Three essays on corporate finance

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Introduction

The dissertation comprises three essays on corporate finance.

Essay one examines whether the monitoring effectiveness of institutional investors varies with the number of stocks they hold as the largest institutional blockholder (institutional blockholding number). We find that a larger institutional blockholding number is associated with higher nonroutine CEO turnover-performance sensitivity, more frequent proxy voting against management, and higher abnormal returns around forced CEO turnover announcements and Schedule 13D filings. These results are particularly evident when institutional investors have multiple blockholdings in the same industry, when they have prior nonroutine CEO turnover experience in their other portfolio firms, or when their aggregate holding periods of block ownership in their portfolio firms are longer. Moreover, the change in Tobin's q is higher for firms with a larger institutional blockholding number than for firms with a smaller institutional blockholding number. Our results suggest that information advantages resulting from past learning are important channels through which institutional investors with multiple blockholdings perform effective monitoring.

Essay two examines whether a firm's financing decision (SEO) affects the market value of other firms that share the same largest institutional blockholder as the issuer. We find that the stock prices of non-SEO firms in the portfolio react negatively when other portfolio firms make SEO announcements. We further find that after controlling for horizontal and vertical industrial information transfers, this spillover effect is more pronounced when issuers (non-issuers) have high information asymmetry or when their stocks are overvalued prior to an offering, or when issuers and non-issuers share similar characteristics (e.g., B/M, price momentum) or similar corporate policies (e.g., leverage policy). The spillover effect is also more evident when non-issuers have a near-term equity financing plan, when issuers time the market for their equity offerings, or when issuers' largest institutional blockholders

manage a small fund or have a small number of largest institutional blockholdings. These results suggest that stock offers by firms with a largest institutional blockholder induce investors' adverse selection concerns for issuers as well as other firms in the same portfolio and that this adverse selection effect is particularly pronounced when the firms held by the common largest institutional blockholder are relatively homogeneous or share similar styles.

Essay three provides direct empirical evidence to the theoretical argument that competition for managerial talents explains the growth of executive pay. We examine this prediction from the perspective of executive job-hopping. Companies that lose executives to other firms raise pay dramatically for their remaining executives. The pay raise is mainly in the form of equity-based compensation and is more pronounced when the remaining executives have better employment mobility in the labor market. Overall, this paper provides direct evidence that competition for top executives drives up executive compensation.

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Essay One: Are Institutional Investors with Multiple Blockholdings Effective Monitors?

Abstract

We examine whether the monitoring effectiveness of institutional investors varies with the number of stocks they hold as the largest institutional blockholder (institutional blockholding number). We find that a larger institutional blockholding number is associated with higher nonroutine CEO turnover-performance sensitivity, more frequent proxy voting against management, and higher abnormal returns around forced CEO turnover announcements and Schedule 13D filings. These results are particularly evident when institutional investors have multiple blockholdings in the same industry, when they have prior nonroutine CEO turnover experience in their other portfolio firms, or when their aggregate holding periods of block ownership in their portfolio firms are longer. Moreover, the change in Tobin's q is higher for firms with a larger institutional blockholding number than for firms with a smaller institutional blockholding number. Our results suggest that information advantages resulting from past learning are important channels through which institutional investors with multiple blockholdings perform effective monitoring.

Keywords: Corporate governance, Institutional ownership, Monitoring, Blockholdings, Experience

JEL Codes: G30, G32, G34

I. Introduction

Previous studies show that unlike small dispersed shareholders, large shareholders have strong incentives to monitor management and take actions that increase firm value (Grossman and Hart (1980), Shleifer and Vishny (1986)). For example, Demsetz and Lehn (1985) show that blockholders with a long-term investment horizon have strong incentives to monitor management, and Carleton, Nelson, and Weisbach (1998) find that institutional investors influence firms to adopt boards that are more responsive to shareholder concerns.¹ However, despite extensive research on the importance of large institutional shareholders in corporate governance, the literature has paid little attention to whether institutional investors' monitoring incentives and effectiveness vary with the number of stocks they hold as large shareholders and where the potential value gains created by such simultaneous holdings come from if in fact they do exist. This lack of evidence is surprising given the fact that many institutional investors in the U.S. serve as large blockholders for various different firms at the same time.²

This study seeks to shed light on these unexplored issues using institutional holding data on a large sample of U.S. public firms for the period 1993 to 2008. We argue that holding a large number of block shares provides institutional investors with enhanced capabilities and incentives to monitor their portfolio firms because the learning and monitoring experience obtained from multiple blockholdings reduces the costs and the information uncertainty associated with monitoring activities. For example, compared with institutional investors who hold few block shares, those holding many block shares may have more opportunities to obtain governance-relevant information through their monitoring experience and learning accumulated from blockholdings in their portfolio firms. To the extent that such governance-relevant

¹ See Holderness (2003) for a review of the evidence on the effects of blockholders on major corporate decisions and firm value.

² According to institutional ownership data from CDA/Spectrum Institutional (13F) Holdings for the period 1993 to 2008, a firm's largest institutional investor on average serves as the largest institutional blockholder for six different firms at the same time. Consistent with the view that multiple holdings by institutional investors have become increasingly important, Matvos and Ostrovsky (2008) and Harford, Jenter, and Li (2011) show that institutional cross-holdings in the U.S. have increased substantially in recent years.

information is important in reducing information search and monitoring costs, institutional blockholders with more blockholdings are likely to perform more effective monitoring than those with fewer blockholdings. Thus, multiple blockholdings enable institutional investors to enjoy information advantages arising from information spillover and learning effects, and these advantages provide them with enhanced capabilities and incentives to monitor their portfolio firms.

The argument that the experience and learning arising from multiple blockholdings matter for institutional monitoring has several testable implications. First, we expect that the monitoring effectiveness of institutional blockholders is more pronounced when they have multiple holdings in firms operating in the same industry.³ Since in many aspects of their business, such as asset characteristics, business practices, and financial policies, there is commonality among firms in the same industry, multiple holdings in firms in the same industry will allow investors to accumulate industry-specific knowledge and experience that are relevant for the future monitoring of other firms in the same industry. Consistent with this view, Bottazzi, Da Rin, and Hellmann (2008) find that venture capital firms whose partners have more industry experience show more activism by actively recruiting the firm's management team and directors, helping firms with fundraising, and frequently interacting with their portfolio firms. Gompers et al. (2008) also find that venture capital firms with more industry experience, measured by the number of investments in the industry, have higher investment sensitivity to investment opportunities but those with overall experience across all industries do not, suggesting that a network of industry contacts is important in venture capital investments. These findings suggest that experience accumulation and learning effects arising from multiple blockholdings are stronger when institutional investors hold multiple large ownerships in the same industry.

Second, we expect that institutional blockholders' monitoring is more effective when they have prior monitoring experience (e.g., nonroutine CEO turnover) in their other portfolio firms because such experience helps to reduce the monitoring costs associated with future governance activities. Several

³ For expositional purposes, we use the terms multiple holdings and multiple blockholdings interchangeably.

papers have examined the importance of experience in corporate governance and firm/fund performance. For example, Sørensen (2007) shows that firms funded by more experienced venture capitalists who have participated in more investment rounds are more likely to succeed in going public since these venture capitalists are better at monitoring and selecting good firms. Boyson and Mooradian (2012) also show that hedge fund activists with experience in their specialized industries or those with prior experience as a research director or portfolio manager at similar hedge funds improve both targets' long-term performance and their own performance. Thus, institutional investors' governance experiences in their portfolio firms in which they hold large shares likely enhance their monitoring effectiveness if their blockholdings function as a channel through which they accumulate governance-relevant experience and information.

Third, we expect that institutional monitoring is more effective when institutional investors serve as the blockholders for their portfolio firms over a longer period of time.⁴ Demsetz and Lehn (1985) and Chen, Harford, and Li (2007) argue that large shareholders' monitoring incentives increase with their investment horizon. The holding periods of block ownership can affect an institution's ability to access information about its portfolio firms since the institution with a long investment horizon can accumulate better quality information about the firm over its holding periods and thus may have significant information advantages over the institution with a short investment horizon. These arguments suggest that institutional investors that serve as the blockholders over long horizons are more likely to learn, practice, and accumulate governance skills through monitoring experience in their portfolio firms than short-horizon institutional investors. Consistent with this prediction, measuring a fund manager's experience in terms of her tenure with the fund and the number of years she has worked in the city, Christoffersen and Sarkissian (2009) find that funds in large cities outperform other funds only when they are managed by more experienced managers. Thus, institutions' aggregate holding periods of block shares

⁴ We measure an institution's aggregate holding period as the sum of the holding periods for all of its block shares.

are likely to have a positive influence on their learning and monitoring experience and thus improve their governance incentives and ability.

Overall, the above arguments suggest that multiple blockholdings allow institutional investors to enjoy information advantages arising from information spillover and learning effects and that these information advantages provide them with enhanced capabilities and incentives to monitor their portfolio firms. These arguments also suggest that the effect of multiple blockholdings on institutional monitoring is particularly pronounced when institutional investors (a) have more industry experience (i.e., multiple holdings in firms operating in the same industry), (b) have prior monitoring experience (i.e., forced CEO turnover in their portfolio firms), or (c) serve as the blockholders for their portfolio firms over a long horizon (i.e., longer aggregate holding periods as a blockholder).

It is worth noting that there is the possible counter argument that multiple holdings reduce institutional investors' monitoring effectiveness because they make institutional investors too busy to monitor management. For example, Fich and Shivdasani (2006) argue that overcommitted outside directors have little time to monitor and advise a firm's management and show that firms with a majority of outside directors holding three or more directorships ("busy boards") are associated with weak corporate governance. However, this limited attention argument is unlikely to apply to institutional monitoring because unlike individuals, institutions can always hire additional personnel to perform monitoring functions and thus do not face time constraints in monitoring corporate managers.

To examine the effect of multiple blockholdings on institutional monitoring, we measure the number of blockholdings conditional on institution size and type using the following residual approach. First, using the 13F institutional holdings database, for each firm, we identify the largest institutional blockholder that owns at least 5% of the firm's outstanding shares. We then count the number of firms that each institutional investor holds as the largest institutional blockholder ("raw number"). Next, we regress the raw number on the total market value of the institution's equity investment, indicators for institution types, and year indicators to obtain the residual holding number. We define the residual

holding number for a firm's largest institutional blockholder as the "institutional blockholding number." This residual approach ensures that the large number of stocks held by institutional investors as blockholders is not simply due to their financial resources (i.e., fund size) to buy more stocks. This approach also mitigates the concern that institutions of different types engage in different portfolio holding strategies and have different monitoring incentives. Finally, for firms that have institutional blockholders, we define an indicator variable that takes the value of one if the firm's institutional blockholding number is greater than or equal to the sample median and zero otherwise ("multiple blockholding indicator"). The multiple blockholding indicator is set to zero for firms with no institutional blockholder. We use this indicator as our key variable of interest to examine the monitoring effectiveness of institutional investors with multiple blockholdings.

We find strong evidence that the number of stocks that the institutional investor holds as the largest institutional blockholder significantly increases the investor's monitoring incentives and effectiveness. Specifically, we find that the forced CEO turnover sensitivity to performance is significantly higher when the firm has an institution with a larger holding number as its largest institutional blockholder. We also find that firms with a larger institutional blockholding number realize higher abnormal returns around a forced CEO turnover announcement.

As more direct tests, we conduct two sets of subsample analyses. First, we examine proxy voting decisions by mutual funds which are the largest institutional shareholders of our sample firms and show that mutual funds with more blockholdings are more likely to vote against management. Second, we investigate stock price reactions around initial Schedule 13D filings by institutional investors targeting the sample firms and find that the stock returns are higher when the activist institutions have more blockholdings. Thus, the market's ex-ante valuation of institutional monitoring is particularly strong when activist institutions hold more firms as the largest institutional blockholder.

The above results are particularly evident when institutional investors (a) have more industry experience from multiple holdings in the same industry, (b) have specific monitoring experience such as

prior nonroutine CEO turnover in their other portfolio firms, or (c) hold block shares for a longer period of time. These results support our argument that multiple blockholdings enhance institutions' monitoring incentives and capabilities through information spillover and learning effects.

Finally, we examine whether the presence of a largest institutional blockholder with multiple holdings affects firm performance. We find that the multiple blockholding indicator is positively and significantly associated with changes in Tobin's q , further showing the importance of multiple holdings in institutional monitoring.

In addressing the effect of multiple blockholdings on institutional monitoring, we pay considerable attention to the potential endogeneity bias that may exist in our tests. First, it is possible that omitted unobservable firm or institution characteristics affect both the institutional blockholding number and the institution's monitoring (firm performance), resulting in a spurious correlation between the two. For example, firms with high growth options could attract large equity investments by institutional investors with multiple blockholdings and also face more monitoring needs (perform better). Alternatively, an institution's ability to identify undervalued stocks might be correlated with both the institutional blockholding number and its monitoring activities. We attempt to address these endogeneity issues using firm (institution) fixed effects. Second, if institutions with more holdings have fewer incentives to monitor their portfolio firms due to their time constraints, firms with good governance (performance) would attract more investments by these institutions and would also be associated with fewer agency problems (better performance). In this case, the direction of causation goes from good governance (performance) to a large institutional blockholding number and not the other way around. We address this endogeneity bias using event study and instrumental variables approaches. Our results are robust to controlling for these endogeneity problems.

Our paper contributes to the ongoing debate about the monitoring role of institutional investors by exploring a new dimension of institutional monitoring. Prior studies show that different institutional investors perform different monitoring roles in influencing corporate strategies and policies. For example,

Cornett et al. (2007) find a positive relation between institutional ownership and operating performance only when institutions are less likely to have business relationships with their portfolio firms. Bushee (1998) shows that although firms with higher institutional ownership are less likely to cut R&D investment, this is not the case if institutions have higher portfolio turnover and momentum trading strategies. Chen, Harford, and Li (2007) also document that long-term institutional investors without business relations with portfolio firms are effective monitors and that their presence is associated with post-merger performance improvement and bad bid withdrawals. Our study shows that institutional investors with multiple blockholdings perform a more effective monitoring role, suggesting that information advantages resulting from past experience and learning are important channels through which institutional investors perform effective monitoring. Thus, our study identifies institutional investors with multiple blockholdings as another important type of active monitors.

Our study also complements a growing literature on the role of prior experience in institutional investments and performance. Several studies, such as Sørensen (2007), Gompers et al. (2008), and Bottazzi, Da Rin, and Hellmann (2008), document that firms financed by venture capitalists with more experience (or those with managers who have more experience) perform better. Boyson and Mooradian (2012) also find that the targets of experienced hedge fund activists outperform those of less experienced activists. Moreover, Christoffersen and Sarkissian (2009) show that funds managed by more experienced managers in financial centers perform better than other funds. We extend this literature by showing that the multiple blockholding is an important channel through which institutional investors accumulate monitoring experience and enhance learning, and this experience and learning affects institutional investors' governance activities and firm performance.

Finally, our paper extends recent studies that have examined the effects of shareholder portfolio diversification on corporate risk taking. For example, Faccio, Marchica, and Mura (2011) show that firms controlled by large shareholders with more diversified portfolios have higher volatility of profitability.

We introduce a new perspective on this line of research by focusing on experience and learning effects accumulated from multiple blockholdings rather than portfolio diversification effects.⁵

The remainder of this paper is organized as follows. In Section I, we describe the data, the sample characteristics, and the construction of our key variables. Section II investigates the impact of multiple blockholdings on the likelihood of forced CEO turnovers, announcement returns around forced CEO turnovers, institutions' proxy voting decisions, and announcement returns around the initial Schedule 13D filings. Section III analyzes the impact of multiple blockholdings on firm performance. Section IV presents results from the instrumental variables approach and various other robustness tests. Finally, we present our summary and concluding remarks in Section V.

II. Sample and Summary Statistics

II.1. Sample

Our initial sample includes all firms covered in Standard & Poor's ExecuComp, which contains information on CEO characteristics and CEO compensation, for the period 1993 to 2008. To be included in our final sample, a firm's CEO ID is required to be present in ExecuComp because we identify CEO turnover by examining changes in CEO IDs. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings and that their reported total institutional ownership be less than 100%.⁶ Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. After excluding firms in the financial or utilities industries, our final sample consists of 2,220 firms (18,008 firm-year observations). We obtain information on the location of institutional investors' headquarters from SEC EDGAR and several websites (e.g., institutions' websites, Yahoo Finance, Bloomberg Business Week, and other

⁵ We examine whether our measure of multiple blockholdings simply captures the extent of portfolio diversification in Section IV.B.

⁶ The CDA/Spectrum data are based on the SEC's Form 13F filings. Institutional investors with investment discretion over \$100 million or more in equity securities are required to file a quarterly report on all of their equity holdings greater than 10,000 shares or \$200,000 in market value.

professional websites) and the location of firms' headquarters from Compustat. Information on boards of directors and the antitakeover provision index (Gompers, Ishii, and Metrick (2003)) comes from the RiskMetrics Directors Database.

II.2. Variable Construction: Institutional Blockholding Number and Multiple Blockholding Indicator

To examine whether the monitoring effectiveness of institutional investors varies with the number of their blockholdings, we focus on a firm's largest institutional blockholder since it represents a close approximation to the active investor with the most influential ownership and the strongest incentives to monitor firms.⁷ Moreover, this one firm-institution pair approach enables us to construct instrumental variables that use the geographic information of the state where the largest institutional shareholder is headquartered. However, to check the robustness of our results, in Section IV, we experiment with an alternative measure of multiple holdings that takes into account all institutional blockholders. We obtain results that are qualitatively similar to those reported in the paper.

To obtain the number of firms for which an institutional investor serves as the largest institutional blockholder, we identify each firm's largest institutional blockholder with at least 5% ownership using the CDA/Spectrum database. We then count the number of firms for which each institutional investor serves as the largest institutional blockholder ("raw number"). We find that 703 institutions (3,041 institution-year observations) serve as the largest institutional shareholder for at least one of our sample firms. The mean (median) raw number during our sample period is 11 (6). Thus, on average, our sample institution simultaneously serves as the largest institutional blockholder for 11 firms that are covered in the CDA/Spectrum and ExecuComp databases.

⁷ Our sample firms on average have two institutional blockholders that own at least 5% of firms' outstanding shares. The mean equity ownership held by the largest and the second largest institutional shareholders is respectively 9.3% and 5.9%.

The raw number, however, is affected by the size of the funds that institutional investors manage and their types, and so it is unlikely to serve as a valid measure for institutions' monitoring experience. We find that the correlation between the raw number and the market value of total equity holdings managed by the institutional investor is 0.61, which is significant at the 1% level. The correlations between the raw number and legal institution type indicators classified by Form 13F (banks, insurance companies, mutual funds, investment advisors, public pension funds, and other institutional investors such as private pension funds, university endowments, and foundations) range between -0.05 and 0.16, all of which except for one type are significant.⁸ To mitigate the concern regarding these high correlations, we estimate the following regression using institution-quarter observations and use the residual as the measure of the number of large block shares that institutions monitor:

$$\begin{aligned} \text{Raw Number} = & \alpha + \beta \times \text{Institution's Total Market Value of Equity Holdings} + \\ & \text{Institution Type Indicators} + \text{Year Indicators}, \end{aligned} \quad (1)$$

where *Raw Number* is the number of firms for which an institutional investor serves as the largest institutional blockholder for a given quarter, *Institution's Total Market Value of Equity Holdings* is the average market value of the total equity holdings managed by the institutional investor during the previous four calendar quarters deflated by the consumer price index in 2000,⁹ and *Institution Type Indicators* are indicators for legal institution types as classified in Form 13F. To mitigate the effects of outliers, *Raw Number* and *Institution's Total Market Value of Equity Holdings* are winsorized at the 1% level at both tails. We define the “institutional blockholding number” for a firm's largest institutional investor as the residual from equation (1).¹⁰

⁸ Because the user guide by WRDS (Wharton Research Data Services) indicates that the institutional type classification in the CDA/Spectrum Institutional Holdings database is not accurate after 1998, we use Brian Bushee's institutional investor classification data to correct this error. We thank Brian Bushee for sharing his data, which are available on his website (<http://acct3.wharton.upenn.edu/faculty/bushee/>).

⁹ We use the average market value of fund size instead of the logarithm of the market value of fund size because the correlation between the former variable and the raw number is significantly higher than the correlation between the latter variable and the raw number.

¹⁰ Our residual approach is similar to that used in Hong, Lim, and Stein (2000), who use the residual from the regression of analyst coverage on firm size as a proxy for the number of analysts following in explaining the link between momentum and analyst coverage.

As expected, the correlation coefficients between the institutional blockholding number and *Institution's Total Market Value of Equity Holdings* and between the institutional blockholding number and *Institution Type Indicators* are zero and statistically insignificant. Therefore, our residual approach appears to substantially mitigate the concerns regarding the mechanical correlations between the blockholding number and fund size (institution type) and the potential multicollinearity problems that arise when these variables are included together as explanatory variables in the same regressions.

We then introduce the multiple blockholding indicator as a measure of the presence of institutional investors with more blockholdings. Specifically, for each sample firm, the multiple blockholding indicator takes the value of one if the institutional blockholding number is greater than or equal to the sample median and zero otherwise. The indicator is set to zero if firms do not have any institutional blockholder since it is unlikely that institutional investors with small ownership have strong monitoring incentives.¹¹ Throughout the paper, we use this multiple blockholding indicator to capture the presence of institutional blockholders with more holdings and examine its effect on institutions' monitoring activities and firm value/performance.¹²

II.3. Summary Statistics

[Insert Table I Here]

Table I reports the distribution of our full sample of 18,008 firm-year observations and the fraction of firms with a larger institutional blockholding number (i.e., multiple blockholding indicator = 1) by industry and year.¹³ The fraction of firms with a larger institutional blockholding number across the

¹¹ In untabulated tests, we exclude firms without institutional blockholders from the analysis and reestimate all of the regressions reported in the paper. With one exception, namely that the coefficient estimate on the multiple blockholding indicator is not significant in Table IX, our results do not change.

¹² In untabulated tests, we also reestimate all the analyses in the paper by including Institution's Raw Number, Institution's Total Market Value of Equity Holdings, a squared term of Institution's Total Market Value of Equity Holdings, Institution Type Indicators, and other control variables as the independent variables in the same regression and find similar results.

¹³ The small number of sample firms in 1993 is due to our requirement that a firm's CEO ID be present in ExecuComp for two consecutive years to identify CEO turnover. ExecuComp starts in 1992, and for this year, its coverage is significantly lower compared with later years.

industries ranges between 39.1% and 44.9%, with the mining and construction industries having the highest fraction. We also find that during recent years, the fraction of firms with a larger institutional blockholding number has increased substantially. For example, in 2008, which is the last year in our sample period, 63.2% of our sample firms have a multiple blockholding indicator of one. The corresponding numbers before 2005 are below 40%. Thus, the presence of a largest institutional blockholder with more holdings is prevalent in many publicly listed firms in the U.S., particularly in the later part of our sample period.¹⁴

[Insert Table II Here]

Table II Panel A compares the summary statistics of firm- and CEO-specific characteristics for a subsample of firms with a larger institutional blockholding number with those for a subsample of firms with a smaller institutional blockholding number. Detailed definitions of the variables used in Table II are provided in the Appendix.

Several observations are noteworthy. First, we find that compared to firms with a smaller institutional blockholding number, those with a larger institutional blockholding number have lower stock and operating performance, lower Tobin's q , lower leverage, and higher stock return volatility. Furthermore, firms with a larger institutional blockholding number make fewer investments, are smaller, have higher total institutional ownership, and represent a smaller portion of their largest institutional shareholder's total market value of equity holdings. Second, CEOs hold higher equity ownership and are less likely to serve as chairman of the board when their firms have a larger institutional blockholding number.

Table II Panel B reports the institution-specific characteristics for a sample of 3,041 institution-year observations as of the last quarter of each calendar year. The panel shows that while the mean (median) number of firms for which institutions with an above-median institutional blockholding number serve as the largest institutional blockholder is 32 (36), the corresponding number for institutions with a below-median institutional blockholding number is 7 (4). We also find that the average number of firms

¹⁴ Because of how we define the multiple blockholding indicator, its distribution differs depending on the sample firms used in the particular analysis.

in the same industry that institutions hold during the previous two years is more than twice as large for institutions with an above-median institutional blockholding number than it is for institutions with a below-median institutional blockholding number. Moreover, during the prior two years, institutions with an above-median institutional blockholding number experience forced CEO turnovers in their portfolio firms four times more frequently than those with a below-median institutional blockholding number. Finally, we find that institutions with an above-median institutional blockholding number manage larger portfolios; are more likely to be classified as independent, dedicated, and independent long-term institutional investors;¹⁵ maintain longer blockholding relationships with their portfolio firms; and have lower portfolio turnover.

III. Impact of Institutional Blockholding Number on Governance Activities

To investigate whether multiple holdings affect institutional monitoring, in this section, we investigate the impact of the institutional blockholding number on the likelihood of forced CEO turnover and forced CEO turnover announcement returns.

III.1. Forced CEO Turnover

III.1.1. Sensitivity of Forced CEO Turnover to Performance

In this subsection, we estimate a logit regression of the likelihood of nonroutine top executive turnover on the multiple blockholding indicator and other control variables. We focus on nonroutine top

¹⁵ Following Cornett et al. (2007) and Chen, Harford, and Li (2007), we use institutional investors' legal types to classify institutions into independent and dependent investors. Independent institutional investors include investment companies, independent investment advisors, and public pension funds. All other types of institutional investors are classified as dependent institutional investors. These studies show that independent institutional investors are less likely to have business relationships with firms and are better suited to monitor than dependent institutional investors. Following Bushee (2001), we also classify an institution as a dedicated investor according to its expected investment horizon. Similar to Chen, Harford, and Li (2007), an institutional investor is classified as independent long-term institutional investor if it is an independent institution and also a dedicated or quasi-indexer investor with block ownership in a firm for at least one year.

executive turnover events because they are considered one of the most aggressive actions taken by large shareholders in the course of corporate governance (Denis, Denis, and Sarin (1995)).

We consider a top executive turnover event as occurring in a given year when a firm's CEO ID in *ExecuComp* differs from that in the prior year. From 1993 to 2001, our forced CEO turnover data is the same as those used in Jenter and Kanaan (2012).¹⁶ For the rest of our sample period, we search news stories on *Factiva* to classify the turnover event as either nonroutine or routine turnover. Following Denis, Denis, and Sarin (1995), Parrino (1997), and Jenter and Kanaan (2012), we classify a management change as nonroutine if the news articles report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences. We also classify a management change as nonroutine if the departing CEO is under the age of 60 and the stated reason for the departure is not due to death, poor health, or the acceptance of another position. Finally, we classify a management change as nonroutine if the stated reason for the change is retirement but the retirement was not announced at least six months before the turnover. This procedure yields a total of 1,989 CEO turnover events, 467 of which are classified as nonroutine.¹⁷

[Insert Table III Here]

Table III presents the results of logit regressions in which the dependent variable is set to one if a forced CEO turnover event occurs and zero otherwise. We estimate p -values using robust standard errors to adjust for heteroskedasticity (White (1980)). Our key variable of interest is the interaction term between past stock performance, measured by previous one-year market-adjusted stock return, and the multiple blockholding indicator. The regressions include institution-, firm-, and CEO-specific characteristics as control variables. As institution-specific characteristics, we first include the largest institutional shareholder's portfolio weight in the sample firm since the largest institutional shareholder

¹⁶ We thank Dirk Jenter for providing us with forced CEO turnover data from 1993 to 2001.

¹⁷ Although we do not include routine turnover events in our analysis, our results do not change if we treat routine turnover events as belonging to the group with no CEO turnover and reestimate the regressions. We also perform a placebo test by excluding nonroutine CEO turnover events from the sample and using the routine CEO turnover indicator as the dependent variable. We find that the multiple blockholding indicator is not significantly associated with routine CEO turnover-performance sensitivity.

would have stronger monitoring incentives when the firm accounts for a larger fraction of its portfolio.¹⁸ Second, we control for institutions' past portfolio returns as large fund inflows induced by their past superior performance may allow them to simultaneously hold large ownership positions in many different firms. It is also possible that their past portfolio performance simply reflects their monitoring ability. We also control for institutional shareholders' past portfolio turnover since portfolio turnover can proxy for their monitoring incentives (Gaspar, Massa, and Matos (2005)).

As firm-specific characteristics, we control for firm size, Tobin's q , leverage, stock return volatility, and total institutional ownership. We include firm size because Farrell and Whidbee (2003) and Huson, Parrino, and Starks (2001) find that CEO turnover is positively related to firm size. We include leverage because Gilson (1989) and Gilson and Vetsuypens (1993) show that leverage is associated with a high likelihood of top management turnover during financial distress. Stock return volatility is included because performance risk is known to affect CEO turnover (Bushman, Dai, and Wang (2008)), and Tobin's q is included because a top executive is more likely to be dismissed if he fails to create sufficient growth opportunities (Gong and Wu (2011)). Finally, we include total institutional ownership because institutions as a whole may play an important monitoring role in top executive turnover.

As CEO-specific characteristics, we control for CEO age, CEO tenure, CEO equity ownership, and a CEO-chairman duality indicator that takes the value of one if the CEO is the chairman of the board and zero otherwise. Finally, to control for potential industry effects and time trends, we include industry and year fixed effects, respectively.¹⁹

In regression (1), we find that past stock performance is significantly and negatively associated with the likelihood of forced CEO turnover, confirming the prior findings that firms with poorer performance are more likely to experience nonroutine top executive turnover (Weisbach (1988)).²⁰

¹⁸ When we measure institution-specific characteristics, we use all largest institutional investors that include both block and non-block shareholders.

¹⁹ Because of the lack of within-firm variation in the dependent variable, including firm fixed effects is not feasible in the Table III regressions.

²⁰ Using industry-adjusted stock returns in the Table III regressions yields similar results.

In regression (2), we find that the sensitivity of forced CEO turnover to stock performance is higher for the firms whose largest institutional blockholders have more blockholdings (i.e., multiple blockholding indicator = 1). Specifically, the interaction term between the multiple blockholding indicator and past stock performance is negatively and significantly related to the likelihood of forced CEO turnover at the 1% level.²¹

To further examine whether the sensitivity of forced CEO turnover to performance is related to the institutional blockholding number, in untabulated tests, we divide the sample into two subgroups according to the multiple blockholding indicator and estimate the marginal effects of past stock performance separately for these two subgroups. We find that for the subsample of firms with a multiple blockholding indicator of one, the marginal effect of past stock performance is negative and significant at the 1% level. Economically, a one-standard-deviation decrease in the past market-adjusted stock return is associated with a 1.4 percent point increase in the likelihood of forced CEO turnover. Given that the unconditional probability of forced CEO turnover is 2.6% for our full sample, the 1.4 percentage point increase is economically large and significant. In contrast, the corresponding marginal effect for the subsample of firms with a multiple blockholding indicator of zero is statistically insignificant and economically small: a one-standard-deviation decrease in the past market-adjusted stock return leads to only a 0.3 percentage point increase in the likelihood of forced CEO turnover. Overall, these results suggest that institutional investors play a more active governance role in their portfolio firms when they hold more stocks as the largest institutional blockholder.

In regression (3), we decompose the multiple blockholding indicator into high- and low-industry-experience multiple blockholding indicators according to whether a firm's largest institutional blockholder has been the largest institutional blockholder for at least one more firm in the

²¹ In unreported tests, we follow Ai and Norton (2003) to perform graphical analyses and find that for most observations, the marginal effects for the interaction term between the prior market-adjusted stock return and the multiple blockholding indicator are clustered between 0% and -10% and their *z*-statistics are densely distributed around the 5% significance level, suggesting that the effects of the interaction term on the likelihood of nonroutine CEO turnover are statistically significant for most observations.

same industry as the sample firm during the past two years. If the results in regression (2) are driven by institutions' monitoring experience and learning accumulated from their multiple blockholdings, we expect these results to be more pronounced when they hold multiple blockholdings in the same industry since such holdings allow them to effectively obtain industry-specific information and accumulate monitoring experience. Consistent with our expectation, the coefficient estimate on the interaction term between the high-industry-experience multiple blockholding indicator and past stock performance is negative and significant but that involving the low-industry-experience multiple blockholding indicator is insignificant.

In regression (4), we decompose the multiple blockholding indicator into high- and low-turnover-experience multiple blockholding indicators according to the sample median frequency of nonroutine CEO turnover that a firm's largest institutional blockholder experienced in its other portfolio firms during the past two years.²² If monitoring experience and learning provide investors with better governance skills and enhanced monitoring capabilities, we expect the sensitivity of nonroutine CEO turnover to performance to be higher when a firm's largest institutional blockholder has more nonroutine CEO turnover experiences. We find that the coefficient estimate on the interaction term between the high-turnover-experience multiple blockholding indicator and past stock performance is negative and significant while that on the interaction term involving the low-turnover-experience multiple blockholding indicator is insignificant.

In regression (5), we decompose the multiple blockholding indicator into long- and short-horizon multiple blockholding indicators according to the sample median aggregate holding period that the largest institutional blockholder continuously serves as the blockholder for its portfolio firms as of the quarter-end before the CEO turnover. If a longer holding period of block ownership enables investors to

²² In other tables, we decompose the multiple blockholding indicator according to whether a firm's largest institutional blockholder has nonroutine CEO turnover experience in at least one of its other portfolio firms during the previous two years. However, this approach is not applicable to our CEO turnover data because for firms that did not experience nonroutine CEO turnover, all other firms in the portfolio held by the same largest institutional blockholder also did not experience nonroutine CEO turnover during the past two years.

accumulate more information and governance skills, we predict that the sensitivity of nonroutine CEO turnover to performance is higher when a firm's largest institutional blockholder serves as the blockholder for its portfolio firms for a longer period of time. The results show that although both interaction terms have negative and significant coefficients, the magnitude of the coefficient estimate on the interaction term between the long-horizon multiple blockholding indicator and past stock returns is greater than that of the coefficient estimate on the interaction term involving the short-horizon multiple blockholding indicator. Overall, these results support our hypothesis that the monitoring experience and the learning gained from multiple blockholdings are important channels through which institutional investors perform more effective monitoring.

Previous studies show that large shareholders vary along several different dimensions, such as their beliefs, skills, and preferences (Cronqvist and Fahlenbrach (2009)). Thus, it is possible that this investor heterogeneity is correlated with both the institutional multiple holdings and the monitoring activities, resulting in a spurious correlation between the two. In regression (6), as an attempt to control for this unobservable institution heterogeneity, we include institution fixed effects and reestimate regression (2). We find that the interaction term between the multiple blockholding indicator and the market-adjusted stock return is negative and significant at the 1% level. Thus, it is unlikely that our findings regarding the effects of institutional multiple blockholdings on forced CEO turnover sensitivity to performance are driven by persistent heterogeneity in institutional investors' unobservable characteristics.

III.1.2. Market Reaction to Forced CEO Turnover Announcements

To investigate the market's ex-ante valuation of monitoring gains created by institutions with multiple holdings, we examine whether stock market reactions to the announcements of forced CEO turnover are related to the multiple blockholding indicator. If multiple holdings lead to more effective monitoring, to the extent that this translates into higher firm value, we expect firms whose largest institutional blockholders have more holdings to experience higher abnormal announcement returns than

other types of firms. To the extent that forced CEO turnovers are largely unanticipated events, using turnover announcement returns in the analysis can potentially mitigate the reverse causality problem that exists in the tests of the effect of institutional monitoring on firm value.

For each forced CEO turnover event, we use the date that a CEO turnover is first disclosed on *Factiva* as the announcement date. We also search *Factiva* for major confounding corporate events (e.g., announcements of mergers and acquisitions, dividend payments, earnings, security issuance, company name changes, and delisting) within one trading day before and after the announcement and exclude observations associated with such news. These sample criteria yield a final sample of 440 forced CEO turnover announcements. To examine the valuation effect of these announcements, we employ a standard event study methodology. Using 250 days of returns data beginning 260 trading days before and ending 11 trading days before the CEO turnover announcement date, we estimate a one-factor market model in which the CRSP equally-weighted index is used as the market portfolio. We sum the daily abnormal returns to compute the cumulative abnormal return (CAR) from the day before the announcement to the announcement date. In untabulated tests, we find that the mean CAR (-1, 0) of our sample firms is 0.47% (p -value=0.18), with a median of -0.1% (p -value=0.60). These announcement returns are comparable to the insignificant 0.14% return for forced CEO turnover documented by Warner, Watts, and Wruck (1988) and the marginally significant 0.28% return for all turnover events documented by Weisbach (1988).

[Insert Table IV Here]

Table IV presents the estimates from OLS regressions in which the dependent variable is CAR (-1, 0) and our key variable of interest is the multiple blockholding indicator. We control for firm characteristics (size, leverage, Tobin's q , ROA, and total institutional ownership) and departing CEO characteristics (age, tenure, chairman duality indicator, and ownership) in the regressions. The regressions also control for the institution characteristics used in the Table III regressions and for industry and year fixed effects and cluster the standard errors by institutions.

The results of regression (1) show that the coefficient estimate on the multiple blockholding indicator is positive and significant. The coefficient estimate of 0.013 indicates that, all else being equal, firms whose largest institutional blockholder has more holdings experience 1.3% higher announcement returns than other types of firms. Thus, the market's ex-ante valuation of multiple holding effects is both statistically and economically significant.

To investigate the potential source of the effects of multiple holdings on firm value, in regression (2), we decompose the multiple blockholding indicator into high- and low-industry-experience multiple blockholding indicators. The coefficient estimate on the high-industry-experience multiple blockholding indicator is positive and significant at the 10% level but that on the low-industry-experience multiple blockholding indicator is not significant.²³

In regression (3), we decompose the multiple blockholding indicator into high- and low-turnover-experience multiple blockholding indicators. We find that the coefficient estimate on the high-turnover-experience multiple blockholding indicator is positive and significant with a p -value of 0.051 while that on the low-turnover-experience multiple blockholding indicator is not significant. Thus, firms whose largest institutional blockholders experience more top executive turnovers in their other portfolio firms realize greater CEO turnover announcement returns than other firms.

As a further test, in regression (4), we decompose the multiple blockholding indicator into long- and short-horizon multiple blockholding indicators. We find that the coefficient estimate on the long-horizon multiple blockholding indicator is positive and significant at the 5% level while that on the short-horizon multiple blockholding indicator is insignificant. Thus, firms appear to realize higher abnormal returns around forced CEO turnover announcements when their largest institutional blockholders accumulate more monitoring skills through their long-term blockholdings in other portfolio firms.

Overall, these results suggest that the positive effect of institutions' multiple blockholdings on firm value comes primarily from their enhanced monitoring abilities and incentives that result from their

²³ This result should be read with caution, since F-test on the difference of high- and low-industry-experience multiple blockholding indicators is statistically insignificant.

industry-specific information advantages and governance skills obtained from their prior experience and learning.

III.2. Proxy Voting by Mutual Funds

To provide further evidence on whether institutional investors with multiple blockholdings perform an effective monitoring role, in this subsection, using proxy voting data, we examine whether mutual funds with multiple holdings are more likely to vote against management than those with fewer holdings.

Since 2003, mutual funds have been required to file Form N-PX on an annual basis; this form contains a fund's proxy voting record for the past year. The ISS Proxy Voting Analytics database compiles detailed data on voting records, such as company identity, meeting dates, issues voted on, proposal sponsors (management or shareholders), proposal recommenders (management or ISS), and voting decisions. Using this database, we collect information on the proxy voting records of mutual funds that are the largest institutional shareholders for our sample firms and investigate whether their voting behavior is different depending on the institutional blockholding number.

III.2.1. Univariate Analysis

For our sample of 745 firms from 2003 to 2008, we find 172,125 voting records of 16 mutual fund families (1,863 fund family-firm-year observations) that have 676 individual funds (22,142 fund-firm-year observations) for 136 different types of voting issues. The largest proportion of these voting issues concerns director election (70.15%), followed by auditor ratification (10.77%), omnibus stock plan amendment (2.55%), omnibus stock plan approval (1.61%), and executive incentive bonus plan approval/amendment (1.46%). These five types of voting issues, all of which are initiated by management, add up to more than 87% of all proposals.

For each fund family- (individual fund-) firm-year observation, we calculate the percentage of voting records where mutual funds are against management recommendations. Following Chou, Ng, and Wang

(2011), we classify the proposals according to whether they are proposed by management or by shareholders and further categorize each of the proposals according to whether the recommendation to vote “for” or “against” is made by managers (*MgtRec*) or by the ISS (*ISSRec*). Given the findings in previous studies that the ISS is committed to make recommendations on whether to vote for or against each proposal and its recommendations are generally considered to be consistent with shareholders’ interests (e.g., Chou, Ng, and Wang (2011)), we take the ISS recommendation as an indicator for representing shareholder interests.

[Insert Table V Here]

Table V reports the mean and median percentages of proxy voting decisions made by mutual funds against management recommendations for the following categories: all proposals, management-sponsored proposals, and shareholder-sponsored proposals. Panel A reports the percentages at the fund family level. We find that, on average, a mutual fund votes against the management in 8.8% of proposals each year.²⁴ When we divide the sample firms according to the multiple blockholding indicator, mutual fund companies with more blockholdings vote against management in 11.1% of proposals while those with fewer blockholdings vote against management in only 6.7% of proposals. The difference in the mean percentages between the two subsamples is significant at the 1% level, indicating that mutual funds with more blockholdings play a more active governance role than those with fewer blockholdings.

When we focus only on proposals where management and the ISS make recommendations against each other (i.e., (*MgtRec* = “For” & *ISSRec* = “Against”) or (*MgtRec* = “Against” & *ISSRec* = “For”)), the mean percentage of votes against management increases to 31.2% for the full sample. The corresponding numbers for the subsamples of mutual funds with more and fewer blockholdings are 37.4% and 26.1%, respectively, and their difference is significant at the 1% level. The median shows a similar pattern.

²⁴ We include “withhold” votes in the category of “against.” According to ISS’s 2008 Proxy Voting Guidelines, in general, the valid contrary vote option is “withhold” in plurality voting and “against” in majority voting for director elections. Cai, Garner, and Walkling (2009) also argue that shareholders express their dissatisfaction by “withhold” votes.

We find a similar pattern when we use the sample of management-sponsored proposals in the analysis. Furthermore, when we divide management-sponsored proposals into two subcategories according to whether the ISS recommends voting for or against (i.e., MgtRec = “For” & ISSRec = “For” versus MgtRec = “For” & ISSRec = “Against”), the mean percentage of mutual funds voting against management is significantly higher for MgtRec = “For” & ISSRec = “Against” than for MgtRec = “For” & ISSRec = “For” (29.7% compared with 6.4%). We also find that in both subcategories, mutual funds with more blockholdings are significantly more likely to vote against management than those with fewer blockholdings.

The results are similar when we use the sample of shareholder-sponsored proposals except that the difference in the percentages of votes against management between mutual fund companies with more blockholdings and those with fewer blockholdings is insignificant in both subcategories.

In Panel B, we repeat the analysis in Panel A at the individual fund level. The results are almost identical to those reported in Panel A. The mean percentages of votes against management are significantly higher for mutual funds whose investment managers have more blockholdings than for those whose investment managers have fewer blockholdings in all categories.

Overall, these results suggest that mutual funds with more blockholdings are active investors who vote more frequently against managers than those with fewer blockholdings and support our argument that multiple blockholdings provide institutional investors with enhanced monitoring capabilities and strong incentives to monitor their portfolio firms. Given that mutual funds are known to be passive investors (Qiu (2003)), the results also suggest that the effects of multiple blockholdings on monitoring effectiveness and incentives are not limited only to active investors.

III.2.2. Multivariate Regression Analysis

[Insert Table VI Here]

To better understand the cross-sectional variation in the effects of multiple blockholdings on mutual fund companies' voting decisions, in Table VI, we present the estimates from multivariate regressions using the percentage of votes against management as the dependent variable. Following Matvos and Ostrovsky (2010) and Ng, Wang, and Zaiats (2009), we include firm size, stock return, ROA, Tobin's q , leverage, capital expenditure, and total institutional ownership to control for observable firm characteristics. As in the previous tables, institution characteristics (portfolio weight, portfolio returns, and portfolio turnover) and year fixed effects are also included. Finally, we include institution fixed effects in all regressions to control for omitted time-invariant institution characteristics. The first four regressions are estimated by the OLS method, and the last four are estimated by the tobit method.²⁵

In regressions (1) and (5), the coefficient estimates on the multiple blockholding indicator are significant: 0.041 and 0.065, respectively. These numbers indicate that mutual fund companies with more blockholdings vote 4.1% and 6.5% more against the management than those with fewer blockholdings, supporting the view that institutional investors with multiple blockholdings are active monitors.

In regressions (2) and (6), we decompose the multiple blockholding indicator into high- and low-industry-experience multiple blockholding indicators. The coefficient estimates on the high-industry-experience multiple blockholding indicators are significant and positive in both regressions, while those on the low-industry-experience multiple blockholding indicators are insignificant.

In regressions (3) and (7), the multiple blockholding indicator is decomposed into turnover- and no-turnover-experience multiple blockholding indicators. We find that only the coefficient estimate on the turnover-experience multiple blockholding indicator is positive and significant in both regressions.

²⁵ We do not include industry fixed effects in the regressions since tobit regressions cannot be estimated with industry fixed effects. In untabulated tests, we estimate the regressions with industry fixed effects using the OLS method and find that the results remain qualitatively unchanged.

In regressions (4) and (8), the multiple blockholding indicator is decomposed into long- and short-horizon multiple blockholding indicators. The results show that only the coefficient estimate on the long-horizon multiple blockholding indicator is positive and significant in both regressions²⁶.

In sum, these results suggest that industry-specific knowledge and prior monitoring experience are important channels through which institutional investors gain monitoring capabilities and incentives to exert influence over firms' management.

III.3. Market Reaction to Shareholder Activism (Schedule 13D Filings)

As an additional test for the effects of multiple blockholdings on institutional monitoring, in this subsection, using data on Schedule 13D filings, we examine whether the multiple blockholdings of activist institutions significantly influence their 13D filing announcement returns. According to the William Act of 1968, investors are legally required to file Schedule 13D with the Securities and Exchange Commission (SEC) within 10 days of accumulating more than 5% of any class of a company's voting equity with an intention to influence firm management (Mikkelsen and Ruback (1985)). The 13D filing requirement that investors should reveal their intention to intervene in a target's management allows us to examine how the market's ex-ante valuation of institutional monitoring is different between block acquisitions by institutional investors with more blockholdings and those by institutional investors with fewer blockholdings. To the extent that market reactions are driven by expected future governance activities by filing activist institutions, our analysis on 13D filings is not likely to be vulnerable to the identification concerns arising from potential endogeneity.

²⁶ The F-tests show that the difference between high- and low-industry-experience multiple blockholding indicators, the difference between turnover- and no-turnover-experience multiple blockholding indicators and that between long- and short-horizon multiple blockholding indicators are all statistically significant in respective regressions.

III.3.1.Univariate Analysis

We obtain information on Schedule 13D filings by searching the SEC EDGAR database. We first collect initial Schedule 13D filings by all 13F institutional investors targeting our sample firms. We then search *Factiva* for major confounding corporate events (e.g., announcements of mergers and acquisitions, dividend payments, earnings, security issuance, company name changes, and delistings) within 30 trading days before and 5 trading days after the initial 13D filing date and exclude observations associated with such news. These sample criteria yield a final sample of 211 initial Schedule 13D filings.

[Insert Table VII Here]

Table VII reports the mean and median CARs for our sample firms during event windows of (-20, 20), (-30, 30), and (-30, 5). We find that our sample firms earn statistically significant positive mean CARs. The mean CAR (-20, 20) and CAR (-30, 30) are about 6%, and the mean CAR (-30, 5) is 4.9%. In comparison, Brav et al. (2008) find a mean CAR (-20, 20) of 7.2% around the Schedule 13D filings by hedge funds and Klein and Zur (2009) find a mean CAR (-30, 5) and a mean CAR (-30, 30) of 5.7% and 7.2%, respectively, for the same event. Subsample analysis shows that the average CAR (-20, 20), CAR (-30, 30), and CAR (-30, 5) for firms targeted by institutions with an above-median blockholding number are 9.2%, 10.2%, and 9.8%, respectively, all of which are significant at the 1% level. In contrast, the corresponding CARs for firms targeted by institutions with a below-median blockholding number are insignificant: 2.2%, 1.6%, and 0%, respectively. The differences in mean CARs between the two groups are statistically significant, suggesting that the stock market perceives block acquisitions by institutions with more blockholdings as more value increasing.

III.3.2. Multivariate Regression Analysis

To better understand the cross-sectional variation in abnormal announcement returns around the Schedule 13D filings, we present estimates from multivariate regressions using CAR (-30, 5) as the dependent variable.²⁷

[Insert Table VIII Here]

The results are reported in Table VIII. Our key variable of interest is the multiple blockholding indicator. If stock price reactions around announcements of Schedule 13D filings reflect the value gains from acquiring institutions' future governance activities and if the stock market perceives institutions with more blockholdings as performing a more effective monitoring function than those with fewer blockholdings, the coefficient estimate on this indicator should be positive and significant. The regressions control for several firm (firm size, leverage, Tobin's q , and ROA) and institution (portfolio weight, portfolio returns, and portfolio turnover) characteristics. We also control for industry and year fixed effects and cluster the standard errors by institutions.

In regression (1), we find that the coefficient estimate on the multiple blockholding indicator is positive and significant. The coefficient estimate of 0.087 suggests that *ceteris paribus*, firms targeted by activist institutions with more blockholdings experience an 8.7% higher announcement return than those targeted by activist institutions with fewer blockholdings. Given that the mean CAR (-30, 5) is 4.9% for the full sample, this value gain expected from monitoring by institutions with more blockholdings is economically large and significant.

In regression (2), we decompose the multiple blockholding indicator into high- and low-industry-experience multiple blockholding indicators. Consistent with our hypothesis, we find that the coefficient estimate on the high-industry-experience multiple blockholding indicator is positive and significant while that on the low-industry-experience multiple blockholding indicator is insignificant.

²⁷ Klein and Zur (2009) also use CAR (-30, 5) as the dependent variable in their analysis. Our results are robust to using CAR (-30, 30) as the dependent variable.

In regression (3), we decompose the multiple blockholding indicator into turnover- and no-turnover-experience multiple blockholding indicators. The coefficient estimate on the turnover-experience multiple blockholding indicator is positive and significant but that on the no-turnover-experience multiple blockholding indicator is insignificant.

In regression (4), we decompose the multiple blockholding indicator into long- and short-horizon multiple blockholding indicators. We find that the long-horizon multiple blockholding indicator has a positive and significant coefficient while the short-horizon multiple blockholding indicator has a negative and insignificant coefficient. Therefore, the stock market reacts more favorably to Schedule 13D filings when activist institutions are likely to accumulate more experience through their long-term blockholdings.

Overall, the results based on institutional shareholder activism, together with those in previous tables, support our hypothesis that prior learning and experience are important channels through which institutional investors exercise their influence over firm management and that the stock market incorporates the extent of such monitoring effects when valuing firms.

IV. Impact of Institutional Blockholding Number on Firm Performance

[Insert Table IX Here]

In this section, we investigate how multiple holdings by largest institutional blockholders affect firm performance. Table IX reports the results from regressions of the annual change in Tobin's q on the multiple blockholding indicator and control variables. Regressions (1) and (2) are estimated using OLS with industry and year fixed effects and OLS with firm and year fixed effects, respectively.

In regression (1), we find that the multiple blockholding indicator is positively and significantly associated with the change in Tobin's q . In regression (2) that includes firm fixed effects, the coefficient estimate on the multiple blockholding indicator is still positive and significant at the 5% level. Thus, our result does not change when we control for the effects of time-invariant unobservable firm characteristics

on firm performance, mitigating a potential concern about the endogeneity between institutional multiple holdings and firm performance. Overall, these results indicate that the presence of largest institutional blockholders with more holdings leads to improvement in firm performance.

V. Additional Tests

In this section, we further address the potential endogeneity problems (unobserved heterogeneity and reverse causality biases) using an instrumental variables approach. To verify the robustness of our findings, we also conduct several additional unreported tests and briefly summarize the results.

V.1. Endogeneity Bias: Using an Instrumental Variables Approach

V.1.1. Instrumental Variable

We attempt to capture exogenous variation in the presence of the largest institutional blockholder with multiple holdings by using the ratio of the number of local firms to the number of local institutions as an instrumental variable.²⁸ The number of local firms and that of local institutions are measured, respectively, as the total number of publicly listed firms in the state where the firm's largest institutional shareholder is headquartered and the total number of institutional investors headquartered in that state.

Several studies show that both institutional and individual investors have strong preferences for geographically proximate stocks (Coval and Moskowitz (1999, 2001), Zhu (2002), Ivkovic and Weisbenner (2005), Kang and Kim (2008)).²⁹ If institutions exhibit a strong preference for local stocks, the demand for local stocks by other institutions would have a significant effect on the institutional

²⁸ Similarly, Becker, Cronqvist, and Fahlenbrach (2011) use investors' geographic preference for local stocks to construct their instrumental variable. Specifically, to instrument for the presence of a large individual shareholder, they use the number of high net worth individuals in the state where a firm is headquartered divided by the number of public firms headquartered in that state. Their instrumental variable is different from ours in that their study focuses on individual blockholders and uses the location of firms' headquarters instead of the location of institutional investors' headquarters to define their instrumental variable.

²⁹ Coval and Moskowitz (1999, 2001) show that mutual fund managers exhibit a strong preference for local stocks, Zhu (2002) and Ivkovic and Weisbenner (2005) find that a strong preference for local stocks also exists for individual investors, and Kang and Kim (2008) show that block shareholders prefer geographically proximate targets.

blockholding number. High competition among institutions in the same region would lower their chance of becoming the largest institutional blockholder for multiple firms. We measure the extent of institutions' demand for local stocks by the number of institutional investors in the state where the firm's largest institutional shareholder is headquartered.

The blockholdings of institutions would also be affected by the supply of local firms. For example, even though institutional investors competing for local stocks are scarce, if only a few neighboring firms are present, there would be an exogenous limitation in the opportunity set for institutional investors to purchase the largest institutional block ownership. Thus, we use the number of listed firms located in the state where a firm's largest institutional shareholder is headquartered as a supply-side variable to capture exogenous variation in the presence of the largest institutional blockholder with multiple holdings.

Our arguments suggest that *ceteris paribus*, the ratio of the number of local firms to the number of local institutions is positively related to the multiple blockholding indicator, thus satisfying the requirements of relevance as an instrumental variable. Furthermore, it is unlikely that this ratio is directly related to institutions' monitoring activity (firm performance), although the numbers of local firms and local institutions can be separately correlated with local economic development or local financing resources and thus affect the performance of firms in the state. Additionally, our instrumental variable is estimated using the state where the firm's largest institutional investor is headquartered, not the state where the firm is headquartered, making it further unlikely that our instrument influences a firm's outcome variables. Therefore, our instrumental variable is likely to affect outcome variables only through its correlation with the endogenous variable (i.e., institutional blockholding number) and thus satisfies its exclusion condition.

V.1.2. 2SLS Results

We use two-stage least squares (2SLS) regressions to address potential endogeneity problems for our full sample analysis.³⁰ In the first stage, we estimate a logit regression of the likelihood that a firm has a largest institutional blockholder with more holdings (i.e., multiple blockholding indicator = 1). As explanatory variables, we use the instrumental variable, the set of control variables included in Table III (IX), and year and industry fixed effects. In the second stage, we estimate the likelihood of forced CEO turnover (firm performance) using the predicted probability that a largest institutional blockholder with more holdings is present and the control variables used in the first-stage regression as explanatory variables. Because using a logit regression in the first stage could bias the standard errors and *t*-statistics in the second-stage regression (Maddala (1983)), we calculate *t*-statistics based on bootstrapped standard errors, as suggested by Timpone (2003).

[Insert Table X Here]

The results are reported in Table X. Regressions (1) and (3) show the estimates from the first-stage logit regressions. The coefficient estimates on the instrumental variable are positive and significant at the 1% level in both models, satisfying the relevance requirement for an instrumental variable. This result suggests that the presence of a large number of local public firms near institutions increases the likelihood that the institutions hold more stocks as the largest institutional blockholder.

Regression (2) presents the estimates from the second-stage logit regression in which the dependent variable is the forced CEO turnover indicator. We find that the coefficient estimate on the interaction term between the instrumented variable and prior stock performance is negative and significant at the 1% level. Thus, our finding that the sensitivity of forced CEO turnover to performance increases with the institutional blockholding number appears to be robust to controlling for endogeneity concerns.

³⁰ Our instrumental variables approach is not suitable for the subsample analyses (e.g., the analyses of market reaction to forced CEO turnover announcements, proxy voting by mutual funds, and market reaction to shareholder Schedule 13D filings) because the variation of the instrumental variable is limited in the subsamples. Although we obtain insignificant results in our subsample analyses when we use the 2SLS regressions, the potential endogeneity bias should be of less concern in the announcement return analyses due to the unexpected nature of the events.

Regression (4) shows the second-stage OLS regressions using the change in Tobin's q as the dependent variable. The coefficient estimate on the instrumented multiple blockholding indicator is positive and significant at the 1% level, confirming our prior results that firm value increases with the presence of largest institutional investors with more blockholdings.

V.1.3. Alternative Instrumental Variable

To check whether our results are sensitive to using an alternative measure of the instrumental variable, we reestimate the regressions in Table X by replacing the ratio of the number of local firms to the number of local institutions with the median equity value of local firms. The median equity value of local firms is measured as the median market value of listed firms' equity in the state where a firm's largest institutional shareholder is headquartered. The rationale for using this instrumental variable is that if firms in the geographically proximate area are relatively small, institutional investors are more likely to become their largest institutional blockholder because acquiring block shares of small firms is less costly than acquiring those of large firms. To the extent that institutional investors have a preference for local stocks, we expect this instrumental variable to be negatively correlated with the number of firms for which the institutional investor serves as the largest institutional blockholder, thus satisfying the relevance requirement. However, it is unlikely that this instrumental variable directly influences governance activities or firm performance.

Consistent with our expectation, we find that in the first-stage regression in which the dependent variable is the multiple blockholding indicator, the coefficient estimate on this alternative instrumental variable is negative and significant at the 1% level. More importantly, the results in the second stages of the 2SLS regressions are qualitatively similar to those reported in Table X. Thus, our key finding that institutional monitoring is more effective when institutions hold multiple stocks is robust to using alternative measures of the instrumental variable.

V.2. Self-Selection Bias

If an institution's decision to have large holdings in multiple firms has its own determinants, then institutions with certain characteristics may choose to serve as the largest institutional blockholder of multiple firms. It is well known that if self-selecting institutions are not random subsets of the population, OLS estimators are not consistent (Heckman (1979)). To correct for this potential bias, we use a Heckman two-stage treatment effects model (Greene (2003)), which is an extension of Heckman's (1979) self-selection model and has been used in several recent studies, including Hochberg (2012) and Officer, Poulsen, and Stegemoller (2009).

The treatment effects model consists of two estimation procedures. Specifically, in the first stage, we estimate an endogenous binary variable (w_{it}), the multiple blockholding indicator, as follows:

$$\begin{aligned} w_{it}^* &= \gamma z_{it} + X_{it} \alpha + \eta_{j(i)} + \varphi_t + \varepsilon_{it} \\ w_{it} &= 1 \quad \text{if } w_{it}^* > 0, \\ w_{it} &= 0 \quad \text{otherwise,} \end{aligned} \tag{2}$$

where w_{it}^* is a latent unobserved variable, w_{it} is the endogenous indicator variable that is modeled as the outcome of w_{it}^* , z_{it} is the instrumental variable used in the 2SLS regression, X_{it} are firm/institution characteristics, $\eta_{j(i)}$ are industry fixed effects, and φ_t are year fixed effects.

In the second stage, we estimate the following outcome equation:

$$y_{it} = X_{it} \beta + \delta w_{it} + v_{j(i)} + \kappa_t + \mu_{it}, \tag{3}$$

where y_{it} denotes a firm's outcome variable, δ represents the term that estimates the average treatment effect, $v_{j(i)}$ are industry fixed effects, and κ_t are year fixed effects.

The error terms, ε and μ , are assumed to be bivariate normal, and the models are estimated using the two-step procedure developed by Heckman (1979) and Lee (1983). Specifically, in the first step, the instrument is used to estimate the inverse Mills' ratio (IMR), and in the second step, the IMR is included

in the primary model of interest as a control for selection effects (Greene (1981)). We find that our results reported in the paper are robust to controlling for self-selection biases.

V.3. Other Robustness Tests

V.3.1. Alternative Measure of Multiple Holdings

To examine whether our results are robust to alternative measures of multiple holdings, we redefine a multiple blockholding indicator considering all institutional blockholdings, irrespective of whether the institutional blockholders are the largest, and reestimate all the regressions reported above. Specifically, for all the institutional investors in the CDA/Spectrum database, we count the number of their blockholdings in the same calendar quarter. Then, we regress the number of blockholdings on an institution's total equity holding value, institution type indicators, and year indicators to obtain the residual blockholding number. Next, for each sample firm, we calculate a weighted average of residual holding numbers (institutional blockholding number) for all of its institutional blockholders using the block ownership fraction in the firm (i.e. institution's block ownership in the firm / sum of all institution's block ownership in the same firm) as a weight. Using this alternative institutional blockholding number, we define the multiple blockholding indicator, which takes the value of one if a firm's alternative institutional blockholding number is greater than or equal to the sample median and zero otherwise. We find that all of the results reported in the previous sections remain qualitatively similar except that the effects of multiple holdings on the announcement returns of forced CEO turnovers and mutual fund proxy voting are not significant.

Another concern with our measure of multiple holdings is that, as discussed in the introduction section, the multiple blockholding indicator may simply capture the extent of institutional investors' portfolio diversification rather than their monitoring experience and learning opportunities. To rule out this alternative explanation, similar to Faccio, Marchica, and Mura (2011), who use the number of stocks that a firm's largest shareholder holds as a measure of portfolio diversification, we redefine raw number

as the number of all stocks reported in the 13F filings (irrespective of the size of stock ownership) that a firm's largest institutional shareholder holds. We then calculate the institutional holding number by reestimating equation (1), use it to define an alternative measure of the multiple holding indicator, and reestimate all of the regressions reported in the tables. We find that the coefficient estimates on this alternative measure are insignificant in most of our analyses. These results mitigate the concern that the multiple blockholding indicator is a proxy for the extent of institutional portfolio diversification rather than the number of firms that an institutional investor monitors.

V.3.2. Controlling for Governance Variables

Another concern with our analyses is that the institutional blockholding number could just be a proxy for the quality of a firm's corporate governance. It is likely that well-governed firms attract large investments from institutional investors and also enjoy higher performance. Thus, our results for the institutional blockholding number may simply reflect the effects of other governance measures on firm performance. To address this issue, we control for the G-index (Gompers, Ishii, and Metrick (2003)), board size (Jensen (1993), Yermack (1996)), and the proportion of independent directors on the board (Weisbach (1988)) as measures of the quality a firm's governance system and reestimate all reported regressions. Our results remain qualitatively similar, suggesting that our main finding on the positive relation between the institutional blockholding number and governance activities (firm performance) is not driven by the quality of a firm's governance system.

V.3.3. Active Investors

Chen, Harford, and Li (2007) show that independent long-term institutional investors help their portfolio firms improve post-merger performance and increase the likelihood of withdrawal of bad bids. To investigate whether the active governance role performed by institutional investors with multiple blockholdings is purely driven by these independent long-term investors, we decompose the multiple

blockholding indicator into active and passive multiple blockholding indicators according to whether a firm's largest institutional blockholder is classified as an independent long-term investor as defined in Chen, Harford, and Li (2007).³¹ We find that the active multiple blockholding indicator is positively and significantly related to the forced CEO turnover announcement returns while the passive multiple blockholding indicator is positively and significantly related to the 13D filing announcement returns. We also find that both indicators are positively and significantly associated with the forced CEO turnover-performance sensitivity, mutual fund proxy voting decisions, and annual changes in Tobin's q . These results suggest that our measure of multiple holdings does not simply capture the active investor effects documented in the previous literature. Furthermore, when we add the independent long-term institution indicator into all previous regressions, we find that our key results for the multiple blockholding indicators do not change.

V.3.4. Information Advantages and Geographic Proximity

The prior literature documents that due to the information advantages held by geographically proximate investors over other investors with respect to firms, investors located near firms earn significant abnormal returns on their investments (Coval and Moskowitz (2001), Ivkovic and Weisbenner (2005)) and also engage in active governance activities (Gaspar and Massa (2007), Baik, Kang, and Kim (2010)). These results suggest that our key findings for firms with a larger institutional blockholding number may come mainly from the low information asymmetry between firms and nearby institutions and not necessarily from institutions' improved monitoring achieved through prior learning and monitoring experiences. To address this alternative explanation, we split the multiple blockholding indicator according to whether the largest institutional blockholder and the firm are located in the same state and

³¹ Similar to Chen, Harford, and Li (2007), we classify an institution as an independent long-term institution if it is an investment company, an independent investment advisor, or a public pension fund that is classified as a dedicated or quasi-indexer investor (according to Bushee's (2001) classification) and also holds block ownership in a firm for at least one year. We find that 129 (18.35%) out of 703 institutions in our sample are classified as independent long-term institutions.

reestimate all of the regressions in the paper using these two indicators. We find that the coefficient estimates on the same- (different-) state multiple blockholding indicator are significant in some regressions but insignificant in other regressions, while in other cases, the coefficient estimates on both indicators are significant. Thus, it is unlikely that our results are driven entirely by institutional investors' information advantages associated with geographic proximity.

V.3.5. CEO Total Compensation

As an additional test of whether multiple holdings affect institutional monitoring, we examine how the institutional blockholding number is related to CEO compensation. If multiple blockholdings provide institutional investors with better governance skills and enhanced monitoring capabilities, we expect firms with a larger institutional blockholding number to be less likely to offer their top management exorbitant compensation packages. We use the logarithm of total CEO compensation as a dependent variable with the explanatory variables used in Table III regressions but also add capital expenditures and R&D intensity as additional control variables as in Gao, Li, and Lemmon (2010) and Masulis, Wang, and Xie (2012). The regressions are estimated using OLS with firm (institution) fixed effects to control for time-invariant unobservable firm (institution) characteristics. We also estimate the regressions using 2SLS to correct for potential endogeneity. In untabulated results, we find that the multiple blockholding indicator is negatively and significantly associated with total CEO compensation, suggesting that multiple blockholdings allow institutional blockholders to effectively limit CEO pay levels.

VI. Summary and Conclusion

In this paper, we investigate whether the governance effectiveness of institutional investors is affected by the number of stocks they hold as the largest institutional blockholder. We find that institutional investors with more blockholdings perform more active and effective monitoring roles than

those with fewer blockholdings. This result is robust to controlling for potential endogeneity and self-selection biases.

Specifically, using a large sample of U.S. firms over the period 1993 to 2008, we find that compared to firms with a smaller institutional blockholding number, firms with a larger institutional blockholding number are more likely to replace poorly performing top executives and realize higher abnormal returns around the forced CEO turnover announcement. We also find more frequent proxy voting decisions against management by mutual funds with more blockholdings and higher stock price reactions around initial Schedule 13D filings by institutions with more blockholdings. These results are particularly pronounced when the largest institutional blockholders have multiple blockholdings in the same industry, when they have prior monitoring experience (i.e., nonroutine CEO turnover) in their portfolio firms, or when they hold block ownership in their portfolio firms longer. Finally, we find larger increases in Tobin's q for firms whose largest institutional blockholders have more blockholdings than for those whose largest institutional blockholders have fewer blockholdings.

Overall, these findings are consistent with the view that information/monitoring cost advantages accumulated through prior learning and monitoring experiences are important channels through which institutional investors with multiple blockholdings perform effective monitoring and create value.

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Table I: Sample Distribution by Year and Industry

The sample consists of 18,008 firm-year observations covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. To be included in our final sample, a firm's CEO ID is required not to be missing from ExecuComp because we identify CEO turnover by examining the changes in CEO IDs. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings and that their reported total institutional ownership be less than 100%. Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Finally, we exclude firms that belong to either the financial services or utilities industries. The multiple blockholding indicator takes the value of one if a firm's institutional blockholding number is equal to or higher than the sample median of firms that have institutional blockholders and zero otherwise. It is set to be zero if firms do not have any institutional blockholders.

	Agriculture, forestry, and fishing (Two-digit SIC = 01-09)		Manufacturing (Two-digit SIC = 20-39)		Mining and construction (Two-digit SIC = 10-17)		Services (Two-digit SIC = 70-89)		Transportation (Two-digit SIC = 40-48)		Wholesale and retail trade (Two-digit SIC = 50-59)		Total	
Year	Number of firms (percentage of firms with a multiple blockholding indicator of one)													
1993	1	(0.0)	184	(22.3)	9	(11.1)	19	(15.8)	22	(13.6)	19	(21.1)	254	(20.5)
1994	5	(40.0)	473	(32.3)	37	(21.6)	73	(37.0)	59	(30.5)	75	(28.0)	722	(31.7)
1995	7	(71.4)	652	(25.8)	60	(30.0)	125	(37.6)	70	(30.0)	153	(27.5)	1,067	(28.2)
1996	7	(42.9)	681	(30.1)	68	(38.2)	145	(36.6)	77	(31.2)	188	(23.9)	1,166	(30.5)
1997	7	(57.1)	678	(34.4)	65	(29.2)	147	(39.5)	73	(30.1)	190	(31.6)	1,160	(34.1)
1998	4	(50.0)	685	(30.7)	62	(29.0)	180	(30.0)	64	(31.3)	190	(25.8)	1,185	(29.8)
1999	4	(0.0)	685	(38.5)	58	(29.3)	200	(47.5)	72	(33.3)	194	(37.6)	1,213	(39.0)
2000	3	(0.0)	693	(29.4)	70	(25.7)	220	(39.1)	75	(45.3)	195	(36.4)	1,256	(32.9)
2001	4	(25.0)	700	(35.1)	68	(33.8)	243	(28.8)	73	(30.1)	191	(37.7)	1,279	(33.9)
2002	3	(33.3)	688	(39.0)	70	(37.1)	242	(33.1)	73	(34.2)	186	(38.7)	1,262	(37.4)
2003	3	(33.3)	681	(41.1)	72	(29.2)	235	(40.4)	69	(31.9)	179	(41.9)	1,239	(39.9)
2004	4	(0.0)	687	(35.2)	74	(36.5)	249	(39.8)	70	(25.7)	187	(37.4)	1,271	(35.9)
2005	5	(40.0)	679	(61.6)	71	(70.4)	239	(54.4)	68	(57.4)	185	(57.3)	1,247	(59.7)
2006	5	(60.0)	677	(70.3)	75	(78.7)	230	(60.4)	71	(69.0)	180	(69.4)	1,238	(68.7)
2007	3	(66.7)	678	(67.0)	82	(81.7)	237	(61.6)	69	(59.4)	188	(67.6)	1,257	(66.6)
2008	3	(66.7)	640	(63.4)	80	(75.0)	222	(61.7)	70	(54.3)	177	(62.1)	1,192	(63.2)
Total	68	(41.2)	10,161	(42.0)	1,021	(44.9)	3,006	(43.9)	1,075	(39.1)	2,677	(41.9)	18,008	(42.3)

Table II: Sample Descriptive Statistics

The sample consists of 18,008 firm-year and 3,041 institution-year observations covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. Institutions are those who serve as firms' largest institutional shareholders. To be included in our final sample, a firm's CEO ID is required not to be missing from ExecuComp because we identify CEO turnover by examining the changes in CEO IDs. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings and that their reported total institutional ownership be less than 100%. Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Finally, we exclude firms that belong to either the financial services or utilities industries. The multiple blockholding indicator takes the value of one if a firm's institutional blockholding number is equal to or higher than the sample median of firms that have institutional blockholders and zero otherwise. It is set to be zero if firms do not have any institutional blockholders. Industry is classified using the 2-digit SIC. Panel A reports firm and CEO characteristics for our sample of 18,008 firm-year observations. Panel B reports institution characteristics for our sample of 3,041 institution-year observations as of the last quarter of each reporting calendar year. The Appendix provides a detailed description of the construction of the variables. The numbers in the test-of-difference columns are *p*-values. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Firm and CEO characteristics

Variable	Full sample: N = 18,008		Firm-years with a multiple blockholding indicator of one (A): N = 7,615		Firm-years with a multiple blockholding indicator of zero (B): N = 10,393		Test of difference (A - B)	
	Mean	Median	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon <i>z</i> -test
Firm characteristics								
Total assets (\$ billions)	5.642	1.120	3.506	0.944	7.207	1.313	0.000***	0.000***
Market-adjusted stock return	0.043	-0.046	0.011	-0.058	0.066	-0.039	0.000***	0.000***
ROA	0.046	0.058	0.042	0.054	0.048	0.061	0.015**	0.000***
Tobin's <i>q</i>	2.064	1.604	1.915	1.516	2.172	1.675	0.000***	0.000***
Leverage	0.224	0.209	0.218	0.203	0.228	0.213	0.001***	0.000***
Stock return volatility	0.123	0.107	0.123	0.107	0.124	0.106	0.446	0.000***
Capital expenditure	0.062	0.045	0.059	0.042	0.064	0.048	0.001***	0.000***
Total institutional ownership	0.649	0.667	0.697	0.720	0.613	0.630	0.000***	0.000***
Largest institutional shareholder's portfolio weight	0.013	0.003	0.005	0.002	0.019	0.004	0.000***	0.000***

CEO characteristics

CEO age	55.755	56.000	55.706	56.000	55.791	56.000	0.461	0.214
CEO tenure	7.258	5.000	7.260	5.000	7.257	5.000	0.982	0.896
CEO ownership	0.030	0.005	0.029	0.006	0.031	0.004	0.154	0.000***
CEO is chairman (indicator)	0.605	1.000	0.568	1.000	0.631	1.000	0.000***	0.000***
Forced CEO turnover (indicator)	0.026	0.000	0.026	0.000	0.026	0.000	0.814	0.814

Panel B. Characteristics of a firm's largest institutional shareholder

Variable	Full sample N = 3,041		Subsample				Tests of difference (A - B)	
			Largest institutional shareholders whose residual holding number is higher than the sample median of firms that have institutional blockholders (A) N = 547		Largest institutional shareholders whose residual holding number is lower than the sample median of firms that have institutional blockholders (B) N = 2,494			
	Mean	Median	Mean	Median	Mean	Median	t-test	Wilcoxon z-test
Number of stocks that the institution holds as the largest institutional blockholder (raw number)	11.066	6.000	31.814	36.000	6.516	4.000	0.000***	0.000***
Number of stocks in the same industry that the institution holds as the largest institutional blockholder during the previous two years	2.095	1.375	4.315	3.429	1.607	1.167	0.000***	0.000***
Frequency of forced CEO turnover in the largest institutional blockholder's portfolio firms during the previous two years	0.317	0.000	0.874	0.000	0.194	0.000	0.000***	0.000***
Largest institutional shareholder's total market value of equity holdings, adjusted by CPI in 2000 (\$ billions)	14.280	5.346	22.636	13.127	12.447	4.218	0.000***	0.000***
Independent largest institutional shareholder (indicator)	0.745	1.000	0.824	1.000	0.728	1.000	0.000***	0.000***
Dedicated largest institutional shareholder (indicator)	0.245	0.000	0.439	0.000	0.202	0.000	0.000***	0.000***
Length of blockholding relationship as of quarter-end (quarter)	7.015	4.000	7.541	5.000	6.900	4.000	0.096*	0.000***
Independent long-term largest institutional shareholder (indicator)	0.288	0.000	0.475	0.000	0.247	0.000	0.000***	0.000***
Largest institutional shareholder's portfolio return	0.064	0.055	0.070	0.063	0.063	0.053	0.207	0.164
Largest institutional shareholder's portfolio turnover	0.107	0.087	0.095	0.088	0.110	0.087	0.000***	0.830

Table III: Logit Estimates of the Likelihood of Forced CEO Turnover

The sample consists of 14,584 firm-year observations covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. To be included in our final sample, a firm's CEO ID is required not to be missing from ExecuComp because we identify CEO turnover by examining the changes in CEO IDs. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings and that their reported total institutional ownership be less than 100%. Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Finally, we exclude firms that belong to either the financial services or utilities industries and those that experience a voluntary CEO turnover. A turnover event is considered occurring in a given year when the CEO ID reported in ExecuComp differs from that in the prior year. Following Parrino (1997) and Denis, Denis, and Sarin (1997), we refer to a turnover event as a forced turnover if 1) news articles on *Factiva* report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; 2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or 3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure. The dependent variable takes the value of one if a forced CEO turnover occurs and zero otherwise. All firm (institution) and CEO characteristics are measured as of the fiscal year-end (the calendar quarter-end) that immediately precedes the event year. Industry is classified using the 2-digit SIC. The Appendix provides a detailed description of the construction of the variables. *P*-values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Multiple blockholding (indicator): A	0.012 (0.912)	-0.053 (0.632)				-0.070 (0.625)
High-industry-experience multiple blockholding (indicator): B			-0.101 (0.376)			
Low-industry-experience multiple blockholding (indicator): C			0.291 (0.237)			
High-turnover-experience multiple blockholding (indicator): D				0.178 (0.121)		
Low-turnover-experience multiple blockholding (indicator): E				-1.524*** (0.000)		
Long-horizon multiple blockholding (indicator): F					-0.060 (0.627)	
Short-horizon multiple blockholding (indicator): G					-0.038 (0.807)	
Market-adjusted stock return: H	-0.349** (0.042)	-0.140 (0.383)	-0.141 (0.379)	-0.139 (0.380)	-0.140 (0.383)	-0.063 (0.520)
A × H		-0.760*** (0.002)				-0.717*** (0.001)
B × H			-0.728*** (0.004)			
C × H			-1.015 (0.191)			
D × H				-0.791*** (0.002)		
E × H				-0.549 (0.412)		
F × H					-0.786*** (0.005)	
G × H					-0.707* (0.064)	
Log (total assets)	-0.009 (0.820)	-0.008 (0.850)	-0.008 (0.847)	-0.018 (0.648)	-0.007 (0.854)	0.010 (0.816)
Tobin's <i>q</i>	0.029 (0.222)	0.025 (0.277)	0.025 (0.281)	0.023 (0.347)	0.025 (0.277)	0.019 (0.337)
Leverage	0.134	0.132	0.126	0.127	0.132	0.099

	(0.569)	(0.594)	(0.607)	(0.613)	(0.594)	(0.683)
Stock return volatility	1.221**	1.211**	1.241**	1.164**	1.214**	1.084
	(0.025)	(0.028)	(0.025)	(0.034)	(0.028)	(0.156)
Total institutional ownership	-0.926***	-0.909***	-0.907***	-0.875***	-0.909***	-1.113***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Log (CEO age)	-0.928***	-0.893**	-0.881**	-0.827**	-0.893**	-0.888**
	(0.007)	(0.010)	(0.011)	(0.018)	(0.010)	(0.025)
Log (CEO tenure)	-0.220***	-0.226***	-0.227***	-0.232***	-0.226***	-0.228***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
CEO is chairman (indicator)	-0.211**	-0.208**	-0.212**	-0.208**	-0.209**	-0.176
	(0.044)	(0.047)	(0.043)	(0.047)	(0.047)	(0.112)
CEO ownership	-3.784**	-3.764**	-3.733**	-3.774**	-3.767**	-3.271***
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)	(0.004)
Largest institutional shareholder's portfolio weight	0.321	0.319	0.291	0.469	0.314	-1.141
	(0.737)	(0.735)	(0.759)	(0.605)	(0.740)	(0.680)
Largest institutional shareholder's portfolio return	0.286	0.313	0.293	0.332	0.312	0.879
	(0.484)	(0.439)	(0.459)	(0.438)	(0.439)	(0.126)
Largest institutional shareholder's portfolio turnover	0.592	0.522	0.508	0.566	0.519	-2.051
	(0.467)	(0.522)	(0.531)	(0.492)	(0.527)	(0.240)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Institution fixed effects	NO	NO	NO	NO	NO	YES
Pseudo R^2	0.0482	0.0513	0.0521	0.0633	0.0513	0.0628
Number of observations	14,584	14,584	14,584	14,584	14,584	12,613

Table IV: OLS Estimates of Cumulative Abnormal Returns (-1, 0) around the Forced CEO Turnover Announcement

The sample consists of 440 forced CEO turnovers by firms covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. We exclude firms that belong to either the financial services or utilities industries. We also exclude the turnover events if there are other major confounding corporate events (e.g., announcements of mergers and acquisitions, dividend payments, earnings, debt issuance, equity issuance, company name change, and delisting) within one trading day before and one trading day after the announcement date. Following Parrino (1997) and Denis, Denis, and Sarin (1997), we refer to a turnover event as a forced turnover if 1) news articles on *Factiva* report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; 2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or 3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure. The dependent variable is the cumulative abnormal return (-1, 0) around the forced CEO turnover announcement date. Daily abnormal returns are calculated using a market model with a 250 trading day estimation period beginning 260 days before and ending 10 days before the forced CEO turnover announcement date. The CRSP equally weighted return is used as a proxy for the market return. All firm (institution) and CEO characteristics are measured as of the fiscal year-end (the calendar quarter-end) that immediately precedes the announcement date. Industry is classified using the 2-digit SIC. The Appendix provides a detailed description of the construction of the variables. *P*-values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity and institution clustering. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	(1)	(2)	(3)	(4)
Multiple blockholding (indicator)	0.013** (0.046)			
High-industry-experience multiple blockholding (indicator)		0.011* (0.073)		
Low-industry-experience multiple blockholding (indicator)		0.029 (0.460)		
High-turnover-experience multiple blockholding (indicator)			0.014* (0.051)	
Low-turnover-experience multiple blockholding (indicator)			0.010 (0.407)	
Long-horizon multiple blockholding (indicator)				0.017** (0.012)
Short-horizon multiple blockholding (indicator)				0.005 (0.692)
Log (total assets)	0.006** (0.032)	0.006** (0.033)	0.006** (0.032)	0.006** (0.033)
Leverage	-0.003* (0.086)	-0.003 (0.100)	-0.003* (0.086)	-0.003* (0.082)
Tobin's <i>q</i>	-0.046*** (0.001)	-0.045*** (0.001)	-0.046*** (0.001)	-0.046*** (0.001)
ROA	-0.013*** (0.000)	-0.013*** (0.000)	-0.013*** (0.000)	-0.013*** (0.000)
Total institutional ownership	-0.017 (0.398)	-0.018 (0.379)	-0.017 (0.416)	-0.015 (0.464)
Log (CEO age)	0.005 (0.354)	0.005 (0.358)	0.005 (0.365)	0.005 (0.347)
Log (CEO tenure)	-0.030 (0.381)	-0.030 (0.384)	-0.030 (0.385)	-0.030 (0.380)
CEO is chairman (indicator)	-0.000 (0.994)	-0.000 (0.996)	-0.000 (0.984)	-0.000 (0.975)
CEO ownership	-0.083 (0.424)	-0.076 (0.444)	-0.084 (0.420)	-0.086 (0.410)
Largest institutional shareholder's portfolio weight	-0.098*** (0.004)	-0.100*** (0.004)	-0.098*** (0.004)	-0.095*** (0.004)
Largest institutional shareholder's portfolio return	0.018 (0.708)	0.018 (0.712)	0.017 (0.729)	0.056 (0.287)
Largest institutional shareholder's portfolio turnover	0.054 (0.311)	0.047 (0.401)	0.055 (0.304)	0.013 (0.780)
Constant	0.114 (0.382)	0.110 (0.403)	0.111 (0.387)	0.110 (0.396)

Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
Adjusted R^2	0.0942	0.0934	0.0919	0.0937
Number of observations	440	440	440	440

Table V: Mutual Fund Proxy Voting against Management

The sample consists of 172,125 proxy voting decisions by mutual funds for their portfolio firms covered in the Compustat, CRSP, ExecuComp, Thomson Reuters Institutional (13F) Holdings, and ISS Voting Analytics databases from 2003 to 2008. Firms that belong to either the financial services or utilities industries are excluded. The numbers in the table are the percentages of mutual funds proxy votes against management recommendations for all proposals, management-sponsored proposals, and shareholder-sponsored proposals at the fund family level (Panel A) and at the individual fund level (Panel B). Management-sponsored proposals refer to the proposals initiated by management, and shareholder-sponsored proposals refer to the proposals initiated by shareholders. These two types of proposals are further divided into two subcategories: recommendations by management (MgtRec) and recommendations by the ISS (ISSRec). The numbers in the test-of-difference columns are *p*-values from the *t*-test for the mean difference and Wilcoxon *z*-test for the median difference, respectively. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Fund family level								
	Full sample		Firms with a multiple blockholding indicator of one (A)		Firms with a multiple blockholding indicator of zero (B)		Test of difference (A - B)	
	Mean	Median	Mean	Median	Mean	Median	<i>t</i> -test	Wilcoxon <i>z</i> -test
All proposals	(Firm # = 1,863)		(Firm # = 882)		(Firm # = 981)			
All (Vote # = 172,125)	8.8 ***	0.0 ***	11.1 ***	0.0 ***	6.7 ***	0.0 ***	0.000 ***	0.191
(MgtRec = For & ISSRec = Against) or (MgtRec = Against & ISSRec = For) (Vote # = 20,198)	31.2 ***	6.5 ***	37.4 ***	15.6 ***	26.1 ***	3.2 ***	0.000 ***	0.004 ***
Management-sponsored proposals	(Firm # = 1,863)		(Firm # = 882)		(Firm # = 981)			
All (Vote # = 157,422)	8.2 ***	0.0 ***	10.4 ***	0.0 ***	6.1 ***	0.0 ***	0.000 ***	0.223
MgtRec = For & ISSRec=Against (Vote # = 11,718)	29.7 ***	0.0 ***	36.8 ***	9.8 ***	23.9 ***	0.0 ***	0.000 ***	0.004 ***
MgtRec = For & ISSRec= For (Vote # = 145,655)	6.4 ***	0.0 ***	8.2 ***	0.0 ***	4.7 ***	0.0 ***	0.000 ***	0.792
Shareholder-sponsored proposals	(Firm # = 296)		(Firm # = 122)		(Firm # = 174)			
All (Vote # =14,703)	25.0 **	2.3 **	33.5 ***	5.7 ***	19.1 ***	0.0 ***	0.002 ***	0.005 ***
MgtRec = Against & ISSRec = For (Vote # = 8,480)	36.3 ***	10.9 ***	40.6 ***	14.3 ***	32.7 ***	8.8 ***	0.166	0.215
MgtRec = Against & ISSRec = Against (Vote # = 5,982)	3.5 ***	0.0 ***	6.9 ***	0.0 ***	2.1 ***	0.0 ***	0.245	0.559

Panel B. Individual fund level

	Full sample		Firms with a multiple blockholding indicator of one (A)		Firms with a multiple blockholding indicator of zero (B)		Test of difference (A - B)	
	Mean	Median	Mean	Median	Mean	Median	t-test	Wilcoxon z-test
All proposals	(Firm # = 1,863)		(Firm # = 882)		(Firm # = 981)			
All (Vote # = 172,125)	8.4 ***	0.0 ***	10.4 ***	0.0 ***	6.1 ***	0.0 ***	0.000 ***	0.000 ***
(MgtRec = For & ISSRec = Against) or (MgtRec = Against & ISSRec = For) (Vote # = 20,198)	30.5 ***	0.0 ***	37.8 ***	0.0 ***	23.2 ***	0.0 ***	0.000 ***	0.000 ***
Management-sponsored proposals	(Firm # = 1,863)		(Firm # = 882)		(Firm # = 981)			
All (Vote # = 157,422)	7.5 ***	0.0 ***	9.5 ***	0.0 ***	5.4 ***	0.0 ***	0.000 ***	0.000 ***
MgtRec = For & ISSRec=Against (Vote # = 11,718)	32.1 ***	0.0 ***	41.0 ***	0.0 ***	22.9 ***	0.0 ***	0.000 ***	0.000 ***
MgtRec = For & ISSRec= For (Vote # = 145,655)	5.9 ***	0.0 ***	7.5 ***	0.0 ***	4.3 ***	0.0 ***	0.000 ***	0.000 ***
Shareholder-sponsored proposals	(Firm # = 296)		(Firm # = 122)		(Firm # = 174)			
All (Vote # =14,703)	19.1 ***	0.0 ***	25.3 ***	0.0 ***	13.9 ***	0.0 ***	0.000 ***	0.000 ***
MgtRec = Against & ISSRec = For (Vote # = 8,480)	27.0 ***	0.0 ***	30.8 ***	0.0 ***	23.2 ***	0.0 ***	0.000 ***	0.000 ***
MgtRec = Against & ISSRec = Against (Vote # = 5,982)	2.2 ***	0.0 ***	1.1 ***	0.0 ***	2.8 ***	0.0 ***	0.000 ***	0.000 ***

Table VI: OLS and Tobit Estimates of Mutual Fund Proxy Voting against Management

The sample consists of 1,850 firm-year observations covered in the Compustat, CRSP, ExecuComp, Thomson Reuters Institutional (13F) Holdings, and ISS Voting Analytics databases from 2003 to 2008. Firms that belong to either the financial services or utilities industries are excluded. The dependent variable is the annual percentage of mutual funds votes against management (i.e., number of proposals that mutual funds vote against management recommendations divided by total number of proposals on which mutual funds cast votes). Columns (1) through (4) are estimated by OLS regression, and Columns (5) through (8) are estimated by tobit regression. The Appendix provides a detailed description of the construction of the variables. *P*-values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	OLS				Tobit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Multiple blockholding (indicator)	0.041*** (0.001)				0.065* (0.057)			
High-industry-experience multiple blockholding (indicator)		0.044*** (0.000)				0.072** (0.037)		
Low-industry-experience multiple blockholding (indicator)		-0.003 (0.896)				-0.065 (0.482)		
Turnover-experience multiple blockholding (indicator)			0.043*** (0.001)				0.067* (0.053)	
No-turnover-experience multiple blockholding (indicator)			-0.045 (0.391)				-0.010 (0.962)	
Long-horizon multiple blockholding (indicator)				0.054*** (0.000)				0.084** (0.026)
Short-horizon multiple blockholding (indicator)				0.005 (0.830)				-0.005 (0.941)
Log (total assets)	-0.011** (0.033)	-0.011** (0.031)	-0.011** (0.034)	-0.011** (0.037)	0.004 (0.655)	0.004 (0.689)	0.004 (0.653)	0.005 (0.580)
Stock return	-0.001 (0.942)	-0.001 (0.942)	-0.001 (0.923)	-0.000 (0.973)	-0.002 (0.895)	-0.003 (0.890)	-0.003 (0.888)	-0.002 (0.919)
ROA	-0.046 (0.249)	-0.047 (0.245)	-0.045 (0.260)	-0.047 (0.242)	-0.156 (0.133)	-0.156 (0.132)	-0.155 (0.136)	-0.156 (0.132)
Tobin's <i>q</i>	-0.002 (0.536)	-0.002 (0.562)	-0.002 (0.541)	-0.002 (0.550)	0.005 (0.523)	0.006 (0.498)	0.005 (0.522)	0.006 (0.509)
Leverage	0.074** (0.020)	0.075** (0.018)	0.074** (0.020)	0.071** (0.023)	0.107* (0.067)	0.110* (0.058)	0.107* (0.066)	0.103* (0.076)
Capital expenditure	-0.065 (0.375)	-0.065 (0.382)	-0.066 (0.369)	-0.063 (0.393)	-0.101 (0.550)	-0.101 (0.548)	-0.102 (0.546)	-0.102 (0.545)
Total institutional ownership	-0.028 (0.359)	-0.028 (0.360)	-0.028 (0.359)	-0.029 (0.353)	-0.071 (0.310)	-0.072 (0.303)	-0.071 (0.308)	-0.072 (0.298)
Largest institutional shareholder's portfolio weight	3.077 (0.202)	3.139 (0.189)	3.106 (0.198)	2.860 (0.214)	8.792** (0.033)	9.035** (0.028)	8.808** (0.032)	8.284** (0.045)
Largest institutional shareholder's portfolio return	-0.069 (0.532)	-0.072 (0.514)	-0.073 (0.514)	-0.077 (0.489)	-0.125 (0.590)	-0.134 (0.562)	-0.128 (0.580)	-0.141 (0.544)
Largest institutional shareholder's portfolio turnover	0.492 (0.131)	0.461 (0.153)	0.486 (0.137)	0.370 (0.207)	1.220* (0.060)	1.132* (0.081)	1.210* (0.062)	1.030 (0.121)
Constant	-0.594 (0.244)	-0.599 (0.235)	-0.597 (0.241)	-0.526 (0.273)	-0.434*** (0.002)	-0.423*** (0.003)	-0.435*** (0.002)	-0.384*** (0.008)
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted/ Pseudo R^2	0.0371	0.0376	0.0370	0.0380	0.0843	0.0856	0.0844	0.0851
Number of observations	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850

Table VII: Cumulative Abnormal Returns for Target Firms around the Initial Schedule 13D Filings

The sample consists of 211 initial filings of Schedule 13D by the institutional investors targeting the firms covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. We exclude firms that belong to either the financial services or utilities industries. We also exclude the events if there are other major confounding corporate events (e.g., announcements of mergers and acquisitions, dividend, earnings, debt issuance, equity issuance, company name change, and delisting) within 30 trading days before and 5 trading days after the filing date. Daily abnormal returns are calculated using a market model with a 255 trading day estimation period beginning 300 days before and ending 46 days before the Schedule 13D filings. The CRSP equally weighted return is used as a proxy for the market return. The numbers in the test-of-difference columns are p -values from the t -test for the mean difference and Wilcoxon z -test for the median difference, respectively. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Event windows	Full sample N = 211		Firms targeted by institutional investors with more blockholdings (A) N = 106		Firms targeted by institutional investors with fewer blockholdings (B) N = 105		Test of difference (A - B)	
	Mean	Median	Mean	Median	Mean	Median	t -test	Wilcoxon z -test
CAR (-20, +20)	0.057***	0.033***	0.092***	0.038***	0.022	0.028*	0.038**	0.249
CAR (-30, +30)	0.059***	0.038***	0.102***	0.058***	0.016	0.028	0.047**	0.187
CAR (-30, +5)	0.049***	0.033**	0.098***	0.045***	0.000	0.008	0.006***	0.027**

Table VIII: OLS Estimates of Cumulative Abnormal Returns (-30, 5) for Target Firms around the Initial Schedule 13D Filings

The sample consists of 209 initial filings of Schedule 13D by institutional investors targeting the firms covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. We exclude firms that belong to either the financial services or utilities industries. We also exclude the events if there are other major confounding corporate events (e.g., announcements of mergers and acquisitions, dividend, earnings, debt issuance, equity issuance, company name change, and delisting) within 30 trading days before and 5 trading days after the filing date. The dependent variable is the cumulative abnormal returns (-30, 5). Daily abnormal returns are calculated using a market model with a 255 trading day estimation period beginning 300 days before and ending 46 days before the Schedule 13D filings. The CRSP equally weighted return is used as a proxy for the market return. All firm (institution) characteristics are measured as of the fiscal year-end (the calendar quarter-end) that immediately precedes the Schedule 13D filing date. Industry is classified using the 2-digit SIC. The Appendix provides a detailed description of the construction of the variables. *P*-values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity and institution clustering. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	(1)	(2)	(3)	(4)
Multiple blockholding (indicator)	0.087* (0.074)			
High-industry-experience multiple blockholding (indicator)		0.180*** (0.000)		
Low-industry-experience multiple blockholding (indicator)		0.012 (0.807)		
Turnover-experience multiple blockholding (indicator)			0.132** (0.019)	
No-turnover-experience multiple blockholding (indicator)			0.065 (0.199)	
Long-horizon multiple blockholding (indicator)				0.111** (0.015)
Short-horizon multiple blockholding (indicator)				-0.009 (0.906)
Log (total assets)	0.012 (0.445)	0.016 (0.319)	0.015 (0.326)	0.014 (0.403)
Leverage	-0.124 (0.180)	-0.125 (0.189)	-0.127 (0.169)	-0.108 (0.264)
Tobin's <i>q</i>	-0.029 (0.296)	-0.030 (0.235)	-0.029 (0.313)	-0.025 (0.399)
ROA	-0.049 (0.794)	-0.015 (0.935)	-0.048 (0.797)	-0.052 (0.794)
Activist institutional investor's portfolio weight	-0.283 (0.548)	-0.243 (0.636)	-0.237 (0.614)	-0.261 (0.583)
Activist institutional investor's portfolio return	-0.085 (0.677)	-0.039 (0.860)	-0.111 (0.593)	-0.092 (0.662)
Activist institutional investor's portfolio turnover	0.233 (0.161)	0.290* (0.061)	0.255 (0.123)	0.261 (0.104)
Constant	0.003 (0.985)	-0.084 (0.635)	0.022 (0.912)	-0.027 (0.888)
Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
Adjusted <i>R</i> ²	0.0418	0.0817	0.0423	0.0508
Number of observations	209	209	209	209

Table IX: OLS Estimates of the Change in Tobin's q

The sample consists of 17,914 firm-year observations covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. To be included in our final sample, a firm's CEO ID is required not to be missing from ExecuComp because we identify CEO turnover by examining the changes in CEO IDs in this database. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings database and that their total institutional ownership reported in this database be less than 100%. Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Finally, we exclude firms that belong to either the financial services or utilities industries. The dependent variable is the annual change in Tobin's q . All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the year in which the performance change is measured. Industry is classified using the 2-digit SIC. The Appendix provides a detailed description of the construction of the variables. P-values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variables	(1)	(2)
Multiple blockholding (indicator)	0.054** (0.011)	0.056** (0.034)
Log (total assets)	0.003 (0.647)	-0.177*** (0.000)
ROA	-0.146* (0.059)	-0.152 (0.132)
Leverage	0.281*** (0.000)	0.340 (0.336)
Stock return volatility	-1.477*** (0.000)	-1.216*** (0.008)
Total institutional ownership	-0.314*** (0.000)	-1.022*** (0.000)
Largest institutional shareholder's portfolio weight	-0.261** (0.027)	-0.198 (0.316)
Largest institutional shareholder's portfolio return	-0.715*** (0.006)	-0.792*** (0.000)
Largest institutional shareholder's portfolio turnover	-0.359** (0.027)	-0.463** (0.049)
Constant	-0.217* (0.059)	1.742*** (0.000)
Year fixed effects	YES	YES
Industry fixed effects	YES	NO
Firm fixed effects	NO	YES
Adjusted R^2	0.0397	0.0441
Number of observations	17,914	17,914

Table X: 2SLS Estimates of the Likelihood of Forced CEO Turnover and the Change in Tobin's q

The sample consists of 17,570 firm-year observations covered in the Compustat, CRSP, Thomson Reuters Institutional (13F) Holdings, and ExecuComp databases from 1993 to 2008. To be included in our final sample, a firm's CEO ID is required not to be missing from ExecuComp because we identify CEO turnover by examining the changes in CEO IDs. We also require that our sample firms be covered in Thomson Reuters' CDA/Spectrum Institutional (13F) Holdings database and that their reported total institutional ownership be less than 100%. Furthermore, we restrict our sample to those firms whose stock returns and financial data are available in CRSP and Compustat, respectively. Finally, we exclude firms that belong to either the financial services or utilities industries. A turnover event is considered occurring in a given year when the CEO ID reported in ExecuComp differs from that in the prior year. Following Parrino (1997) and Denis, Denis, and Sarin (1997), we refer to a turnover event as a forced turnover if 1) news articles on Factiva report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; 2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or 3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure. Firms that experience a voluntary CEO turnover are excluded from the turnover analysis (models (1) and (2)). Models (1) and (3) report estimates from the first-stage regressions using the multiple blockholding indicator as the dependent variable. The instrumental variable is the ratio of the number of local firms to the number of local institutional investors in the state in which the firm's largest institutional shareholder is headquartered. Models (2) and (4) report estimates from the second-stage regressions in which the dependent variables are the forced CEO turnover indicator and the annual change in Tobin's q , respectively. The statistical significance of the variables in the second-stage regressions are estimated using bootstrap-corrected standard errors, which are based on 500 replications. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the event year. Industry is classified using the 2-digit SIC. The Appendix provides a detailed description of the construction of the variables. P -values are in parentheses and estimated using robust standard errors that adjust for heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Independent variable	First stage	Second stage	First stage	Second stage
	Multiple blockholding indicator	Forced CEO turnover indicator	Multiple blockholding indicator	Change in Tobin's q
	(1)	(2)	(3)	(4)
Instrumental variable:				
Ratio of the number of local firms to the number of local institutional investors	0.042*** (0.000)		0.040*** (0.000)	
Instrumented variable from the first stage: A		-0.111 (0.917)		0.479*** (0.005)
Market-adjusted stock return: B	-0.120*** (0.001)	0.074 (0.739)		
A × B		-1.444*** (0.007)		
Log (total assets)	-0.288*** (0.000)	-0.011 (0.877)	-0.269*** (0.000)	0.027** (0.016)
Tobin's q	-0.109*** (0.000)	0.016 (0.681)		
ROA			-0.291*** (0.000)	-0.131 (0.696)
Leverage	0.237** (0.028)	0.141 (0.719)	0.300*** (0.009)	0.242*** (0.001)
Stock return volatility	0.028 (0.935)	1.059 (0.219)	-0.469 (0.165)	-1.448*** (0.000)
Total institutional ownership	1.836*** (0.000)	-0.879* (0.059)	1.760*** (0.000)	-0.446*** (0.001)
Log (CEO age)	0.188 (0.203)	-0.923** (0.038)		
Log (CEO tenure)	-0.039	-0.222***		

	(0.114)	(0.000)		
CEO is chairman (indicator)	-0.041	-0.237 ^{**}		
	(0.323)	(0.046)		
CEO ownership	0.420	-3.572 ^{***}		
	(0.113)	(0.010)		
Largest institutional shareholder's portfolio weight	-28.905 ^{***}	0.237	-32.875 ^{***}	0.363
	(0.000)	(0.938)	(0.000)	(0.104)
Largest institutional shareholder's portfolio return	0.736 ^{***}	0.351	0.663 ^{***}	-0.769 ^{***}
	(0.001)	(0.515)	(0.002)	(0.002)
Largest institutional shareholder's portfolio turnover	-4.824 ^{***}	0.457	-5.296 ^{***}	0.049
	(0.000)	(0.718)	(0.000)	(0.822)
Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
Pseudo R^2 / Adjusted R^2	0.141	0.0374	0.147	0.0363
Number of observations	14,881	14,306	17,570	17,562

Appendix: Variable Definitions

This appendix provides a detailed description of the construction of all of the variables used in the tables.

Variable	Definition
Capital expenditures	Capital expenditures divided by total assets.
CEO is chairman (indicator)	Indicator variable that takes the value of one if the CEO is the chairman of the board and zero otherwise.
CEO ownership	Fraction of the firm's equity held by the CEO.
Dedicated largest institutional shareholder (indicator)	Indicator that takes the value of one if the institution is classified as a dedicated investor based on its expected investment horizon following Bushee (2001) and zero otherwise.
Forced CEO turnover (indicator)	Indicator variable that takes the value of one if a forced CEO turnover occurs and zero otherwise. Following Parrino (1997) and Denis, Denis, and Sarin (1997), we refer to turnover events as forced turnovers if 1) news articles on Factiva report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; 2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or 3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure.
High-industry-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and a firm's largest institutional blockholder has served as the largest institutional blockholder for at least one other portfolio firm in the same industry as the sample firm during the previous two years and zero otherwise.
High-turnover-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and the frequency of forced CEO turnover in the largest institutional blockholder's other portfolio firms during the previous two years is higher than or equal to the sample median and zero otherwise.
Independent long-term largest institutional shareholder (indicator)	Indicator that takes the value of one if the largest institutional shareholder is an investment company, an independent investment advisor, or a public pension fund that is classified as a dedicated or quasi-indexer investor (according to Bushee's (2001) classification) and also holds block ownership in a firm for at least one year and zero otherwise, similar to definition of Chen, Harford, and Li (2007).
Institution type (indicator)	Indicator variable for an institutional investor's legal type. These are six indicator variables corresponding to the six different legal types classified by form 13F and Brian Bushee: banks and trusts, insurance companies, investment companies, independent investment advisors, public pension funds, and other investors (private pension funds, university and foundation endowments, etc.).
Institution's total market value of equity holdings	Average market value of total equity holdings managed by the institutional investor during prior four calendar quarters deflated by the consumer price index in 2000.
Institutional blockholding number	The residual from the following institution-level regression at each calendar quarter: $Raw\ Number = \alpha + \beta \times Institution's\ Total\ Market\ Value\ of\ Equity\ Holdings + Institution\ Type\ Indicators + Year\ Indicators$, where <i>Raw Number</i> and <i>Institution's Total Market Value of Equity Holdings</i> are winsorized at the 1% level at both tails.
Independent largest institutional shareholder (indicator)	Indicator variable that takes the value of one if the largest institutional shareholder is an investment company, independent investment advisor, or public pension fund and zero otherwise, as defined by Chen, Harford, and Li (2007).
Largest institutional shareholder's portfolio return	Largest institutional shareholder's monthly buy-and-hold value-weighted portfolio return in the quarter before the event (year).
Largest institutional shareholder's portfolio turnover	Churn rate for the largest institutional shareholder in the quarter before the event defined as the minimum of aggregate purchase and sale over average equity asset holding value, as estimated by Carhart (1997) and Yan and Zhang (2007).
Largest institutional shareholder's portfolio weight	Weight of the value of equity investment in a firm in the largest institutional shareholder's portfolio.
Length of blockholding relationship as of quarter-end (quarter)	Number of quarters that the largest institutional investor serves as the firm's blockholder as of quarter-end.
Leverage	Book value of short-term debt plus book value of long-term debt divided by book value of total assets.

Log (CEO age)	Log of CEO's age.
Log (CEO tenure)	Log of CEO's tenure.
Log (total assets)	Log of book value of total assets.
Long-horizon multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and the aggregate length of time that the institutional shareholder continuously serves as the blockholder for its portfolio firms as of the quarter end is longer than or equal to the sample median and zero otherwise.
Low-industry-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and a firm's largest institutional blockholder has not served as the largest institutional blockholder for at least one other portfolio firm in the same industry as the sample firm during the previous two years and zero otherwise.
Low-turnover-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and the frequency of forced CEO turnover in the largest institutional blockholder's other portfolio firms during the previous two years is lower than the sample median and zero otherwise.
Market-adjusted stock return	Buy-and-hold market-adjusted stock return during a one-year period. The CRSP-equal-weighted return is used as a proxy for the market return.
Multiple blockholding (indicator)	Indicator variable that takes the value of one if a firm's institutional blockholding number is equal to or higher than the sample median of firms that have institutional blockholders and zero otherwise. It is set to be zero if firms do not have any institutional blockholders.
No-turnover-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and a firm's largest institutional blockholder does not have any forced CEO turnover experience in its other portfolio firms during the previous two years and zero otherwise.
Ratio of the number of public firms to the number of institutional investors in the state in which the firm's largest institutional shareholder is headquartered (instrumental variable)	Number of publicly listed firms whose stock prices are reported in CRSP divided by the number of institutional investors who file a form 13F in the state in which the firm's largest institutional investor is headquartered.
Raw number	The number of stocks that the institution holds as the largest institutional blockholder.
ROA	Ratio of EBITDA to lagged book value of assets.
Short-horizon multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and the aggregate length of time that the institutional shareholder continuously serves as the blockholder for its portfolio firms as of the quarter end is shorter than the sample median and zero otherwise.
Stock return	Buy-and-hold monthly stock return during a one-year period.
Stock return volatility	Standard deviation of monthly stock returns for three years prior to the event year.
Tobin's q	Book value of assets minus book value of equity plus market value of equity divided by book value of assets.
Total institutional ownership	Aggregate ownership held by institutions.
Turnover-experience multiple blockholding (indicator)	Indicator variable that takes the value of one if the value of the multiple blockholding indicator is one and a firm's largest institutional blockholder has forced CEO turnover experience in at least one of its other portfolio firms during the previous two years and zero otherwise.

Essay Two: Spillover Effects of SEO Announcements in Institutional Blockholding Networks

Abstract

We examine whether a firm's financing decision (SEO) affects the market value of other firms that share the same largest institutional blockholder as the issuer. We find that the stock prices of non-SEO firms in the portfolio react negatively when other portfolio firms make SEO announcements. We further find that after controlling for horizontal and vertical industrial information transfers, this spillover effect is more pronounced when issuers (non-issuers) have high information asymmetry or when their stocks are overvalued prior to an offering, or when issuers and non-issuers share similar characteristics (e.g., B/M, price momentum) or similar corporate policies (e.g., leverage policy). The spillover effect is also more evident when non-issuers have a near-term equity financing plan, when issuers time the market for their equity offerings, or when issuers' largest institutional blockholders manage a small fund or have a small number of largest institutional blockholdings. These results suggest that stock offers by firms with a largest institutional blockholder induce investors' adverse selection concerns for issuers as well as other firms in the same portfolio and that this adverse selection effect is particularly pronounced when the firms held by the common largest institutional blockholder are relatively homogeneous or share similar styles.

Keywords: Seasoned equity offering, Spillover effect, Institutional blockholder, Adverse selection, Information asymmetry, Market timing, Agency problem.

JEL Classification: G14, G30, G32.

I. Introduction

In recent years, multiple blockholdings by institutional investors have become a common and important feature of the ownership structure for publicly listed firms in the U.S. For example, according to institutional ownership data from CDA/Spectrum Institutional (13F) Holdings for the period 1991 to 2009, a firm's largest institutional investor on average serves as the largest institutional blockholder for six different firms at the same time. These multiple blockholdings by institutions can create important information networks among firms in the same portfolio, with large institutional investors collecting and distributing value-relevant information about their portfolio member firms. Such information networks created by the same institutional blockholding (hereafter, blockholding networks) may allow firms to share and react to new information with respect to other firms in the same portfolio. Blockholding networks may also create significant operating and financial interdependence across firms in the same portfolio since institutional blockholders can influence their portfolio firms through their stylistic investment strategies (Barberis and Shleifer (2003), Teo and Woo (2004), Froot and Teo (2008)), or by monitoring their portfolio firms' major corporate decisions (Holderness (2003), Kang, Luo, and Na (2012), Massa and Žaldokas (2012))³². The potential information sharing and corporate policy interdependence within the blockholding network suggest that a firm's financing and investment decisions impact the value of both the firm and other firms in the same portfolio through information spillovers.

In this paper we examine this unexplored question of information spillover effects among firms belonging to the same blockholding network using seasoned equity offerings (SEOs) as our experiment. To test the importance of blockholding networks in transmitting information from one firm to another, we

³² Massa and Žaldokas (2012) show that the coownership (blocks in multiple firms) creates financial links among member firms. An increase in the credit risk of peer firms raises the focal firm's credit risk. Following their approach, we also find corporate policy correlation among member firms in the same blockholding network. In untabulated tests, we find that an increase in the leverage, cash holding, investments or R&D intensity of peer firms leads to higher leverage, cash holding, investments or R&D intensity for the focal firm. These results suggest that blockholding networks created by common largest institutional blockholders could induce indirect financial and operational links among otherwise formally independent firms.

focus on firms' largest institutional blockholder. First, these blockholders are more likely to move the stock prices of their portfolio firms through their large trading and active monitoring.³³ Second, focusing on a single largest institutional blockholder (instead of all institutional blockholders) allows us to investigate how institution characteristics affect the spillover effects of SEO announcements on non-issuers in the same blockholding network in a clean and unambiguous way.

We use SEOs as our experiment because they are among the most important financial decisions that firms make, significantly impacting firms' investment policy and capital structure as well as major shareholders' ownership stakes due to their dilution effects. As a consequence, stock offers by firms in the blockholding network are likely to reveal information about the value of institutional investors' stock portfolios, stock-picking styles and characteristics, and monitoring incentives and abilities, and hence are likely to have significant effects on the value of non-SEO firms in the portfolio. Furthermore, SEO announcements are largely unanticipated and typically associated with negative valuation effects due to adverse selection concerns (Myers and Majluf (1984)). To the extent that the SEO firm and the non-SEO firms in the same portfolio share similar characteristics due to institutions' style investing, outside investors may have the same adverse concerns about overvaluation for other member firms and thus stock offers by firms with the largest institutional blockholder can affect the value of non-SEO firms in the same portfolio.

We propose two hypotheses on the importance of blockholding networks in transmitting SEO information across portfolio firms and creating interdependent valuation effects, namely, the adverse selection concern hypothesis and the agency problem hypothesis. Previous studies show that the announcement of new public equity issues is associated with a decrease in the announcing firm's stock price.³⁴ The most widely accepted interpretation for this result is that SEOs convey information about

³³ On average our sample firms have two institutional blockholders that own at least 5% of the firm's outstanding shares and 42% of our sample firms have only one institutional investor as their large blockholders. The median equity ownership held by the largest institutional blockholder is 9.2% and that held by the second largest institutional blockholder is 5.7%.

³⁴ See Eckbo and Masulis (1995) for a review of the evidence.

issuers' adverse selection problems (Myers and Majluf (1984)). Since managers have insider information about current assets in place and future investment opportunities that outside investors do not have, they will issue equity only when the payoff to old shareholders from taking positive NPV projects outweighs the cost of issuing shares at a bargain price. New investors, knowing their informational disadvantage, will ask for a price discount to minimize the risk associated with buying overvalued stocks, resulting in a negative stock price reaction to new equity offerings.

As is well documented in the literature, fund managers tend to engage in style investing, holding stocks that share similar characteristics. Brown and Goetzmann (1997, 2003) show that mutual funds and hedge funds follow distinct investment styles and management styles. For example, they might pursue small-cap, value, global macro, global opportunity, natural resources, event driven, pure emerging market style, or other types of styles. Chan, Chen, and Lakonishok (2002) document that mutual fund styles remain consistent over time although some funds with poor past performance are likely to change their styles. Froot and Teo (2008) find that institutions allocate fund across style groups more intensively than across random stock groups. Harford, Jenter, and Li (2011) show that even institutional blockholders apply characteristic-based selection screens (e.g., size, market-to-book, and prior stock return characteristics) when choosing stocks, ending up with portfolios consisting of large stakes in stocks with similar characteristics. They further show that the cross-sectional determinants of institutional cross-holdings do not show much change over time.

In addition, recent studies suggest that commonality in misvaluation exists among firms within the same style. Barberis and Shleifer (2003) build a theoretical model to show that style investing generates common factors in the returns of assets that happen to be grouped into the same style. These return factors can be completely unrelated to common factors in cash flows and can be accompanied by higher average returns for reasons that have nothing to do with risk. Therefore, style investing clearly increases the correlation between assets in the same style, lowers the correlation between assets in different styles. Using Morningstar styles for mutual funds, Teo and Woo (2004) find strong evidence of style-level

reversals and momentum even after controlling for the variation in the fundamental risk, and stock-level reversals and momentum, which is attribute to positive feedback style traders as in Barberis and Shleifer (2003). Pirinsky and Wang (2004), Sun (2008), and Faias et al. (2011) also show that institutions' style investing contributes to excessive comovement in stock prices.

These findings on institutional style investing and its impact on firm valuation suggest that firms held by the same large institutional investor are likely to be categorized into the same style, hence share similar characteristics and have covariation in their firm value. Therefore, stock offerings by firms with the largest institutional blockholder convey value-relevant information not only for their own issuers but also for non-issuers in the same blockholding network. If investors perceive that an issuer's stock is overvalued, they may infer that non-issuers' stocks in the same blockholding network are also overvalued due to their common characteristics, resulting in a spillover effect. In other words, outside investors' information asymmetry and institutions' style investing will induce adverse selection concerns for both SEO issuers and non-issuers in the same blockholding network, leading to negative stock price externalities from SEO issuers to non-issuers. We refer to this argument as the adverse selection concern hypothesis.

The adverse selection concern hypothesis leads to several testable implications. First, it predicts that the spillover effects are more evident when informative asymmetry between outside investors and SEO issuers (non-issuers) is greater since information asymmetry exacerbates adverse selection effects in the new issue market. Second, it predicts that the adverse effects of SEOs on the market value of non-issuers are more severe when issuer (non-issuer) stocks are more overvalued (Myers and Majluf (1984)) or when issuers engage in market timing. Third, it predicts that the spillover effects are more pronounced when non-issuers plan to issue equity in the near future since the market's ex-ante valuation of adverse selection will be stronger for firms that are expected to sell information-sensitive securities in the near term. Finally, this hypothesis predicts that the spillover effects are stronger when the common largest institutional

blockholder has relatively concentrated holdings, or when the issuers and non-issuers in the same network share similar characteristics or similar corporate policies.

Our second hypothesis is the agency problem hypothesis. SEOs produce a large cash inflow³⁵. Jensen (1986) argues that managers with large free cash flows have incentives to overinvest beyond the optimal level even though this investment is not profitable. If the firm issues equity not because of attractive future investment opportunities but rather because of managers' incentives to engage in value-destroying empire building (Pilotte (1992), Denis (1994), Jung, Kim, and Stulz (1996), Kim and Purnanadam (2011)), then to the extent that an SEO announcement signals unfavorable information to the market about the quality of the overall governance structures that the largest institutional blockholders adopt for their portfolio firms, it could negatively impact the value of both the issuing firm and the non-issuing firms in the same blockholding network.³⁶ Thus, if the market is able to infer the largest institutional investor's monitoring incentives and abilities from equity offering announcements by one of its portfolio firms, this inference will have a value impact for non-issuing firms in the same portfolio.

The agency problem hypothesis also leads to several predictions. First, it predicts that the spillover effects of SEO announcements on non-issuing firms are more pronounced when the issuers (non-issuers) have greater agency problems, that is, when the largest institutional blockholder's governance activities are important for their value³⁷, and when they have poor investment opportunities. Second, it predicts that the spillover effects are more pronounced when the largest institutional investors have less incentive to monitor (for example, when their portfolio weight in the issuer is small). Third, to the extent that equity offerings produce large free cash flows, the agency problem hypothesis predicts that the spillover effects are more pronounced for non-issuers who plan to raise funds through an equity offering in the near term.

³⁵ We delete pure secondary offers to ensure that SEOs bring cash inflows to the issuers.

³⁶ Demsetz and Lehn (1985) and Shleifer and Vishny (1986) argue that large institutional blockholders have strong incentives to monitor corporate managers.

³⁷ Consistent with this argument, Lee and Park (2009) find significant positive spillover effects of the Korea Corporate Governance Fund's target acquisition announcements on the market value of non-target firms listed on the Korean Stock Exchange. This result is particularly pronounced for non-target firms with poor governance that are more likely to be targets in the future, as such announcements create the expectation that similar fund activism will be aimed at these firms.

In sum, in investigating the spillover effects of SEO announcements in blockholding networks, we focus on issuers' (non-issuers') information asymmetry, overvaluation, market timing and characteristics similarity as key variables to test the adverse selection concern hypothesis, and we focus on issuers' (non-issuers') governance and investment opportunities as well as institutions' portfolio weight in the issuers as key variables to test the agency problem hypothesis.

Using a large sample of SEOs from 1991 to 2009 by firms that have a largest institutional blockholder, we find that, consistent with previous studies, issuers experience a large and significant negative cumulative abnormal return (CAR) around SEO announcement dates. More important, we find that SEO announcements lead to a significant negative market reaction for non-SEO firms in the same blockholding network: both value- (equally-) weighted portfolios of non-SEO firms and individual non-SEO firms in the same network experience significantly negative mean and median CARs around SEO announcements made by portfolio firms. In terms of economic magnitudes, the CAR (-1, 1) for portfolios of non-SEO firms (individual non-SEO firms) on average is 0.4% (0.3%) lower when issuers experience a negative CAR (-1, 1) than when issuers experience a positive CAR (-1, 1). In terms of dollar values, these results suggest that during the three days around the SEO announcement, portfolios of non-SEO firms (individual non-SEO firms) in the same blockholding network as the issuer on average lose 122 (4.2) million more when the issuer's CAR (-1, 1) is negative than when the issuer's CAR (-1, 1) is positive³⁸. These spillover effects of SEO announcements across a blockholding network remain significant even after controlling for intra- and inter-industry information externalities (Szewczyk (1992), Johnson, Kang, Masulis, and Yi (2011)).

Multivariate regressions of the abnormal returns for value-weighted portfolios of non-SEO firms further show that the sensitivity of these abnormal returns to the abnormal returns for SEO firms is higher when issuing firms have greater information asymmetry, or when they have a higher pre-SEO stock price run-up. These results are consistent with the predictions of the adverse selection concern hypothesis. We

³⁸ The average size of largest blockholding portfolio for the sample institutional investor is 30.5 billion.

also find that the spillover effects are stronger when the largest institutional blockholders has small fund size, when they serve as the largest institutional blockholder for a small number of firms, or when their portfolio weight in the issuing firms is large. To the extent that the portfolio firm characteristics in the blockholding network owned by a small institution or constituted by few members are relatively homogeneous, outside investors are more likely to infer value-relevant information from SEO announcements about non-issuers as well as issuers. These results again support the adverse selection concern hypothesis.

To further distinguish between the adverse selection concern and the agency problem hypotheses, we investigate whether the spillover effects as captured using portfolio returns are more pronounced when issuing firms time the market. We construct three market timing indicators: 1) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO three-year market-adjusted abnormal stock return and a negative CAR $(-1, 1)$, and zero otherwise; 2) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO one-year market-adjusted abnormal stock return and a negative CAR $(-1, 1)$, and zero otherwise; and 3) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO three-year market-adjusted abnormal stock return, a negative CAR $(-1, 1)$, and a below-median post-SEO one-year market-adjusted abnormal stock return, and zero otherwise. Consistent with the adverse selection concern hypothesis, we find significant negative externalities for non-SEO firms when the offering firms time the market, particularly when the largest institutional blockholders are small, or when they serve as the largest institutional blockholder for a small number of firms.

In additional analysis, results from multivariate regressions of abnormal returns for individual non-SEO firms corroborate those from multivariate regressions of abnormal returns for value-weighted portfolios of non-SEO firms. Specifically, we find that the spillover effects for non-issuing firms are especially strong when non-issuing firms have a high level of information asymmetry, when they are more likely to be overvalued, or when they plan to issue equity in the two years following the issuer's SEO. The adverse effects of SEO firms' market timing on the market value of non-SEO firms are also

stronger for informationally opaque non-SEO firms. Moreover, the spillover of SEO announcement effects is particularly evident when SEO firm and non-SEO firms in the same blockholding network share similar characteristics (e.g., B/M, price momentum) or similar policies (e.g., leverage policy). These results strongly support the adverse selection concern hypothesis.

Throughout our analysis, we find no evidence that the negative announcement returns for non-issuing firms are related to issuing and non-issuing firms' investment opportunities, their internal governance, or their largest institutional blockholders' monitoring incentives. We thus find little support for the agency problem hypothesis.

Our paper contributes to existing literature in several ways. First, to the best of our knowledge, our study is the first to examine how equity offering announcement effects spill over to independent firms that share the same largest institutional blockholder as the issuer, and whether these spillover effects are affected by institution characteristics. Matvos and Ostrovsky (2007) and Harford, Jenter, and Li (2011) study how indirect cross-ownerships formed by institutions' large stakes facilitate bidder-target relationships between portfolio firms and affect bidder returns around acquisition announcements. Azar (2011) discusses the voting of common institutional shareholders in the setting of product-market collusion. Jung (2012) examines how a firm's change in voluntary disclosure behavior is subsequently emulated by other firms in the industry that share common institutional investors with the first-mover firm. Massa and Žaldokas (2012) show that coownership creates indirect financial links between coowned firms. Our paper is distinct from these studies in that we investigate how a common largest institutional blockholder creates interdependent valuation effects for member firms in the institution's portfolio when one firm in the portfolio makes important financing decisions.

Second, our paper extends the literature on the potential horizontal or vertical industry spillover effects of SEO announcements. Szewczyk (1992) documents significant negative abnormal returns for non-announcing firms operating in the same industry as SEO-announcing firms, while Slovin, Sushka, and Polonchek (1992) do not find such intra-industry effects for industrial firms. Johnson, Kang, Masulis,

and Yi (2011) examine equity offering spillover effects along the supply chain and find significant negative customer announcement returns around suppliers' stock offer announcements. We extend these studies by examining how a firm's stock offer affects other firms in their largest institutional investor's portfolio that are not the issuer's rivals or trading partners.

Third, our study extends the literature on the relation between institutional ownership and stock price comovement. Pirinsky and Wang (2004), Sun (2008), and Fias et al. (2011) show that institutional ownership (or institutional clientele) induces excessive comovement in stock prices either through institutions' style investing or wealth constraints. Unlike these studies, we examine the effect of a firm's financing decisions on stock return comovement of portfolio firms that share the same largest institutional blockholder, and show that stock return comovement occurs mainly through investors' adverse selection concerns and information revelation about firm value along the blockholding network.

This paper proceeds as follows. Section I describes the data and sample characteristics. Section II discusses the measures of abnormal returns and presents univariate results. In Sections III and IV, we provide multivariate regression results using portfolio returns of non-issuing firms in the same portfolio and the returns of individual non-issuing firms, respectively. In Section V, we present results from additional tests of the agency problem hypothesis and other alternative explanations as well as results from various robustness tests. Section VI summarizes and concludes the paper.

II. Data

II.1. Sample

Our initial sample begins with all SEOs reported in Thomson's SDC new issues database during the 1991 to 2009 period. We require that offering firms be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases.³⁹ We next require that offering firms not belong

³⁹ The CDA/Spectrum data are based on the SEC's Form 13F filings. Institutional investors with investment discretion over \$100 million or more in equity securities are required to file a quarterly report of all their equity holdings greater than 10,000 shares or \$200,000 in market value.

to financial (SIC 6000-6999) and utility (SIC 4910-4940) industries. Sample SEO firms must also have a largest institutional blockholder that serves as the largest institutional blockholder for at least one non-SEO firm, be listed on the NYSE, Nasdaq, or Amex, and have a CRSP share code of 10 or 11 (ordinary common shares). We delete pure secondary offers, rights offerings, private placements, and offers with a missing filing date or an offer price lower than \$5. In addition, using the SEO's filing date provided by SDC as its initial announcement date (Jegadeesh, Weinstein, and Welch (1993), Denis (1994), Clarke, Dunbar, and Kahle (2001), Datta, Iskandar-Datta, and Raman (2005), Purnanandam and Swaminathan (2006), Kim and Purnanandam (2011)),⁴⁰ we search the Compustat, CRSP event tapes, and Thomson's SDC databases for issuer and non-issuers' major confounding corporate news events (e.g., M&As, dividend and earnings announcements, company name changes, delistings, and other types of securities offerings) within one trading day before and after the SEO filing date and exclude deals with such events from the sample.⁴¹

Taken together, the above sample selection criteria yield a final sample of 2,240 SEOs by 1,374 industrial firms and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. Our sample issuers and non-issuers share 333 largest institutional blockholders.

II.2.Summary Statistics

[Insert Table I Here]

Table I Panel A reports the distribution of the 2,240 SEO firms by year and the corresponding mean and median numbers for non-SEO firms that share the same largest institutional blockholder as the SEO firm. The panel shows a significant increase in the frequency of offers during the late 1990s and a decline

⁴⁰ Purnanandam and Swaminathan (2006) examine the actual SEO announcement dates for a subsample of approximately 300 firms during the 1993 to 2000 period and find that 90% of these firms made their SEO announcements on the same day as their filing dates, with the majority of the remaining firms making announcements one day before the filing date. Kim and Purnanandam (2011) conduct a manual search of SEO announcement dates over the 1993 to 2006 period using *Factiva* and find that only 28 cases (about 5% of the sample) have an announcement date that precedes the filing date. In 16 of these 28 cases, the announcement date does not precede the filing date by more than two days.

⁴¹ To be precise, when calculating the CAR for portfolios of non-SEO firms (an individual non-SEO firm) over a certain event window, we delete observations with major confounding events during the corresponding event window.

during the late 2000s. The annual mean (median) number of non-issuers that share the same largest institutional blockholder as the issuer is 93 (28).

Table I Panel B presents the distribution of the sample SEO firms by industry and the corresponding mean and median percentages of non-SEO firms that operate in the same two-digit SIC industry as the SEO firm. The frequency of equity offerings is highest in manufacturing industries (1,068 (47.6%)), followed by the service (458 (20.4%)), wholesale and retail trade (254 (11.3%)), mining and construction (248 (11.1%)), and agriculture, forestry, and fishing (10 (0.4%)) industries. The mean (median) percentage of non-SEO firms that operate in the same industry as the SEO firm is highest in manufacturing industries (11.25% (6.67%)), followed by the mining and construction (11.09% (2.93%)), services (9.49% (3.85%)), and transportation (6.23% (1.67%)) industries. The median SEO firm in the agriculture, forestry, and fishing industry and that in the wholesale and retail trade industry do not have corresponding non-SEO firms that operate in the same industry and share the same largest institutional blockholder as the issuer.

[Insert Table II Here]

Table II presents summary statistics for issue-, institution-, issuer-, and non-issuer-specific characteristics. Detailed definitions for the variables in Table II are provided in the Appendix. Panel A reports on issue-specific characteristics. Mean (median) offer proceeds equal \$118.18 (\$64.9) million and the mean (median) percent of primary shares sold in the offering is 91% (100%). About half of the issues are underwritten by investment banks with a high reputation rank and 32% of the issues are Rule 415 shelf registrations.⁴²

Panel B reports on the characteristics of institutions that serve as the largest institutional blockholder for issuing firms. The mean (median) fund size is \$106.74 (\$25.75) billion. The mean (median) quarterly portfolio turnover, portfolio return, and portfolio weight are 11.19% (9.91%), 6.01% (5.68%), and 1.27% (0.17%), respectively. The average (median) institution serves as the largest institutional blockholder for

⁴² The underwriter is regarded as having a high reputation if it has a ranking of 9 on a 9-point scale based on Jay Ritter's underwriter rankings.

138 (40) firms.⁴³ Mutual funds and investment advisors account for 29% and 54% of the sample institutions, respectively.

Panel C reports the characteristics of SEO firm and non-SEO firms in the same blockholding network. Several findings are worth noting. Compared to non-SEO firms, SEO firms are younger and have higher Tobin's q , higher return volatility, higher R&D intensity, and higher discretionary accruals. SEO firms also experience a higher three- (one-) year stock price run-up prior to the SEO filing date and earn a lower post-issue one-year market-adjusted abnormal stock return. These results suggest that among firms in the same blockholding network, those that exhibit higher information asymmetry or those that are more overvalued are more likely to issue stock, all else being equal. Further, SEO firms have higher leverage and higher total institutional ownership than non-SEO firms. We also find that on average, 9.84% of non-SEO firms issue equity within two years after the issuer's SEO. About 5.94% of non-SEO firms operate in the same two-digit SIC industry as the SEO firm and only 0.02% of non-SEO firms maintain a customer-supplier relationship with SEO firms.

III. Methodology and Univariate Results

III.1. Measures of Abnormal Returns

We employ a standard event study methodology to examine the valuation effect of equity issuance announcements. Using 150 days of return data, beginning 160 trading days and ending 11 trading days before the SEO announcement date, we estimate a one-factor market model in which the CRSP value-weighted index is used as the market portfolio. Abnormal returns are computed as the difference between realized returns and estimated returns from the market model. We sum the daily abnormal returns to compute the CAR.

⁴³ In untabulated tests, we find that the mean (median) holding period by the largest institutional blockholder in issuing firms is 6.87 (5) quarters prior to the offering and 6.5 (4) quarters after the offering. Controlling for pre-SEO blockholding periods in the regressions does not change the results reported in the paper.

To examine the spillover effects of SEO announcements in the same blockholding network, we use both portfolio and individual firm approaches to calculate the CARs around SEO announcement dates. An important advantage of using the portfolio approach is that it allows us to diversify away the cross-sectional dependence of returns for individual non-SEO firms that arises when using the individual firm approach to estimate abnormal returns. In other words, since we employ the market-model approach to estimate abnormal returns for non-SEO firms in the same blockholding network, the estimation periods and event windows used to compute their abnormal returns perfectly overlap when individual returns are used in the analysis. As a result, the t -statistics in the analyses of individual returns are biased upwards. However, the portfolio returns do not allow us to examine the effect of non-SEO firms' financial characteristics on the information spillover in the blockholding network. We therefore also conduct analyses using individual firm returns and their financial characteristics to examine the spillover effect of equity issuance announcements.

III.2. Univariate Results

[Insert Table III Here]

Table III reports the mean and median CARs for SEO firms, portfolios of non-SEO firms, and individual non-SEO firms over several different event windows. Panel A presents the CARs using the CRSP value-weighted return as the market return. The CARs for the portfolios of non-SEO firms that share the same largest institutional blockholder as the SEO firm are obtained by combining non-SEO firm returns into a single value-weighted portfolio and estimating the market model for each SEO event. We use the market capitalization of each individual non-SEO firm as the portfolio weight. Consistent with prior literature, we find that our sample SEO firms earn statistically significant negative mean and median CARs over all event windows considered (Eckbo (1986), Masulis and Korwar (1986), Mikkelson and Partch (1986)). Although the mean and median CAR (-1, 1) and CAR (-2, 2) for value-weighted portfolios of non-SEO firms are not significant, the mean and median CAR (-3, 3) and CAR (-5, 5) are

negative and significant. In untabulated tests, we also investigate whether the value-weighted portfolios of all non-SEO firms covered in the Compustat, CRSP, and 13F databases that do not share the same largest institutional blockholder as the issuing firm show any significant response to the SEO announcement. We find that their mean and median CARs over all event windows we consider are small, ranging from -0.01% to 0.01%, and insignificant. These results suggest that the blockholding network does indeed create spillover effects among firms in the same portfolio by transmitting financing announcement effects from one firm to another.

It is possible, however, that the negative value-weighted portfolio returns observed in Table III Panel A simply reflect negative industry information shocks around SEO announcements (Szewczyk (1992)). To exclude the possibility that industry spillover effects drive our results, we divide non-SEO firms into those in the same versus different industries as the SEO firm (using two-digit SIC codes) and examine whether our results on portfolio returns in Panel A are mainly attributable to non-SEO firms in the same industry as the SEO firm. We find that the mean and median CAR (-3, 3) and CAR (-5, 5) for value-weighted portfolios of non-SEO firms in different industries are negative and significant. However, the corresponding returns for value-weighted portfolios of non-SEO firms in the same industries are not significant except for the median CAR (-5, 5), which is negative and significant at the 1% level. These results suggest that the negative horizontal industry shocks in the SEO issuers' industries are unlikely to drive the negative announcement returns for non-SEO firms in the same blockholding network.

The last column of Table III Panel A shows that the CARs for individual non-SEO firms are more negative and significant than the CARs for the portfolios of non-SEO firms. Their mean (median) CAR (-1, 1), CAR (-2, 2), CAR (-3, 3), and CAR (-5, 5) are -0.05% (-0.23%), -0.10% (-0.32%), -0.15% (-0.37%), and -0.30% (-0.53%), respectively, all of which are significant at the 1% level. In untabulated tests, we divide non-SEO firms into those in the same versus different industries as the SEO firm and estimate the abnormal returns separately for these two subgroups. We find that the mean and median CARs for individual non-issuers that are in different industries than the issuers are negative and

significant at the 1% level for all event windows considered. However, the corresponding CARs for individual non-issuers in the same industries as the issuers are not significant. These results further confirm that negative industry information shocks around SEO announcements are not the main reason for the negative announcement returns of non-SEO firms in the same portfolio.

Table III Panel B presents the CARs using the CRSP equally-weighted return as the market return. Portfolio returns of non-SEO firms are estimated by combining non-SEO firm returns into a single equally-weighted portfolio and estimating the market model for each SEO event. We find that the results echo those in Panel A, but are larger in magnitude and show higher significance. In particular, the median CAR (-1, 1) and CAR (-2, 2) for both portfolios of non-SEO firms and individual non-SEO firms are negative and significant. These results indicate that the spillover effects of SEO announcements in the same blockholding network are more pronounced for small non-SEO firms than large non-SEO firms.

Negative and positive SEO announcement effects might convey different information about SEOs and thus offset each other. To unambiguously investigate the relation between the returns of issuers and non-issuers in the same blockholding network, we divide our sample SEO firms into two groups according to whether their CARs are positive or negative and estimate the abnormal returns for issuers and non-issuers separately for these two groups. The results are reported in Table III Panels C and D, respectively. We find that when issuers experience significant negative (positive) abnormal returns, both value-weighted portfolios of non-issuers (regardless of whether they are in the same industry as the issuer) and individual non-SEO firms experience significant negative (positive) abnormal returns. However, the spillover effects of SEO announcements on the CARs of value-weighted portfolios of non-issuers tend to be stronger when the issuers have negative announcement returns than when they have positive announcement returns, suggesting that such spillover effects are stronger when offer announcements convey bad news.

IV. Multivariate Analyses Using Abnormal Returns for Portfolios of Non-Issuers in the Same Blockholding Network

To examine whether the spillover effects of SEO announcements in the same blockholding network can be explained by investors' adverse selection concerns or by offering firms' agency problems, we conduct multivariate regressions of the CARs for the portfolios of non-SEO firms on issue-, issuer-, and institution-specific characteristics.

IV.1. Relation between Abnormal Returns for Portfolios of Non-SEO Firms and Issue and Issuer Characteristics

[Insert Table IV Here]

Table IV presents the estimates from ordinary least squares (OLS) regressions of CAR (-1, 1) for value-weighted portfolios of non-SEO firms on issue and issuer characteristics.⁴⁴ Our key explanatory variables are the issuer CAR (-1, 1), an indicator for a negative issuer CAR (-1, 1) that takes the value of one if the issuer CAR (-1, 1) is negative and zero otherwise, and interaction terms between the issuer CAR (-1, 1) and issuer characteristics. Following previous research, we use the following issue and issuer characteristics measured at the pre-offer year-end as control variables: offer proceeds, percent of primary shares sold, high reputation underwriter indicator, NYSE listed indicator, Rule 415 shelf registration indicator, log of total assets, leverage, Tobin's q , total institutional ownership, pre-SEO three-year stock price run-up, and pre-SEO three-year stock return volatility (Jung, Kim, and Stulz (1996), Lee and Masulis (2009), Kim and Purnanandam (2011)). We also control for the largest institutional blockholder's fund size, portfolio return, portfolio turnover, and portfolio weight in each SEO firm, all of which are measured as of the calendar quarter-end that immediately precedes the SEO announcement date. In addition, we include year, industry, and institution fixed effects to control for potential time trends, industry effects, and unobservable institution heterogeneity, respectively.

⁴⁴ In untabulated tests, we also experiment with CAR (-3, 3) for the value-weighted portfolios of non-SEO firms as the dependent variable. We find that the results are almost identical to those reported in the paper.

In regressions (1) through (6), we use all non-SEO firms in estimating portfolio returns. The coefficient estimate on the issuer CAR (-1, 1) is 0.032 in regression (1), which is significant at the 1% level. The coefficient estimate on the indicator for a negative issuer CAR (-1, 1) is -0.004 in regression (2), which is significant at the 1% level. This result suggests that the abnormal return for the portfolio of non-SEO firms is on average 0.4% lower when the issuer experiences a negative SEO announcement return than when it experiences a positive SEO announcement return.

In regressions (3) and (4), we add institution characteristics to regression models (1) and (2), respectively. We find that the results do not change. Overall, these results show that the spillover effects of SEO announcements on the market value of non-SEO firms in the same blockholding network are statistically and economically significant.

In unreported tests, we divide SEO firms into those with positive and negative CARs (-1, 1) and reestimate regression (3) separately for these two subsamples. We find that the relation between the issuer CARs and the CARs for the value-weighted portfolios of non-issuers is positive and significant only for issuers with a negative CAR (-1, 1). This result suggests that the spillover effect is particularly pronounced when SEO announcements convey bad news to the market.

In regressions (5) and (6), we include interaction terms between the issuer CAR (-1, 1) and issuer characteristics. In regression (5), we include interaction term between the issuer CAR (-1, 1) and the indicator for high discretionary accruals, which takes the value of one if an issuer's discretionary accruals are larger than the sample median and zero otherwise. Lee and Masulis (2009) show that discretionary accruals can serve as a good proxy for offering firms' information uncertainty. We find that the coefficient estimate on the interaction term is positive and significant at the 5% level. This result suggests that higher issuer information asymmetry exacerbates the spillover effects in the blockholding network.

To examine whether an issuer's market timing behavior can explain the spillover effects observed in regressions (1) through (4), in regression (6) we follow prior literature and replace the indicator for high discretionary accruals in regression (5) with the pre-SEO three-year stock price run-up (Loughran and

Ritter (1995, 1997), DeAngelo, DeAngelo, and Stulz (2010)). We find that the coefficient estimate on the interaction term between the issuer CAR and the pre-SEO three-year stock price run-up is positive and significant at the 5% level. Thus, the sensitivity of the abnormal return for the portfolio of non-SEO firms to the abnormal return for SEO firms is particularly high when issuers are likely to engage in market timing. Overall, these results support the adverse selection concern hypothesis.

To alleviate the concern that the spillover effects we document in Table IV are driven by negative industry information shocks around SEO announcements, we divide non-SEO firms into those in different industries than and those in the same industry as the SEO firm and calculate the CAR (-1, 1) for the value-weighted portfolios of non-SEO firms separately for these two groups. We then reestimate regressions (3) and (4) separately using these portfolio CARs (-1, 1) as the dependent variable. In regressions (7) and (8), we use the CAR (-1, 1) for the value-weighted portfolio of non-SEO firms in different industries than the SEO firm as the dependent variable. The results are similar to those reported in regressions (3) and (4), suggesting that our spillover effects are not driven by negative industry shocks documented in previous studies. In regressions (9) and (10), we use the CAR (-1, 1) for the value-weighted portfolio of non-SEO firms in the same industry as the SEO firm as the dependent variable. Although the coefficient estimate on the issuer CAR (-1, 1) is not significant, the coefficient estimate on the indicator for a negative issuer CAR (-1, 1) is negative and significant at the 5% level. This result is consistent with the intra-industry spillover effects of equity offerings documented by Szewczyk (1992).

IV.2. Relation between Abnormal Returns for Portfolios of Non-SEO Firms and Largest Institutional Blockholder Characteristics

To investigate how largest institutional blockholder characteristics affect the spillover effect of equity offerings in the blockholding network, we estimate a battery of regressions by adding largest institutional blockholder characteristics to the Table IV regressions. The results are reported in Table V.

[Insert Table V Here]

In regressions (1) and (2), we include the indicator for issuing firms' largest institutional investors holding a small number of largest blockholdings, which takes the value of one if the number of largest institutional blockholdings by a firm's largest institutional blockholder is lower than the sample median and zero otherwise. We find that the coefficient estimate on the interaction between this indicator and the issuer CAR (-1, 1) (the indicator for a negative issuer CAR (-1, 1)) is significantly positive (negative) at the 5% level, indicating that the spillover effect of equity offerings is stronger when the blockholding network is made up of a small number of portfolio firms. In regressions (3) and (4), we include the indicator for small funds, which takes the value of one if the total market value of equity holdings managed by a firm's largest institutional blockholder is lower than the sample median and zero otherwise. The interaction between this indicator and the issuer CAR (-1, 1) (the indicator for a negative issuer CAR (-1, 1)) is positively (negatively) and significantly related to the CAR (-1, 1) for the value-weighted portfolio of non-SEO firms. Compared with portfolios owned by large funds and institutions with many blockholdings, portfolio firms are more homogeneous if they are owned by small funds and institutions with few largest blockholdings, hence the issuer's characteristics is more representative of other members in the same portfolio, and outside investors are more likely to have similar adverse selection concerns for other member firms if one of them makes a SEO announcement. On the other hand, the issuer's financing decision also reveals more accurate and reliable information about the common largest institutional blockholder's monitoring ability if there are few members in this common institution's portfolio. Therefore, these results support both the adverse selection concern hypothesis and the agency problem hypothesis.

In regressions (5) and (6), we include the indicator for a high portfolio weight in the issuing firm, which takes the value of one if the largest institutional blockholder's portfolio weight in the issuing firm is higher than the sample median and zero otherwise. We find that the interaction between this indicator and the issuer CAR (-1, 1) (the indicator for a negative issuer CAR (-1, 1)) has a significantly positive

(negative) coefficient. This result suggests that spillover effects in a blockholding network are stronger when institutional investors put more wealth into the issuing firm and thus investors have greater adverse selection concerns, supporting the adverse selection concern hypothesis. The result is inconsistent, however, with the agency problem hypothesis, which predicts that the spillover effects should be small or non-existent when the institution's portfolio weight in the issuer is large.

Overall, the results in Table V indicate that when issuing firms' largest institutional investors hold a small number of largest blockholdings or manage small funds, or when these institutions' portfolio weights in the issuing firms are larger, outside investors' concerns about issuers' adverse selection problems are more likely to spill over to other non-issuers in the same blockholding network, intensifying the negative market reactions to other non-issuers.

IV.3. Additional Tests of the Adverse Selection Concern Hypothesis: Relation between Abnormal Returns for Portfolios of Non-SEO Firms and Issuers' Market Timing

One important prediction of the adverse selection concern hypothesis is that the spillover effects of SEO announcements on non-issuing firms in the same blockholding network, if they exist, should be more pronounced when issuers exploit windows of opportunity by timing their stock offering (i.e., issue equity when their stocks are substantially overvalued).⁴⁵ In this subsection, we examine this prediction using issuer stock price run-up prior to a SEO announcement and whether the issuer announcement effect is negative to measure the issuer's market timing motive (Loughran and Ritter (1995, 1997), DeAngelo, DeAngelo, and Stulz (2010)). We also use the extent of unfavorable post-SEO stock price changes to further identify the issuer's market timing motive since DeAngelo, DeAngelo, and Stulz (2010) argue that a firm with higher past stock returns and lower future stock returns is more successful in timing the issuance of its stocks.

⁴⁵ In their adverse selection model, Myers and Majluf (1984) show that investors react negatively to SEO announcements since equity issuance signals information about the overvaluation of the issuing firms. Extending the Myers and Majluf (1984) model, Lucas and McDonald (1990) further show that managers delay equity issues until their stock price rises to or above its true value.

Specifically, we use the following three indicators as proxies for an issuing firm's market timing motives: 1) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO three-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise; 2) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO one-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise; and 3) an indicator that takes the value of one if the SEO firm has an above-median pre-SEO three-year market-adjusted abnormal stock return, a negative CAR (-1, 1), and a below-median post-SEO one-year market-adjusted abnormal stock return, and zero otherwise. Prior studies also use the market-to-book ratio to measure a firm's market timing motive (Baker and Wurgler (2002)). However, the market-to-book ratio can also proxy for a firm's investment opportunities, which makes it difficult to draw meaningful conclusions about the adverse selection concern hypothesis, and thus we do not use this variable in measuring SEO firms' market timing opportunities.

[Insert Table VI Here]

Table VI presents estimates from OLS regressions in which the dependent variable is the CAR (-1, 1) for the value-weighted portfolio of non-SEO firms in the same blockholding network as the issuing firm. Our key variables of interest are the market timing indicators and their interactions with institution characteristics. We use the same control variables as those used in the Table IV regressions.

In regression (1), the coefficient estimate on the indicator for a high pre-SEO three-year price run-up and a negative CAR is negative and significant at the 1% level. The coefficient estimate suggests that the value-weighted portfolio return for non-SEO firms is on average 0.4% lower if other portfolio firms in the same blockholding network engage in market timing by issuing equity when their stocks are overvalued. The results do not change when we use the indicator for a high pre-SEO one-year price run-up and a negative CAR as the market timing variable (regression (2)).

In regression (3), we capture marketing timing using the indicator for a high pre-SEO three-year stock price run-up, a negative CAR (-1, 1), and a low post-SEO one-year market-adjusted abnormal stock return.

The significantly negative coefficient estimate on this variable confirms that spillover effects are more pronounced when SEO firms engage in market timing.

In regressions (4) and (5), we find that the coefficient estimates on the interaction terms between the market timing indicator for a high pre-SEO three-year price run-up and a negative CAR (-1, 1) and indicators for a small number of largest blockholdings and small funds are both negative and significant at the 5% level or better. Thus, the negative effects of an issuer's market timing on the value of other firms in the same blockholding network observed in previous regressions are particularly severe when the members in the network are relatively homogeneous and share similar style, indicating that institution's style investing exacerbate investors' concerns about the value of other non-issuing firms in the same blockholding network, causing adverse stock price comovement around SEO announcements.

V. Multivariate Analyses Using Returns for Individual Non-Issuers in the Same Blockholding Network

To investigate whether controlling for non-SEO firms' financial characteristics has any impact on the spillover effects of equity offering announcements in the blockholding network, in this section we conduct regression analyses in which we use the CAR (-1, 1) for individual non-SEO firms in the same blockholding network as the dependent variable. To alleviate the potential concern about the cross-sectional dependence of returns for individual non-SEO firms belonging to the same portfolio, we follow Froot's (1989) procedure and cluster the standard errors at the event level and use unbiased *t*-statistics to evaluate the statistical significance of each explanatory variable.

V.1. Relation between Abnormal Returns for Individual Non-SEO Firms and Non-issuer Characteristics

[Insert Table VII Here]

The results are reported in Table VII. In regression (1), we control for the same set of financial characteristics for both the SEO firm and the non-SEO firms: log (total assets), leverage, Tobin's q , total institutional ownership, portfolio weight, pre-SEO three-year stock price run-up, and pre-SEO three-year stock return volatility. In addition, we include year, industry, and institution fixed effects. Our key variable of interest is the issuer CAR (-1, 1). The coefficient estimate on the issuer CAR (-1, 1) is 0.035, which is significant at the 1% level. In regression (2), we replace the issuer CAR (-1, 1) with the indicator for a negative issuer CAR (-1, 1). The coefficient estimate on this indicator is -0.003, which is significant at the 1% level, suggesting that non-issuers in the same portfolio group as the issuer on average observe 0.3% lower abnormal returns if the SEO announcement is unfavorably received by the market.

In regressions (3) and (4), to control for potential horizontal industry spillover effects (Szewczyk (1992)), we include the indicator for whether the SEO firm and non-SEO firms operate in the same two-digit SIC industry. We also include the indicator for whether the SEO firm and non-SEO firms have a customer-supplier relationship to control for potential vertical industry spillover effects (Johnson, Kang, Masulis, and Yi (2011)). We further control for institutional blockholder characteristics (fund size, portfolio return, and portfolio turnover) in the regressions. We find results that are similar to those in regressions (1) and (2).

Overall, the results in Table VII show that the spillover effects of SEO announcements in the same blockholding network are both statistically and economically significant, not only at the portfolio level but also at the individual firm level.

[Insert Table VIII Here]

To examine whether the spillover effects we document in Table VII are different depending on non-issuers' information asymmetry, overvaluation, or planned future SEOs, we estimate the regressions by including the interaction terms between the indicator for a negative issuer CAR (-1, 1) and a variety of measures of non-SEO firms' information asymmetry (overvaluation and intended future SEO activity). Table VIII reports the results. In regressions (1) through (7), we use the following seven information

asymmetry variables as the key explanatory variables, respectively: indicator for a small firm, indicator for a young firm, indicator for a volatile firm, indicator for a high R&D firm, indicator for a small number of analysts following, indicator for high analyst forecast dispersion, and indicator for high discretionary accruals. We find that the coefficient estimate on the indicator for a negative issuer CAR (-1, 1) is negative and significant at the 1% level in all seven regressions. More important, consistent with the adverse selection concern hypothesis, the coefficient estimates on the interaction terms involving these information asymmetry variables are all negative and significant. These results suggest that when the issuer realizes a negative abnormal return around the offering announcement date, other non-issuers in the same blockholding network observe a more negative market reaction if the market perceives that they have high information asymmetry.

In regressions (8) and (9), we include the measure of non-issuers' overvaluation. We find that the coefficient estimates on the interaction term between the pre-SEO three-year stock price run-up for non-SEO firms and the indicator for a negative issuer CAR (-1,1) as well as the interaction term between the indicator for a low post-SEO one-year market-adjusted abnormal stock return for non-SEO firms and the indicator for a negative issuer CAR (-1, 1) are both negative and significant, which indicates that when issuers' announcement returns are negative, non-issuers in the same portfolio that are more overvalued experience stronger negative announcement effects.

Likewise, in regression (10), when we include the indicator for a non-SEO firm's equity issuance in the two years after the issuer's SEO, we find that the coefficient estimate on the interaction term between this indicator and the indicator for a negative issuer CAR (-1, 1) is negative and significant at the 5% level. This result suggests that the spillover effects of SEO announcements on non-issuers in the same blockholding network are particularly severe when non-issuers plan to make equity issuance in the near term. Since investors' adverse selection concerns are likely to be stronger if non-issuers also engage in equity issuance in the near future, this result is consistent with the adverse selection concern hypothesis.

However, if equity issuance by non-issuers increases their free cash flows, this result is also consistent with the agency problem hypothesis.

Overall, these results provide strong support for the adverse selection concern hypothesis although we also find some weak evidence in support of the agency problem hypothesis. When investors have adverse selection concerns about equity issuance by firms in the blockholding network, they will update their value-relevant information about other firms in the same portfolio. To the extent that investors' extrapolation about non-issuers' misvaluation is particularly severe when non-issuers have high information asymmetry, when they are overvalued, or when they are expected to engage in equity offerings in the near term to presumably exploit opportunities to time the market, investors will react more negatively when non-issuers possess these characteristics.

V.2. Additional Tests of the Adverse Selection Concern Hypothesis: Relation between Abnormal Returns for Individual Non-SEO Firms and Issuers' Market Timing

[Insert Table IX Here]

To further test the validity of the adverse selection concern hypothesis, we examine whether the abnormal returns for individual non-SEO firms are related to issuers' market timing motives and their interactions with non-issuers' information asymmetry. The results are presented in Table IX. The dependent variable is the CAR (-1, 1) for individual non-SEO firms and our key variables of interest are the three market timing indicators used in Table VI and the interaction terms between the market timing indicators and non-issuers' information asymmetry measures. The other control variables are the same as those used in Table VII.

In regressions (1) through (3), we separately employ the three market timing indicators used in Table VI as the key explanatory variable. We find that the coefficient estimates on all three of these indicators are negative and significant at the 1% level. These results echo those using portfolio returns as the

dependent variable and suggest that spillover effects of market timers' SEO announcements in the same blockholding network exist for both portfolios of non-issuers and individual non-issuers.

In regressions (4) through (7), we include the interaction term between the market timing indicator used in regression (1) and the indicator for, respectively, small non-issuers, young non-issuers, volatile non-issuers, and non-issuers with a small number of analysts following. We find that the coefficient estimates on all these interaction terms are negative and significant, suggesting that the negative effects of issuers' market timing on the value of non-issuers in the sample portfolio is particularly pronounced when non-issuers are perceived to have greater information asymmetry. Since investors' adverse selection concerns about firms' stock offerings are higher when the firms engage in market timing and overvaluation concerns for non-issuers in the same blockholding network are more pronounced when non-issuers have greater information asymmetry, these results support the adverse selection concern hypothesis.

V.3. Relation between Abnormal Returns for Individual Non-SEO Firms and Similarity between Issuers and Non-issuers

[Insert Table X Here]

If the adverse selection concern hypothesis stands, outside investors would be more concerned about non-issuers' valuation when they share similar characteristic or similar corporate policy as the issuer in the same blockholding network. In Table X we explore this possibility by adding interaction terms between the indicator for negative issuer CAR (-1, 1) and indicators for the similarity between issuer and non-issuer in the same network, with the CAR (-1, 1) for individual non-SEO firms as the dependent variable.

Following Daniel, Grinblatt, Titman, and Wermers (1997), we construct characteristic-based rankings for the universe of stocks listed on NYSE, AMEX, and Nasdaq from a quarterly triple sort on each of the three characteristics, i.e., size (market equity value), B/M (book-to-market ratio), and price

momentum (past 12-month compounded stock return), end up with a ranking on each dimension for all the firms covered by CRSP and COMPUSTAT that ranges from 1 to 5. Further, we define an indicator of similar size (B/M, price momentum) which takes value of one if the squared difference in the ranking of size (B/M, price momentum) between the issuer and non-issuer is lower than the sample median and zero otherwise. Although the coefficient estimate on the interaction term between the indicator for a negative issuer CAR (-1,1) and the indicator for similar size is statistically insignificant, the coefficient estimate on the interaction term involving the indicator for a negative issuer CAR (-1,1) and the indicator for similar B/M (price momentum) is significantly negative in regression (1) (regression (2)). These results suggest that investors would discount other non-issuers' valuation more heavily if they share similar B/M or price momentum with the issuer around the announcement date since they regard those similar non-issuers as overvalued as the issuer in the same blockholding network.

Similarly, we get policy rankings for all the firms covered by CRSP and COMPUSTAT after sorting them into 5 quintiles according to their corresponding corporate policies (e.g., leverage policy, cash holding policy and investment policy). We then define a similar policy indicator if the squared difference in policy ranking between the issuer and non-issuer is lower than the sample median and zero otherwise. Among these similar policy indicators, we find that the interaction between the indicator for a negative issuer CAR (-1,1) and the indicator for similar leverage has a significant and negative coefficient, which is reported in regression (3). This might be attributable to the significant change in the leverage ratio for the issuer around the equity issuance, the strong correlation among portfolio member firms' leverage policy, and the impact of leverage policy on firm valuation (Harris and Raviv(1991), Masulis(1983)).

In a nutshell, these results are largely consistent with the adverse selection concern hypothesis, that outside investors are more likely to extrapolate issuer's misevaluation to other non-issuers in the same institution's portfolio if they conform to a particular style, and cause more unfavorable reactions for other similar non-issuers when the issuer receives a negative CAR.

VI. Further Tests of the Agency Problem Hypothesis, Other Alternative Explanations and Other Additional Tests

VI.1. Agency Problem Hypothesis

Although the results in the previous sections are generally consistent with the adverse selection concern hypothesis, it is still possible that the post-SEO severity of agency problems or other alternative explanations such as a change in investment policy (Pilotte (1992), Denis (1994), Carlson, Fisher, and Giammarino (2006)) explain some or all of the spillover effects we have documented thus far.

To examine whether these alternative explanations can explain our results, in this section we conduct a series of additional tests using both the CAR $(-1, 1)$ for the value-weighted portfolio of non-SEO firms and the CAR $(-1, 1)$ for individual non-SEO firms as the dependent variable. Below, we briefly summarize the results of these untabulated tests.

To further test the validity of the agency problem hypothesis in explaining our results, we follow Lang, Stulz, and Walkling (1991) and construct an agency problem indicator that takes the value of one if an issuer's Tobin's q is lower than the two-digit SIC industry median Tobin's q and its ratio of free cash flows to total assets exceeds the industry median ratio, and zero otherwise. We find that neither the coefficient estimate on this agency problem indicator nor that on its interaction with the issuer CAR $(-1, 1)$ is significant in regressions that use the CAR $(-1, 1)$ for the portfolio of non-issuers (individual non-issuers) as the dependent variable. We thus fail to find support for Jensen's (1986) free cash flow argument.

We also include G-index (Gompers, Ishii, and Metrick (2003)), CEO-chairman duality (Core, Holthausen, and Larcker (1999), Goyal and Park (2002)), and the proportion of independent directors on the board (Weisbach (1988)) as measures of the quality of a firm's corporate governance.⁴⁶ We find that neither these variables nor their interactions with the issuer CAR $(-1, 1)$ are significantly related to the CAR $(-1, 1)$ for the portfolio of non-issuers (individual non-issuers). These results, together with those in

⁴⁶ Information on these governance variables comes from RiskMetrics Database.

Table V, which show that the spillover effects of SEO announcement on non-issuers in the same blockholding network do not exist when institutional investors have weak incentives to monitor the issuers, do not support the agency problem hypothesis.

To test the importance of changes in firm investment policy in explaining our results, following Pilotte (1992), Denis (1994), and Jung, Kim, and Stulz (1996) we measure its investment opportunities using an issuer's (a non-issuer's) Tobin's q , annual growth rates in total assets, sales, equity, and net operating income, and average ratio of capital expenditures to total assets subsequent to offerings. We find that the sensitivity of the abnormal returns for portfolios of non-SEO firms (abnormal returns for individual non-SEO firms) to the abnormal returns for SEO firms is not significantly related to SEO firms' (individual non-SEO firms') investment opportunities.

VI.2. Other Alternative Explanations

VI.2.1. Behavioral Biases

Except for adverse selection concern hypothesis, a behavioral story is also consistent with some of our findings. According to Hirshleifer (2001), individual investors are subject to cognitive biases, such as “halo effect”, “devil effect” and other misattribution bias. The “halo effect” causes someone who likes one outstanding characteristic of an individual to extend this favorable evaluation to the individual's other characteristics (Nisbett and Wilson (1977a)). The “devil effect”, also known as the “reverse halo effect”, is when people allow an undesirable trait to influence their evaluation of other traits. People subject to this type of cognitive bias tend to take the “mental shortcut” to generalize things and get an overall impression of a certain subject. So, if one group member has certain characteristics, individual investors may generalize his attributes to other group members. Analogously, when the SEO announcement reveals that the issuer is overvalued, individual investors subject to this “devil effect” may irrationally extrapolate the issuer's characteristic to other firms in the same portfolio, think that others are also overvalued. Further, this extrapolation would be more severe when the information asymmetry between outside investors and

SEO issuers (non-issuers) is greater, since individual investors exhibit stronger behavioral biases when stocks are harder to value and when valuation uncertainty is higher (Kumar(2009)).

VI.2.2. Portfolio Rebalancing

An alternative explanation for non-issuers' price reactions on issuer's SEO announcement is the cash flow support hypothesis: the common largest institutional blockholder purchases new shares in a portfolio firm's SEO while funds this transaction by selling shares in other portfolio firms. If this is the case, the issuer is expected to receive a positive market reaction with the strong cash flow support from his largest institutional blockholder, while other non-issuers in the same portfolio are most likely to experience price decline due to the selling pressure from the common largest institutional blockholder, and thus, the price pressure effect will lead to a negative association between issuer CAR and non-issuer CAR around the SEO announcements, which is opposite to our findings. Nonetheless, we formally test this hypothesis by constructing a "Cash Flow Support" indicator that takes the value of one if the common largest institutional blockholder purchases new shares in the SEO while selling shares in other portfolio firms around the issue date and zero otherwise. We add this "Cash Flow Support" indicator and its interaction with issuer CAR (-1,1) (Negative issuer CAR (-1,1) indicator) into regression (3) (regression (4)) of table VII, find that both the indicator and the interaction term are statistically insignificant, suggesting that the cash flow support argument is not driving our results.

Other portfolio rebalancing story might also exist: the common largest institutional blockholder adds new stocks into his portfolio whilst dumping shares in both the issuer and non-issuers, and hence causes the price comovement between the issuer and non-issuers. We investigate this possibility by including institution's trading behavior into the model specification. Specifically, we measure common largest institutional blockholder's trading behavior as the change of his ownership in portfolio firms around the announcement date, and find that the spillover effects remain robust after including institution's trading behavior into the regressions. Since institution's trading behavior could predict portfolio firm's future

stock return (Nofsinger and Sias (1999)), we also include common largest institutional blockholder's trading in his portfolio firms during the quarter right before the announcement date into the regressions, and find similar results. Therefore, our results are not likely to be driven by institution's portfolio rebalancing.

VI.3.Other Additional Tests

VI.3.1. Probability of Other Non-issuers in the Same Portfolio Conducting a SEO in the Future

If the adverse selection concern hypothesis holds and the market infers that other non-issuers in the same portfolio are likely to be overvalued due to institution's style investing, we would expect that other non-issuers are also likely to conduct equity offerings in the near future to potentially exploit their windows of opportunity. In the untabulated test, using quarterly data for firms in the blockholding networks, we estimate a logit regression of the likelihood of other non-issuers in the same blockholding network conducting equity issuance in the year immediately following the quarter end (i.e., Future Equity Issuance indicator). In the regression, we include "Network Equity Issuance" indicator as the interested variable that equals one if one member firm in the blockholding network made a SEO announcement during the year prior to the quarter end, and control for firm characteristics (size, leverage, Tobin's q , ROA, total institutional ownership, pre-SEO three-year stock price run-up and pre-SEO three-year stock return volatility) and largest institutional blockholder's characteristics (fund size, portfolio return and portfolio turnover). We also control for quarter and industry fixed effects and cluster the standard errors by institutions. We find that if one member firm in the blockholding network makes SEO announcements, other non-issuers held by the same largest institutional blockholder are more likely to issuer new equity in the near future, which is consistent with the adverse selection concern and overvaluation argument.

VI.3.2. Abnormal Returns Using Fama French-Carhart Four Factor Model

To alleviate the concern that underlying common factors drive the price synchronicity between issuers and non-issuers, in untabulated tests we experiment with the CARs calculated over the same estimation and event windows using the Fama French-Carhart four-factor model (1997) which includes market index, size index (SMB), book-to-market index (HML) and momentum index (UMD).⁴⁷ Reestimating model (3) in table IV and model (3) in table VII using the CARs from Fama French-Carhart four-factor model, we find that the positive association between issuer CAR (-1,1) and CAR (-1,1) for the portfolios of non-issuers, and between issuer CAR (-1,1) and individual non-issuer CAR (-1,1) remain statistically significant. These results show that the spillover effects of SEO announcements in the blockholding network remain robust after considering the common style effects among the member firms.

VI.3.3. Daily Stock Price Comovement

Pirinsky and Wang (2004), Sun (2008), and Faia et al. (2011) show that institutional ownership induces excessive comovement in stock prices, which indicates that the positive correlation of stock returns for issuer and non-issuers around the SEO announcements might just be a manifestation of daily stock price comovement among firms hold by the same largest institutional blockholder. To address this concern, we first run a time-series regression of issuer's daily stock return on the daily return of value-weighted market portfolio and the daily return for the portfolio of non-issuers (individual non-issuers) in the quarter right before the announcement date, and use the coefficient estimate on the daily return for the portfolio of non-issuers (individual non-issuers) as the measure of stock price comovement between the issuer and the portfolio of non-issuers (individual non-issuers) in the same blockholding network. We further include the stock price comovement between the issuer and the portfolio of non-issuers (individual non-issuers) into model (3) in table IV (model (3) in table VII), and find that the spillover effects of SEO announcements remain the same, suggesting that our main finding

⁴⁷ The daily market index (CRSP value-weighted index), SMB (Small Minus Big), HML (High Minus Low), and UMD (Up Minus Down) were generously provided on Kenneth French's Web site.

on the positive relation between the issuer CAR and non-issuer CAR in the same blockholding network is not driven by the daily stock price comovement among member firms.

VII. Summary and Conclusion

In this paper we examine the effect of SEO announcements on the market value of other firms that share the same largest institutional blockholder as the issuing firm. We find that non-issuers observe a negative market reaction when other portfolio firms in the same blockholding network announce equity offerings. This stock price comovement in the blockholding network holds regardless of whether we use portfolio returns for non-issuers or individual non-issuer returns, and remains significant even after controlling for horizontal and vertical industrial relationships between the issuer and non-issuers.

To identify the source of the spillover effects of SEO announcements in the blockholding network, we propose two hypotheses, namely, the adverse selection concern hypothesis and the agency problem hypothesis. We find that the positive association between the abnormal returns for the value-weighted portfolio of non-SEO firms and the abnormal returns for the SEO firms is stronger when the issuing firm has higher information asymmetry or when it experiences a higher stock price run-up prior to its SEO announcement. The positive relation is also stronger when the largest institutional blockholder manages a small fund, when the number of its largest institutional blockholdings is small or when its portfolio weight in the issuing firm is large. Furthermore, the spillover effects of SEO announcements in the blockholding network are more pronounced when non-SEO firms have higher information uncertainty, when they are more overvalued, when they issue equity in the two years after the issuer's SEO, or when they share similar B/M, similar price momentum or similar leverage policy as the issuer.

We also find that non-SEO firms that share the same largest institutional blockholder as the SEO firm realize significant negative abnormal returns when SEO firms engage in market timing. This spillover effect is stronger when the largest institutional blockholder manages a small fund or when the

number of its largest institutional blockholdings is small. The spillover effect is also stronger if non-SEO firms in the same blockholding have higher information asymmetry.

However, we find that the sensitivity of the abnormal returns for portfolios of non-SEO firms (abnormal returns for individual non-SEO firms) to the abnormal returns for SEO firms is not significantly related to SEO firms' (individual non-SEO firms') severity of agency problems and investment opportunities.

Overall, these findings suggest that investors' concerns about the value of non-issuing firms around SEO announcements by other firms in the same blockholding network are particularly severe when the issuer and non-issuers have high information asymmetry, when they are substantially overvalued, or when the firms held by common institutional investor are relatively homogeneous or share similar characteristics, consistent with the adverse selection concern hypothesis.

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Table I: Sample Distribution by Year and Industry

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). Panel A presents the distribution of sample SEOs by year and the mean and median numbers of non-SEO firms that share the same largest institutional blockholder as the SEO firm. Panel B presents the distribution of sample SEOs by industry and the mean and median percentages of non-SEO firms that operate in the same industry as the SEO firm.

Panel A. Distribution of SEOs and non-SEO firms by Year			
Year	Number of SEOs	Number of non-SEO firms that share the same largest institutional blockholder as the SEO firm	
		Mean	Median
1991	119	43	13
1992	95	68	17
1993	149	104	17
1994	82	131	24
1995	149	117	22
1996	169	74	21
1997	131	105	41
1998	123	90	39
1999	164	73	23
2000	173	74	28
2001	143	50	23
2002	105	93	50
2003	123	85	19
2004	98	94	23
2005	60	102	24
2006	83	150	37
2007	80	89	11
2008	66	120	78
2009	128	112	18

Panel B. Distribution of SEOs and non-SEO firms by Industry			
Two-digit SIC industry	Number of SEOs	Percentage of non-SEO firms that operate in the same industry as the SEO firm and share the same largest institutional blockholder as the SEO firm	
		Mean	Median
Agriculture, forestry, and fishing (Two-digit SIC =01-09)	10	0.00%	0.00%
Mining and construction (Two-digit SIC=10-17)	248	11.09%	2.93%
Manufacturing (Two-digit SIC=20-39)	1,068	11.25%	6.67%
Transportation (Two-digit SIC =40-48)	202	6.23%	1.67%
Wholesale and retail trade (Two-digit SIC=50-59)	254	2.87%	0.00%
Services (Two-digit SIC=70-89)	458	9.49%	3.85%

Table II: Issue, Institution, SEO firm, and Non-SEO Firm Characteristics

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. The numbers in the test-of-difference columns are p -values. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Panels A and B present descriptive statistics for issue and institutional blockholder characteristics, respectively. Panel C reports the characteristics of SEO and non-SEO firms that share the same largest institutional blockholder.

Panel A. Issue characteristics		
	Mean	Median
Proceeds (\$ millions)	118.18	64.90
Percent of primary shares sold	0.91	1.00
High reputation underwriter (indicator)	0.49	0.00
Rule 415 Shelf (indicator)	0.32	0.00
Panel B. Institution characteristics		
	Mean	Median
Fund size (\$ billions)	106.74	25.75
Portfolio turnover (%)	11.19	9.91
Portfolio return (%)	6.01	5.68
Portfolio weight (%)	1.27	0.17
Number of largest blockholding	137.94	40.00
Mutual funds (indicator)	0.29	0.00
Investment advisors (indicator)	0.54	1.00

Panel C. Characteristics of SEO firm and non-SEO firms in the same blockholding network						
	SEO firms (N=2,240): A		Non-SEO firms (N= 20,1895): B		Test of difference (A-B)	
	Mean	Median	Mean	Median	t-test	Wilcoxon z-test
Total assets (\$ millions)	1441.66	265.26	1384.48	284.96	0.678	0.475
Firm age (years)	13.25	8.00	15.00	11.00	0.000***	0.000***
Tobin's <i>q</i>	2.62	1.75	2.28	1.57	0.000***	0.000***
Leverage	0.28	0.26	0.22	0.19	0.000***	0.000***
Total institutional ownership	0.57	0.57	0.54	0.56	0.000***	0.003***
NYSE listed (indicator)	0.35	0.00	0.34	0.00	0.440	0.000***
Pre-SEO three-year stock price run-up	0.90	0.35	0.37	-0.04	0.000***	0.000***
Pre-SEO one-year stock price run-up	0.66	0.34	0.17	-0.01	0.000***	0.000***
Post-SEO one-year market-adjusted stock return	-0.02	-0.10	0.04	-0.05	0.000***	0.000***
Pre-SEO three-year stock return volatility	0.17	0.15	0.16	0.14	0.000***	0.000***
R&D intensity	0.09	0.00	0.06	0.00	0.000***	0.000***
Number of analyst following	7.29	6.00	7.12	6.00	0.231	0.000***
Analyst forecast dispersion	0.20	0.05	0.23	0.05	0.300	0.003***
Discretionary accruals	-0.10	-2.75	-5.55	-10.27	0.198	0.000***
Percent of non-SEO firms that issue equity in next 2 years of an issuer's SEO	NA	NA	9.84%	0.00%	NA	NA
Percent of non-SEO firms in the same industry as the SEO firm	NA	NA	5.94%	0.00%	NA	NA
Percent of non-SEO firms that have the customer-supplier relationship with the SEO firm	NA	NA	0.02%	0.00%	NA	NA

Table III: Cumulative Abnormal Returns (CARs) for SEO and Non-SEO firms that Share the Same Largest Institutional Blockholders around the SEO Announcement Date

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs and individual non-issuer CARs are computed as the difference between realized returns and estimated returns using the market model over the pre-event period from day -160 to day -11. We use the CRSP value- (equally-) weighted return as the market return. The CARs for the portfolios of non-SEO firms that share the same largest institutional blockholder as the SEO firm are obtained by combining non-SEO firm returns into a single value- (equally-) weighted portfolio and estimating the market model for each SEO event. For value-weighted portfolio CARs, the market capitalization of each individual non-SEO firm is used as the portfolio weight. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Using the value-weighted CRSP returns as the market return: Total sample										
Event windows	SEO firms (N = 2,240)		Value-weighted portfolios of non-SEO firms (N = 2,240)		Value-weighted portfolios of non-SEO firms in different industries (N = 2,214)		Value-weighted portfolios of non-SEO firms in same industries (N = 1,513)		Individual non-SEO firms (N = 201,895)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
(-1, 1)	-2.18% ^{***}	-2.18% ^{***}	0.02%	0.03%	-0.01%	0.02%	0.05%	-0.08%	-0.05% ^{***}	-0.23% ^{***}
(-2, 2)	-2.44% ^{***}	-2.44% ^{***}	0.05%	-0.08%	-0.07%	-0.04%	0.02%	-0.13%	-0.10% ^{***}	-0.32% ^{***}
(-3, 3)	-2.83% ^{***}	-2.83% ^{***}	-0.17% ^{**}	-0.05% [*]	-0.18% ^{**}	-0.07% [*]	0.04%	-0.23%	-0.15% ^{***}	-0.37% ^{***}
(-5, 5)	-2.89% ^{***}	-2.89% ^{***}	-0.39% ^{***}	-0.20% ^{***}	-0.35% ^{***}	-0.21% ^{***}	0.01%	-0.52% ^{***}	-0.30% ^{***}	-0.53% ^{***}

Panel B. Using the equally-weighted CRSP returns as the market return: Total sample										
Event windows	SEO firms (N = 2,240)		Equally-weighted portfolios of non-SEO firms (N = 2,240)		Equally-weighted portfolios of non-SEO firms in different industries (N = 2,214)		Equally-weighted portfolios of non-SEO firms in same industries (N = 1,513)		Individual non-SEO firms (N = 201,895)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
(-1, 1)	-2.25% ^{***}	-2.15% ^{***}	-0.04%	-0.03% [*]	-0.06%	-0.06% ^{**}	0.03%	-0.16% [*]	-0.08% ^{***}	-0.24% ^{***}
(-2, 2)	-2.52% ^{***}	-2.55% ^{***}	-0.12% [*]	-0.09% ^{**}	-0.14% ^{**}	-0.09% ^{**}	0.00%	-0.22%	-0.14% ^{***}	-0.31% ^{***}
(-3, 3)	-2.94% ^{***}	-2.90% ^{***}	-0.25% ^{***}	-0.08% ^{**}	-0.26% ^{***}	-0.09% ^{**}	0.01%	-0.18%	-0.20% ^{***}	-0.36% ^{***}
(-5, 5)	-3.02% ^{***}	-3.14% ^{***}	-0.50% ^{***}	-0.26% ^{***}	-0.47% ^{***}	-0.26% ^{***}	-0.02%	-0.49% ^{***}	-0.32% ^{***}	-0.47% ^{***}

Panel C. Using the value-weighted CRSP returns as the market return: A subsample of SEO firms with negative CARs

Event windows	SEO firms (N = 1,493)		Value-weighted portfolios of non-SEO firms (N = 1,493)		Value-weighted portfolios of non-SEO firms in different industries (N = 1,476)		Value-weighted portfolios of non-SEO firms in same industries (N = 1,000)		Individual non-SEO firms (N = 133,435)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
(-1, 1)	-5.72% ^{***}	-4.55% ^{***}	-0.10%	-0.05%	-0.09%	-0.07%	-0.19%	-0.30%	-0.17% ^{***}	-0.30% ^{***}
(-2, 2)	-6.91% ^{***}	-5.5% ^{***}	-0.27% ^{***}	-0.15% ^{***}	-0.24% ^{***}	-0.12% ^{***}	-0.47% ^{**}	-0.47% ^{**}	-0.26% ^{***}	-0.43% ^{***}
(-3, 3)	-8.24% ^{***}	-6.41% ^{***}	-0.39% ^{***}	-0.15% ^{***}	-0.30% ^{***}	-0.15% ^{***}	-0.59% ^{**}	-0.72% ^{**}	-0.31% ^{***}	-0.51% ^{***}
(-5, 5)	-9.92% ^{***}	-7.89% ^{***}	-0.64% ^{***}	-0.35% ^{***}	-0.49% ^{***}	-0.34% ^{***}	-0.88% ^{***}	-0.94% ^{***}	-0.55% ^{***}	-0.68% ^{***}

Panel D. Using the value-weighted CRSP returns as the market return: A subsample of SEO firms with positive CARs

Event windows	SEO firms (N = 747)		Value-weighted portfolios of non-SEO firms (N = 747)		Value-weighted portfolios of non-SEO firms in different industries (N = 738)		Value-weighted portfolios of non-SEO firms in same industries (N = 513)		Individual non-SEO firms (N = 68,460)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
(-1, 1)	4.89% ^{***}	3.19% ^{***}	0.26% ^{***}	0.17% ^{***}	0.16% [*]	0.17% [*]	0.51% ^{**}	0.47% ^{**}	0.18% ^{***}	-0.09% ^{***}
(-2, 2)	6.27% ^{***}	4.19% ^{***}	0.42% ^{***}	0.27% ^{***}	0.27% ^{**}	0.18% ^{**}	0.96% ^{***}	0.68% ^{***}	0.19% ^{***}	-0.11% ^{***}
(-3, 3)	6.88% ^{***}	4.35% ^{***}	0.21%	0.17%	0.03%	0.11%	1.10% ^{***}	0.65% ^{***}	0.10% ^{***}	-0.15% ^{***}
(-5, 5)	8.88% ^{***}	5.68% ^{***}	0.02%	-0.01%	-0.12%	0.00%	1.45% ^{***}	0.58% ^{***}	0.08% ^{**}	-0.28% ^{**}

Table IV: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for the Portfolios of Non-SEO Firms on SEO Firms' Financial Characteristics

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. The CARs for the portfolios of non-SEO firms that share the same largest institutional blockholder as the SEO firm are obtained by combining non-SEO firm returns into a single value-weighted portfolio and estimating the market model for each SEO event. The market capitalization of each individual non-SEO firm is used as the portfolio weight to calculate value-weighted portfolio CARs. In models (1) through (6), the dependent variable is the CAR (-1, 1) for the portfolio of all non-SEO firms that share the same largest institutional blockholder as the SEO firms. In models (7) and (8), the dependent variable is the CAR (-1, 1) for the portfolio of the subsample of non-SEO firms that are not in the same industry as the SEO firm and share the same largest institutional blockholder as the SEO firms. In models (9) and (10), the dependent variable is the CAR (-1, 1) for the portfolio of the subsample of non-SEO firms that are in the same industry as the SEO firm and share the same largest institutional blockholder as the SEO firms. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	Portfolio of all non-SEO firms						Portfolio of non-SEO firms in different industries		Portfolio non-SEO firms in same industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Issuer CAR (-1,1): A	0.032*** (0.000)		0.032*** (0.000)		0.017 (0.111)	0.025*** (0.002)	0.024*** (0.001)		0.025 (0.199)	
Negative issuer CAR (-1,1) (indicator)		-0.004*** (0.000)		-0.004*** (0.000)				-0.003** (0.010)		-0.007** (0.019)
High discretionary accruals (indicator)					0.002 (0.151)					
A * High discretionary accruals (indicator)					0.032** (0.034)					
A * Pre-SEO three-year stock price run-up						0.007** (0.017)				
Log (total assets)	-0.000 (0.829)	-0.000 (0.827)	-0.000 (0.919)	-0.000 (0.922)	-0.000 (0.862)	-0.000 (0.951)	0.000 (0.934)	0.000 (0.919)	0.001 (0.399)	0.001 (0.404)
Leverage	0.005** (0.047)	0.005* (0.058)	0.005** (0.047)	0.005* (0.059)	0.005** (0.041)	0.005** (0.043)	0.000 (0.914)	0.000 (0.991)	0.012* (0.072)	0.012* (0.072)
Tobin's <i>q</i>	0.000 (0.789)	0.000 (0.703)	0.000 (0.691)	0.000 (0.614)	0.000 (0.762)	0.000 (0.763)	0.000 (0.427)	0.000 (0.377)	-0.001 (0.296)	-0.001 (0.272)
Total institutional ownership	0.000 (0.879)	0.001 (0.811)	0.001 (0.813)	0.001 (0.739)	0.001 (0.819)	0.001 (0.847)	0.004 (0.247)	0.004 (0.221)	-0.017** (0.043)	-0.016* (0.054)
Log (proceeds)	0.001 (0.192)	0.001 (0.193)	0.001 (0.195)	0.001 (0.197)	0.001 (0.189)	0.001 (0.195)	0.001 (0.394)	0.001 (0.401)	0.001 (0.669)	0.001 (0.620)
Percent of primary shares sold	-0.002 (0.414)	-0.002 (0.443)	-0.003 (0.379)	-0.002 (0.408)	-0.003 (0.356)	-0.003 (0.319)	-0.003 (0.365)	-0.003 (0.394)	0.005 (0.536)	0.005 (0.538)
High reputation underwriter	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001

(indicator)	(0.111)	(0.108)	(0.117)	(0.113)	(0.139)	(0.130)	(0.149)	(0.147)	(0.769)	(0.755)
NYSE listed (indicator)	0.001 (0.671)	0.001 (0.648)	0.001 (0.717)	0.001 (0.693)	0.001 (0.726)	0.000 (0.769)	0.001 (0.617)	0.001 (0.594)	-0.003 (0.533)	-0.003 (0.512)
Rule 415 Shelf (indicator)	0.001 (0.741)	0.000 (0.761)	0.001 (0.716)	0.001 (0.728)	0.001 (0.685)	0.001 (0.723)	0.001 (0.665)	0.001 (0.660)	-0.001 (0.735)	-0.002 (0.617)
Pre-SEO three-year stock price run-up	-0.000 (0.417)	-0.000 (0.318)	-0.000 (0.417)	-0.000 (0.321)	-0.000 (0.386)	-0.000 (0.720)	-0.000 (0.182)	-0.000 (0.142)	0.000 (0.839)	0.000 (0.891)
Pre-SEO three-year stock return volatility	-0.001 (0.942)	-0.001 (0.908)	-0.001 (0.939)	-0.001 (0.903)	-0.001 (0.938)	0.000 (0.997)	-0.002 (0.823)	-0.002 (0.806)	0.006 (0.781)	0.007 (0.765)
Fund size			-0.003** (0.043)	-0.003** (0.049)	-0.003** (0.043)	-0.003* (0.063)	-0.004** (0.016)	-0.004** (0.017)	-0.006 (0.166)	-0.006 (0.173)
Portfolio return			-0.002 (0.675)	-0.001 (0.779)	-0.002 (0.730)	-0.002 (0.636)	0.005 (0.359)	0.005 (0.313)	0.006 (0.659)	0.007 (0.608)
Portfolio turnover			0.003 (0.850)	0.004 (0.803)	0.001 (0.930)	0.003 (0.845)	0.009 (0.584)	0.010 (0.548)	0.031 (0.559)	0.031 (0.565)
Portfolio weight			0.007 (0.757)	0.006 (0.802)	0.006 (0.798)	0.007 (0.779)	0.020 (0.415)	0.018 (0.448)	0.059 (0.619)	0.051 (0.665)
Constant	0.007 (0.764)	-0.003 (0.902)	0.054* (0.093)	0.064* (0.068)	0.039 (0.247)	0.037 (0.272)	0.063* (0.057)	0.060* (0.072)	0.003 (0.973)	0.006 (0.946)
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.0534	0.0511	0.0562	0.0537	0.0589	0.0592	0.0536	0.0517	0.0475	0.0505
No. of observations	2,230	2,230	2,227	2,227	2,227	2,227	2,201	2,201	1,506	1,506

Table V: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for the Portfolios of Non-SEO Firms on the Largest Institutional Blockholder's Characteristics

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. The CARs for the portfolios of non-SEO firms that share the same largest institutional blockholder as the SEO firm are obtained by combining non-SEO firm returns into a single value-weighted portfolio and estimating the market model for each SEO event. The market capitalization of each individual non-SEO firm is used as the portfolio weight to calculate value-weighted portfolio CARs. The dependent variable is the CAR (-1, 1) for the portfolio of all non-SEO firms that share the same largest institutional blockholder as the SEO firms. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Issuer CAR (-1,1): A	0.015 (0.120)		0.013 (0.175)		0.015 (0.111)	
Negative issuer CAR (-1,1) (indicator): B		-0.002 (0.129)		-0.002 (0.146)		-0.002 (0.221)
Small number of largest institutional blockholding (indicator)	-0.001 (0.631)	0.001 (0.620)				
Small fund (indicator)			0.004 (0.113)	0.006** (0.031)		
High portfolio weight (indicator)					0.001 (0.770)	0.003 (0.181)
A * Small number of largest blockholding (indicator)	0.038** (0.011)					
B * Small number of largest blockholding (indicator)		-0.005** (0.040)				
A * Small fund (indicator)			0.046*** (0.002)			
B * Small fund (indicator)				-0.005** (0.027)		
A * High portfolio weight (indicator)					0.042*** (0.005)	
B * High portfolio weight (indicator)						-0.005** (0.017)
Log (total assets)	-0.000 (0.936)	-0.000 (0.917)	-0.000 (0.924)	-0.000 (0.858)	0.000 (0.927)	0.000 (0.964)
Leverage	0.005** (0.048)	0.005* (0.070)	0.005** (0.046)	0.005* (0.063)	0.005* (0.056)	0.005* (0.074)
Tobin's <i>q</i>	0.000 (0.749)	0.000 (0.669)	0.000 (0.869)	0.000 (0.789)	0.000 (0.750)	0.000 (0.655)
Total institutional ownership	0.001 (0.864)	0.001 (0.777)	-0.000 (0.935)	0.000 (0.947)	0.001 (0.828)	0.001 (0.717)
Log (proceeds)	0.001 (0.208)	0.001 (0.192)	0.001 (0.226)	0.001 (0.192)	0.001 (0.216)	0.001 (0.189)
Percent of primary shares sold	-0.002 (0.396)	-0.002 (0.398)	-0.002 (0.437)	-0.002 (0.436)	-0.003 (0.367)	-0.002 (0.393)
High reputation underwriter (indicator)	-0.002 (0.137)	-0.002 (0.119)	-0.002 (0.105)	-0.002* (0.091)	-0.002 (0.131)	-0.002 (0.105)
NYSE listed (indicator)	0.001 (0.653)	0.001 (0.651)	0.001 (0.713)	0.001 (0.653)	0.001 (0.695)	0.001 (0.647)
Rule 415 Shelf (indicator)	0.001 (0.670)	0.001 (0.688)	0.001 (0.707)	0.001 (0.723)	0.001 (0.721)	0.001 (0.725)

Pre-SEO three-year stock price run-up	-0.000 (0.460)	-0.000 (0.329)	-0.000 (0.457)	-0.000 (0.373)	-0.000 (0.495)	-0.000 (0.337)
Pre-SEO three-year stock return volatility	-0.001 (0.936)	-0.001 (0.930)	-0.001 (0.864)	-0.002 (0.830)	-0.000 (0.999)	-0.000 (0.975)
Fund size	-0.004** (0.022)	-0.003** (0.035)			-0.003** (0.035)	-0.003** (0.045)
Portfolio return	-0.001 (0.790)	-0.001 (0.852)	-0.003 (0.559)	-0.003 (0.617)	-0.002 (0.710)	-0.001 (0.809)
Portfolio turnover	0.002 (0.900)	0.004 (0.800)	0.010 (0.491)	0.011 (0.455)	0.002 (0.896)	0.004 (0.807)
Portfolio weight	0.009 (0.687)	0.007 (0.750)	0.017 (0.463)	0.014 (0.557)		
Constant	0.067* (0.073)	0.057* (0.088)	-0.007 (0.771)	0.004 (0.872)	0.061* (0.061)	0.051 (0.117)
Year fixed effects	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.0599	0.0562	0.0598	0.0550	0.0603	0.0567
No. of observations	2,227	2,227	2,227	2,227	2,227	2,227

Table VI: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for the Portfolios of Non-SEO Firms on Market Timing Indicators

The sample consists of 2,240 SEOs made by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs are computed as the difference between realized returns and estimated returns using the market model over the pre-event period from day -160 to day -11. The CARs for the portfolios of non-SEO firms that share the same largest institutional blockholder as the SEO firm are obtained by combining non-SEO firm returns into a single value-weighted portfolio and estimating the market model for each SEO event. The market capitalization of each individual non-SEO firm is used as the portfolio weight to calculate value-weighted portfolio CARs. The dependent variable is the CAR (-1, 1) for the portfolio of all non-SEO firms that share the same largest institutional blockholder as the SEO firms. High pre-SEO three-year price run-up and negative CAR is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO three-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise. High pre-SEO one-year price run-up and negative CAR is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO one-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise. High pre-SEO three-year price run-up, negative CAR, and low post-SEO one-year market-adjusted return is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO three-year market-adjusted abnormal stock return, a negative CAR (-1, 1), and a below-median post-SEO one-year market-adjusted abnormal stock return, and zero otherwise. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)
High pre-SEO three-year price run-up and negative CAR (indicator): A	-0.004*** (0.000)			-0.002 (0.198)	-0.002 (0.323)
High pre-SEO one-year price run-up and negative CAR (indicator)		-0.003** (0.013)			
High pre-SEO three-year price run-up, negative CAR, and low post-SEO one-year market-adjusted return (indicator)			-0.005*** (0.000)		
Small number of largest blockholding (indicator)				0.000 (0.968)	
A * Small number of largest blockholding (indicator)				-0.005** (0.023)	
Small fund (indicator)					0.005** (0.034)
A * Small fund (indicator)					-0.006*** (0.006)
Log (total assets)	-0.000 (0.828)	-0.000 (0.767)	-0.000 (0.843)	-0.000 (0.875)	-0.000 (0.731)
Leverage	0.005* (0.066)	0.005** (0.038)	0.005* (0.055)	0.005* (0.072)	0.005* (0.070)
Tobin's <i>q</i>	0.000 (0.448)	0.000 (0.647)	0.000 (0.465)	0.000 (0.470)	0.000 (0.561)
Total institutional ownership	0.001 (0.689)	0.001 (0.724)	0.001 (0.709)	0.001 (0.738)	0.000 (0.876)
Log (proceeds)	0.001 (0.174)	0.001 (0.220)	0.001 (0.242)	0.001 (0.194)	0.001 (0.180)
Percent of primary shares sold	-0.003 (0.381)	-0.002 (0.440)	-0.002 (0.404)	-0.002 (0.391)	-0.002 (0.395)
High reputation underwriter (indicator)	-0.002* (0.090)	-0.002 (0.109)	0.001 (0.553)	-0.002* (0.094)	-0.002* (0.077)
NYSE listed (indicator)	0.001 (0.604)	0.001 (0.644)	-0.002 (0.101)	0.001 (0.572)	0.001 (0.526)
Rule 415 Shelf (indicator)	0.001 (0.666)	0.001 (0.537)	0.001 (0.633)	0.001 (0.736)	0.001 (0.648)

Pre-SEO three-year stock return volatility	-0.002 (0.835)	-0.001 (0.910)	-0.001 (0.909)	-0.002 (0.823)	-0.003 (0.719)
Fund size	-0.003 ^{**} (0.044)	-0.003 [*] (0.057)	-0.003 ^{**} (0.039)	-0.003 ^{**} (0.035)	
Portfolio return	-0.002 (0.753)	-0.001 (0.772)	-0.001 (0.793)	-0.001 (0.783)	-0.003 (0.576)
Portfolio turnover	0.003 (0.867)	0.004 (0.796)	0.004 (0.792)	0.003 (0.836)	0.010 (0.491)
Portfolio weight	0.007 (0.774)	0.007 (0.771)	0.007 (0.780)	0.011 (0.642)	0.018 (0.439)
Constant	0.064 [*] (0.068)	0.047 (0.148)	0.064 [*] (0.067)	0.056 [*] (0.092)	0.002 (0.916)
Year fixed effects	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES
Adjusted R-squared	0.0525	0.0492	0.0539	0.0555	0.0554
No. of observations	2,227	2,227	2,227	2,227	2,227

Table VII: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for Individual Non-SEO firms

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs and the individual non-issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. We use the CRSP value-weighted return as the proxy for the market return. The dependent variable is the CAR (-1, 1) for individual non-SEO firms that share the same largest institutional blockholder as the SEO firms. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)	(4)
Issuer CAR (-1,1)	0.035*** (0.000)		0.034*** (0.000)	
Negative issuer CAR (-1,1) (indicator)		-0.003*** (0.000)		-0.003*** (0.000)
Log (total assets): SEO firms	-0.000 (0.611)	-0.000 (0.785)	-0.000 (0.632)	-0.000 (0.827)
Log (total assets): Non-SEO firms	0.000** (0.013)	0.000** (0.013)	0.000*** (0.005)	0.000*** (0.005)
Leverage: SEO firms	-0.002 (0.239)	-0.001 (0.344)	-0.002 (0.199)	-0.001 (0.288)
Leverage: Non-SEO firms	-0.001 (0.213)	-0.001 (0.217)	-0.001 (0.167)	-0.001 (0.166)
Tobin's <i>q</i> : SEO firms	-0.000* (0.078)	-0.000 (0.130)	-0.000* (0.089)	-0.000 (0.148)
Tobin's <i>q</i> : Non-SEO firms	-0.000 (0.192)	-0.000 (0.174)	-0.000 (0.226)	-0.000 (0.211)
Total institutional ownership: SEO firms	0.002 (0.403)	0.001 (0.418)	0.001 (0.507)	0.001 (0.521)
Total institutional ownership: Non-SEO firms	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Portfolio weight: SEO firms	0.057 (0.130)	0.056 (0.138)	0.045 (0.220)	0.043 (0.245)
Portfolio weight: Non-SEO firms	-0.146*** (0.000)	-0.146*** (0.000)	-0.151*** (0.000)	-0.151*** (0.000)
Pre-SEO three-year stock price run-up: SEO firms	-0.000 (0.632)	-0.000 (0.598)	-0.000 (0.710)	-0.000 (0.674)
Pre-SEO three -year stock price run-up: Non-SEO firms	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Pre-SEO three -year stock return volatility: SEO firms	0.009** (0.045)	0.007 (0.101)	0.008* (0.069)	0.007 (0.144)
Pre-SEO three -year stock return volatility: Non-SEO firms	-0.010** (0.034)	-0.010** (0.038)	-0.010** (0.028)	-0.010** (0.031)
SEO and non-SEO firms in the same industry (indicator)			0.001 (0.170)	0.001 (0.203)
SEO and non-SEO firms have the customer-supplier relationship (indicator)			0.005 (0.499)	0.005 (0.529)
Fund size			-0.004** (0.020)	-0.004** (0.013)
Portfolio return			-0.010** (0.038)	-0.009* (0.050)
Portfolio turnover			0.012 (0.396)	0.012 (0.423)
Constant	-0.067*** (0.000)	-0.064*** (0.000)	0.039 (1.000)	0.048 (1.000)

Year fixed effects	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES
Cluster by event	YES	YES	YES	YES
Adjusted R-squared	0.0077	0.0067	0.0081	0.0071
No. of observations	200,718	200,718	200,710	200,710

Table VIII: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for Individual non-SEO Firms on Financial Characteristics of SEO and Non-SEO Firms

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs and the individual non-issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. We use the CRSP value-weighted return as the proxy for the market return. The dependent variable is the CAR (-1, 1) for individual non-SEO firms that share the same largest institutional blockholder as the SEO firms. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Negative issuer CAR (-1,1) (indicator): A	-0.002*** (0.001)	-0.003*** (0.000)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.003)	-0.002*** (0.003)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.001)	-0.003*** (0.000)
Small firm (indicator): Non-SEO firms	0.000 (0.695)									
A * Small firm (indicator): Non-SEO firms	-0.002** (0.019)									
Young firm (indicator): Non-SEO firms		0.001** (0.043)								
A * Young firm (indicator): Non-SEO firms		-0.001** (0.050)								
Volatile firm (indicator): Non-SEO firms			0.002*** (0.007)							
A * Volatile firm (indicator): Non-SEO firms			-0.003*** (0.003)							
High R&D firm (indicator): Non-SEO firms				0.001 (0.101)						
A * High R&D firm (indicator): Non-SEO firms				-0.001* (0.091)						
Small number of analyst following (indicator): Non-SEO firms					0.001** (0.039)					
A * Small number of analyst following (indicator): Non-SEO firms					-0.002** (0.039)					
High analyst forecast dispersion (indicator): Non-SEO firms						0.001** (0.048)				
A * High analyst forecast dispersion (indicator): Non-SEO firms						-0.002** (0.010)				

High discretionary accruals (indicator): Non-SEO firms								0.001 (0.111)		
A * High discretionary accruals (indicator): Non-SEO firms								-0.001* (0.084)		
A * Pre-SEO three-year stock price run-up: Non-SEO firms								-0.001*** (0.001)		
Low post-SEO one-year market-adjusted stock return (indicator): Non-SEO firms									0.001 (0.178)	
A * Low post-SEO one-year market-adjusted stock return (indicator): Non-SEO firms									-0.001* (0.095)	
Equity issuance in next two years of an issuer's SEO (indicator): Non-SEO firms										0.002*** (0.005)
A * Equity issuance in next two years of an issuer's SEO (indicator): Non-SEO firms										-0.002** (0.047)
Log (total assets): SEO firms	-0.000 (0.832)	-0.000 (0.830)	-0.000 (0.834)	-0.000 (0.829)	-0.000 (0.828)	-0.000 (0.951)	-0.000 (0.736)	-0.000 (0.804)	-0.000 (0.826)	-0.000 (0.830)
Log (total assets): Non-SEO firms		0.000*** (0.004)	0.001*** (0.000)	0.000*** (0.005)	0.000** (0.012)	0.000** (0.021)	0.000*** (0.006)	0.000*** (0.004)	0.000*** (0.005)	0.000*** (0.004)
Leverage: SEO firms	-0.002 (0.282)	-0.002 (0.282)	-0.001 (0.296)	-0.001 (0.289)	-0.001 (0.440)	-0.001 (0.537)	-0.001 (0.364)	-0.002 (0.283)	-0.002 (0.283)	-0.001 (0.286)
Leverage: Non-SEO firms	-0.001 (0.229)	-0.001 (0.160)	-0.002* (0.069)	-0.001 (0.179)	-0.001 (0.210)	-0.001 (0.332)	-0.001 (0.145)	-0.001 (0.168)	-0.001 (0.168)	-0.001 (0.134)
Tobin's q: SEO firms	-0.000 (0.147)	-0.000 (0.146)	-0.000 (0.139)	-0.000 (0.147)	-0.000 (0.133)	-0.000 (0.101)	-0.000 (0.135)	-0.000 (0.132)	-0.000 (0.148)	-0.000 (0.149)
Tobin's q: Non-SEO firms	-0.000 (0.177)	-0.000 (0.202)	-0.000 (0.148)	-0.000 (0.203)	-0.000 (0.269)	-0.000 (0.167)	-0.000 (0.184)	-0.000 (0.231)	-0.000 (0.214)	-0.000 (0.208)
Total institutional ownership: SEO firms	0.001 (0.530)	0.001 (0.522)	0.001 (0.531)	0.001 (0.521)	0.001 (0.673)	0.000 (0.820)	0.001 (0.445)	0.001 (0.518)	0.001 (0.512)	0.001 (0.528)
Total institutional ownership: Non-SEO firms	-0.004*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Portfolio weight: SEO firms	0.044 (0.230)	0.043 (0.245)	0.044 (0.231)	0.042 (0.252)	0.034 (0.413)	0.019 (0.671)	0.052 (0.177)	0.043 (0.243)	0.042 (0.250)	0.043 (0.241)
Portfolio weight: Non-SEO firms	-0.135*** (0.000)	-0.151*** (0.000)	-0.147*** (0.000)	-0.151*** (0.000)	-0.172*** (0.000)	-0.150*** (0.001)	-0.168*** (0.000)	-0.152*** (0.000)	-0.151*** (0.000)	-0.151*** (0.000)
Pre-SEO three-year stock price run-up: SEO firms	-0.000 (0.677)	-0.000 (0.670)	-0.000 (0.688)	-0.000 (0.675)	-0.000 (0.796)	-0.000 (0.839)	-0.000 (0.675)	-0.000 (0.687)	-0.000 (0.673)	-0.000 (0.675)
Pre-SEO three -year stock price run-up: Non-SEO firms	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.156)	-0.001*** (0.000)	-0.001*** (0.000)
Pre-SEO three -year stock return	0.007	0.007	0.007	0.007	0.005	0.005	0.007	0.006	0.007	0.007

volatility: SEO firms	(0.144)	(0.144)	(0.144)	(0.146)	(0.299)	(0.316)	(0.143)	(0.158)	(0.142)	(0.146)
Pre-SEO three -year stock return	-0.011**	-0.010**		-0.010**	-0.009*	-0.010*	-0.011**	-0.010**	-0.010**	-0.010**
volatility: Non-SEO firms	(0.021)	(0.028)		(0.030)	(0.077)	(0.077)	(0.018)	(0.032)	(0.032)	(0.026)
SEO and non-SEO firms in the same industry (indicator)	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001
	(0.196)	(0.203)	(0.211)	(0.195)	(0.410)	(0.578)	(0.190)	(0.204)	(0.208)	(0.206)
SEO and non-SEO firms have the customer-supplier relationship (indicator)	0.005	0.005	0.005	0.005	0.003	0.009	0.004	0.005	0.005	0.005
	(0.507)	(0.526)	(0.534)	(0.532)	(0.641)	(0.232)	(0.658)	(0.505)	(0.536)	(0.524)
Fund size	-0.004**	-0.004**	-0.004**	-0.004**	-0.003**	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**
	(0.016)	(0.014)	(0.017)	(0.014)	(0.044)	(0.029)	(0.012)	(0.015)	(0.013)	(0.014)
Portfolio return	-0.009*	-0.009*	-0.009*	-0.009*	-0.011**	-0.010*	-0.010**	-0.010**	-0.009*	-0.009*
	(0.052)	(0.051)	(0.050)	(0.050)	(0.032)	(0.056)	(0.040)	(0.046)	(0.051)	(0.050)
Portfolio turnover	0.011	0.012	0.011	0.012	0.018	0.016	0.010	0.012	0.012	0.012
	(0.441)	(0.426)	(0.454)	(0.420)	(0.254)	(0.302)	(0.514)	(0.421)	(0.425)	(0.425)
Constant	0.048	0.044	0.042	0.050	0.023	-0.078	-0.001	0.046	0.048	0.046
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.997)	(0.982)	(1.000)	(1.000)	(1.000)
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cluster by event	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.0071	0.0071	0.0071	0.0071	0.0076	0.0080	0.0071	0.0073	0.0071	0.0072
No. of observations	200,710	200,710	200,710	200,710	175,273	159,163	193,323	200,710	200,710	200,710

Table IX: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for Individual Non-SEO Firms on Market Timing Indicators

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs and the individual non-issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. We use the CRSP value-weighted return as the proxy for the market return. The dependent variable is the CAR (-1, 1) for individual non-SEO firms that share the same largest institutional blockholder as the SEO firms. High pre-SEO three-year price run-up and negative CAR is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO three-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise. High pre-SEO one-year price run-up and negative CAR is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO one-year market-adjusted abnormal stock return and a negative CAR (-1, 1), and zero otherwise. High pre-SEO three-year price run-up, negative CAR, and low post-SEO one-year market-adjusted return is a market timing indicator that takes the value of one for SEO firms with an above-median pre-SEO three-year market-adjusted abnormal stock return, a negative CAR (-1, 1), and a below-median post-SEO one-year market-adjusted abnormal stock return, and zero otherwise. All firm (institution) characteristics are measured as of the fiscal year-end (the calendar quarter-end) that immediately precedes the SEO announcement date. Industry is classified using the two-digit SIC codes. The appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High pre-SEO three-year price run-up and negative CAR (indicator): A	-0.003*** (0.000)			-0.002** (0.021)	-0.002*** (0.003)	-0.002*** (0.004)	-0.002** (0.028)
High pre-SEO one-year price run-up and negative CAR (indicator)		-0.003*** (0.000)					
High pre-SEO three-year price run-up, negative CAR, and low post-SEO one-year market-adjusted return (indicator)			-0.002*** (0.004)				
Small firm (indicator): Non-SEO firms				-0.000 (0.420)			
A * Small firm (indicator): Non-SEO firms				-0.002** (0.018)			
Young firm (indicator): Non-SEO firms					0.001** (0.028)		
A * Young firm (indicator): Non-SEO firms					-0.001* (0.061)		
Volatile firm (indicator): Non-SEO firms						0.001 (0.120)	
A * Volatile firm (indicator): Non-SEO firms						-0.002** (0.036)	
Small number of analyst following (indicator): Non-SEO firms							0.001* (0.080)
A * Small number of analyst following (indicator): Non-SEO firms							-0.002** (0.024)
Log (total assets): SEO firms	-0.000 (0.781)	-0.000 (0.638)	-0.000 (0.944)	-0.000 (0.763)	-0.000 (0.783)	-0.000 (0.780)	-0.000 (0.769)
Log (total assets): Non-SEO firms	0.000*** (0.004)	0.000*** (0.004)	0.000*** (0.004)		0.000*** (0.002)	0.001*** (0.000)	0.000** (0.010)
Leverage: SEO firms	-0.002 (0.255)	-0.001 (0.350)	-0.001 (0.280)	-0.002 (0.261)	-0.002 (0.254)	-0.002 (0.257)	-0.001 (0.392)
Leverage: Non-SEO firms	-0.001 (0.154)	-0.001 (0.156)	-0.001 (0.153)	-0.001 (0.216)	-0.001 (0.140)	-0.002* (0.064)	-0.001 (0.205)
Tobin's <i>q</i> : SEO firms	-0.000 (0.245)	-0.000 (0.155)	-0.000 (0.202)	-0.000 (0.238)	-0.000 (0.245)	-0.000 (0.248)	-0.000 (0.210)

Tobin's q : Non-SEO firms	-0.000 (0.208)	-0.000 (0.209)	-0.000 (0.204)	-0.000 (0.175)	-0.000 (0.199)	-0.000 (0.148)	-0.000 (0.265)
Total institutional ownership: SEO firms	0.001 (0.529)	0.001 (0.436)	0.001 (0.574)	0.001 (0.513)	0.001 (0.527)	0.001 (0.536)	0.001 (0.659)
Total institutional ownership: Non-SEO firms	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Portfolio weight: SEO firms	0.051 (0.172)	0.049 (0.190)	0.048 (0.202)	0.053 (0.157)	0.051 (0.169)	0.053 (0.158)	0.044 (0.297)
Portfolio weight: Non-SEO firms	-0.152*** (0.000)	-0.152*** (0.000)	-0.153*** (0.000)	-0.134*** (0.000)	-0.151*** (0.000)	-0.147*** (0.000)	-0.171*** (0.000)
Pre-SEO three-year stock price run-up: Non-SEO firms	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Pre-SEO three -year stock return volatility: SEO firms	0.007 (0.138)	0.008* (0.082)	0.007 (0.117)	0.007 (0.136)	0.007 (0.137)	0.007 (0.140)	0.005 (0.274)
Pre-SEO three -year stock return volatility: Non-SEO firms	-0.010** (0.034)	-0.010** (0.033)	-0.010** (0.032)	-0.011** (0.023)	-0.010** (0.027)		-0.009* (0.085)
SEO and non-SEO firms in the same industry (indicator)	0.001 (0.224)	0.001 (0.177)	0.001 (0.193)	0.001 (0.216)	0.001 (0.222)	0.001 (0.231)	0.001 (0.439)
SEO and non-SEO firms have the customer-supplier relationship (indicator)	0.005 (0.511)	0.004 (0.559)	0.005 (0.520)	0.005 (0.497)	0.005 (0.513)	0.005 (0.512)	0.003 (0.618)
Fund size	-0.004** (0.010)	-0.004** (0.010)	-0.004** (0.011)	-0.004** (0.012)	-0.004** (0.011)	-0.004** (0.013)	-0.003** (0.036)
Portfolio return	-0.009* (0.065)	-0.009* (0.057)	-0.009* (0.059)	-0.009* (0.063)	-0.009* (0.065)	-0.009* (0.064)	-0.010** (0.041)
Portfolio turnover	0.011 (0.462)	0.011 (0.441)	0.013 (0.383)	0.011 (0.461)	0.011 (0.458)	0.010 (0.484)	0.016 (0.293)
Constant	0.049 (1.000)	0.047 (1.000)	0.049 (1.000)	0.049 (1.000)	0.048 (1.000)	0.041 (1.000)	0.025 (1.000)
Year fixed effects	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES
Institution fixed effects	YES	YES	YES	YES	YES	YES	YES
Cluster by event	YES	YES	YES	YES	YES	YES	YES
Adjusted R-squared	0.0069	0.0069	0.0067	0.0069	0.0069	0.0068	0.0074
No. of observations	200,710	200,710	200,710	200,710	200,710	2007,10	175,273

Table X: OLS Regression of the Three-day Cumulative Abnormal Returns (CARs) for Individual Non-SEO Firms on the Similarity between SEO Firm and Non-SEO Firms in the Same Blockholding Network

The sample consists of 2,240 SEOs by firms reported in the Thomson Financial SDC New Issues database over the 1991 to 2009 period and 201,895 non-SEO firms that share the same largest institutional blockholder as the issuing firms. To be included in the final sample of issuing firms, they must meet the following requirements: have a largest institutional blockholder that also serves as the largest institutional blockholder for at least one non-SEO firm, be covered in the Compustat, CRSP, and Thomson Reuters CDA/Spectrum Institutional (13F) Holdings databases, not belong to the financial (SIC 6000-6999) and utility (SIC 4910-4940) industries, be listed on the NYSE, Nasdaq, or Amex, and have CRSP share code 10 or 11 (ordinary common shares). The issuer CARs and the individual non-issuer CARs are computed as the difference between realized returns and estimated returns, using the market model over the pre-event period from day -160 to day -11. We use the CRSP value-weighted return as the proxy for the market return. The dependent variable is the CAR (-1, 1) for individual non-SEO firms that share the same largest institutional blockholder as the SEO firms. All firm (institution) characteristics are measured as of the fiscal year-end (calendar quarter-end) that immediately precedes the SEO announcement date. Industries are classified using two-digit SIC codes. The Appendix provides a detailed description of the construction of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *P*-values are in parentheses.

	(1)	(2)	(3)
Negative issuer CAR (-1,1) (indicator): A	-0.003*** (0.000)	-0.003*** (0.000)	-0.002*** (0.001)
Similar B/M (indicator)	0.001 (0.236)		
A * Similar B/M (indicator)	-0.002** (0.019)		
Similar price momentum (indicator)		-0.000 (0.666)	
A * Similar price momentum (indicator)		-0.003*** (0.001)	
Similar leverage (indicator)			0.002*** (0.004)
A * Similar leverage (indicator)			-0.002** (0.015)
Log (total assets): SEO firms	-0.000 (0.327)	-0.000 (0.339)	-0.000 (0.500)
Log (total assets): Non-SEO firms	0.000** (0.018)	0.000** (0.027)	0.000*** (0.005)
Leverage: SEO firms	-0.001 (0.653)	-0.001 (0.673)	-0.001 (0.590)
Leverage: Non-SEO firms	-0.001 (0.582)	-0.001 (0.623)	-0.001 (0.198)
Tobin's <i>q</i> : SEO firms	-0.000 (0.141)	-0.000 (0.139)	-0.000 (0.132)
Tobin's <i>q</i> : Non-SEO firms	-0.000 (0.593)	-0.000 (0.551)	-0.000 (0.174)
Total institutional ownership: SEO firms	0.001 (0.530)	0.001 (0.530)	0.001 (0.640)
Total institutional ownership: Non-SEO firms	-0.004*** (0.000)	-0.004*** (0.000)	-0.005*** (0.000)
Portfolio weight: SEO firms	0.125** (0.049)	0.126** (0.048)	0.048 (0.196)
Portfolio weight: Non-SEO firms	-0.149*** (0.004)	-0.145*** (0.005)	-0.147*** (0.000)
Pre-SEO three-year stock price run-up: SEO firms	-0.000 (0.254)	-0.000 (0.289)	-0.000 (0.587)
Pre-SEO three -year stock price run-up: Non-SEO firms	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Pre-SEO three -year stock return volatility: SEO firms	0.007 (0.196)	0.007 (0.190)	0.006 (0.155)
Pre-SEO three -year stock return volatility: Non-SEO firms	-0.010* (0.064)	-0.009* (0.076)	-0.009* (0.073)
SEO and non-SEO firms in the same industry (indicator)	0.000	0.000	0.001

	(0.913)	(0.819)	(0.312)
SEO and non-SEO firms have the customer-supplier relationship (indicator)	0.003 (0.759)	0.004 (0.748)	0.005 (0.523)
Fund size	-0.004** (0.037)	-0.004** (0.034)	-0.003* (0.097)
Portfolio return	-0.011** (0.044)	-0.011** (0.043)	-0.012*** (0.009)
Portfolio turnover	0.007 (0.644)	0.008 (0.603)	0.020 (0.182)
Constant	0.076*** (0.007)	0.076*** (0.007)	0.085 (1.000)
Year fixed effects	YES	YES	YES
Industry fixed effects	YES	YES	YES
Institution fixed effects	YES	YES	YES
Cluster by event	YES	YES	YES
Adjusted R-squared	0.0077	0.0081	0.0070
No. of observations	163,623	163,623	198,534

Appendix : Variable Definitions

This appendix provides a detailed description of the construction of all the variables used in the tables.

Variable	Definition
Analyst forecast dispersion	Standard deviation across analysts' EPS forecasts divided by the absolute value of the mean EPS forecast. Observations are missing when only one analyst EPS forecast is available in a particular month or when the mean EPS forecast is zero.
CAR (-1,1) for the portfolios of non-SEO firms	Abnormal returns for the value-weighted portfolio of non-SEO firms that share the same largest institutional blockholder as the SEO firms cumulated over 3 days from day -1 to day +1 relative to the SEO announcement dates. The abnormal return is measured as the difference between realized returns and estimated returns, using the market model over the pre-event period of day -160 to day -11.
Discretionary accruals	Discretionary accruals is measured as the residual from the following regression: Total accruals (TA) = $a + b_1 (1/\text{item } 6) + b_2 (\text{change in item } 12) + b_3 (\text{item } 7) + e$, where total accruals (TA) = the change in item 4 - the change in item 5 + change in item 34 - item 14 from the COMPUSTAT data.
Equity issuance in next two years of an issuer's SEO (indicator)	Indicator that takes the value of one if at least one of non-SEO firms that has the same largest institutional blockholder as the SEO firm issues equity during two years after the SEO announcement and zero otherwise.
Firm age (years)	Number of years since the SEO firm's stock price is available in the CRSP database.
Fund size (\$ billions)	Total market value of equity holdings managed by the institutional investor.
High analyst forecast dispersion (indicator)	Indicator that takes the value of one if the firm's analyst forecast dispersion is higher than the sample median and zero otherwise.
High discretionary accruals (indicator)	Indicator that takes the value of one if the firm's discretionary accruals is higher than the sample median and zero otherwise.
High portfolio weight (indicator)	Indicator that takes the value of one if the largest institutional blockholder's portfolio weight in the issuing firm is higher than the sample median and zero otherwise.
High pre-SEO one-year price run-up and negative CAR (indicator)	Market timing indicator that takes the value of one if the SEO firm has both an above-median pre-SEO one-year market-adjusted abnormal stock return and a negative CAR (-1, 1) and zero otherwise.
High pre-SEO three-year price run-up and negative CAR (indicator)	Market timing indicator that takes the value of one if the SEO firm has both an above-median pre-SEO three-year market-adjusted abnormal stock return and a negative CAR (-1, 1) and zero otherwise.
High pre-SEO three-year price run-up, negative CAR, and low post-SEO one-year market-adjusted return (indicator)	Market timing indicator that takes the value of one if the SEO firm has an above-median pre-SEO three-year market-adjusted abnormal stock return, a negative CAR (-1, 1), and a below-median post-SEO one-year market-adjusted abnormal stock return and zero otherwise.
High reputation underwriter (indicator)	Indicator that takes the value of one if the lead underwriters' or the bookrunner's reputation rank from Jay Ritter's website (Loughran and Ritter (2004)) is 9 (the highest possible ranking score) and zero otherwise.
Investment advisors (indicator)	Indicator that takes the value of one if an institutional investor's legal type is classified as independent investment advisors by 13F and Brian Bushee and zero otherwise.
Issuer (non-issuer) CAR (-1,1)	Abnormal returns for SEO (non-SEO) firms cumulated over 3 days from day -1 to day +1 relative to the SEO announcement dates. The abnormal return is measured as the difference between realized returns and estimated returns, using the market model over the pre-event period of day -160 to day -11.
Leverage	Book value of short-term debt plus book value of long-term debt divided by book value of total assets.
Log (proceeds)	Log of number of shares issued in the offer times the offer price as reported in the SDC Platinum New Issues database.
Log (total assets)	Log of book value of total assets.
Low post-SEO one-year market-adjusted return (indicator)	Indicator that takes the value of one if the firm's post-SEO one-year market-adjusted abnormal return is lower than the sample median and zero otherwise.
Mutual funds (indicator)	Indicator that takes the value of one if an institutional investor's legal type is classified as investment companies by 13F and Brian Bushee and zero otherwise.
Negative issuer CAR (-1,1) (indicator)	Indicator that takes the value of one if the issuer CAR (-1, 1) around the SEO announcement date is negative and zero otherwise.

Number of analyst following	Number of analysts following the firm.
Number of largest blockholding	Number of stocks that the institution holds as the largest institutional blockholder.
NYSE listed (indicator)	Indicator that takes the value of one if the firm trades on the New York Stock Exchange and zero otherwise.
Percent of non-SEO firms issuing equity in next two years after the issuer's SEO	Percent of non-SEO firms that issue equity during two years after the SEO announcement date and share the same largest institutional blockholder as the SEO firm.
Percent of primary shares sold	Number of primary shares sold based on the offering prospectus divided by the total shares sold in the offer.
Portfolio return	Largest institutional blockholder's monthly buy-and-hold value-weighted portfolio return in the quarter before the SEO announcement.
Portfolio turnover	Churn rate for the largest institutional blockholder in the quarter before the SEO announcement, defined as the minimum of aggregate purchase and sale over average equity asset holding value, as estimated by Carhart (1997) and Yan and Zhang (2009).
Portfolio weight	Largest institutional blockholder's portfolio weight t in a firm.
Pre-SEO one-year stock price run-up	Buy-and-hold market-adjusted stock return during a one-year period from month -13 to month -2 prior to the SEO announcement. The CRSP-value-weighted return is used as a proxy for the market return. We skip month -1 prior to the announcement to avoid the overlap between the time period to calculate stock price run-up and the event window of abnormal returns.
Pre-SEO three-year stock price run-up	Buy-and-hold market-adjusted stock return during a three-year period from month -37 to month -2 prior to the SEO announcement. The CRSP-value-weighted return is used as a proxy for the market return. We skip month -1 prior to the announcement to avoid the overlap between the time period to calculate stock price run-up and the event window of abnormal returns.
Pre-SEO three-year stock return volatility	Standard deviation of monthly stock returns for three years prior to the SEO announcement.
Post-SEO one-year market-adjusted stock return	Buy-and-hold market-adjusted stock return during a one-year period after the SEO issuance. The CRSP-value-weighted return is used as a proxy for the market return.
High R&D firm (indicator)	Indicator that takes the value of one if the firm's R&D intensity is higher than the sample median and zero otherwise.
R&D intensity	Ratio of R&D expenditures to total assets. This variable is set to be zero if R&D expenditure is missing.
Rule 415 Shelf (indicator)	Indicator that takes the value of one if the SEO offer is a shelf offer according to SEC Rule 415 and zero otherwise.
SEO and non-SEO firms have the customer-supplier relationship (indicator)	Indicator that takes the value of one if there is a customer-supplier relationship between SEO and non-SEO firms that share the same largest institutional blockholder and zero otherwise.
SEO and non-SEO firms in the same industry (indicator)	Indicator that takes the value of one if SEO and non-SEO firms that share the same largest institutional blockholder belong to the same two-digit SIC industry and zero otherwise.
Similar B/M (indicator)	Indicator that takes the value of one if the squared difference in the ranking of B/M between the issuer and non-issuer hold by the same largest institutional blockholder is lower than the sample median and zero otherwise. The ranking of B/M is from a quarterly triple sort on the universe of firms covered by CRSP and COMPUSTAT, on each of the three characteristics, i.e., size (market equity value), book-to-market ratio (B/M), and price momentum (past 12-month compounded stock return), as constructed by Daniel, Grinblatt, Titman, and Wermers (1997).
Similar leverage (indicator)	Indicator that takes the value of one if the squared difference in the ranking of leverage ratio between the issuer and non-issuer hold by the same largest institutional blockholder is lower than the sample median and zero otherwise. The ranking of leverage ratio is obtained by sorting all the firms covered by CRSP and COMPUSTAT into 5 quintiles according to their leverage ratio.
Similar price momentum (indicator)	Indicator that takes the value of one if the squared difference in the ranking of price momentum between the issuer and non-issuer hold by the same largest institutional blockholder is lower than the sample median and zero otherwise. The ranking of price momentum is from a quarterly triple sort on the universe of firms covered by CRSP and COMPUSTAT, on each of the three characteristics, i.e., size (market equity value), book-to-market ratio (B/M), and price momentum (past 12-month compounded stock return), as constructed by Daniel, Grinblatt, Titman, and Wermers (1997).

Small number of analyst following (indicator)	Indicator that takes the value of one if the firm's number of analyst following is lower than the sample median and zero otherwise.
Small number of largest institutional blockholding (indicator)	Indicator that takes the value of one if the number of large institutional blockholding by a firm's largest institutional blockholder is lower than the sample median and zero otherwise.
Small firm (indicator)	Indicator that takes the value of one if the firm's book value of total assets is lower than the sample median and zero otherwise.
Small fund (indicator)	Indicator that takes the value of one if the total market value of equity holdings managed by a firm's largest institutional blockholder is lower than the sample median and zero otherwise.
Tobin's q	Book value of assets minus book value of equity plus market value of equity divided by book value of assets.
Total institutional ownership	Aggregate ownership held by institutions.
Volatile firm (indicator)	Indicator that takes the value of one if the firm's pre-SEO three-year stock return volatility is higher than the sample median and zero otherwise.
Young firm (indicator)	Indicator that takes the value of one if the firm's age is lower than the sample median and zero otherwise.

Essay Three: Labor Market Competition, Executive Job Hopping, and Compensation

Abstract

Although various optimal contracting models predict that competition for managerial talents explains the growth of executive compensation, there is little direct evidence. We examine this prediction empirically from the perspective of executive job-hopping. Companies that lose executives to other firms raise pay dramatically for their remaining executives. The pay raise is mainly in the form of equity-based compensation and is more pronounced when the remaining executives have better employment mobility in the labor market. Overall, this paper provides direct evidence that competition for top executives drives up executive compensation.

Keywords: Labor Market Competition; Executive Compensation; Job-hopping; Pay Growth

JEL classification: G34; J31; J33

I. Introduction

The dramatic growth of executive compensation over the past two decades has triggered a large amount of public controversy and academic research.⁴⁸ Several theoretical models suggest that labor market competition for corporate executives is one of the driving forces for the growth of executive compensation (see for example, Gabaix and Landier (2008), Murphy and Zabojnik (2004), and Terviö (2008)). More specifically, as long as firms keep competing for highly skilled managers, executive compensation will be driven up for better recruitment and retention purposes.⁴⁹ Despite an intuitive explanation on managerial pay growth, direct empirical evidence is lacking, possibly because executive recruiting details are confidential, and thus it is difficult, if not impossible, to estimate the degree to which firms compete for a manager in the labor market.⁵⁰

In this paper, we examine empirically whether labor market competition drives up executive compensation from the perspective of executive job-hopping. Executive job-hopping refers to the case in which one executive leaves his current firm and subsequently takes an executive position in another firm (in most cases, for greater pay and/or higher position). To the extent that the outside employment opportunities of a firm's executives are positively correlated with one another, the job-hopping of one executive can be viewed as a signal of incoming competition for the incumbent managers. Therefore, using the job-hopping events, we examine particularly how firms adjust their compensation scheme for the incumbent executives accordingly. We find that companies raise pay dramatically for their incumbent executives in response to a job-hopping event. Our results provide direct evidence supporting the prediction that labor market competition for managerial talents drives up executive pay (Gabaix and Landier (2008), Murphy and Zabojnik (2004), and Terviö (2008)).

⁴⁸ Bebchuk and Grinstein (2005) document that the average compensation for top-five executives among S&P 500 firms increased from \$9.5 million in 1993 to \$21.4 million in 2003 (an increase of 125%). In our sample period, the average compensation for top-five executives among S&P 1500 firms increased from \$0.97 million in 1993 to \$2.42 million in 2009 (an increase of 149%).

⁴⁹ Practitioners also suggest that the potential threats of losing star talents push firms to raise executive pay (see for example, Smith (2009) and Tett (2009)).

⁵⁰ As pointed out by Oyer and Schaefer (2011), the detailed firm-level executive hiring process is largely a black box.

To be more specific, based on 1,069 job-hopping events from 1993 to 2009, we first find that competition for talents affects executive pay level and structure significantly. Companies that experienced executive job-hopping events subsequently raise pay to their incumbent executives more than companies experiencing no job-hopping events do. The pay raise is mainly driven by the increase of equity-based compensation. To the extent that the vesting period associated with restricted stock and option grants can help to retain managers (Balsam and Miharjo (2007)), this evidence suggests that after losing top executives, firms not only pay their remaining managers more generously, but also structure the compensation package for the purpose of better retention. The effect on both executive pay level and structure is consistent with the efficient contracting view that the growth of pay is driven by the market force.

Next, the magnitude of the pay raise is not uniform across all the remaining executives, but varies positively with each executive's employment mobility in the labor market. To the extent that it is more difficult for an incumbent CEO to find an equivalent or higher-ranking job in another firm, we find that the pay growth for CEOs is smaller than that for non-CEO executives. In addition, consistent with the view that high stock ownership helps to retain managerial talents (Balsam and Miharjo (2007)), we also find that executives with higher stock ownership receive lower pay raise. To the extent that managers whose incumbent compensation is already excessive are less likely to leave their current positions voluntarily, we find that these managers receive less pay growth. Furthermore, since it is easier for a manager to move to a new firm if there are a large number of same-industry companies (Deng and Gao (2012)), we find that the magnitude of pay growth is positively associated with the number of industry peer firms. Given that managers usually have better outside opportunities in industries that have more outside hiring (Cremers and Grinstein (2011)), firms in these industries are found to have a greater pay raise after a job-hopping event. Moreover, Oyer (2004) shows that managers' outside employment opportunities are positively associated with market condition. Thus, managers have fewer outside opportunities in the market recession period. Consistent with this view, we find that firms raise pay less

during the market recession period in response to losing executives. Finally, when managers are approaching retirement or have already stayed in the firm for long, they are less likely to look for new jobs and thus have less mobility in the labor market (Balsam and Miharjo (2007) and Gibbons and Murphy (1992)). Supporting this implication, we find that the pay growth is less pronounced for retiring executives and long-tenure executives.

Moreover, the characteristics of the job-hopping executive (hereafter referred to as the job-hopper) also play important roles in explaining the magnitude of pay growth for the remaining managers. In particular, we find that firms raise pay more aggressively for incumbent executives when losing a higher-ranking executive to another firm, when losing executives to an industry competitor, when losing executives to a nearby company, and when the job-hopper is paid more in the new company than in the former one. To the extent that the above job-hopping events are more reflective of intense competition for managerial talents, these results further support the view that labor market competition drives up executive pay.

Finally, we conduct various robustness checks and additional analyses to strengthen the validity of our results. First, some executive job-hopping may be correlated with the forced termination of a contract with the former firm, rather than an indication of incoming competition for talents in the labor market. To address this possibility, we employ alternative approaches to capture job-hopping events that are less likely to be correlated with forced turnover. Our results are robust to a number of alternative measures of executive job-hopping. Second, the pay raise for the remaining executives may come as compensation for additional services they need to provide after one executive position becomes vacant. To address this concern, we examine a subsample of firms that find a replacing executive right after the former one's departure, and find that pay growth for the remaining executives is still robust. Third, after losing executives, firms are likely to promote some of their incumbent managers internally to fill in the vacant positions. Thus, the growth of compensation for incumbent managers may be due to internal promotions. To investigate this issue, we focus on a subsample of incumbent managers with no changes

in positions and still find a dramatic increase in compensation for these managers after their firms experience a job-hopping event.

Economists have long debated what drives the dramatic growth of executive pay. The managerial power view believes that the pay growth is due to powerful managers extracting rents from shareholders, while the efficient contracting view suggests that pay growth is driven by competition for good managerial talents.⁵¹ The job-hopping events we are focusing on are less likely to be associated with managerial power, but more likely to be driven by competition for executives. Thus, our paper can better distinguish these two competing views and contribute to the literature on managerial compensation by providing direct evidence that labor market competition drives the growth of executive pay.

Moreover, employing executive job-hopping can help us identify the direct relation between competition for managerial talents and executive pay, because the pay growth of incumbent executives is triggered by the out-going executives' job-hopping, which is likely to be positively associated with incoming competition for talents in the labor market. Thus, this provides cleaner evidence that competition for executives helps to explain the growth of managerial compensation.

The rest of this paper is organized as follows. Section 2 discusses related literature and illustrates the theoretical framework. Section 3 describes the data collection process and the construction of the main variables. Section 4 presents the empirical results. We conduct robustness checks in Section 5. Finally, Section 6 concludes.

II. Related Literature and Theoretical Framework

There are a few explanations on the dramatic growth of executive compensation. The first explanation attributes the increase in executive pay to the widespread adoption of equity-based

⁵¹ See Weisbach (2007) for an excellent review.

compensation, especially stock options (Hall and Liebman (1998), and Holmstrom and Kaplan (2001, 2003)).⁵²

The second explanation focuses on the limits of the corporate governance system and suggests that the rise of executive compensation is due to weak board monitoring as powerful managers extract excessive pay at the cost of shareholders (see for example, Bebchuk and Fried (2003) and Bebchuk and Grinstein (2005)). However, as Murphy and Zabojnik (2004) point out, this explanation alone does not provide a satisfactory explanation for the increase in executive pay as managers were trying to extract rents decades ago. On the other hand, Hermalin (2005) suggests that stronger corporate governance leads to a greater executive compensation, as a more diligent board makes the managers work harder in equilibrium and the managers will demand higher compensation for this.

The third explanation argues that the increase in executive compensation is mainly due to the change in the nature of the executive job itself. For example, Garicano and Rossi-Hansberg (2006) predict that new communication technologies change managerial job functions and the improvement on knowledge communication helps to increase executive pay. Frydman (2005) proposes a shift in the importance of skills from firm-specific to more general managerial skills for top executives and theorizes that the shift leads to higher manager pay and higher mobility of executives. Cremers and Grinstein (2011) find empirical evidence in favor of this explanation.

This paper is inspired mostly by the explanation that attributes executive pay growth to the market force and the competition for top managers. As highly skilled managers are scarce resources in the labor market, competition for talents makes recruitment and retention more difficult, which pushes up executive pay. As indicated in Kaplan and Rauh (2010), the pay increase has been dramatic not only for corporate executives but also for investment bankers, VC/PE investors, corporate lawyers, and professional athletes. Such a trend increases the outside employment options for corporate executives and therefore puts upward pressure on executive compensation. In the same spirit, Gabaix and Landier (2008)

⁵² Our study complements this explanation by showing that the increase in both equity-based compensation and total compensation can be driven by competition for managerial talents in the labor market.

suggest that as long as other firms are comparably large and keep competing for talented managers, market force will drive up wages. In addition, other theoretical models, including Giannetti (2011), Murphy and Zajączkowski (2004) and Terviö (2008), also predict that competition for managerial talents is the driving force for pay growth of corporate executives. However, while these optimal contracting models have provided insightful theoretical frameworks, existing empirical research offers little direct evidence on whether or how a firm's compensation scheme is related to its managers' potential job offers from other rival firms.

Following the framework of Gabaix and Landier (2008), Murphy and Zajączkowski (2004), Giannetti (2011) and Terviö (2008), we hypothesize that a firm pays its manager i based on the estimated probability of him receiving a competing job offer from other firms (denoted as p_i), and in equilibrium (*ex ante*), manager i 's compensation is positively associated with p_i .⁵³ Although difficult to estimate p_i empirically, it is expected to be positively correlated with the external employment opportunities of other managers in the same firm: for example, p_j of manager j who is in the same firm as manager i . *Ex post*, when manager j voluntarily takes an executive position in a new firm, it signals better outside opportunities for manager i . Therefore, the firm will revise up the posterior p_i and raise pay accordingly.

We expect that outside employment opportunities of one executive are positively correlated with those of other executives in the same firms for three reasons. First, executives in the same firm are more likely to have shared social networks, and these social ties between individuals, such as friends, former colleagues, and employee referrals, facilitate the executive hiring process (see for example, Montgomery (1991) and Rees (1966)). Second, executives in the same firm are likely subject to the same firm-level compensation policy. When one executive finds the competing job offer more attractive and leaves for a new firm, other executives probably also find that the pay package from potential outside opportunities is appealing. Third, executives in the same firms are likely to have similar institutional knowledge and thus be subject to the same demand from the labor market. For example, when one executive realizes his

⁵³ See Giannetti (2011) for a formal model about this hypothesis. In particular, Implication 1 of Giannetti (2011) predicts that managers receive higher compensation when they are more likely to receive outside offers.

institutional knowledge highly valued by competing firms in the labor market and accepts the new job offer, other executives in the same firm are likely to face the same demand.

Based on the discussions above, if firms are found to raise pay for their incumbent executives in response to a job-hopping event, we will interpret this as the evidence of labor market competition driving up executive compensation. Moreover, the job-hopping activity of one leaving executive is less likely to be correlated with dramatic changes in the firm's corporate governance or with the shift of managerial skills of the remaining executives, and thus it provides a clean setting to disentangle the effect of the labor market competition from the factors such as corporate governance and the nature of managerial job functions. In addition, examining the effect of manager j 's job-hopping on manager i 's compensation can avoid the difficulty of estimating p_i empirically and better identify the relation between competition for managers and managerial compensation.

III. Sample Formation

Our primary data source is the Standard & Poor's (S&P's) ExecuComp database from 1993 to 2009. ExecuComp records compensation data on corporate executives (typically the top five executives) reported in proxy statements for the firms comprising the S&P 1500 index. To capture the pay growth of executives, we use the growth of total compensation (ExecuComp variable TDC1) as the main dependent variable.⁵⁴ An executive's total compensation in a given year includes the executive's salary, bonus, the grant-date value of restricted stock awards, the Black–Scholes value of granted options, and other compensation. Moreover, to measure any possible change in the structure of executive pay, following standard procedure, we break down the total compensation into cash and equity components and measure the growth of cash compensation and the growth of equity compensation, respectively.

⁵⁴ Starting in 2006, there is slight change in the definition of TDC1. Following Walker (2011), we reconcile the TDC1 definition between the 1993–2005 period and the 2006–2009 period, although these specifications do not change our results.

ExecuComp assigns a unique identifier (EXECID) to each executive in the database. We track those EXECIDs to locate each executive's position across different firms over the sample period. We define an executive job-hopping event as the case that one executive leaves his current firm and subsequently takes an executive position in another firm within a three-year window. Firms with at least one job-hopping executive in a given year are defined as job-hopping firms hereafter. The main reason that we start with a three-year window is that the widely adopted state-level noncompetition law and/or firm-level noncompetition agreements may prevent the departing executives from taking a new job offer immediately, and therefore, there could be a time gap between two jobs.⁵⁵ As a robustness check later, we employ other time windows, such as one-year and five-year windows, and find similar results. It is possible that some job-hopping events are confounded with forced executive turnover. However, this possibility works against finding significant pay growth for the remaining executives after their firm experiences a job-hopping event. Moreover, Fee and Hadlock (2004) examine the new employment of executives after they are fired by their former employers and find that only about one-third of fired executives obtain top management positions afterwards and that the new firms are, on average, one-tenth as large as their former firms were. Their finding provides further support that our job-hopping measure is not likely to be driven by forced turnover because, by construction, those job-hopping executives subsequently find top management positions in other S&P 1500 firms. Nevertheless, to further strengthen our results, we also try alternative definitions of job-hopping events that are less likely to be associated with forced turnover, and our results still hold.

Further, we collect accounting information from Compustat and stock price information from CRSP. We include a set of standard control variables in the executive compensation literature, including firm size, firm age, ROA, cash holding, capital expenditure, R&D expenditure, stock return, and stock volatility. All monetary variables are measured in 2009 dollars and all continuous variables are

⁵⁵ For example, Pennsylvania routinely enforces a three-year noncompetition covenants; Florida enforces a maximum of two-year noncompetition covenants. See Garmaise (2011) for a detailed discussion.

winsorized at the 1st and 99th percentiles. The final sample consists of 1,069 firm-year observations (5,376 executive-year observations) with job-hopping events and 28,520 firm-year observations (146,725 executive-year observations) with no job-hopping activities.

IV. Job-hopping and Growth of Executive Compensation

IV.1. Descriptive Statistics

[Insert Table I Here]

Table I provides the distribution of job-hopping firms by year and industry. As shown in Panel A, the numbers of firms with at least one job-hopping executive are distributed almost evenly over the years, except for a significant drop during the 2009 crisis year. It suggests that firms are competing constantly for the skilled executives, and managers are apt to take new jobs when outside employment options are attractive. A drop in job-hopping frequency in 2009 is consistent with Oyer (2004), who suggests that executives have fewer outside employment opportunities in the market downturn. On average, about 3.42% of ExecuComp firms experience an executive job-hopping event in a given year. It is worth pointing out that some job-hopping executives may join non-S&P 1500 firms, private firms, or even private equity funds, which are not covered by ExecuComp database. Given that our measure does not capture these types of job-hopping cases, the actual job-hopping frequency is likely to be higher than the one reported here.

As shown in Panel B, the manufacturing industry has the most representation of firms that experience job-hopping events (46.87%), followed by the wholesale and retail trade industry (15.53%) and the service industry (13.47%). Considering that the total number of firms in each industry can be different in the ExecuComp population, in the last column we normalize the number of job-hopping firms by the total number of firms in ExecuComp of a given industry and find that each industry faces a similar probability of job-hopping events (around 3%) over the sample period.

[Insert Table II Here]

Table II Panel A reports the executive characteristics. For incumbent executives in firms that experienced job-hopping events, the average (median) growth rate in total compensation is 66% (15%). Further examining the growth of cash pay versus the growth of equity pay, we find that most of the pay growth is due to the increase of restricted stock and options. In firms that had job-hopping events, the average (median) growth rate of cash pay for the remaining executives is 24% (6%), while the average (median) growth rate of equity pay is 59% (1.4%). In contrast, in firms without job-hopping executives, the average (median) growth rate is 42% (9%) in total pay, 15% (4%) in cash pay, and 41% (0%) in equity pay. Moreover, both *t*-test and Wilcoxon *z*-test indicate that the differences in the growth rates of pay (either cash pay or equity pay) across the two groups of firms are significant at the 1% level. This univariate comparison indicates that firms raise incumbent executives' pay more dramatically, especially equity-based pay, in response to a job-hopping event.

As shown in Panel B of Table II, job-hopping firms, on average, are two times bigger in sales than the non-job-hopping firms are, consistent with the view that managers in larger firms tend to have better outside opportunities (Gabaix and Landier (2008)). Moreover, as compared with non-job-hopping firms, job-hopping firms are generally older and have slightly lower growth of sales, higher growth of cash holding, lower ROA, and lower stock volatility. Nonetheless, there is no significant difference in stock performance across the two types of firms.

Table II Panel C reports the characteristics of job-hoppers' new firms versus their former firms. The average (median) relative sales of the new firm to the former firm is 0.99 (0.97), indicating that a job-hopper's new firm is as large as his former firm. However, the job-hopper's pay is increased by more than 100% (28%) on average (at median) after joining the new firm. Moreover, about one-quarter of job-hoppers are non-CEOs in the former firms but promoted to the CEO position in the new firms, while less than 2% of job-hoppers are CEOs in the former firms but obtain non-CEO jobs in the new firms. Overall, these job-hoppers are clearly better off in the new firms, typically with greater pay and/or higher position. This result also supports that our job-hopping sample is less likely to be driven by forced

executive dismissal, in which case, departing executives suffer greatly in the labor market (Fee and Hadlock (2004)).

IV.2. Executive Job-hopping and Pay Raise

Our main hypothesis is that job-hopping firms have greater pay raise for incumbent executives than firms experiencing no job-hopping events do. We test this hypothesis through a multivariate regression of the growth of executive pay against the *Job-hopping* indicator, as well as various firm and executive characteristics. In particular, we estimate the following model:

$$\begin{aligned} \ln(\text{Pay growth})_{it+1} = & \alpha + \beta_1(\text{Job-hopping})_{it} + \beta_2\text{ROA}_{it+1} + \beta_3(\text{Stock return})_{it+1} + \beta_4\text{Volatility}_{it+1} \\ & + \beta_5\Delta\ln(\text{Sales})_{it+1} + \beta_6\Delta(\text{Cash ratio})_{it+1} + \beta_7\Delta(\text{Capital expenditure})_{it+1} + \beta_8\Delta(\text{R\&D intensity})_{it+1} \\ & + \beta_9\ln(\text{Firm age})_{it} + \beta_{10}(\text{Industry pay growth})_{it+1} + \beta_{11}(\text{CEO indicator})_{it} \\ & + \beta_{12}(\text{Executive ownership})_{it} + \text{Year fixed effects} + \text{Industry fixed effects} + \varepsilon \end{aligned} \quad (1)$$

The dependent variable is the natural logarithm of the pay growth for each incumbent executive. The key independent variable is the *Job-hopping* indicator, which takes the value of one if the firm experiences an executive job-hopping event in that year and zero otherwise. We also add a set of conventional control variables, including firm size, firm age, firm performance, growth opportunity, stock return volatility, availability of cash, investment, industry median growth rate in executive total pay, CEO indicator, and executive ownership. Industry fixed effects based on a 2-digit SIC code and year fixed effects are included to control for industry and time variation in executive compensation. Following Petersen (2009) and Jayaraman and Milbourn (2012), *p*-values are based on robust standard errors clustered at the executive level.⁵⁶

[Insert Table III Here]

Table III shows a positive and significant association between the *Job-hopping* indicator and pay growth rate, supporting our view that companies raise pay dramatically for remaining executives in

⁵⁶ Our results do not change if we cluster the standard error at firm level.

response to losing executives to other firms. In Column (1), we only include the *Job-hopping* indicator as the independent variable and control for industry and year fixed effects. The coefficient on the *Job-hopping* indicator is 0.078 and is significant at the 1% level, indicating that the growth of total pay in job-hopping firms is 8.11% ($e^{0.078} - 1$) higher than that in non-job-hopping firms. In Column (2), we add a set of commonly used firm characteristics, including firm performance, stock return volatility, firm age, and the growth in sales, the growth in cash holding, the growth in investment, and the growth in R&D expenditure. The coefficient on the *Job-hopping* indicator is 0.094, and its significance still remains at the 1% level, implying a 9.86% ($e^{0.094} - 1$) higher pay raise in job-hopping firms than in non-job-hopping firms, even after controlling for firm characteristics. This result is also economically significant given that the median growth rate of total pay in the ExecuComp population is 9.45%.

In Column (3), we additionally control for the industry median growth rate in executive total compensation (*Industry pay growth*), as existing literature finds that executive compensation is usually benchmarked against industry peer groups (Bizjak, Lemmon, and Naveen (2008) and Faulkender and Yang (2010)). We find that the coefficient on the *Job-hopping* indicator remains positive and significant at the 1% level, suggesting that the effect of job-hopping on pay growth is beyond the industry norm of benchmarking.

We further control for CEO indicator and executive ownership in Column (4) and the coefficient on *Job-hopping* is again positive and significant at the 1% level, indicating that the effect of job-hopping on executive compensation is robust after controlling for various firm and executive characteristics. Notably, the coefficient on CEO indicator is negative and significant, suggesting that on average, remaining CEOs experience lower pay raise than non-CEO executives do. To the extent that a CEO is typically more powerful than non-CEO executives, this result does not support the view that the growth of executive pay is largely due to managerial power (Bebchuk and Grinstein (2005)). Instead, this evidence is more consistent with the efficient contracting hypothesis that executive pay is largely driven by market

forces, as CEOs are less likely to find an equivalent or higher-ranking outside employment opportunity. The coefficient on executive ownership is also negative and significant, consistent with the view that higher ownership substitutes for higher annual compensation for the purpose of retention (Core, Holthausen, and Larcker (1999)).

To mitigate the concern that some time-invariant unobservable firm characteristics drive our results, we include firm fixed effects in Column (5). The coefficient on the *Job-hopping* indicator is 0.083 and is significant at the 1% level. This result indicates that within the same firm, the growth of executive pay in the year subsequent to losing an executive is 8.65% ($e^{0.083} - 1$) higher than in other periods.

Overall, the results in Table III show that firms raise pay greatly for their incumbent executives in response to a job-hopping event. The effect of job-hopping on pay growth is significant both statistically and economically.⁵⁷

[Insert Table IV Here]

In Table IV, we break the total compensation further into different components. The dependent variable is *Ln(Growth of cash pay)* in Column (1), and the coefficient on the *Job-hopping* indicator is 0.051 and is significant at the 1% level. This result indicates that after experiencing a job-hopping event, the firm's incumbent executives have a 5.23% ($e^{0.051} - 1$) higher raise in salary and bonus than other companies' executives do. Using *Ln(Growth of equity pay)* as the dependent variable in Column (2), we find a significant coefficient of 0.253 on the *Job-hopping* indicator, indicating a 28.79% ($e^{0.253} - 1$) higher growth rate of equity pay for remaining executives in job-hopping firms. It is worth pointing out that this coefficient is approximately five times in magnitude of that in Column (1), indicating that firms

⁵⁷ We re-examine the growth of pay for remaining executives after excluding all incumbent executives with a change in job title from the year of the job-hopping event to the year afterwards, and find that our results are not driven by internal promotions. We discuss those results in section V.3.

raise equity-based compensation more aggressively than salary and bonus to retain executives.⁵⁸ This is consistent with the view that the vesting period associated with restricted stock and option grants can better retain executives than salary and bonus can (Core and Guay (1999) and Balsam and Miharjo (2007)).

Moreover, the greater raise of equity pay relative to cash pay suggests that the structure of executive pay changes after the job-hopping event. To further examine the structure of pay, we include $\Delta(\text{Equity pay} / \text{total pay})$ as the dependent variable in Column (3). The significant coefficient 0.016 on the *Job-hopping* indicator suggests that firms greatly increase the proportion of equity-based compensation for their incumbent executives in response to a job-hopping event.

In addition to annual compensation, an executive's total equity portfolio can also influence his retention incentive. We further investigate the change in the value of the executive's total holding of restricted stock and unvested stock option in Column (4) and change in the number of shares of restricted stock and unvested option in Column (5), respectively. The coefficients on the *Job-hopping* indicator are positive and significant in both columns, indicating that there is a significant increase in restricted stock and unvested options held by the incumbent executives after their firms experienced job-hopping events. Our results are broadly consistent with Balsam and Miharjo (2007), who show that unvested equity holdings can help to reduce voluntary executive turnover.

IV.3.The Effect of Employment Mobility

[Insert Table V Here]

If labor market competition is the driving force for the positive relation between job-hopping activity and pay growth, we should expect that the incumbent executives with better employment mobility receive greater pay raise than the ones with poorer employment mobility. In this subsection, we carry out additional analyses to examine this prediction. The model specification in Table V is the same as that in

⁵⁸ The Chow test on the equality of these two coefficients indicates that they are significantly different at the 1% level.

Column (4) of Table III, except that we also include the interaction terms between the *Job-hopping* indicator and executive employment mobility. In particular, we use eight different proxies to measure the mobility of an executive in the labor market.

First, it is possible for a non-CEO executive to join another firm as CEO, but it is less likely for a CEO to join another firm as a non-CEO executive.⁵⁹ Therefore, a CEO should have lower mobility in the labor market than non-CEO executives do and thus the firm does not need to raise as much pay to the CEO after a job-hopping event as to non-CEO executives. To test this view empirically, we include the interaction term, *Job-hopping* $\times$ *CEO indicator*, in Column (1) of Table V and find a negative and significant coefficient on this interaction. This result indicates that while the job-hopping firm raises pay for all incumbent executives, the magnitude of pay raise is larger for non-CEO executives than for CEO executives.

Second, high stock ownership can help to retain managers (Balsam and Miharjo (2007)). Thus, a top manager is less likely to leave the firm for another one when he owns a large stake of the firm's stock. Therefore, the pay raise for the executives with higher ownership level is expected to be relatively lower. To examine this prediction, we include the interaction, *Job-hopping* $\times$ *Ownership*, in Column (2) and find that the coefficient on this interaction is negative and significant. This result is consistent with the view that stock ownership helps to retain an executive, and thus the pay raise is lower for the executive with higher level of ownership.

Third, Balsam and Miharjo (2007) show that excessive pay helps to prevent voluntary executive turnover. Thus, the pay growth for overpaid executives should be lower than that for other remaining executives. To define "overpaid" executives, we first run the following pooled OLS regression to estimate predicted compensation:

⁵⁹ Out of 1,069 job-hopping cases in our sample, there are only 16 cases in which a CEO joins another firm as a non-CEO executive.

$$\begin{aligned} \ln(\text{Total pay}) = & \alpha + \beta_1 \ln(\text{Sales}) + \beta_2 \text{ROA} + \beta_3 \text{Stock return} + \beta_4 \text{CEO indicator} + \beta_5 \text{CFO indicator} \\ & + \beta_6 \text{COO indicator} + \text{Year fixed effects} + \text{Industry fixed effect} + \varepsilon \end{aligned} \quad (2)$$

Then, we define *excess pay* as the difference between the executive's actual pay and his predicted pay. To mitigate the concern that we do not know the true regression model of fair-market executive pay, we flag a manager as “being overpaid” if his *excess pay* is in the top quartile of the population. In this way, our definition of “overpaid” is less sensitive to errors in the predicted pay level, as we are only selecting managers in the high extremes of the compensation distribution. In Column (3), the interaction, *Job-hopping* $\times$ *Overpaid*, has a negative and significant coefficient, supporting the prediction that the positive association between job-hopping and pay growth is less pronounced for an executive who is already paid excessively.

Next, the external hiring opportunity for executives is expected to increase with the number of industry peer firms: managers have more outside opportunities when there are a large number of industry peer firms around (Deng and Gao (2012)). In Column (4), we define the *Many industrial rivals* indicator based on the sample median of the number of firms in an industry and then include the interaction *Job-hopping* $\times$ *Many industrial rivals*. We find a positive and significant coefficient on this interaction term, implying that the pay growth for incumbent executives in a job-hopping firm is more pronounced when there is a large number of potential competitors for managerial talents.

Moreover, executives may have better employment mobility in industries with more external hiring (Cremers and Grinstein (2011)), and thus the positive association between job-hopping and pay growth is expected to be stronger in these industries. To test this prediction, we first define an external CEO as the one who takes the CEO position within the one-year period since he joins the firm, and then compute the variable *Industry outside hiring* as the number of firms managed by external CEOs in an industry normalized by the total number of firms in the industry.⁶⁰ In Column (5), the interaction,

⁶⁰ We only compute the number of external CEOs because of the data limitation in the ExecuComp database. The date of joining the firm and the date of taking the executive position are poorly recorded for non-CEO executives.

Job-hopping $\times$ *Industry outside hiring*, attracts a significantly positive coefficient. This result is consistent with our prediction that in an industry with greater external executive hiring (better employment mobility), firms raise pay more substantially in response to losing executives.

In addition, Oyer (2004) argues that a manager's outside opportunity is positively associated with the overall market condition. Managers would have poorer outside employment and thus are less mobile in the labor market during the recession period than in the booming period. Based on this view, we flag the recession period as the years 2001, 2008, and 2009, and include the interaction term, *Job-hopping* $\times$ *Recession*, in Column (6). The coefficient on this interaction is negative and significant, indicating that the effect of job-hopping on executive pay growth is weakened during the market downturn period.

Finally, managerial career concern may also influence a manager's employment mobility, as near-retirement managers and long-tenure managers are less likely to leave for a new company (Balsam and Miharjo (2007) and Gibbons and Murphy (1992)). In Column (7), we define the *Retirement* indicator, using the age 60 as the cutoff, and include its interaction with *Job-hopping* in the regression. The coefficient on *Job-hopping* $\times$ *Retirement* is negative and significant, indicating that the positive association between job-hopping and executive pay growth is less pronounced for retiring managers. In Column (8), we further define the *Long tenure* indicator based on the sample median of executive tenure and include its interaction with *Job-hopping*. The coefficient on *Job-hopping* $\times$ *Long tenure* is also negative and significant, indicating that the pay raise is less pronounced if the incumbent managers have stayed in office for long.⁶¹

In summary, the positive association between job-hopping and pay growth is more pronounced when the incumbent executives have greater employment opportunities. This result further strengthens the view that labor market competition drives firms to raise executive pay.

⁶¹ The age (tenure) information is missing for more than 20% (45%) of executives in the ExecuComp database; for this reason, the numbers of observations in Columns (7) and (8) are smaller than those in other columns.

IV.4. The Effect of the Job-hopping Executive

[Insert Table VI Here]

The pay growth of the remaining executives may also depend on the characteristics of the job-hopper, as certain characteristics of the job-hopper may indicate the intensity of incoming competition. We further examine this question in Table VI by exploring four job-hopper's characteristics that are likely related to labor market competition. Since the characteristics of job-hoppers are only available in job-hopping firms, the sample in Table VI only consists of the job-hopping firms.

First, we expect that the pay growth of the incumbent executives depends on the importance of the job-hopper. Compared with the move of a lower-ranking job-hopper, the job-hopping of a higher-ranking manager may be a more credible signal of incoming competition for managerial talents and may trigger a more pronounced pay raise in the job-hopping firm as an attempt to retain remaining executives. In Column (1), we use the job-hopper's rank of compensation prior to the job-hopping (*Former pay rank*) to proxy for the relative importance of this executive in the firm. The variable, *Former pay rank*, ranges from one (lowest paid among the top five executives) to five (highest paid among the top five executives). The coefficient on *Former pay Rank* is positive and significant at the 1% level, consistent with our prediction that the pay raise is more pronounced for incumbent executives when a more important executive leaves for a new job.

Second, a firm is more likely to compete with other firms in closer proximity for managerial talents. Thus, in Column (2), we include the *Nearby rival* indicator that takes the value of one if the geographical distance between the job-hopper's new company and his former company is smaller than the sample median, and zero otherwise. We find a positive and significant coefficient on *Nearby rival* indicator, consistent with the view that losing executives to a nearby company triggers a more pronounced pay growth for the incumbent executives.

Third, if the job-hopper receives higher compensation in the new firm than in his former firm, it may clearly signal that the job-hopping firm's compensation is not competitive and thus, as a response,

this firm should have a greater pay raise for remaining executives to compete against potential outside rivals. In Column (3), we flag the *Higher pay* indicator as one if the job-hopper's first-year total compensation in the new firm is larger than his last-year total compensation in the former firm, and zero otherwise.⁶² Consistent with the argument above, we find that the increase in pay of remaining executives is larger when the job-hopper receives a higher pay in his new company.

Lastly, a firm is most likely to face competition for managerial talents from its industry rivals. Thus, losing executives to industry rival firms should be a stronger signal of incoming competition and lead to a more pronounced pay growth for the remaining executives. In Column (4), we define the *Industry rival* indicator as one if the job-hopper's new firm is in the same industry as his former firm and the new firm's sales is between 80% and 120% of that in the former firm, and zero otherwise. The coefficient on *Industry rival* is positive and significant, supporting the prediction that fiercer labor market competition between industry peers helps to explain the pronounced pay growth for executives.

In summary, Table VI shows that the pay growth for incumbent executives in response to a job-hopping event is more evident when the firm loses a more important executive, when the firm loses an executive to a nearby firm, when the job-hopper receives higher compensation in the new firm, and when the firm loses an executive to its industry competitors. Overall, these results further support the view that the pay raise subsequent to a job-hopping event is driven by the competition for managerial talents.

V. Robustness Check and Additional Investigation

V. 1. Alternative Ways of Defining Job-hopping

[Insert Table VII Here]

⁶² As a robustness check, we re-define *Higher pay* indicator as one if the job-hopper's total pay of the second year in the new firm is larger than his total pay of the second last year in the former firm, and zero otherwise. Our results are similar.

Our job-hopping events might be confounded with forced executive turnover, which are unrelated to labor market competition. To mitigate this concern, in Column (1) of Table VII, we define the *New Job-hopping1* indicator as one if the firm experiences a job-hopping event as defined in Table I and either the job-hopper's first-year compensation in the new firm is larger than his last-year pay in the former firm, or the job-hopper is promoted from a non-CEO position in his former firm to the CEO position in the new firm, and zero otherwise. Also, in Column (2) we define the *New Job-hopping2* indicator as one if the firm experiences a job-hopping event as defined in Table I and the firm's stock return prior to the hopping is above the industry median, and zero otherwise. These two types of job-hopping events are more likely to be driven by the better job offer in the new firm rather than forced dismissal by the former firm. The coefficients on both *New Job-hopping1* and *New Job-hopping2* remain positive and significant at the 1% level.

It is also possible that the incumbent executives in job-hopping firms have to share some workload left by the job-hopper and thus require a higher pay. To address this possibility, in Column (3) we define the *New Job-hopping3* indicator as one if the firm experiences a job-hopping event as defined in Table I and immediately finds replacement next year, zero otherwise. The incumbent executives in this type of job-hopping firms are less likely to be afflicted by increased workload. The coefficient on *New Job-hopping3* is also positive and significant at the 1% level.

So far, we have used a three-year window to define a job-hopping event, which might be ad hoc. In Columns (4) and (5), we use a one-year window and a five-year window to re-define job-hopping events, respectively. The results are largely unchanged: job-hopping firms have a greater growth of pay for their remaining executives than non-job-hopping firms do.

Overall, our results are robust to various alternative definitions of job-hopping events.

V.2. Propensity Score Matching

As another robustness check, we also employ a matching technique to examine differences in pay growth between firms with and without job-hopping events. The matching procedure controls for selection based on the observable firm characteristics. Our data are well suited to the matching approach given that we have a much larger pool of control group (the non-job-hopping firms) compared with the treatment group (the job-hopping firms), which increases the likelihood of finding close matches for the job-hopping firms.

We first estimate the propensity scores using a probit model in which the dependent variable is an indicator that takes the value of one for the executives in a job-hopping firm and zero otherwise. The independent variables are the full set of firm and executive characteristics as defined in Column (1) of Table IV.⁶³ We then use the predicted probabilities (propensity scores) from the probit regression to match each executive-year observation in a job-hopping firm to the executive-year observation in a non-job-hopping firm that minimizes the absolute value of the difference between the propensity scores. To find optimal matches, three different matching techniques are employed respectively: nearest neighborhood, Gaussian kernel, and local linear regression. All matches are conducted with replacement. Bootstrapped standard errors based on 50 replications are used to conduct statistical inferences. Bias-corrected 95% confidence intervals are also reported.

[Insert Table VIII Here]

Table VIII presents differences in pay growth between the executives in job-hopping firms and their matched peers in non-job-hopping firms under three different matching criteria. We find that incumbent executives in job-hopping firms have significantly larger pay growth than their matched peers in non-job-hopping firms. This again strengthens our view that tougher labor competition, signaled by job-hopping events, contributes to the rise of executive compensation.

⁶³ Lower prior level of compensation may lead mechanically to a higher growth rate of pay for incumbent executives in job-hopping firms. To address this concern, in an untabulated analysis, we also include the executive's total compensation in the year prior to the job-hopping event to estimate the propensity scores, and the results are similar.

V.3. Addressing Internal Promotion

[Insert Table IX Here]

When losing one executive to other firms, it is possible that the job-hopping firm promotes some of its incumbent executives internally to fill in the vacant position, and then the growth of pay for incumbent executives is, at least partially, a reflection of compensation to job promotion, rather than a response to incoming competition for remaining managerial talents.⁶⁴ To examine this possibility, we exclude all incumbent executives with a change in job title from the year of the job-hopping event to the year afterwards, and re-examine the growth of pay for remaining executives. As shown in Table IX, we find again that after experiencing a job-hopping event, firms raise pay dramatically for their remaining executives who resume the same job responsibility, and the pay increase is more in the form of equity-based compensation. This result indicates that the possibility of internal promotions after a job-hopping event is not driving our results.

V.4. Determinants of Job-hopping

[Insert Table X Here]

It would be useful to understand which group of firms experience job-hopping. Do they have low performance? Do they have poor growth potential? Do they set pay too low in the first place? To answer these questions, we run logit regressions to examine the determinants of job-hopping in Table X. The dependent variable indicates whether a firm experiences a job-hopping event in a given year, and the independent variables include the firm's executive pay and ownership level, firm size, and firm performance. All the independent variables are measured in the year prior to the job-hopping events. Table X reveals several interesting findings.

First of all, none of the coefficients on *Median executive ln(total pay)*, *Median executive ln(cash pay)*, and *Median executive ln(equity pay)* is significant; the magnitude of these three coefficients are also virtually zero. This result indicates that job-hopping firms do not underpay their managers *ex ante*.

⁶⁴ For example, after the CEO leaves, the incumbent COO is promoted to be CEO, then an incumbent senior manager is promoted to be COO, and consequently a series of internal promotions follow.

Second, the significant and negative coefficients on *Median executive ownership* indicate that high stock ownership helps to prevent managers from job-hopping, consistent with Balsam and Miharjo (2007).

Third, the coefficients on *Ln(sales)* are significantly positive while the coefficients on *ROA*, *Stock return* and *Five-year sales growth* are significantly negative. To the extent that managers in large firms are usually more talented (Gabaix and Landier (2008)), these results suggest that job-hopping is likely to be associated with talented managers leaving their poorly performing and low-growth firms for new employment.

Overall, job-hopping is more likely to occur in declining large firms and there is no evidence that job-hopping firms pay their managers too low in the first place.

V.5. Further Discussions

There could be an alternative explanation of the positive relation between job-hopping and pay raise: one executive's job-hopping can increase the marginal value of remaining executives, leading to their pay raise. For example, when one executive leaves, the remaining executives' institutional knowledge can be, on the margin, more valuable, and therefore the firm raises pay in response to the increased marginal value of the remaining executives.

If this explanation is true, we should expect the pay raise to be more pronounced for the remaining executives who are senior and/or have more institutional knowledge. To the extent that the CEO, executives with high ownership, and long-tenure executives are likely to know more institutional details about the firm than other remaining executives, therefore, under this explanation, these three types of executives should have greater pay raise after the job-hopping. However, opposite to this prediction, Columns (1), (2) and (8) of Table V show that these executives actually have smaller pay raise due to their poorer employment mobility. For this reason, the pay raise of remaining executives after job-hopping is not a reflection of increased marginal value of the remaining executives.

VI. Conclusions

An extensive literature on executive compensation argues that competition for top executives is one of the driving forces for the rising executive pay (for example, Gabaix and Landier (2008), Kaplan (2008), Murphy and Zabojnik (2004), and Terviö (2008)). Despite a very intuitive explanation, little direct evidence is provided to identify the relation between labor market competition and executive compensation. This is probably because the detailed information on executive recruiting is largely confidential, and thus it is challenging to measure empirically the competing job offers that an executive receives from outside.

In this paper, we employ job-hopping events and examine empirically whether labor market competition for top managers contributes to the rise of executive compensation. We find that firms raise pay dramatically for their incumbent executives after losing one executive to another firm. The growth of pay is mainly in the form of equity-based compensation and is more pronounced when the incumbent executives have better employment mobility in the labor market. Overall, our paper provides direct empirical evidence that competition for managerial talents drives up executive compensation.

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Table I: Sample Distribution by Year and Industry

The sample consists of 1,069 firm-year observations with executive job-hopping events from 1993 to 2009, obtained from the ExecuComp database. An executive job-hopping event refers to the case that one executive leaves his current firm and subsequently takes an executive position in another firm within a three-year window. Firms with at least one job-hopping executive in a given year are referred to as job-hopping firms hereafter. Panel A presents the distribution of job-hopping firms by year. Panel B presents the distribution of job-hopping firms by industry.

Panel A: Distribution of Job-hopping Firms by Year

Year	Frequency	Percent	Number of job-hopping firms as a percentage of all
			firms in ExecuComp
1993	41	3.83%	2.48%
1994	56	5.08%	3.26%
1995	72	6.71%	4.02%
1996	74	6.93%	3.85%
1997	66	7.22%	3.35%
1998	52	5.90%	2.61%
1999	85	8.11%	4.46%
2000	72	7.22%	4.00%
2001	69	6.04%	3.79%
2002	49	5.16%	2.66%
2003	59	5.60%	3.13%
2004	77	7.81%	4.20%
2005	62	5.97%	3.60%
2006	77	6.19%	4.14%
2007	74	5.67%	3.89%
2008	54	4.05%	2.94%
2009	30	2.51%	1.70%
Total	1,069	100%	3.42%

Panel B: Distribution of Job-hopping Firms by Industry

Industry	Frequency	Percent	Number of job-hopping firms as a percentage of all same-industry firms in ExecuComp
Agriculture, forestry, and fishing (2-digit SIC 01-09)	3	0.28%	2.94%
Finance (2-digit SIC 60-69)	94	8.79%	2.03%
Manufacturing (2-digit SIC 20-39)	501	46.87%	3.78%
Mining and construction (2-digit SIC 10-17)	39	3.65%	2.41%
Services (2-digit SIC 70-89)	144	13.47%	3.16%
Transportation and public utilities (2-digit SIC 40-49)	122	11.41%	3.51%
Wholesale and retail trade (2-digit SIC 50-59)	166	15.53%	4.63%
Total	1,069	100%	3.42%

Table II: Sample Descriptive Statistics

The sample consists of 5,376 executive-year observations (1,069 firm-year observations) for job-hopping firms, and 146,725 executive-year observations (28,520 firm-year observations) for non-job-hopping firms from 1993 to 2009. Variable definitions are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. The last two columns of Panels A and B present, respectively, the p -values in the t -test and the Wilcoxon z -test on the executive and firm characteristics between the job-hopping and non-job-hopping firms. In Panel C, Non-CEO to CEO indicator takes the value of one if the job-hopper is not the CEO in his former firm but obtains the CEO position in the new firm, and zero otherwise. CEO to CEO indicator takes the value of one if the job-hopper is the CEO in his former firm and again obtains the CEO position in the new firm, and zero otherwise. CEO to non-CEO indicator takes the value of one if the job-hopper is the CEO in his former firm but resumes a non-CEO position in the new firm, and zero otherwise. Non-CEO to non-CEO indicator takes the value of one if the job-hopper is not the CEO in either his former firm or the new firm, and zero otherwise. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Executive Characteristics

	Job-hopping firms		Non-job-hopping firms		Test of differences	
	Mean	Median	Mean	Median	t -test	Wilcoxon
	(1)	(2)	(3)	(4)	(1) – (2)	(3) – (4)
Growth of total pay	66%	15%	42%	9%	0.000***	0.000***
Growth of cash pay	24%	6%	15%	4%	0.000***	0.000***
Growth of equity pay	59%	1.4%	41%	0%	0.000***	0.000***
CEO indicator	0.17	0.00	0.17	0.00	0.171	0.171
Ownership	0.09%	0.00%	0.14%	0.00%	0.000***	0.000***

Panel B: Firm Characteristics

	Job-hopping firms		Non-job-hopping firms		Test of differences	
	Mean	Median	Mean	Median	t -test	Wilcoxon
	(1)	(2)	(3)	(4)	(1) – (2)	(3) – (4)
Sales(\$M)	7264	2630	3818	1013	0.000***	0.000***
Sales growth	1.05	1.05	1.14	1.09	0.000***	0.000***
Δ Cash	0.47%	0.08%	-0.09%	0.02%	0.011**	0.085*
Δ Capex	-0.42%	-0.07%	-0.22%	-0.01%	0.033**	0.117
Δ R&D	0.05%	0.00%	-0.02%	0.00%	0.140	0.189
ROA	1.70%	3.59%	3.22%	4.21%	0.000***	0.000***
Stock return	16.59%	9.63%	16.17%	10.11%	0.801	0.886
Stock volatility	11.68%	10.32%	12.16%	10.69%	0.008***	0.005***
Firm age	27.78	22.00	22.18	17.00	0.000***	0.000***

Panel C: Job-hoppers' New Firms versus Former Firms

	Mean	Median
Sales of new firm / sales of former firm (at the year following the job-hopping)	0.99	0.97
Total pay of first year in new firm / total pay of last year in former firm	2.66	1.28
Total pay of 2nd year in new firm / total pay of 2nd last year in former firm	2.07	1.30
Non-CEO to CEO indicator	24.13%	0
CEO to CEO indicator	2.53%	0
CEO to non-CEO indicator	1.50%	0
Non-CEO to non-CEO indicator	71.84%	1

Table III: Pay Growth and Executive Job-hopping

The sample consists of 5,376 executive-year observations for job-hopping firms, and 146,725 executive-year observations for non-job-hopping firms from 1993 to 2009. The dependent variable is the natural logarithm of the growth of total pay. Job-hopping is an indicator variable, taking the value of one if one of the firm's executives leaves the firm in a given year and subsequently takes an executive position in another firm within a three-year window, zero otherwise. Variable definitions are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)
Job-hopping	0.078*** (0.000)	0.094*** (0.000)	0.091*** (0.000)	0.091*** (0.000)	0.083*** (0.000)
ROA		0.118*** (0.000)	0.098*** (0.000)	0.097*** (0.000)	0.130*** (0.002)
Stock return		0.017*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.008* (0.076)
Volatility		0.142*** (0.000)	0.146*** (0.000)	0.145*** (0.000)	0.102 (0.133)
ΔLn (sales)		0.337*** (0.000)	0.284*** (0.000)	0.284*** (0.000)	0.271*** (0.000)
ΔCash		0.317*** (0.000)	0.298*** (0.000)	0.296*** (0.000)	0.317*** (0.000)
ΔCapex		0.025 (0.731)	−0.091 (0.213)	−0.091 (0.210)	−0.132 (0.261)
ΔR&D		−0.884*** (0.000)	−0.857*** (0.000)	−0.847*** (0.000)	−0.777*** (0.007)
Ln (firm age)		0.015*** (0.000)	0.013*** (0.000)	0.014*** (0.000)	0.029** (0.011)
Industry pay growth			0.957*** (0.000)	0.956*** (0.000)	0.963*** (0.000)
CEO indicator				−0.129*** (0.000)	−0.127*** (0.000)
Ownership				−0.009*** (0.003)	−0.005 (0.143)
Constant	−0.105 (0.999)	−0.181*** (0.000)	−0.115*** (0.000)	0.015 (0.625)	−0.075** (0.025)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	No
Firm fixed effects	No	No	No	No	Yes
Adjusted R2	2%	3%	4.4%	5%	4.5%
No. of observations	152,028	143,370	143,370	143,370	143,370

Table IV: Pay Structure and Executive Job-hopping

The sample consists of 5,376 executive-year observations for job-hopping firms, and 146,725 executive-year observations for non-job-hopping firms from 1993 to 2009. The dependent variable is the natural logarithm of the growth of cash pay in Column (1), the natural logarithm of the growth of equity pay in Column (2), the change in the percentage of equity pay in total pay in Column (3), the natural logarithm of the growth of the value of restricted stock and unvested stock option in Column (4), and the natural logarithm of the growth of the share number of restricted stock and unvested stock option in Column (5), respectively. Job-hopping is an indicator variable, taking the value of one if one of the firm's executives leaves the firm in a given year and subsequently takes an executive position in another firm within a three-year window, zero otherwise. Variable definitions are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)
	Ln(Growth of cash pay)	Ln(Growth of equity pay)	Δ (Equity pay/ total pay)	Ln [Growth of value of (restricted stock+ unvested option)]	Ln [Growth of share number of (restricted stock+ unvested option)]
Job-hopping	0.051*** (0.000)	0.253*** (0.000)	0.016*** (0.001)	0.530*** (0.000)	0.348*** (0.000)
ROA	-0.000 (0.979)	0.585*** (0.000)	0.061*** (0.000)	1.030*** (0.000)	0.246*** (0.000)
Stock return	0.007*** (0.004)	0.016 (0.372)	0.002 (0.155)	0.224*** (0.000)	0.017 (0.119)
Volatility	0.153*** (0.000)	0.258* (0.090)	0.023 (0.113)	-0.410*** (0.007)	0.085 (0.400)
Δ Ln (sales)	0.204*** (0.000)	0.364*** (0.000)	0.027*** (0.000)	0.527*** (0.000)	0.209*** (0.000)
Δ Cash	0.263*** (0.000)	-0.011 (0.944)	-0.039*** (0.008)	1.623*** (0.000)	-0.159* (0.062)
Δ Capex	-0.198*** (0.000)	-0.296 (0.367)	0.061* (0.054)	-1.708*** (0.000)	-0.052 (0.779)
Δ R&D	-0.525*** (0.000)	-0.271 (0.681)	-0.076 (0.260)	-6.051*** (0.000)	-0.709* (0.073)
Ln (firm age)	0.003** (0.048)	0.001 (0.905)	0.001 (0.103)	0.002 (0.793)	-0.004 (0.444)
Industry pay growth	0.264*** (0.000)	2.898*** (0.000)	0.238*** (0.000)	0.906*** (0.000)	0.277*** (0.000)
CEO indicator	-0.110*** (0.000)	-0.550*** (0.000)	-0.041*** (0.000)	-0.745*** (0.000)	-0.578*** (0.000)
Ownership	0.006*** (0.001)	-0.056*** (0.000)	-0.002 (0.123)	0.016 (0.196)	0.015* (0.068)
Constant	-0.053*** (0.001)	0.070 (0.699)	0.014 (0.302)	0.792*** (0.001)	0.354** (0.010)

Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R2	8.6%	3%	2.4%	5.6%	3.2%
No. of observations	143,370	143,370	143,370	143,370	143,370

Table V: Employment Mobility, Pay Growth, and Executive Job-hopping

The sample consists of 5,376 executive-year observations for job-hopping firms, and 146,725 executive-year observations for non-job-hopping firms from 1993 to 2009. The dependent variable is the natural logarithm of the growth of total pay. Job-hopping is an indicator variable, taking the value of one if one of the firm's executives leaves the firm in a given year and subsequently takes an executive position in another firm within a three-year window, zero otherwise. Variable definitions are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Job-hopping	0.122*** (0.000)	0.096*** (0.000)	0.167*** (0.000)	0.061*** (0.000)	0.069*** (0.000)	0.104*** (0.000)	0.074*** (0.000)	0.100*** (0.000)
Job-hopping × CEO indicator	-0.178*** (0.000)							
Job-hopping × Ownership		-0.059*** (0.005)						
Job-hopping × Overpaid			-0.218*** (0.000)					
Job-hopping × Many industrial rivals				0.062*** (0.007)				
Job-hopping × Industry outside hiring					0.121** (0.045)			
Job-hopping × Recession						-0.062** (0.024)		
Job-hopping × Retirement							-0.062* (0.097)	
Job-hopping × Long tenure								-0.063** (0.018)
Overpaid			-0.536*** (0.000)					
Many industrial rivals				-0.002 (0.740)				

Industry outside hiring					−0.001 (0.878)			
Recession						0.016*** (0.000)		
Retirement							−0.075*** (0.000)	
Long tenure								−0.124*** (0.000)
ROA	0.097*** (0.000)	0.097*** (0.000)	0.093*** (0.000)	0.097*** (0.000)	0.097*** (0.000)	0.093*** (0.000)	0.133*** (0.000)	0.159*** (0.000)
Stock return	0.015*** (0.000)	0.015*** (0.000)	0.019*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.012*** (0.008)	0.009 (0.107)
Volatility	0.145*** (0.000)	0.145*** (0.000)	0.348*** (0.000)	0.145*** (0.000)	0.146*** (0.000)	0.130*** (0.000)	0.107*** (0.008)	0.075 (0.141)
ΔLn (sales)	0.284*** (0.000)	0.284*** (0.000)	0.351*** (0.000)	0.284*** (0.000)	0.284*** (0.000)	0.277*** (0.000)	0.288*** (0.000)	0.239*** (0.000)
ΔCash	0.296*** (0.000)	0.296*** (0.000)	0.204*** (0.000)	0.296*** (0.000)	0.296*** (0.000)	0.300*** (0.000)	0.313*** (0.000)	0.270*** (0.000)
ΔCapex	−0.091 (0.210)	−0.091 (0.208)	−0.099 (0.139)	−0.091 (0.210)	−0.091 (0.210)	−0.126* (0.080)	−0.063 (0.449)	−0.177* (0.090)
ΔR&D	−0.848*** (0.000)	−0.846*** (0.000)	−0.758*** (0.000)	−0.851*** (0.000)	−0.848*** (0.000)	−0.852*** (0.000)	−0.812*** (0.000)	−0.362 (0.112)
Ln (firm age)	0.014*** (0.000)	0.014*** (0.000)	−0.016*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.012*** (0.000)	0.018*** (0.000)	0.011*** (0.000)
Industry pay growth	0.956*** (0.000)	0.956*** (0.000)	0.831*** (0.000)	0.956*** (0.000)	0.956*** (0.000)	1.034*** (0.000)	0.969*** (0.000)	0.956*** (0.000)
CEO indicator	−0.122*** (0.000)	−0.129*** (0.000)	−0.122*** (0.000)	−0.129*** (0.000)	−0.129*** (0.000)	−0.131*** (0.000)	−0.110*** (0.000)	−0.144*** (0.000)
Ownership	−0.009***	−0.007**	0.001	−0.009***	−0.009***	−0.005*	−0.004	−0.006

	(0.002)	(0.010)	(0.789)	(0.003)	(0.003)	(0.071)	(0.135)	(0.416)
Constant	0.014	0.015	0.029	0.015	0.015	−0.017	−0.031	0.011
	(0.644)	(0.642)	(0.600)	(0.626)	(0.632)	(0.587)	(0.333)	(1.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	5%	5%	16%	5%	5%	5%	5%	6%
No. of observations	143,370	143,370	143,370	143,370	143,370	143,370	111,821	78,780

Table VI: Analysis of only Using Job-hopping Firms

The sample consists of 5,376 executive-year observations for job-hopping firms over the period from 1993 to 2009. The dependent variable is the natural logarithm of the growth of total pay. *Former pay rank* measures the job-hopping executive's pay rank in his former company (the rank of one indicates the lowest paid executive). *Nearby rival* is an indicator variable, which takes the value of one if the geographical distance between the job-hopping executive's new company and his former company is smaller than the sample median, and zero otherwise. *Higher pay* is an indicator variable, which takes the value of one if the job-hopping executive's first-year total pay in the new company is larger than his last-year total pay in the former company, and zero otherwise. *Industry rival* is an indicator variable, which takes the value of one if the job-hopping executive's new company is in the same industry as his former firm and the new firm's sales is between 80% and 120% of that in the former firm, zero otherwise. Definitions of other variables are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)
Former pay rank	0.029*** (0.000)			
Nearby rival		0.052** (0.029)		
Higher pay			0.041* (0.087)	
Industry rival				0.099** (0.020)
ROA	-0.028 (0.856)	-0.072 (0.641)	-0.074 (0.633)	-0.083 (0.592)
Stock return	0.019 (0.463)	0.014 (0.605)	0.014 (0.602)	0.014 (0.592)
Volatility	0.248 (0.363)	0.243 (0.376)	0.249 (0.361)	0.235 (0.391)
ΔLn (sales)	0.071 (0.369)	0.067 (0.397)	0.065 (0.416)	0.067 (0.399)
ΔCash	0.584*** (0.007)	0.670*** (0.002)	0.661*** (0.002)	0.650*** (0.003)
ΔCapex	-0.103 (0.835)	-0.018 (0.971)	-0.046 (0.927)	0.010 (0.984)
ΔR&D	0.574 (0.542)	0.585 (0.538)	0.621 (0.512)	0.545 (0.565)
Ln (firm age)	0.020 (0.192)	0.023 (0.134)	0.022 (0.150)	0.023 (0.134)
Industry pay growth	0.776*** (0.000)	0.768*** (0.000)	0.750*** (0.000)	0.762*** (0.000)
CEO indicator	-0.284*** (0.000)	-0.293*** (0.000)	-0.293*** (0.000)	-0.292*** (0.000)
Ownership	0.005 (0.824)	0.001 (0.978)	0.001 (0.966)	-0.000 (0.991)

Constant	−0.214 (0.235)	−0.172 (0.338)	−0.127 (0.478)	−0.127 (0.475)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R2	7.0%	6.6%	6.6%	6.6%
No. of observations	5,220	5,220	5,220	5,220

Table VII: Alternative Ways of Defining Job-hopping

This table presents the results under alternative definitions of executive job-hopping events. The dependent variable is the natural logarithm of the growth of total pay. In Column (1), *New Job-hopping1* is an indicator variable, taking the value of one if the firm experiences a job-hopping event as defined in Table I and either the job-hopping executive's first-year pay in the new firm is larger than his last-year pay in the former firm or the job-hopping executive is promoted from a non-CEO position in his former firm to the CEO position in the new firm, zero otherwise. In Column (2), *New Job-hopping2* is an indicator variable, taking the value of one if the firm experiences a job-hopping event as defined in Table I and the firm's stock return prior to the job-hopping is above the industry median, zero otherwise. In Column (3), *New Job-hopping3* is an indicator variable, taking the value of one if the firm experiences a job-hopping event as defined in Table I, and immediately finds replacement next year, zero otherwise. In Column (4), *New Job-hopping4* is an indicator variable, taking the value of one if the firm experiences a job-hopping event within a one-year window, zero otherwise. In Column (5), *New Job-hopping5* is an indicator variable, taking the value of one if the firm experiences a job-hopping event within a five-year window, zero otherwise. Definitions of other variables are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)	(5)
New Job-hopping1	0.090*** (0.000)				
New Job-hopping2		0.081*** (0.000)			
New Job-hopping3			0.104*** (0.000)		
New Job-hopping4				0.081*** (0.000)	
New Job-hopping5					0.088*** (0.000)
ROA	0.095*** (0.000)	0.093*** (0.000)	0.094*** (0.000)	0.094*** (0.000)	0.097*** (0.000)
Stock return	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)	0.015*** (0.000)
Volatility	0.145*** (0.000)	0.146*** (0.000)	0.144*** (0.000)	0.144*** (0.000)	0.143*** (0.000)
ΔLn (sales)	0.282*** (0.000)	0.282*** (0.000)	0.283*** (0.000)	0.282*** (0.000)	0.284*** (0.000)
ΔCash	0.297*** (0.000)	0.298*** (0.000)	0.298*** (0.000)	0.297*** (0.000)	0.297*** (0.000)
ΔCapex	-0.094 (0.195)	-0.091 (0.208)	-0.093 (0.201)	-0.095 (0.191)	-0.089 (0.222)
ΔR&D	-0.847*** (0.000)	-0.857*** (0.000)	-0.851*** (0.000)	-0.847*** (0.000)	-0.844*** (0.000)
Ln (firm age)	0.014*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.014*** (0.000)	0.013*** (0.000)
Industry pay growth	0.956***	0.957***	0.957***	0.958***	0.956***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CEO indicator	−0.129***	−0.129***	−0.129***	−0.129***	−0.129***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ownership	−0.009***	−0.009***	−0.009***	−0.009***	−0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Constant	0.014	0.014	0.016	0.014	0.016
	(0.647)	(0.657)	(0.620)	(0.661)	(0.606)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Adjusted R2	5%	5%	5%	5%	5%
No. of observations	143,370	143,370	143,370	143,370	143,370

Table VIII: Propensity Score Matching

This table presents differences in pay growth between the executives in job-hopping firms and their matched peers in non-job-hopping firms under three different matching criteria: nearest neighborhood, Gaussian kernel, and local linear regression. In the first step, we run a probit regression, in which the dependent variable is the job-hopping indicator and the independent variables are the firm and executive characteristics used in Column (1) of Table IV. In the second step, we use the predicted probabilities (propensity scores) from the probit regression to match each executive-year observation in a job-hopping firm to the executive-year observation in a non-job-hopping firm that minimizes the absolute value of the difference between the propensity scores. To test pairwise differences in means between the two samples, we use bootstrapped standard errors based on 50 replications with replacement. The *p*-values are reported in parentheses. Bias-corrected 95% confidence intervals are reported in brackets.

Variables	Nearest neighborhood	Gaussian kernel	Local linear regression
Growth of total pay	25.66%	23.34%	25.11%
	(0.00)	(0.00)	(0.00)
	[19.04%, 32.28%]	[19.60%, 27.07%]	[19.73%, 30.48%]
Growth of equity pay	21.72%	18.28%	19.89%
	(0.00)	(0.00)	(0.00)
	[9.98%, 33.46%]	[10.20%, 26.37%]	[10.64%, 29.14%]
Growth of cash pay	11.04%	9.13%	9.66%
	(0.00)	(0.00)	(0.00)
	[7.77%, 14.32%]	[7.34%, 10.92%]	[7.89%, 11.43%]

Table IX: Robustness Check of Excluding Executives with Job Title Changes

In this table, we exclude all incumbent executives with a change in job title from the year of the job-hopping event to the year afterwards. The dependent variable is the natural logarithm of the growth of cash pay in Column (1), the natural logarithm of the growth of equity pay in Column (2), the natural logarithm of the growth of total pay in Columns (3) and (4), respectively. Job-hopping is an indicator variable, taking the value of one if one of the firm's executives leaves the firm in a given year and subsequently takes an executive position in another firm within a three-year window, zero otherwise. Variable definitions are provided in the appendix. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the executive level are reported in parentheses.

	(1)	(2)	(3)	(4)
	Ln(Growth of cash pay)	Ln(Growth of equity pay)	Ln(Growth of total pay)	Ln(Growth of total pay)
Job-hopping	0.060*** (0.000)	0.426*** (0.000)	0.127*** (0.000)	0.115*** (0.000)
ROA	-0.011 (0.467)	0.307*** (0.003)	0.044* (0.082)	0.036 (0.451)
Stock return	0.006** (0.027)	0.002 (0.927)	0.013*** (0.005)	0.006 (0.278)
Volatility	0.223*** (0.000)	0.526*** (0.006)	0.211*** (0.000)	0.112 (0.169)
ΔLn (sales)	0.206*** (0.000)	0.374*** (0.000)	0.294*** (0.000)	0.284*** (0.000)
ΔCash	0.289*** (0.000)	-0.015 (0.932)	0.321*** (0.000)	0.342*** (0.000)
ΔCapex	-0.197*** (0.000)	-0.741* (0.052)	-0.096 (0.251)	-0.129 (0.314)
ΔR&D	-0.517*** (0.000)	-0.164 (0.830)	-0.773*** (0.000)	-0.762** (0.013)
Ln (firm age)	0.005*** (0.001)	0.016 (0.156)	0.014*** (0.000)	0.043*** (0.002)
Industry pay growth	0.285*** (0.000)	3.065*** (0.000)	0.952*** (0.000)	0.955*** (0.000)
CEO indicator	-0.109*** (0.000)	-0.616*** (0.000)	-0.131*** (0.000)	-0.130*** (0.000)
Ownership	0.005** (0.044)	-0.130*** (0.000)	-0.019*** (0.000)	-0.016*** (0.001)
Constant	0.063*** (0.005)	1.023*** (0.000)	0.182*** (0.000)	0.129*** (0.006)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No
Firm fixed effects	No	No	No	Yes

Adjusted R2	8.5%	4%	5%	4.8%
No. of observations	106,886	106,886	106,886	106,886

Table X: Determinants of Job-hopping

In this table, we report the marginal effects of logit regressions, in which the dependent variable takes the value of one if the firm experiences a job-hopping event in a given year, and zero otherwise. The variables, *Median executive ln(total pay)*, *Median executive ln(cash pay)*, *Median executive ln(equity pay)*, and *Median executive ownership*, measure the median value of the corresponding pay and ownership of the firm's top five executives. All the independent variables are measured in the year prior to the job-hopping event. All monetary variables are measured in 2009 dollars, and all continuous variables are winsorized at the 1st and 99th percentiles. Industry is classified using the first 2-digit of SIC code. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. *p*-values based on robust standard errors clustered at the firm level are reported in parentheses.

	(1)	(2)	(3)
Median executive ln(total pay)	0.002 (0.203)		
Median executive ln(cash pay)		-0.003 (0.216)	
Median executive ln(equity pay)			0.000 (0.220)
Median executive ownership	-0.016*** (0.002)	-0.016*** (0.003)	-0.016*** (0.003)
Ln (sales)	0.012*** (0.000)	0.013*** (0.000)	0.012*** (0.000)
ROA	-0.059*** (0.000)	-0.057*** (0.000)	-0.058*** (0.000)
Stock return	-0.008*** (0.001)	-0.007*** (0.003)	-0.007*** (0.002)
Five-year sales growth	-0.012** (0.042)	-0.011* (0.070)	-0.011* (0.056)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Pseudo R2	7.3%	7.3%	7.3%
No. of observations	27,340	27,340	27,340

Appendix: Variable Definitions

This appendix provides a detailed description of the construction of all of the variables used in the tables.

<i>Variable</i>	<i>Definition</i>
ΔCash	Cash $t+1$ – Cash t .
ΔCapex	Capex $t+1$ – Capex t .
$\Delta \text{Ln}(\text{sales})$	$\text{Ln}(\text{sales } t+1) - \text{Ln}(\text{sales } t)$
$\Delta \text{R\&D}$	R&D $t+1$ – R&D t .
CEO indicator	Indicator variable that equals to one if the executive is the CEO, and zero otherwise
Capex	The ratio of capital expenditures over total assets.
Cash	The ratio of cash plus short-term investments over total asset.
Cash pay	The sum of salary and bonus.
Equity pay	The sum of the grant-date value of restricted stock awards and the Black–Scholes value of granted options.
Firm age	The number of years since the firm first shows up in CRSP.
Five-year sales growth	Five-year accumulative sales growth rate
Former pay rank	Job-hopping executive's pay rank among all the top executives in the former company. Higher rank indicates higher compensation relative to other executives.
Growth of cash pay	Cash pay $t+1$ / Cash pay t .
Growth of equity pay	Equity pay $t+1$ / Equity pay t .
Growth of total pay	Total pay $t+1$ / Total pay t .
Higher pay	Indicator variable that equals to one if the job-hopping executive's first-year total compensation in the new company is higher than his last-year total compensation in the former firm, and zero otherwise.
Industry pay growth	The median of natural logarithm of growth of total pay for all the top executives in a 2-digit SIC industry.
Industry outside hiring	The percentage of outside-hired CEOs relative to all CEO appointments in firm's industry, where an outside-hired CEO is the one who takes the CEO position within one year since he joins the firm.
Industry rival	Indicator variable that equals to one if the new company's sales is between 80% and 120% of former company's sales and both firms are in the same industry, and zero otherwise.
Job-hopping	Indicator variable that equals to one if one of the firm's executives leaves the firm in a given year and subsequently takes an executive position in another firm within a three-year window, zero otherwise.
Long tenure	Indicator variable that equals to one if the executive's tenure is above the sample median, and zero otherwise.
Many industrial rivals	Indicator variable that equals to one if the number of firms in the same 2-digit SIC industry is larger than the sample median, zero otherwise.
Nearby rival	Indicator variable that equals to one if the geographical distance between the job-hopping executive's new company and his former company is smaller than the sample median, and zero otherwise.
Overpaid	Indicator variable that equals to one if the residual of a pooled OLS regression of executive's total compensation ($\text{Ln}(\text{Total pay}) = a_0 + a_1 \text{Ln}(\text{Sales}) + a_2 \text{ROA} + a_3 \text{Stock return} + \text{CEO indicator} + \text{CFO indicator} + \text{COO indicator} + \text{Year fixed effects} + \text{Industry fixed effects}$) is in the top quartile of the population, zero otherwise.
Ownership	The number of shares owned by the executives over total shares outstanding.
R&D	The ratio of R&D expenditures over total assets.
Recession	Indicator variable that equals to one for year 2001, 2008 or 2009, and zero otherwise.
Retirement	Indicator variable that equals to one if the executive is aged 60 or above, and zero otherwise.
ROA	Net income divided by total asset.
Share number of restricted stock	The number of shares of unvested restricted stock .
Share number of unvested option	The number of shares of unvested options.
Stock return	The yearly stock return.
Total pay	The variable TDC1 in Execucomp, which is the sum of salary, bonus, the grant-date value of restricted stock awards, and the Black–Scholes value of granted options, and other compensation.
Value of restricted stock	The market value of unvested restricted shares.
Value of unvested option	The market value of in-the-money unvested options.
Volatility	The standard deviation of monthly stock return for the prior 60 months.