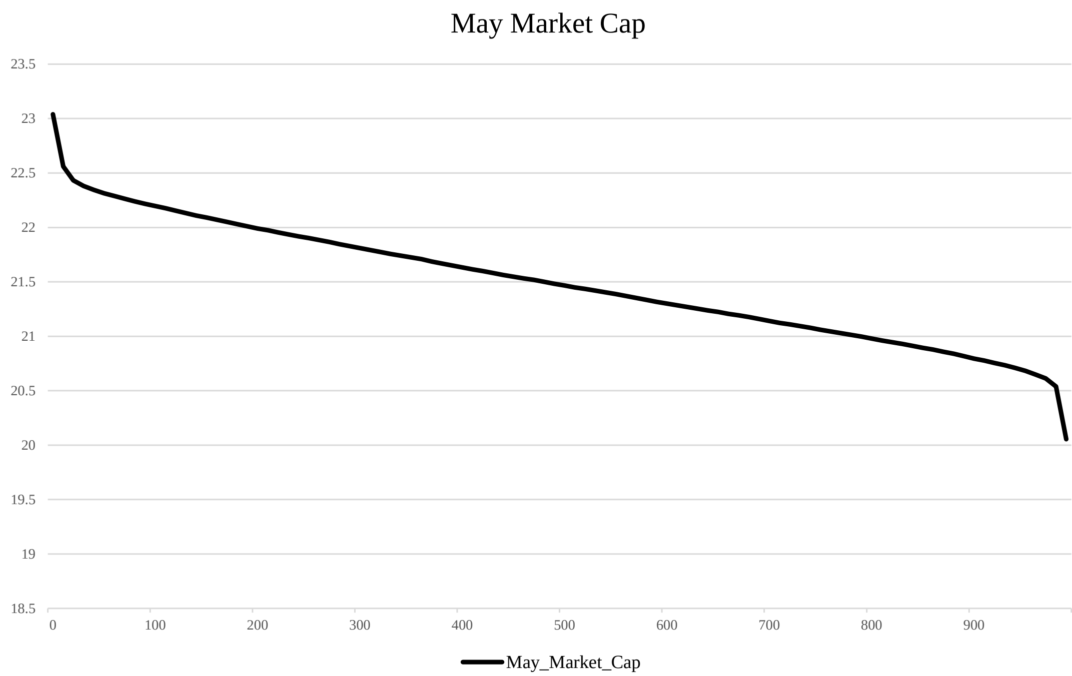
The firm-level sample I use in the analyses is the bottom 500 firms in the Russell 1000 index and the top 500 firms in the Russell 2000 index each year from 2007 to 2013.[9] The first panel in Figure 1 shows that there is no discontinuity between firms at the bottom of the Russell 1000 index (500th) and firms at the top of the Russell 2000 index (501th) in the observed end-of-May CRSP market capitalization.The second panel in Figure 1 shows the average fraction of firms assigned to the Russell 2000 index using bins of ten firms from 2007 to 2013. There is a positive correlation in the Russell 2000 index assignment and its Russell index ranking. It is important to note that there is no discontinuity around Russell 2000 index threshold for the end of May market capitalization (first panel), but a positive jump in the probability of being assigned to Russell 2000 index (second panel).

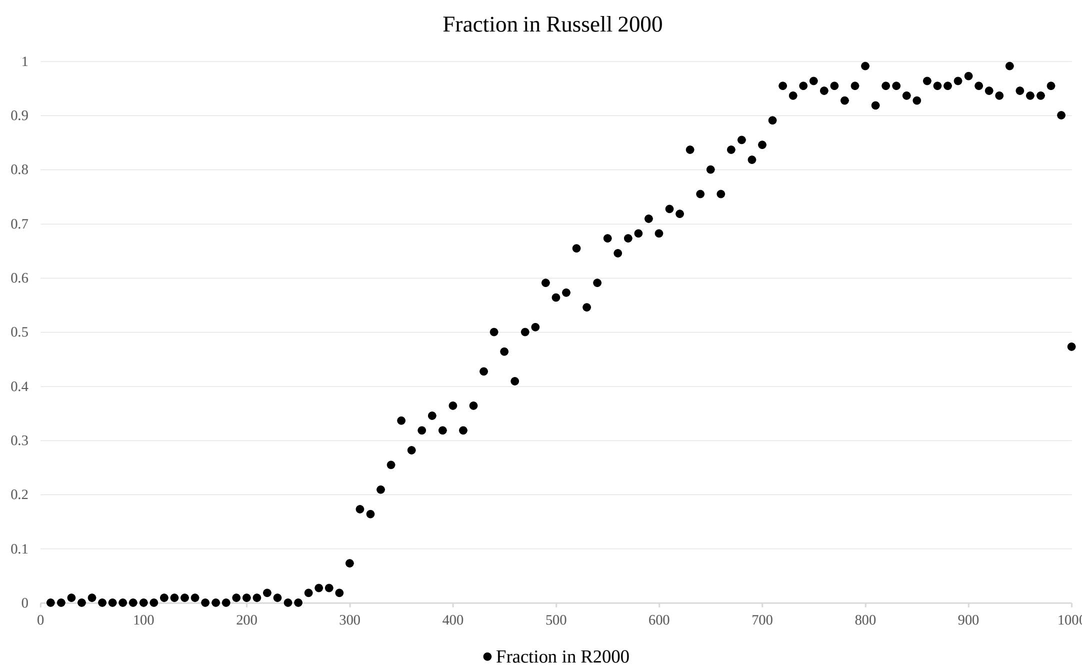
I also use a fund family-portfolio firm-proposal unit sample to examine the actual proxy voting behavior of passive institutions on compensation-related agendas. The sample is obtained by matching ISS mutual fund voting records data, Thomson Reuters 13F holdings data, and Russell index firm-level data. I explain more about the matched sample in Section 2.1.4.

[9] I stop my sample period at 2013 due to the data reliability of Thomson Reuters.

Figure 2.1: Rankings based on end-of-May market capitalization

The first figure plots the average natural logarithm of the end-of-May market capitalization (CRSP) and the second figure plots the average fraction of firm-year observations in the Russell 2000 index by the ranking based on end-of-May market capitalization (CRSP). The sample includes 500 firms around the Russell 1000/2000 index threshold determined using end-of-June Russell-assigned portfolio weights in each index. All averages are calculated using bins of 10 firms and the sample period is 2007 to 2013.



#### 2.2.1.1 CEO compensation duration

I follow Gopalan et al. (2014) to calculate CEO compensation duration for each fiscal year. Compensation duration is calculated as the weighted average of the vesting schedules of four pay components; salary, bonus, restricted stocks (RS) and stock options. The data on CEO salary, bonus, restricted stocks and option awards are from Incentive Lab. Incentive Lab provides detailed descriptions on each awards granted to executives. The information includes the amount (value) of the grant, date of the award granted, vesting schedule, types of vesting, performance metrics, types of awards and other information related to each award. A detailed description on how I calculate CEO compensation duration measure is available in Appendix A (equation (1) in Appendix A). I calculate pay duration based on new awards granted to CEOs during the year, and I convert the monthly duration measure into years by multiplying 12. More than 60% of stocks and options are granted in the beginning of calendar year (January to March, $t$) for fiscal year $t$. Hence, I measure CEO duration in the next fiscal year of reconstitution year to gauge the effect of passive ownership on CEO compensation duration.

#### 2.2.1.2 Passive ownership

I use mutual funds that are passively managed to define passive ownership in each firm. To classify a mutual fund as either a passive or an active fund, I follow Appel et al. (2016b) and Appel et al. (2018) to identify passively managed funds using their fund names. First, I merge Thompson Reuters S12 Mutual Fund Holdings data with CRSP Mutual Fund data using the MFLINKS table available on WRDS. A fund is classified as a passively managed fund if it is either identified as an index fund by the CRSP Mutual Fund Database or the fund name includes a string that identifies it as an index fund.[10] Active funds are those that are matched to the CRSP Mutual Fund Database but are not index funds, and funds that are not matched by the CRSP Mutual Fund Database are categorized as unclassified funds.

[10]The strings that are used to identify index funds are the same as those in Appel et al.'s (2016) lists: *Index, Idx, Indx, Ind , Russell, S&P, S and P, SP, S & P, DOW, DJ, MSCI, Bloomberg, KBW, NASDAQ, NYSE, STOXX, FTSE, Wilshire, Morningstar, 100,400,500,600,900,1000,1500,2000, and 5000.*

#### 2.2.1.3 *Shareholder(management)-sponsored compensation proposals, voting support for director elections and SOP proposals*

I use the Shareholder Proposals and Company Vote Result database in ISS Voting Analytics to obtain information on shareholder(management)-sponsored compensation proposals. I categorize voting items related to compensation if the agenda's general description contains certain keywords related to executive compensation. The keywords used to identify compensation-related voting items are the following: *compensation, option plan, stock plan, restricted stock, restricted stock option, clawback, awards, stock option, equity plan, vesting, and incentive.* The list of compensation proposals used in the sample are sponsored by either management or shareholders, and the frequency with which each proposal appears during the sample period is available in Appendix C. The database also provides information on management's and ISS's recommendation on each proposal.

The firm-level voting support data for (uncontested) director elections and SOP proposals are obtained from the Company Vote Results database in ISS Voting Analytics. I count the average fraction of *FOR* votes cast in (uncontested) director elections as well as in SOP proposals that are held in annual meetings after the index reconstitutions. More details on voting support variables are available in Appendix A under "Voting Support at Firm-level" section.

#### 2.2.1.4 *Mutual fund proxy voting data*

Starting in 2003, the SEC required mutual funds to disclose their voting results every year in N-PX or N-PX/A form filings. Mutual funds are required to file voting results by the end of August every year $t$, and each filing contains votes that were cast from July 1 of the previous year $t-1$ to June 30 of year $t$. The filings contain information on fund names; portfolio firm information such as company CUSIP, ticker, and meeting date; the description of items that the fund voted on, who sponsored the proposal, management recommendations on the voting agenda, how funds voted, and whether the fund vote was against/for management's recommendations.[11] I obtain mu-

[11]This is an example of Vanguard fund N-PX filings:
`https://www.sec.gov/Archives/edgar/data/36405/000093247114006637/`

tual fund voting results from Mutual Fund Vote Records database in ISS Voting Analytics. The database covers votes cast by funds in large mutual fund families (approximately top 250 fund-families) for every Russell 3000 company they hold starting in 2003.

I merge mutual fund voting records data with the Thomson Reuters institutional holdings (13F) database using their fund family and institution names to control for each institution's (fund family's) holding in the firm.[12] The merged sample includes votes cast by 248 mutual fund-families on compensation-related voting items in their portfolio firms, which are in the top (bottom) 500 of the Russell 2000 (1000) index from 2007 to 2013.[13] The total number of observations after matching 13F holdings data to mutual fund voting records data is 138,449. A summary statistics of the matched sample is available in Appendix Table A1. I use the merged data to analyze how passive institutions vote on compensation-related voting items when a portfolio firm switches to the top (bottom) of the Russell 2000 (1000) index, controlling for their size of holdings in each firm. The fund-family level voting related variable is defined in Appendix A under "Fund-family voting level sample".

*2.2.1.5 Timeline and descriptive statistics*

Figure 2 presents the timeline for using Russell index reconstitutions and the timing of variables measured. Russell index reconstitution occurs every year in June. Passive ownership changes are measured from the previous quarter of the index reconstitution month to the the following quarters of the index reconstitution. For CEO stock and option awards, the majority of equity-based awards are granted at the beginning of the calendar year $t$ for the fiscal year $t$. Therefore, I calculate CEO compensation duration for fiscal year $t + 1$ to gauge the effect of passive ownership on CEO compensation duration. Firms that have fiscal year end in December $t$, for example, receive shareholder proposals until November $t$ to be included in proxy materials sent out to shareholders

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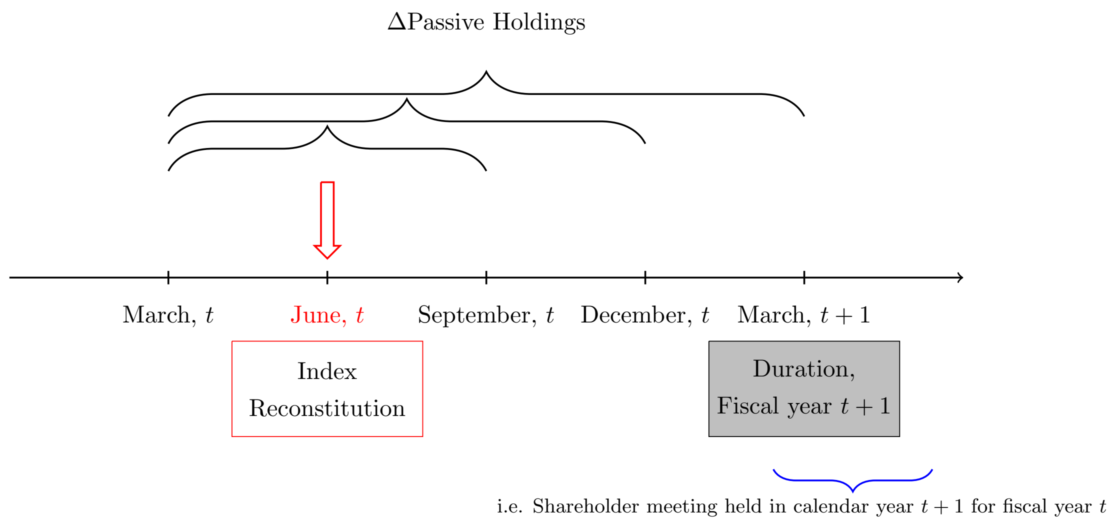
indexfunds0048.htm

[12]I thank Marco Rossi for providing me with the SAS code.

[13]The fund family in ISS Voting Analytics data is comparable to Thomson Reuters 13F holdings institutions. Since ISS Voting Analytics data collects voting records from the top 250 mutual fund families, the size of the fund family for the matched sample is larger than the Thomson Reuters 13F universe. The average size of a fund family for my sample is $101.62 billion and the median is $29.65 billion. During the same period, the average size of the 13F universe is $3.4 billion and the median is $243 million.

Figure 2.2: Time-line

The figure shows the timeline of using Russell index reconstitution as an exogenous shock to the passive ownership. Every year in June, Russell index reconstitution occurs. Passive ownership is measured in the following quarters in September, $t$, December, $t$ and March, $t+1$, and I calculate changes in passive holdings from March, $t$ to the following quarters of Russell index reconstitution month (Passive Holdings Change). CEO compensation duration is measured using stocks and options granted to CEOs for the next fiscal year ($t+1$). For example, I illustrate a typical timeline for firms that have fiscal year end in December $t$. Usually, CEO equity-based awards (stocks and options) for fiscal year $t+1$ will be granted in the beginning of year $t+1$ from January to March, and the annual shareholder meeting will be held around February to May in year $t+1$ (i.e. for firms that have fiscal year end in December $t$).



for the annual meeting. Usually, shareholder meetings are then held around February to May in calendar year $t + 1$, which is about two to four months after the fiscal year end month. I count the number of shareholder (management) proposals that are subject to shareholder voting in annual meetings held in September, year $t$ to June, $t + 1$.

Table 1 provides summary statistics for the variables I use throughout the paper. The average CEO compensation duration in my sample is 1.60 years. The average percentage change in CEO compensation duration (Duration_chg) compare to the previous year is 3.0%. I use an investor turnover measure at the firm to assess a given firm's investor horizon following Gaspar et al. (2005) (equation (3) in Appendix A). The average investor turnover for the sample measured in September each year is 0.232 (23.2%), which means that the average institutional investor's investment horizon in my sample is around 25 months.[14]

Table 1 provides summary statistics for institutional holdings (change) calculated at the end of September each year, which is the quarter following the Russell index reconstitutions. Passive (active) ownership is the percentage of shares outstanding owned by passive (active) mutual funds, as defined in Section 2.1.2, at the end of September $t$. On average, 6.8% of shares are held by passive institutions and 15.2% of shares are held by active institutions during my sample period. The average total institutional ownership, measured using 13F holdings data in September $t$, is 80.6%. I also calculate changes in ownership by passive and active institutions. The changes in passive holdings after the index reconstitutions ($\Delta$ Passive Ownership) is the change in holdings measured from March $t$ to September $t$. Passive institutions show 0.00 percentage point changes in holdings, whereas active institutions show 0.5 percentage points decrease in their holdings on average ($\Delta$Active Ownership).

Table 1 also reports the summary statistics on the frequency of shareholder-sponsored compensation proposals. On average, 1.5% of firms have shareholder-sponsored compensation proposals (Shareholder Proposal) and 1.0% of firms see an increase in the number of shareholder-

[14]Investor turnover of 23.2% means that almost 12% of the portfolio is churned in a quarter or approximately 48% of the position is churned in a given year. This number gives that the average investor holds a stock in her portfolio for approximately 25 months (12/0.48).

Table 2.1: Summary Statistics

The table reports summary statistics for the variables that are used throughout the analyses. Panel A reports the firm-level sample summary statistics. The firm-level sample includes 500 firms around the Russell 1000/2000 threshold from 2007 to 2013. Panel B reports passive institutions voting level summary statistics on compensation-related proposals. A detailed description on constructing the variables are available in Appendix A.

Panel A. Firm level summary statistics

| | Mean | SD | P5 | Median | P95 |
|---|---|---|---|---|---|
| CEO Compensation Duration (Duration) | 1.595 | 0.887 | 0.000 | 1.797 | 2.703 |
| $\Delta$ Duration | 0.030 | 0.596 | -1.000 | 0.002 | 0.830 |
| Passive Ownership | 0.068 | 0.042 | 0.007 | 0.068 | 0.137 |
| Active Ownership | 0.151 | 0.084 | 0.025 | 0.144 | 0.300 |
| $\Delta$Passive Ownership | 0.000 | 0.027 | -0.059 | 0.004 | 0.036 |
| $\Delta$Active Ownership | -0.005 | 0.050 | -0.090 | -0.003 | 0.079 |
| Total IO | 0.806 | 0.202 | 0.422 | 0.833 | 1.081 |
| Turnover (Mar.) | 0.238 | 0.057 | 0.152 | 0.235 | 0.340 |
| Turnover (Sept.) | 0.232 | 0.055 | 0.152 | 0.227 | 0.332 |
| $\Delta$Turnover (Sept.) | -0.006 | 0.037 | -0.057 | -0.006 | 0.048 |
| Compensation-related Proposals | | | | | |
| Shareholder Proposal | 0.015 | 0.120 | 0.000 | 0.000 | 0.000 |
| Shareholder Proposal Increase | 0.010 | 0.098 | 0.000 | 0.000 | 0.000 |
| Shareholder Proposal Number | 0.017 | 0.155 | 0.000 | 0.000 | 0.000 |

Panel B. Passive institution voting level summary statistics

| Compensation-related proposals | Mean | SD | P5 | Median | P95 |
|---|---|---|---|---|---|
| Vote-For-Mgmt | 0.880 | 0.325 | 0.000 | 1.000 | 1.000 |
| Vote-For-Mgmt (At least one active) | 0.889 | 0.313 | 0.000 | 1.000 | 1.000 |
| Vote-For-Mgmt (Above median active) | 0.877 | 0.327 | 0.000 | 1.000 | 1.000 |
| Shareholder-sponsored proposal | | | | | |
| Vote-For-Mgmt | 0.417 | 0.492 | 0.000 | 0.000 | 1.000 |
| Vote-For-Mgmt (At least one active) | 0.413 | 0.492 | 0.000 | 0.000 | 1.000 |
| Vote-For-Mgmt (Above median active) | 0.360 | 0.479 | 0.000 | 0.000 | 1.000 |
| Say-on-pay proposals | | | | | |
| Vote-For-Mgmt | 0.914 | 0.279 | 0.000 | 1.000 | 1.000 |
| Vote-For-Mgmt (At least one active) | 0.916 | 0.276 | 0.000 | 1.000 | 1.000 |
| Vote-For-Mgmt (Above median active) | 0.905 | 0.292 | 0.000 | 1.000 | 1.000 |

sponsored compensation proposals (Shareholder Proposal Increases). Firms have 0.017 number of shareholder-sponsored compensation proposals on average (Shareholder Proposal Number).

At fund-family voting level, I estimate the fraction of funds that cast votes in line with the management's recommendation for each compensation-related proposal in the portfolio firms' annual shareholder meetings. The average *vote-for-management* is calculated at the fund-family level using passive funds. A detailed description on this variable is available in Appendix A in equations (4). On average, 88.0% of passive funds within a fund family ($VoteForMgmt$) vote in line with management recommendations in compensation-related proposals. I also divide fund-families with at least one active fund voting in the same compensation related proposals (At least one active) as well as fund-families with above median proportion of active funds voting in the same compensation-related proposals (Above median active). Passive funds with at least one active fund voting together in the same compensation-related proposals vote 88.9% in line with the management's recommendation. Passive funds with above median proportion of active funds voting together in the same compensation related proposals vote 87.7% in line with the management's recommendation on average.

### 2.2.2 Methods

The greatest empirical challenge in observing the effect of passive institutional ownership and pay duration is that the ownership structure is endogenous: ownership structure, firm characteristics, and incentive horizons can be correlated with unobservables that might affect passive holdings and CEO pay durations. Moreover, if a firm with more valuable long-term investment opportunities is more likely to incentivize the CEO with a longer pay duration and if these firms are more likely to be held by long-term investors, this introduces the problem of reverse causality.

To overcome such challenges, I use a stock's assignment to the Russell 2000 index to exploit exogenous variation in passive ownership that is unrelated to firm fundamentals or the compensation structure (Appel et al. (2016b), Appel et al. (2018), and Schmidt and Fahlenbrach (2017)). Every June, Russell indexes are reconstituted based on the end-of-May market capitalization. After determining the index assignment based on end-of-May market capitalization, the Russell index implements a weighting scheme based on float-adjusted market capitalization in June. Passive funds (passive institutions) revise their portfolio holdings in an attempt to minimize the tracking error of the underlying index. As a consequence, passive ownership significantly increases when a firm is positioned at the top of the Russell 2000 index, which is a plausibly exogenous ownership variation induced by index reconstitution (Appel et al. (2016b), Appel et al. (2018), Bird and Karolyi (2016), Boone and White (2015), Crane et al. (2016), Chang et al. (2014) and Schmidt and Fahlenbrach (2017)).[15]

There are two ways to exploit the Russell index reconstitution setting: regression discontinuity (RD) and the instrumental variable approach. I specifically use Russell 2000 index assignment as an instrument for passive holdings instead of using a regression discontinuity framework for two reasons. First, assignment (forcing) variable is unobservable to the econometricians; the true end-of-May market capitalization used by Russell is proprietary.[16] Because the assignment variable that determines the exact cutoff is unobservable, prior researchers have used Russell June rankings as the assignment variable. However, June index rankings are based on float-adjusted shares which are endogenous. Second, instead of using the sharp regression discontinuity, fuzzy regression discontinuity can be used to circumvent the unobserved assignment variable problem (Chang et al. (2014)). However, my sample suffers from a weak first stage using the fuzzy RD framework, as documented by (Appel et al. (2016b), Crane et al. (2016)).[17]

Using actual index assignment as an instrument for passive ownership should be valid if two conditions are met: the relevance condition and the exclusion restriction. I obtain a strong first-stage result which ensures that the instrument satisfies the relevance condition. The difficulty in validating the instrument lies in proving whether the exclusion restriction is met. Even though there is no rule of thumb to test whether the instrument satisfies the exclusion restriction, I con-

[15]Given that a large proportion of a dollar invested in passive funds will be invested in stocks at the top of the Russell 2000 index, there is a large increase in passive ownership (Appel et al. (2016b), Chang et al. (2014), Schmidt and Fahlenbrach (2017)).

[16]FTSE Russell probably keeps its end-of-May market capitalization proprietary, possibly to avoid front-running of traders based on index reconstitution.

[17] The weak first stage result is due to the fact that the probability of being in Russell 2000 index is equally likely for firms at the right below the cutoff (995-1000) and the firms at the right above the cutoff (1001-1005). See Appel et al. (2016a) and Schmidt and Fahlenbrach (2017) for further discussion on the index assignment methodology.

trol for potential measurement error induced by unobservable end-of-May market capitalization by dropping samples that might be a poor proxy for the true market capitalization used by Russell. According to FTSE Russell, the total market capitalization of each firm, which determines the index assignment, is calculated using common shares, non-restricted exchangeable shares and partnership/membership interests at the end of May each year. In Appendix B, I discuss in detail what could potentially be missing when calculating total market capitalization using the CRSP database (e.g., exchangeable shares and partnership/membership units) and how the results are unaffected after controlling for possibly missing information on shares outstanding.

Beginning in 2007, the Russell implemented a banding policy to prevent firms from switching between indexes too frequently. FTSE Russell provides details on how to determine index membership after the banding rule was implemented in the years after 2006 (Investment (2016)). The new banding rule still relies on the market capitalization but is designed to maintain some continuity in the indexes. As long as we can control for the determinants of index assignments incorporating the new policy change, the identification strategy should remain valid. Consequently, additional controls in estimating ownership variation are needed to make the index assignment conditionally random.

I add four additional control variables to incorporate the new policy change in the index assignment (Appel et al. (2018)): 1) a dummy indicating whether the firm's market capitalization is within the band, 2) the previous year's Russell 2000 index assignment and 3) the interaction of the two as additional controls. Since index switchers became less frequent, only those firms that experience significant changes in market capitalization will move in and out of an index. To account for this concern, I add 4) the cumulative return in the previous reconstitution year to control for past performance. Controlling for the measurement error in end-of-May market capitalization, banding policy, and past firm performances, it is difficult to think of unobservables that would affect both the Russell 2000 index assignment and compensation duration at the same time.

Using Russell 2000 index assignment as an instrument for passive ownership, I estimate CEO compensation duration (change) using the following regression equation in the second stage:

$$
\begin{aligned}
(\Delta)Y_{it+1} = \alpha + \beta(\Delta)\widehat{Passive}_{it} + \sum_{n=1}^{N}\theta_n(ln(Mktcap_{it})^n) + \gamma ln(Float_{it}) \\
+\mu_1 band_{it} + \mu_2 R2000_{it-1} + \mu_3(band_{it} \times R2000_{it-1}) + \tau(prev\_1yr\_ret_{it}) + \sigma_t + \epsilon_{it}
\end{aligned}
\tag{2.1}
$$

where $Y_{it+1}$ is the outcome variable (e.g., compensation duration) observed at the next fiscal year; $(\Delta)\widehat{Passive}_{it}$ is the instrumented (changes) passive ownership, which is measured as the percentage of shares held by passive institutions at the end of September in year $t$ (from March $t$), instrumented using the Russell 2000 index assignment as in equation (2); $band_{it}$ is an indicator variable that takes a value of one if the firm's end-of-May market capitalization is less than 2.5% of the Russell 3000E index cumulative market capitalization; $R2000_{it-1}$ is an indicator for being in the previous year's Russell 2000 index; $Mktcap_{it}$ is the end-of-May CRSP market capitalization in year $t$; $prev\_1yr\_ret_{it}$ is the previous year's cumulative return before the index reconstitution (June, t-1 to May, t) and $Float_{it}$ is the float-adjusted market capitalization calculated by the Russell when setting the index weights at the reconstitution in June, year $t$. Passive ownership and the outcome variables are standardized to have unit standard deviations.

The passive ownership (changes) in equation (1), $(\Delta)\widehat{Passive}_{it}$, is instrumented by the Russell 2000 index assignment in the first stage. The first-stage estimation equation is

$$
\begin{aligned}
(\Delta)Passive_{it} = \phi + \lambda R2000_{it} + \sum_{n=1}^{N}\zeta_n(ln(Mktcap_{it})^n) + \chi ln(Float_{it}) \\
+\rho_1 band_{it} + \rho_2 R2000_{it-1} + \rho_3(band_{it} \times R2000_{it-1}) + \kappa(prev\_1yr\_ret_{it}) + \sigma_t + \varepsilon_{it}
\end{aligned}
\tag{2.2}
$$

The first-stage estimation results are reported in Table 1.2. Regardless of which specification is considered, adding different polynomial orders for the end-of-May market capitalization, including past performance, the first-stage result is strong; Kleibergen-Paap F-statistics over 10. When a firm is assigned to the top of Russell 2000 index, passive ownership increases by 0.31 to 0.38 standard deviation. I also use changes in passive ownership ($\Delta Passive_{it}$) rather than the levels

## Table 2.2: First-Stage Regression

The table reports the first stage estimation result using equation (2) in the text. Columns (1) through (3) report the first stage estimation of passive mutual fund holdings on an indicator for Russell 2000 index assignment plus additional controls. Columns (4) through (6) report the first stage estimation of changes in passive holdings on the indicator for the assignment in the Russell 2000 index also with additional controls. The passive ownership is measured at the end of September in year $t$ (Passive Ownership). The change in passive ownership ($\Delta$ Passive Ownership) is the holdings change measured from March in year $t$ to September year $t$. The model is augmented using polynomial orders of the logarithm of end-of-May CRSP market capitalization (log_may_mcap) from 1 to 3 in column (1) through (3) and (4) through (6), respectively. All specification include previous year's cumulative return (prev_1yr_ret) to control for the past performance that might affect the index assignment. More detail on banding control variable is available in Appendix A. Kleibergen-Paap Wald F-statistics (F-statistics) are reported. Year fixed effect is included in all specification. The sample consists of 500 firms around the Russell 1000/2000 threshold over 2007-2013 period. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | Passive Ownership | | | $\Delta$ Passive Ownership | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| R2000 | 0.314*** | 0.358*** | 0.378*** | 0.372*** | 0.376*** | 0.368*** |
| | (3.872) | (4.389) | (4.443) | (5.992) | (6.028) | (5.862) |
| prev_1yr_ret | -0.145*** | -0.147*** | -0.149*** | -0.058* | -0.058* | -0.057* |
| | (-6.014) | (-6.071) | (-6.134) | (-1.898) | (-1.903) | (-1.879) |
| log_mcap_june | 0.799*** | 0.776*** | 0.769*** | -0.157*** | -0.158*** | -0.154*** |
| | (15.565) | (15.070) | (14.400) | (-4.560) | (-4.627) | (-4.506) |
| band | 0.115** | 0.065 | 0.079* | -0.016 | -0.020 | -0.025 |
| | (2.287) | (1.528) | (1.739) | (-0.521) | (-0.639) | (-0.779) |
| r2000_prev | 0.159*** | 0.134*** | 0.138*** | -0.305*** | -0.307*** | -0.308*** |
| | (3.024) | (2.672) | (2.736) | (-5.586) | (-5.624) | (-5.630) |
| band_prevr2000 | -0.077 | -0.089 | -0.108 | 0.057 | 0.056 | 0.063 |
| | (-0.907) | (-1.087) | (-1.275) | (0.967) | (0.953) | (1.048) |
| log_may_mcap | -0.678*** | 5.544*** | -23.064 | 0.077** | 0.551 | 13.684 |
| | (-7.161) | (3.632) | (-0.841) | (2.210) | (0.545) | (0.627) |
| log_may_mcap2 | | -0.144*** | 1.188 | | -0.011 | -0.624 |
| | | (-4.186) | (0.928) | | (-0.469) | (-0.615) |
| log_may_mcap3 | | | -0.021 | | | 0.010 |
| | | | (-1.039) | | | (0.607) |
| Constant | -1.463 | -68.006*** | 136.559 | 2.744*** | -2.327 | -96.102 |
| | (-0.977) | (-4.089) | (0.696) | (3.396) | (-0.212) | (-0.613) |
| N | 3717 | 3717 | 3717 | 3032 | 3032 | 3032 |
| F-Stat | 14.992 | 19.264 | 19.739 | 35.904 | 36.336 | 34.368 |
| $Adj.R^2$ | 0.605 | 0.611 | 0.611 | 0.729 | 0.729 | 0.729 |

in columns (4) through (6). The results show that the Russell 2000 index assignment is a strong instrument for passive ownership changes. When a firm is included in the Russell 2000 index, there is approximately a 0.37 standard deviation increase in passive ownership changes.[18]

### 2.3 Empirical Results

I first show the effect of passive institutions on CEO compensation duration using Russell 2000 index assignment as a plausibly exogenous shock to passive ownership. Then, I examine the channels through which passive institutions affect CEO incentive horizons. Specifically, I show how passive institutions utilize their voting power to influence CEO compensation durations by examining their proxy voting behavior.

#### 2.3.1 Passive Institutions' Effect on CEO Compensation Duration

Compensation contracts are designed to align managers' incentives with those of shareholders. A long-term incentive plan is essential to encouraging managers to allocate effort and investment decisions to promote the firm's long-term success of. Given that executive compensation should incentivize managers to act on behalf of shareholders, when a firm's shareholder base changes to be more long-term, the compensation contract should also be modified to account for such changes in investor horizons. In this section, I test whether a passive ownership increase leads to longer CEO compensation durations that would better align CEOs' incentive horizons with passive institutions' long-term investment horizons.

I exploit plausibly exogenous variations in passive ownership using Russell 2000 index assignments in the first stage as explained in equation (2). Then, I estimate the effect of passive ownership on CEO compensation duration in the second stage as explained in equation (1). The results are reported in Table 3. A one-standard-deviation increase in passive ownership is associated with a 0.61-standard-deviation increase in CEO compensation duration. The results are robust to different

[18] Using changes in passive ownership can mitigate the concern that passive institutions adjust their holdings in advance of the Russell reconstitution announcement in June. I replace passive ownership with active ownership changes to examine if Russell 2000 index assignment has a significant effect on active ownership changes. Russell 2000 index assignment does not induce significant changes in active ownership and hence it cannot be used as an instrument for active ownership.

Table 2.3: Second-Stage Regression: Passive institution and CEO compensation duration

This table reports the second stage estimation result using the instrumented passive ownership to identify the effects of passive investors on CEO compensation duration. The estimation is based on equation (1) in the text. For columns (1) through (3), the dependent variable is CEO compensation duration measured at the next fiscal year of the index assignment year. For columns (4) through (6), the percentage change in duration measured from fiscal year $t$ to fiscal year $t+1$. The variable $\widehat{Passive}$ is the instrumented passive holdings measured at the end of September in year $t$, estimated from the first stage regression in equation (2) in the text. The variable $\Delta\widehat{Passive}$ is the instrumented passive holdings change in September in year $t$ compare to March in year $t$, estimated from the first stage regression in equation (2) in the text. Definitions on other variables are available in Appendix A. Duration (change) and passive holdings (the percentage of shares outstanding owned by passive mutual funds at the end of September $t$) (change) are both scaled by their sample standard deviations, respectively. Column (1) and (4) include the logarithm of end-of-May CRSP market capitalization(log_may_mcap) first order polynomial. Columns (2) and (5) include first and second order polynomials of the logarithm of end-of-May CRSP market capitalization(log_may_mcap2). Columns (3) and (6) are augmented by the third order polynomial of the logarithm of end-of-May CRSP market capitalization (log_may_mcap3). In all specification, previous year cumulative return (Prev_1yr_ret) is included to control for the past performance that might affect the index assignment. Year fixed effect is included in all specifications. The sample consists of 500 firms around the Russell 1000/2000 threshold over 2007-2013 period. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | Duration | | | ΔDuration | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\widehat{Passive}$ | 0.595* | 0.573** | 0.608** | | | |
| | (1.816) | (1.984) | (2.231) | | | |
| $\Delta\widehat{Passive}$ | | | | 0.819** | 0.809** | 0.870** |
| | | | | (2.352) | (2.350) | (2.388) |
| prev_1yr_ret | 0.144** | 0.141** | 0.145*** | 0.158** | 0.158** | 0.160** |
| | (2.414) | (2.542) | (2.650) | (2.054) | (2.055) | (2.060) |
| log_mcap_june | -0.055 | -0.034 | -0.066 | 0.181* | 0.181* | 0.179* |
| | (-0.212) | (-0.149) | (-0.302) | (1.881) | (1.882) | (1.851) |
| band | -0.009 | 0.002 | 0.009 | 0.069 | 0.073 | 0.090 |
| | (-0.130) | (0.027) | (0.140) | (1.043) | (1.083) | (1.259) |
| r2000_prev | -0.258** | -0.251** | -0.253** | 0.014 | 0.013 | 0.035 |
| | (-2.384) | (-2.528) | (-2.543) | (0.158) | (0.148) | (0.367) |
| band_prevr2000 | -0.074 | -0.074 | -0.083 | -0.149 | -0.147 | -0.171 |
| | (-0.746) | (-0.749) | (-0.865) | (-1.212) | (-1.205) | (-1.331) |
| log_may_mcap | 0.220 | -0.777 | -19.489 | -0.107 | -0.628 | -41.029 |
| | (0.818) | (-0.326) | (-0.512) | (-1.576) | (-0.364) | (-1.135) |
| log_may_mcap2 | | 0.023 | 0.890 | | 0.012 | 1.896 |
| | | (0.392) | (0.502) | | (0.304) | (1.129) |
| log_may_mcap3 | | | -0.013 | | | -0.029 |
| | | | (-0.486) | | | (-1.125) |
| Constant | -2.542* | 7.919 | 142.744 | -2.530 | 3.078 | 291.461 |
| | (-1.705) | (0.300) | (0.524) | (-1.217) | (0.166) | (1.126) |
| N | 3717 | 3717 | 3717 | 3032 | 3032 | 3032 |
| $Adj.R^2$ | -0.057 | -0.049 | -0.063 | -0.185 | -0.181 | -0.209 |

specifications; adding different polynomial orders for end-of-May market capitalization produces similar results. A 0.61-standard-deviation increase in CEO compensation duration can be interpreted as an approximately 6.5-month increase in the vesting period of the stocks and options granted to the CEO. The median CEO tenure in my sample is 4.26 years, and a 6.5-month increase in compensation duration is a non-negligible lengthening of the managerial incentive horizon.

I repeat the analysis to examine compensation duration and passive ownership not only in levels but also in changes. The results are reported in columns (4) through (6) in Table 3. The duration change ($\Delta$Duration) is defined as the percentage change in duration from fiscal year $t$ to fiscal year $t+1$. Passive ownership change is measured as the holdings change from March, $t$ to September, $t$. A one-standard-deviation increase in the change in passive institutions leads to a 0.82 to 0.87 standard-deviation increase in the CEO compensation duration change for the next fiscal year. In other words, when passive ownership change increases by one standard deviation (2.7%), there is an approximately 48.9% to 51.8% point increase in CEO compensation duration. Overall, an increase in passive institutions leads to the lengthening of CEO compensation duration.

I find robust results when employing different index threshold methodologies used by prior researchers (e.g.,Schmidt and Fahlenbrach (2017), and Crane et al. (2016)). The results are reported in Appendix Table A2 and Table A3. In Table A3 column (3), passive ownership is replaced with quasi-index ownership classified as in Bushee (1998).[19] Additionally, the results are robust to measuring passive ownership changes in the following quarters, December $t$ and March $t+1$.

*2.3.1.1 Using actual switchers of Russell indexes*

In addition to the 2SLS estimation, I also estimate passive institutions' effects on compensation duration using the actual switchers of Russell 1000/2000 indexes. Chemmanur et al. (2016) use the same index reconstitution setting but identify firms that switch index membership as treatment firms and use a difference-in-difference (diff-diff) framework. The underlying assumption is that after controlling for the determinants of index assignment, such as the banding policy, an index switching event is conditionally random, for firms around the Russell 2000 index threshold. I test

[19] http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

whether the results I find with 2SLS estimation are robust under the diff-diff framework.[20]

I identify firms that move from the Russell 1000 index in year $t-1$ to the Russell 2000 index in year $t$ as **R2000 movers**. Firms that move from the Russell 2000 index in year $t-1$ to the Russell 1000 index in year $t$ are classified as **R1000 movers**. Russell index switchers should experience significant changes in passive ownership because of the significant index rankings change. In particular, Russell 2000 index movers encounter a significant increase in passive ownership; thus, **R2000 movers** is my variable of interest.

The univariate test between R2000 movers and R1000 movers are reported in Table 4 in Panel A. Under the "Russell 2000 index" column reports the mean of $\Delta$duration, $\Delta$passive (active) ownership and $\Delta$investor turnover, where $\Delta$ denotes the change in the variable before and after the index reconstitution. The last column shows the mean difference in variables for Russell 2000 index movers and non-movers. Under Russell 1000 index column shows the mean for $\Delta$duration, $\Delta$passive (active) ownership and $\Delta$investor turnover, where $\Delta$ denotes the change in the variable before and after the index reconstitution. Again, the last column shows the difference in the variables for Russell 1000 index movers and non-movers. The univariate test shows that Russell 2000 index movers show a significant increase in the changes in passive ownership and a significant decrease in the change in investor turnover. These results validate the use of index reconstitution as a shock to long-term passive ownership. Additionally, the result shows that the mean difference in CEO duration change is significantly larger for Russell 2000 index movers than non-movers.

Panel B in Table 4 reports the results for multivariate analysis. Using the actual switchers of the Russell indexes, I run a difference-in-difference type regression where Russell 1000 index movers and Russell 2000 index movers are considered as treatment firms. I follow the estimation

[20]Another advantage of using the actual index-switching firms is that I can further extend the analysis to test the interaction effect. Whenever an interaction term is needed for a further analysis in the 2SLS estimation, if one of the interaction terms is endogenous, an ideal case is to find a new instrument for the interaction term. However, it is extremely difficult to find a valid instrument for the interaction term, given that finding one valid instrument for one endogenous variable is already difficult. Alternatively, one can use the interaction between the instrument and the interaction variable as an instrument for the interaction term. However, this procedure suffers from weak first-stage estimations in my sample. Therefore, I present results using index switchers whenever an interaction term is needed for further analysis.

Table 2.4: Using Russell 1000/2000 index switchers

This table reports the effects of actual switchers of Russell 1000/2000 indexes on CEO compensation duration. Panel A shows the univariate analysis on the difference in means for variables measured pre- and post- Russell index reconstitution. Panel A under R2000(1000) index (**R2000(1000) Index**) column reports the means for CEO compensation duration changes (ΔDuration), passive ownership changes (ΔPassive Ownership), active ownership changes (ΔActive Ownership) and investor turnover changes (ΔInvestor Turnover) for Russell 2000 (1000) index non-movers and movers. The last column reports the difference in means for the two group (Non Movers-Movers) for each index, respectively. Panel B reports results for the multivariate analysis. The dependent variable for column (1) and (2) in Panel B is the percentage change in CEO compensation duration measured from fiscal year $t$ to fiscal year $t+1$. The dependent variable for column (3) and (4) in Panel B is the CEO compensation duration measured at the next fiscal year ($t+1$). The variable **R2000Movers** is an indicator variable for actual movers that switch to Russell 2000 index in year $t$. **R1000Movers** is an indicator for actual movers that switch to Russell 1000 index in year $t$. The past stock return, **prev_1yr_ret**, is added as a control and previous year's stock firm performance. The **banding controls** are included to make index assignment conditionally random. The **firm controls** are ROA, R&D-to-asset, market-to-book, debt-to-asset, long-term asset, sales growth, sales growth volatility, CAPEX to asset, EBIT to sales, and the average bid-ask spread which are known to affect duration (Gopalan et al. (2014)). The variables used are explained in Appendix A. The sample consists of 500 firms around the Russell 1000/2000 index threshold over 2007-2013 period. Industry fixed effects (Ind FE: SIC 3-digit) and year fixed effects (Year FE) are used in all specifications. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses. ***,**, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A. Univariate Analysis

| Variables | Non Movers | Movers | Mean Diff (Non Movers-Movers) |
|---|---|---|---|
| **R2000 Index** | | | |
| ΔDuration | 0.024 | 0.247 | -0.223*** |
| ΔPassive Ownership | 0.000 | 0.012 | -0.012*** |
| ΔActive Ownership | -0.003 | 0.008 | -0.011** |
| ΔInvestor Turnover | -0.006 | -0.018 | 0.011*** |
| **R1000 Index** | | | |
| ΔDuration | 0.032 | -0.035 | 0.067 |
| ΔPassive Ownership | 0.000 | -0.009 | 0.009*** |
| ΔActive Ownership | -0.003 | 0.013 | -0.016*** |
| ΔInvestor Turnover | -0.007 | -0.003 | -0.004 |

Panel B. Multivariate Analysis

| | Δ Duration | | Duration | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| R2000Movers | 0.230** | 0.253* | 0.192* | 0.316*** |
| | (2.041) | (1.852) | (1.939) | (2.766) |
| R1000Movers | -0.114 | -0.151* | -0.103 | -0.172 |
| | (-1.566) | (-1.672) | (-1.023) | (-1.483) |
| Prev_1yr_ret | 0.062 | 0.010 | 0.041 | 0.023 |
| | (1.375) | (0.241) | (1.179) | (0.491) |
| Banding Controls | Yes | Yes | Yes | Yes |
| Firm Controls | No | Yes | No | Yes |
| Ind FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| N | 3021 | 2500 | 3623 | 2942 |
| $Adj.R^2$ | -0.010 | -0.012 | 0.160 | 0.194 |

methodology used in Chemmanur et al. (2016):

$$(\triangle)duration_{i,t+1} = \alpha_t + \beta_1 R2000Movers_{i,t} + \beta_2 R1000Movers_{i,t} + \gamma \textbf{Banding Controls}_{i,t} + \theta(\Delta)\textbf{firm controls}_{i,t} + \lambda_c + \epsilon_{i,t} \tag{2.3}$$

where **banding controls** include variables that determine the index assignment, making the index-switching event conditionally random. The banding controls are the same as the controls used in equations (1) and (2). The coefficient $\beta_1$ captures the effect of Russell 2000 index movers on $\Delta$CEO compensation duration. Because the sample I use is the 500 firms around the Russell 2000 index threshold, non-index movers are considered as a control group. Instead of having $post$ and $treated$ dummies as in the standard diff-diff setting, I use changes in CEO compensation duration before and after the Russell reconstitution shock as the dependent variable. Therefore, when the dependent variable is the change in CEO compensation duration, the coefficient for Russell 2000 index movers (R2000Mover) captures the difference in changes in duration for the treatment group and control groups (non R2000 movers), which captures the difference in differences. Additionally, in certain specifications, I add additional firm-level control variables (in changes when needed)– such as ROA, R&D to assets, long-term assets, sales growth, market-to-book ratio, debt to assets, long-term asset, sales growth, sales growth volatility, CAPEX to assets, EBIT to sales, and the average bid-ask spread – that are known to affect compensation duration (Gopalan et al. (2014)). A detailed description of firm control variables and banding controls are given in Appendix A. Year fixed effects ($\alpha_t$) and industry (SIC-3) fixed effects ($\lambda_c$) are included.

Columns (1) and (2) in Panel B Table 4 show the effect of Russell 2000 index movers on duration changes. Firms that switch to the Russell 2000 index show a 23 to 25.3% point greater increase in $\Delta$duration than non-Russell 2000 index movers. Columns (3) and (4) report results for duration measured in levels. Russell 2000 index switchers show an 0.19-0.32 years longer duration than non-Russell 2000 index switchers. The level analysis shows that the effect comes from a positive effect on the movers (treatment group), not from the negative effect on the non-movers (control group).

The result in Table 4 is more intriguing in that the coefficient for Russell 1000 index movers is negative. Active funds have higher portfolio turnover than passive funds and thus, short-term investment horizons (Gaspar et al. (2005), Iliev and Lowry (2015)). For Russell 1000 index movers, ownership by long-term passive institutions decreases and ownership by active institutions (short-term investors) increases, as shown in Panel A. In columns (1) through (4) in Table 4, the coefficients for Russell 1000 index movers (R1000 Mover) are negative and statistically significant in column (2). This result is interesting because it is consistent with the argument that CEO compensation duration changes in accordance with shareholder investment horizon change: the increase in holdings by short-term investors is associated with shorter CEO compensation durations. This result also supports my hypothesis that shareholder composition change is associated with changes in incentive horizons of CEOs.[21]

### 2.3.2 How Do Passive Institutions Affect CEO Compensation Duration?

I show that passive institutions lengthen compensation duration to align the incentive horizons of CEOs with their own long-term investment horizons. This finding raises the following question: *how* do they affect compensation durations? McCahery et al. (2016) show in a survey that two commonly used intervention strategies by institutional investors are "communicating with top management" and "voting against management". Surprisingly, the most frequent intervention strategy employed by institutional investors is communicating behind closed doors. Some might argue that there is no incentive for passive institutions to intervene actively by either voting or communicating. However, anecdotal evidence suggests that major index funds (e.g., Blackrock, Vanguard, State Street) frequently 'engage' with management to discuss firm policies including compensation issues. The engagement is very "nuanced" and "sensitive", ranging from a brief conversation with management to a series of one-on-one meetings (Azar et al. (2018)). The rapidly growing size of passive institutions, often collectively exceeding the shares held by actively man-

[21] For other components of pay, I also examine total compensation, delta and vega changes when there is an increase in passive institutions. The results are reported in Table A4 in the Appendix. I find that delta increases more in firms with more passive institutions, while total compensation and vega are unaffected by the increase in passive ownership. This result implies that pay-for-performance sensitivity becomes stronger when passive institutions increase.

aged funds, allows them to wield their growing clout over important corporate governance issues.

As there is a significant increase in passive ownership in firms that switch to the top of the Russell 2000 index, the increased voting shares empower passive institutions to influence CEO compensation contracts. As passive institutions accumulate more shares, the benefits of active voting also increase for passive institutions. More importantly, the increased voting shares can be used as a bargaining tool to negotiate with management for the institutions' desired outcome.

In the following sections, therefore, I examine passive institutions' role as voting shareholders to establish the channels through which they influence CEO compensation durations. First, I examine the changes in the number of compensation-related proposals and passive institutions' proxy voting on these proposals. Then, I examine their proxy voting behavior on say-on-pay proposals, depending on duration changes. Finally, I attempt to shed light on the possible behind-the-scenes engagement by passive institutions using their voting power.

*2.3.2.1 Shareholder-sponsored compensation proposal channel*

Flammer and Bansal (2017) argue that shareholder proposals are usually symbolic in nature, and the purpose of submitting a proposal is to bring management and public attention to certain issues. Further, shareholder-sponsored proposals can be regarded as a means to suggest a specific action to management, and this action can be a consequence of the failure of behind-the-scenes engagement (CvijanoviĆ et al. (2016), Gantchev (2013) and McCahery et al. (2016)). Recognizing the presence of passive institutions with greater voting power, other shareholders may be more willing to propose compensation proposals under the expectation that it will attract a greater support from passive institutions. If the increase in compensation duration after passive ownership increase is the product of such intervention, I hypothesize that the number of compensation-related shareholder proposals will increase following a passive ownership increase.

To test the above hypothesis, I collect compensation-related proposals sponsored by shareholders. The compensation-related proposals are identified by reading the agenda description section of the Company Vote Results and Shareholder Proposals database in ISS Voting Analytics (Section 2.1.3). In Appendix C, I report the frequency of compensation-related proposals categorized by ISS proposal type for a sample of 500 firms around the Russell 1000/2000 index threshold. Of course, not all of these compensation proposals are necessarily associated with CEO compensation duration increases. In Appendix C.1, I provide an example of compensation proposal sponsored by the Trowel Trades S&P 500 Index Fund for Safeway Inc. The Trowel Trades Index Fund asked the board of Safeway Inc. to limit the accelerated vesting of any equity award to a senior executive. This anecdotal evidence provides support for the argument that passive institutions pay attention to the link between the CEO's pay horizon and the firm's long-term performance.

Table 5 reports results on the effect of passive institutions on shareholder-sponsored compensation proposals. I use 2SLS estimation and a diff-diff type framework using index switchers to test the effect of passive ownership increases on shareholder compensation proposals. Columns (1), (4), and (7) report results using the instrumented passive ownership in levels. Columns (2), (5) and (8) report results using the instrumented passive ownership changes. In addition, columns (3), (6) and (9) report the estimation results using actual index switchers.

I present the results incorporating changes in the number of shareholder proposals compared to the year prior to the index reconstitution in columns (1) through (3). The results show that a one-standard-deviation increase in passive ownership increases the likelihood of seeing an increase in the number of shareholder-sponsored compensation proposals by 4.9% (in column (1)). When a firm moves to the Russell 2000 index, the firm is approximately 2.2% more likely to see an increase in the number of shareholder-sponsored compensation proposals (column (3)) than the non-Russell 2000 index movers (the unconditional mean of seeing an increase in shareholder compensation proposals is 1.0%). Using the instrumented passive ownership in changes, in columns (2) and (5), show similar results.[22]

A one-standard-deviation increase in passive institutions leads to a 4.9% greater likelihood of having a shareholder-sponsored compensation proposal (in column (4)). Using actual switchers of

[22] In the Appendix Table A5, I show whether passive institutions affect management-sponsored compensation proposals. I find that an increase in passive ownership is *not* associated with an increase in management-sponsored compensation proposals (columns (1) to (3) in Table A5). There is a greater likelihood of having a management-sponsored compensation proposal (columns (4) to (6)).

Table 2.5: Passive institutions and shareholder-sponsored compensation proposals

This table reports result on the effect of passive institutions on the increase in the number of shareholder-sponsored compensation proposals. The compensation-related proposals are described in Appendix A. The dependent variable for column (1) through (3), **Shareholder Proposal Increase**, is an indicator variable which takes value of one if there is an increase in the number of shareholder-sponsored compensation proposals subject to shareholder voting in the following annual meetings after the index reconstitution (from September, year $t$ to June, year $t+1$) compare to the prior annual shareholder meeting. The dependent variable for column (4) through (6), **Shareholder Proposal**, is an indicator variable which takes value of one if there exists a shareholder-sponsored compensation proposal subject to shareholder voting in the following annual meetings after the index reconstitution (from September, year $t$ to June, year $t+1$). Columns (1), (2), (4) and (5) report estimation results using the second stage regression based on equation (1) in the text. Columns (3), and (6) report results considering actual switchers of the Russell 1000 and 2000 indexes as treated. The variable $\widehat{Passive}$ is the instrumented passive holdings measured at the end of September in year $t$, estimated from the first stage regression in equation (2) in the text. The passive holding is scaled by its sample standard deviations. The variable $\Delta\widehat{Passive}$ is the instrumented passive holdings change measured at the end of September in year $t$ compare to holdings measured at the end of March in year $t$. The variable **R2000Movers** is an indicator variable for actual movers that switch to Russell 2000 index in year $t$. **R1000 Movers** is an indicator for actual movers that switch to Russell 1000 index in year $t$. The past performance (prev_1yr_ret) is added to control for the past performance that might affect the index assignment. In all specifications, **banding controls** are included to make index assignment conditionally random. More detailed information on the banding controls are available in Appendix A. Industry (Ind FE: SIC-3 digit) fixed effects are included in columns (3) and (6) and year fixed effects (Year FE) are used in all specifications. The sample consists of 500 firms around the Russell 1000/2000 index threshold over 2007-2013 period. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | Shareholder Proposal Increase | | | Shareholder Proposal | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\widehat{Passive}$ | 0.049** | | | 0.049* | | |
| | (1.987) | | | (1.921) | | |
| $\Delta\widehat{Passive}$ | | 0.041** | | | 0.042* | |
| | | (2.020) | | | (1.950) | |
| R2000Movers | | | 0.022* | | | 0.026* |
| | | | (1.649) | | | (1.820) |
| R1000Movers | | | -0.010** | | | -0.003 |
| | | | (-2.148) | | | (-0.336) |
| Prev_1yr_ret | -0.003 | -0.010*** | -0.012*** | -0.004 | -0.010*** | -0.012*** |
| | (-0.780) | (-4.192) | (-4.903) | (-0.618) | (-2.777) | (-3.535) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Ind FE | No | No | Yes | No | No | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 6901 | 6888 | 6972 | 6901 | 6888 | 6972 |
| $Adj.R^2$ | -0.079 | -0.040 | 0.014 | -0.044 | -0.021 | 0.055 |

the index in column (6), I find a similar result. Russell 2000 index movers (R2000Movers) are 2.6 percentage points more likely to have shareholder compensation proposals than non R2000 index movers. Given that the unconditional mean of firms with shareholder compensation proposals is 1.5%, the effect is economically significant.

Further, I investigate how an increase in the number of shareholder-sponsored compensation proposals and an increase in passive ownership are associated with CEO compensation duration. If a shareholder-sponsored compensation proposal is one channel through which passive institutions affect CEO compensation duration, I expect to find that CEO compensation duration to increase more in firms with shareholder compensation proposals. In Table A6 in the Appendix, I show that CEO compensation duration increases when there exists shareholder-sponsored compensation proposals or when there is an increase in the number of shareholder-sponsored compensation proposals in addition to a passive ownership increase. For example, when a firm moves to the top of the Russell 2000 index and when the firm has shareholder-sponsored compensation proposals (R2000Movers×Shareholder Proposal), the CEO compensation duration is 0.96 years higher than that in Russell 2000 index movers but without shareholder-sponsored compensation proposals (Column (3)). Similarly, when a firm switches to the Russell 2000 index and sees an increase in the number of shareholder-sponsored compensation proposals (R2000Movers×Shareholder Proposal Increase), the firm shows a 0.94-year-longer compensation duration (column (4)) than Russell 2000 index movers without the shareholder proposal increase.

Overall, passive institutions increase the number of compensation-related proposals sponsored by shareholders. The increase in shareholder proposals might be evidence of 'behind-the-scenes' engagement by passive institutions (McCahery et al. (2016)). Further, CEO compensation duration increases more when there is (an increase in) shareholder-sponsored compensation proposals. This finding implies that the shareholder-sponsored compensation proposal is one mechanism through which passive institutions affect CEO compensation contracts. The very presence of passive institutions could have affected proponents' decision to propose compensation items that could attract more voting support from passive institutions. I test whether passive institutions vote to support these compensation shareholder proposals in the next section.

#### 2.3.2.2 *Proxy voting behavior of passive institutions in compensation proposals*

My evidence thus far suggests that shareholder-sponsored compensation proposals is one channel through which passive institutions affect CEO compensation duration. In this section, I explore the proxy voting behavior of passive institutions to gain further insights into the voting channel employed by passive institutions. First, I examine how passive institutions vote on compensation-related proposals to validate the shareholder-sponsored proposal channel mentioned above. I hypothesize that passive funds vote to support shareholder-sponsored compensation proposals

I begin by analyzing passive institutions' voting behavior in shareholder-sponsored compensation proposals when the portfolio firm switches to either the Russell 1000 or 2000 Index. Following CvijanoviĆ et al. (2016) and He et al. (2017), I aggregate fund-level voting data to the fund-family level. For each passive fund $j$ in fund family $f$ that casts votes on a compensation proposal $p$ in the meeting date $t$ of a portfolio firm $c$, I aggregate votes cast by passive funds to estimate "vote-for-management" ($VoteForMgmt$) at the fund-family level and estimate following regression:

$$\begin{aligned} VoteForMgmt_{passive\_f,p,c,t} &= \alpha + \beta_1 R2000Movers_{c,t} + \beta_2 R1000Movers_{c,t} + \\ \beta_3 ffamily\_holdings_{f,c,t} &+ \beta_4 ISSrecomm_{p,c,t} + \gamma Banding\_controls_{c,t} + \\ &\mu_p + FE_{f,t} + \epsilon_{f,p,c,t} \end{aligned} \tag{2.4}$$

The dependent variable is the fraction of passive funds voting *in line with* management's recommendations aggregated at the fund-family level, as described in equation (4) in Appendix A. $R2000Movers_{c,t}$ is an indicator variable that takes the value of one when a portfolio firm $c$ in a fund family $f$ in June of year $t$ switches to the Russell 2000 index. $R1000Movers_{c,t}$ is a dummy variable that takes the value of one when a portfolio firm $c$ switches to the Russell 1000 Index in year $t$. I use shareholder meetings, $t$, that took place from September of year $t$ to June of year $t+1$ to assess mutual fund voting behavior after index reconstitution each year. The proposal $p$ only includes compensation-related proposals that are put to a vote during shareholder meetings. Compensation-related proposals are identified using compensation keywords as explained in Section 2.1.3. $ffamily\_holdings$ is the holding by the fund family in the portfolio firm, measured as of the most recent quarter from annual meeting date $t$. The size of the portfolio holding is an important determinant of voting (Iliev and Lowry (2015)). The ISS recommendation ($ISSrecomm$) takes a value of one if ISS recommends to vote in line with the management's recommendation on the proposal and 0 otherwise. To the extent that the ISS recommendation contains information about the quality and type of proposal at hand, Matvos and Ostrovsky (2010) argue that including the ISS recommendation as a control variable is important. In all specifications, $Banding\_controls_{c,t}$ are included that make the Russell 1000/2000 Index assignment conditionally random. More details on banding controls are provided in Appendix A. The sample is limited to the intersection of 13F and ISS Voting Analytics data. I merge 13F institutional holdings data with ISS voting data using fund-family names as explained in Section 2.1.4.

The variable $R2000Movers$ captures the effect of passive institutions' voting behavior on compensation-related proposals when there is variation in the portfolio holding induced by Russell index reconstitutions. In addition, I control for unobserved heterogeneity across fund family, proposal type, firm and year using a variety of fixed effects ($\mu_p$+$FE_{f,t}$). More specifically, the fund-family fixed effects subsume the unobserved heterogeneity within a fund-family and captures the variation within fund-family portfolio firm index switching events across years.

Table 2.6: Passive institution voting on shareholder-sponsored compensation proposals

This table reports passive funds voting on shareholder-sponsored compensation proposals when a portfolio firm switches to either Russell 1000 or Russell 2000 index. The dependent variable in all columns is the proportion of passive funds belonging to a fund family that voted in line with the management's recommendation on the shareholder-sponsored compensation proposals put on to vote in annual meetings of the fund family's portfolio firm (equation (4) in Appendix A). Columns (1) through (3) report results for fund-families with at least one passive fund voting on shareholder-sponsored compensation proposals. Columns (4) through (6) report results for a subsample of fund-families with passive funds voting and at least one active fund in the same fund-family voting on the same compensation shareholder proposal. Columns (7) to (9) report results for a subsample of fund-families with passive funds voting and above median proportion of active funds in the same fund-family voting in the same compensation shareholder proposal. The sample consists of mutual funds that can be matched with 13F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold from September, 2007 to June, 2014. The unit of observation is (passive fund votes aggregated at a fund-family)*portfolio firm*proposal level. **R2000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 2000 index in year $t$ and **R1000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 1000 index in year $t$. **ISSrecomm** is a dummy variable that takes the value of one if the voting recommendation of ISS on the proposal is in line with the management's recommendation. **ffamily_holding** is the holdings of the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. **Prev_1yr_ret** is the past one year performance of the portfolio firm. In all specifications, **banding controls** are included to make the index assignment conditionally random. Different fixed effects (FE) are used as reported and proposal-type fixed effects are included in all specifications. "**ffamily**" is the fund-family fixed effect, "**ffamily_yr**"is the fund-family*year fixed effect, and "**firm_ffamily**" is the portfolio_firm*fund-family fixed effect. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund-family*year.

| | Vote-For-Mgmt | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At least one passive | | | At least one active | | | Above median active fund proportion | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| R2000Movers | -0.092* | -0.045 | -0.110 | -0.168* | -0.111* | -0.177 | -0.195** | -0.171*** | -0.219 |
| | (-1.949) | (-1.175) | (-0.628) | (-1.915) | (-1.901) | (-0.885) | (-2.076) | (-2.988) | (-0.717) |
| R1000Movers | -0.059 | -0.127** | -0.148 | -0.046 | -0.191*** | -0.505*** | -0.030 | -0.193** | -0.584** |
| | (-0.905) | (-2.178) | (-1.080) | (-0.616) | (-2.689) | (-2.989) | (-0.383) | (-2.405) | (-2.404) |
| ISSrecomm | 0.426*** | 0.411*** | 0.652*** | 0.417*** | 0.453*** | 0.599*** | 0.542*** | 0.578*** | 0.625*** |
| | (6.573) | (5.972) | (5.645) | (4.715) | (4.501) | (4.265) | (5.912) | (4.891) | (3.992) |
| ffamily_holding | 4.032*** | 4.067*** | 1.236 | 4.762*** | 4.492*** | 1.747 | 4.432*** | 3.314** | 1.183 |
| | (3.472) | (3.635) | (1.098) | (3.448) | (3.946) | (1.288) | (3.052) | (2.603) | (0.951) |
| Prev_1yr_ret | 0.017 | -0.012 | 0.050 | 0.018 | -0.025 | 0.065 | 0.024 | -0.033 | 0.069 |
| | (0.441) | (-0.420) | (0.992) | (0.386) | (-0.602) | (0.875) | (0.462) | (-0.679) | (0.734) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily |
| Proposal-type FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 1056 | 1032 | 629 | 669 | 645 | 394 | 528 | 502 | 308 |
| $R^2$ | 0.510 | 0.627 | 0.675 | 0.469 | 0.598 | 0.653 | 0.438 | 0.559 | 0.573 |

Table 6 reports the results for passive fund voting behavior on shareholder-sponsored compensation proposals when a portfolio firm switches to either of the Russell 1000/2000 Indexes. Columns (1) to (3) in Table 6 show the results for fund families with at least one passive fund. Using fund-family fixed effect in column (1), the identification comes from portfolio firms within a fund-family that switch to the Russell 2000 index. Passive funds vote on average 9.2% point more often against management's recommendations on shareholder-sponsored proposals. In most cases, management recommends voting *against* shareholder-sponsored proposals, and thus, when a fund casts a vote against management's recommendation, it implies that the fund is voting to support shareholder-sponsored proposals.[23] Given the unconditional mean of passive funds voting on shareholder-sponsored compensation proposal is 41.7%, passive funds are 22.1% more likely to vote to support shareholder-sponsored compensation proposals when a portfolio firm switches to the top of Russell 2000 index.

When I saturate the model with fund family×year fixed effect or fund family×firm fixed effects, I lose statistical power (columns (2) and (3)) because there are relatively few index switchers in the sample and having shareholder-sponsored proposals is not a frequent event. When using firm×fund-family fixed effects, the variation comes from a firm switching to the Russell 2000 index in certain years within firm and fund-family combination. Though I cannot claim significant findings without statistical significance using the firm×fund-family fixed effect, the coefficient magnitude is larger and the sign is consistently negative.[24]

In columns (4) to (6), I report results for a subsample of fund-families with at least one passive fund and at least one active fund voting in the same shareholder-sponsored compensation proposals in the same portfolio firm. Passive funds that have at least one active fund in the same fund-family vote more strongly against management's recommendation (strongly to support) for shareholder-sponsored compensation proposal when the portfolio firm switches to the Russell 2000 index.

[23] Usually, the percentage of shareholder proposals that management recommends to vote in favor is less than 1% (CvijanoviĆ et al. (2016)). In my sample, the average compensation shareholder-proposals that are recommended by managements to vote in favor is 0.11%.

[24] I find that mutual funds (in general) are less supportive of compensation-related proposals when the portfolio firm switches to the Russell 2000 index. The results are reported in Appendix Table A7.

Passive funds vote 16.8% point more often against management's recommendation on shareholder compensation proposals when a portfolio firm switches to the Russell 2000 index, using fund-family fixed effects (column (4)). The result implies that passive funds with at least one active fund voting together more strongly support these proposals. Columns (7) to (9) show results for a subsample of fund-families with at least one passive fund and an above-median proportion of active funds voting in the same shareholder-sponsored compensation proposal in the same portfolio firm. With more active funds voting in the same proposal, passive funds are more likely to vote against management's recommendation, 19.5% in column (7), and hence support the shareholder proposal. As the voting happens at the fund-family level, when other active funds in the same fund-family vote together, the results show that passive funds tend to vote more actively to support the shareholder-sponsored compensation proposal.[25]

Overall, passive institutions more frequently support shareholder-sponsored compensation proposals when the portfolio firm switches to the top of the Russell 2000 index. Given the evidence that shareholder compensation proposals are one channel for increasing CEO compensation duration, passive institutions voting more often in favor of these proposals supports the hypothesis that passive institutions affect managerial incentives through proxy voting.

#### *2.3.2.3 Passive institutions voting on say-on-pay (SOP) proposals*

The Dodd-Frank Act requires SOP votes be included as a proxy ballot item at least once every three years, beginning in January 2011. The SOP votes allow shareholders to express their opinions on the quality of named executives through advisory voting, thereby offering shareholders a direct opportunity to provide feedback on executive compensation-related issues and their general level of satisfaction with managerial performance (Schwartz-ziv and Wermers (2017)). Although SOP votes are non-binding, there is evidence that this mechanism is beneficial to shareholders and value creating; it provides a means to communicate with management on the overall performance

[25] A possible reason for this result might be due to passive funds working with active funds within the same fund family to monitor portfolio firms that they hold together. The result has further implications on coordination among funds within a fund-family. I have a separate paper on this topic in which we explore the coordination between passive funds and active funds within a fund-family and the extent to which they monitor the portfolio firm.

of the firm and has consequences for directors (Aggarwal et al. (2018), Cai et al. (2009), Denis et al. (2017), Ferri and Maber (2013), and Iliev and Vitanova (2017)).

In a survey by Stuart (2013) on shareholder engagement in S&P 500 firms, 62% of the respondents reported that management or the board proactively reached out to the company's largest institutional investors or shareholders during 2013. The most common topics discussed were SOP proposals (47%), CEO compensation-related issues (29%), and director slate issues (17%). The survey response shows that management or the board communicate with their largest institutional investors to receive feedback on important issues such as executive compensation. Moreover, it provides direct evidence of behind-the-scenes communication between management and large institutions, as well as management's concern for SOP voting outcome.

If passive institutions use voting to express their opinions, I expect to observe differences in SOP voting support depending on the changes implemented in CEO compensation durations after index reconstitution. I hypothesize that passive institutions decrease (increase) support for SOP proposals when CEO compensation duration decreases (increases) after the index reconstitution. I test this hypothesis using a subsample of fund-family level SOP voting data from 2011 to 2013 to explore whether passive funds' voting on SOP proposals is affected by CEO duration changes.

Table 2.7: Passive institution voting on Say-on-Pay proposal when CEO compensation duration decreases

This table reports passive funds voting on Say-on-Pay (SOP) proposals when a portfolio firm switches to Russell 2000 index and when CEO compensation duration increases by above the sample median. The dependent variable is the proportion of passive funds belonging to a fund family that voted in line with the management's recommendation on the SOP proposals (Vote-For-Mgmt: equation (4) in Appendix A) subject to shareholder voting in annual meetings of the fund family's portfolio firm that take place from September, 2011 to June, 2014. Columns (1) through (3) report results for fund-families with at least one passive fund voting on SOP proposals. Columns (4) through (6) report results for a subsample of fund-families with passive funds voting and at least one active fund in the same fund-family voting on the same SOP proposal. Columns (7) to (9) report results for a subsample of fund-families with passive funds voting and above median proportion of active funds in the same fund-family voting in the same SOP proposal. **R2000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 2000 index in year $t$. **Duration Decrease** is an indicator variable which takes value of one if the CEO compensation duration decreased (negative) compare to the prior year. **ISSrecomm** is a dummy variable which takes the value of one if the voting recommendation of ISS on the SOP proposal is in line with the management's recommendation. **ffamily_holding** is the percentage shares held by the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. **Prev_1yr_ret** is the previous year's cumulative return to control for the past performance of the portfolio firm. In all specifications, **banding controls** are included to make the index assignment conditionally random. Different fixed effects (FE) are used as reported. "**ffamily**" is the fund-family fixed effect, "**ffamily_yr**"is the fund-family*year fixed effect, and "**firm_ffamily**" is the portfolio_firm*fund-family fixed effect. The sample consists of mutual funds that can be matched with 13-F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund family*year.

| | At least one passive | | | At least one active | | | Above median active funds | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| R2000Movers | 0.021 | 0.016 | 0.015 | 0.018 | 0.010 | -0.004 | 0.052* | 0.038 | 0.019 |
| | (1.096) | (0.814) | (0.522) | (0.846) | (0.486) | (-0.098) | (1.928) | (1.465) | (0.495) |
| Duration Decrease | -0.015*** | -0.016*** | -0.013** | -0.017** | -0.017*** | -0.016** | -0.020** | -0.021*** | -0.025** |
| | (-2.915) | (-2.980) | (-2.430) | (-2.579) | (-2.634) | (-1.999) | (-2.598) | (-2.677) | (-2.318) |
| R2000Movers× Duration Decrease | -0.057* | -0.052 | -0.045 | -0.092** | -0.083** | -0.099* | -0.119** | -0.106** | -0.114 |
| | (-1.719) | (-1.600) | (-0.926) | (-2.500) | (-2.258) | (-1.727) | (-2.373) | (-2.125) | (-1.426) |
| ISSrecomm | 0.487*** | 0.487*** | 0.425*** | 0.450*** | 0.451*** | 0.406*** | 0.494*** | 0.496*** | 0.470*** |
| | (11.881) | (11.902) | (7.514) | (9.222) | (9.230) | (5.556) | (9.041) | (9.079) | (5.342) |
| ffmaily_holding | 0.876*** | 0.991*** | -0.029 | 0.814** | 0.921*** | -0.016 | 0.965** | 1.048** | 0.111 |
| | (3.438) | (3.758) | (-0.102) | (2.497) | (2.737) | (-0.053) | (2.425) | (2.526) | (0.285) |
| Prev_1yr_ret | 0.000 | 0.006* | -0.003 | -0.003 | 0.005 | -0.006 | -0.006 | 0.004 | -0.008 |
| | (0.039) | (1.703) | (-0.428) | (-0.690) | (1.164) | (-0.745) | (-1.233) | (0.803) | (-0.861) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily |
| N | 14886 | 14876 | 11578 | 9949 | 9946 | 7678 | 7605 | 7602 | 5382 |
| $Adj.R^2$ | 0.334 | 0.345 | 0.412 | 0.301 | 0.314 | 0.406 | 0.308 | 0.322 | 0.415 |

Table 7 reports the results. I examine how passive funds vote on SOP proposals when a portfolio firm switches to the top of the Russell 2000 index and when the firm decreases its CEO compensation duration compared to the prior year. The dependent variable is passive funds aggregated voting at the fund-family level for SOP proposal after 2011, equation (4) in Appendix A with only SOP proposals. When a portfolio firm switches to the top of the Russell 2000 index and decreases CEO compensation duration, passive funds are 5.7% point more likely to vote against the management's recommendation in the SOP proposals than firms that switch to the Russell 2000 index with no decrease in compensation duration change (columns (1) and (2) in Table 7). Using firm×fund family fixed effects, the interaction coefficient is negative with a similar magnitude but is not statistically significant (column (3) in Table 7). With firm and fund-family fixed effects, fewer firms move in and out of the Russell 2000 index within firm×fund-family combination, and thus, as mentioned previously, there is low statistical power to reject the null.[26]

I also divide the sample into fund-families with at least one passive fund and at least one active fund voting in the same SOP proposal in columns (4) to (6). The fraction of passive funds voting against the management's recommendation in SOP proposals when the firm decreases CEO compensation duration is much larger. Using the most stringent fixed effect (in Column (6)), passive funds vote 10% point more often against management's recommendation when a portfolio firm switches to the Russell 2000 index and decreases its CEO compensation duration. Given the unconditional mean of voting for management on SOP proposals for this subsample is 91.6%, the effect is economically significant. The results are statistically and economically significant using a subsample of fund families with at least one passive fund and an above-median proportion of active funds voting on the same SOP proposal. The results reported are in columns (7) to (9).

Overall, I find that passive institutions decrease (increase) support in SOP proposals when a

[26]In Table A9 and Table A10 in the Appendix, I show passive fund voting on SOP proposals when the duration change is positive and when the change is above the sample median, respectively. These results show that passive funds vote in a way that is aligned with their long-term investment horizon. I also test firm-level voting outcomes when CEO compensation duration increases. Firms receive more supporting votes when CEO compensation duration is above the sample median. At the firm level, I find that firms that move to the Russell 2000 index and with an above-median sample duration receive 12.7 percentage points greater voting support in SOP proposals than firms that move to the Russell 2000 index (Table A11).

portfolio firm moves to the Russell 2000 index and when its CEO duration change is negative (positive). The results imply that passive institutions use proxy voting to express their opinions in SOP agendas. In particular, I provide evidence that passive institution vote actively, by voting against the SOP agenda, when the direction in changes do not align with their own long-term investment horizons.

### 2.3.3 Behind-the-Scenes Engagement? Passive Institutions' Voting Support in Director Elections

In this section, I specifically test how passive funds utilize their voting power as a bargaining tool to communicate with management behind-the-scenes. Board of director elections represent the most routine agenda item put to a vote for shareholder approval in annual meetings. Withheld votes in uncontested director elections can serve as a disciplining device, as suggested by proxy advisors such as the ISS or Glass-Lewis. Dissatisfied shareholders can use their vote as a means to express their views to management, thereby inducing the board to take action in shareholders' interest. Some express a skeptical view on the effectiveness of the proxy voting system in U.S. firms (Cai et al. (2009), Kahan and Rock (2011)). However, voting 'no' in director elections is associated with high CEO turnover and operating performance (Del Guercio et al. (2008)). Furthermore, when managers receive fewer supporting votes, it has consequences either through negative publicity (Grundfest (2003)) or real outcomes (Aggarwal et al. (2018)). More companies now "routinely vet director candidates with their major shareholders before their names are placed on the proxy."[27] If the board or management cannot completely ignore the voting outcome, large shareholders, who presumably have great voting power, can negotiate and communicate with management on certain issues; according to McCahery et al. (2016) and Azar et al. (2018), such negotiation and communication frequently happen behind closed doors.

Specifically, I test whether there is a positive association between voting support from passive institutions in director elections and compensation duration to shed some light on the behind-the-

[27] Charan, Ram, Michael Useem, and Dennis Carey, February 9, 2015, Your board should think like an activist, HBR.org, `https://hbr.org/2015/02/your-board-should-be-full-of-activists`

scenes engagement. Given that institutions usually vote against management's proposals when an attempt to engage has failed (Blackrock (2014)), I expect to find a positive relation between voting support and CEO compensation duration. With substantial ownership in the firm, passive institutions can negotiate by agreeing to vote more in favor of management in board of director elections, for a CEO duration increase. That is, when passive institutions negotiate with management, they can offer voting support in line with management recommendations — and management, in turn, can agree to respond to what these investors demand — increases in compensation duration.

I estimate the following regression to test whether CEO compensation duration increases more when passive institutions vote more in favor of management in board of director elections. With the caveat that behind-the-scenes engagement is unobservable, the provided evidence is suggestive.

$$\begin{aligned}(\Delta)Duration_{i,t+1} = \alpha_t + \beta_1 R2000Movers_{i,t} + \beta_2 (Non)Passive\_above\_med_{i,t} + \\ \beta_3((Non)Passive\_above\_med_{i,t} \times R2000Movers_{i,t}) + \\ \gamma Banding\_controls_{i,t} + \lambda_c + \epsilon_{i,t}\end{aligned} \tag{2.5}$$

The above analysis is estimated at the firm level. For example, Apple Inc. had eight nominees up for a vote in the uncontested board of director elections during the annual meeting held on February 25, 2009. First, for each of the eight nominees, I calculate the fraction of passive funds voting in line with the management's recommendation among all passive funds casting a vote in the director election. Then, I average the fraction of pro-management voting by passive funds for the eight nominees to obtain the firm-level passive institutions' voting support in director elections. Additionally, I calculate similar average pro-management voting support by non-passive funds at the same director election in the same meeting date for a comparison.[28]

The sample firms include 500 firms around the Russell 2000 index threshold with annual meetings held from September of year $t$ to June of year $t+1$. $PassiveVotingAboveMedian$ is an indicator variable that takes a value of one if the average fraction of passive funds cast-

[28]The reason I calculate the fraction of passive institutions that cast votes in line with the management's recommendation is because the actual number of each vote cast by passive funds is difficult to measure.

ing supporting votes in director elections is above the sample median and 0 otherwise. $Non-PassiveVotingAboveMedian$ is an indicator variable that takes a value of one if the average fraction of non-passive funds casting supporting votes in director elections is above the sample median and 0 otherwise. I interact each of the two indicator variables with the Russell 2000 index movers (R2000Movers) to estimate the effect of passive or non-passive institutions' high voting support, in addition to the effect of passive ownership increases, on compensation duration.

Table 8 reports the results. The dependent variable in columns (1) and (2) is the percentage change in CEO compensation duration measured from fiscal year $t$ to $t+1$. The coefficient on the interaction, $R2000Movers \times PassiveVotingAboveMedian$, shows that Russell 2000 index movers with high supporting votes in director elections increase compensation duration by 67.2% point more than Russell 2000 index movers with fewer supporting votes from passive institutions. In columns (3) and (4), I examine the duration in levels. In particular, firms that move to the top of the Russell 2000 index with high supporting votes from passive institutions in uncontested board of director elections show 0.43 years longer CEO compensation duration than Russell 2000 index movers with less voting support from passive institutions.[29]

In contrast, non-passive institutions' voting support does not affect changes in compensation duration. Columns (2) and (4) in Table 8 show that there is no significant effect on CEO compensation duration changes when Russell 2000 movers receive above-median supporting votes from non-passive institutions. I provide two potential reasons why I find an insignificant effect of non-passive institutions' voting support on compensation duration. First, non-passive institutions exhibit shorter-term investment horizons than passive institutions. If behind-the-scenes engagement is at work with institutions' voting power, non-passive institutions might not use it to increase CEO compensation duration. Second, non-passive institutions are more heterogeneous with respect to their preferences, investment styles, and incentives. These institutions might not act in concert to

[29]When I define high passive vote support above the 75th percentile of voting support, I find marginal significance with positive signs (see Table A12 in the Appendix). Overall voting support measured at the firm level without separating voting support between passive and non-passive institutions does not affect changes in CEO compensation durations. Therefore, overall high voting support from mutual funds is not correlated with CEO compensation durations but only high voting support from passive institutions is correlated.

Table 2.8: Passive (non-passive) funds voting support in uncontested board of director elections and CEO compensation duration

The table reports the effect of voting support of mutual funds (passive and non-passive funds) in uncontested director elections and its relation to CEO compensation duration for Russell 2000 index switchers. The dependent variable for columns (1) and (2) is CEO compensation duration measured as of the next fiscal year ($t+1$) of the index reconstitution year. For columns (3) and (4), the dependent variable is the percentage change in duration from the fiscal year $t$ to fiscal year $t+1$. For columns (5) and (6), the dependent variable is the simple change in duration from fiscal year $t$ to fiscal year $t+1$. **R2000Movers** is an indicator which takes value of one if a firm switches to Russell 2000 index in year $t$. **Passive_above_med** is an indicator variable which takes value of one if a firm receives above median average supporting votes from passive funds in uncontested board of director elections put to vote in the annual meeting held after the index reconstitution (meetings held from September in year $t$ to June, year $t+1$). **Non-Passive_above_med** is an indicator variable which takes value of one if a firm receives above median supporting votes from non-passive funds in uncontested board of director elections put to vote in the annual meeting held after the index reconstitution. **Prev_1yr_ret** is the previous year's cumulative return to control for past performance. Passive funds and non-passive funds are categorized using fund names as explained in the text (section 2.1.2). In all specifications, **banding controls** are included which makes the index assignment conditionally random. The **firm controls** are ROA, R&D-to-asset, market-to-book, debt-to-asset, longterm_asset, sales_growth, sales_growth volatility, CAPEX to asset, EBIT to sales, and the average bid-ask spread which are known to affect duration (Gopalan et al. (2014)). The detailed description on these control variables are available in Appendix A. The sample consists of 500 firms around the Russell 1000/2000 index threshold with annual meeting dates from June, 2007 to June, 2013. In all specification, industry fixed effects (Ind FE: SIC-3digit) and year fixed effects (Year FE) are included. The numbers in parentheses are $t$-statistics based on standard errors clustered by firm.

| | Δ Duration | | Duration | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| R2000Movers | 0.003 | 0.293 | 0.094 | 0.311* |
| | (0.020) | (1.522) | (0.607) | (1.920) |
| Passive Voting Above Median | 0.012 | | 0.065* | |
| | (0.452) | | (1.771) | |
| R2000Movers ×Passive Voting Above Median | 0.672** | | 0.425** | |
| | (2.267) | | (2.028) | |
| Non-Passive Voting Above Median | | 0.015 | | 0.119*** |
| | | (0.605) | | (3.331) |
| R2000Movers ×Non-Passive Voting Above Median | | -0.185 | | -0.133 |
| | | (-0.734) | | (-0.638) |
| Prev_1yr_ret | 0.027 | 0.019 | 0.039 | 0.041 |
| | (0.620) | (0.450) | (0.805) | (0.832) |
| Banding Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| Ind FE | Yes | Yes | Yes | Yes |
| N | 2333 | 2335 | 2810 | 2812 |
| $Adj.R^2$ | -0.012 | -0.017 | 0.173 | 0.175 |

affect CEOs' incentive horizons.

If passive institutions can communicate directly with management to demand changes in firm policies or executive compensation (e.g., lengthening the duration), their voting shares can serve as a bargaining tool at the negotiation table. What I document here is a positive correlation between CEO duration and passive institutions' voting support in director elections. With the caveat that behind-the-scenes engagement is inherently unobservable, the provided evidence can only be suggestive. Nevertheless, this result has further implications for other firm outcomes, shedding light on the behind-the-scenes voice channel utilized by institutional investors.

### 2.3.4 Are Passive Institutions Really Long-Term Investors?

Last, I directly test whether a passive ownership increase due to Russell index reconstitution leads to an increase in the firm's long-term shareholder base. Russell index reconstitution occurs every June and reshuffles the shareholder base as passive investors re-balance their portfolios. Because of the holdings change by passive institutions, shareholder composition also changes at the firm. If investor composition changes, the overall investment horizon of firms' shareholders should also change. Although passive institutions are relatively long-term investors, if short-term investors also increase holdings following the index reconstitution, the shareholder base may not end up becoming more long-term overall. In this section, I investigate investor horizon(turnover) changes before and after the index reconstitution to find evidence of whether a passive ownership increase leads to a longer investor horizon at the firm.

Using a two-stage least squares (2SLS) estimation, where passive ownership is instrumented by Russell 2000 index assignment, I show whether an increase in passive institutions decreases investor turnover in the quarters following index reconstitution. First, I instrument passive holdings changes using Russell 2000 index assignment in equation (2), and then, I estimate passive institutions' effects on investor turnover change in the second stage using equation (1). I use the investor turnover measure of Gaspar et al. (2005) to capture the investment horizons of the firm's institutional shareholders. A description of the measure is given in Appendix A. The results are reported in Table 9.

A one-standard-deviation increase in passive institution changes leads to a 0.64-standard-deviation decrease in investor turnover change, measured in September of year $t$ (Table 9, column (1)). This number translates into an increase in investor horizon of approximately 2.8 months when the passive ownership change increases by one standard deviation. The effect lasts until March of the year following the index reconstitution (March, $t + 1$). As time passes, the turnover change effect diminishes as the coefficient decreases for the subsequent quarters, December in year $t$ and March of the next year $t + 1$. Alternatively, long-term investors can be defined using the churn rate of each institution (Gaspar et al. (2005)). I define long-term investors as those with a below-median churn rate in the sample and find robust results. That is, Russell reconstitution induces an increase in long-term investor ownership of firms at the top of the Russell 2000 index, and these firms show an increase in CEO compensation duration. This result is available upon request.

In summary, the investor turnover analysis provides supporting evidence that the increase in passive ownership due to Russell index reconstitution decreases investor turnover in the following quarters. In other words, the result indicates that Russell index reconstitution significantly reshuffles the shareholder base, shifting it toward a more long-term shareholder base when the firm is at the top of Russell 2000 index. Based on this evidence, I conclude that passive institutions work to lengthen CEO pay duration to align managerial incentive horizons with the passive institution's long-term investment horizon.

## Table 2.9: Passive institutions and investor turnover

This table reports the second stage estimation result using the instrumented passive ownership to identify the effect of passive investors on the firm's investor turnover change measured in the subsequent quarters following the index reconstitution. The estimation is based on equation (1) in the text. The dependent variables are the changes in investor turnover in the subsequent quarters of the index reconstitution month (September $t$, December $t$, and March year $t+1$) relative to investor turnover measured as of the prior quarter of the index reconstitution (March, year $t$), respectively. The variable $\Delta\widehat{Passive}$ is the instrumented changes in passive holdings measured at the end of September, $t$ relative to the prior quarter of the index reconstitution. Definitions on other variables are available in Appendix A. Investor turnover and passive holdings (the shares outstanding owned by passive mutual funds at the end of September $t$) (changes) are all scaled by their sample standard deviations respectively. First and second order polynomial controls are added as controls and the previous year's cumulative return (Prev_1yr_ret) is added to control for the past performance. The sample consists of 500 firms around the Russell 1000/2000 threshold over 2007-2013 period. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | $\Delta$Investor Turnover | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| | Sept.$t$ | Dec.$t$ | March.$t+1$ |
| $\Delta\widehat{Passive}$ | -0.644*** | -0.589*** | -0.027*** |
| | (-3.338) | (-3.590) | (-3.024) |
| Prev_1yr_ret | -0.069* | -0.086*** | -0.006*** |
| | (-1.955) | (-2.733) | (-3.443) |
| log_mcap_june | -0.101 | -0.127*** | -0.004* |
| | (-1.526) | (-2.586) | (-1.755) |
| band | -0.029 | 0.012 | 0.002 |
| | (-0.629) | (0.300) | (0.910) |
| r2000_prev | -0.084 | -0.071 | -0.005** |
| | (-1.420) | (-1.592) | (-1.980) |
| band_prevr2000 | 0.089 | 0.043 | 0.002 |
| | (1.225) | (0.732) | (0.632) |
| log_may_mcap | -2.001 | -2.805** | -0.093* |
| | (-1.531) | (-2.543) | (-1.926) |
| log_may_mcap2 | 0.047 | 0.068*** | 0.002* |
| | (1.542) | (2.597) | (1.921) |
| post_1yr_ret | 0.247*** | 0.280*** | 0.014*** |
| | (5.660) | (6.950) | (6.534) |
| Constant | 24.030* | 32.540*** | 1.127** |
| | (1.720) | (2.754) | (2.160) |
| N | 6801 | 6696 | 6628 |
| $Adj.R^2$ | 0.081 | 0.352 | 0.291 |

# 3. WHAT DOES THE CORPORATE VALUE OF VOTE TELL US ABOUT FUTURE STOCK RETURNS?

## 3.1 Introduction and Literature Review

A common share of stock consists of two components–the right to future cash flows and the right to vote (Manne (1964)). Since stockholders can achieve control by accumulating shares in the open market, the observed stock price should include a vote component, as long as there is competition among the parties who are interested in control (Zingales (1995)). The existing asset pricing studies, however, largely ignore the role of the vote component of stock prices in understanding the sources of variation in stock returns.[1] This paper represents a first attempt to understand whether the vote component of stock prices contains information about future stock returns.

Two important factors make control valuable to investors: incompleteness of contracts and disagreements among investors (Aghion and Bolton (1992)). In the face of incomplete contracts, voting rights give investors the right to make all decisions that are not otherwise specified in the contract (Easterbrook and Fischel (1991)). [2] And when investors disagree, resolutions are found via the voting process. These factors would seem to make voting rights particularly valuable in the presence of a control contest. Consistent with this, Zingales (1995) and Cox and Roden (2002) argue that the value of voting rights depends in part on the probability of a control contest. Furthermore, Zingales (1995) and Kalay et al. (2014) show that the value of voting rights indeed increase before control events.[3]

[1]On the one hand, following the tradition of Lucas Jr. (1978), simple asset pricing models assume endowment economies in which cash flows are exogenously given (i.e., shareholders take the payout process as given). On the other hand, production-based or investment-based models such as Cochrane (1991) or more broadly general equilibrium asset pricing models (e.g., Cox et al. (1985)) presume that shareholders make both investment and payout decisions without a need for a resolution mechanism in case of a potential disagreement among shareholders. As noted by Easterbrook and Fischel (1991), the right to make all the decisions that are not otherwise specified by contract includes the right to delegate them which is what is typically observed in public corporations due to high costs of coordination among shareholders.

[2]As noted by Easterbrook and Fischel (1991), the right to make all the decisions that are not otherwise specified by contract includes the right to delegate them which is what is typically observed in public corporations due to high costs of coordination among shareholders.

[3]Kalay et al. (2014) document that the market value of shareholder voting rights increases prior to special shareholder meetings, periods of hedge fund activism, and M&As. Zingales (1995) documents that an exogenous break-

Given the uncertain outcomes of future control events, investors who are interested in control may be willing to pay higher prices to accumulate stocks–and the voting rights that go with them–when the probability of control events are high.[4] At these times, dispersed shareholders free ride in selling their voting shares to the parties seeking control, leading to a (partial) transfer of private benefits of control from control contestants to dispersed shareholders (Grossman and Hart (1988) and Burkart et al. (2000)).[5] Once the outcome of the control event is revealed and uncertainty is resolved, however, the voting rights are no longer as valuable. A disproportionately higher control-related demand for stocks with higher likelihood of a control event (i.e., stocks with higher value of voting rights) results in upward price pressure for such stocks and therefore decreases future stock returns.

To test our hypothesis, we use two measures of the value of voting rights. For our main analyses, we estimate the value of voting rights from option prices following the methodology developed by Kalay et al. (2014). We define value-of-vote as the price difference between the underlying stock and the synthetic non-voting stock using put-call parity relation. The important insight of the method is that synthetic stocks reflect the cash flows–but not the voting rights–of the underlying stocks. An important advantage of this measure is that it enables us to estimate the value of voting rights for any firm, at any time, as long as there are liquid publicly traded options on the underlying stocks. As a robustness check, we also use an alternative measure of the value of voting rights based on the price difference between the two classes of stocks in firms with dual-class structure.

Our main finding is that firms with higher value-of-vote earn lower returns, even after controlling for size, book-to-market, momentum, profitability, investment, and other known predictors of stock returns (such as idiosyncratic volatility, analysts' forecast dispersion, liquidity, earnings surprises, and short-term reversal). The economic magnitude of this effect is large. Our results

down of the controlling blocks (for example due to sudden death of the largest blockholder) leads to a significant increase in value of voting rights.

[4]Extreme examples of such situations include substantial premiums paid in block trades (see, e.g., Barclay and Holderness (1989)), and significant higher likelihood of exercising a call option out of the money by executives prior to proxy contests (Fos and Jiang (2015)).

[5]Private benefits of control are benefits that management or controlling shareholders obtain by keeping control of the firm, and include the ability to run the firm more efficiently compared to other control contestants.

indicate that the difference in the estimated alphas between the lowest and the highest value-of-vote quintiles is about 80 basis points per month (an annualized return of about 10 percent). This difference is highly statistically significant and is remarkably robust to a variety of empirical specifications. Moreover, while our results are strongest for the one-month horizon, we find that significant return predictability of value-of-vote persists for up to twelve months. This suggests that our findings are unlikely to result from short-lived micro structure differences in stock and options markets.

Prior studies attribute apparent deviations from options put-call parity to the trading activities of informed investors as well as the presence of short-sale constraints on the underlying stocks. If informed investors choose to trade in the option market before the stock market, option prices will deviate away from put-call parity and in the direction that is dictated by the informed investors' private information (Easley et al. (1998)). As a result, the option prices carry information that is predictive of future stock price changes (Cremers and Weinbaum (2010) and An et al. (2014)). We perform extensive subsample and robustness analyses and find that our results cannot be explained by models of informed trading, or by liquidity-related issues in the option and stock markets.[6] Relatedly, Ofek et al. (2004) show that the presence of short-sale constraint can result in deviations from put-call parity, whereas Battalio and Schultz (2006) provide evidence that short-sale constraints have little impact on such deviations. Using short interest as a measure of the demand for short-sale in the market and equity lending fees and as a measure of short-sale costs, we find that our results are robust to controlling for short-sale constraints as well as equity lending fees. Taken together, these results suggest that the value of voting rights contains information about future stock returns that is distinct from the effects of informed trading, potential liquidity differences in the option and stock markets or short-sale constraints.

As an additional robustness test, we repeat our analysis for a subsample of dual-class firms using an alternative measure of the value of voting rights. Following Zingales (1995), we define

[6] It is worth noting that it is inherently difficult to fully disentangle the effect of informed trading from that of value of voting rights on future stock prices. This is because informed trading can happen before control events precisely to accumulate voting rights to capture control (Cao et al. (2005), Brav and Mathews (2010)).

*voting premium* as the price difference between the superior and inferior voting stocks normalized by their respective voting power. Consistent with our main findings, we find that firms with higher *voting premium* have lower future returns for superior voting stocks.[7] This further alleviates the concern that our results are somehow driven by informed traders' preferences for the option versus stock markets.

Moreover, our cross-sectional analyses using Fama-Macbeth (Fama and Macbeth (1973)) regressions show value-of-vote to be a strong predictor of future stock returns. Specifically, we find that moving from the first quintile to the fifth quintile of value-of-vote decreases the expected return by 0.84% per month. Given that we control for an extensive list of firm characteristics, these results corroborate our argument that the value of voting rights contains independent information about future stock returns.

There are several reasons why (some) investors may be willing to pay higher prices when control becomes more important. Grossman and Hart (1988) argue that investors are willing to pay a premium in order to capture control as long as the controlling party enjoys private benefits, which could include the ability to run the firm more efficiently. Voting rights are especially valuable if investors feel the need to wield disciplinary pressure to improve managerial efficiency (see, e.g., Manne (1964), and Cox and Roden (2002)). If investors are willing to pay a higher price to capture control in firms with more managerial inefficiencies (and thus more room for improvement), we should observe improved long-term operating performance in firms with higher value-of-vote.[8] Consistent with this conjecture, we find that firms in the highest value-of-vote quintile portfolio significantly improve their operating performance and profitability in two- and three-year horizons, compared with firms in the lowest value-of-vote quintile. This is consistent with the literature showing control contests, on average, lead to improved firm performance and benefit shareholders

[7]Our option-based measure of the value of voting rights can be interpreted as synthesizing an inferior voting class of stocks with no voting rights (Kalay et al. (2014)). Hence, the common shares in firms with a single class of stocks are equivalent to the superior voting shares in firms with dual-class structure.

[8]Since current stock prices reflect any market expectation of future improved management, ceteris paribus, the expected return for firms with higher expected improvement in managerial efficiency will be lower than the expected return for otherwise identical firms whose current stock prices are depressed due to managerial inefficiencies but whose prospects for improvement are slim. The expected improvement in managerial efficiency is reflected in the value of voting rights.

(see, e.g., Barclay and Holderness (1989)).

Our paper contributes to a recent literature on the asset pricing implications of corporate control and private benefits of control. Albuquerque and Schroth (2010) estimate private benefits of control using a structural model of block trades by Burkart et al. (2000). Albuquerque and Schroth (2015) develop a model of block trades that quantifies the illiquidity discount of controlling blocks for both blockholders and dispersed shareholders. We provide strong empirical evidence showing that the market value of voting rights can help explain the cross-section of stock returns. To the best of our knowledge, this is the first paper that establishes this link.

Our findings are also closely related to a literature documenting the effect of corporate governance on firm value and stock market performance (see, e.g., Gompers et al. (2003), Bebchuk et al. (2008), Cremers and Nair (2005), and Cremers et al. (2009)). Prior literature documents that the value of voting rights is higher in poorly governed companies because there is more room to improve managerial efficiency (see, e.g., Masulis et al. (2009), Karakas and Mohseni (2018)). At the same time, firms with poor governance practices tend to earn significantly lower returns (Gompers et al. (2003), Bebchuk et al. (2008)). Our paper directly examines the link between the value of voting rights and stock returns.

Finally, our paper joins a more recent literature documenting that option prices contain information about future stock returns, which is largely attributed to informed trading (see, e.g., Cao et al. (2005), Bali and Hovakimian (2009), Cremers and Weinbaum (2010), Xing et al. (2010), Johnson and So (2012), and An et al. (2014)). However, by performing subsample analysis and controlling for an extensive list of firm, stock market, and option market characteristics, our evidence suggests that the value of voting rights contains information about future stock returns that is distinct from the effects of informed trading or liquidity in the option and stock markets.

The remainder of the paper proceeds as follows. Section 2 describes data, sample construction, and our methodology for measuring the value of voting rights. Section 3 shows the main results of our empirical analyses. Section 4 provides additional robustness checks. We conclude in Section 5.

## 3.2 Data and Methodology

This section describes our data sources and the methodology used to construct two measures of the value of voting rights, and also presents summary statistics of our sample.

### 3.2.1 Data and Sample Selection

Our sample includes stocks of all public US firms in the intersection of the OptionMetrics and CRSP monthly returns file between January 1996 and September 2015.[9] Some of our tests require data from other sources to control for various firm, ownership, and governance characteristics. We use Compustat for data on firm characteristics; I/B/E/S (Institutional Brokers' Estimate System) for data on analysts' earnings forecasts; Thomson Reuters (S34) for data on institutional holdings (13F filings); Securities Finance database from IHS Markit for data on equity lending fees; and Institutional Shareholder Services (ISS) (formerly Riskmetrics) and GMI for data on corporate governance. We also identify firms with a control event if the firm is the target of a merger, is subject to 13-D filings, or experiences a proxy contest or special shareholder meeting within a month of our portfolio formation period. We obtain this information from SDC, SEC Analytics Suite from WRDS, and ISS Voting Analytics. In addition, we hand-collect data on the relative voting power of different classes of stocks in dual-class firms by reading their proxy statements. Proxy statements for firms were relatively rare on EDGAR prior to 1994, so our sample of dual-class firms starts in 1994 and ends in 2016.[10]

### 3.2.2 Measuring the Value of Voting Rights

We construct our main measure of the value of voting rights (value-of-vote) following the method developed in Kalay et al. (2014). The main insight of the method is that one can use options to synthesize cash flows of an underlying stock, but the synthetic stock will not reflect the voting rights in the underlying stock. The measure captures the value of voting rights by subtracting the

[9] OptionMetrics data starts in January 1996.

[10] We thank Andrew Metrick for providing the data from Gompers et al. (2010) which spans 1992âĂŞ2002. To expand this sample, we identify dual-class firms using data sources such as GMI and ISS, manually verify the accuracy of the data, and collect data on the relative voting power of different classes of stocks from firms' proxy statements.

price of a synthetic non-voting stock, denoted as S ÌĆ, from that of the underlying stock, denoted as S. To make the measure comparable across firms and over time, we normalize it by the price of the underlying stock (see equation 2 below). S ÌĆ is calculated using options put-call parity for an option pair with the same strike price X and maturity T, and is adjusted for the early exercise premiums of American options (EEP) and for dividends paid before options mature, denoted by DIV (See equation 1 below):

$$\hat{S} = C - P + PV(X) + adjustmentsforEEPandDIV \tag{3.1}$$

$$Value\breve{~}of\breve{~}Vote = \frac{S - \hat{S}}{S} \tag{3.2}$$

where C and P are the prices of the American call and put options, respectively; X is their common strike; T is their time to maturity; and PV(X) is the present value of a risk-free bond with face value X that matures at time T.[11] An important advantage of this methodology is that it lets us estimate the value of voting rights for any firm, at any time, as long as there are publicly traded options on the underlying stocks.

As a robustness check, we use an alternative measure of the value of voting rights based on the price difference between the two classes of stocks in firms with dual-class structure (adjusted for their relative voting power). Following Zingales (1995), we define the value of voting rights in dual class firms as:

$$VotingPreimum = \frac{P_s - P_i}{P_i - rP_s} \tag{3.3}$$

where $P_s$ and $P_i$ are the prices of superior and inferior voting stocks, respectively, and r is the ratio of the number of votes of an inferior voting share to the number of votes of a superior voting share. This method is commonly used to compute value of voting rights in the literature (e.g., Lease et al. (1983), Levy (1983), DeAngelo and DeAngelo (1985), Zingales (1994), Zingales (1995),

[11]In our calculations of value-of-vote, we use the most liquid option pair for each firm in each day, defined as the option pair with the highest volume (maximum of minimum volume of call and put), closest at the money, and shortest maturity. This procedure helps minimize the impact of non-control related frictions such as liquidity or nonsynchronous trading in the option and stock markets on our measure.

Smith and Amoako-adu (1995), Rydqvist (1996), Cox and Roden (2002), Nenova (2003), Hauser and Lauterbach (2004), Masulis et al. (2009)),[12] but is applicable to only about 6% of US public firms that have dual-class structure. This alternative method is conceptually similar to our option-based methodology. In the option-based methodology, we essentially synthesize an inferior voting class–in this case, one with no voting rights–as we construct value-of-vote.[13]

### 3.2.3 Summary Statistics

In this subsection, we describe the summary statistics of the sample used in our analyses. Table 1 Panel A reports the average value-of-vote and number of firms in our sample by the calendar year. The number of firms with publicly traded options in our sample more than doubles, going from 1053 in 1996 to 2164 in 2015. The average value-of-vote in our sample is around 0.10% of the stock price. The annual average value-of-vote varies over time and peaks in the 2008-2009 period.

Panel B of Table 1 presents the summary statistics of value-of-vote and other firm characteristics for the five quintile portfolios sorted based on value-of-vote. To construct quintile portfolios, we sort stocks at the beginning of each month, based on the median value-of-vote during the prior month. We rebalance our quintile portfolios every month. Average value-of-vote is negative for quintile 1 but positive for quintiles 2, 3, 4, and 5. It is important to emphasize that despite value-of-vote taking negative values in some observations, the average value-of-vote in our sample is positive. Negative value-of-vote, when it occurs, could be due to noise, estimation errors, or information leaking into the option market before the stock market.[14] Kalay et al. (2014) show that

[12]For empirical and theoretical surveys of the literature on the separation of voting rights from cash flow rights, see Adams and Ferreira (2008) and Burkart and Lee (2008), respectively.

[13]Another method for measuring the value of voting rights takes the difference between the share price in a block trade and the prevailing market price right after the sale of the block (e.g., Barclay and Holderness (1989) and Dyck and Zingales (2004)). The limitation of this methodology is that block trades are not frequently observed. Other studies have used the equity lending market to infer the value of voting rights. The main idea is that one can separate voting rights from cash flow rights by borrowing shares of stocks to vote without an equivalent economic interest, commonly known as empty voting.Christoffersen et al. (2007) study the market for votes within the U.S. equity loan market and find that the average vote sells for zero. However, using an expanded sample, Aggarwal et al. (2015) find the average value of vote to be positive.

[14]Other methods of estimating the value of voting rights also yield negative values. Barclay and Holderness (1989) find a block premium of up to 20% for the US firms but also find negative values for some firms. Applying a similar methodology to the international data, Dyck and Zingales (2004) find a premium of around 14% with variations ranging from -4% to 65% across countries. Albuquerque and Schroth (2015) argue that, depending on the costs

## Table 3.1: Descriptive statistics of Value of Vote quintile portfolios

This table presents summary statistics for the sample of all public US firms in the intersection of the OptionMetrics and CRSP monthly returns files between January 1996 and September 2015. Panel A provides the average of monthly median Value-of-Vote and the average number of stocks per month for each year in our sample. Panel B reports summary statistics of firm characteristics for portfolios sorted into quintiles based on Value-of-Vote.

Panel A. Univariate Analysis

| Year | Value of Vote | Average Number of stocks |
|---|---|---|
| 1996 | 0.10% | 1053 |
| 1997 | 0.08% | 1311 |
| 1998 | 0.05% | 1469 |
| 1999 | 0.05% | 1562 |
| 2000 | 0.09% | 1436 |
| 2001 | 0.14% | 1335 |
| 2002 | 0.12% | 1373 |
| 2003 | 0.07% | 1358 |
| 2004 | 0.08% | 1446 |
| 2005 | 0.12% | 1568 |
| 2006 | 0.11% | 1643 |
| 2007 | 0.12% | 1766 |
| 2008 | 0.22% | 1782 |
| 2009 | 0.21% | 1754 |
| 2010 | 0.11% | 1862 |
| 2011 | 0.16% | 1891 |
| 2012 | 0.19% | 1876 |
| 2013 | 0.15% | 2067 |
| 2014 | 0.09% | 2210 |
| 2015 | 0.10% | 2164 |

Panel B. Firm characteristics for each Value of Vote quintile portfolios

| | Value of Vote Portfolio | | | | |
|---|---|---|---|---|---|
| | (1 - Low Vote) | (2) | (3) | (4) | (5 - High Vote) |
| *Main Characteristics* | | | | | |
| Value of Vote | -0.388% | 0.010% | 0.062% | 0.150% | 0.740% |
| Size ($ million) | $3,677.10 | $11,792.13 | $11,422.00 | $4,701.85 | $1,397.12 |
| BTM | 0.651 | 0.477 | 0.466 | 0.506 | 0.660 |
| ILLIQ | 0.035 | 0.008 | 0.007 | 0.012 | 0.044 |
| IVOL | 0.025 | 0.019 | 0.019 | 0.021 | 0.026 |
| DISP | 1.885 | 1.236 | 0.849 | 1.565 | 2.426 |
| Age | 18.820 | 24.263 | 24.790 | 21.776 | 17.390 |
| Market Beta | 1.402 | 1.240 | 1.231 | 1.280 | 1.375 |
| Leverage | 0.182 | 0.201 | 0.208 | 0.202 | 0.190 |
| Prior 11-month return | 8.96% | 21.27% | 23.77% | 3.22% | 14.10% |
| *Institutional Ownership Characteristics* | | | | | |
| Io Holding | 0.633 | 0.707 | 0.712 | 0.697 | 0.608 |
| IO HHI | 0.073 | 0.052 | 0.051 | 0.058 | 0.082 |
| Dedicated | 0.077 | 0.073 | 0.075 | 0.081 | 0.088 |
| Quasi-Index | 0.389 | 0.442 | 0.446 | 0.429 | 0.361 |
| Transient | 0.172 | 0.186 | 0.187 | 0.189 | 0.170 |
| Insider Own | 0.040 | 0.031 | 0.030 | 0.036 | 0.046 |
| *Governance Characteristics* | | | | | |
| G-Index | 6.137 | 6.065 | 6.072 | 6.146 | 6.133 |
| Control Event Probability | 0.047 | 0.031 | 0.031 | 0.038 | 0.061 |

these frictions do not drive the changes in value-of-vote around important control events. Moreover, our entire analyses are robust to dropping observations with negative value-of-vote.[15]

Panel B of Table 1 also shows that firms with the highest value-of-vote are smaller in size and have more dedicated institutional investors, a higher concentration of institutional investors, and higher insider ownership.[16] In addition, changes in total institutional ownership monotonically increase as we move from the portfolio with the lowest to the portfolio with the highest value-of-vote, which indicates that institutional investors accumulate more shares in the firms with the highest value-of-vote in the year prior to forming portfolios. Further, firms with a higher value-of-vote tend to show more disagreement among investors (as measured using dispersion in analysts' forecasts) and to experience more control events in the immediate time periods. As we move from the lowest to the highest value-of-vote portfolios, institutional ownership by long-term investors (dedicated), insider ownership, and governance measures (modified G-Index) all generally increase.[17] These observed patterns are broadly consistent with prior literature documenting that the value of voting rights is related to the likelihood of control events and the potential (private) benefits of control (Zingales (1995), Karakas and Mohseni (2018)).

### 3.3 Empirical Analysis

In this section, we discuss the results of our empirical analysis of the links between value-of-vote and future stock returns.

#### 3.3.1 Stock Returns and Portfolios Sorted by Value-of-Vote

Upon formation of quantile portfolios based on value-of-vote, we calculate equal-weighted (EW) and value-weighted (VW) portfolio returns. Table 2 presents monthly returns on portfolios sorted based on value-of-vote. The average monthly returns and t-statistics for the quintile port-

associated with a controlling block of shares such as illiquidity, this premium can be negative as well. Using price difference in dual-class firms to measure the value of voting rights, Lease et al. (1983) also find negative vote values, which they attribute to "some incremental costs borne by the holders of the class of common stock with superior voting rights that are not borne by the [others]."Applying the same methodology to the country level data, Nenova (2003) finds that the average value of votes in Hong Kong is negative.

[15]Our results when dropping observations with negative value-of-vote from our sample are reported in Table 13.

[16]We use data from Bushee (2001)'s institutional investors classification(Bushee (2001)).

[17]These patterns become monotonic if we focus on observations with non-negative value-of-vote.

folios, as well as the difference between quintile 5 (highest value-of-vote) and quintile 1 (lowest value-of-vote), are reported in Panel A of Table 2. Firms in the lowest value-of-vote quintile portfolio earn an average EW return of 1.32% per month. Average EW return of quintile portfolios monotonically declines to 0.62% per month for firms in the highest value-of-vote quintile portfolio. The spread between the two is -0.70% per month, which carries a statistically significant t-statistics of -4.97. The spread between the VW average return of highest and lowest value-of-vote quintile portfolios is -0.41% per month, with a t-statistics of -1.81.

The last column of Panel A Table 2 presents characteristics-adjusted returns of value-of-vote quintile portfolios. We use the method employed in Daniel, Grinblatt, Titman, and Wermers (1997) to adjust individual stock returns for size, book-to-market, and momentum (Daniel et al. (1997)). Each month we sort all firms in our sample into size quintiles (using NYSE breakpoint); then, within each size quintile, we further sort firms into book-to-market quintiles. Within each of these 25 portfolios, we further sort the firms into quintiles based on stock return in the prior 12 months, skipping the most recent month. We average the stock returns within each of these 125 portfolios to form a benchmark, which we then subtract from the corresponding individual raw stock returns. The expected value of this excess return would be zero if size, book-to-market, and past returns completely described the cross section of expected returns. Even after adjusting for these characteristics, we find a significant spread in average returns between value-of-vote quantile portfolios. The average adjusted return is positive and statistically significant for the lowest value-of-vote quantile portfolio and monotonically decreases to negative and statistically significant for the highest value-of-vote quantile portfolio. The characteristic adjusted return spread for value-of-vote quintile portfolios is -0.66% with a t-statistics of -5.39. This suggests that the return premium associated with value-of-vote is independent of the return premiums associated with size, book-to-market, and momentum.

It is plausible that control contestability decreases as firm size increases, and that value-of-vote decreases as a result. In order to examine whether firm size affects the value-of-vote return spread, we use dependent sorting based on market capitalization and value-of-vote. In panel B of Table

## Table 3.2: Value-of-Vote portfolio returns

This table reports the average returns of portfolios sorted by Value-of-Vote. At the beginning of each month, stocks are sorted into five quintile portfolios based on the median Value-of-Vote during the prior month. In Panel A, equal-weighted (EW), value-weighted (VW) and characteristics matched benchmark-adjusted returns are reported. The characteristics-adjusted returns are calculated following Daniel, Grinblatt, Titman and Wermers (DGTW, Daniel et al. (1997)). Stocks are matched to portfolios of benchmark firms that are similar in size, book-to-market and momentum characteristics. 125 portfolios formed from the intersection of five portfolios sorted based on size, five portfolios sorted based on book-to-market and five portfolios sorted based on momentum. Benchmark-adjusted returns are computed as the monthly Value-of-Vote portfolio returns in excess of the benchmarked returns of the portfolio to which a stock belongs. In Panel B, stocks are first sorted into five size groups. Within each size group stocks are then sorted into five quintiles based on Value-of-Vote. Average equal-weighted returns are reported within each sub-group. In Panel C, stocks are first sorted into five groups based on Value-of-Vote. Within each group stocks are then sorted into five groups based on size. Average equal-weighted returns are reported within each sub-group. The sample period is from February 1996 to September 2015. Numbers reported in parentheses are t-statistics.

Panel A. Average and benchmark-adjusted returns for Value-of-Vote quintile portfolio

| Value of Vote Portfolio | EW | t-statistics | VW | t-statistics | Characteristics-adjusted | t-statistics |
|---|---|---|---|---|---|---|
| 1 (Low) | 1.32% | (2.76) | 1.05% | (2.84) | 0.40% | (3.86) |
| 2 | 1.10% | (2.91) | 0.87% | (2.78) | 0.26% | (3.59) |
| 3 | 0.95% | (2.57) | 0.82% | (2.76) | 0.11% | (1.69) |
| 4 | 0.91% | (2.28) | 0.79% | (2.41) | 0.01% | (0.12) |
| 5 | 0.62% | (1.34) | 0.65% | (1.72) | -0.25% | (-3.29) |
| V5 - V1 (Vote HML) | -0.70% | (-4.97) | -0.41% | (-1.81) | -0.66% | (-5.39) |

Panel B. Mean returns (EW) for double sort portfolios based on size and Value-of-Vote

| Value of Vote \ Size | 1 (Small) | 2 | 3 | 4 | 5 (Large) | Mean |
|---|---|---|---|---|---|---|
| 1 (Low) | 1.41% | 1.39% | 1.32% | 1.09% | 1.02% | 1.25% |
| 2 | 1.31% | 1.367% | 1.10% | 1.16% | 1.04% | 1.20% |
| 3 | 1.16% | 1.06% | 0.967% | 0.83% | 0.80% | 0.96% |
| 4 | 1.12% | 1.14% | 0.98% | 0.97% | 0.84% | 1.01% |
| 5 (High) | 0.44% | 0.52% | 0.71% | 0.70% | 0.81% | 0.64% |
| V5 - V1 | -0.97% | -0.87% | -0.61% | -0.38% | -0.21% | -0.61% |
| (Vote HML) | (-3.07) | (-4.45) | (-3.42) | (-2.22) | (-1.32) | (-4.91) |

Panel C. Mean returns (EW) for double sort portfolios based on Value-of-Vote and size

| Size \ Value of Vote | 1 (Low) | 2 | 3 | 4 | 5 (High) | Mean |
|---|---|---|---|---|---|---|
| 1 (Small) | 1.44% | 1.25% | 1.27% | 0.945% | 0.70% | 1.12% |
| 2 | 1.34% | 1.35% | 0.88% | 0.95% | 0.36% | 0.98% |
| 3 | 1.35% | 0.96% | 0.89% | 0.98% | 0.63% | 0.96% |
| 4 | 1.29% | 1.06% | 0.91% | 0.86% | 0.70% | 0.96% |
| 5 (Big) | 1.18% | 0.88% | 0.81% | 0.85% | 0.69% | 0.88% |
| S5 - S5 | 0.26% | 0.37% | 0.47% | 0.09% | 0.01% | 0.24% |
| (SMB) | (0.56) | (1.04) | (1.50) | (0.28) | (0.03) | (0.71) |

2, we first sort stocks based on market capitalization. Within each size quintile, we further sort stocks based on median value-of-vote during the prior month. For any given size quintile, we take the average spread between quintile 5 and 1 of value-of-vote portfolios. The average return spread is statistically significant across all size groups except the largest (size group 5). This is consistent with the notion that very large firms are less likely to be the subject of a control contest. In Panel C of Table 2, we first sort stocks based on value-of-vote, then, within each value-of-vote quintile, we further sort stocks based on their market capitalization. Within each value-of-vote quintile, the average monthly return spread between the smallest and largest firms (SMB) is statistically insignificant in every value-of-vote quintile. The results in Panels B and C of Table 2 suggest that the size effect cannot explain the return spread in value-of-vote portfolios, but the differences in value-of-vote can account for the size effect.

#### 3.3.2 Adjusting for Known Pricing Factors

In this section we adjust for common risk and pricing factors to examine whether value-of-vote contains independent information about future stock returns. Table 3 presents monthly excess returns using three commonly used asset pricing models. Panel A of Table 3 presents the monthly estimated alphas using Fama-French (1993) three-factor model (FF3 hereafter) for the quantile portfolios as well as the alpha difference between quintile 5 and quintile 1 (Fama and French (1993)). The FF3 alpha difference between quintile 5 and 1 is -0.77% with a t-statistics of -5.60.

In Panel B of Table 3, we add a momentum factor-mimicking portfolio to the Fama-French factors, as in Carhart (1997), to estimate a four-factor model (FF4 hereafter). The FF4 alpha difference between quintile 5 and quintile 1 is -0.80% with a t-statistics of -5.73. Panel C of Table 3 uses Fama-French five factor model (FF5 hereafter) as in Fama and French (2015), which includes profitability and investment factors in addition to the FF3 factors. The FF5 alpha difference between quintile 5 and quintile 1 is -0.78% with a t-statistics of -5.41. The average return differences between the highest and lowest value-of-vote quintile portfolios are very similar across different asset pricing models, and are larger than the differences in raw returns (reported in Table 2).

## Table 3.3: Risk adjusted Value-of-Vote portfolio returns

This table presents risk-adjusted returns (alpha) on Value-of-Vote quintiles portfolios using Fama-French three-, four- and five-factor models. The Value-of-Vote quintile portfolios are formed as in Table 2. The dependent variable is the monthly equal-weighted Value-of-Vote portfolio returns in excess of the one-month Treasury bill rate. Panel A reports alphas and factor loadings using the Fama-French three factor model (FF3), which includes the market excess returns (MKTRF), the size factor (SMB) and the book-to-market factor (HML). Panel B reports alphas and factor loadings using Fama-French four-factor model (FF4), which is the FF3 model (MKTRF, SMB, HML) plus a momentum factor (UMD), often referred to as the Carhart (1997) model. Panel C reports alphas and factor loadings using Fama-French five-factor (FF5) which is the FF3 factors plus a profitability factor (RMW) and an investment factor (CMA). Numbers reported in parentheses are t-statistics.

Panel A. Value-of-Vote quintiles and FF3 model

| Value of Vote Portfolios | alpha (%) | MKTRF | SMB | HML | Adj. R-sqr |
|---|---|---|---|---|---|
| 1 (Low) | 0.26% | 1.29 | 0.67 | 0.09 | 86.05% |
| | (1.42) | (31.15) | (11.98) | (1.59) | |
| 2 | 0.19% | 1.12 | 0.45 | 0.07 | 94.74% |
| | (2.07) | (55.40) | (16.43) | (2.34) | |
| 3 | 0.04% | 1.12 | 0.41 | 0.10 | 96.00% |
| | (0.48) | (64.97) | (17.56) | (3.91) | |
| 4 | -0.07% | 1.16 | 0.60 | 0.15 | 95.22% |
| | (-0.79) | (56.53) | (21.55) | (5.09) | |
| 5 (High) | -0.51% | 1.27 | 0.77 | 0.31 | 91.05% |
| | (-3.59) | (39.69) | (17.80) | (6.87) | |
| V5 - V1 | -0.77% | -0.02 | 0.10 | 0.22 | 9.46% |
| (Vote HML) | (-5.60) | (-0.66) | (2.36) | (4.96) | |

Panel B. Value-of-Vote quintiles and FF4 model

| Value of Vote Portfolios | alpha (%) | MKTRF | SMB | HML | UMD | Adj. R-sqr |
|---|---|---|---|---|---|---|
| 1 (Low) | 0.50% | 1.15 | 0.73 | -0.01 | -0.34 | 91.35% |
| | (3.41) | (33.03) | (16.40) | (-0.28) | (-11.80) | |
| 2 | 0.25% | 1.08 | 0.46 | 0.04 | -0.09 | 95.31% |
| | (2.91) | (53.20) | (17.88) | (1.41) | (-5.33) | |
| 3 | 0.090% | 1.08 | 0.42 | 0.07 | -0.08 | 96.46% |
| | (1.26) | (62.91) | (19.16) | (3.03) | (-5.52) | |
| 4 | 0.02% | 1.10 | 0.62 | 0.11 | -0.14 | 96.40% |
| | (0.29) | (58.14) | (25.63) | (4.10) | (-8.68) | |
| 5 (High) | -0.30% | 1.15 | 0.82 | 0.22 | -0.30 | 95.63% |
| | (-2.97) | (47.95) | (26.99) | (6.70) | (-15.41) | |
| V5 - V1 | -0.80% | -0.01 | 0.09 | 0.23 | 0.04 | 9.74% |
| (Vote HML) | (-5.73) | (-0.17) | (2.20) | (5.12) | (1.30) | |

Panel C. Value-of-Vote quintiles and FF5 model

| Value of Vote Portfolios | alpha (%) | MKTRF | SMB | HML | RMW | CMA | Adj. R-sqr |
|---|---|---|---|---|---|---|---|
| 1 (Low) | 0.38% | 1.23 | 0.69 | 0.18 | -0.13 | -0.33 | 86.77% |
| | (2.05) | (26.43) | (11.05) | (2.17) | (-1.44) | (-2.94) | |
| 2 | 0.17% | 1.12 | 0.50 | 0.03 | 0.08 | -0.13 | 95.15% |
| | (1.89) | (50.08) | (16.80) | (0.69) | (1.79) | (-2.45) | |
| 3 | 0.04% | 1.11 | 0.45 | 0.07 | 0.05 | -0.13 | 96.35% |
| | (0.48) | (58.79) | (17.84) | (2.07) | (1.41) | (-2.89) | |
| 4 | -0.04% | 1.14 | 0.61 | 0.11 | -0.04 | -0.11 | 95.61% |
| | (-0.40) | (50.41) | (20.34) | (2.82) | (-0.85) | (-2.05) | |
| 5 (High) | -0.40% | 1.22 | 0.76 | 0.32 | -0.16 | -0.18 | 91.53% |
| | (-2.77) | (34.00) | (15.91) | (5.09) | (-2.25) | (-2.08) | |
| V5 - V1 | -0.78% | -0.01 | 0.08 | 0.14 | -0.03 | 0.15 | 9.76% |
| (Vote HML) | (-5.41) | (-0.25) | (1.57) | (2.26) | (-0.38) | (1.73) | |

To ensure that what we capture by value-of-vote is distinct from other known pricing factors, we control for five additional anomaly factors that the literature has shown to affect stock returns: idiosyncratic volatility, analysts' forecast dispersion, illiquidity, earnings surprise, and lottery demand. Since control contests are a source of firm-specific risk, we want to make sure our results are robust to controlling for idiosyncratic volatility which captures general firm-specific risks. Analysts' forecast dispersion incorporates differences in opinions and heterogeneous beliefs about a firm among market participants. Since investor heterogeneities make corporate control rights more important (Aghion and Bolton (1992)), analysts' forecast dispersion may be related to the value of voting rights. Thus, we need to control for it. We control for illiquidity factor to mitigate the concern that liquidity-related issues have contaminated our main measure of the value of voting rights (see Section 3.4 for a more detailed discussion). Later in Section 4.1, we control for various other liquidity measures related to option and stock markets. We also control for earnings surprise factor since Gurun and KarakaÅ§ (2018) find that vote values are negatively associated with earnings surprises. Finally, given the existing evidence of speculative investors' high demand for lottery-like stocks (Kumar (2009), Bali et al. (2011), Doran et al. (2012), Han and Kumar (2013), Bali et al. (2017)), we examine whether there is a connection between value-of-vote and lottery-like features of optionable stocks. We check for this connection by including a lottery demand factor in our analysis. Although some of these factors are imperfect proxies, controlling for them helps to quantify the marginal contribution of value-of-vote to the cross-sectional stock return predictability.

We follow Ang et al. (2006) to calculate idiosyncratic volatility measured relative to the FF3 model; for each month, we regress daily stock returns on daily market returns (value-weighted return on all NYSE, AMEX, and NASDAQ stocks), size, and book-to-market factor returns to obtain the standard deviation of residuals of the month. We follow Diether et al. (2002) by defining analysts' forecast dispersion as the standard deviation of earnings forecasts divided by the absolute value of the average analyst's forecast. We use Amihud (2002)'s illiquidity measure, defined as the absolute return to dollar volume averaged over the prior six months. Following Livnat and

Mendenhall (2006), we define standardized unexpected earnings (SUE) as the difference between the actual earnings and the median of earnings forecasts normalized by stock price at the quarter end. Finally, we use MAX factor (FMAX), as constructed by Bali et al. (2017), to control for demand for lottery-like stocks. MAX is calculated as the average of the stock's five highest daily returns during a given month and MAX factor (FMAX) is constructed using the Fama and French (1993) factor-forming technique.[18] To construct these anomaly factors, we sort stocks into five quintiles based on each anomaly factor and get the return difference between high and low quintile portfolios.

The monthly estimated alphas for the quantile portfolios as well as the alpha difference between quintile 5 and quintile 1 using modified FF3, FF4, and FF5 models are reported in Panels A, B, and C of Table 4, respectively. In each panel, we modify the corresponding asset pricing model by individually adding each of the additional five anomaly factors to the model. The alpha difference between quintile 5 and quintile 1 is highly robust to the choice of the pricing factor included in the asset pricing model. This further shows that existing pricing factors do not account for the return premium associated with value-of-vote. [19]

### 3.3.3 Long-Term Predictability

Tables 3 and 4 show a robust value-of-vote return spread, but if this predictability is short-lived, then the results could be driven by market microstructure frictions that lead to mispricing for a short period of time. In this section, we therefore examine whether the out-of-sample predictability of value-of-vote persists over longer horizons.

To investigate the predictability of value-of-vote over the next twelve months, we construct portfolios with overlapping holding periods following Jegadeesh and Titman (1993). At the beginning of each month, we sort stocks based on the median value-of-vote during the prior month and

[18] We thank Turan Bali for kindly sharing this data with us. See Bali et al. (2017) for a detailed description of the dataset.

[19] In untabulated analysis, we also add all five additional anomaly factors to the common asset pricing models (as opposed to adding them one by one), and the results are very similar to those in Table 4. For example, when we add all five additional pricing factors to FF5, the alpha difference between quintile 5 and quintile 1 using this ten-factor model is -0.65% with a t-statistics of -4.51.

Table 3.4: Risk adjusted Value-of-Vote portfolio returns with additional risk factors

This table presents risk-adjusted returns (alpha) on Value-of-Vote quintiles portfolios using FF3, FF4 and FF5 models augmented by five additional anomaly factors. The dependent variable is the monthly equal-weighted Value-of-Vote portfolio returns in excess of the one-month Treasury bill rate. Panel A reports risk-adjusted returns for Value-of-Vote quintile portfolios, alpha, using the FF3 model ($\alpha_{FF3}$) plus the following anomaly factors: idiosyncratic volatility factor ($\alpha_{FF3+IVOL}$), dispersion factor ($\alpha_{FF3+DISP}$), illiquidity factor ($\alpha_{FF3+ILLIQ}$), earnings surprise factor ($\alpha_{FF3+SUE}$), and lottery demand factor ($\alpha_{FF3+FMAX}$) which are reported in columns 1 through 5, respectively. Panel B reports the risk-adjusted returns for Value-of-Vote quintile portfolios, using FF4 model ($\alpha_{FF4}$) plus additional anomaly factors explained above. Panel C reports the risk-adjusted return for Value-of-Vote quintile portfolios using FF5 model ($\alpha_{FF5}$) plus additional anomaly factors explained above. Numbers reported in parentheses are t-statistics.

Panel A. Risk-adjusted return using FF3 model plus additional anomaly factors

| Value of Vote Portfolios | $\alpha_{FF3+IVOL}$ | $\alpha_{FF3+DISP}$ | $\alpha_{FF3+ILLIQ}$ | $\alpha_{FF3+SUE}$ | $\alpha_{FF3+FMAX}$ |
|---|---|---|---|---|---|
| 1 (Low) | 0.43% | 0.41% | 0.27% | 0.36% | 0.21% |
| | (2.37) | (2.20) | (1.48) | (1.93) | (1.11) |
| 2 | 0.19% | 0.20% | 0.18% | 0.17% | 0.15% |
| | (2.07) | (2.19) | (2.07) | (1.84) | (1.60) |
| 3 | 0.05% | 0.06% | 0.04% | 0.05% | 0.02% |
| | (0.65) | (0.76) | (0.47) | (0.64) | (0.25) |
| 4 | -0.01% | -0.01% | -0.07% | -0.06% | -0.07% |
| | (-0.14) | (-0.10) | (-0.78) | (-0.64) | (-0.74) |
| 5 (High) | -0.35% | -0.37% | -0.51% | -0.39% | -0.46% |
| | (-2.54) | (-2.63) | (-3.66) | (-2.76) | (-3.13) |
| V5 - V1 | -0.78% | -0.78% | -0.78% | -0.75% | -0.68% |
| (Vote HML) | (-5.48) | (-5.46) | (-5.60) | (-5.29) | (-4.76) |

Panel B. Risk-adjusted return using FF4 model plus additional anomaly factors

| Value of Vote Portfolios | $\alpha_{FF4+IVOL}$ | $\alpha_{FF4+DISP}$ | $\alpha_{FF4+ILLIQ}$ | $\alpha_{FF4+SUE}$ | $\alpha_{FF4+FMAX}$ |
|---|---|---|---|---|---|
| 1 (Low) | 0.51% | 0.50% | 0.49% | 0.44% | 0.40% |
| | (3.40) | (3.32) | (3.38) | (2.98) | (2.65) |
| 2 | 0.22% | 0.23% | 0.26% | 0.19% | 0.20% |
| | (2.50) | (2.62) | (3.05) | (2.31) | (2.26) |
| 3 | 0.22% | 0.23% | 0.26% | 0.19% | 0.20% |
| | (2.50) | (2.62) | (3.05) | (2.31) | (2.26) |
| 4 | 0.02% | 0.03% | 0.03% | -0.03% | 0.00% |
| | (0.24) | (0.32) | (0.33) | (-0.32) | (0.02) |
| 5 (High) | -0.28% | -0.29% | -0.30% | -0.32% | -0.30% |
| | (-2.74) | (-2.83) | (-3.02) | (-3.17) | (-2.91) |
| V5 - V1 | -0.79% | -0.79% | -0.80% | -0.76% | -0.70% |
| (Vote HML) | (-5.55) | (-5.54) | (-5.71) | (-5.40) | (-4.92) |

Panel C. Risk-adjusted return using FF5 model plus additional anomaly factors

| Value of Vote Portfolios | $\alpha_{FF5+IVOL}$ | $\alpha_{FF5+DISP}$ | $\alpha_{FF5+ILLIQ}$ | $\alpha_{FF5+SUE}$ | $\alpha_{FF5+FMAX}$ |
|---|---|---|---|---|---|
| 1 (Low) | 0.43% | 0.41% | 0.33% | 0.45% | 0.33% |
| | (2.38) | (2.22) | (1.80) | (2.40) | (1.77) |
| 2 | 0.18% | 0.18% | 0.18% | 0.16% | 0.16% |
| | (2.01) | (2.00) | (2.02) | (1.80) | (1.81) |
| 3 | 0.05% | 0.04% | 0.04% | 0.05% | 0.04% |
| | (0.59) | (0.60) | (0.59) | (0.65) | (0.48) |
| 4 | -0.02% | -0.02% | -0.03% | -0.03% | -0.04% |
| | (-0.18) | (-0.25) | (-0.39) | (-0.30) | (-0.43) |
| 5 (High) | -0.35% | -0.37% | -0.43% | -0.31% | -0.39% |
| | (-2.59) | (-2.64) | (-3.07) | (-2.25) | (-2.70) |
| V5 - V1 | -0.79% | -0.78% | -0.76% | -0.76% | -0.72% |
| (Vote HML) | (-5.44) | (-5.38) | (-5.29) | (-5.23) | (-5.06) |

form five quintile portfolios based on these rankings. In a given month t, this strategy buys stocks in the highest value-of-vote quintile, sells stocks in the lowest value-of-vote quintile, and holds this position for T months (i.e., closes out this position after Tth months). Hence, under this trading strategy, we revise the weights on 1/T of the stocks in the entire portfolio in any given month and carry over the remaining from the previous month (T = 1 to 12 months).

Table 5 presents average equal-weighted raw and risk-adjusted value-of-vote return differences for holding periods of up to twelve months. The average raw return differences between quintile 5 and quintile 1 of value-of-vote portfolios are statistically significant for the one- to eight-month holding periods. The magnitude of the average raw return differences, however, drops from -0.70% for the one-month holding period to -0.46% for the two-month holding period and -0.36% for the three-month holding period. The risk-adjusted return differences (using FF3, FF4, and FF5 models) are statistically significant for holding periods of up to twelve months. The magnitude of the risk-adjusted return differences (using FF5 model) monotonically drops from -0.78% for the one-month holding period to -0.58% for the two-month holding period, -0.45% for the three-month holding period, and -0.13% for the twelve-month holding period.

Figure 1 plots the average raw return difference between High and Low value-of-vote portfolios as the holding period increases. Evidently, the return difference between quintile 5 and quintile 1 of value-of-vote portfolios is not short-lived–it persists for at least nine months despite declines in the magnitude of the return differences over the holding period. Given that most of the previous literature on lead-lag effects of option and stock markets focuses on daily and intraday frequencies (e.g., Manaster and Rendleman Jr. (1982),Chakravarty et al. (2004), and Muravyev et al. (2013)), the predictability of value-of-vote over longer horizons further suggests that microstructure differences in the option and stock markets do not drive our results.

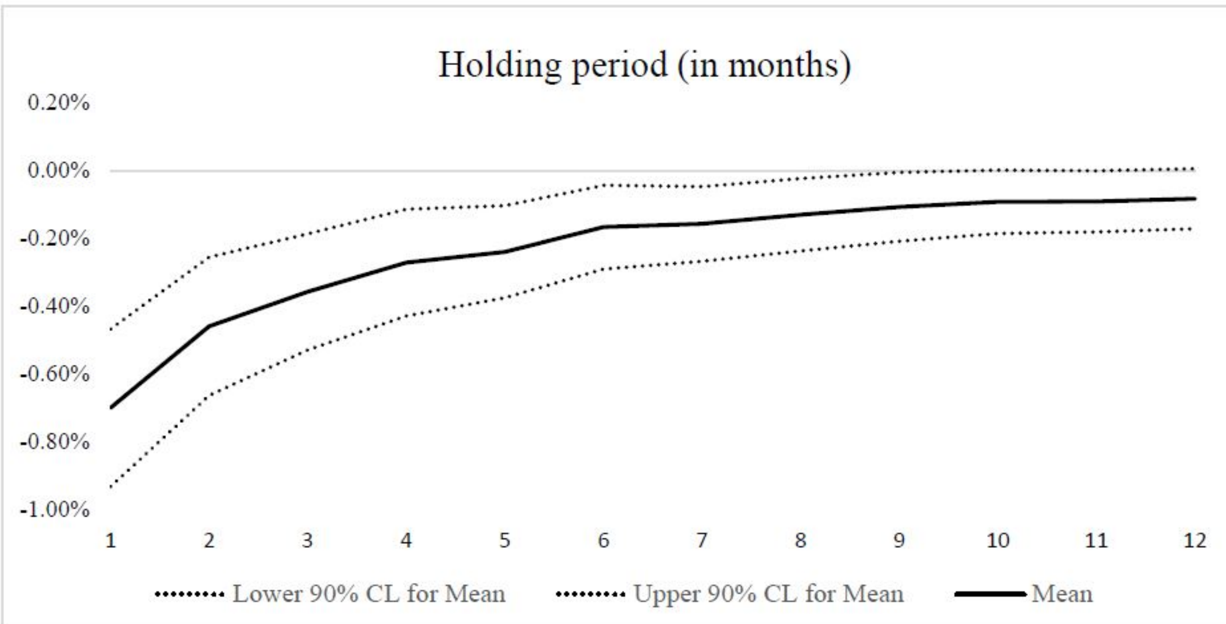
Table 3.5: Long-term predictability of Value-of-Vote

This table reports the Value-of-Vote portfolio return differences for overlapping holding periods of up to twelve months. At the beginning of each month, stocks are sorted into five quintile portfolios based on the median Value-of-Vote during the prior month. Following Jegadeesh and Titman (1993), each month this strategy buys stocks in the highest Value-of-Vote quintile, sells stocks in the lowest value-of-vote quintile, and holds this position for T months (T = 1 to 12 months). The first row reports the one to twelve-month average equal-weighted raw return differences between high (V5) and low (V1) Value-of-Vote portfolios. The second, third and fourth rows reports one to twelve-month alpha differences between high (V5) and low (V1) Value-of-Vote portfolios using FF3, FF4, and FF5 models, respectively. The sample period is from February 1996 to September 2015. Numbers reported in parentheses are t-statistics.

| | 1-month | 2-month | 3-month | 4-month | 5-month | 6-month | 7-month | 8-month | 9-month | 10-month | 11-month | 12-month |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average return | -0.70% | -0.46% | -0.36% | -0.27% | -0.24% | -0.17% | -0.16% | -0.13% | -0.11% | -0.09% | -0.09% | -0.08% |
| difference | (-4.97) | (-3.72) | (-3.45) | (-2.85) | (-2.91) | (-2.23) | (-2.35) | (-2.00) | (-1.72) | (-1.62) | (-1.66) | (-1.54) |
| FF3 alpha | -0.77% | -0.56% | -0.45% | -0.35% | -0.32% | -0.25% | -0.23% | -0.20% | -0.18% | -0.16% | -0.15% | -0.15% |
| | (-5.60) | (-4.64) | (-4.55) | (-3.80) | (-4.05) | (-3.52) | (-3.74) | (-3.45) | (-3.12) | (-3.04) | (-3.05) | (-2.92) |
| FF4 alpha | -0.80% | -0.61% | -0.49% | -0.38% | -0.34% | -0.26% | -0.23% | -0.21% | -0.18% | -0.16% | -0.16% | -0.15% |
| | (-5.73) | (-5.04) | (-4.92) | (-4.09) | (-4.28) | (-3.66) | (-3.75) | (-3.46) | (-3.12) | (-2.99) | (-3.05) | (-2.88) |
| FF5 alpha | -0.78% | -0.58% | -0.45% | -0.34% | -0.31% | -0.24% | -0.22% | -0.20% | -0.16% | -0.14% | -0.14% | -0.13% |
| | (-5.41) | (-4.74) | (-4.43) | (-3.62) | (-3.83) | (-3.36) | (-3.50) | (-3.22) | (-2.79) | (-2.62) | (-2.63) | (-2.57) |

Figure 3.1: Long-term predictability of Value-of-Vote

This figure plots the average equal-weighted raw return differences between the highest (V5) and lowest (V1) Value-of-Vote portfolios for overlapping holding periods of up to twelve months. At the beginning of each month, stocks are sorted into five quintile portfolios based on the median Value-of-Vote during the prior month. Following Jegadeesh and Titman (1993), each month this strategy buys stocks in the highest Value-of-Vote quintile, sells stocks in the lowest value-of-vote quintile, and holds this position for T months (T = 1 to 12 months). The dotted lines indicate the 90 percent confidence interval (CL).




### 3.3.4 Does Informed Trading Explain Our Findings?

Some studies attribute apparent deviations from options put-call parity at least partly to trading activity by informed investors. If informed investors choose to trade first in the option market–as in the equilibrium model of Easley et al. (1998)–then option prices will deviate away from put-call parity toward the direction of the informed investors' private information.[20] This leads to option prices carrying information that is predictive of future stock price movements. Relatedly, An et al. (2014) document that large increases in call (put) implied volatilities predict high (low) future

[20] Informed investors might prefer to trade in the option market rather than stock market because of the higher leverage available there (Black, 1975), or because options markets allow them to achieve better liquidity or to more easily hide their private information (Back (1993), Biais and Hillion (1994)).

returns. In a closely related study, Cremers and Weinbaum (2010) use the difference in implied volatility between call and put options (volatility spread) on the same underlying equity, with the same strike price and the same expiration date, to measure deviations from put-call parity. They document that stocks with relatively expensive calls outperform stocks with relatively expensive puts. Both studies interpret their findings as being consistent with models of informed trading.

Since we construct our main measure of the value of voting rights using options and the underlying stock prices, our results could also be interpreted as consistent with informed trading. However, we argue that the value of voting rights contains information about future stock returns that is independent of informed trading. We provide four sets of evidence to support this argument and to distinguish our findings from those of An et al. (2014) and Cremers and Weinbaum (2010).

First, the model of informed trading by Easley et al. (1998) indicates that when the liquidity of the options market is low, informed traders prefer to mainly trade in the stock market. Consistent with this prediction, An et al. (2014) and Cremers and Weinbaum (2010) both document that the degree of predictability is substantially larger when option liquidity is higher. In fact, both studies find statistically insignificant predictability in stocks with relatively illiquid options. This, however, is not the case for our findings. Following An et al. (2014) and Cremers and Weinbaum (2010), we repeat our analysis for the subsamples of stocks based on different option liquidity measures. Panel A of Table 6 presents the results of our analysis for the subsamples of stocks based on options volume, open interests, and options bid-ask spreads. The first two columns of this panel show that the alpha difference (using FF5 model) between quintile 5 and quintile 1 of value-of-vote portfolios for the subsamples of stocks with options volume below and above the median is -0.70% (with a t-statistics of -4.50) and -0.87% (with a t-statistics of -4.60), respectively. This indicates that the predictability of value-of-vote is economically large, statistically significant, and comparable in magnitude for both subsamples of stocks (i.e., stocks with relatively liquid options and those with relatively illiquid options), and suggests that predictability of value-of-vote cannot be explained by models of informed trading such as that of Easley et al. (1998). Using other measures of option liquidity, namely open interests and options bid-ask spreads, yields similar results.

Second, we find our results to be robust to controlling for the implied volatility-based measures used in An et al. (2014) and Cremers and Weinbaum (2010). Panel B of Table 6 presents the results of our analysis using double-sorted portfolios. In row (1), we first sort stocks on the difference between changes of implied volatilities of put and call options, ΔPVOL- ΔCVOL, as in An et al. (2014). Within each quintile of ΔPVOL-ΔCVOL, we then form value-of-vote quintile portfolios and average the returns on each value-of-vote portfolio over the five ΔPVOL-ΔCVOL portfolios. Thus, these average returns represent returns on value-of-vote quintile portfolios after controlling for ΔPVOL-ΔCVOL. The alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.70% with a t-statistics of -5.29. In row (2), we first sort stocks based on the differences between call and put implied volatilities, CVOL-PVOL, as in Cremers and Weinbaum (2010). Within each quintile of CVOL-PVOL, we then form value-of-vote quintile portfolios, and average the returns on each value-of-vote portfolio over the five CVOL-PVOL portfolios. Therefore, these average returns represent returns on value-of-vote quintile portfolios after controlling for CVOL-PVOL. The average alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.41% with a t-statistics of -3.26. Although the magnitude of value-of-vote return spread is smaller after controlling for volatility spread, it remains economically large and statistically significant. Note that theoretically, a divergence in put and call implied volatilities could be driven by the value of voting rights. This is because one could capture voting rights without having any economic exposure to changes in stock prices by buying the common stocks and selling short the synthetic stocks (synthesized using option put-call parity). To sell short the synthetic stock, however, one must buy the put and sell short the call options of the same underlying stock. This would generate buying and selling pressures in opposite directions, which could lead to the divergences of put and call implied volatilities. Thus, the robustness checks described above could limit our ability to capture the return predictability of value-of-vote, making it more difficult to obtain results that support our hypothesis. Despite this conservative approach, our empirical results hold with strong economical and statistical significance.

## Table 3.6: Is Value-of-Vote return spread isomorphic to informed trading

Panel A reports alphas using Fama-French five factor model ($\alpha_{FF5}$) for value-of-vote quintile portfolios for subsamples based on different measures of option market liquidity; (1) option volume which is the monthly average of the sum of daily call and put option volume; (2) option open interest which is calculated as the monthly average of the sum of daily call and put open interest; (3) put option bid ask spread which is the monthly average of the daily bid ask spread; and (4) call option bid/ask spread which is the average of the call option daily bid/ask spread. In Panel B Row 1, we first sort stocks into five quintiles based on a measure of option implied volatility innovation (ΔPVOL-ΔCVOL) introduced by An et al. (2014) and then within each quintile we further sort stocks based on Value-of-Vote. The five Value-of-Vote portfolios are then averaged across the five ΔPVOL-ΔCVOL quintiles. In Row 2 we first sort stocks into five quintiles based on call-put option implied volatility differences (CVOL-PVOL) introduced by Cremers and Weinbaum (2010) and then within each quintile we further sort stocks based on Value-of-Vote. Panel C reports FF5 alphas of quintile portfolios sorted based on Value-of-Vote as well as implied volatility-based measures used in An et al. (2014) and Cremers and Weinbaum (2010). Strategy (1/0/1) denotes one month formation period and observe return the next month and (1/1/1) is when a month is skipped before observing the return.

Panel A. Option Market liquidity and FF5 alpha for Value of Vote portfolios

| | Option Volume | | Option Open Interest | | Put Bid/Ask spread | | Call Bid/Ask spread | |
|---|---|---|---|---|---|---|---|---|
| Value of Vote Portfolio | Above $\alpha_{FF5}$ | Below $\alpha_{FF5}$ | Above $\alpha_{FF5}$ | Below $\alpha_{FF5}$ | Above $\alpha_{FF5}$ | Below $\alpha_{FF5}$ | Above $\alpha_{FF5}$ | Below $\alpha_{FF5}$ |
| 1 (Low) | 0.33% | 0.45% | 0.32% | 0.42% | 0.37% | 0.41% | 0.28% | 0.45% |
| | (1.77) | (2.07) | (1.54) | (2.02) | (2.17) | (1.74) | (2.25) | (1.64) |
| 2 | 0.10% | 0.26% | 0.08% | 0.29% | 0.21% | 0.12% | 0.21% | 0.19% |
| | (0.98) | (2.18) | (0.75) | (2.71) | (2.17) | (1.02) | (2.21) | (1.29) |
| 3 | 0.05% | -0.02% | -0.01% | 0.05% | 0.06% | 0.00% | 0.10% | -0.06% |
| | (0.52) | (-0.17) | (-0.10) | (0.46) | (0.57) | (-0.02) | (1.06) | (-0.51) |
| 4 | 0.06% | -0.13% | 0.03% | -0.10% | -0.05% | -0.03% | -0.02% | -0.07% |
| | (0.57) | (-1.05) | (0.27) | (-0.94) | (-0.48) | (-0.25) | (-0.21) | (-0.45) |
| 5 (High) | -0.54% | -0.24% | -0.60% | -0.16% | -0.31% | -0.47% | -0.33% | -0.44% |
| | (-3.31) | (-1.47) | (-3.45) | (-1.08) | (-2.11) | (-2.53) | (-2.69) | (-1.96) |
| V5-V1 | -0.87% | -0.70% | -0.91% | -0.58% | -0.68% | -0.89% | -0.61% | -0.88% |
| (vote HML) | (-4.60) | (-4.50) | (-4.75) | (-3.65) | (-4.32) | (-4.57) | (-4.22) | (-4.65) |

Panel B. FF5 alphas for Value-of-Vote portfolios controlling for pricing factors related to informed trading

| | Value of Vote Portfolio | | | | | Difference | |
|---|---|---|---|---|---|---|---|
| | 1 (Low) | 2 | 3 | 4 | 5 (High) | V5-V1 | t-statistics |
| (1)ΔPVOL-ΔCVOL | 0.32% | 0.17% | 0.06% | -0.01% | -0.38% | -0.70% | (-5.29) |
| (2)CVOL-PVOL | 0.22% | 0.15% | 0.07% | -0.07% | -0.19% | -0.41% | (-3.26) |

Panel C. FF5 alphas for portfolios formed based on Value-of-Vote and factors related to informed trading under different portfolio formation schemes

| | Value of Vote Portfolio | | | | | Difference | |
|---|---|---|---|---|---|---|---|
| Strategies | 1 (Low) | 2 | 3 | 4 | 5 (High) | V5-V1 | t-statistics |
| (1) 1/0/1 | 0.38% | 0.17% | 0.04% | -0.04% | -0.40% | -0.78% | (-5.41) |
| (2) 1/1/1 | 0.35% | 0.09% | 0.04% | 0.05% | -0.27% | -0.61% | (-4.11) |
| | (ΔPVOL-ΔCVOL) portfolio | | | | | Difference | |
| | 1 | 2 | 3 | 4 | 5 | A5-A1 | t-statistics |
| (3) 1/0/1 | 0.72% | 0.33% | 0.26% | 0.06% | -0.21% | -0.94% | (-7.08) |
| (4) 1/0/1 | 0.17% | 0.30% | 0.32% | 0.25% | 0.18% | 0.01% | (0.12) |
| | (CVOL-PVOL) portfolio | | | | | Difference | |
| | 1 | 2 | 3 | 4 | 5 | C5-C1 | t-statistics |
| (5) 1/0/1 | -0.50% | 0.06% | 0.24% | 0.49% | 0.86% | 1.36% | (9.10) |
| (6) 1/0/1 | 0.07% | 0.27% | 0.32% | 0.29% | 0.27% | 0.20% | (1.86) |

Third, even if the option market is more attractive to informed traders, option volumes (if not option prices) will convey the informed traders' private information to other investors, leading the stock market to (perhaps partially) incorporate the informed traders' private information into prices after a short delay. This suggests that the return predictability of option-based measures of An et al. (2014) and Cremers and Weinbaum (2010) should largely decline if we allow for a gap between portfolio formations and holding period. To assess this, we replicate the analysis of An et al. (2014) and Cremers and Weinbaum (2010) twice, first with no gap between portfolio formation and holding period, and then with a month between portfolio formation and holding period. The results are reported in Panel C of Table 6, which has three sections devoted to portfolios sorted based on value-of-vote, $\triangle$PVOL- $\triangle$CVOL and CVOL-PVOL, respectively. In each section of this panel, the first row reports the baseline results (1/0/1) where there is no gap between portfolio formation and holding period, and the second row reports the results when a month is skipped between portfolio formation and holding period (1/1/1). We indeed find that if we skip a month between portfolio formation (at time t) and observing monthly stock returns (return from t+1 to t+2), the average return spread for portfolios sorted based on $\triangle$PVOL-$\triangle$CVOL and CVOL-PVOL becomes economically smaller and statistically insignificant, while the average alpha difference between quintile 5 and quintile 1 of value-of-vote portfolios stays economically large at -0.61% per month and statistically significant with a t-statistics of -4.11.

Fourth, the findings of An et al. (2014) and Cremers and Weinbaum (2010) are, by definition, mainly driven by the stocks in which the implied volatility of put and call diverge the most. Hence, if our results are robust to excluding this type of stock, then our measure of the value of voting rights is likely to contain information beyond what is captured by the measures used in those two studies. We use the ratio of put to call option implied volatility, implied volatility ratio, to proxy for the divergence of implied volatility of put and call options, and repeat our analysis for a subsample of stocks in which implied volatility ratio is between the 10th and 90th percentiles of its empirical distribution (which corresponds to implied volatility ratios between 0.91 and 1.16). Panel D of Table 6 presents the monthly estimated FF5 alphas for the quantile portfolios as well as the alpha difference between quintile 5 and quintile 1 for the filtered same. The monthly alpha difference between quintile 5 and quintile 1 is -0.71%, with a t-statistics of -5.28, which is similar, both in magnitude and statistical significance, to the results for the full sample in Table 3. In addition, our results are robust to a different choice of thresholds for excluding stocks with extreme divergences between implied volatility of put and call options. When we repeat the same analysis using a symmetric range between 0.95 and 1.05 as the thresholds for implied volatility ratio, we obtain similar results, as reported in the second row of Panel D of Table 6. Together, these tests suggest that our results are not purely driven by stocks with extreme divergence between implied volatility of put and call options.

Moreover, the literature provides some evidence against the notion that informed investors prefer the option market when trading on their private information. Muravyev et al. (2013) conclude that no economically significant price discovery occurs in the option market. Muravyev et al. (2013) argue that many of the market participants who are most likely to have valuable private information (e.g., hedge funds) have access to ample leverage and thus do not need the synthetic leverage in the option market. More recently, Collin-dufresne et al. (2016) study a large sample of trades from Schedule 13D filings by activist investors, who supposedly have valuable private information about firms, and find that these investors choose the stock market over the option market 98% of the time. The authors conclude that the option market may not attract this class of informed traders after all. These studies, together with our analyses in Table 6, suggest that the value of voting rights contains information about future stock returns that is distinct from previously documented anomalies related to informed trading.[21]

### 3.3.5 Fama-MacBeth Cross-Sectional Regression with Value-of-Vote

To further examine the relation between value-of-vote and average stock returns, we conduct Fama-MacBeth (FM) cross-sectional regressions of monthly stock returns on value-of-vote and

[21] In untabulated analysis, we also examine whether the predictability of value-of-vote is stronger for stocks largely held by institutional investors, who are likely more sophisticated than retail investors. We find return predictability of value-of-vote to be economically large and statistically significant in subsamples of firms with high and low institutional ownership.

other firm characteristics. Specifically, we run the following cross-sectional regression:

$$R_{i,t+1} = \gamma_{0,t} + \gamma_{1,t} Value - of - Vote + \gamma_{2,t} X_{i,t} + \epsilon_{i,t+1} \quad (3.4)$$

where $R_{i,t+1}$is the realized return on stock i in time Âňt+1 and $X_{i,t}$ is a vector of control variables for stock i at time t and includes an extensive list of firm characteristics, common risk loadings, measures of option and stock market liquidity, and other option-related variables that have been shown in the literature to have cross-sectional predictability for stock returns, including the changes in implied volatility and volatility spread used in An et al. (2014) and Cremers and Weinbaum (2010), respectively. We estimate the above regression across stocks at any given time t and report the cross-sectional coefficients averaged across all time periods t. In order to correct for potential autocorrelation and heteroscedasticity in the cross-sectional coefficients, we compute Newey and West (1987) t-statistics on the time series of slope coefficients using standard errors computed with six lags. Table 7 presents the results of our Fama-MacBeth regressions.

In Column (1) of Table 7, we find that, after controlling for common risk factors and firm characteristics such as size, book-to-market, and leverage, value-of-vote has a highly significant predictive power in explaining future stock returns. The average cross-sectional regression coefficient on value-of-vote, -0.80, is highly significant, with a t-statistics of -4.82. In Column (2) of Table 7, we add asset growth, idiosyncratic volatility, analysts' forecast dispersion, and illiquidity to the control variables, and find that the average regression coefficient on value-of-vote becomes even larger in absolute value (-0.998), and is still strongly significant, with a t-statistics of -6.67. In Column (3) we add controls for option and stock market liquidity measures, ratio of call to put option volume and open interest, and skewness attributes of options, namely coskewness (COSKEW) and the risk-neutral skewness (QSKEW).[22] The average cross-sectional regression coefficient on value-of-vote in specification (3) is -1.007 with a t-statistics of -6.19. In Columns (4) and (5) we control for measures of news arrival in the option market that were introduced in An

[22]We define conditional skewness (COSKEW) as in Harvey and Siddique (2000) and risk-neutral skewness (QSKEW) as in Xing et al. (2010).

Table 3.7: Fama-MacBeth regressions

This table presents the results of Fama-MacBeth (1973) cross-sectional regressions of expected stock return on various firm characteristics including Value-of-Vote.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| *Value-of-Vote* | -0.8024 | -0.9980 | -1.0067 | -0.9732 | -0.9949 | -0.7442 | -0.7416 |
| | (-4.82) | (-6.67) | (-6.19) | (-6.00) | (-6.09) | (-4.48) | (-4.56) |
| Beta | -0.0034 | -0.0004 | 0.0014 | 0.0014 | 0.0013 | 0.0012 | 0.0012 |
| | (-1.06) | (-0.12) | (0.50) | (0.50) | (0.45) | (0.42) | (0.42) |
| Log(ME) | -0.0021 | -0.0007 | -0.0005 | -0.0004 | -0.0005 | -0.0005 | -0.0004 |
| | (-2.49) | (-0.96) | (-0.67) | (-0.57) | (-0.63) | (-0.65) | (-0.56) |
| Log(B/M) | 0.0024 | 0.0025 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0024 |
| | (2.18) | (2.11) | (2.07) | (2.11) | (2.10) | (2.07) | (2.06) |
| Ret(t-1) | -0.0316 | -0.0320 | -0.0251 | -0.0249 | -0.0244 | -0.0247 | -0.0250 |
| | (-4.18) | (-4.10) | (-3.45) | (-3.45) | (-3.39) | (-3.44) | (-3.49) |
| Ret(t-12, t-2) | -0.0072 | -0.0043 | -0.0035 | -0.0035 | -0.0036 | -0.0035 | -0.0035 |
| | (-1.47) | (-0.96) | (-0.87) | (-0.86) | (-0.86) | (-0.83) | (-0.85) |
| Ret(t-36, t-13) | -0.0029 | -0.0014 | -0.0012 | -0.0011 | -0.0012 | -0.0012 | -0.0011 |
| | (-3.20) | (-1.73) | (-1.60) | (-1.48) | (-1.49) | (-1.52) | (-1.44) |
| St. dev.(return) | 0.4343 | 0.2670 | 0.1985 | 0.2033 | 0.1941 | 0.2013 | 0.2032 |
| | (3.44) | (2.14) | (1.58) | (1.61) | (1.56) | (1.63) | (1.61) |
| Leverage | 0.0001 | -0.0021 | -0.0029 | -0.0026 | -0.0026 | -0.0026 | -0.0026 |
| | (0.01) | (-0.60) | (-0.83) | (-0.72) | (-0.73) | (-0.72) | (-0.71) |
| Log(assets growth) | | -0.0015 | -0.0016 | -0.0017 | -0.0017 | -0.0016 | -0.0016 |
| | | (-3.45) | (-3.65) | (-3.85) | (-3.85) | (-3.80) | (-3.77) |
| IVOL | | 0.0153 | -0.0327 | -0.0296 | -0.0176 | -0.0212 | -0.0294 |
| | | (0.22) | (-0.45) | (-0.38) | (-0.24) | (-0.29) | (-0.39) |
| ILLIQ | | 0.2176 | 0.1159 | 0.1153 | 0.1138 | 0.1152 | 0.1161 |
| | | (5.47) | (2.51) | (2.51) | (2.49) | (2.51) | (2.55) |
| DISP | | 0.0002 | -0.0002 | -0.0003 | -0.0003 | -0.0004 | -0.0004 |
| | | (0.30) | (-0.28) | (-0.35) | (-0.36) | (-0.44) | (-0.50) |
| Bid-ask spread (Stock) | | | 3.6774 | 3.6102 | 3.5935 | 3.6622 | 3.5699 |
| | | | (2.92) | (2.89) | (2.85) | (2.90) | (2.93) |
| Bid-ask spread (put) | | | 0.0151 | 0.0164 | 0.0163 | 0.0159 | 0.0151 |
| | | | (2.37) | (2.59) | (2.53) | (2.45) | (2.36) |
| Bid-ask spread (call) | | | -0.0188 | -0.0206 | -0.0204 | -0.0202 | -0.0204 |
| | | | (-2.73) | (-2.87) | (-2.80) | (-2.80) | (-2.80) |
| C/P OI | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | | | (0.86) | (0.79) | (0.80) | (0.86) | (0.80) |
| C/P Volume | | | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| | | | (1.71) | (1.40) | (1.44) | (1.41) | (1.33) |
| COSKEW | | | -0.0001 | -0.0001 | -0.0001 | -0.0001 | -0.0001 |
| | | | (-0.59) | (-0.48) | (-0.46) | (-0.45) | (-0.46) |
| QSKEW | | | -0.0576 | -0.0493 | -0.0517 | -0.0421 | -0.0397 |
| | | | (-5.27) | (-5.02) | (-5.18) | (-4.57) | (-4.31) |
| $\Delta$CVOL | | | | 0.0288 | | | 0.0084 |
| | | | | (3.23) | | | (0.31) |
| $\Delta$PVOL | | | | -0.025 | | | -0.004 |
| | | | | (-3.27) | | | (-0.16) |
| $\Delta$PVOL-$\Delta$CVOL | | | | | -0.0291 | | -0.0035 |
| | | | | | (-3.58) | | (-0.12) |
| CVOL-PVOL | | | | | | 0.0613 | 0.0530 |
| | | | | | | (4.29) | (2.94) |
| Adj. R-sqr | 0.0882 | 0.0992 | 0.1079 | 0.1099 | 0.1088 | 0.1094 | 0.1119 |
| | (9.17) | (9.86) | (10.77) | (10.85) | (10.81) | (10.76) | (10.97) |

et al. (2014): changes in implied volatility of put and call options. In Column (4), we control for changes in implied volatility of put and call separately ($\Delta$PVOL and $\Delta$CVOL), while in Column (5) we control for the difference between the two ($\Delta$PVOL-$\Delta$CVOL). The average cross-sectional regression coefficient on value-of-vote is -0.973 in specification (4) and -0.995 in specification (5); these results are highly significant, with t-statistics of -6.00 and -6.09, respectively. In Column (6), instead of changes in implied volatility of put and call options, we control for volatility spread (CVOL-PVOL), because Cremers and Weinbaum (2010) have shown this measure to have cross-sectional return predictability. The average cross-sectional regression coefficient on value-of-vote is still economically large and statistically significant, with a coefficient of -0.724 and a t-statistics of -4.48. In regression (7), we control for all of the above-mentioned characteristics, and find that the average cross-sectional regression coefficient on value-of-vote is still highly significant, with a coefficient of -0.742 and a t-statistics of -4.56.

To gauge the economic magnitude of the average coefficient on value-of-vote in Table 7, we focus on Column (7) of that table which includes the most comprehensive list of control variables. Given the difference between average value-of-vote in the first and fifth quintile portfolios (1.128% as reported in Table 1), a firm that moves from the first quintile to the fifth quintile of value-of-vote would see its expected return decrease by $-0.7416 \times 1.128\% = -0.836\%$. Given the extensive use of control variables in our Fama-MacBeth estimation, the large economic magnitude of value-of-vote's cross-sectional predictability suggests that value-of-vote is a strong predictor of stock return.

Our results in Table 7 confirm that the effect of value-of-vote on the cross-section of stock returns is robust to controlling for various risk factors and firm characteristics. This suggests that the value-of-vote effect we identify is not being driven by correlations with other determinants of expected returns, and contains independent information about the cross-section of stock returns.

#### 3.3.6 Dual-Class Stocks

In this section, we repeat our analysis for a subsample of firms with dual-class structure, using an alternative measure of the value of voting rights. The literature has used the price difference between classes of stocks with different voting rights to measure the value of voting rights and/or private benefits of control (see, e.g., Lease et al. (1983), Zingales (1995), Nenova (2003), and Masulis et al. (2009)). One limitation of this methodology is that the number of dual-class firms in which both classes of stocks are publicly traded is limited. Another is that different classes of stocks might differ across dimensions other than voting rights, such as dividend rights and market liquidity (DeAngelo and DeAngelo (1985), Smart and Zutter (2003), and Kalay et al. (2014)). With these caveats in mind, we expect that, when uncertainty about the outcome of a future control event is high (proxied by a high value of voting rights), investors will be willing to pay higher prices to accumulate superior voting shares, so that they can increase their chances of winning the control contest. These higher prices, in turn, will lead to lower future expected returns. Our measure of the value of voting rights based on the price difference between the two classes of stocks in firms with dual-class structure–voting premium–is conceptually similar to our option-based methodology. In constructing value-of-vote, we used options to (essentially) synthesize a class of share with no voting rights. Hence, the common stocks in firms with a single class of stocks (used in value-of-vote) are equivalent to the superior class of shares in dual class firms (used in voting premium).

To construct our sample of dual-class firms, we start with a sample from Gompers et al. (2010) from 1992 to 2002, then expand it using data sources such as GMI and ISS. We hand-collect data on the relative voting power of different classes of stocks by reading firms' proxy statements. We require both classes of stocks to be publicly traded, and eliminate firms that do not meet this criterion. We end up with 115 firms over the period 1994-2015. Following Zingales (1995), as described in Section 2.2, we measure voting premium in dual-class firms by taking the price difference between the superior and inferior voting stocks, normalized by their respective voting rights.

We calculate voting premium each month using the end of month stock price; sort quintile portfolios based on voting premium; and observe the next month's return for superior voting class shares. The results of our analysis of dual-class firms are reported in Table 8. In Panel A of that table, we report the average and median voting premium for each of the voting premium portfolios. Similar to our earlier result Table 1, the lowest voting premium portfolio (VP1) takes negative values.

Table 3.8: *Voting Premium* portfolio returns using dual-class stocks

This table presents average voting premium and voting premium portfolio returns calculated using dual-class stocks. Voting premium (VP) is a proxy for the value of voting rights in firms with dual-class structure and following Zingales (1995) is calculated as $VP = \frac{P_s - P_i}{P_i - rP_s}$, where $P_s$ and $P_i$ are the prices of superior and inferior voting stocks, respectively, and r is the ratio of the number of votes of an inferior voting share to the number of votes of a superior voting share. At the beginning of each month stocks are sorted into five quintile portfolios based on voting premium calculated at the end of the prior month. Panel A reports the average and median voting premium for each quintile portfolio. Panel B reports equal-weighted (EW), value-weighted (VW), and characteristics-adjusted (DGTW, Daniel et al. (1997)) portfolio returns for superior voting share class. The sample period is from February 1994 to December 2015. Numbers reported in parentheses are t-statistics.

Panel A. Mean *voting premium* for voting premium portfolio

| *Voting Premium* Portfolio Rank | Average *Voting Premium* | Median *Voting Premium* |
|---|---|---|
| 1 (Low) | -14.48 | -0.10 |
| 2 | -0.01 | -0.01 |
| 3 | 0.01 | 0.01 |
| 4 | 0.07 | 0.06 |
| 5 (High) | 0.07 | 0.06 |

Panel B. Mean *voting premium* for superior voting stocks (monthly frequency)

| *Voting Premium* Portfolio Rank | EW | VW | Characteristics-adjusted |
|---|---|---|---|
| 1 (Low) | 1.63% | 1.36% | 0.58% |
| 2 | 1.38% | 0.73% | 0.37% |
| 3 | 1.23% | 1.09% | 0.11% |
| 4 | 0.63% | 1.13% | -0.34% |
| 5 (High) | 0.35% | -0.28% | -0.62% |
| V5-V1 | -1.28% | -1.64% | -1.20% |
| (VP HML) | (-3.36) | (-3.62) | (-3.18) |

In Panel B of Table 8, we report equal-weighted, value-weighted, and characteristics-adjusted returns for voting premium portfolios. Consistent with our prediction for superior voting shares, high voting premium stocks have lower future returns. The equal-weighted return difference between high and low voting premium portfolios (VP5-VP1) for superior voting shares is -1.28% per month with a t-statistics of -3.36. This is in line with our findings in Table 2, where our option-based measure of the value of voting rights was used in a larger sample of firms.[23] We obtain similar results when we examine value-weighted return difference between high and low voting premium portfolios, and when we adjust stock returns for size, book-to-market, and momentum, as in Daniel et al. (1997). Overall, these findings confirm that regardless of the methodology used to measure the value of voting rights, it contains valuable information about future stock returns.[24]

#### 3.3.7 Long-Term Operating Performance and Value-of-Vote

The fact that (some) investors are willing to pay higher prices when control becomes more important suggests that there are benefits to having control, (i.e., private benefits of control). As Grossman and Hart (1988) argue, investors who are competing for control will bid the stock up to the minimum value that they place on these private benefits, which include the ability to run the firm more efficiently. Voting rights are especially valuable if investors feel the need to wield disciplinary pressure to improve managerial efficiency (see, e.g., Manne (1964), and Cox and Roden (2002)). If investors are, on average, paying a higher price to Lcapture voting rights so that they can improve managerial efficiency, we should observe long-term improvements in operating performance in firms with higher value-of-vote. On the other hand, if investors are paying higher prices to enjoy private benefits of control at the expense of other stakeholders, we would not expect long term performance improvements. In Table 9, we report the results of analyzing measures of operating performance for value-of-vote portfolios for up to three years after portfolio formation. Panels A and B of Table 9 show that firms in the highest value-of-vote quintile significantly improve their operating performance and profitability, respectively, compared with firms in the lowest value-of-vote quintile. These improvements become statistically significant only over horizons of two years or longer, suggesting that firms with high value-of-vote, on average, experience long-term improvements in operating performance and profitability.

[23]Our findings using the dual-class subsample of firms are broadly consistent with Karakas (2009) which studies the time variation of relative prices of dual-class shares.

[24]Since holders of inferior voting shares are less likely to be influential in determining the outcome of a control contest, investors would be willing to purchase the inferior voting class only at a discounted price, which leads to higher future expected returns for this class of stocks. Consistently, for inferior voting class shares, we find that high voting premium stocks have higher future returns. The equal-weighted return difference between high and low voting premium portfolios (VP5-VP1) is 1.75% per month with a t-statistics of 4.31 (untabulated).

Table 3.9: Operating performance

This table reports the average changes in operating performance in one, two and three-year horizons of firms in Value-of-Vote quintile portfolios. Changes are calculated relative to the fiscal year before portfolio formation month. The Value-of-Vote quintile portfolios are formed as in Table 2. Panel A reports changes in industry-adjusted ROA (NI/AT). Panel B reports changes in industry-adjusted profitability (EBITDA/AT). Numbers reported in parentheses are t-statistics.

Panel A. Average change in ROA for firms in each Value-of-Vote quintile portfolio

| Value of Vote Portfolio | ΔROA(+1yr) | ΔROA(+2yr) | ΔROA(+3yr) |
|---|---|---|---|
| 1 (Low) | -0.01 | -0.01 | -0.02 |
| 2 | -0.02 | -0.02 | -0.02 |
| 3 | -0.01 | -0.01 | -0.02 |
| 4 | -0.01 | -0.02 | -0.01 |
| 5 (High) | 0.04 | 0.07 | 0.12 |
| V5-V1 | 0.05 | 0.08 | 0.14 |
| (Vote HML) | (1.61) | (1.83) | (2.21) |

Panel B. Average Change in Profitability in each value-of-vote quintile portfolios

| Value of Vote Portfolio | ΔProfitability(+1yr) | ΔProfitability(+2yr) | ΔProfitability(+3yr) |
|---|---|---|---|
| 1 (Low) | -0.01 | -0.01 | -0.02 |
| 2 | -0.01 | -0.01 | -0.02 |
| 3 | -0.01 | -0.01 | -0.02 |
| 4 | 0.00 | -0.01 | -0.01 |
| 5 (High) | 0.05 | 0.08 | 0.13 |
| V5-V1 | 0.06 | 0.09 | 0.15 |
| (Vote HML) | (1.67) | (1.97) | (2.32) |

## 3.4 Additional Robustness Analyses

### 3.4.1 Controlling for Various Firm Characteristics using Double-Sorted Portfolios

Existing literature has documented numerous characteristics that are associated with cross-sectional differences in average stock returns. To examine whether value-of-vote inadvertently captures any of these characteristics, we use conventional double-sorting analyses to control for them. We first sort the stocks into five quintile portfolios based on the firm characteristic of interest. Then, within each quintile portfolio, we further sort the stocks into five quintile portfolios based on value-of-vote. The returns on each value-of-vote portfolio are then averaged over the five characteristic portfolios. Therefore, these average returns represent returns on value-of-vote quintile portfolios after controlling for the characteristic of interest. Using this approach, we can examine expected return differences between quintile 5 and quintile 1 of value-of-vote while controlling for the characteristic of interest. Table 10 reports the results of the analysis of returns on double-sorted portfolios.

In row (1) of Table 10, we control for size by double-sorting based on market capitalization and value-of-vote, and find that the FF5 alpha difference between quintile 5 and quintile 1 of value-of-vote remains sizeable (-0.61%) and statistically significant (t-statistics of -4.85). In row (2), we control for book-to-market (BTM) and again find that the alpha difference is sizable (-0.73%) and statistically significant (t-statistics of -5.42). The pattern holds for momentum. Row (3) shows that after controlling for momentum, the alpha difference is -0.72% with a t-statistics of -6.26.

Liquidity is another important characteristic that affects stock returns. Highly illiquid stocks, on average, have higher stock returns (Amihud (2002)). To examine whether the liquidity of a stock affects the predictability of our measure of the value of voting rights, we control for liquidity using Amihud (2002)'s illiquidity measure. Row (4) of Table 10 shows that, after controlling for illiquidity, the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.61% with a t-statistics of -4.46, which is still economically large and statistically significant.

Additionally, Ang et al. (2006) document that stocks with high idiosyncratic volatility have extremely low average returns. To control for the effect of idiosyncratic volatilities on stock returns, we use double-sorted portfolios based on idiosyncratic volatility and value-of-vote. Row (5) of Table 10 shows that, after controlling for idiosyncratic volatility, the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.66% with a t-statistics of -5.61, which is economically large and statistically significant. This suggests that value-of-vote return spread is distinct from idiosyncratic volatility.

The summary statistics of our sample (in Panel B of Table 2) show that firms in quintile 5 of value-of-vote are associated with a high level of dispersion in analysts' earnings forecasts. Because Diether et al. (2002) find that stocks with high analysts' forecast dispersion have lower returns, we want to make sure that value-of-vote is not isomorphic to this measure. Row (6) of Table 10 shows that our results are not sensitive to controlling for analysts' forecast dispersion: the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.74% with a t-statistics of -5.44.

Table 3.10: Risk adjusted Value-of-Vote portfolio returns controlling for firm characteristics

This table presents risk-adjusted returns using Fama-French five factor model (FF5 alpha) for equal-weighted double-sorted portfolios. We first sort stocks into five quintiles based on a firm characteristic and then within each quintile we further sort stocks based on Value-of-Vote. The five Value-of-Vote portfolios are then averaged across the five characteristic quintiles. Using these average Value-of-Vote quintiles portfolios, we calculate alphas using Fama-French five-factor (FF5) model. These FF5 alpha estimates represent Value-of-Vote FF5 alphas controlling for that particular characteristics. We perform double sort on the following firm characteristics: (1) size defined as market value of equity, (2) book-to-market (BTM), (3) momentum defined as the past return from month t-12 to month t-2, (4) illiquidity defined as Amihud (2002)'s illiquidity measure (Amihud (2002)), (5) idiosyncratic volatility (IVOL) defined as in Ang et al. (2006) which is the standard deviation of the residuals from monthly regressions of daily stock returns on Fama-French three factors, (6) analysts' forecast dispersion (DISP) defined as in Diether et al. (2002), (7) standardized unexpected earnings (SUE) defined as the difference between the actual earnings and the median of analysts' earnings forecasts normalized by the stock price, (8) short-term reversal defined as the prior month return, (9) stocks' bid-ask spread, (10) stocks trading volume, (11) options trading volume, (12) option open interest, (13) stocks' short interest ratio defined as short interest divided by total shares outstanding, and (14) equity lending fees are the equal weighted monthly average of equity lending fees. The sample period is from February 1996 to September 2015, except in row (14) where our data on equity lending fees cover August 2006 to January 2012. Numbers reported in parentheses are t-statistics.

Panel A. Option Market liquidity and FF5 alpha for Value of Vote portfolios

| | Value of Vote portfolio rankings | | | | | |
|---|---|---|---|---|---|---|
| | 1 (Low) | 2 | 3 | 4 | 5 (High) | V5-V1 |
| (1) Double sort on Size | 0.28% | 0.25% | -0.03% | -0.01% | -0.33% | -0.61% |
| | (1.86) | (2.46) | (-0.29) | (-0.13) | (-3.00) | (-4.85) |
| (2) Double sort on BTM | 0.34% | 0.19% | -0.01% | -0.08% | -0.40% | -0.73% |
| | (2.11) | (1.86) | (-0.10) | (-0.80) | (-3.08) | (-5.42) |
| (3) Double sort on Momentum | 0.37% | 0.19% | -0.06% | -0.11% | -0.36% | -0.72% |
| | (2.56) | (1.78) | (-0.54) | (-1.00) | (-2.99) | (-6.26) |
| (4) Double sort on Illiquidity | 0.29% | 0.16% | -0.02% | -0.08% | -0.32% | -0.61% |
| | (1.74) | (1.55) | (-0.26) | (-0.80) | (-2.58) | (-4.46) |
| (5) Double sort on IVOL | 0.30% | 0.14% | 0.03% | -0.08% | -0.36% | -0.66% |
| | (1.87) | (1.31) | (0.29) | (-0.74) | (-3.00) | (-5.61) |
| (6) Double sort on Dispersion (DISP) | 0.35% | 0.10% | 0.01% | -0.03% | -0.39% | -0.74% |
| | (1.93) | (1.06) | (0.05) | (-0.32) | (-2.96) | (-5.44) |
| (7) Double sort on SUE | 0.42% | 0.06% | -0.08% | -0.05% | -0.31% | -0.73% |
| | (2.38) | (0.65) | (-0.90) | (-0.53) | (-2.35) | (-5.43) |
| (8) Double sort on short-term reversal | 0.36% | 0.06% | 0.03% | -0.01% | -0.40% | -0.75% |
| | (2.12) | (0.62) | (0.29) | (-0.14) | (-2.85) | (-5.92) |
| (9) Double sort on Stock Bid-Ask spread | 0.32% | 0.21% | 0.02% | -0.11% | -0.41% | -0.73% |
| | (1.79) | (2.18) | (0.26) | (-1.08) | (-3.24) | (-5.42) |
| (10) Double sort on Stock Volume | 0.29% | 0.14% | 0.03% | -0.09% | -0.34% | -0.63% |
| | (1.67) | (1.42) | (0.35) | (-0.94) | (-2.55) | (-4.52) |
| (11) Double sort on Option Volume | 0.40% | 0.17% | 0.02% | -0.02% | -0.42% | -0.82% |
| | (2.17) | (1.97) | (0.30) | (-0.27) | (-2.89) | (-5.48) |
| (12) Double sort on Option Open Interest | 0.36% | 0.19% | 0.03% | -0.04% | -0.42% | -0.75% |
| | (1.95) | (2.11) | (0.41) | (-0.48) | (-2.89) | (-5.28) |
| (13) Double sort on Short Interest Ratio | 0.36% | 0.18% | -0.03% | 0.04% | -0.39% | -0.75% |
| | (2.06) | (1.79) | (-0.34) | (0.41) | (-2.91) | (-5.56) |
| (14) Double sort on Equity Lending Fees | 0.570% | 0.370% | 0.210% | 0.140% | 0.100% | -0.47% |
| | (3.42) | (3.56) | (1.71) | (1.04) | (0.48) | (-2.27) |

We also take earnings surprises into account. Livnat and Mendenhall (2006) document that earnings surprises affect stock returns in the same direction as the earning surprise, and that this effect typically lasts for several weeks. In addition, Gurun and Karakas (2017) provide empirical evidence that value of vote is negatively related to earnings surprises. If firms with more negative earnings surprises tend to have higher value-of-vote, and at the same time lower stock returns, then the effect we document using value-of-vote might instead be attributable to earnings surprises. In row (7) of Table 10, we control for earnings surprises. We define surprise in earnings (SUE) as the difference of the median analysts' earnings forecasts and the actual earnings normalized by the stock price. The results–an alpha difference of -0.73% between quintile 5 and quintile 1 of value-of-vote, with a t-statistics of -5.43–show that our findings are robust to controlling for earnings surprises.

Stocks with high returns in the most recent month tend to have low average returns in the next month, an effect known as "short-term reversal" (Jegadeesh (1990)). In row (8) of Table 10, we control for short-term reversal and find that the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.75% per month with a t-statistics of -5.92. This suggests that our results are very robust to controlling for short-term reversal.

In rows (9) to (12) of Table 10, we control for various measures of stock and option liquidity. In row (9), we control for stocks' bid-ask spread. We calculate bid-ask spread as the monthly average of stock's daily bid-ask spreads in the most recent month. The results show that the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.73% with a t-statistics of -5.42. Because Gervais et al. (2001) find that stocks with high trading volume tend to have higher returns, we control for the stocks' dollar volume in row (10), and find that the alpha difference between quintile 5 and quintile 1 of value-of-vote is -0.63% with a t-statistics of -4.52. And in rows (11) and (12), we control for option volume and open interest, respectively. The results show that our findings are very robust to controlling for these option liquidity measures. The alpha difference between quintiles 5 and 1 of value-of-vote, after controlling for option volume (open interest), is -0.82% (-0.75%) with a t-statistics of -5.48 (-5.28).

Lastly, we control for short-sale constraint. Ofek et al. (2004) show that the presence of short-sale constraint can result in deviations from put-call parity. In contrast, Battalio and Schultz (2006) provide evidence that short-sale constraints have little impact on such deviations. In order to mitigate the concern that our results might be affected by the presence of short-sale constraints, we use two proxies to capture the demand for and cost of short selling. Asquith et al. (2005) use short interest ratio to capture the demand for short-sale in the market. Short interest ratio is defined as the short interest divided by the total shares outstanding. As reported in row (13) in Table 10, the alpha difference between high and low value-of-vote portfolios, after controlling for short-sale demand, is -0.75% with a t-statistics of -5.56. In row (14) we use equity lending fees as a direct measure of short-sale costs, and find that our results are still economically large and statistically significant after controlling for short-sale costs (with a coefficient of -0.47% and t-statistics of -2.27. These suggests that our results are not driven by the presence of short-sale constraints on the underlying stocks.

As an additional robustness analysis to mitigate the concern regarding short-sale constraints, in untabulated analysis we use regulation SHO, which introduced a shock to short-sale constraints as a quasi-natural experiment. As part of regulation SHO, a random sample of US firms were selected for the pilot program, in which short-selling constraints were relaxed. The pilot program was announced on July 28, 2004, implemented on May 2, 2005, and ended on August 6, 2007. We define the treated group as firms that were randomly selected for the pilot program and the control group as firms in Russell 3000 index that were not part of the pilot program. We define post period as the 27 months between the implementation and end of the pilot program, and pre period as the 27 months before the announcement date. If our results were mainly driven by short-sale constraints, we expect value-of-vote return spread to decrease in magnitude for the treated group but not for the control group. Our difference-in-difference estimation does not show any significant difference in changes in value-of-vote return spread between the treated and the control group. Interestingly, we do not find a negative value-of-vote return spread for treated firms before the announcement of the pilot program (pre period), whereas we do find a negative value-of-vote return spread for treated firms in post period. This further suggests our results are not driven by the presence of short-sale constraints. The caveat is that the value-of-vote return spreads for both the treated and control groups in both pre and post periods are not statistically significant. This is likely due to the short time series used for this analysis.

### 3.4.2 Different Formation Periods

To check whether our findings are robust to alternative portfolio formation periods, we use L/M/N portfolio formation methodology as in Jegadeesh and Titman (1993) and Ang et al. (2006). In a given L/M/N portfolio formation method, we use the average of the monthly medians of value-of-vote from prior L months to form value-of-vote quintile portfolios, we skip M months between the portfolio formation period and the holding period and then calculate return over the next N months. The portfolio formation method used in our main analyses and described in Section 3.1 can be shown as 1/0/1. Note that we do not leave a gap between the portfolio formations and holding period in our main analyses. We examine longer holding periods in Table 5 (e.g., 1/0/1, 1/0/2, etc.), but in this section we vary L and M to see whether value-of-vote return spread is robust to alternative methods of portfolio formation. Table 11 presents the results of this analysis. Using 1/1/1 strategy, the FF5 alpha difference between high and low value-of-vote quintile portfolios is -0.61% per month with a t-statistics of -4.11. If we increase the gap between portfolio formation and return estimation period to two months (1/2/1 strategy), the FF5 alpha difference between high and low value-of-vote quintile portfolios remains statistically significant and economically large at -0.50% per month with a t-statistics of -3.36.

When we use the average of the monthly medians of value-of-vote over the previous six months to form value-of-vote quintile portfolios and calculate return over the next months without a gap in between (6/0/1), we still find a significant value-of-vote return spread. The FF5 alpha difference in this case is -0.71% with a t-statistics of -4.87. If we skip one month between portfolio formation and return estimation period (6/1/1), we find the FF5 alpha difference to be -0.57% with a

Table 3.11: Alternative portfolio formation periods (L/M/N)

This table presents risk-adjusted returns using Fama-French five factor model (FF5 alpha) for equal-weighted Value-of-Vote quintile portfolios using various portfolio formation schemes. We use L/M/N portfolio formation methodology as in Jegadeesh and Titman (1993) and Ang et al. (2006). In a given L/M/N portfolio formation scheme, we use the average of the monthly medians of Value-of-Vote from prior L months to form Value-of-Vote quintile portfolios; we skip M months between the portfolio formation period and the holding period, and then calculate return over the next N months. The portfolio formation method used in our main analyses and described in Section 4.1 can be shown as 1/0/1. The sample period is from February 1996 to September 2015. Numbers reported in parentheses are t-statistics.

| | Value of Vote portfolio rankings | | | | | |
|---|---|---|---|---|---|---|
| Strategies | 1 (Low) | 2 | 3 | 4 | 5 (High) | V5-V1 (Vote HML) |
| 1/1/1 | 0.35% | 0.09% | 0.04% | 0.05% | -0.27% | -0.61% |
| | (1.61) | (0.95) | (0.44) | (0.54) | (-1.76) | (-4.11) |
| 1/2/1 | 0.31% | 0.12% | 0.04% | 0.08% | -0.19% | -0.50% |
| | (1.52) | (1.15) | (0.47) | (0.81) | (-1.23) | (-3.36) |
| 6/0/1 | 0.41% | 0.15% | 0.08% | 0.03% | -0.30% | -0.71% |
| | (2.35) | (1.40) | (0.86) | (0.31) | (-2.21) | (-4.87) |
| 6/1/1 | 0.43% | 0.08% | 0.15% | 0.05% | -0.15% | -0.57% |
| | (2.15) | (0.73) | (1.53) | (0.47) | (-0.98) | (-3.75) |
| 12/0/1 | 0.43% | 0.15% | 0.08% | 0.10% | -0.18% | -0.61% |
| | (2.68) | (1.33) | (0.73) | (0.87) | (-1.39) | (-4.16) |
| 12/1/1 | 0.40% | 0.19% | 0.13% | 0.06% | -0.07% | -0.48% |
| | (2.34) | (1.62) | (1.17) | (0.48) | (-0.55) | (-3.06) |

t-statistics of -3.75. Using the previous 12 months to form value-of-vote quintile portfolios yields similar results.

### 3.4.3 Using Different Subsample Periods

In order to examine whether the predictability of value-of-vote has changed over time, we repeat our analysis in different sample periods. We first split our sample into two subsample periods: January 1996 to December 2006, and January 2007 to September 2015. Table 12 Panel A shows that the FF5 alpha difference between high and low value-of-vote quintile portfolios is economically large and highly significant in both of these subsample periods. (In contrast, Cremers and Weinbaum (2010) find that the degree of predictability of volatility spread (CVOL-PVOL) declines over time in their sample.) Panel B of Table 12 shows that the value-of-vote return spread was economically large and statistically significant even during the financial crisis period

## Table 3.12: Alternative subsample periods

This table presents risk-adjusted returns (alpha) for Value-of-Vote quintile portfolios using different subsample periods. The Value-of-Vote quintile portfolios are formed as in Table 2. The dependent variable is the monthly equal-weighted Value-of-Vote portfolio returns in excess of the one-month Treasury bill rate. Panel A reports risk-adjusted returns for Value-of-Vote quintile portfolios using FF3 model ($\alpha_{FF3}$), FF4 model ($\alpha_{FF4}$), and FF5 model ($\alpha_{FF5}$) for the periods 1996-2006 and 2007-2015, separately. Panel B reports FF3, FF4 and FF5 alphas for a sub-sample that excludes the financial crisis period (2007-2009). Numbers reported in parentheses are t-statistics.

Panel A. FF3, FF4 and FF5 alpha for subsample periods

| | Subsample:1996-2006 | | | Subsample:2007-2015 | | |
|---|---|---|---|---|---|---|
| Value of Vote Portfolio | $\alpha_{FF3}$ | $\alpha_{FF4}$ | $\alpha_{FF5}$ | $\alpha_{FF3}$ | $\alpha_{FF4}$ | $\alpha_{FF5}$ |
| 1 (Low) | 0.16% | 0.62% | 0.34% | 0.24% | 0.25% | 0.34% |
| | (0.52) | (2.72) | (1.09) | (1.74) | (2.18) | (2.56) |
| 2 | 0.09% | 0.21% | 0.11% | 0.16% | 0.16% | 0.18% |
| | (0.62) | (1.54) | (0.74) | (2.09) | (2.23) | (2.37) |
| 3 | -0.07% | 0.01% | -0.05% | 0.11% | 0.11% | 0.13% |
| | (-0.58) | (0.08) | (-0.40) | (1.29) | (1.52) | (1.56) |
| 4 | -0.26% | -0.10% | -0.19% | 0.04% | 0.05% | 0.10% |
| | (-1.85) | (-0.83) | (-1.36) | (0.44) | (0.58) | (1.15) |
| 5 (High) | -0.58% | -0.26% | -0.50% | -0.42% | -0.40% | -0.27% |
| | (-2.76) | (-1.79) | (-2.33) | (-2.25) | (-3.02) | (-1.56) |
| V5-V1 | -0.75% | -0.88% | -0.84% | -0.66% | -0.65% | -0.61% |
| (Vote HML) | (-3.56) | (-4.34) | (-4.03) | (-3.72) | (-3.85) | (-3.46) |

Panel B. FF3, FF4 and FF5 alphas estimated excluding the financial crisis period (2007-2009)

| Value of Vote Portfolio | $\alpha_{FF3}$ | $\alpha_{FF4}$ | $\alpha_{FF5}$ |
|---|---|---|---|
| 1 (Low) | 0.16% | 0.51% | 0.29% |
| | (0.74) | (3.24) | (1.38) |
| 2 | 0.10% | 0.20% | 0.11% |
| | (0.96) | (2.07) | (1.09) |
| 3 | -0.04% | 0.02% | -0.03% |
| | (-0.49) | (0.22) | (-0.34) |
| 4 | -0.17% | -0.04% | -0.12% |
| | (-1.66) | (-0.47) | (-1.23) |
| 5 (High) | -0.57% | -0.31% | -0.48% |
| | (-3.71) | (-2.80) | (-3.15) |
| V5-V1 | -0.73% | -0.82% | -0.78% |
| (Vote HML) | (-4.89) | (-5.64) | (-5.16) |

of 2007-2009.

### 3.4.4 Dropping Observations with Negative Value-Of-Vote

To the extent that shareholders do not incur any costs due to having voting rights, the option to vote should intuitively have a non-negative value. To mitigate potential concerns about the presence of negative values of value-of-vote, we repeat our analysis while excluding observations with negative value-of-vote. As reported in Table 13, our results are highly robust to excluding these observations. This suggests that our findings are not materially driven by observations with negative value-of-vote.

Table 3.13: Value of Vote portfolio returns: Dropping observations with negative value of vote

This table presents risk-adjusted returns (alpha) for Value-of-Vote quintile portfolios using a subsample that excludes observations with negative Value-of-Votes. At the beginning of each month, stocks are sorted into five quintile portfolios based on the median Value-of-Vote during the prior month. The dependent variable is the monthly equal-weighted Value-of-Vote portfolio returns in excess of the one-month Treasury bill rate. The sample period is from February 1996 to September 2015. Numbers reported in parentheses are t-statistics.

| Value of Vote Portfolio | $\alpha_{FF3}$ | $\alpha_{FF4}$ | $\alpha_{FF5}$ |
|---|---|---|---|
| 1 (Low) | 0.14% | 0.17% | 0.13% |
| | (1.81) | (2.25) | (1.62) |
| 2 | -0.02% | 0.03% | -0.01% |
| | (-0.28) | (0.36) | (-0.15) |
| 3 | -0.05% | 0.03% | -0.04% |
| | (-0.59) | (0.33) | (-0.40) |
| 4 | -0.11% | 0.01% | -0.06% |
| | (-1.01) | (0.05) | (-0.50) |
| 5 (High) | -0.70% | -0.46% | -0.59% |
| | (-4.32) | (-3.97) | (-3.58) |
| V5-V1 (Vote HML) | -0.84% | -0.63% | -0.71% |
| | (-5.26) | (-4.99) | (-4.39) |

# 4. SUMMARY AND CONCLUSION

The dramatic increase in passive institutions in recent decades has changed the investor base of U.S. firms. The influence of passive institutions on management and their role as voting shareholders have often been overlooked due to their passive investment strategy. Nevertheless, anecdotal evidence indicates that passive institutions are evolving and acknowledging the importance of corporate governance, thus shifting to promote best practices of corporate governance across the firms in their portfolios and to exercise their fiduciary duties through proxy voting. As long as a firm remains in the benchmark index, passive institutions must hold the firm. The nature of the passive investment strategy gives these institutions longer-term incentives compared with short-term active traders who have the option to sell. I specifically document the effect of passive institutions' long-term investment horizons on managerial incentive horizons and the voting channel that passive institutions use to affect managerial behavior.

The first chapter finds that passive institutions increase CEO compensation duration to align managers' incentive horizons with their long-term incentives. A one-standard-deviation increase in passive institutions leads to a 0.61-standard-deviation increase in duration, which is interpreted as a lengthening of the vesting schedules of stocks and options granted to the CEO by approximately 6.5 months. As the median CEO tenure is 4.26 years for my sample, 6.5 months is not a negligible increase in pay duration.

Because passive institutions usually hold large stake in firms, they have the voting power to influence management. Unfortunately, the most common intervention strategies adopted by institutions are often undertaken behind closed doors, which makes it difficult for researchers to observe their efforts to influence managerial incentives, and corporate governance more broadly. I provide possible channels through which passive institutions induce changes in compensation contracts by specifically observing compensation proposals and the proxy voting behavior of passive institutions. Increasing ownership by passive institutions leads to more shareholder-sponsored compensation proposals, and CEO compensation duration increases more for firms experiencing an increase in shareholder compensation proposals. Furthermore, passive institutions more strongly support shareholder-sponsored compensation proposals, and the greater their support in board of director elections, the more the CEO duration increases. These results provide suggestive evidence of behind-the-scenes engagement by passive institutions using their voting power.

Many researchers have documented that long-term investors improve various corporate decisions; increase payout Crane et al. (2016), disclose more information (Bird and Karolyi (2016), and Boone and White (2015)), discourage misconduct, and engage in less earnings management (Harford et al. (2018)). However, the mechanism through which these investors affect such decisions remains a black box. The results in this chapter shed light on how passive institutions encourage managers to focus on the long term, by offering longer-term incentives. Considering the large stakes that passive institutions hold in firms, passive institutions affect managerial incentive contracts in accordance with their own long-term incentives, and they do so by utilizing their voting power.

In the second chapter, we show that the market value of corporate voting rights significantly predicts future stock returns. The risk-adjusted returns earned by stocks with high vote values are more than 10 percent lower per year than the risk-adjusted returns earned by stocks with low vote values. Numerous robustness checks reveal that neither the models of informed trading nor the factors that are known to affect stock prices explain our results. The cross-sectional predictability persists over longer horizons, suggesting that our results are not driven by microstructure differences in the option and stock markets. Finally, we find that firms with high vote values significantly improve their operating performance and profitability over longer horizons, compared to firms with lower vote values.

An important implication of our findings is that existing asset pricing models, which heavily rely on understanding cash flow processes, cannot fully explain asset prices in part because they ignore the vote component of stock prices. In a perfect world–one without market frictions or failures, agency problems, or information asymmetry–a cash flow process would be a sufficient statistic for defining an asset, provided that a proper discount factor exists and is known to investors. However, outside of such a perfect world and in the presence of agency problems, control rights–and voting rights in particular–become a critical mechanism for settling disputes among investors, and thus are key to understanding the sources of variation in asset prices.

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APPENDIX A

VARIABLE DEFINITIONS

**Firm-level Sample**

CEO Compensation Duration and Investor Turnover

- **Duration**: The weighted average of the vesting periods of stocks and option grants awarded to CEO (Gopalan et al. (2014)) during the fiscal year following the index reconstitution ($t+1$). The data on the composition of CEO compensation is from Incentive Lab. The variable is winsorized at the 1% and 99% level.

$$Duration = \frac{(Salary + Bonus) \times 0 + \sum_{i=1}^{n_s} RS_i \times t_i + \sum_{i=1}^{n_o} Option_j \times t_j}{(Salary + Bonus) + \sum_{i=1}^{n_s} RS_i + \sum_{i=1}^{n_o} Option_j} \quad \text{(A.1)}$$

  The equation calculates duration when the awards have a cliff vesting schedule. The salary and bonus have a vesting period of 0. When the restricted stock or option grant has a graded vesting schedule, $t_i(t_j)$ is replaced with $\frac{t_i+1}{2}(\frac{t_j+1}{2})$. For performance-based equity awards, I use the initial vesting schedules specified in the plan.

- **△Duration**: The percentage change in duration from fiscal year $t$ to fiscal year $t+1$. The variable is winsorized at the 1% and 99% level.
- **Duration Decrease**: A dummy variable which takes value of one if the firm's CEO compensation duration change is negative
- **Duration Increase**: A dummy variable which takes value of one if the firm's CEO compensation duration change is positive
- **△Duration_Above Med**: A dummy variable which takes value of one if the firm's △ Duration is above the sample median

- **Turnover**: I use a measure of investor turnover introduced in Gaspar et al. (2005) to assess a given firm's investor horizon. Based on the idea that short-term investors frequently change their portfolios while long-term investors keep their positions unchanged for a long period of time, Gaspar et al. (2005) measure the churn rate ($CR_{i,t,}$) of each institutional investor's portfolios. The churn rate for each institutional investor i at quarter t is measured as follows:

$$CR_{i,t} = \frac{\sum_{j \in Q} |N_{j,i,t}P_{j,t} + N_{j,i,t-1}P_{j,t-1} - N_{j,i,t-1} \bigtriangleup P_{j,t}|}{\sum_{j \in Q} \frac{N_{j,i,t}P_{j,t} + N_{j,i,t-1}P_{j,t-1}}{2}} \quad \text{(A.2)}$$

where $N_{j,i,t}$ and $P_{j,t}$ represent the number of shares and price of company $j$ held by institutional investor $i$ at quarter $t$, respectively. Using the churn rate of each institution, I calculate investor turnover at the firm level by finding the weighted average of the total portfolio churn rates of its investors. The investor turnover of firm k at quarter t is

$$Turnover_{k,t} = \sum_{i \in S} w_{k,i,t} (\frac{1}{4} \sum_{r=1}^{4} CR_{i,t-r}) \tag{A.3}$$

where $w_{k,i,t}$ is the percentage held by investor $i$ among the total held by institutional investors at quarter $t$, and I calculate the moving average of the churn rate in the previous 4 quarters in order to account for any seasonality in the institutional churn rate.

- **Turnover (Sept.)**: Investor turnover measured at the end of September in year $t$, using equation (3), which is the post quarter of Russell index reconstitution month. The variable is winsorized at the 1% and 99% level.
- **Turnover (Mar.)**: Investor turnover measured at the end of March in year $t$, using equation (3), which is the prior quarter of Russell index reconstitution month. The variable is winsorized at the 1% and 99% level.
- **ΔTurnover (Sept.)**: Change in investor turnover measured from March $t$ to the end of September, $t$, using equation (3). The variable is winsorized at the 1% and 99% level.

Ownership Variables

- **Active Ownership**: Total number shares held by active mutual funds (S12 & CRSP MFDB) / Total shares outstanding (CRSP)
- **ΔActive Ownership**: The change in ownership by active funds in September in year $t$ from holdings measured in March in year $t$.
- **Passive Ownership**: Total number of shares held by passive mutual fund (S12 & CRSP MFDB) / Total shares outstanding (CRSP)
- **ΔPassive Ownership**: The change in ownership by passive funds in September in year $t$ to holdings measured in March in year $t$.
- **Total IO**: Total number of shares held by institutions (13F) / Total shares outstanding (CRSP)

Banding Controls for Index Assignment

- **R2000Movers**: an indicator that takes value one for firms that move from Russell 1000 index in year $t-1$ to Russell 2000 index in year $t$
- **R1000Movers**: an indicator that takes value one for firms that move from Russell 2000 index in year $t-1$ to Russell 1000 index in year $t$
- **R2000_prev_yr**: an indicator for being in the Russell 2000 index in the previous reconstitution year $t-1$

– **Band**: an indicator that takes value one if the distance between a firm's end-of-May market capitalization and the Russell 1000/2000 index cutoff is less than 2.5% of Russell 3000E index cumulative market capitalization

– **Band_previndex**: Band × R2000_prev_yr

– **log_mcap_june**: the log of float-adjusted market capitalization at the end-of-June each year (Russell)

– **log_may_mcap**: the log of market capitalization at the end of May each year (CRSP)

– **log_may_mcap2**: the second order polynomials for log of market capitalization at the end of May each year (CRSP)

– **log_may_mcap3**: the third order polynomials for log market capitalization at the end of May each year (CRSP)

– **Prev_1yr_ret**: the cumulative stock return over the previous year of the index reconstitution (from June, $t-1$ to May $t$ )

Compensation-related Proposals

Compensation related proposals are identified if the agenda general description contains keywords such as: *compensation, option plan, stock plan, restricted stock, restricted stock option, clawback, awards, stock option, equity plan, vesting, and incentive.* in ISS Voting Analytics (Shareholder Proposal & Company Vote Results)

– **Shareholder Proposal**: an indicator that takes value of one when there is at least one shareholder-sponsored compensation proposal subject to shareholder voting in the annual meeting held in the following year of the index reconstitution (ISS Vote Results database)

– **Shareholder Proposal Increase**: an indicator that takes value one when there is an increase in the number of shareholder-sponsored compensation proposals subject to shareholder voting in the annual meeting held in the following year of the index reconstitution compare to the annual meeting held in the year previous to the index reconstitution (ISS Vote Results database)

– **Shareholder Proposal Number**: the number of shareholder-sponsored compensation proposals subject to shareholder voting in the annual meeting held in the following year of the index reconstitution (ISS Vote Results database)

– **Management Proposal**: an indicator that takes value one when there is at least one management-sponsored compensation proposals that are subject to shareholder voting in the annual meeting held in the following year of the index reconstitution (ISS Vote Results database)

– **Management Proposal Increase**: an indicator that takes value one when there is an increase in the number of management-sponsored compensation proposals that are subject to shareholder voting in the annual meeting held in the following year of the index reconstitution compare to the annual meeting held in the year previous to the index reconstitution (ISS Vote Results database)

- **Management Proposal Number**: the number of management-sponsored compensation proposals that are subject to shareholder voting in the annual meeting held in the following year of the index reconstitution (ISS Vote Results database)

Firm Controls

- **Average bid-ask spread**: The average daily stock bid-ask spread during previous year of the index reconstitution (CRSP)
- **CAPEX_Asset**: CAPX(#128)/Total assets (#6)
- **Debt_asset**: (dlc(#34)+dltt(#142))/ Total assets (#6)
- **EBIT_sale** : (OIADP(#178))/Sales(#12)
- **Market-to-book**: Market value of assets (prcc_f(#24)*cshpri(#54)+dlc(#34)+dltt(#142))/ Total assets (#6)
- **Long-term_Asset**: (PPENT(#8) + Goodwill (#204))/ Non-cash total assets (#6 - #162)
- **R&D_asset**: xrd (#46) / Total assets (#6)
- **ROA**: Net Income (#172) / Total assets (#6)
- **Sales growth**: Firm's annual sales growth rate
- **Sales growth volatility**: The standard deviation of the firm's annual sales growth during previous 5 years

Voting Support at Firm-level

- **Voting Support**: the total number of *FOR* votes received from a proposal (e.g., SOP, director elections) divided by the total number of shares available for voting
- **Passive Voting Above Median**: A dummy variable that takes a value of one if the average fraction of passive funds casting supporting votes in director elections is above the sample median and 0 otherwise
- **Non-Passive Voting Above Median**: A dummy variable that takes a value of one if the average fraction of non-passive funds casting supporting votes in director elections is above the sample median and 0 otherwise
- **Passive Voting Above P75**: A dummy variable that takes a value of one if the average fraction of passive funds casting supporting votes in director elections is above the 75th percentile of the sample and 0 otherwise
- **Non-Passive Voting Above P75**: A dummy variable that takes a value of one if the average fraction of non-passive funds casting supporting votes in director elections is above the 75th percentile of the sample and 0 otherwise

**Fund-family voting level sample**

Average Vote-For-Management at fund-family level

I aggregate vote-for-management at the fund-family level using Mutual Fund Vote Records in ISS Voting Analytics database. For each fund-family, I identify passive and non-passive funds using the fund-name strings. There can be multiple funds in a fund-family voting in the sample portfolio firm on the sample proposal. I calculate aggregate vote-for-management at a fund-family, portfolio firm, proposal-type level. The proposals are compensation-related as defined above.

- $VoteForMgmt$: is the fraction of management-for-votes aggregated for passive funds $i$ in a fund family $f$, for proposal $p$, at portfolio firm $c$, at meeting date $t$.

$$VoteForMgmt_{f,p,c,t} = \frac{\sum_{i=1}^{I}(FundVoteForMgmt_{i,f,p,c,t})}{I} \tag{A.4}$$

  $FundVoteForMgmt$ takes value of one if a (passive) fund ($i$) in a fund-family ($f$) casts vote in-line with the management recommendation on the proposal ($p$), at portfolio firm ($c$), at meeting date ($t$).

As multiple funds in a fund family can cast votes in the same proposal in the same portfolio firm, I use subsample of fund-families where passive funds vote with at least one active funds ("At least one active") or multiple active funds ("Above median active") casting votes in the same portfolio firm $c$, in the same proposal $p$, at the same meeting date ($t$) and identify $VoteForMgmt_{f,p,c,t}$ for the subsample of fund-families.

- At least one active: at least one active fund in the same fund-family $f$ cast vote in the proposal $p$, in portfolio firm $c$, at meeting date $t$
- Above median active: the proportion of active funds in a fund-family $f$ casting votes in the proposal $p$, in portfolio firm $c$, at meeting date $t$, is above the sample median

## APPENDIX B

## ACTUAL INDEX ASSIGNMENT AS AN INSTRUMENTAL VARIABLE

FTSE Russell uses common shares, non-restricted exchangeable shares, and membership or partnership units to calculate a firm's total shares outstanding at the end of May each year to determine index membership. A detailed description of incorporating non-restricted exchangeable share and membership units information is provided below as documented by FTSE Russell:

> *"Common stock, non-restricted shares and partnership units/membership interests are used to calculate a company's total market capitalization. Exchangeable shares are shares which may be exchanged at any time, at the holderâĂŹs options, on a one-for-one basis for common stock. Membership or partnership units/interests represent an economic interest in a limited liability company or limited partnership. FTSE Russell includes membership or partnership units/interests as part of total market capitalization when the company in question is merely a holding company of an underlying entity that issues membership or partnership units/interests and when these membership units are the companyâĂŹs sole asset. This is not to be confused with operating partnership units that are issued in conjunction with UPREITs. In these cases, total market capitalization will be calculated based on 100% of the value of all membership interests.*
>
> *Any other form of shares, such as preferred or convertible preferred stock, redeemable shares, participating preferred stock, warrants, rights, installment receipts or trust receipts, are excluded from the calculation. If multiple share classes of common stock exist, they are combined to determine total shares outstanding. In cases where the common stock share classes act independently of each other (e.g., tracking stocks), each class is considered for inclusion separately."*

If CRSP end-of-May market capitalization is a bad proxy for the true market capitalization used by Russell and hence the missing information is included in the error term of the first-stage estimation, it may confound any causal inference due to the measurement error. Based on the determinants of total market capitalization that Russell uses as mentioned above, two components can be missing from the observed CRSP May market capitalization; non-restricted exchangeable shares and membership/partnership units. Given that the true market capitalization used by Russell is unobservable, I can validate my findings by ruling out cases in which CRSP market capitalization might be a bad proxy for true market capitalization. Moreover, as long as the missing information about shares outstanding is not systematically related to compensation duration or passive ownership, using actual index assignment as an instrument should be valid.

Non-restricted exchangeable shares are used primarily for an acquisition of a Canadian company by a foreign parent (e.g., a U.S. company) involving a share exchange. Exchangeable shares are usually issued by a Canadian entity, and target shareholders can exchange them on a rollover basis and defer any gain until the exchangeable shares are ultimately exchanged into shares of the parent company. The exchangeable shares are economically and legally equivalent to the shares of the parent, and therefore, they should be included when calculating the market capitalization of the parent company. If the parent company is a U.S. firm with subsidiary Canadian firms which might have issued non-restricted exchangeable shares, this exchangeable shares might be missing when calculating market capitalization for the parent firm using CRSP.

To rule out cases in which exchangeable shares are not included in the calculation of shares outstanding, I exclude U.S. acquirers who acquired a Canadian company during the 12 months prior to the annual index reconstitutions from the sample. There are 80 firm-year observations that were excluded due to acquisitions of a Canadian firm prior to index reconstitution. After excluding these firms from the sample, all the results I document in this paper remain robust.

For a trust company that has membership/partnership units with shares of beneficiary interests, I may not able to calculate total market capitalization using the CRSP database if not all membership units are not available in the data. Membership and partnership units are used primarily in REITs or mutual-fund like securities. These securities are a small portion of CRSP universe, I do not know of a sensible to believe that there exists any systematic bias between passive institutional holdings and CEO compensation duration because of missing information in partnership/membership units. However, to be more precise in ruling out these cases, I exclude a total of 505 observations where shares information includes REITs, closed-end funds and shares of beneficial interests of REITs. I obtain consistent results after excluding these securities from the sample.

APPENDIX C

COMPENSATION-RELATED PROPOSALS

Below reports the frequency of compensation proposals identified using compensation-related keywords described in the text section 2.1.3. The sample consists of 500 firms around the Russell 1000/2000 threshold over 2007-2013 period and proposals are from annual meetings that are held from September in year $t$ to June in year $t+1$. Each proposal is categorized by ISS proposal-type. The bold items are agendas which focus executives to create long-term value of the firm.

**Shareholder Proposals related to compensation**

| **ISS Proposal-type** | **Agenda General Description** | **N** |
|---|---|---|
| S0500 | **Stock Retention/Holding Period:** at least x% of all equity-based compensation to be held at least y years of departure of senior executives to focus on the company's long-term success and better align their interests with those of the company's shareholders | 18 |
| S0501 | Limit/Prohibit Executive Stock-Based Awards | 2 |
| S0504 | Limit Executive Compensation | 1 |
| S0511 | **Compensation-Miscellaneous Company Specific:** No shorting, pledging company stock as collateral, require shareholder approval of quantifiable performance metrics etc. | 8 |
| S0512 | **Performance-Based and/or Time-Based Equity Awards** | 12 |
| S0515 | Non-Employee Director Compensation | 1 |
| S0516 | Clawback of Incentive Payments | 4 |
| S0517 | Advisory Vote to Ratify Named Executive Officers' Compensation | 33 |
| S0527 | **Double Trigger on Equity Plans:** No acceleration of vesting periods of any future equity at the event of change in control | 16 |

## Management Proposals related to compensation

| ISS Proposal-type | Agenda General Description | N |
|---|---|---|
| M0501 | Approve Stock Option Plan | 15 |
| M0503 | Amend Stock Option Plan | 38 |
| M0507 | Approve Restricted Stock Plan | 12 |
| M0509 | Amend Restricted Stock Plan | 28 |
| M0522 | Approve Omnibus Stock Plan | 555 |
| M0524 | Amend Omnibus Stock Plan | 1202 |
| M0525 | Approve Non-Employee Director Stock Option Plan | 8 |
| M0526 | Amend Non-Employee Director Stock Option Plan | 16 |
| M0535 | Approve/Amend Executive Incentive Bonus Plan | 530 |
| M0538 | Approve/Amend Deferred Compensation Plan | 17 |
| M0547 | Company-Specific-Compensation-Related | 13 |
| M0550 | Advisory Vote to Ratify Named Executive Officers' Compensation | 3268 |
| M0554 | Approve Outside Director Stock Awards/Options in Lieu of Cash | 6 |
| M0555 | Approve Stock Option Plan Grants | 26 |
| M0558 | Approve/Amend Bundled Compensation Plans | 8 |
| M0559 | Amend Articles/Charter Compensation-Related | 1 |
| M0596 | Approve Non-Employee Director Restricted Stock Plan | 7 |
| M0597 | Amend Non-Employee Director Restricted Stock Plan | 19 |
| M0598 | Approve Non-Employee Director Omnibus Stock Plan | 24 |
| M0599 | Amend Non-Employee Director Omnibus Stock Plan | 37 |

## C.1 EXAMPLE: LIMIT OF ACCELERATED VESTING PERIODS OF EXECUTIVE COMPENSATION

Below is the shareholder proposal related to accelerated vesting of executive office stock award upon change in controls proposed by the Trowel Trades S&P 500 Index Fund during annual meeting of Safeway Inc. Shareholder proposal statement are from Safeway Inc.'s annual proxy statement filed on 5/15/2012.

*The shareholders hereby ask the board of directors of Safeway Inc. (the "Company"), to adopt a policy that in the event of a change of control of the Company, there shall be no acceleration in the vesting of any equity award to a senior executive, provided that any unvested award may vest on a pro rata basis up to the time of a change of control event. To the extent any such unvested awards are based on performance, the performance goals must have been met. This policy shall apply to future awards without affecting any contractual obligations that may exist at the time.*

Supporting Statement from Trowel Trades Fund:

*We support the concept of performance-based equity awards to senior executives to the extent that such awards are tailored to promote performance and align executives' interests with those of the shareholders. We also believe that severance payments may be appropriate in some circumstances following a change of control.*

*We are concerned, however, that the Company's current practices can disregard performance criteria upon a change of control. Instead, they can permit full and immediate accelerated vesting of unearned equity awards.*

*The Company's 2011 proxy summarizes the Company's potential exposure if unvested equity awards should vest upon a change in control. According to the Company's 2011 proxy, if there had been a change of control on January 1. 2011, Chairman and CEO Steven A. Burd would have been eligible to receive more than $4 million in accelerated vesting of equity awards. Other senior executives would have received accelerated vesting of awards worth between approximately $1 and $3 million apiece.*

*The vesting of equity awards over a period of time is intended to promote long-term improvements in performance.* ***The link between pay and long-term performance can be severed if awards pay out on an accelerated schedule.*** *We urge you to vote FOR this proposal.*

## APPENDIX D

## ADDITIONAL TABLES

### Table A1: Summary statistics for mutual fund voting record matched sample

The table reports summary statistics for matched sample of Mutual Fund Voting Records in ISS Voting Analytics database and Thomson Reuters 13F institutional holdings database. The merged sample includes votes cast by 248 mutual fund-families on compensation-related proposals in their portfolio firms, where the portfolio firms are restricted to the top (bottom) 500 of the Russell 2000 (1000) index with annual shareholder meetings held from September, 2007 to June, 2014. Panel A reports the matched sample of all mutual funds and panel B shows matched sample of passive funds only. **VoteForMgmt** is the fraction of funds in a fund-family voted in line with the management recommendation on the compensation proposal subject to shareholder voting in the annual meeting following the Russell index reconstitution (equation (4) in Appendix A). **ISSrecomm** is a dummy variable that takes the value of one if the voting recommendation of ISS on the proposal is in-line with the management's recommendation. **ffamily_holding** is the percentage of shares held by the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. **ffamily_size** is the total market value of equity holdings of the fund-family measured as of the recent quarter from the annual meeting date (unit in $billions). **Passive fund proportion** is the fraction of passive funds in a fund-family that cast vote in the same portfolio firm, proposal and meeting date. **Number of funds** is the number of funds in a fund-family that cast votes in the same portfolio firm, proposal and meeting date.

Panel A. Total mutual fund voting level summary statistics

| | Mean | SD | P5 | Median | P95 | count |
|---|---|---|---|---|---|---|
| VoteForMgmt | 0.860 | 0.342 | 0.000 | 1.000 | 1.000 | 137,395 |
| ISSrecomm | 0.863 | 0.344 | 0.000 | 1.000 | 1.000 | 138,449 |
| ffamily_holding | 0.011 | 0.019 | 0.000 | 0.002 | 0.051 | 138,449 |
| ffamily_size ($bil.) | 101.61 | 185.25 | 0.75 | 29.65 | 557.03 | 138,448 |
| Passive fund proportion | 0.309 | 0.395 | 0.000 | 0.000 | 1.000 | 138,449 |
| Number of funds | 4.400 | 4.552 | 1.000 | 3.000 | 14.000 | 138,449 |

Panel B. Passive institution voting level summary statistics

| Passive Institution | Mean | SD | P5 | Median | P95 | count |
|---|---|---|---|---|---|---|
| VoteForMgmt | 0.880 | 0.325 | 0.000 | 1.000 | 1.000 | 60,311 |
| ISSrecomm | 0.864 | 0.342 | 0.000 | 1.000 | 1.000 | 60,506 |
| ffamily_holding | 0.013 | 0.021 | 0.000 | 0.002 | 0.056 | 60,506 |
| ffamily_size ($bil.) | 189.53 | 247.40 | 1.26 | 77.46 | 783.30 | 60,506 |
| Passive fund proportion | 0.699 | 0.282 | 0.200 | 0.714 | 1.000 | 60,506 |
| Number of funds | 4.423 | 4.504 | 1.000 | 2.000 | 14.000 | 60,506 |

Table A2: Instrumenting passive ownership change using Schmidt and Fahlenbrach (2017)

This table reports the first and second stage estimation result using the instrumented passive holdings change following Schmidt and Fahlenbrach (2017). The columns under (2nd Stage) report the second stage estimation and columns under (1st Stage) report the first stage estimation results. The variable $\Delta\widehat{passive}$ is the change in passive institutions holdings from December, year $t-1$ to September year $t$, where year $t$ is the reconstitution year. The passive holdings change is scaled to have a unit standard deviation. **Post_1yr_ret** is the cumulative return for post one year of the Russell index reconstitution month. **Prev_1yr_ret** is the cumulative return for previous one year of the Russell index reconstitution month. $\Delta Asset$ is the percentage change in asset from the previous fiscal year. $MarketCap_{t-1}$ is the raw market capitalization calculated from Compustat variable $Prcc\_f \times CSHO$ for the previous fiscal year. **R2000Movers** is the firm that switch to Russell 1000 index previous year $t-1$ to Russell 2000 index in year $t$. **R1000Movers** is firms that switch from Russell 2000 index in year $t-1$ to Russell 1000 index for year $t$. **May_Rank_Chg** is the change in may ranking for year $t$ relative to year $t-1$, $((MayRank_t - MayRank_{t-1})/1000)$, using CRSP end-of-May market capitalization. The sample consists of 500 firms around Russell 2000 index threshold using the end-of-May CRSP market capitalization from year 2007 to 2013. Kleibergen-Paap Wald F-statistics is reported. The regressions include year dummies as well as industry dummies defined using Fama-French (48) industries. Standard errors are clustered at the firm level and $t$-statistics are reported in parentheses.

| | Duration | | $\Delta$Duration | |
|---|---|---|---|---|
| | (2nd Stage) | (1st Stage) | (2nd Stage) | (1st Stage) |
| $\Delta\widehat{Passive}$ | 0.264* | | 0.431** | |
| | (1.668) | | (2.451) | |
| Post_1yr_ret | 0.058 | 0.168*** | -0.012 | 0.197*** |
| | (1.084) | (4.838) | (-0.230) | (4.806) |
| Prev_1yr_ret | 0.130*** | -0.009 | 0.120** | 0.009 |
| | (2.876) | (-0.180) | (2.092) | (0.160) |
| $\Delta Asset$ | -0.070 | 0.074* | -0.030 | 0.053 |
| | (-0.972) | (1.652) | (-0.439) | (1.090) |
| $MarketCap_{t-1}$ | 0.074*** | 0.022*** | -0.006 | 0.018* |
| | (3.751) | (2.647) | (-0.541) | (1.866) |
| R2000Movers | | 0.411*** | | 0.448*** |
| | | (3.082) | | (3.076) |
| R1000Movers | | -0.350*** | | -0.327*** |
| | | (-7.338) | | (-6.224) |
| May_Rank_Chg | | 0.278* | | 0.357** |
| | | (1.922) | | (1.979) |
| N | 2957 | 2957 | 2422 | 2422 |
| F-Statistics | | 25.182 | | 20.507 |
| $Adj.R^2$ | -0.014 | 0.605 | -0.160 | 0.621 |

Table A3: Two-stage-least squares estimation using Crane et al. (2016)

This table reports the second stage estimation result using the instrumented institutional holding, passive holding and quasi-index holdings to identify the effect of quasi-index institutions on CEO compensation duration, using below estimation equation following Crane et al. (2016).

$$Duration_{i,t+1} = \alpha_t + \beta\widehat{IO}_{i,t} + \gamma_1(Rank^*_{it} - 1000) + \gamma_2 R2000_{i,t}(Rank^*_{it} - 1000) + \gamma_3 FloatAdj_{it}$$

$$+\gamma_4 Prev\_1yr\_ret_{it} + \gamma_5 post\_1yr\_ret_{it} + \epsilon_{i,t}$$

*$Rank^*_{it}$-1000* is a variable which represents the distance to the threshold of Russell 2000 index. *R2000 *($Rank^*_{it}$-1000)* is the interaction between Russell 2000 index assignment and the distance to the threshold, which is included to control for the mechanical relationship with market capitalization ranking on either side of the threshold. *FloatAdj* is a proxy for the float adjustment by Russell, computed as the difference between the rank implied by the end-of-May CRSP market capitalization and the actual rank assigned by Russell in June. Institutional holding($\widehat{IO}$), passive holding ($\widehat{Passive}$), and quasi_index holding($\widehat{Quasi - Indexer}$) are instrumented using the Russell 2000 index assignment. CEO compensation duration, institutional holding, passive holding, and quasi_index holding are all scaled by their sample standard deviations, respectively. All specification include previous year's cumulative return (Prev_1yr_ret), and the post year's cumulative return (post_1yr_ret) to control for the past and current performance that might affect the index assignment. Year fixed effects are included in all specifications. Kleibergen-Paap Wald F-statistics is reported. Standard errors are clustered at the firm level and $t$-statistics are reported in parentheses.

| | CEO Compensation Duration | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| $\widehat{IO}$ | 0.323** | | |
| | (2.466) | | |
| $\widehat{Passive}$ | | 0.306** | |
| | | (2.563) | |
| $\widehat{Qausi - Indexer}$ | | | 0.260*** |
| | | | (2.581) |
| Rank*-1000 | -0.001*** | -0.001*** | -0.001*** |
| | (-4.627) | (-4.962) | (-4.296) |
| R2000 ×(Rank*-1000) | 0.000 | 0.000 | 0.000 |
| | (0.302) | (0.047) | (0.092) |
| FloatAdj | -0.000 | -0.000** | -0.000 |
| | (-0.993) | (-2.055) | (-0.818) |
| Prev_1yr_ret | -0.025 | 0.023 | 0.028 |
| | (-0.581) | (0.621) | (0.737) |
| Post_1yr_ret | 0.138*** | 0.147*** | 0.148*** |
| | (3.417) | (3.834) | (3.777) |
| Constant | 0.343 | 1.380*** | 0.812** |
| | (0.591) | (8.611) | (2.177) |
| N | 3686 | 3731 | 3686 |
| F-Statistics | 30.464 | 147.662 | 71.680 |

# Table A4: Delta, vega and total compensation change

The table reports the effect of passive institutions on other components of CEO compensation such as delta, vega and total compensation changes. The dependent variable for column (1) and (3) is the change in logarithm of delta measured as of the next fiscal year $t+1$ from the index reconstitution year $t$. The dependent variable for column (4) and (6) is the change in logarithm of vega measured during the same period. The dependent variable for column (7) and (9) is the change in logarithm of total compensation (TDC1 in Execucomp) measured during the same period. $\widehat{Passive}$ is the instrumented passive ownership estimated using the first stage in equation (2). $\Delta\widehat{Passive}$ is the instrumented passive ownership changes measured from March,$t$ to Sept., $t$ and estimated using the first stage in equation (2). **R2000Movers** is an indicator variable that takes value one for Russell 2000 index switchers in year $t$, **R1000Movers** is an indicator that takes value one for Russell 1000 index switchers in year $t$. **current_yr_ret** is the cumulative return from July, $t$ to June, $t+1$. **Tenure0** is tenure of CEO during the index reconstitution year $t$, measured as the logarithm of months in office using BECAMECEO (Execucomp). The cumulative return for the previous year of the index reconstitution (Prev_1yr_ret) is added to control for the past performance that might affect the index assignment. **log_cashcomp** is the logarithm of cash compensation (salary and bonus) from Execucomp. Firm controls include ROA, log sales, sales growth, debt-to-asset, R&D-to-asset, cash, and previous year's annualized stock return volatility. The detailed description on these variables is available in Appendix A. Firm fixed effect is used in column (2), (4), and (6) and year fixed effects are included in all specifications. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | $\Delta$log_Delta | | | $\Delta$log_Vega | | | $\Delta$log_TDC1 | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $\widehat{Passive}$ | 0.713** | | | 0.062 | | | 0.217 | | |
| | (2.057) | | | (0.180) | | | (1.066) | | |
| $\Delta\widehat{Passive}$ | | 0.560** | | | 0.049 | | | 0.186 | |
| | | (2.121) | | | (0.180) | | | (1.050) | |
| R2000Movers | | | 0.261* | | | 0.319 | | | 0.109 |
| | | | (1.756) | | | (1.495) | | | (0.765) |
| R1000Movers | | | 0.054 | | | 0.012 | | | -0.017 |
| | | | (0.512) | | | (0.082) | | | (-0.163) |
| current_yr_ret | 0.438*** | 0.403*** | 0.407*** | 0.421*** | 0.418*** | 0.411*** | 0.240*** | 0.228*** | 0.180*** |
| | (7.806) | (6.375) | (5.077) | (7.281) | (6.408) | (4.721) | (4.864) | (4.369) | (2.917) |
| tenure0 | -0.145*** | -0.124*** | -0.276*** | -0.086*** | -0.085*** | -0.179*** | 0.005 | 0.010 | 0.020 |
| | (-8.257) | (-10.023) | (-10.462) | (-5.201) | (-6.388) | (-6.031) | (0.374) | (0.878) | (0.939) |
| log_cashcomp | 0.082** | 0.069*** | 0.136** | -0.029 | -0.030 | 0.020 | -0.004 | -0.000 | 0.108 |
| | (2.248) | (3.035) | (2.539) | (-0.766) | (-0.854) | (0.240) | (-0.072) | (-0.006) | (1.498) |
| prev_1yr_ret | -0.028 | -0.050 | -0.023 | -0.018 | -0.020 | -0.013 | -0.041* | -0.047* | -0.039 |
| | (-1.011) | (-1.340) | (-0.581) | (-0.785) | (-0.864) | (-0.387) | (-1.820) | (-1.894) | (-1.568) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Controls | No | No | Yes | No | No | Yes | No | No | Yes |
| Firm FE | No | No | Yes | No | No | Yes | No | No | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 4579 | 4578 | 4546 | 4604 | 4603 | 4570 | 4834 | 4833 | 4794 |
| $Adj.R^2$ | -0.050 | 0.004 | 0.190 | 0.043 | 0.042 | 0.084 | -0.008 | -0.001 | 0.005 |

Table A5: Passive institutions and management-sponsored compensation proposals

This table reports result on the effect of passive institutions on the management-sponsored compensation proposals. The compensation proposals are identified using the “agenda general description” column in ISS Voting Analytics data. The keywords used to identify compensation proposals are described in Appendix A. The odd columns report estimation results using the second stage regression based on equation (1) in the text. The even columns report results using the diff-diff analysis by identifying actual switchers of the Russell 1000 and 2000 indexes. The dependent variable for column (1) to (3), **Management Proposal Increase**, is an indicator variable that takes value of one if there is an increase in the number of management-sponsored compensation proposals subject to shareholder voting in the annual meeting held after the index reconstitution month (from September, year $t$ to June, year $t+1$) compare to the prior year annual meeting. The dependent variable for column (4) to (6), **Management Proposal Change**, is the change in the number of management-sponsored compensation proposals subject to shareholder voting in the annual meeting held after the index reconstitution compare to the prior year's annual meeting. The variable $\widehat{Passive}$ is the instrumented passive holdings measured at the end of September in year $t$ estimated from the first stage regression in equation (2) in the text. The variable $\Delta\widehat{Passive}$ is the instrumented passive holdings change from March $t$ to September $t$. The variable **R2000Movers** is an indicator variable that takes value one for actual movers that switch to Russell 2000 index in year $t$. **R1000 Movers** is an indicator that takes value one for actual movers that switch to Russell 1000 index in year $t$. The past firm performance, (Prev_1yr_ret), is added to control for the past performance that might affect the index assignment. In all specifications, **banding controls** are included. More detailed information on the banding controls are available in Appendix A. Industry fixed effects (Ind FE: SIC-3 digit) are included in even columns and year fixed effects (Year FE) are used in all specifications. The sample consists of 500 firms around the Russell 1000/2000 index threshold over 2007-2013 period. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | Management Proposal Increase | | | Management Proposal | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\widehat{Passive}$ | 0.109 | | | 0.182* | | |
| | (1.142) | | | (1.923) | | |
| $\Delta\widehat{Passive}$ | | 0.097 | | | 0.157* | |
| | | (1.182) | | | (1.880) | |
| R2000Movers | | | 0.010 | | | 0.007 |
| | | | (0.253) | | | (0.183) |
| R1000Movers | | | -0.033 | | | -0.080** |
| | | | (-0.810) | | | (-2.061) |
| Prev_1yr_ret | -0.008 | -0.024* | -0.012 | 0.004 | -0.022 | -0.017 |
| | (-0.379) | (-1.693) | (-0.859) | (0.197) | (-1.643) | (-1.287) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Ind FE | No | No | Yes | No | No | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 6901 | 6888 | 6972 | 6901 | 6888 | 6972 |
| $Adj.R^2$ | 0.162 | 0.152 | 0.210 | 0.232 | 0.227 | 0.289 |

Table A6: Shareholder-sponsored compensation proposals and CEO compensation duration

This table reports the effect of increase in the number of compensation proposals and CEO compensation duration for Russell 2000 index switchers. The dependent variable for columns (1) and (2) is the percentage change in CEO compensation duration from fiscal year $t$ to fiscal year $t+1$. The dependent variable for column (3) and (4) is the simple change in CEO compensation duration from fiscal year $t$ to fiscal year $t+1$. The compensation proposals are identified using the "agenda general description" column in ISS Voting Analytics data. **R2000Movers** is an indicator which takes value of one for firms that switch to Russell 2000 index in year $t$. **Shareholder Proposal** is an indicator variable that takes value of one when there is a shareholder-sponsored compensation proposal subject to shareholder voting in the following annual meetings after the index reconstitution compare. **Shareholder Proposal Increase** is an indicator variable that takes value of one when there is an increase in the number of shareholder-sponsored compensation proposals subject to shareholder voting in the following annual meetings after the index reconstitution (from September, year $t$ to June, year $t+1$) compare to the prior annual meetings. The **firm controls** are ROA, R&D-to-asset, market-to-book, debt-to-asset, longterm_asset, sales_growth, sales_growth volatility, capex to asset, EBIT to sales, and the average bid-ask spread which are known to affect duration (Gopalan et al. (2014)). The detailed description on firm control variables are available in Appendix A. The past performance (prev_1yr_ret) and **banding controls** are added to make index assignment conditionally random. The sample consists of 500 firms around the Russell 1000/2000 threshold over 2007-2013 period. Industry fixed effects (Ind FE: SIC-3 digits) and year fixed effects (Year FE) are included. Standard errors are clustered at the firm level and $t$-statistics is reported in parentheses.

| | $\Delta$ Duration | | Duration Change | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| R2000Movers | 0.202 | 0.203 | 0.135 | 0.135 |
| | (1.427) | (1.427) | (0.873) | (0.874) |
| Shareholder Proposal | -0.044 | | -0.019 | |
| | (-0.566) | | (-0.159) | |
| R2000Movers × Shareholder Proposal | 0.467 | | 0.956** | |
| | (1.575) | | (1.979) | |
| Shareholder Proposal Increase | | -0.048 | | -0.003 |
| | | (-0.477) | | (-0.023) |
| R2000Movers × Shareholder Proposal Increase | | 0.470 | | 0.942* |
| | | (1.564) | | (1.893) |
| Prev_1yr_ret | 0.006 | 0.006 | -0.057 | -0.057 |
| | (0.145) | (0.149) | (-1.084) | (-1.081) |
| Banding Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| Ind FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| N | 2500 | 2500 | 2942 | 2942 |
| $Adj.R^2$ | -0.012 | -0.013 | -0.033 | -0.033 |

## Table A7: Total mutual fund voting on compensation proposals

The table reports the effect of Russell index switchers on mutual fund voting behavior on compensation-related proposals. The compensation-related proposals are defined in Appendix A. The dependent variable is the proportion of mutual funds belonging to a fund family that voted in line with the management's recommendation on compensation-related proposals at the shareholder meeting of the fund family's portfolio firm that take place from September in year $t$ to June, year $t+1$ (equation (4) in Appendix A). The sample consists of mutual funds that can be matched with 13F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold from September, 2007 to June, 2014. The unit of observation is fund-family (ffamily)-portfolio firm-proposal level, where only compensation-related proposals are included in the sample. **R2000Movers** is an indicator that takes value of one if a portfolio firm switches to Russell 2000 index in year $t$ and **R1000Movers** is an indicator that takes value of one if a portfolio firm switches to Russell 1000 index in year $t$. **ISSrecomm** is a dummy variable that takes the value of one if the voting recommendation of ISS on the proposal is in-line with the management's recommendation. **ffamily_holding** is the percentage shares held by the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. **Prev_1yr_ret** is the past one year performance of the portfolio firm. In all specifications, **banding controls** are included which makes the index assignment conditionally random. More detailed description on the banding controls are available in Appendix A. Different fixed effects are used as reported and proposal-type fixed effects are included in all specifications. **ffamily** is the fund-family fixed effect, **ffamily_yr** is the fund-family*year fixed effect, and **firm_ffamily** is the portfolio_firm*fund-family fixed effect. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund-family*year.

| | Vote-For-Mgmt | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| R2000Movers | -0.034*** | -0.035*** | -0.042*** |
| | (-3.557) | (-4.011) | (-2.958) |
| R1000Movers | -0.015* | -0.013** | -0.005 |
| | (-1.935) | (-2.280) | (-0.528) |
| ISSrecomm | 0.552*** | 0.551*** | 0.531*** |
| | (24.358) | (24.192) | (17.321) |
| ffamily_holding | 1.104*** | 1.139*** | 0.598*** |
| | (4.724) | (4.683) | (2.815) |
| Prev_1yr_ret | 0.000 | 0.001* | -0.001 |
| | (0.274) | (1.785) | (-0.709) |
| Banding Controls | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily |
| Proposal-type FE | Yes | Yes | Yes |
| N | 114050 | 113989 | 99526 |
| $Adj.R^2$ | 0.407 | 0.436 | 0.472 |

# Table A8: Passive institution voting on management-sponsored compensation proposals

This table reports passive funds voting on management-sponsored compensation proposals when a portfolio firm switches to either Russell 1000 or Russell 2000 index. The dependent variable in all columns is the proportion of passive funds belonging to a fund family that voted in line with the management's recommendation on the shareholder-sponsored compensation proposals put on to vote in annual meetings of the fund family's portfolio firm (equation (4) in Appendix A). Columns (1) through (3) report results for fund-families with at least one passive fund voting on shareholder-sponsored compensation proposals. Columns (4) through (6) report results for a subsample of fund-families with passive funds voting and at least one active fund in the same fund-family voting on the same compensation shareholder proposal. Columns (7) to (9) report results for a subsample of fund-families with passive funds voting and above median proportion of active funds in the same fund-family voting in the same compensation management proposal. The sample consists of mutual funds that can be matched with 13F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold from September, 2007 to June, 2014. The unit of observation is (passive fund votes aggregated at a fund-family)*portfolio firm*proposal level. **R2000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 2000 index in year $t$ and **R1000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 1000 index in year $t$. **ISSrecomm** is a dummy variable that takes the value of one if the voting recommendation of ISS on the proposal is in line with the management's recommendation. **ffamily_holding** is the holdings of the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. In all specifications, **banding controls** are included to make the index assignment conditionally random. Different fixed effects (FE) are used as reported and proposal-type fixed effects are included in all specifications. "**ffamily**" is the fund-family fixed effect, "**ffamily_yr**"is the fund-family*year fixed effect, and "**firm_ffamily**" is the portfolio_firm*fund-family fixed effect. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund-family*year.

| | Vote-For-Mgmt | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At least one passive | | | At least one active | | | Above median active fund proportion | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| R2000Movers | -0.019** | -0.021*** | -0.029** | -0.017 | -0.019** | -0.023 | -0.005 | -0.010 | -0.011 |
| | (-1.972) | (-2.746) | (-2.500) | (-1.292) | (-2.127) | (-1.259) | (-0.399) | (-0.972) | (-0.518) |
| R1000Movers | -0.019* | -0.016* | 0.003 | -0.025** | -0.021** | -0.002 | -0.035*** | -0.027** | -0.011 |
| | (-1.779) | (-1.785) | (0.323) | (-2.288) | (-2.271) | (-0.129) | (-3.007) | (-2.444) | (-0.625) |
| ISSrecomm | 0.475*** | 0.473*** | 0.434*** | 0.453*** | 0.451*** | 0.419*** | 0.476*** | 0.473*** | 0.444*** |
| | (13.946) | (13.864) | (10.326) | (5.276) | (5.232) | (4.143) | (5.829) | (5.765) | (4.342) |
| ffamily_holding | 1.006*** | 1.026*** | 0.650*** | 0.922** | 0.950** | 0.510*** | 1.039** | 1.066** | 0.597** |
| | (5.834) | (5.803) | (3.952) | (2.624) | (2.344) | (2.699) | (2.311) | (2.112) | (2.016) |
| Banding Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily |
| Proposal-type FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 59199 | 59184 | 52485 | 38586 | 38568 | 34066 | 29062 | 29044 | 24601 |
| $R^2$ | 0.335 | 0.346 | 0.391 | 0.317 | 0.330 | 0.385 | 0.320 | 0.334 | 0.380 |

## Table A9: Passive institution voting on Say-on-Pay proposal when duration increases

This table reports passive funds voting on Say-on-Pay (SOP) proposals when a portfolio firm switches to Russell 2000 index and when CEO compensation duration increases. The dependent variable is the proportion of passive funds belonging to a fund family that voted in line with the management's recommendation on the SOP proposals (Vote-For-Mgmt: equation (4) in Appendix A) subject to shareholder voting in annual meetings of the fund family's portfolio firm that take place from September, 2011 to June, 2014. Columns (1) through (3) report results for fund-families with at least one passive fund voting on SOP proposals. Columns (4) through (6) report results for a subsample of fund-families with passive funds voting and at least one active fund in the same fund-family voting on the same SOP proposal. Columns (7) to (9) report results for a subsample of fund-families with passive funds voting and above median proportion of active funds in the same fund-family voting in the same SOP proposal. **R2000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 2000 index in year $t$. **Duration Increase** is an indicator variable which takes value of one if the percentage change in CEO compensation duration is positive. **ISSrecomm** is a dummy variable which takes the value of one if the voting recommendation of ISS on the SOP proposal is in line with the management's recommendation. **ffamily_holding** is the percentage shares held by the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. In all specifications, **banding controls** are included to make the index assignment conditionally random. Different fixed effects (FE) are used as reported. "**ffamily**" is the fund-family fixed effect, "**ffamily_yr**"is the fund-family*year fixed effect, and "**firm_ffamily**" is the portfolio_firm*fund-family fixed effect. The sample consists of mutual funds that can be matched with 13-F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund family*year.

| | Vote-For-Mgmt | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At least one passive | | | At least one active | | | Above median active fund proportion | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| R2000Movers | -0.037 | -0.037 | -0.030 | -0.075** | -0.073** | -0.103** | -0.068 | -0.069 | -0.095 |
| | (-1.451) | (-1.453) | (-0.831) | (-2.468) | (-2.458) | (-2.331) | (-1.510) | (-1.557) | (-1.203) |
| Duration Increase | 0.014*** | 0.015*** | 0.012** | 0.015** | 0.016** | 0.015* | 0.019** | 0.020** | 0.024** |
| | (2.667) | (2.745) | (2.254) | (2.389) | (2.455) | (1.907) | (2.414) | (2.506) | (2.205) |
| R2000Movers×Duration Increase | 0.058* | 0.053 | 0.045 | 0.093** | 0.084** | 0.100* | 0.120** | 0.108** | 0.115 |
| | (1.753) | (1.634) | (0.944) | (2.518) | (2.276) | (1.742) | (2.390) | (2.143) | (1.444) |
| ISSrecomm | 0.487*** | 0.487*** | 0.425*** | 0.450*** | 0.451*** | 0.406*** | 0.495*** | 0.496*** | 0.470*** |
| | (11.885) | (11.906) | (7.514) | (9.225) | (9.233) | (5.556) | (9.045) | (9.082) | (5.339) |
| ffmaily_holding | 0.876*** | 0.991*** | -0.030 | 0.815** | 0.921*** | -0.017 | 0.965** | 1.048** | 0.111 |
| | (3.439) | (3.759) | (-0.103) | (2.498) | (2.737) | (-0.055) | (2.426) | (2.527) | (0.284) |
| Banding Control | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily |
| N | 14886 | 14876 | 11578 | 9949 | 9946 | 7678 | 7605 | 7602 | 5382 |
| $Adj.R^2$ | 0.334 | 0.345 | 0.412 | 0.301 | 0.314 | 0.406 | 0.308 | 0.322 | 0.415 |

## Table A10: Passive institution voting on Say-on-Pay proposal

This table reports passive funds voting on Say-on-Pay (SOP) proposals when a portfolio firm switches to Russell 2000 index and when CEO compensation duration increases by above the sample median. The dependent variable is the proportion of passive funds belonging to a fund family that voted in line with the management's recommendation on the SOP proposals (Vote-For-Mgmt: equation (4) in Appendix A) subject to shareholder voting in annual meetings of the fund family's portfolio firm that take place from September, 2011 to June, 2014. Columns (1) through (3) report results for fund-families with at least one passive fund voting on SOP proposals. Columns (4) through (6) report results for a subsample of fund-families with passive funds voting and at least one active fund in the same fund-family voting on the same SOP proposal. Columns (7) to (9) report results for a subsample of fund-families with passive funds voting and above median proportion of active funds in the same fund-family voting in the same SOP proposal. **R2000Movers** is an indicator which takes value of one if a portfolio firm switches to Russell 2000 index in year $t$. **ΔDuration_Above Med** is an indicator variable which takes value of one if the percentage change in CEO compensation duration is above the sample median. **ISSrecomm** is a dummy variable which takes the value of one if the voting recommendation of ISS on the SOP proposal is in line with the management's recommendation. **ffamily_holding** is the percentage shares held by the fund family in the portfolio firm measured as of the recent quarter from the annual meeting date. In all specifications, **banding controls** are included to make the index assignment conditionally random. Different fixed effects (FE) are used as reported. "**ffamily**" is the fund-family fixed effect, "**ffamily_yr**"is the fund-family*year fixed effect, and "**firm_ffamily**" is the portfolio_firm*fund-family fixed effect. The sample consists of mutual funds that can be matched with 13-F holdings data which have holdings on 500 firms around the Russell 1000/2000 index threshold. The numbers in parentheses are $t$-statistics based on standard errors clustered by fund family*year.

| | Vote-For-Mgmt | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | At least one passive | | | At least one active | | | Above median active fund proportion | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| R2000Movers | -0.038 | -0.038 | -0.032 | -0.077** | -0.075** | -0.106** | -0.070 | -0.071 | -0.098 |
| | (-1.493) | (-1.491) | (-0.905) | (-2.527) | (-2.511) | (-2.401) | (-1.548) | (-1.593) | (-1.239) |
| ΔDuration Above Med | 0.012** | 0.013** | 0.007 | 0.012** | 0.012** | 0.008 | 0.016** | 0.017** | 0.016** |
| | (2.492) | (2.576) | (1.506) | (2.039) | (2.104) | (1.362) | (2.290) | (2.386) | (2.032) |
| R2000Movers×ΔDuration Above Med | 0.060* | 0.055* | 0.050 | 0.097** | 0.088** | 0.106* | 0.123** | 0.111** | 0.121 |
| | (1.789) | (1.673) | (1.036) | (2.563) | (2.328) | (1.812) | (2.395) | (2.155) | (1.499) |
| ISSrecomm | 0.488*** | 0.488*** | 0.425*** | 0.451*** | 0.452*** | 0.407*** | 0.496*** | 0.497*** | 0.471*** |
| | (11.914) | (11.935) | (7.525) | (9.254) | (9.262) | (5.571) | (9.075) | (9.113) | (5.358) |
| ffmaily_holding | 0.875*** | 0.990*** | -0.030 | 0.811** | 0.918*** | -0.021 | 0.961** | 1.044** | 0.107 |
| | (3.442) | (3.764) | (-0.104) | (2.496) | (2.737) | (-0.071) | (2.428) | (2.529) | (0.272) |
| Banding Control | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FE | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily | ffamily | ffamily_yr | firm_ffamily |
| N | 14886 | 14876 | 11578 | 9949 | 9946 | 7678 | 7605 | 7602 | 5382 |
| $Adj.R^2$ | 0.334 | 0.345 | 0.412 | 0.301 | 0.314 | 0.405 | 0.308 | 0.321 | 0.415 |

## Table A11: Firm-level voting support in Say-on-Pay proposal

The table reports the effect of CEO compensation duration changes on Say-on-Pay (SOP) proposal voting support for Russell 2000 index switchers. The dependent variable for columns (1) to (4), *Voting Support*, is the total number of *FOR* votes received in SOP proposal divided by the total number of votes entitled to vote. **Duration Above Med** is an indicator variable which takes value of one if CEO compensation duration is above the sample median measured during the fiscal year after the Russell index reconstitution. **R2000Movers** is an indicator which takes value of one if a firm switches to Russell 2000 index in year $t$. **Duration Increase** is an indicator variable which takes value of one if the percentage change in CEO compensation duration is positive. **ΔDuration_Above Med** is an indicator variable which takes value of one if the percentage change in CEO compensation duration is above the sample median. **ΔDuration Above P75** is an indicator variable which takes value of one if the percentage change in CEO compensation duration is above the 75th percentile of the sample. The previous year's cumulative stock return (Prev_1yr_ret) is included to control for the past firm performance. The firm controls include, the logarithm of market capitalization (log_size), ROA, book-to-market(BTM) and leverage (LEV) is added to control for firm characteristics. The **banding controls**, the determinants of index assignments, are included in the regression in columns (2) and (4). The sample includes 500 firms around Russell 1000/2000 index thresholds which have SOP votes put to vote during the annual shareholder meeting held from September 2011 to June 2014. A combination of firm (Firm FE), industry (IND FE: SIC-3digit), and year fixed effects (Year FE) are included. The numbers in parentheses are $t$-statistics based on standard errors clustered by firm.

| | Voting Support | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| R2000Movers | -0.025 | 0.016 | 0.015 | -0.015 |
| | (-0.419) | (0.294) | (0.285) | (-0.250) |
| Duration Above Med | 0.019* | | | |
| | (1.677) | | | |
| R2000Movers × Duration Above Med | 0.127* | | | |
| | (1.809) | | | |
| Duration Increase | | 0.006 | | |
| | | (0.887) | | |
| R2000Movers ×Duration Increase | | 0.018 | | |
| | | (0.162) | | |
| ΔDuration Above Med | | | 0.004 | |
| | | | (0.658) | |
| R2000Movers × ΔDuration Above Med | | | 0.019 | |
| | | | (0.170) | |
| ΔDuration Above P75 | | | | -0.002 |
| | | | | (-0.299) |
| R2000Movers×ΔDuration Above P75 | | | | 0.178** |
| | | | | (2.216) |
| Prev_1yr_ret | 0.008 | 0.012* | 0.012* | 0.012* |
| | (1.319) | (1.752) | (1.764) | (1.755) |
| Banding Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| N | 1403 | 1177 | 1177 | 1177 |
| $Adj.R^2$ | 0.397 | 0.381 | 0.380 | 0.385 |

Table A12: Passive institutions vote in board of director elections for Russell 2000 index switchers

The table reports the effect of voting support from mutual funds (passive and non-passive) in uncontested director elections and its relation on CEO compensation duration for Russell 2000 index switchers. The dependent variable for columns (1) and (2) is CEO compensation duration measured at the next fiscal year ($t+1$) of the index assignment year. For columns (3) and (4), the dependent variable is the percentage change in duration from fiscal year $t$ to fiscal year $t+1$. For columns (5) and (6), the dependent variable is the simple raw change in duration from fiscal year $t$ to fiscal year $t+1$. **R2000Movers** is an indicator which takes value of one if a firm switches to Russell 2000 index in year $t$. **Passive_high_Q4** is an indicator variable which takes value of one if a firm received above 75th percentile of average support votes from passive institutions (the average of passive institution votes that are in line with the management recommendations at the firm level) in board of director elections put onto vote in annual meetings after the index reconstitution (annual meetings held from September, $t$ to June, $t+1$). **R2000Movers×Passive_high_Q4** is an interaction term between R2000Movers and Passive_high_Q4. **Non-Passive_high_Q4** is an indicator variable which takes value of one if a firm received above 75th percentile of average support votes from non-passive institutions (the average of non-passive institution votes that are in line with the management recommendations at the firm level) in board of director elections in the annual meetings that are held following the index reconstitution. **Non-Passive_high_Q4 ×R2000Movers** is an interaction term between Non-Passive_high_Q4 and R2000Movers. **prev_1yr_ret** is the past one year performance of the portfolio firm. Passive funds and non-passive funds are categorized using fund names as explained in the text (section 2.1.1). In all specifications, 'banding controls' are included which makes the index assignment conditionally random. More detailed description on the banding controls are available in Appendix A. The firm controls are ROA, R&D-to-asset, market-to-book, debt-to-asset, longterm_asset, sales_growth, sales_growth volatility, CAPEX to asset, EBIT to sales, and the average bid-ask spread which are known to affect duration (Gopalan et al. (2014)). The detailed description on constructing firm controls are available in Appendix A. The sample consists of 500 firms around the Russell 1000/2000 index threshold firms from June, 2007 to June, 2013. In all specification, industry fixed effects (Ind FE: SIC-3digit) and year fixed effects (Year FE) are included. The numbers in parentheses are $t$-statistics based on standard errors clustered by firm.

| | $\Delta$ Duration | | Duration | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| R2000Movers | 0.023 | 0.238 | 0.171 | 0.228* |
| | (0.158) | (1.520) | (1.103) | (1.658) |
| Passive Voting Above P75 | -0.028 | | -0.009 | |
| | (-0.997) | | (-0.246) | |
| R2000Movers × Passive Voting Above P75 | 0.471* | | 0.254 | |
| | (1.731) | | (1.227) | |
| Non-Passive Voting Above P75 | | -0.012 | | 0.060 |
| | | (-0.487) | | (1.565) |
| R2000Movers × Non-Passive Voting Above P75 | | -0.075 | | 0.093 |
| | | (-0.240) | | (0.389) |
| Prev_1yr_ret | 0.028 | 0.020 | 0.033 | 0.040 |
| | (0.659) | (0.469) | (0.662) | (0.813) |
| Banding Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| Ind FE | Yes | Yes | Yes | Yes |
| N | 2266 | 2335 | 2721 | 2812 |
| $Adj.R^2$ | -0.022 | -0.017 | 0.172 | 0.172 |