Three Essays on Empirical Corporate Finance

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To my parents for their unconditional love, continuous support, invaluable guidance, and never-ending encouragement.

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I   Summary

This dissertation consists of three independent, academic papers in the field of corporate finance and empirically investigates the influence of governance characteristics on firm performance and merger and acquisition (M&A) outcomes.

Exploiting a unique feature of the Clayton Antitrust Act, Chapter 1 analyzes how directors holding outside directorships at peer firms affect firm value and performance of financial firms. The analyses provide evidence that directors serving simultaneously at firms within the same industry are associated with lower firm performance, whereas directors holding outside directorships in customer or supplier industries, enhance firm performance. Event study results suggest that investors recognize the value-diminishing effect of horizontal directors as well as the value-increasing effect of vertical directors. The results provide evidence of a tradeoff between director experience and conflicts of interest.

Chapter 2 examines how directors with supply-chain experience affect acquirer M&A outcomes. The results show that acquirers with directors holding simultaneous directorships at firms in supply-chain industries experience higher announcement returns when conducting supply-chain transactions. The improvement stems from the ability of acquirers with supply-chain-experienced directors to capture a larger fraction of synergy gains, exhibit higher long-term performance, pay lower price premiums, and hire fewer additional external financial advisors in supply-chain transactions. The results suggest that supply-chain experience enhances directors' ability to identify suitable targets and reduce the costs of the deal, thereby achieving better supply-chain acquisitions.

Finally, Chapter 3 investigates the influence of directors with M&A experience on acquirer transaction outcomes. The findings indicate that acquirers employing directors who have past M&A experience generate higher abnormal stock returns upon the announcement of the deal. The improved performance is due to M&A-experienced directors' ability to identify more synergistic targets and to reduce the costs of the deal by paying lower prices for targets and reducing external financial advisory fees. The results suggest that directors learn from having engaged in M&As and that the gained experience enhances acquirer M&A outcomes.

II Zusammenfassung

Die vorliegende Dissertation besteht aus drei unabhängigen wissenschaftlichen Arbeiten im Bereich Corporate Finance und untersucht empirisch den Einfluss von Governance-Charakteristika auf die Unternehmensperformance und auf Fusionen und Übernahmen, kurz M&As.

Ausgehend von der Ausnahmeregelung des Clayton Antitrust Acts für Finanzunternehmen erforscht Kapitel 1, inwieweit Verwaltungsratsmitglieder, die Verwaltungsratsmandate bei Peerfirmen halten, den unternehmerischen Erfolg beeinflussen. Die Ergebnisse zeigen, dass Verwaltungsratsmitglieder, die gleichzeitig eine Position im Verwaltungsrat von Firmen innerhalb der gleichen Industrie (horizontal) innehaben, die Unternehmensperformance verschlechtern. Verwaltungsratsmitglieder, die gleichzeitig im Verwaltungsrat von Firmen innerhalb der Wertschöpfungskette (vertikal) sitzen, hingegen verbessern die Unternehmensperformance. Event Studienresultate lassen darauf schliessen, dass Investoren sowohl den negativen Einfluss von horizontalen als auch den positiven Einfluss von vertikalen Verwaltungsratsmitgliedern erkennen. Aus den Erkenntnissen lässt sich ein Tradeoff zwischen Erfahrung und Interessenskonflikten von Verwaltungsratsmitgliedern ableiten.

Kapitel 2 behandelt die Frage, wie Verwaltungsratsmitglieder mit Supply-Chain-Erfahrung die finanziellen Ergebnisse des Käufers bei M&As beeinflussen. Die Analysen belegen, dass Käufer mit Verwaltungsratsmitgliedern, die gleichzeitig Verwaltungsratsmandate bei Firmen in der Wertschöpfungskette halten, höhere Renditen bei Supply-Chain-Fusionsankündigungen generieren. Die Hauptgründe hierfür liegen in der Erzielung höherer Synergien und langfristiger betrieblicher Leistungen, der Verminderung des Preisaufschlages und der Reduktion der Anzahl externer Berater. Die Studie deutet darauf hin, dass Supply-Chain-Erfahrung Verwaltungsratsmitgliedern hilft, passende Zielobjekte zu identifizieren und die Transaktionskosten zu senken.

Abschließend untersucht Kapitel 3 den Einfluss von Verwaltungsratsmitgliedern mit M&A-Erfahrungen auf die Transaktionsergebnisse der Käufer. Die Resultate ergeben, dass Käufer mit Verwaltungsratsmitgliedern, die in der Vergangenheit M&As begleitet haben, höhere Renditen zum Zeitpunkt der Transaktionsankündigung generieren. Dies ist auf die Fähigkeit von M&A-erfahrenen Verwaltungsratsmitgliedern zurückzuführen, synergistische Zielunternehmen zu identifizieren und Transaktionskosten durch verminderte Preisaufschläge und Beratungskosten zu senken. Die Nachforschungen weisen darauf hin, dass ein Lerneffekt von Verwaltungsratsmitgliedern in der Durchführung von M&As existiert.

Chapter 1

Sharing a Director with a Peer

Tatjana Berg, Philipp Horsch and Markus Schmid

Abstract

Exploiting a unique feature of the Clayton Antitrust Act, we analyze how directors holding outside directorships at peer firms affect firm value and profitability of financial firms. We find that directors serving simultaneously at horizontally-related firms are associated with lower firm performance, whereas directors holding outside directorships in vertical industries, i.e., customer or supplier industries, enhance firm performance. Event study results suggest that investors recognize the value-diminishing effect of horizontal directors as well as the value-increasing effect of vertical directors. Our results provide evidence of a tradeoff between industry-specific knowledge and conflicts of interest.

1.1 Introduction

The structure of boards of directors is an important determinant of firm policies and outcomes.[1] Previous research identifies many value-relevant characteristics, such as board independence (Weisbach, 1988; Knyazeva et al., 2013), director busyness (Fich and Shivdasani, 2006; Field et al., 2013), or director gender (Adams and Ferreira, 2009; Gul et al., 2011). One board characteristic that has received little attention so far is directors holding outside directorships at industry peers.[2] Foucault and Fresard (2014) and Leary and Roberts (2014) show that observing actions of industry peers influences company decisions. Hence, sharing a director with a peer, representing a stronger link between firms than just product market rivalry, may have a substantial influence on company behavior and performance. In this paper, we empirically investigate the impact of directors serving simultaneously on peer firms' boards on firm value and profitability using a unique and previously unexplored feature of the Clayton Antitrust Act: the exemption of financial firms from the prohibition of employing directors who serve at a competitor. Focusing on financial firms, this exemption allows us to differentiate between directors being affiliated with firms within the same industry, directors holding outside directorships at firms in customer or supplier industries, and directors serving simultaneously in other industries.

Directors affiliated with firms within the same industry, which we determine based on four-digit Standard Industry Classification (SIC) codes and subsequently refer to as horizontal directors, presumably have a profound understanding of the specific industry in which they serve. Their frequent encounters with the industry's dynamics, firm policies, and strategies broaden their industry-specific knowledge and may increase their cognition of strategic opportunities and competitive threats. Hence, horizontal directors may benefit from superior advising and monitoring skills. However, directors serving simultaneously at firms within the same industry may also harm firm performance. For instance, horizontal directors may encourage the implementation of a competitor's strategy without considering differences across the firms (Benabou and Tirole, 2003). Horizontal directors may also be afraid of breaching confidentiality agreements and thereby avoid advocating beneficial strategies because the peer firm previously implemented them. Essentially, horizontal directors may harm firm performance as they are prone to conflicts of interest as the firms they serve on compete for market share.

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[1] For a detailed review, see Adams et al. (2010).

[2] A notable exception is Dass et al. (2014) who investigate the impact of vertically related directors on firm performance.

In comparison to horizontal directors, directors simultaneously holding board seats in upstream or downstream industries – subsequently referred to as vertical directors – are less exposed to conflicts of interest. Although vertical directors serving simultaneously at direct customer or supplier firms may lobby for more business between the two firms – potentially benefiting one firm more than the other – the conflict of interest is less striking than in the case of horizontal directors. Vertical directors who do not hold a board seat at direct customers or suppliers have hardly any conflict of interest, as the firms do not have a direct trade relationship. On the upside, directors serving on the boards of firms in the customer or supplier industry can provide important insights to executives about challenges and changes in these industries. Thus, they can help the firm adjust its strategies and anticipate customer demands or supplier difficulties (e.g., Custódio and Metzger, 2013; Dass et al., 2014). Consequently, exposure to peer firms may improve directors' understanding of and receptiveness to industry-specific challenges.

We investigate the impact of peer directors on firm value and profitability using all U.S. financial firms listed in the S&P 1500 index over the period 2000 to 2011. Our sample is limited to financial firms, as Section 8 of the Clayton Act prohibits non-financial firms from employing directors who hold outside directorships at direct competitors.[3] To mitigate endogeneity concerns we use two-stage least squares regressions in which we instrument the endogenous peer director variables with the supply of peer directors and the industry's practice to employ peer directors. We find an increase in the supply of peer directors to be associated with a higher probability that a firm appoints a peer director. Further, we observe a clustering of peer director appointments within industries, i.e., a firm is more likely to appoint a peer director if other firms within the same industry also employ peer directors. Yet, there is no plausible reason why the supply of peer directors or a prevalence of employing peer directors should affect firm value or profitability. Statistical tests support the relevance and validity of our instruments.

Consistent with the hypothesis that directors holding outside directorships at horizontally-related firms are prone to conflicts of interest, we find firms employing horizontal directors to have lower value and be less profitable. The results are statistically and economically significant. An increase in the proportion of horizontal directors on the

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[3] In 1996, Section 8 of the Clayton Act was complemented by §212 of Regulation L of the Federal Reserve Board which prohibits bank holding companies (BHCs) to share directors. Consequently, we observe relatively less horizontal directors in this category (SIC code 6020). However, Regulation L grants several exemptions depending on, for instance, the size or the geographical focus of BHCs, explaining why we still observe directors serving simultaneously on the boards of (competing) BHCs. All our results hold when we exclude BHCs from our sample.

board by one standard deviation is associated with a decrease in firm value of 4.3%. In contrast, vertical directors improve firm value and profitability. An increase in the fraction of vertical directors on the board by one standard deviation is associated with an increase in firm value of 8.5%. This suggests that the benefit of additional knowledge about the upstream and downstream industries outweighs the disadvantage of potential conflicts of interest. Supporting the idea that vertical directors are better advisors, we find that the more connected the supply-chain industry is, the larger the impact of vertical directors on firm value and profitability. Our results are also supported by the fact that we find no significant valuation effect of directors holding outside directorships at other financial firms that are neither horizontally nor vertically related. These directors are rarely exposed to conflicts of interest. However, neither do they gain relevant industry knowledge that could enhance their advising skills. Our results hold for a variety of robustness tests. Specifically, we obtain similar results when using exactly identified 2SLS regressions, the distance between firms as an additional instrument, or alternative affiliation definitions. Our results also hold for different sub-periods of our sample (i.e., before and after the financial crisis).

Further, we conduct an event study that examines announcements of directors becoming peer directors. To mitigate endogeneity concerns, we do not analyze the abnormal returns of companies appointing the director but the abnormal returns of the companies already employing the director who now – through a secondary appointment to another firm's board – becomes a horizontal or vertical director. This setup is particularly appealing as the decision of a firm to announce a director is exogenous to the company already employing the director and, thus, our estimates are unlikely to result from changes or endogenous selection taking place at the firm of study. We find that directors appointed to horizontally-related firms are associated with negative and statistically significant cumulative abnormal returns. In contrast, we observe that investors perceive the announcement of vertical directors as value enhancing. To ensure that our results are not driven by unobserved director characteristics, we repeat our event study using their initial appointment (i.e., before becoming vertical or horizontal directors). For these initial announcements we find no significant abnormal returns. Thus, our event study results provide evidence that investors recognize horizontal directors' potential conflicts of interest and vertical directors' knowledge about the upstream and downstream industries.

We provide evidence of heterogeneity in the negative horizontal director effect. The negative impact of horizontal directors on firm value and profitability is restricted to directors holding relatively smaller equity stakes in these firms, directors having relatively shorter tenure, and male directors. Moreover, the negative valuation effect is more pronounced for horizontal directors serving on the board of smaller firms, more

risky firms, and firms with a higher information asymmetry. These results suggest that the negative influence of horizontal directors varies with the value these directors assign to their individual board seats. This supports our conjecture that the detrimental effect of horizontal directors stems from conflicts of interest in which directors systematically favor one firm over the other.

This paper contributes to the stream of literature on board structure and performance. Prior literature shows that structural differences such as board size (Yermack, 1996; Coles et al., 2008), board independence (Weisbach, 1988; Knyazeva et al., 2013), CEO duality (Adams et al., 2005), director busyness (Fich and Shivdasani, 2006; Field et al., 2013), and director gender (Adams and Ferreira, 2009; Gul et al., 2011) influence boards' monitoring and advising abilities and, thereby, firm value. Our paper extends the existing literature by evaluating the effect of an additional structural difference, namely peer directors. Peer directors have received hardly any attention in the literature, with the exception of Dass et al. (2014) investigating the impact of vertical directors on firm performance. We complement these authors' research by not only analyzing the valuation and profitability effect of vertical, but also horizontal peer firm directors. Moreover, we focus on one particular industry group, financial firms, which has been reported to differ with respect to various board characteristics from other industries (e.g., Adams and Mehran, 2003) while allowing us to analyze a relatively homogenous group of firms. As most studies of board effectiveness exclude financial firms from the sample, we know much less about board effectiveness in the financial industry as compared to other industries.

Our paper also contributes to the literature stream on director interlocks. Previous research finds that firms with board interlocks exhibit similar governance patterns (Bouwman, 2011), are more likely to form strategic alliances (Gulati and Westphal, 1999), are exposed to higher option backdating (Bizjak, Lemmon, and Whitby, 2009), and experience declining firm values when the interlocked firm is sued (Fich and Shivdasani, 2007). In contrast to the interlock literature, which considers any type of firms sharing a director, we analyze specific types of within-industry interlocks. Specifically, we split up within-industry interlocks into horizontal, vertical, and other interlocked directorships and show that the valuation effect of interlocks varies substantially across these categories. Focusing on financial firms, due to the exemption rule in the Clayton Antitrust Act, allows us to analyze horizontal directors, a sub-group of interlocks which does not exist outside the financial industry but is of particular interest because of the obvious conflicts of interest these directors may face.

Finally, we contribute to the literature on the role of director expertise. Prior literature examines directors with financial expertise (e.g., Harris and Raviv, 2008; Minton et al., 2014), bankers on the board of directors (e.g., Kroszner and Strahan, 2001; Guener et al., 2008; Dittmann et al., 2010; Ferreira and Matos, 2012), directors with industry experience from upstream and downstream industries (e.g., Dass et al., 2014), and directors with past experience in the same industry (e.g. Masulis et al., 2012; Faleye et al., 2013; Wang et al., 2013; Drobetz et al., 2015; von Meyerinck et al., 2015). Examining directors who simultaneously hold directorships in peer firms adds to this research stream as peer directors gather information and experience from peer firms and can apply this knowledge to the firms they serve.

The remainder of the paper is structured as follows. We explain the sample and the variable construction in Section 1.2. In Section 1.3, we describe our instrumental variables approach and the main results. In Section 1.4, we present our event study analysis. In Section 1.5, we investigate whether conflicts of interest explain the negative influence of horizontal directors. We conclude in Section 1.6.

1.2   Data and Variables

1.2.1   Sample Construction

Our base sample consists of all U.S. financial firms listed in the Compustat North America database over the period 2000 to 2011. We define companies as financial firms if their primary SIC code is between 6000 and 6999. For each firm we obtain accounting data from Compustat. We merge this sample with RiskMetrics and ExecuComp to retrieve director names and director characteristics such as gender and the number of outside directorships. The use of RiskMetrics and ExecuComp restricts our sample to S&P 1500 companies. In addition, we exclude subsidiaries (eleven firms according to Exhibit 21 of firms' annual filings) and firms with a parent-spinoff relationship. We supplement missing director data from the firms' Def 14A proxy statements and annual 10k statements. To determine which directors serve simultaneously at peer firms, we use directors' names as identifiers. For this, we manually verify director names with information from their firm's proxy statements and Bloomberg Business Week before hand-matching them. Directors are treated as the same person if their first name, middle name, last name, generation extension, and birth year are identical. Our final sample consists of 39,884 director-years, 7,541 unique directors, 3,405 firm-year observations, and 485 unique financial firms.

We determine vertical relationships of financial firms through the Use tables of the Benchmark Input-Output (I-O) data, which are published by the Bureau of Economic

Analysis every five years. We use the 1997 Use table for the years 2000 and 2001, the 2002 Use table for the years 2002 to 2006, and the 2007 Use table for 2007 onward. The I-O data provide detailed information on the interrelationships between U.S. industries. Specifically, they provide the value of inputs purchased and the value of outputs sold by one industry to each of the other industries. For example, in 2007, the life insurance industry (SIC code 6311) received 2% of its inputs from and sold 7% of its outputs to the insurance agents and brokers industry (SIC code 6411). We take the sum of the percentage input and the percentage output for each industry and define industries to be related at three different thresholds based on whether the input-output coefficient (I-O) exceeds the value of 1%, 5%, or 10%. As the combined percentage of the life insurance industry's inputs from and outputs to the insurance agents and brokers industry amounts to 9%, the life insurance industry is vertically related to the insurance agents and brokers industry at the 1% and 5% thresholds.[4]

1.2.2 Measures of Director Affiliations

We classify directors as horizontal if they hold directorships within the same four-digit SIC industry. An example of a horizontal director is Mr. Robert W. Trudeau, who served as a director at both the Interactive Brokers Group (SIC code 6211) and at Marketaxess Holdings (SIC code 6211). For each firm, we construct the variables *Horizontal Board* and *Horizontal Board Dummy. Horizontal Board* is the proportion of horizontal directors on the firm's board. *Horizontal Board Dummy* is a binary variable that is one if there is at least one horizontal director on the board, and zero otherwise. In robustness tests we use the fraction of horizontal directors on the board based on three-digit SIC codes (*Horizontal Board SIC 3*) and two-digit SIC industries (*Horizontal Board SIC 2*) to ensure that our results are not driven by the choice of industry cutoff.

Vertical directors are directors who serve simultaneously on at least two boards of financial firms that are not in the same industry, but whose industries have an input-output coefficient of at least 1%. For instance, Frederic V. Salerno simultaneously served at both Bear Stearns Companies (SIC code 6211) and at Popular Inc. (SIC code 6020) between 2003 and 2008. Fourteen percent of all inputs and outputs of SIC code 6211 come from and go to SIC code 6020. Consequently, Mr. Salerno is a vertical director of Bear Stearns Companies at the 1% (and also at the 5% and 10%) vertical-relatedness level. The input-output coefficient of SIC code 6020 accounts for around 6% in relation

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[4] The degree of vertical relatedness is not necessarily the same in both directions. In 2007, the insurance agents and brokers industry received 62% of its inputs from and sold 1% of its outputs to the life insurance industry. Thus, the insurance agents and brokers industry is vertically related to the life insurance industry at the 1%, 5%, and 10% threshold.

with SIC code 6211. Accordingly, Mr. Salerno is also a vertical director of Popular Inc. *Vertical Board* is the aggregate number of vertical directors divided by board size. The *Vertical Board Dummy* indicates the presence of at least one vertical director. In our baseline results we use the 1% vertical-relatedness threshold. To ensure that our results are not driven by the choice of the threshold we use the 5% (*Vertical Board 5%)* and 10% (*Vertical Board 10%)* threshold in robustness tests.

When directors hold multiple directorships at financial firms but neither classify as horizontal nor vertical directors, we refer to them as other directors. We aggregate other directors on the firm level (*Other Board*), as the fraction of other directors on the firm's board.

1.2.3 Firm Characteristics

In our analysis, we use return on assets (ROA) as a measure of operating performance, and a market-based measure of firm value as a proxy for Tobin's Q. ROA is the ratio of net income before extraordinary items to the book value of total assets.[5] Our proxy for Tobin's Q is the ratio of the firm's market value to its book value of assets (Kaplan and Zingales, 1997; Masulis and Mobbs, 2014). The firm's market value is calculated as the book value of total assets plus the market value of common equity minus the book value of common equity.[6]

As control variables, we include firm size and leverage. Firm size is the natural logarithm of the book value of total assets. Leverage is the book value of debt, calculated as total assets minus the book value of equity, divided by the book value of assets. Further, we construct a set of corporate governance control variables that previous research found to be correlated with firm value and profitability (e.g., Adams et al., 2010). Specifically, we include *Board Size* (Yermack, 1996), *Indep. Board* (Knyazeva et al., 2013), *CEO Duality* (Yang and Zhao, 2014), *Board Busyness* (Fich and Shivdasani, 2006; Field et al., 2013), *Female Board* (Adams and Ferreira, 2009; Gul et al. 2011), and *Board Age*. All variables are defined in Appendix 1.A.

1.2.4 Summary Statistics

In our sample, an average board consists of 1.0% horizontal directors, 4.6% vertical directors, and 0.8% other directors (Panel A of Table 1.1). This corresponds to 8.2% of the firms employing at least one horizontal director and 33.1% of the firms employing at

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[5] We winsorize ROA at the 1st and 99th percentiles to reduce the influence of outliers.

[6] Due to numerous outliers, we winsorize Tobin's Q at the 5th and 95th percentiles.

Table 1.1: Summary Statistics
The table reports summary characteristics of 485 financial firms (SIC codes 6000 to 6999) from 2000 to 2011. Panel A reports board affiliation characteristics. Panel B shows financial and governance characteristics. Definitions of all variables are provided in Appendix 1.A.

	Mean	Min.	Median	Max.	Std. Dev.	Obs.
Panel A: Board Affiliation Characteristics						
Horizontal Board	0.010	0.000	0.000	0.364	0.037	3,405
Vertical Board	0.046	0.000	0.000	0.750	0.081	3,405
Other Board	0.008	0.000	0.000	0.333	0.031	3,405
Horizontal Board Dummy	0.082	0.000	0.000	1.000	0.274	3,405
Horizontal Board SIC 3	0.011	0.000	0.000	0.364	0.037	3,405
Horizontal Board SIC 2	0.018	0.000	0.000	0.400	0.048	3,405
Vertical Board Dummy	0.331	0.000	0.000	1.000	0.471	3,405
Vertical Board 5%	0.021	0.000	0.000	0.400	0.051	3,405
Vertical Board 10%	0.015	0.000	0.000	0.400	0.044	3,405
Panel B: Financial and Corporate Governance Characteristics						
ROA	0.023	-0.092	0.013	0.202	0.042	3,405
Tobin's Q	1.212	0.950	1.089	2.173	0.323	3,384
Firm Size	9.126	4.072	8.922	14.986	1.718	3,405
Leverage	0.794	0.179	0.884	1.030	0.178	3,405
Board Size	11.696	5.000	11.000	35.000	3.797	3,405
Indep. Board	0.721	0.000	0.750	1.000	0.147	3,405
CEO Duality	0.544	0.000	1.000	1.000	0.498	3,274
Board Busyness	0.045	0.000	0.000	0.643	0.097	3,405
Female Board	0.103	0.000	0.100	0.556	0.089	3,405
Board Age	60.876	43.000	60.857	75.750	4.082	3,400

least one vertical director. Considering alternative measures, there are on average 1.1% horizontal directors on the board of directors based on the same three-digit SIC industry and 1.8% horizontal directors based on the same two-digit SIC industry. With regard to vertical directors, there are 2.1% vertical directors on boards based on an I-O coefficient of 5% and 1.5% based on an I-O coefficient of 10%.

The firms in our sample have a mean (median) ROA of 2.3% (1.3%) and Tobin's Q of 1.21 (1.09) (Panel B of Table 1.1). This is consistent with the findings of Ellul and Yeramilli (2013) on U.S. bank-holding companies for the period 1997 to 2011. The mean (median) firm size is $59.3 billion ($7.5 billion) and the mean (median) leverage is 79.4% (88.4%). Confirming other studies (e.g., Aebi et al., 2012; Pathan and Faff, 2013), mean board size is 12, there are on average 72.1% independent directors on the board, and 54.4% of all firms have a CEO who is also the chairman of the board. In the average board, 4.4% of directors hold at least three outside directorships, 10.3% of directors are female, and the average director is 61 years old.

1.3 Empirical Analysis

1.3.1 Methodology

Studying the impact of peer directors on firm performance is subject to endogeneity concerns. On the one hand, there may be omitted variables affecting both firm performance and the firm's choice to appoint peer directors. On the other hand, there may be reverse causality. That is, it is not clear whether better performing firms are more successful in recruiting directors from peer firms or whether peer directors have an impact on firm value and profitability. To mitigate these endogeneity concerns, we estimate two-stage least square (2SLS) regressions and instrument our peer director variables through exogenous variables. Following Dass et al. (2014), we estimate the following second-stage regression:

$$Perf_{i,\,t} = \beta_0 + \beta_1 Peer\,\widehat{Directors}_{i,t} + \beta_2 X_{i,t} + \gamma_{j(i)} + \delta_t + \varepsilon_{i,t},$$

where i and t are indices for firms and years, respectively, and $j(i)$ indicates the industry to which firm i belongs. *Perf* is either ROA or Tobin's Q and is measured at the end of the year. X denotes the time-varying financial and governance firm-level controls, and $\gamma_{j(i)}$ and δ_t represent industry and year fixed effects, respectively. Industry fixed effects are defined using the Fama-French 48 industries (Fama and French, 1997). As observations can be correlated for a given firm, we use robust standard errors clustered at the firm level (Petersen, 2009).

Our first set of instruments (*Supply Horizontal Board*, *Supply Vertical Board* and *Supply Other Board*) is based on the supply of peer directors. *Supply Horizontal Board* is the total number of directors within the same industry based on four-digit SIC codes scaled by the total number of directors in the respective year. *Supply Vertical Board* is the total number of vertical directors based on an I-O coefficient of at least 1% scaled by the total number of directors. *Supply Other Board* is the total number of directors who are neither horizontally nor vertically related based on four-digit SIC codes and a 1% I-O coefficient scaled by the total number of directors. These instrumental variables are economically relevant as a greater availability of peer directors improves the chances of locating and convincing peer directors to join a firm's board. Consequently, a firm is more likely to have a peer director on its board if there is a greater availability of these directors. The exclusion restriction holds as there is no reason why greater availability of affiliated directors in the industry should directly affect firm value or profitability.[7]

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[7] Across industries the exclusion restriction does not necessarily hold. For instance, a higher supply of horizontal directors is likely to be positively correlated with competition, which might affect firm

Following Dass et al. (2014), we construct a second set of instrumental variables based on the prevalence of peer directors within an industry. These include *Median Horizontal Board*, *Median Vertical Board*, and *Median Other Board* and are defined as the median of *Horizontal Board*, *Vertical Board*, and *Other Board* in the same three-digit SIC industry, respectively. The validity of these instruments is based on the rationale that the more pervasive the presence of peer directors within an industry, the higher the probability that a firm will choose to employ a peer director. On the other hand, there is no plausible argument for why the instruments should affect firm value or profitability. In addition to being economically rational, we require that our instruments meet statistical relevance and validity conditions as described in the next section.

1.3.2   Main Results

We analyze the influence of sharing a director on firm value and profitability by means of an OLS regression model and by an over-identified 2SLS model. All regressions include controls for firm size, leverage, past performance, board size, the fraction of independent directors on the board, CEO duality, the fraction of busy directors on the board, mean board age, the fraction of female directors on the board, and year and industry dummies.

We first consider the OLS regression results. While OLS regressions do not allow causal interpretations, they provide evidence of correlation. Table 1.2 shows that *Horizontal Board* is negatively related to ROA (Column (1)) and to Tobin's Q (Column (2)), with the former result being significant at the 1% level. We find the opposite result for *Vertical Board*. *Vertical Board* is positively related to ROA (Column (3)) and Tobin's Q (Column (4)), but only the latter relation is significant at the 1% level. Studying *Other Board*, we do not find any significant relation between *Other Board* and ROA (Column (5)) or Tobin's Q (Column (6)). The results in Table 1.2 also allow us to compare the control variable coefficients to these in the extant literature. Consistent with Pathan and Faff (2013) and Erkens et al. (2012), we find a negative relation between independent directors and ROA and Tobin's Q. Likewise the results confirm the positive relation between female boards (Adams, Gray, and Nowland, 2011; Gul et al., 2011; Pathan and Faff, 2013) and firm performance. Finally, we find that higher board busyness is associated with higher firm value and profitability. This is consistent with the findings of

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profitability. But, within industries all companies are subject to the same industry' characteristics (e.g., competition or supplier/customer bargaining power). Thus, by including industry fixed effects the exclusion restriction of our supply instrument remains valid (Gormley and Matsa, 2014).

Table 1.2: Profitability and Firm Value: OLS Regressions

The table reports results from OLS regressions of ROA and Tobin's Q on *Horizontal Board*, *Vertical Board*, and *Other Board*. *Horizontal Board* is the fraction of directors on the board who serve on at least one other board in the same four-digit SIC industry. *Vertical Board* is the fraction of directors on the board who serve on at least one other board in a downstream or upstream industry based on an I-O coefficient of at least 1%. *Other Board* is the fraction of directors who hold at least one outside directorship but do not serve on another board in the same four-digit SIC industry or in a downstream or upstream industry based on an I-O coefficient of at least 1%. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. Definitions of all variables are provided in Appendix 1.A.

	ROA (1)		Tobin's Q (2)		ROA (3)		Tobin's Q (4)		ROA (5)		Tobin's Q (6)	
Horizontal Board	-0.052	***	-0.010									
	(-3.36)		(-0.07)									
Vertical Board					0.006		0.244	***				
					(0.67)		(3.55)					
Other Board									-0.012		0.040	
									(-0.63)		(0.29)	
Firm Size	-0.001	**	-0.025	***	-0.001	**	-0.028	***	-0.001	**	-0.025	***
	(-2.11)		(-5.76)		(-2.09)		(-5.94)		(-2.04)		(-5.79)	
Leverage	-0.125	***	-0.578	***	-0.125	***	-0.573	***	-0.125	***	-0.577	***
	(-10.01)		(-7.07)		(-9.96)		(-7.20)		(-9.91)		(-7.11)	
Performance (t-1)	0.138	*	0.116	***	0.138	*	0.115	***	0.138	*	0.116	***
	(1.79)		(3.02)		(1.78)		(3.04)		(1.78)		(3.04)	
Board Size	-0.002		-0.010		-0.001		-0.009		-0.001		-0.009	
	(-0.95)		(-0.72)		(-0.79)		(-0.72)		(-0.80)		(-0.71)	
Indep. Board	-0.014	***	-0.081	**	-0.014	***	-0.089	**	-0.014	***	-0.081	**
	(-2.89)		(-2.32)		(-3.00)		(-2.50)		(-2.96)		(-2.31)	
CEO Duality	0.003	**	0.019	**	0.003	***	0.020	**	0.003	***	0.019	**
	(2.56)		(2.03)		(2.78)		(2.04)		(2.77)		(1.99)	
Board Busyness	0.008		0.115	***	0.006		0.086	**	0.007		0.113	***
	(1.54)		(2.75)		(1.27)		(2.29)		(1.44)		(2.75)	
Female Board	0.013	*	0.150	***	0.015	**	0.150	***	0.015	**	0.149	***
	(1.86)		(2.81)		(2.01)		(2.80)		(2.01)		(2.75)	
Board Age	0.000		0.001		0.000		0.002		0.000		0.001	
	(0.25)		(1.30)		(0.37)		(1.53)		(0.31)		(1.32)	
Year Dummies	yes		yes		yes		yes		yes		yes	
Industry Dummies	yes		yes		yes		yes		yes		yes	
Observations	3,271		3,242		3,271		3,242		3,271		3,242	
Adj. R^2	0.473		0.549		0.471		0.552		0.471		0.549	

Field et al. (2013).[8] Overall, OLS results provide evidence that horizontal directors are associated with worse firm performance and vertical directors with better firm performance.

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[8] The conformity of our coefficients with extant literature provides confidence that our results are not due to the restriction on financial firms, but – if not prohibited by the Clayton Act – may also hold for non-financial companies.

To establish causality, we use instrumental variables regressions (Table 1.3). For brevity, we only report coefficients on the endogenous variables; the omitted control variable estimates are similar to those reported in Table 1.2. When regressing ROA on *Horizontal Board* (Column (1)) the coefficient on the *Horizontal Board* variable is negative and statistically significant at the 1% level. Its value of –0.464 indicates that a one standard deviation increase in the *Horizontal Board* variable decreases ROA by 1.7%. We obtain similar results when we examine the relation between *Horizontal Board* and Tobin's Q (Column (2)). The coefficient of -1.393 is significant at the 5% level. In terms of economic significance, an increase in the proportion of horizontal directors by one standard deviation decreases Tobin's Q by 0.052 or 4.3% of mean Tobin's Q. In contrast, we obtain a positive, statistically significant coefficient when regressing ROA on *Vertical Board* (Column (3)). The coefficient of 0.091 indicates that an increase in the proportion of vertical directors by one standard deviation increases ROA by 0.7%. When using Tobin's Q as dependent variable (Column (4)), the coefficient estimate is positive and statistically significant at the 1% level. The coefficient of 1.268 implies that an increase in the proportion of vertical directors by one standard deviation increases Tobin's Q by 0.103 or 8.5% of mean Tobin's Q.[9] When we consider *Other Board*, we do not find a significant relation between *Other Board* and ROA (Column (5)) or Tobin's Q (Column (6)). Overall, the instrumental variable regressions confirm the results of the OLS regressions, but are stronger both in terms of statistical and economic significance suggesting that OLS results are subject to endogeneity.[10] Thus, the results of the instrumental variables regressions provide evidence of a causal relation between director affiliation and firm value and profitability.

The quality of the conclusions and interpretations drawn from instrumental variables regressions strongly depends on the quality of the instruments. Therefore, we test our instruments' economic relevance, validity, and excludability (Table 1.3). Wooldridge's (1995) p-value is statistically significant for all regressions, confirming the endogenous nature of our peer director variables and hence, the relevance of the instrumental variables. In the first-stage regression, all instrumental variables are statistically significant at the 1% level. Moreover, they all pass weak instrument tests (Stock and

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[9] One standard deviation amounts to about 8% of the board (Table 1.1). The mean percentage of vertically integrated directors is about 4.6% only. Hence, a one standard deviation increase, for the mean firm, represents an increase from about 4.6% vertically integrated directors to 12.6% vertically integrated directors.

[10] As the other corporate governance variables besides the director affiliation variables are possibly endogenous as well, we rerun our instrumental variables regressions without these additional governance controls and find similar results.

Table 1.3: Profitability and Firm Value: IV Regressions
The table reports results from over-identified 2SLS regressions of ROA and Tobin's Q on *Horizontal Board*, *Vertical Board*, and *Other Board*. *Horizontal Board* is the fraction of directors on the board who serve on at least one other board in the same four-digit SIC industry. *Vertical Board* is the fraction of directors on the board who serve on at least one other board in a downstream or upstream industry based on an I-O coefficient of at least 1%. *Other Board* is the fraction of directors who hold at least one outside directorship but do not serve on another board in the same four-digit SIC industry or in a downstream or upstream industry based on an I-O coefficient of at least 1%. *Horizontal Board*, *Vertical Board* and *Other Board* are instrumented by *Supply Horizontal Board* and *Median Horizontal Board*, *Supply Vertical Board* and *Median Vertical Board*, and *Supply Other Board* and *Median Other Board*, respectively. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. Definitions of all variables are provided in Appendix 1.A.

	ROA (1)		Tobin's Q (2)		ROA (3)		Tobin's Q (4)		ROA (5)		Tobin's Q (6)	
Horizontal Board	-0.464	***	-1.393	**								
	(-3.61)		(-2.06)									
Vertical Board					0.091	**	1.268	***				
					(2.53)		(3.94)					
Other Board									-0.010		-0.106	
									(-0.10)		(-0.12)	
Controls	yes		yes		yes		yes		yes		yes	
Year Dummies	yes		yes		yes		yes		yes		yes	
Industry Dummies	yes		yes		yes		yes		yes		yes	
Observations	3,271		3,242		3,271		3,242		3,271		3,242	
Adj. R^2	0.348		0.526		0.450		0.499		0.451		0.549	
First-stage estimates:												
Supply Instrument	0.367	***	0.346	***	0.028	***	0.028	***	0.055	***	0.056	***
	(11.85)		(11.50)		(4.68)		(4.65)		(6.20)		(6.32)	
Median Instrument	0.799	***	0.802	***	0.462	***	0.455	***	0.557	***	0.558	***
	(26.73)		(28.67)		(10.09)		(9.78)		(4.81)		(4.80)	
Controls	yes		yes		yes		yes		yes		yes	
Year Dummies	yes		yes		yes		yes		yes		yes	
Industry Dummies	yes		yes		yes		yes		yes		yes	
Wooldridge's robust score test	0.009	***	0.003	***	0.001	***	0.001	***	0.692	***	0.656	***
Kleibergen-Paap F-statistic	577.54	***	637.30	***	85.14	***	81.57	***	37.26	***	37.66	***
Sargan's test	0.128		0.422		0.193		0.784		0.211		0.028	

Yogo, 2005). Both of these sets of tests confirm the validity of the instruments. Finally, the Sargan's test is above 0.05, providing evidence on the instruments' excludability. As our instrumented variables are bounded between zero and one, we rerun the first-stage regression using a Tobit regression. All results are robust for this alternative estimation.

Overall, our results suggest that horizontal directors have a negative, statistically and economically significant impact on firm value and profitability. The results suggest that even though horizontal directors' increased industry knowledge may increase directors'

ability to monitor and advice management, conflicts of interest outweigh these benefits. In contrast, vertical directors have a positive impact on firm value and profitability, complementing findings in Dass et al. (2014) by providing evidence that the positive valuation effect prevails in financial firms. The results suggest that the experience gained from working with vertically-related industries enhances directors' ability to monitor and to advise management, and that conflicts of interest are less pronounced for vertical directors than for horizontal directors. Furthermore, the results show that directors holding outside directorships at financial firms that are neither horizontally nor vertically related do not affect firm value or profitability. As these directors are not prone to conflicts of interest, but also do not have the specific knowledge of vertically related directors, their presence on the board is not significantly related to firm value or profitability.

1.3.3   Robustness Tests

We perform a variety of tests to ensure the robustness of our results. First, we test the robustness of our identification by (1) using exactly identified 2SLS regressions and (2) using distance between firms instead of pervasiveness of peer directors within an industry as an instrument. Whited and Roberts (2013) argue that over-identified 2SLS regressions increase the precision of the estimates, but that they can also result in biases toward the OLS estimator. When rerunning our analyses instrumenting *Horizontal Board* and *Vertical Board* only with *Supply Horizontal Board* and *Supply Vertical Board*, respectively, we obtain similar results (Panel A of Table 1.4). Gormley and Matsa (2014) show that using industry medians of independent variables as instruments might lead to biased estimators. We, thus, follow Dass et al. (2014) and rerun our analyses replacing the *Median Horizontal Board* and *Median Vertical Board* instruments with an alternative instrument based on the distance between peer firms (Panel B of Table 1.4).[11] Our results do not notably change.

Next, we test the sensitivity of our results with respect to the definition of our horizontal and vertical director variables (Panel C of Table 1.4). As alternative measures of *Horizontal Board*, we use *Horizontal Board Dummy*, *Horizontal Board SIC 3*, and *Horizontal Board SIC 2*. As alternative measures of *Vertical Board*, we use *Vertical*

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[11] We define the instrumental variables as the natural logarithm of the average distance of the firm's headquarters to all other horizontal (*Distance to Horizontal Firms*) or vertical firms' headquarters (*Distance to Vertical Firms*) using ZIP codes provided by Compustat and latitude and longitude data provided by the Census Gazetteer Files. The rationale behind the instrument is that the closer the peer firms, the higher the probability that the firm will employ a peer director. However, there is no reason why these instruments should be related to firm performance.

Table 1.4: Robustness Tests

The table reports results for a variety of 2SLS regressions of ROA and Tobin's Q on a *Director Variable* and a set of control variables. *Director Variable* is the endogenous variable instrumented by (unless otherwise stated) *Supply Horizontal Board* and *Median Horizontal Board* in Columns (1) and (2), and *Supply Vertical Board* and *Median Vertical Board* in Columns (3) and (4). Each coefficient represents a separate regression. In Panel A, we use exactly identified 2SLS regressions with the supply instrument. In Panel B, we use the distance between peer firms as the second instrument, instead of using the median instrument. In Panel C, we use alternative definitions for horizontal and vertical board. *Definition 1* is a binary variable which is one if the firm has at least one horizontal (vertical) director on the board and zero otherwise. *Definition 2* is the fraction of horizontal directors based on three-digit SIC industries and the fraction of vertical directors based on an I-O coefficient of at least 5%. *Definition 3* is the fraction of horizontal directors based on two-digit SIC industries and the fraction of vertical directors based on an I-O coefficient of at least 10%. In Panel D, we consider different sample periods. We define the following sub-periods: the pre-financial-crisis period from 2000 to 2006, the financial crisis period from 2007 to 2008, and the post-crisis period from 2009 to 2011. All regressions include the full set of financial and governance controls, and year and industry dummies. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. Definitions of all variables are provided in Appendix 1.A.

	Horizontal Board				Vertical Board			
	ROA		Tobin's Q		ROA		Tobin's Q	
	(1)		(2)		(1)		(2)	
Panel A: Exactly Identified 2SLS Regressions								
Director Variable	-0.158		-2.299	**	0.183	***	1.079	*
	(-1.39)		(-2.29)		(2.80)		(1.85)	
Panel B: Alternative Instruments								
Director Variable	-0.250	*	-2.573	**	0.200	**	1.687	**
	(-1.93)		(-2.36)		(2.56)		(2.53)	
Panel C: Alternative Definitions								
Director Variable (Definition 1)	-0.061	***	-0.183	**	0.018	***	0.248	***
	(-5.94)		(-2.07)		(2.65)		(3.92)	
Director Variable (Definition 2)	-0.484	***	-1.443	**	0.137	**	1.978	***
	(-5.85)		(-2.06)		(2.41)		(3.83)	
Director Variable (Definition 3)	-0.460	***	-1.302	**	0.177	**	2.436	***
	(-5.82)		(-2.01)		(2.49)		(3.67)	
Panel D: Alternative Time Periods								
Director Variable: Pre-Crisis	-0.192	***	-2.280	***	0.101	***	1.446	***
	(-2.96)		(-3.87)		(2.79)		(4.92)	
Director Variable: Crisis	-1.124	**	-27.804	***	0.388		10.563	***
	(-2.54)		(-4.04)		(1.52)		(3.01)	
Director Variable: Post-Crisis	-0.672	***	-0.526		0.191	***	0.797	***
	(-7.43)		(-1.09)		(3.05)		(2.64)	

Board Dummy, *Vertical Board 5%*, and *Vertical Board 10%*. All our results hold for these alternative definitions. Moreover, we find that vertical directors serving at more closely-related firms enhance firm outcomes more than directors serving in less connected firms. Specifically, vertical directors based on an I-O coefficient of 1% increase firm value and profitability less than vertical directors based on an I-O coefficient of at least 10%. This supports the notion that increased experience in the supply-chain enhances firm outcomes.

Finally, we test whether our results hold across different time periods. We define the following sub-periods: 1) the pre-financial-crisis period from 2000 to 2006, 2) the financial crisis from 2007 to 2008, and 3) the post-crisis period from 2009 to 2011.[12] Panel D of Table 1.4 provides evidence that our results also hold for these sub-periods. Overall the robustness tests confirm our previous findings that horizontal directors are associated with lower firm value and profitability and vertical directors are associated with higher firm value and profitability.

1.4   Stock Price Reactions to Director Announcements

1.4.1   Stock Price Reactions to Peer Director Announcements

In this section of the paper, we conduct an event study analysis that examines announcement returns upon an appointment resulting in a director becoming a peer director. Specifically, we analyze the stock market reaction of an incumbent director's firm upon the announcement of this director being appointed to the board of a peer firm. For instance, Frederic V. Salerno was a director at Bear Stearns from 1992 to 2008. On April 30th, 2003, he was announced to become a director of Popular Inc. Popular Inc. is vertically-related to Bear Stearns. Consequently, Mr. Salerno became a vertical director of Bear Stearns on the announcement date of his appointment to Popular's board. In our analysis, we examine the stock returns of Bear Stearns around April 30th, 2003.

We consider all horizontal and vertical directors which are appointed during our sample period. Using Factiva and firms' 8-k statements, we determine the announcement dates of these appointments. In addition, we exclude events which are potentially confounded by other material news releases such as other director appointments, mergers and acquisitions, or spinoffs. We merge our event data to CRSP to obtain the firms' daily returns. We calculate CARs as the realized return minus the expected return under the market model with an estimation period starting 300 days and ending 46 days prior to the announcement date. The final sample consists of 31 announcements of directors becoming horizontal directors, and 200 announcements of directors becoming vertical directors.

In Table 1.5, we investigate abnormal returns around the announcement date of a director being appointed to the board of a peer firm using five alternative event windows ranging

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[12] In the analysis of the crisis sub-period, *Horizontal Board* and the control variables are measured as of December 2006, while ROA and Tobin's Q are the cumulative values the period 2007 to 2008. As the crisis may strongly affect both board structure and performance, using pre-crisis independent variables mitigates endogeneity concerns.

Table 1.5: Stock Performance upon Peer Director Announcements
The table reports mean cumulative abnormal returns (CARs) for the announcement of a director becoming a peer director through a board appointment at another firm across different event windows. A market model with an estimation period ranging from 300 to 46 days prior the announcement is used to calculate CARs. *Horizontal Directors* are directors who are announced to become directors at firms within the same four-digit SIC industry. *Vertical Directors* are directors who are announced to become directors at vertically related firms based on an I-O coefficient of at least 1%. The event windows are in trading days. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	CARs		
	Horizontal Directors		Vertical Directors
Event Window	(1)		(2)
[-1 to 1]	-0.023	**	0.004 **
	(2.18)		(2.14)
[-1 to 2]	-0.022	**	0.008 ***
	(2.09)		(3.08)
[-1 to 5]	-0.027	*	0.010 ***
	(1.70)		(2.68)
[-2 to 2]	-0.026	**	0.008 ***
	(2.52)		(3.00)
[-3 to 3]	-0.034	**	0.006 **
	(2.79)		(2.10)

from three to seven days. Column (1) reports mean CARs for firms with a director being appointed to the board of another, horizontally-related firm upon the announcement of this appointment. Consistent with our instrumental variables results, the announcement return is negative across all event windows. The mean CARs range from -2.3% for a three-day event window to -3.4% for the seven-day event window from t = -3 to t = 3 and are all statistically significant at the 10% level or better.[13] In Column (2), we report mean CARs around the announcement of a director being appointed to a vertically-related firm's board using alternative event windows. Consistent with our previous results, we find the announcement returns to be positive and significant across all event windows. The CARs range from 0.4% for the three-day window to 1.0% for the seven-day window from t = -1 to t = 5. Hence, if a director of a firm becomes a vertical director by being appointed to the board of a vertically related firm, this is perceived to be value increasing by the market.[14]

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[13] While our stock return reactions seem to be large, they are comparable in size to those found by Adams, Gray, and Nowland (2011) and Ferris, Jagannathan, and Pritchard (2003), who among others, investigate the stock return reaction upon the announcement of female directors and of directors with multiple directorships, respectively.

[14] In addition, we run cross-sectional tests regressing the cumulative abnormal returns on known return predictors, such as past profitability, market to book ratio, board busyness, and board independence. Our results remain unchanged when controlling for these return predictors.

Given that we examine the market reaction to an indirect event for firms with peer directors, the documented effects are unlikely to result from changes or endogenous selection taking place at the firm of study.[15] In fact, the same director stays at the same company and change only results from a second appointment to the board of a horizontally or vertically related company. Hence, our results suggest that investors account for horizontal directors being prone to conflicts of interest and vertical directors to increase firm performance due to better advising capabilities upon announcement of such a secondary appointment. Overall, the results in this section support our previous findings of horizontal directors destroying firm performance and vertical directors increasing firm performance.

1.4.2 Stock Price Reactions to Appointments of Future Peer Directors

Being a peer director may be correlated with omitted director-specific characteristics that are value relevant. For instance, it might be that only less (more) talented directors become horizontal (vertical) directors. Moreover, directors simultaneously holding directorships at vertical firms are more likely to have been employed in the upstream or downstream industries in the past. Having been exposed to peer industries in the past, increases directors' industry-specific knowledge and may thereby enhance firm performance (e.g., Drobetz et al., 2015; von Meyerinck et al., 2015).

To test for these alternative hypotheses, we analyze the announcement returns to the initial appointment of directors who will become peer directors by being appointed to the board of a peer firm sometime in the future. For instance, in the case of Frederic V. Salerno, who became a vertical director at Bear Stearns on April 30th, 2003, we investigate stock returns upon his appointment at Bear Stearns.[16] Accordingly, if our results are driven by time-invariant director characteristics such as education or talent and not by the shared directorship, we would expect to find negative (positive) director announcement returns for directors who become horizontal (vertical) directors sometime in the future. In contrast, if the horizontal or vertical directorship at a peer firm is driving our results, we would expect no significant announcement returns upon the first appointment which does not involve a peer firm directorship yet.[17] We determine director

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[15] An additional benefit of this indirect event study is that it also mitigates the effect of unobserved confounding events at the firm announcing the director.

[16] As explained in the last section, Frederic V. Salerno was appointed to the board of directors of Popular Inc. on April 30th, 2003, a company that is vertically-related to Bear Stearns.

[17] This test relies on the assumption that director characteristics are time-invariant. This is not necessarily true (e.g., experience). However, given that the average time period between the first and

Table 1.6: Stock Price Reactions to Appointments of Future Peer Directors

The table reports mean cumulative abnormal returns (CARs) around the announcements of appointments of directors who will become peer directors sometime in the future. We report six alternative event windows ranging from two to seven days. A market model with an estimation period ranging from 300 to 46 days prior the announcement is used to calculate CARs. *Future Horizontal Directors* are directors who will be appointed to the board of another firm within the same four-digit SIC industry sometime in the future. *Future Vertical Directors* are directors who will be appointed to the board of another firm in the upstream or downstream industries based on an I-O coefficient of at least 1% sometime in the future. The event windows are in trading days. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | CARs | |
| | Future Horizontal Directors | Future Vertical Directors |
Event Window	(1)	(2)
[-1 to 1]	0.010	0.000
	(0.75)	(0.04)
[-1 to 2]	0.003	0.002
	(0.30)	(0.17)
[-1 to 5]	0.002	-0.004
	(0.19)	(-0.42)
[-2 to 2]	0.003	0.002
	(0.18)	(0.19)
[-3 to 3]	0.010	0.006
	(0.42)	(0.48)

announcement dates using Factiva and 8-k statements over the period 2000 to 2011. Daily stock return data is obtained from CRSP. To compute CARs, we use a market model over an estimation period ranging from 300 to 46 days prior the announcement date.

In Table 1.6, we report the mean CARs around the announcements of appointments of directors who will become either horizontal (Column (1)) or vertical (Column (2)) peer directors sometime in the future using five alternative event windows ranging from three to seven days. In Column (1), we find positive, albeit insignificant, stock price reactions upon announcement of director appointments of future horizontal directors. In Column (2), we find that the announcement returns are mostly positive but again statistically insignificant across all time windows. In summary, the results in this section suggest that peer directors do not have any time-invariant value relevant characteristics which can explain our results.

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the second appointment is only two years for horizontal directors and three years for vertical directors, we believe that it is reasonable to assume that director characteristics do not change over this short horizon.

1.5 Horizontal Directors and Conflicts of Interest

Our results provide evidence that horizontal directors generate lower firm performance, whereas vertical directors lead to an increase in performance. While previous literature (e.g., Dass et al., 2014) shows that the positive influence of vertical directors is due to their industry expertise, we so far assumed that the negative influence of horizontal directors is due to conflicts of interest. To test this assumption, we conduct heterogeneous treatment tests.

1.5.1 Horizontal Directors and Conflicts of Interest at the Director Level

If directors' behavior is influenced by conflicts of interest, the magnitude of the negative effect should change according to how directors value their individual board seats (Masulis and Mobbs, 2014). When directors value one board seat more than the other, the negative effect should be less severe for the higher ranked board seat. Thus, we expect the impact of conflicts of interest to be smaller when directors have a higher ownership in one of the companies or have served for a longer time period on one of the boards. Moreover, we expect a more negative effect for male CEOs than for female CEOs as gender research shows that men are more prone to conflicts of interest than women (e.g., Self and Olivarez, 1993). In line with this reasoning, female directors increase public disclosure (Gul, Srindhi, and Ng, 2011), promote monitoring (Adams and Ferreira, 2009), and female CFOs are more conservative when making accounting decisions (Francis et al., 2014). In addition, Steffensmeier, Schwartz, and Roche (2013) observe that women are less likely to commit corporate fraud. Thus, women should have a less detrimental influence on firm performance if our results are due to conflicts of interest.

We perform 2SLS director-level regressions in which we test whether the negative valuation effect of horizontal directors is driven by their ownership, tenure, or gender.[18] For each director-company-year observation we construct a dummy variable which is one if the director is a horizontal director. We then interact this variable with indicator variables identifying the lower and upper observation of the within director-year distribution of tenure and ownership. In other words, we identify the lower and higher ownership stake (tenure) for each director comparing his horizontal directorships. For gender, we interact the horizontal director dummy with indicator variables identifying whether the director is male or female. For tenure and ownership we use the same

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[18] Ownership is the fraction of shares held by the director divided by the total number of shares outstanding. Tenure is the number of years the director has served on the board of the firm.

Table 1.7: Horizontal Directors and Conflicts of Interest
The table reports estimates from 2SLS director-level regressions of ROA and Tobin's Q on horizontal director dummies interacted with indicator variables identifying directors' relative tenure and ownership across directorships as well as their gender. The horizontal director dummies are equal to one if directors hold more than one board seat in the same four-digit SIC industry. *Higher Ownership* (*Longer Tenure*) is a dummy variable which is equal to one if the horizontal director has a higher proportional *Ownership* (*Longer Tenure*) in this firm versus all other firms in which he serves as a horizontal director in the year. *Lower Ownership* (*Shorter Tenure*) is a dummy variable equal to one if the horizontal director has a lower proportional ownership (shorter tenure) in this firm versus one other firm in which he serves as a horizontal director in the year. *Female* (*Male*) is a dummy variable which is equal to one if the horizontal director is female (male). The interaction terms in Panels A and B are instrumented using *Supply Horizontal Board* and *Median Horizontal Board*. The instruments for Panel C are adjusted by directors' gender. Each column in each panel represents a separate regression. All regressions include the full set of financial and governance controls in which the board controls are replaced by the corresponding variable at the director level. The t-values are based on robust standard errors clustered at the director level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. Definitions of all variables are provided in Appendix 1.A.

	ROA		Tobin's Q	
	(1)		(2)	
Panel A: Ownership				
Higher Ownership	1.866	***	6.761	***
	(3.86)		(2.94)	
Lower Ownership	-0.266	***	-3.172	***
	(-4.04)		(-5.24)	
Controls	yes		yes	
Year and Industry Dummies	yes		yes	
Panel B: Tenure				
Longer Tenure	2.539	**	9.562	
	(2.05)		(1.53)	
Shorter Tenure	-3.586	**	-18.253	**
	(-2.23)		(-2.18)	
Controls	yes		yes	
Year and Industry Dummies	yes		yes	
Panel C: Gender				
Female	0.441		-1.521	
	(0.80)		(-0.33)	
Male	-0.213	***	-2.941	***
	(-4.07)		(-5.43)	
Controls	yes		yes	
Year and Industry Dummies	yes		yes	

instruments as in our main analyses. For gender, we include the supply of female and male horizontal directors and the median ratio of female and male horizontal directors as instruments. We use the same control variables as in Table 1.2 but replace *Indep. Board*, *Board Busyness*, *Female Board*, and *Board Age* with the director specific variables. Standard errors are clustered on the director level.

Table 1.7 presents the results of the director-level heterogeneous treatment tests. We find that the negative valuation and profitability effect of horizontal directors is driven by those directorships with lower ownership and shorter board tenure, whereas horizontal directors with higher ownership and longer board tenure enhance firm profitability and value. Moreover, we find that the negative relation between horizontal directors and ROA and between horizontal directors and Tobin's Q is restricted to male horizontal directors. These results suggest that the negative influence of horizontal directors is driven by conflicts of interest.

1.5.2   Conflicts of Interest at the Firm Level

In addition to director-specific characteristics, we expect director behavior to be influenced by differences in firm characteristics. Specifically, we expect horizontal directors to give preference to larger firms, less risky firms, and firms with smaller information asymmetry as this type of firm is expected to be more lucrative (Bebchuk and Grinstein, 2005; Fernandes et al., 2012), safer, and easier to monitor. To test whether the impact of horizontal directors depends on firm characteristics, we split our sample firms into two groups based on whether they are above or below the sample median of firm size, risk, and information asymmetry. We define firm risk as the standard deviation of daily stock returns over the year. We use two measures for information asymmetry: the bid-ask spread and the probability of informed trades (PIN). The bid-ask spread is the average daily bid-ask spread over the year. We obtain stock return and bid and ask data from CRSP. PIN is the probability of a privately informed investor to execute a particular trade which is more likely in firms with higher information asymmetries (Brown et al., 2004). We retrieve the variable PIN from Stephen Brown's webpage.[19] For each group we run 2SLS regressions using the same control variables and instruments as in Table 1.3.

The results in Table 1.8 show that the negative valuation and profitability effect stems from horizontal directors serving at smaller firms. This finding is consistent with the notion that directors rank their directorships higher with increasing firm size (Masulis and Mobbs, 2014). It provides further support for the hypothesis that conflicts of interest drive the results. Further and consistent with our expectations, the results indicate that the negative impact of horizontal directors on ROA and Tobin's Q is more pronounced for risky firms and firms with a higher information asymmetry.

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[19] http://scholar.rhsmith.umd.edu/sbrown/pin-data?destination=node/998

Table 1.8: Horizontal Directors and Firm Sub-Samples
The table reports the results from 2SLS regressions of ROA and Tobin's Q on *Horizontal Board* for different sub-samples. *Horizontal Board* is instrumented with *Supply Horizontal Board* and *Median Horizontal Board*. For brevity, we only report the coefficients of the horizontal directors' variables. Each coefficient represents a separate regression. We split the sample into two groups based on the sample median of their firm size, firm risk, bid-ask spread, and probability of informed trades (PIN). *Firm Risk* is the standard deviation of daily stock returns over the year. The *Bid-Ask Spread* is the average daily bid-ask spread over the year. *PIN* is defined as the probability of a privately informed investor to execute a particular trade. All regressions include the full set of financial and governance controls and year and industry dummies. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Lower				Higher			
	(1)		(2)		(3)		(4)	
	ROA		Tobin's Q		ROA		Tobin's Q	
Firm Size	-0.552	***	-2.695	**	-0.100		1.271	
	(-3.20)		(-2.03)		(-1.42)		(1.54)	
Firm Risk	-0.235	***	1.484	*	-0.485	***	-1.773	*
	(-2.90)		(1.71)		(-3.40)		(-1.81)	
Bid Ask Spread	-0.328	***	0.881		-0.573	***	-2.637	**
	(-3.07)		(1.25)		(-3.34)		(-2.28)	
PIN	-0.372	***	0.635		-0.492	***	-1.830	*
	(-3.60)		(0.88)		(-2.90)		(-1.69)	

1.6   Conclusion

In this paper we study the influence of directors holding outside directorships at peer firms on firm value and profitability of S&P 1500 financial firms over the period 2000 to 2011. Using the exemption of financial firms from Section 8 of the Clayton Antitrust Act and applying instrumental variable regressions to mitigate endogeneity concerns, we find that horizontal directors have a negative impact on firm value and profitability. In contrast, vertical directors improve firm value and profitability. Moreover, we find that the closer the ties between upstream and downstream industries, the greater the impact of vertical directors on firm value and profitability. We find no significant impact of directors holding outside directorships in other financial firms that are neither horizontally nor vertically related.

Our results support the idea that experience in and knowledge of peer firms enhances advising and monitoring capabilities as long as conflicts of interest are limited. We corroborate our panel data results using event study analysis. Specifically, we analyze the stock market reaction upon the announcement of a director being appointed to the board of an either horizontally or vertically integrated peer firm. We find negative and significant announcement returns upon a director being appointed to the board of a horizontally-related firm. Given that we determine market reactions to an indirect event, our results suggest that investors take into account horizontal directors' conflicts of

interest. When, however, directors are appointed to vertically-related firms, we find positive stock reactions, indicating that investors take into account vertical directors' enhanced ability to advice managers. Finally, to ensure that time-invariant director characteristics do not drive our results, we analyze the announcement returns to the original director appointment of directors who will become peer directors at some time in the future. We find the announcement returns to the appointment of directors who will become horizontal or vertical directors to be insignificant across all specifications suggesting that time-invariant director characteristics are unlikely to explain our results.

Consistent with conflicts of interest driving the negative performance effect of horizontal directors, we find the negative relation between horizontal directors and performance to be restricted to directors holding relatively smaller equity stakes in their firms, directors having relatively shorter tenure, and male horizontal directors. Moreover, the negative valuation effect is more pronounced for horizontal directors serving on the board of smaller firms, more risky firms, and firms with a higher information asymmetry. Whereas existing literature shows that firms benefit if directors have past industry experience or serve on the board of a customer or supplier, our paper shows that directors with simultaneous duties at direct peers reduce firm value and performance due to conflicts of interest.

1.7 Appendix 1.A

Panel A: Proportional Measures of Director Affiliations	
Horizontal Board	Fraction of directors on the board who hold an outside directorship within the same four-digit SIC industry.
Vertical Board	Fraction of directors on the board who hold an outside directorship at a vertically related firm with an I-O coefficient of at least 1%.
Other Board	Fraction of directors on the board who hold an outside directorship at another firm which is neither horizontally nor vertically related.

Panel B: Financial Characteristics	
ROA	Net income divided by the book value of total assets.
Tobin's Q	Firm's market value to its book value of assets.
Firm Size	Natural logarithm of the book value of total assets.
Leverage	Book value of debt to the book value of assets.
Market to Book	Natural logarithm of the market value divided by the book value of equity.

Panel C: Governance Characteristics	
Board Size	Natural logarithm of the total number of directors on the board.
Indep. Board	Fraction of independent directors (NYSE guidelines) on the board.
CEO Duality	Dummy variable that equals one if the CEO is also the chairman of the board.
Board Busyness	Fraction of directors on the board, who hold three or more outside directorships.
Female Board	Fraction of female directors on the board.
Board Age	Mean age of the directors on the board.

Panel D: Instrumental Variables	
Supply Horizontal Board	Ratio of the total number of horizontal directors based on four-digit SIC codes to the total number of all financial directors.
Supply Vertical Board	Ratio of the total number of vertical directors based on an I-O coefficient of 1% to the total number of all financial directors.
Supply Other Board	Ratio of the total number of other financial directors to the total number of all financial directors.
Median Horizontal Board	Median of *Horizontal Board* across all other firms within the same three-digit SIC industry.
Median Vertical Board	Median of *Vertical Board* across all other firms within the same three-digit SIC industry.
Median Other Board	Median of *Other Board* across all other firms within the same three-digit SIC industry.
Distance to Horizontal Firms	Natural Logarithm of the distance in km to all other horizontal firms based on four-digit SIC codes.
Distance to Vertical Firms	Natural Logarithm of the distance in km to all other vertical firms with an I-O coefficient of at least 1%.

Panel E: Heterogeneous Treatment	
Ownership	Fraction of shares held by the director divided by the total number of shares outstanding.
Tenure	Number of years the director has served on the board.
Gender	Female (Male) dummy variable that equals one if the director is female (male).
Firm Risk	Standard deviation of daily stock returns over the year.
Bid Ask Spread	Daily average bid-ask spread over the year.
PIN	The probability of a privately informed investor to execute a particular trade which is more likely in firms with higher information asymmetries.

Chapter 2

Supply-Chain Experience: Evidence on M&As

Tatjana Berg

Abstract

In this paper, I examine how directors with supply-chain experience affect acquirer merger and acquisition (M&A) outcomes. I find that acquirers with directors holding simultaneous directorships at firms in supply-chain industries experience higher stock return reactions when announcing supply-chain transactions. The improvement stems from the ability of acquirers with supply-chain-experienced directors to capture a larger fraction of the synergy gains, exhibit higher long-term performance, pay lower price premiums, and hire fewer additional external financial advisors in supply-chain transactions. The results suggest that supply-chain experience enhances directors' ability to identify suitable targets and reduce the costs of the deal, thereby achieving better supply-chain acquisitions.

2.1 Introduction

Mergers and acquisitions (M&As) are generally the largest investments firms can undertake, and yet, on average, acquirers' announcement returns are zero or negative (DeYoung, Evanoff, and Molyneux, 2009; Minnick, Unal, and Yang, 2011). One of the key players in M&As is the board of directors as it is tasked with approving proposed transactions, designing negotiation and integration strategies, reviewing the terms of the deal, and determining whether the transaction is in line with shareholder interests (Byrd and Hickman, 1992; Subrahmanyam, Rangan, and Rosenstein, 1997; Masulis, Wang, and Xie, 2007). However, tight deadlines and a surfeit of information can make M&A decisions difficult. The question arises as to whether certain characteristics of directors might help overcome these difficulties. In this study, I examine the effect of directors gaining supply-chain expertise by holding outside directorships at firms in the upstream or downstream industries on acquirer supply-chain transaction outcomes.

The importance of industry experience has only recently received attention in the literature. For instance, Faleye, Hoitash, and Hoitash (2013) and Drobetz et al. (2015) analyze the relation between directors with past industry experience and firm performance. They observe that directors with past industry experience increase performance by decreasing investment cash flows, avoiding investment distortions (Drobetz et al., 2015), and facilitating corporate innovations (Faleye, Hoitash, and Hoitash, 2013). With regard to the effect of industry experience on M&As, recent literature finds that having CEOs (Custódio and Metzger, 2013) and directors (Kroll, Walter, and Wright, 2008) with past work experience in the target's firm industry are positively related to acquirers' stock returns, as industry knowledge enhances their negotiation skills (Custódio and Metzger, 2013).

Increased knowledge and understanding of the relevant industries may help directors evaluate deals both more accurately and efficiently, thereby enhancing their decisions with respect to M&As (Kroll, Walters, and Wright, 2008). Directors holding outside directorships in firms in the upstream or downstream industry bring valuable knowledge from their own industry, learn from the related industry, and have a better comprehension of the overall supply-chain interrelation. Increased knowledge and a better understanding of the relevant industries may improve directors' acquisition decisions and, hence, acquisition performance in two ways. First, supply-chain expertise may refine directors' ability to screen potential targets in that they may be able to differentiate between value-enhancing and value-diminishing transactions. Accordingly, they may be able to identify and pursue more appropriate targets. Second, supply-chain expertise may enhance

directors' ability to negotiate better deal terms and may obviate the need for external financial advisors.

In this study, I examine the effect of directors holding simultaneously directorships at firms that are in the upstream or downstream industry[20] (also referred to as vertical directors) on acquirer announcement returns in supply-chain transactions using all U.S. S&P 1500 financial firms that acquired U.S. financial public, private, or subsidiary targets between January 1, 2000 and December 31, 2011. Between 2000 and 2011, U.S. financial acquirers announced 2,826 transactions involving financial targets, with a total worth more than $1.3 trillion and accounting for 20% of the total value of all M&As in the United States.[21] Yet, even though transactions in the financial industry are a substantial proportion of total M&As, research often omits the financial industry (e.g., Huang and Kisgen, 2013; Bena and Li, 2014) or does not differentiate between financial and other firms (e.g., Cai and Sevilir, 2012; Custódio and Metzger, 2013). However, the relevance of the financial industry to the economic system and certain of its characteristics, such as stronger regulations and opaqueness (Levine, 2004), make its governance structures unique (Adams, 2012; Erkens, Hung, and Matos, 2012). Further, the high information asymmetry (De Andres and Vallelado, 2008) and complexity (Adams, 2012) of financial institutions demand highly skilled and knowledgeable boards of directors (Masulis et al., 2012).

Consistent with the notion that supply-chain expertise enhances directors' acquisition decision making, I find that announcement returns for supply-chain transactions are significantly higher for acquirers employing vertical directors. In economic terms, a one standard deviation increase in the proportion of vertical directors is associated with a 0.3% increase in acquirer's abnormal returns when acquiring a vertically-related firm. Considering the average firm, this means a shareholder gain of around $47 million. The results are robust to alternative definitions, alternative time windows, and an extensive set of control variables.

The interpretation of my results may be biased by the endogeneity of board composition (Hermalin and Weisbach, 1998). I use two methods to mitigate these concerns. First, I use two-stage least squares regressions in which I instrument vertical directors with the industry's custom of employing vertical directors and the supply of vertical directors. Second, I control for board-firm fixed effects by restricting the sample to acquirers making at least two acquisitions with the same board of directors. This allows me to

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[20] In my sample, no vertical director simultaneously serves on the board of the target firm.

[21] The data encompass transactions for all U.S. financial firms with SIC codes 6000 to 6999 covered in the Thomson One database. Almost 50% did not disclose their deal value.

account for unobservable time-invariant firm, board, and director heterogeneity. Even when controlling for board fixed effects, it is still possible that the outperforming board is just simply better at conducting transactions. Therefore, I further restrict the sample to acquirers that engage in at least one supply-chain transaction and one other transaction. My results are robust to these alternative methods and I find that directors with supply-chain experience enhance acquirers' announcement returns when conducting vertical transactions.

Next, I investigate the channels through which vertical directors influence acquirer returns in supply-chain transactions. I find that acquirers employing vertical directors conduct fewer supply-chain transactions, but that the transactions they do undertake generate higher synergy gains and higher long-term operating performance. This suggests that directors with supply-chain experience have a better understanding of the firm's supply chain and hence are better at avoiding value-diminishing transactions and instead seek value-enhancing transactions. Moreover, I provide evidence that acquirers employing vertical directors pay relatively lower price premiums for vertically-related targets, indicating that vertical directors are able to estimate the value of the target and synergy gains more accurately and negotiate more favorable terms. Finally, I find that acquirers with vertical directors pay lower advisory fees and are less likely to employ additional external financial advisors, implying that directors' supply-chain expertise decreases the necessity for external advisors.

The paper makes several contributions to the corporate finance literature. First, the results provide an additional explanation of how experience enhances firm performance. Prior literature shows that industry expertise of board directors (e.g., Masulis et al., 2012; Minton, Taillard, and Williamson, 2014; Drobetz et al., 2015), financial expertise of board directors (e.g., Guener, Malmedier, and Tate, 2008), industry expertise of CEOs (e.g., Custódio and Metzger, 2014), and expertise of financial advisors (Wang, Xie, and Zhang, 2014) influence firm outcomes and strategies. For instance, Dass et al. (2014) analyze the effect on firm performance of directors with supply-chain experience. They find that these directors increase firm performance due to their ability to cope with industry shocks and reduce the cash-conversion cycle. My findings extend these findings by providing an additional explanation of how directors with supply-chain experience enhance firm performance.

Second, my results provide new evidence on the determinants of M&A success. Previous literature finds that, among other things, anti-takeover provisions (e.g., Masulis, Wang, and Xie, 2007), director experience in the target industry (e.g., Kroll, Walters, and Wright, 2008), social ties between the bidding firm and the target (e.g., Ishii and Xuan,

2014), director gender (Levi, Li, and Zhang, 2014), multiple directorships (Ahn, Jiraporn, and Kim, 2010), CEOs with experience in the target's industry (Custódio and Metzger, 2013), and interlocked boards (Cai and Sevilir, 2012) affect acquisition behavior and transaction outcomes. I contribute to this literature stream by providing evidence of how a different director characteristic, namely director's supply-chain expertise influences acquirer transaction outcomes.

The rest of the paper is organized as follows. In Section 2.2, I describe the sample and variable construction. In Section 2.3, I examine the relation between vertical directors and acquirer returns. In Section 2.4, I determine the channels through which this relationship manifests. I perform heterogeneous treatment effects and analyze the main results for subsamples in Section 2.5 before drawing a conclusion in Section 2.6.

2.2   Data and Variables

2.2.1   Sample Construction

I extract director characteristics such as name, age, gender, independence, and number of outside directorships for all U.S. S&P 1500 financial firms with Standard Industry Classification (SIC) codes between 6000 and 6999 over the period 2000 to 2011 from Risk Metrics and ExecuComp. I manually supplement missing data from the firms' proxy statements and 10-k statements. Additionally, I hand-collect the director's tenure and whether the CEO is also the firm's chairman. To determine which directors simultaneously hold directorships at firms in the supply-chain industries, I manually reconcile different spellings and abbreviations of director names and their birthdates using Bloomberg Business Week and firms' proxy statements. Directors are deemed to be the same person if their first names, middle names, last names, generation extensions, and birthdates are identical.

I match these firms with Compustat to obtain accounting and financial data. Next, I retrieve M&A data from the Thomson One Banker database for deals announced between January 1, 2000 and December 31, 2011. Both successful and non-successful transactions in the form of a merger or an acquisition of majority interests are included. Acquirer firms are U.S. public financial firms, and targets are U.S. public, private, or subsidiary financial firms. Following Golubov, Petmezas, and Travlos (2012), I restrict the sample to deals that are worth at least $1 million and the acquirer has to own less than 50% prior to and more than 50% after the transaction (Wang, Xie, and Zhang, 2014). I then extract daily stock return data from CRSP.

To determine supply-chain relationships between the firms in the financial industry, I retrieve the Use Tables of the Benchmark Input-Output (I-O) data, which is published by

the Bureau of Economic Analysis[22] every five years. For the years 2000 and 2001, I use the Use Table of 1997, for the period 2002 to 2007, I employ the Use Table of 2002, and for the period 2007 to 2011, I use the Use Table of 2007. The I-O tables provide information on how the U.S. industries interact. Specifically, they report for each industry the value of inputs that come from, and the value of outputs that go, to every other industry. For instance, the life insurance industry (SIC industry 6311) purchased 2% of its total inputs from, and sold 7% of its total outputs to, the insurance agents and brokers industry (SIC industry 6411) in 2007. I then compute an I-O coefficient between industries by taking the sum of the fraction of inputs and the fraction of outputs for every pair of industries. Consequently, the I-O coefficient for the life insurance industry with respect to the insurance agents and brokers industry adds up to 9%. I define industries to be vertically related if their I-O coefficient exceeds 5%. In robustness checks, I use I-O coefficients of 10% and 1% as alternative thresholds.[23]

2.2.2   Supply Chain Measures

A vertical director is a director who simultaneously serves on the board of a firm in the supply-chain industry based on an I-O coefficient of at least 5%. For instance, Barrett A. Toan held directorships at both Genworth Fiancial Inc., which is active in the life insurance industry, and at Express Scripts Holding, which is active in the insurance agents and brokers industry. As both firms' industries have I-O coefficients exceeding 5% to each other, they are vertically related and hence Barrett A. Toan is a vertical director at both firms. For my analysis, I define *Vertical Directors* as the fraction of vertical directors on the board. Alternatively, I construct an indicator variable that takes the value of one if the board has at least one vertical director based on an I-O coefficient of at least 5% (*Vertical Directors Dummy*). Moreover, to ensure that my results are not driven by the specific I-O threshold, I generate *Vertical Directors 10%*, which is the fraction of vertical directors based on an I-O coefficient of at least 10%, and *Vertical Directors 1%*, which is the fraction of vertical directors based on an I-O coefficient of at least 1%.

I construct the variable *Vertical Deal* to determine supply-chain transactions. *Vertical Deal* is a dummy variable taking the value of one if the target is vertically related to the acquirer based on an I-O coefficient of at least 5%. Consistent with the vertical director

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[22] http://www. bea.gov/index.htm

[23] As the I-O coefficients are unique for each industry to every other industry, a different I-O coefficient is calculated for the insurance agents and brokers industry. Specifically, in 2007, the insurance agents and brokers industry purchased 62% of its total inputs from, and sold 1% of its total outputs to, the life insurance industry. Consequently, the I-O coefficient of the insurance agents and brokers industry amounts to 63%.

variables, I construct *Vertical Deal 10%* and *Vertical Deal 1%*, which are indicator variables taking the value of one if the target and the acquirer are vertically related based on an I-O coefficient of at least 10% and 1%, respectively.

2.2.3 Outcome Variables

The main dependent variable is the acquirer abnormal stock return around the deal announcement. I first estimate the market model for each acquirer over an estimation window starting 220 and ending 46 days before the announcement date. The benchmark return is the value-weighted financial industry return, which I obtain from the Fama-French 48 Industry Portfolios.[24] I then use the estimated parameters to compute the cumulative abnormal returns (CARs) over a five-day event window starting two days before and ending two days after the deal announcement (e.g., Masulis, Wang, and Xie, 2007; Ahn, Jiraporn, and Kim, 2010; Cai and Sevilir, 2012). In robustness checks, I alternatively determine CARs over three-day [–1, +1], seven-day [–3, +3], and 26-day [–5, +20] event windows.

To determine whether vertical directors affect the target selection, I construct three variables: *Vertical Bid Initiations*, *Synergy Gains*, and *Change in ROA*. To compute *Vertical Bid Initiations*, which is a dummy variable taking the value of one if the firm conducted at least one supply-chain transaction in a year, my sample includes all firm-years irrespective of whether the firm engaged in an M&A (e.g., Renneboog and Zhao, 2014). I define *Synergy Gains* as the acquirer dollar-denominated gain divided by the positive total synergy gains and one minus the acquirer dollar-denominated gain by the negative total synergy gains. Total synergy gains is the sum of the acquirer's and target's dollar-denominated gain with the dollar-denominated gain being the product of the respective firm's market capitalization four weeks before the deal announcement and its five-day CARs around the announcement date (Kale, Kini, and Ryan, 2003). To measure *Synergy Gains*, my sample is restricted to public targets. Finally, I measure acquirers change in long-term operating performance around the deal announcement (*Change in ROA*) as the change in industry-adjusted return on assets (ROA) for three years before the deal announcement to three years after the deal announcement (e.g., Wu, 2011). ROA is defined as net income over the book value of total assets. To obtain industry-adjusted ROA, I subtract the median ROA in the firm's industry (based on four-digit SIC codes) from the firm's ROA for each year starting three years before the deal announcement and ending three years after the deal announcement. I then calculate the *Change in ROA* as the difference between the average three-year after the deal announcement industry-

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[24] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Breakpoints

adjusted ROA and the average three-year before the deal announcement industry-adjusted ROA.

The next set of outcome variables are proxies for the costs of the deal with respect to the price premium and external financial advisory services. The price premium is defined as the final price offered by the acquirer divided by the target's stock price one week (*Price Premium 1 Week*) or one month (*Price Premium 1 Month*) before the deal announcement (Wang, Xie, and Zhang, 2014). As I need targets' stock prices to compute the price premium, the sample is restricted to public targets. I construct two proxies for the acquirer's need for external financial advisors: *No. of Advisors* and *Advisory Fees*.[25] *No. of Advisors* is the total number of external financial advisors employed by the acquirer. *Advisory Fees* is measured as the fraction of the total dollar value of external financial advisory fees paid by the acquirer relative to the deal value (e.g., Cai and Sevilir, 2012).

2.2.4 Control Variables

I construct a set of deal characteristic variables that extant research has found to be related to acquirer announcement returns. Specifically, I include *Cash Deal* (e.g., Myers and Majluf, 1984), *Stock Deal* (e.g., Travlos, 1987), *Relative Deal Size* (e.g., Asquith, Bruner, and Mullins, 1983; Moeller, Schlingemann, and Stulz, 2004), *Public Deal*, *Private Deal* (Fuller, Netter, and Stegemoller, 2002), and *Friendly Deal*. Taking my cue from the literature, in regard to acquirer financial characteristics, I control for *Tobin's Q* (e.g., Jovanovic and Rousseau, 2002), *Firm Size* (e.g., Moeller, Schlingemann, and Stulz, 2004; Schmid and Walter, 2009), and *Leverage* (e.g., Maloney, McCormick, and Mitchell, 1993; Schmid and Walter, 2009). In addition to acquirer financial characteristics, I account for acquirer governance characteristics including *Board Size* (e.g., Yermack, 1996), *Independent Board* (e.g., Subrahmanyam, Rangan, and Rosenstein, 1997), *CEO Duality* (e.g., Masulis, Wang, and Xie, 2007), *Busy Board* (e.g., Ahn, Jiraporn, and Kim, 2010), *Female Board* (e.g., Levi, Li, and Zhang, 2014), *Board Tenure* (Ahn, Jiraporn. and Kim, 2010), and *Board Age* (Minnick, Unal, and Yang, 2011). Definitions of all variables can be found in Appendix 2.A.

2.2.5 Summary Statistics

My final sample includes 818 M&A announcements made by 272 financial firms between January 1, 2000 and December 31, 2011. Table 2.1 presents the distribution of M&As by announcement year. The statistics closely parallel trends found in other studies (e.g., Ghosh and Petrova, 2013). The sharp drop in merger activity in 2008 and 2009 is a

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[25] I retrieve data on external financial advisors from Thomson One Banker.

Table 2.1: Sample Distribution
The table provides the sample distribution of all transactions, vertical transactions, horizontal transactions, public transactions, and private transactions over time and the fraction of each subsample to the total number of M&As. The sample includes U.S. S&P 1500 financial acquirer firms and U.S. financial public, private, or subsidiary target firms. *Vertical Deals* are supply-chain transactions based on an I-O coefficient of at least 5%, *Horizontal Deals* are deals in which the acquirer and the target firm are within the same four-digit SIC industry, *Public Target* indicates transactions in which the target is a publicly traded firm, and *Private Target* indicates that the target firm is privately held.

Year	All M&As	Vertical Deals		Horizontal Deals		Public Target		Private Target	
		No.	%	No.	%	No.	%	No.	%
2000	86	27	31	47	55	49	57	24	28
2001	74	21	28	46	62	34	46	28	38
2002	48	16	33	28	58	23	48	15	31
2003	79	28	35	44	56	38	48	25	32
2004	73	22	30	49	67	33	45	27	37
2005	77	29	38	43	56	21	27	41	53
2006	97	44	45	47	48	30	31	48	49
2007	92	43	47	45	49	37	40	37	40
2008	38	15	39	21	55	7	18	14	37
2009	22	13	59	8	36	4	18	5	23
2010	60	46	77	12	20	14	23	33	55
2011	72	55	76	16	22	13	18	27	38
Total	818	359	44	406	50	303	37	324	40

consequence of the financial crisis (Ghosh and Petrova, 2013), which is typical crisis behavior (James and Wier, 1987). Between 2000 and 2005, around one-third of the deals are vertically-related transactions. From 2004 onward, the fraction of vertical deals increases and in 2011, three-quarters of the targets are vertically related to the acquirer. In contrast, the fraction of horizontal deals decreases from 2004 onward: more than half of the transactions were horizontal in 2000, but only 22% of all transactions were horizontally related in 2011. Moreover, between 2000 and 2011, the fraction of public targets decreased from 57% to 18% and the fraction of private targets increased from 28% to 38%. These numbers reveal that vertical transactions and private targets became more popular over time.

Table 2.2 reports summary statistics of acquirer and deal characteristics. Panel A of Table 2.2 provides descriptive statistics for board characteristics. On average, there are 1.4% vertical directors on the board and 13% of the acquirers employ at least one vertical director based on an I-O coefficient of at least 5%. Similarly, Dass et al. (2014) find that 2.3% of the directors on the board are vertical directors and 17% employ at least one vertical director using an I-O cutoff of 5%. Under alternative cutoffs, 4.1% and 0.9% of the directors on the board are supply-chain directors based on I-O coefficients of at least 1% and 10%, respectively. In line with extant research, there are on average 12 directors

Table 2.2: Summary Statistics
The table provides descriptive statistics for a sample of financial (SIC codes 6000 to 6699) U.S. public, private, and subsidiary M&As announced over the period January 1, 2000 to December 31, 2011. Panel A reports summary statistics for the acquirer firms' board characteristics. Panel B shows descriptive statistics for the acquirer firms' financial characteristics. Panel C describes the same statistics for the deal characteristics. Definitions of all variables can be found in Appendix 2.A.

	Mean	Min	Median	Max	Std. Dev.	Obs.
Panel A: Acquirer Board Characteristics						
Vertical Directors	0.014	0.000	0.000	0.308	0.040	818
Vertical Directors Dummy	0.131	0.000	0.000	1.000	0.337	818
Vertical Directors 10%	0.009	0.000	0.000	0.308	0.033	818
Vertical Directors 1%	0.041	0.000	0.000	0.571	0.076	818
Board Size	12.488	5.000	12.000	30.000	3.991	818
CEO Duality	0.553	0.000	1.000	1.000	0.497	799
Independent Board	0.830	0.000	0.857	1.000	0.103	818
Busy Board	0.058	0.000	0.000	0.545	0.111	818
Board Tenure	6.389	0.000	6.134	22.813	4.033	818
Female Board	0.098	0.000	0.091	0.444	0.082	818
Board Age	61.253	47.000	61.400	75.750	3.867	818
Panel B: Acquirer Financial Characteristics						
CAR [-2 to 2]	-0.002	-0.046	-0.003	0.044	0.027	818
Tobin's Q	1.285	0.932	1.123	3.910	0.459	817
Size	9.353	5.696	8.986	14.598	1.777	818
Leverage	0.807	0.172	0.893	0.981	0.153	817
Change in ROA	-0.013	-0.715	-0.000	0.498	0.093	514
Vertical Bid Initiations	0.162	0.000	0.000	8.000	0.525	2,154
No of Advisors	1.212	0.000	1.000	6.000	0.689	319
Advisory Fees	0.006	0.000	0.005	0.015	0.004	43
Panel C: Deal Characteristics						
Cash Deal	0.257	0.000	0.000	1.000	0.437	818
Stock Deal	0.215	0.000	0.000	1.000	0.411	818
Relative Deal Size	0.039	0.000	0.013	0.573	0.079	818
Price Premium 1 Week	1.278	0.178	1.239	3.174	0.312	236
Price Premium 4 Weeks	1.311	0.179	1.260	3.251	0.349	233
Synergy Gain	-2.124	-113.879	-0.880	1.234	8.656	207

on the board (Minton, Taillard, and Williamson, 2014), of which, on average, 83% are independent (Erkens, Hung, and Matos, 2012), 6% are busy (Aebi, Sabato, and Schmid, 2012), and 10% are female (Pathan and Faff, 2013). The average director is 61 years old and has been on the board for around six years. Finally, around 55% of the firms have a CEO who is also the chairman of the board.

Panel B of Table 2.2 sets out acquirer characteristics. The average firm has a mean (median) Tobin's Q of 1.285 (1.123). This is similar to the average Tobin's Q of 1.213 for U.S. banks found by DeAndres and Vallelado (2008). The results indicate that the average (median) acquirer has assets worth of $7,997 million ($799 million) and a leverage ratio of 81% (89%). On average, between 2000 and 2011, 16% of all firms announced the acquisition of a vertically-related target firm. The acquirers employ, on average, one external financial advisor and pay an advisory fee of 0.6% relative to the

deal value. This figure is in accordance with Cai and Sevilir (2012) and Golubov, Petmezas, and Travlos (2012), who find that acquirers pay on average a fee of 0.62% and 0.65% of deal value, respectively.

Descriptive statistics of the deal characteristics are set out in Panel C of Table 2.2. On average, 26% of the deals are paid for entirely in cash and 22% are paid for entirely with stock. The average deal value is 4% of the acquirer's total market capitalization 20 days prior to the announcement date. The mean acquirer offers a price premium of 27% and 31% on the target's stock price one week and four weeks prior to the deal announcement, respectively.

2.3 Vertical Directors, Vertical Deals, and Acquirer Returns

2.3.1 Main Results

To investigate how directors with supply-chain expertise influence acquirer abnormal stock returns upon the announcement of a supply-chain transaction, I use the following specification:

$$CARs_i = \beta_0 + \beta_1 Vertical\ Directors_i * Vertical\ Deal_i + \beta_2 Vertical\ Directors_i + \beta_3 Vertical\ Deal_i + \beta_4 Gov_i + \beta_5 Fin_i + \beta_6 Deal_i + \varepsilon_i,$$

where *CARs* is the announcement return of acquisition *i* over a five-day event window. My key independent variable is the interaction of *Vertical Directors* and *Vertical Deal* and indicates the fraction of vertical directors on the acquirer's board involved in supply-chain M&As. To evaluate the overall effect of vertical directors and vertical transactions on acquirer announcement returns, I also separately control for *Vertical Directors* and *Vertical Deal*. *Gov* denotes the governance characteristics of the acquirer in the year of the announcement and includes *Board Size*, *CEO Duality*, *Independent Board*, *Busy Board*, *Board Tenure*, *Board Age*, and *Female Board*. With regard to acquirers' financial characteristics (*Fin*), I control for *Tobin's Q*, *Size*, and *Leverage*. *Deal* stands for the deal characteristics and includes *Horizontal Deal*, *Cash Deal*, *Stock Deal*, *Relative Deal Size*, *Private Target*, *Public Target*, and *Friendly Deal*. Finally, I include year and industry dummies to control for potential systematic differences in time or industry, where the industry dummies are defined using the Fama-French 48 industries (Fama and French, 1997). The standard errors are adjusted for heteroscedasticity and are clustered at the acquirer level.

Table 2.3 shows my main results. Since the main focus rests on the relation between vertical directors and acquirer CARs in vertical transactions, in Column (1) I estimate

Table 2.3: Vertical Directors, Vertical Deals, and Acquirer CARs

The table reports OLS regression results of acquirers' five-day CARs. *Vertical Directors* and *Vertical Deal* are determined based on an I-O coefficient of at least 5%. All regressions include Fama and French 48 industry dummies and year dummies. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Definitions of all variables can be found in Appendix 2.A.

	(1)		(2)		(3)		(4)	
					CARs			
Vertical Directors * Vertical Deal	0.099	**	0.107	**	0.100	**	0.107	**
	(2.06)		(2.45)		(2.22)		(2.36)	
Vertical Deal	0.003		0.003		0.002		0.003	
	(1.59)		(0.55)		(0.51)		(0.66)	
Vertical Directors	-0.015		-0.057	*	-0.051	*	-0.063	**
	(-0.47)		(-1.96)		(-1.69)		(-2.21)	
Horizontal Deal			0.005		0.004		0.004	
			(0.92)		(0.90)		(0.91)	
Cash Deal			0.003		0.003		0.003	
			(1.34)		(1.33)		(1.16)	
Stock Deal			-0.001		-0.001		0.001	
			(-0.05)		(-0.03)		(0.06)	
Relative Deal Size			0.006		-0.008		-0.007	
			(0.41)		(-0.43)		(-0.39)	
Private Target			0.002		0.001		-0.001	
			(0.92)		(0.20)		(-0.11)	
Public Target			-0.007	***	-0.008	***	-0.008	***
			(-2.86)		(-2.99)		(-2.96)	
Friendly Deal			0.004		0.003		0.003	
			(0.52)		(0.42)		(0.46)	
Tobin's Q					0.003		0.002	
					(1.04)		(0.63)	
Size					-0.001		-0.001	
					(-1.64)		(-1.21)	
Leverage					-0.001		0.001	
					(-0.14)		(0.07)	
Board Size							-0.001	
							(-0.25)	
CEO Duality							0.001	
							(0.24)	
Independent Board							-0.023	**
							(-2.25)	
Busy Board							-0.003	
							(-0.37)	
Board Tenure							-0.001	
							(-0.06)	
Female Board							0.006	
							(0.47)	
Board Age							-0.001	
							(-1.25)	
Constant	-0.004	***	0.031	***	0.009		0.050	**
	(-2.72)		(2.91)		(0.63)		(2.04)	
Year and Industry Dummies	yes		yes		yes		yes	
Observations	818		818		814		795	
Adj. R²	0.010		0.071		0.075		0.078	

acquirer CARs on the interaction term *Vertical Directors * Vertical Deal* and the two components, before adding any controls to the specification. I find that the interaction term is positive and statistically significant at the 5% level, indicating that vertical directors are positively related to acquirer announcement returns when conducting supply-chain transactions. In contrast, neither *Vertical Directors* nor *Vertical Deal* are significantly related to acquirer's stock returns on their own. In Columns (2), (3), and (4) of Table 2.3, I repeat the setup while adding deal characteristics, acquirer financial characteristics, and acquirer governance characteristics, respectively. In all regression specifications, the estimated coefficients for *Vertical Directors * Vertical Deal* are positive and statistically significant.[26] Column (4) of Table 2.3 is my baseline regression as it includes all controls.[27] The coefficient of 0.107 suggests that acquirer CARs increase by 0.3% per one standard deviation increase of vertical directors on the board upon the announcement of a vertical transaction. Given the average acquirer's market capitalization of $15,738 million, the improvement of acquirer returns is equivalent to an absolute gain of $47 million.

Consistent with results in earlier studies, I find that the controls have the expected signs (Minnick, Unal, and Yang, 2011; Ghosh and Petrova, 2013). Specifically, I find that bidders acquiring public targets and acquirers employing a higher fraction of independent directors experience lower announcement returns (Subrahmanyam, Rangan, and Rosenstein, 1997; Fuller, Netter, and Stegemoller, 2002).

Moreover, as I am analyzing the relation between vertical directors and acquirer stock returns when announcing vertical transactions, I rerun my baseline regression restricting the sample to vertical transactions only. In unreported results, I find that vertical directors are positively related to acquirer announcement returns when conducting vertical transactions at the 5% significance level. I also test the influence of vertical directors on acquirer abnormal stock returns when announcing horizontal transactions or transactions that are neither horizontally nor vertically related. Confirming the conjecture that it is directors' supply-chain expertise that drives the beneficial M&A outcome, in unreported

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[26] In unreported results, I calculate the variance inflation factors (VIF) for the independent variables and find that all variables have a VIF below ten providing evidence that there is no multicollinearity between my independent variables.

[27] Scholars evaluating the effect of governance attributes on deal announcement generally restrict their samples to deals that are completed (e.g., Kroll, Walters, and Wright, 2008; Minnick, Unal, and Yang, 2011; Cai and Sevilir, 2012). For this reason, I rerun my baseline regression for completed deals only. Consistently, I find that acquirers employing vertical directors are associated with higher stock returns when announcing a vertical transaction. The results are statistically significant at the 5% level.

results, I find no statistically significant relation between vertical directors and acquirer CARs in these alternative M&A announcements.

2.3.2   Endogeneity

The relation between vertical directors and acquirer announcement returns is subject to endogeneity. On the one hand, there might be reverse causality. That is, vertical directors might improve acquirer CARs when announcing supply-chain transactions, but it might also be that acquirers anticipating superior supply-chain transactions are better at locating or attracting supply-chain-experienced directors. On the other hand, omitted variables could be driving the results.

To examine the validity of the baseline estimates, I first adopt instrumental variable regressions in which I predict *Vertical Directors* using *Median Vertical Directors* and *Supply Vertical Directors* as instruments. Following Dass et al. (2014), I define *Median Vertical Directors* as the median of the *Vertical Directors* variable in the same three-digit SIC industry. The rationale behind the instrument is that the stronger the presence of vertical directors within an industry, the higher the probability that the firm will employ a vertical director. I compute *Supply Vertical Directors* as the total number of potential vertical directors based on an I-O coefficient of 5% divided by the total number of board directors in the financial industry. I expect that a higher supply of vertical directors increases a firm's probability of employing such a director. There is no plausible reason why *Median Vertical Directors* or *Supply Vertical Directors* should influence M&A announcement returns except through the *Vertical Directors* variable. In Column (1) of Table 2.4, I regress *Vertical Directors* on the instrumental variables and the baseline regression controls. The results indicate that both *Median Vertical Director* and *Supply Vertical Directors* are positively and statistically significantly associated with *Vertical Directors* at the 1% level. In the second-stage regression (Column (2) of Table 2.4), I then use the predicted value of *Vertical Directors* from Column (1) to examine the effect of vertical directors on acquirer CARs. The coefficient of the interaction term *Vertical Directors * Vertical Deal* remains positive and statistically significant at the 10% level.

To further mitigate the omitted variable concern, I rerun my baseline regression using board-firm fixed effects. To this end, I restrict my sample to firms that conducted at least two M&As with exactly the same board of directors. In this setting, I can include board-firm fixed effects to control for omitted time-invariant director heterogeneity, thereby mitigating the concern that alternative explanations are driving the results. Column (3) of Table 2.4 reports the regression results of acquirer announcement returns on the *Vertical*

Table 2.4: Endogeneity
The table reports results from 2SLS and board-firm fixed effects regressions of acquirers' five-day (–2, +2) cumulative abnormal returns around M&A announcements on *Vertical Directors*. *Vertical Directors* and *Vertical Deal* are determined based on an I-O coefficient of at least 5%. Column (1) reports the first-stage regression. *Vertical Directors* is the dependent variable and the instruments in use are *Median Vertical Director* and *Supply Vertical Directors*. Column (2) reports the second-stage results, where the dependent variable is acquirer CARs and *Pred. Vertical Directors* is the predicted value of *Vertical Directors* from the first-stage regression. Columns (3) and (4) present board-firm fixed regressions and the dependent variable is acquirer CARs. In Column (3), the sample is restricted to firms that conducted at least two M&As with the same board of directors. In Column (4), the sample is further restricted to firms that conducted at least one vertical deal and one other deal with the same board of directors. All regressions include the full set of control variables as in Column (4) of Table 2.3. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Vertical Directors First-Stage (1)		CARs Second-Stage (2)		CARs (3)		CARs (4)	
Median Vertical Director	0.832	***						
	(5.59)							
Supply Vertical Directors	0.023	***						
	(3.09)							
Pred. Vertical Directors * Vertical Deal			0.162	*				
			(1.93)					
Pred. Vertical Directors			-0.013					
			(-0.18)					
Vertical Directors * Vertical Deal					0.334	*	0.498	*
					(1.69)		(1.76)	
Vertical Deal	0.004		0.003		0.231		-1.756	*
	(0.61)		(0.55)		(1.20)		(-2.09)	
Constant	0.035		0.049	*	-0.616	**	-2.690	**
	(0.98)		(1.69)		(-2.31)		(-2.84)	
Acquirer and Deal Controls	yes		yes		yes		yes	
Year Dummies	yes		yes		yes		yes	
Industry Dummies	yes		yes		no		no	
Board-Firm Fixed Effects	no		no		yes		yes	
Observations	792		792		145		61	
Adj. R²	0.277		0.056		0.229		0.401	

Directors * *Vertical Deal* interaction term and controls.[28] Confirming previous results, I find a positive, statistically significant relation between vertical directors and acquirer abnormal stock returns when announcing supply-chain transactions. This suggests that the effect of vertical directors on announcement returns in vertical transactions is not driven by unobserved board and firm heterogeneity. As boards employing vertical directors and conducting vertical transactions may just be generally better at making acquisitions, I further require, in Column (4) of Table 2.4, that the firms engaging in

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[28] Note that *Board Size* and *Female Board* are excluded as they do not vary over time.

multiple acquisitions with the same board make at least one supply-chain transaction and at least one other transaction. The results show a positive statistically significant effect of vertical directors on acquirer announcement returns in vertical M&As, thereby confirming the validity of my baseline results.[29]

2.3.3 Robustness Tests

In Table 2.5, I replicate my baseline regression using alternative definitions of *Vertical Directors* and *Vertical Deal* (Panel A), alternative event windows (Panel B), and additional control variables (Panel C).

As alternative *Vertical Directors* measures, I use *Vertical Directors Dummy*, indicating at least one vertical director on the board based on an I-O coefficient of at least 5% (Panel A, Column (1) of Table 2.5), *Vertical Directors 10%*, indicating the fraction of vertical directors on the board based on an I-O coefficient of at least 10% (Panel A, Column (2)), and *Vertical Directors 1%*, indicating the fraction of vertical directors on the board based on an I-O coefficient of at least 1% (Panel A, Column (3)). The vertical deal variables are adjusted according to the I-O thresholds used for the vertical director variables. The results confirm my baseline results and show that vertical directors are associated with higher acquirer announcement returns when conducting vertical transactions, irrespective of the definition of vertical directors or the threshold of the vertically-relatedness coefficient.

In Panel B of Table 2.5, I present the baseline regression results for alternative event windows. Following other papers (e.g., Lehn and Zhao, 2006; Kroll, Walters, and Wright, 2008; Custódio and Metzger, 2013; Wang, Xie, and Zhu, 2013), I calculate acquirer announcement returns over three-day (–1 to 1), seven-day (–3 to 3), and 26-day (–5 to 20) event windows. The results from my baseline regression remain robust and show that acquirers employing vertical directors experience higher abnormal stock returns upon the announcement of a supply-chain transaction across alternative event windows.

Masulis, Wang, and Xie (2007) and Ghosh and Petrova (2013) analyze the relation between anti-takeover provisions and M&A performance. They find that firms with more anti-takeover provisions experience lower announcement returns. To this end, I

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[29] One drawback of this setup is the restricted sample size. To address this concern, I rerun the baseline regression using this restricted sample. In unreported results, I find that the coefficient is still positive and statistically significant when using industry fixed effects instead of board-firm fixed effects.

Table 2.5: Robustness Tests

The table reports OLS regression results of acquirers' five-day (–2, +2) cumulative abnormal returns (CARs) around M&A announcements on vertical directors and a set of controls. The sample includes financial (SIC codes 6000 to 6999) U.S. public, private, and subsidiary M&As announced over the period January 1, 2000 to December 31, 2011. Panel A reports alternative definitions of vertical directors. Definition 1 is a binary variable that is one if the firm employs at least one vertical director on the board and zero otherwise. Definition 2 is the fraction of vertical directors on the board based on an I-O coefficient of at least 10% . Definition 3 is the fraction of vertical directors on the board based on an I-O coefficient of at least 1%. The I-O cutoffs for the *Vertical Deal* variables are adjusted accordingly. In Panel B, CARs are determined over three-day, seven-day, and 26-day event windows. Panel C includes the *G-Index*, *CEO Pay-for-Performance*, and *CEO Ownership* as additional controls. *G-Index* is the governance index proposed by Gompers, Ishii, and Metrick (2003), consisting of 24 anti-takeover provisions. *CEO Incentive Pay* is computed as the fraction of the CEO's option and stock compensation to his total compensation. *CEO Ownership* is defined as the fraction of shares owned by the CEO relative to the total number of shares outstanding. All regressions include the full set of control variables as in Column (4) of Table 2.3. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	CARs		
	(1)	(2)	(3)
Panel A: Alternative Definitions	Definition 1	Definition 2	Definition 3
Vertical Directors * Vertical Deal	0.011 *	0.118 *	0.045 *
	(1.90)	(1.88)	(1.75)
Vertical Directors	-0.008 **	-0.080 **	-0.053 ***
	(-2.08)	(-2.12)	(-2.70)
Vertical Deal	0.003	0.001	0.001
	(0.83)	(0.39)	(0.10)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Industry Dummies	yes	yes	yes
Observations	795	795	795
Adj. R²	0.077	0.077	0.079
Panel B: Alternative Event Windows	[–1 to 1]	[–3 to 3]	[–5 to 20]
Vertical Directors * Vertical Deal	0.073 *	0.145 ***	0.196 *
	(1.72)	(2.70)	(1.83)
Vertical Deal	0.003	0.002	-0.013
	(0.81)	(0.40)	(-1.56)
Vertical Directors	-0.030	-0.073 **	-0.073
	(-1.02)	(-2.12)	(-1.15)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Industry Dummies	yes	yes	yes
Observations	795	795	795
Adj. R²	0.065	0.042	0.015
Panel C: Alternative Controls	G-Index	CEO Incentive Pay	CEO Ownership
Vertical Directors * Vertical Deal	0.184 *	0.150 **	0.140 ***
	(1.72)	(2.21)	(2.97)
Vertical Deal	0.012 *	0.007	0.003
	(1.83)	(1.08)	(0.74)
Vertical Directors	-0.196 **	-0.046	-0.062 **
	(-2.21)	(-1.31)	(-2.06)
Additional Control	-0.001 **	0.010 *	0.037
	(-2.57)	(1.96)	(1.16)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Industry Dummies	yes	yes	yes
Observations	259	519	779
Adj. R²	0.053	0.067	0.061

additionally control for the *G-Index*[30] (Panel C, Column (1)), which is the sum of 24 anti-takeover provisions, with each provision scoring one point (Gompers, Ishii, and Metrick, 2003). Higher values signify that firms have stronger anti-takeover protection and, hence, fewer shareholder rights. Cornett et al. (2003) and Minnick, Unal, and Yang (2011) find a positive relation between CEO incentive pay and acquirer announcement returns. I thus control for *CEO Incentive Pay* in Panel C, Column (2). I define *CEO Incentive Pay* as the sum of the CEO's option and stock compensation over the CEO's total compensation (Aebi, Sabato, and Schmid, 2012). Additionally, following Cornett et al. (2003), I control for *CEO Ownership* (Panel C, Column (3)). The more of the firm's equity the CEO holds, the more of his financial wealth is directly affected by the announcement returns of the transaction. *CEO Ownership* is defined as the fraction of shares owned by the CEO relative to the total number of shares outstanding.[31] Confirming my baseline regression results, I find that vertical directors enhance acquirers' stock returns when announcing supply-chain transactions while controlling for the *G-Index*, *CEO Incentive Pay*, or *CEO Ownership*. Confirming previous studies, I find that the *G-Index* is negatively (e.g., Ghosh and Petrova, 2013), and *CEO Incentive Pay* and *CEO Ownership* (Cornett et al., 2003) positively, related to acquirer announcement returns.

2.4   Channels

To this point, my results gave evidence that vertical directors add value to acquirers' announcement returns in supply-chain transactions. In this section I analyze potential sources through which vertical directors influence acquirer returns. In particular, I conjecture that vertical directors help in the target selection process by seeking out value-enhancing deals while avoiding value-diminishing transactions. Moreover, I conjecture that vertical directors can use their supply-chain experience to reduce the costs of the deal by negotiating more favorable prices for the target and by being in less need of external financial advisors and thereby paying lower advisory fees. All regressions include the same set of control variables as in Column (4) of Table 2.3.

2.4.1   Target Selection

Vertical directors have knowledge about their own industry, gain experience from the supply-chain industry, and have an overall better understanding of firms' positions along

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[30] In unreported results, I replace the *G-Index* with the *E-Index*. The *E-Index*, proposed by Bebchuk, Cohen, and Ferrell (2009), is a shorter version of the *G-Index* and includes only six of the original 24 provisions. I obtain data on the *G-Index* and the *E-Index* from Risk Metrics.

[31] I obtain data on CEO compensation and ownership from ExecuComp.

Table 2.6: Target Selection
The table reports regression results of target selection measures on vertical directors. *Vertical Directors* and *Vertical Deal* are determined based on an I-O coefficient of at least 5%. In Column (1), the dependent variable, *Vertical Bid Initiations*, is estimated using negative binominal regression. In Column (2), the dependent variable, *Synergy Gains*, is estimated using a Probit regression. In Column (3), the dependent variable, *Change in ROA*, is estimated using OLS regressions. All regressions include the full set of control variables as in Column (4) of Table 2.3. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Vertical Bid Initiations (1)		Synergy Gains (2)		Change in ROA (3)	
Vertical Directors * Vertical Deal			78.385	***	0.394	*
			(2.62)		(1.87)	
Vertical Deal			-0.064		-0.017	
			(-0.07)		(-0.82)	
Vertical Directors	-0.928	***	-75.750	***	-0.131	
	(-2.79)		(-3.36)		(-0.79)	
Constant	0.004	***	64.102	**	-0.131	
	(0.00)		(2.27)		(-1.28)	
Acquirer Controls	yes		yes		yes	
Deal Controls	no		yes		yes	
Year and Industry Dummies	yes		yes		yes	
Observations	2,154		206		511	

the supply chain and of trends and upcoming developments that affect the supply chain. Accordingly, supply-chain experience may help directors to select more appropriate supply-chain targets.

In Column (1) of Table 2.6, I determine whether acquirers with supply-chain-experienced directors are more likely to engage in supply-chain transactions. On the one hand, vertical directors might assist in identifying suitable supply-chain targets that otherwise would have been foregone. In this case, the probability of engaging in supply-chain transactions would increase with a higher fraction of vertical directors on the board. On the other hand, vertical directors might assist in identifying and dodging value-diminishing targets that otherwise would have been pursued, in which case the probability of conducting supply-chain transactions would decrease with a higher fraction of vertical directors. These two notions are not mutually exclusive, but could be at work simultaneously, in which case vertical directors would be unrelated to the probability of engaging in a supply-chain transaction. To test the relation between vertical directors and the probability of conducting a supply-chain transaction, I include all firm-years in my sample and determine the number of supply-chain transactions the acquirer announced within each year (*Vertical Bid Initiations*). As the outcome variable contains excessive zeros and is overdispersed, I model the estimates using a negative

binomial regression. Column (1) shows that acquirers employing vertical directors are less likely to announce a supply-chain transaction.

To discover whether vertical directors are related to value-enhancing targets, I analyze the relation between vertical directors and *Synergy Gains* when conducting supply-chain transactions. The results in Column (2) of Table 2.6 show a positive statistically significant coefficient on the interaction term *Vertical Directors * Vertical Deal*, suggesting that vertical directors create value for the acquirer shareholders by identifying supply-chain targets that create more synergistic gains.

Additionally, I examine the effect of vertical directors on the acquirer's change in long-run operating performance (*Change in ROA*) when conducting supply-chain transactions. The results are reported in Column (3) of Table 2.6 and show that vertical directors are positively statistically significantly related to *Change in ROA*. This indicates that acquirer post-deal operating performance improves with the employment of vertical directors when conducting supply-chain transactions. Overall, the results are consistent with the conjecture that vertical directors seek more appropriate supply-chain targets that generate both higher synergy gains and higher long-term performance.

2.4.2   Deal Costs

Cai and Sevilir (2012) state that overpaying is one of the most common reasons for acquirers making value-diminishing M&A transactions. If acquirers benefit from the supply-chain expertise of board directors in valuing targets and potential synergy gains, they might be less likely to overpay for supply-chain targets. To investigate this possibility, in Panel A of Table 2.7 I analyze the relation between vertical directors and the price premium paid for vertical targets. I determine the price premium as the final offer price relative to the target's stock price one week (Column (1)) and one month (Column (2)) prior to the deal announcement. All regressions include the full set of control variables used in Column (4) of Table 2.3. The results suggest that acquirers employing vertical directors pay relatively lower prices for supply-chain targets.

Generally, acquirers hire external financial advisors to help them identify potential targets, provide opinions on the transaction price, and facilitate the negotiation process (Cai and Sevilir, 2012). If acquirers employ directors with supply-chain expertise, they may have less need of external advisory services when conducting supply-chain transactions and might be in a better position to negotiate advisory fees. Supporting this reasoning, Custódio and Metzger (2013) observe that acquirers with CEOs who have past industry experience in the target's industry are less likely to employ external advisors for

Table 2.7: Deal Costs
The table reports OLS regression results of the price premium and proxies for the acquirer's use of external financial advisors on *Vertical Directors*. *Vertical Directors* and *Vertical Deal* are determined based on an I-O coefficient of at least 5%. Panel A reports OLS regression results of the price premium based on the target's stock price one week (Column (1)) and one month (Column (2)) before the deal announcement. Panel B reports Poisson regression results for *No. of Advisors* (Column (3)) and Tobit regression results for *Advisory Fees* (Column (4)). All regressions include the full set of control variables as in Column (4) of Table 2.3. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	CARs			
	(1)		(2)	
Panel A: Price Premium	Price Premium 1 Week		Price Premium 4 Weeks	
Vertical Directors * Vertical Deal	-6.892	***	-6.377	***
	(-3.30)		(-2.91)	
Vertical Deal	-0.558		-1.188	***
	(-1.51)		(-3.27)	
Vertical Directors	-0.740		-0.551	
	(-0.61)		(-0.36)	
Acquirer and Deal Controls	yes		yes	
Year and Industry Dummies	yes		yes	
Observations	234		231	
Adj. R²	0.279		0.336	
Panel B: Financial Advisor	No. Of Advisors		Advisory Fees	
Vertical Directors * Vertical Deal	-1.847	*	-0.095	
	(-1.66)		(-1.60)	
Vertical Deal	0.041		0.010	*
	(0.26)		(1.78)	
Vertical Directors	0.475		-0.039	
	(0.64)		(-1.43)	
Acquirer and Deal Controls	yes		yes	
Year and Industry Dummies	yes		yes	
Observations	319		43	

transactions. To evaluate whether vertical directors influence external advisory services, I run Poisson regression analysis of the number of external financial advisors (*No. of Advisors*) on *Vertical Directors* in Table 2.7, Panel B, Column (1). I find that acquirers with vertical directors are less likely to employ additional external advisors when conducting supply-chain transactions. To further test the advisory service conjecture, I investigate the impact of vertical directors on the fraction of advisory fees paid for external advisors relative to the deal value (*Advisory Fees*) using a Tobit regression (Table 2.7, Panel B, Column (2)). The coefficient of the *Vertical Directors * Vertical Deal* interaction term is negative but not significantly different from zero; however, this could be due to the reduced sample size.

2.5 Subsamples and Heterogeneous Treatment Effects

Table 2.8 reports the relation between vertical directors and acquirer announcement returns for several subsamples (Panel A) and reveals whether the effect stems from heterogeneous vertical directors or acquirer characteristics (Panel B). All regressions include the full set of control variables used in Column (4) of Table 2.3.

Gobulov, Petmezas, and Travlos (2012) argue that acquirers of public targets face higher bargaining power, more resistance by the targets' shareholders and regulators, and more difficulty in claiming post-deal indemnification because owners are relatively more dispersed, suggesting that acquirers need better skills and knowledge to successfully negotiate this type of deal. Thus, experience and knowledge gained from vertical industries may be more relevant in the case of acquiring a public target. I analyze the relation between vertical directors and acquirer announcement returns for public (Column (1)), private (Column (2)), and subsidiary (Column (3)) targets in Panel A of Table 2.8. The interaction term between *Vertical Directors* and *Vertical Deal* is positive and statistically significant for public targets only, supporting the idea that acquiring a public target can benefit from greater experience on the part of the board.

Directors gain supply-chain knowledge by simultaneously holding directorships at firms in the upstream or downstream industries. I conjecture that the longer a director serves on the vertically-related board, the greater should be his knowledge. To this end, I construct two indicator variables; *Long Tenure* and *Short Tenure*. *Long Tenure* takes the value of one if the vertical directors served as long as or longer at the vertically-related firm than the median vertical director. *Short Tenure* takes the value of one if the vertical director served a shorter time at the vertically-related firm than the median vertical director. The results are presented in Column (1) of Panel B, Table 2.8 and show that the positive valuation effect stems from vertical directors who served longer at the vertically-related firm.

Field, Lowry, and Mkrtchyan (2013) suggest that directors holding at least three or more outside directorships have enhanced advising abilities in a variety of matters. In line with this, Fama and Jensen (1983) argue that the number of outside directorships signals quality to other firms and that directors with multiple directorships are therefore more frequently asked to serve on additional boards (Bugeja, Rosa, and Lee, 2009). Vertical directors by definition hold at least one outside directorship, but additional directorships may further hone their skills. The positive effect of vertical directors on acquirer returns in supply-chain transactions, therefore, may be related to general skills acquired from holding multiple directorships. To control for this, I group vertical directors based on the

Table 2.8: Subsamples and Heterogeneous Treatment Effects
The table reports OLS regression results of acquirers' five-day (–2, +2) cumulative abnormal returns around M&A announcements on *Vertical Directors* over the period January 1, 2000 to December 31, 2011. *Vertical Directors* and *Vertical Deal* are determined based on an I-O coefficient of at least 5%. In Panel A, the sample is divided into public, private, and subsidiary targets. In Panel B, heterogeneous treatment effects are used. *Long Tenure* and *Short Tenure* indicate that the director holds the vertical directorship as long as or longer and shorter than the median vertical director, respectively. *Busy* indicates that the vertical director holds three or more outside directorships, while *Not Busy* takes the value of one if the vertical director holds less than three outside directorships. *Large Acquirer* is a dummy taking the value of one if the acquirer firm is as large as or larger than the median acquirer firm and *Small Acquirer* indicates that the size of the acquirer is smaller than the median acquirer firm. All regressions include the full set of control variables as in Column (4) of Table 2.3. The t-values are based on robust clustered standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	CARs		
	(1)	(2)	(3)
Panel A: Subsamples	Public	Private	Subsidiary
Vertical Directors * Vertical Deal	0.155 *	-0.052	0.065
	(1.69)	(-0.53)	(0.55)
Vertical Deal	0.006	0.005	-0.013
	(0.54)	(0.73)	(-1.64)
Vertical Directors	-0.030	-0.046	0.002
	(-0.47)	(-1.03)	(0.02)
Year and Industry Dummies	yes	yes	yes
Observations	300	310	185
Adj. R²	0.063	0.015	0.128
Panel B: Heterogeneous Treatment			
Vertical Directors * Long Tenure * Vertical Deal	0.126 **		
	(2.15)		
Vertical Directors * Short Tenure * Vertical Deal	0.102		
	(1.59)		
Vertical Directors * Busy * Vertical Deal		0.119 *	
		(1.71)	
Vertical Directors * Not Busy * Vertical Deal		0.112 *	
		(1.78)	
Vertical Directors* Large Acquirer * Vertical Deal			0.133 *
			(1.87)
Vertical Directors * Small Acquirer * Vertical Deal			0.103 *
			(1.70)
Year and Industry Dummies	yes	yes	yes
Observations	795	795	795
Adj. R²	0.072	0.076	0.078

number of outside directorships they hold. *Busy* takes the value of one if the vertical director holds at least three or more outside directorships, whereas *Not Busy* takes the value of one if the director holds less than three outside directorships. The results are set out in Column (2) of Panel B, Table 2.8. I find that the number of directorships held by vertical directors does not influence the results. Both busy vertical directors and non-

busy vertical directors have a positive statistically significant impact on acquirer abnormal stock returns upon the announcement of a supply-chain transaction.

Moeller, Schlingemann, and Stulz (2004) observe that small acquirers have higher announcement returns than larger acquirers. They argue that larger firms overpay for targets and managerial hubris is more likely. In Column (3) of Panel B of Table 2.8, I evaluate whether vertical directors have a different impact on announcement returns in vertical transactions for larger versus smaller acquirers. *Large Acquirer* indicates that the acquirer is equal to or bigger than the median *Size*. *Small Acquirer* takes the value of one if the acquirer is smaller than the median financial firm in my sample. The coefficients of the interaction term are both positive and statistically significant irrespective of acquirer size.

2.6 Conclusion

In this paper, I examine how directors holding simultaneous directorships at firms in the supply-chain industry impact acquirer announcement returns over the period January 1, 2000 to December 31, 2011. The sample includes U.S. S&P 1500 financial acquirer firms and U.S. public, private, and subsidiary target firms. My results indicate that directors with supply-chain experience increase acquirer abnormal stock returns upon the announcement of a supply-chain transaction, suggesting that learning through experience and gaining relevant knowledge from supply-chain industries enhance directors' ability to design effective M&A strategies. My results hold when using instrumental variable and board-firm fixed effects regressions to mitigate endogeneity concerns, for various definitions of the vertical director variable and a large set of control variables. Moreover, I find that the positive wealth effect is more prominent when the vertical target is publicly traded, suggesting that the importance of supply-chain expertise increases with the complexity of the transaction. When exploring the potential sources through which vertical directors influence acquirer announcement returns, I find that vertical directors help in the target selection process by seeking out value-enhancing deals that generate higher synergy gains and higher long-term performance, and in the negotiation process by reducing the price premium and the need for external financial advisors. Overall, the results suggest that supply-chain experience promotes directors' ability to identify and value supply-chain targets, reduces the need for external financial advice, and thereby enhances supply-chain M&A outcomes.

2.7 Appendix 2.A

Panel A: Dependent Variables	
CARs	Bidding firms' cumulative abnormal returns calculated using the market model with the market model parameters estimated over the period starting 220 days and ending 21 days prior to the announcement. Fama and French 48 industry value-weighted index return is the market return.
Change in ROA	Change in three-year industry-adjusted ROA before and after the deal announcement.
Price Premium	The final offer price per share paid by the acquirer over the price per share of the target stock one week / four weeks before the announcement.
Vertical Bid Initiations	Total number of vertical M&A announcements within the year based on an I-O coefficient of 5%.
Synergy Gains	Dollar-denominated gain of the acquirer divided by the sum of the dollar-denominated gains of the acquirer and the target, where the dollar-denominated gain is the market cap times the CARs (–2, +2) of the respective firms.
Advisory Fees	The total advisory fees paid by the acquirer over the deal value.
No of Advisors	Number of advisors employed by the acquirer firm for the deal.

Panel B: Acquirer Board Characteristics	
Vertical Directors	Fraction of directors on the board holding outside directorships at vertically-related firms based on an I-O coefficient of at least 5%.
Board Size	Number of directors on the board.
CEO Duality	Indicator variable that equals one if the CEO is also the chairman of the board.
Independent Board	Fraction of independent directors (NYSE and NASDAQ guidelines) on the board.
Busy Board	Fraction of directors on the board holding at least three or more outside directorships.
Board Tenure	Average number of years the directors served on the firm's board.
Female Board	Fraction of female directors on the board.
Board Age	Average age of the directors on the board.

Panel C: Acquirer Financial Characteristics	
Tobin's Q	The firm's market value of assets to ist book value of assets, where market value of assets is the book value of assets plus the market value of common equity minus the book value of common equity.
Size	Natural logarithm of the book value of total assets.
Leverage	Book value of debt over the book value of assets.

Panel D: Deal Characteristics	
Vertical Deal	Indicator variable that equals one if the deal is vertically related based on an I-O coefficient of at least 5%.
Horizontal Deal	Indicator variable that equals one if the deal is horizontally related based on four-digit SIC codes.
Public Target	Indicator variable that equals one if the target firm is public.
Private Target	Indicator variable that equals one if the target firm is private.
Friendly Deal	Indicator variable that equals one if the deal is friendly.
Cash Deal	Indicator variable that equals one if the deal is financed fully with cash.
Stock Deal	Indicator variable that equals one if the deal is financed fully with stock.
Relative Deal Size	Deal value over the acquirer's market value of equity.

Panel E: Instrumental Variables	
Median Vertical Director	Median of *Vertical Directors* across all other firms within the same three-digit SIC industry.
Supply Vertical Director	Total number of potential vertical directors based on an I-O coefficient of 5% divided by the total number of financial directors.

Chapter 3

Learning by Doing: Directors' Impact on M&As

Tatjana Berg

Abstract

In this paper, I examine how directors with mergers and acquisitions (M&As) experience affect acquirer transaction outcomes. I find that acquirers employing directors who have past M&A experience generate higher abnormal stock returns upon the announcement of the deal. The improved performance is due to M&A-experienced directors' ability to identify more synergistic targets and to reduce the costs of the deal by paying lower price premiums for the target and reducing external financial advisory fees. Overall, the results suggest that directors learn from having engaged in M&As and that the gained experience enhances acquirer M&A outcomes.

3.1 Introduction

Mergers and acquisitions (M&A) are complex processes for acquirers as they need to identify the most suitable targets, estimate their value and the possible synergy gains, and design negotiation and integration strategies. These acquisition decisions are generally based on a great deal of ambiguous information (Coff, 2003) that has to be evaluated in a short amount of time (Jemison and Sitkin, 1986). Additionally, acquisition decisions need to take the long-term consequences into account, including how the transaction will affect future policies and outcomes and whether the combined company will ultimately create value (McDonald, Westphal, and Graebner, 2008). Due to the board of directors' crucial role in M&As, recent research focuses on board characteristics that may help overcome or mitigate these challenges and enhance decision-making skills, thereby improving transaction outcomes (e.g., Cai and Sevilir, 2012; Huang et al., 2014). As acquirers have a tendency to hire external financial advisors with extensive M&A experience (Huang et al., 2014), M&A experience appears to play a substantial role in the success of M&As. Therefore, in this paper I analyze whether directors on companies' boards learn from engaging in M&As, and whether these M&A-experienced directors influence acquirer transaction outcomes.

Psychological research argues that expert knowledge in a specific domain is accumulated after having been involved in multiple situations of the domain (e.g., Ericsson and Charness, 1994). The obtained expertise enhances individuals' complex decision-making and problem-solving abilities as it enables them to sift through large quantities of information more efficiently (March, 1994) in a relatively shorter amount of time (Sternberg, 1997), infer from past problems the potential for similar difficulties, and recognize long-term strategic consequences more accurately (Ericsson and Charness, 1994).

Directors who have learned from repeatedly conducting acquisitions may have a better understanding of the complex M&A processes. Accordingly, they may be able to differentiate between essential and irrelevant information and recognize important patterns in information about the target. This, in turn, may help them to process the large amount of information provided in M&A transactions more accurately in the time required and increase their ability to assess strategic implications. Additionally, M&A-experienced directors may be able to draw causal inferences between acquisition decisions and deal outcomes. Specifically, directors who have been exposed to different M&A processes may learn from both mistakes and successes (Hayward, 2002). By having engaged in multiple acquisitions, they may also be able to draw crucial parallels between the current situation and specific problems experienced in previous transactions,

increasing their ability to quickly identify effective solutions and solve complex challenges (Reeves and Weisberg, 1994). Therefore, I conjecture that directors with high levels of M&A expertise are particular effective at addressing the challenges involved in M&A processes (McDonald, Westphal, and Graebner, 2008) and thus make better decisions when it comes to identification, selection, and acquisition of targets.

I examine the relationship between directors with M&A experience and acquirer announcement returns using a sample of U.S. S&P 1500 firms that acquired U.S. public, private, or subsidiary targets during the period from January 1, 2000 to December 31, 2013. I define directors as having M&A experience if they have conducted at least five M&As within the 24 months prior to the deal announcement. Based on acquirer fixed effects regressions, my results suggest that acquirers with M&A-experienced directors generate higher abnormal stock returns upon the announcement of the deal, while controlling for deal, acquirer financial, and acquirer governance characteristics. Specifically, I find that a one standard deviation increase in the fraction of directors with M&A experience increases the acquirer's cumulative abnormal returns by around 0.4%. This translates into $33 million in increased shareholder value for the average acquirer in my sample.

A potential concern with the results is endogeneity. M&A-experienced directors might be correlated with omitted explanatory variables, which would bias my results. To address this possibility, I first deal with external financial advisor characteristics. Specifically, I control for the use of external advisors (Custódio and Metzger, 2013), for the use of a top-tier investment bank (Golubov, Petmezas, and Travlos, 2012), and external advisor fixed effects (Bao and Edmans, 2011). Second, as the better M&A outcomes may stem from superior CEOs, I control for observable and unobservable but time-invariant, acquirer CEO characteristics, including proxies of CEO quality (Yim, 2013), the CEO's pay-for-performance sensitivity (Datta, Iskandar-Datta, and Raman, 2001), and CEO fixed effects (Custódio and Metzger, 2013). Third, I test the sensitivity of my results with respect to external monitoring characteristics (Wang and Xie, 2009). Finally, as the positive relation between M&A experience and acquirer announcement returns may be driven by directors' superior ability or skills instead of their M&A experience, I address identification concerns with regard to observable and unobservable director heterogeneity. Specifically, I control for proxies of board financial expertise and skills and I rerun the baseline regression using director-level regressions to control for director-specific time-invariant factors through a fixed effects approach. My results remain robust when controlling for these alternative explanations. Reverse causality is another possible concern. That is, acquirers anticipating value-increasing transactions may be more successful at locating and attracting M&A-experienced directors. However, the mean

tenure of M&A-experienced directors in my sample of eight years mitigates this concern, as it is unlikely that acquirers employ directors with M&A experience in anticipation of transactions several years later. Additionally, the results are similar when looking at M&A-experienced directors with either longer or shorter tenures. The robustness checks also reveal that my finding holds for different time frames in which directors gained M&A experience, for a threshold of three former learning experiences (instead of five), and for directors gaining M&A experience solely via outside directorships.

Next, I investigate the channels through which M&A-experienced directors enhance acquirer announcement returns. First, I conjecture that learning by doing M&As increases directors' ability to identify and pursue more suitable targets. Consistent with this view, I find that directors with M&A experience are associated with higher acquirer synergy gains, are more likely to pursue the completion of transactions that generate positive acquirer announcement returns, and withdraw from those transactions that generate negative acquirer announcement returns. Second, I conjecture that directors with M&A experience reduce the costs of the deal by negotiating better transaction terms, are in less need of external financial advisors, and are in a better position to negotiate advisory fees. Consistent with this, I find that acquirers with M&A-experienced directors pay relatively less for the target and incur lower advisory fees.

My findings contribute to the literature on organizational learning (e.g., DeLong and DeYoung, 2007; Aktas, DeBodt, and Roll, 2011, 2013; Jaffe, Pedersen, and Voetmann, 2013; Trichterborn, Zu Knyphausen-Aufsess, and Schweizer, 2015). In the specific context of M&As, DeLong and DeYoung (2007) find that acquirers learn from merely observing other firms engaged in M&As and, therefore, generate higher abnormal returns upon the announcement of their own deals. The authors also provide evidence that the learning effect is of short duration and begins to decay after just one year. Confirming this decay of experience over time, Aktas, DeBodt, and Roll (2013) show that firms that have learned from previous transactions deliberately reduce the time between deals in order to take advantage of the gained M&A experience. Hayward (2002) argues that the learning effect is more pronounced for moderately similar deals and when previous transactions resulted in small losses. I extend this research by focusing on M&A learning at the director level, instead of learning at the company level, and provide evidence that directors learn from having conducted transactions with the same acquirer and with acquirers in which they hold outside directorships.

This study also contributes to the literature on how boards of directors influence corporate policies by providing new insights into how boards influence M&A outcomes. Prior literature finds that director connections between the acquirer and the target (Cai

and Sevilir, 2012), directors with social ties to the CEO (e.g., Schmidt, 2015), inside directors holding outside directorships (Masulis and Mobbs, 2011), directors with multiple directorships (Ahn, Jiraporn, and Kim, 2010), female directors (Levi, Li, and Zhang, 2014), independent directors (Subrahmanyam, Rangan, and Rosenstein, 1997), foreign independent directors (Masulis, Wang, and Xie, 2012), directors with cross-border M&A experience (Stroup, 2014), and investment banking directors (Huang et al., 2014) all have an influence on M&A outcomes. I contribute to this literature stream by analyzing the effect of a different director characteristic, namely, director M&A experience, on M&A outcomes. In line with my results, Huang et al. (2014) find that the presence of outside directors who have been or currently are employed as top executives or senior management at one of the most active investment banks is positively related to acquirer announcement returns. They show that the positive valuation effect stems from investment banking directors decreasing the price paid for the target, reducing external advisory fees, and increasing long-term operating performance. I supplement their results by focusing explicitly on M&A experience and show that directors with M&A experience enhance acquirer transaction outcomes.

The rest of the paper is structured as follows. In Section 3.2, I explain the sample and variable construction. In Section 3.3, I report the main results and robustness checks. In Section 3.4, I examine the channels through which M&A-experienced directors achieve the beneficial M&A outcome. In Section 3.5, I report heterogeneous treatment effects. I conclude in Section 3.6.

3.2   Data and Variables

3.2.1   Sample Construction

The data in this study comes from multiple sources. I start with all U.S. publicly listed firms over the period 2000 to 2013 from Compustat. I merge the sample with Risk Metrics and ExecuComp Directors to obtain director characteristics. This reduces my sample to S&P 1500 companies. To have as large a sample as possible, I hand-collect missing governance data from the firms' proxy statements. Next, I retrieve M&A data from Thomson One Banker and acquirer stock return data from CRSP. I keep only transactions that are labeled as mergers or acquisitions of majority interest. Targets are required to be U.S. firms that are either public, private, or subsidiaries. Further, I require the deals to be worth at least $1 million (Golubov, Petmezas, and Travlos, 2012), the deal value has to be at least 1% of the acquirer's market capitalization 20 days before the deal announcement (e.g., Masulis, Wang, and Xie, 2007), and the acquirer has to own less than 50% before the deal announcement, and more than 50% after the deal

announcement (Wang, Xie, and Zhang, 2014). Finally, the deal has to be completed (e.g., Cai and Sevilir, 2012; Wang, Xie, and Zhang, 2014). [32]

3.2.2 Variable Construction

To identify directors with M&A experience, I determine the number of M&As the director was involved in prior to the deal announcement both within the firm and from his outside directorships. I choose director names as director identifiers and clean and adjust them using firms' proxy statements and Bloomberg Business Week. Directors are deemed to be the same person if their first name, middle name, last name, generation extension, and birthdates are identical.

I define a director to have gained M&A experience if the director, as a director both within the firm and at other firms, has been involved in at least five M&A transactions within the 24 months prior to the deal announcement. This selection criterion is based on psychological research arguing that expert knowledge in a specific domain, in my case M&As, is mostly accumulated after having been involved in multiple situations of the domain (e.g., Ericsson and Charness, 1994). The main reason why I choose a 24-month time window for the directors to accumulate M&A experience is that learning starts to depreciate after a year (Hayward, 2002; DeLong and DeYoung, 2007). Consequently, after a year or two, directors may forget or misinterpret what they have learned or the knowledge may have become obsolete (Argote, Beckman, and Epple, 1990) due to changes in regulations, technologies, and transaction structures (DeLong and DeYoung, 2007). For my analysis, I take the fraction of directors on the board with M&A experience (*M&A Experience*).

To ensure that my results are not driven by my measures of board acquisition experience, I create several alternative measures aimed to capture the time, the quantity, and the type of M&A experience directors accumulate. First, to account for the time when M&A experience was gained, I compute the fraction of directors on the board who, prior to the deal announcement, conducted at least five M&As within 12 months (*M&A Experience 12 Months*), within 36 months (*M&A Experience 36 Months*), and between 24 and 12 months (*M&A Experience 12 to 24 Months*). Second, to account for the quantity of M&A experience, I use the fraction of directors on the board who conducted at least three or more M&As within the 24 months prior to the deal announcement (*M&A Experience (≥ 3 M&As)*). Finally, I construct two more variables to account for the type of M&A experience that is accumulated. The variable, *M&A Experience from Other Firms* is

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[32] In unreported robustness checks, I rerun the baseline regression results using all M&A transactions. The results remain robust.

defined as the board average of the number of M&As each director conducted via his outside directorships within the 24 months before the deal announcement. The second variable, *Abnormal M&A Experience*, is the board average of the number of M&As each director conducted minus the number of deals the firm conducted within the 24 months prior to the deal announcement.

The main dependent variable is acquirer cumulative abnormal returns (CARs) upon the M&A announcement. CARs are measured over a five-day event window starting two days before and ending two days after the deal announcement (e.g., Hayward, 2002; Masulis, Wang, and Xie, 2007). To calculate the abnormal returns, I use the market model with parameters estimated over an estimation window ranging from 300 to 21 days prior to the announcement date (Nguyen and Nielsen, 2010). I winsorize CARs at their 1st and 99th percentiles to reduce the influence of outliers.

To discover the channels through which directors with M&A experience influence acquirer announcement returns, I construct two proxies for directors' ability to identify and pursue value-enhancing targets, namely *Acquirer Synergy Gains* and *Good Advice*, and two proxies for directors' ability to reduce the costs of the deal, namely *Price Premium* and *Advisory Fees*. *Acquirer Synergy Gains* is computed as the acquirer's dollar-denominated gain divided by the positive total synergy gains and one minus the acquirer's dollar-denominated gain divided by the negative total synergy gains (e.g., Golubov, Petmezas, and Travlos, 2012).[33] Total synergy gains are measured as the sum of the target's and acquirer's dollar-denominated gain with the dollar-denominated gain being the product of the market capitalization and five-day CARs around the deal announcement of the respective firm. Following Rau (2000), I define *Good Advice* to be an indicator variable taking the value of one both if the acquirer announcement return is positive and the transaction is successfully completed and if the acquirer announcement return is negative and the deal is withdrawn and zero otherwise. I define the *Price Premium* as the final price offered by the acquirer divided by the target's stock price four weeks prior to the deal announcement (e.g., Wang, Xie, and Zhang, 2014).[34] Finally, I compute *Advisory Fees* as the fraction of fees paid by the acquirer for an external financial advisor relative to the deal value (e.g., Cai and Sevilir, 2012).

Consistent with extant literature, I control for deal characteristics including *Relative Deal Size*, *Public Target*, *Private Target*, *Cash Dummy*, *Stock Dummy*, *Friendly Deal*, and

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[33] Following Golubov, Petmezas, and Travlos (2012) and Kale, Kini, and Ryan (2003), I winsorize *Acquirer Synergy Gains* at the 5th and 95th percentiles to control for outliers.

[34] As I need the target's stock returns to define the synergy gain variables and the price premium, the sample is reduced to public targets.

Diversifying Deal (e.g., Asquith, Bruner, and Mullins, 1983; Myers and Majluf, 1984; Travlos, 1987) and acquirer financial characteristics including *Leverage*, *Tobin's Q*, and *Size* (e.g., Maloney, McCormick, and Mitchell, 1993; Jovanovic and Rousseau, 2002; Moeller, Schlingemann and Stulz, 2004). Moreover, as Bradley and Sundaram (2006) find that frequent acquirers outperform infrequent acquirers, I construct the variable *Past No. of Deals*, which is the natural logarithm of one plus the total number of deals conducted within the 24 months prior to the deal announcement. I also control for acquirer governance characteristics including *CEO Duality*, *Board Size*, *Independent Board*, *Female Board*, *Board Age*, *Board Tenure*, and *Board Busyness* (e.g., Yermack, 1996; Subrahmanyam, Rangan, and Rosenstein, 1997; Masulis, Wang, and Xie, 2007; Ahn, Jiraporn, and Kim, 2010; Levi, Li, and Zhang, 2014). The definitions of all variables are reported in Appendix 3.A.

3.2.3   Summary Statistics

Table 3.1 reports summary statistics of my final sample, which consists of 1,372 unique U.S. public acquirers conducting a total of 3,716 M&A transactions over the period January 1, 2000 to December 31, 2013. Panel A of Table 3.1 reports descriptive statistics of the director M&A experience measures. Among the deals, the average board consists of 3.3%, 1.0%, 5.5%, and 0.6% directors who conducted at least five transactions within the 24 months, 12 months, 36 months, and between 24 and 12 months prior to the deal announcement, respectively. Regarding my alternative definitions of M&A-experienced directors, within the 24 months prior to the deal announcement, 12% of the directors on the board were involved in at least three transactions, every fifth director conducted at least one M&A transaction via his outside directorship, and the average director participated in 0.14 excessive deals.

Panel B of Table 3.1 reports descriptive statistics of the deal characteristics. In line with Custódio and Metzger (2013), the average deal value is 14% of the acquirers' market capitalization 20 days prior to the announcement date. Consistent with extant literature, 22% of the targets are publicly listed and 44% are private firms (e.g., Huang et al., 2014). On average, 40% of the deals are paid for entirely in cash (e.g., Schmidt, 2015) and 7% are paid for entirely in stock. Similar to the findings of Rennebog and Zhao (2013), 94% of all transactions are friendly and in 70% of all transactions the acquirer and the target have a different four-digit standard industry classification code (SIC).

Panel C of Table 3.1 sets out acquirer financial and governance characteristics. The average acquirer has a Tobin's Q of 1.77 and a book value of total assets of $8.5 billion. Similarly, Levi, Li, and Zhang (2014) observe a Tobin's Q of 1.89 and Masulis, Wang,

Table 3.1: Summary Statistics
The table reports summary statistics for a sample of 3,716 mergers and acquisitions (M&As) announced between January 1, 2000 and December 31, 2013. Acquirers are U.S. public firms and targets are U.S. public, private, or subsidiary firms. Panel A reports M&A experience of the acquirer's board of directors. Panel B shows deal characteristics. Panel C reports acquirer financial and governance characteristics and Panel D reports summary statistics for the dependent variables. Definitions for all variables can be found in Appendix 3.A.

	Mean	Min	Median	Max	Std. Dev.	Obs.
Panel A: Director M&A Experience						
M&A Experience	0.033	0.000	0.000	1.000	0.149	3,716
M&A Experience (12 Months)	0.010	0.000	0.000	1.000	0.086	3,716
M&A Experience (36 Months)	0.055	0.000	0.000	1.000	0.181	3,716
M&A Experience (12 to 24 Months)	0.006	0.000	0.000	1.000	0.060	3,716
M&A Experience (≥ 3 M&As)	0.115	0.000	0.000	1.000	0.262	3,716
M&A Experience from Other Firms	0.206	0.000	0.111	4.200	0.279	3,716
Abnormal M&A Experience	0.139	-1.692	0.091	4.200	0.331	3,716
Panel B: Deal Characteristics						
Relative Deal Size	0.140	0.010	0.057	1.400	0.228	3,716
Public Target	0.223	0.000	0.000	1.000	0.416	3,716
Private Target	0.441	0.000	0.000	1.000	0.497	3,716
Cash Dummy	0.403	0.000	0.000	1.000	0.491	3,716
Stock Dummy	0.074	0.000	0.000	1.000	0.261	3,716
Friendly Deal	0.941	0.000	1.000	1.000	0.237	3,716
Diversifying Deal	0.695	0.000	1.000	1.000	0.461	3,716
Panel C: Acquirer Characteristics						
Tobin's Q	1.765	0.635	1.469	27.523	1.160	3,716
Size	7.869	3.260	7.763	11.122	1.551	3,716
Leverage	0.551	0.035	0.556	0.984	0.213	3,716
Past No. of Deals	0.439	0.000	0.000	2.398	0.544	3,716
CEO Duality	0.289	0.000	0.000	1.000	0.453	3,716
Board Size	2.249	1.609	2.197	3.584	0.289	3,716
Independent Board	0.766	0.000	0.813	1.000	0.153	3,716
Board Busyness	0.079	0.000	0.000	0.714	0.111	3,716
Female Board	0.097	0.000	0.100	0.455	0.090	3,716
Board Age	60.085	40.333	60.360	75.438	4.377	3,716
Board Tenure	7.897	0.000	7.500	26.111	3.841	3,716
Panel D: Dependent Variables						
CARs	0.001	-0.204	0.001	0.193	0.063	3,716
Acquirer Synergy Gains	-0.937	-6.208	-0.707	0.940	1.777	740
Good Advice	0.483	0.000	0.000	1.000	0.500	4,081
Price Premium	1.408	0.438	1.339	12.760	0.539	708
Advisory Fees	0.006	0.000	0.005	0.027	0.005	153

and Xie (2007) report a firm size of $9.01 billion. The average acquirer in my sample has a leverage ratio of 55% and has conducted 0.85 deals within the 24 months prior to the deal announcement. 29% of all firms have a CEO who is also the chairman of the board. Confirming findings from other studies, the mean board has ten directors (e.g., Levi, Li, and Zhang, 2014), of which, on average, 77% are independent (e.g., Huang et al., 2014), 8% hold at least three or more outside directorships, and around 10% are female (e.g., Levi, Li, and Zhang, 2014). The average board director is 60 years old and has held the

directorship for eight years. This is consistent with the findings of Fracassi and Tate (2012), who observe that the average director is 59 years old and has an average tenure of eight years.

I report descriptive statistics of the dependent variables in Panel D of Table 3.1. In line with extant literature, I find that the average acquirer in my sample has an abnormal stock return reaction upon the M&A announcement of around zero (e.g., Golubov, Petmezas, and Travlos, 2012). As to the synergy gains of acquiring public targets, the average acquirer loses $25 million, which approximates to 93% of the total synergy losses.[35] 48% of all transactions are based on good advice, indicating that the deal is completed when acquirer announcement returns are positive and withdrawn when acquirer announcement returns are negative. The final price offered by the acquirer for the target exceeds the target's stock price four weeks prior to the deal announcement by 41%. Further, on average, acquirers pay 0.6% of the deal value for external financial advisors. Similarly, Cai and Sevilir (2012) and Wang, Xie, and Zhang (2014) find that acquirers pay a price premium of 45% for the target, and 0.6% of the deal value for external advisors.

3.3   M&A Experience and Acquirer Returns

3.3.1   Methodology

If M&A-experienced directors provide valuable advice in transaction processes, I expect acquirers to obtain higher stock return reactions around the announcement of deals. Golubov, Yawson, and Zhang (2015) show that acquirer fixed effects are a key factor in explaining acquirer announcement returns; therefore, I analyze the relationship between director M&A experience and acquirer announcement returns using acquirer fixed effects regressions while controlling for deal characteristics, acquirer financial characteristics, acquirer governance characteristics, and year dummies. The regression equation is:

$$CARs_i = \beta_0 + \beta_1 M\&A\ Experience_i + \beta_2 Deal_i + \beta_3 Fin_i + \beta_4 Gov_i + \varepsilon_i,$$

where *CARs* stands for the acquirer's announcement return over a five-day event window around the announcement of transaction *i*. *M&A Experience* is the fraction of directors on the board of the acquirer who conducted at least five M&A transactions within the 24 months prior to the deal announcement. *Deal* used in cross-sectional M&A analysis, are transaction *i*'s deal characteristics including *Relative Deal Size*, *Public Target*, *Private*

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[35] The difference between acquirer CARs, which are around zero, and their negative synergy gains result from the different samples. When measuring acquirer synergy gains, the sample is restricted to public targets, whereas to determine CARs, targets can be private, public, or subsidiary firms.

Target, *Cash Dummy*, *Stock Dummy*, *Friendly Deal*, and *Diversifying Deal*. *Fin* and *Gov* measure acquirer financial and governance controls, respectively and include *Tobin's Q*, *Size*, *Leverage*, *Past No. of Deals*, *CEO Duality*, *Board Size*, *Independent Board*, *Board Busyness*, *Female Board*, *Board Age*, and *Board Tenure*. I use robust standard errors, ε, clustered at the acquirer level.

3.3.2 Baseline Results

Table 3.2 reports acquirer fixed effects regressions of acquirer CARs over a five-day event window around the deal announcement on M&A experience. I first estimate the acquirer fixed effects regression model including only deal controls, acquirer characteristics, and year dummies (Column (1)). Confirming findings in the literature, the controls have the expected signs (e.g., Masulis, Wang, and Xie, 2007; Custódio and Metzger, 2013). I find that firms acquiring public targets and acquirers paying with equity exhibit lower announcement returns (e.g., Travlos, 1987; Fuller, Netter, and Stegemoller, 2002), while employing directors who hold three or more outside directorships is positively and statistically significantly related to acquirer CARs. In Column (2), I include *M&A Experience* while only controlling for year dummies. The results indicate that a higher fraction of directors with M&A experience on the acquirer's board is perceived favorably by the market around the deal announcement. In Column (3), which is the baseline regression, I then add deal, acquirer financial, and acquirer governance characteristics. I find that the fraction of directors who conducted at least five M&A transactions within 24 months prior to the deal announcement is positively and statistically significantly related to acquirer stock returns when announcing a transaction. Specifically, the results suggest that a one standard deviation increase in *M&A Experience* corresponds to a 0.4% increase in acquirers' CARs. Given that the acquirers in my sample have an average market cap of around $8.3 billion, this corresponds to a total shareholder gain of around $33 million.

In unreported tests, I obtain similar results when using, alternatively, a three-day [−1, +1] (e.g., Huang et al., 2014), a seven-day [−3, +3] (e.g., Kroll, Walters, and Wright, 2008), an eleven-day [−5, +5] (e.g., McDonald, Westphal, and Graebner, 2008), and a 26-day [−5, +20] (e.g., Lehn and Zhao, 2006) event window, when using industry fixed effects instead of firm-fixed effects, and when excluding *Past No. of Deals*.[36] Overall, the results

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[36] The positive relationship between directors with M&A experience and acquirer announcement returns might be subject to a selection bias. That is, firms that anticipate good acquisition opportunities could hire directors with M&A experience to facilitate the prospective transaction. Therefore, in unreported robustness tests, I rerun the baseline regression considering only directors with M&A experience who have been serving as a director for at least three years. The results remain robust.

Table 3.2: M&A Experience and Acquirer CARs

The table reports results from acquirer fixed effects regressions of acquirers' five-day cumulative abnormal returns (CARs) upon M&A announcements on director M&A experience. *M&A Experience* is the fraction of directors on the board who conducted five or more M&As within the 24 months prior to the deal announcement. The t-values are based on robust standard errors clustered at the acquirer level and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Definitions for all variables can be found in Appendix 3.A.

	CARs					
	(1)		(2)		(3)	
M&A Experience			0.012	**	0.026	***
			(1.98)		(2.90)	
Relative Deal Size	0.004				0.003	
	(0.38)				(0.37)	
Public Target	-0.016	***			-0.016	***
	(-3.57)				(-3.58)	
Private Target	-0.002				-0.002	
	(-0.57)				(-0.65)	
Cash Dummy	0.002				0.002	
	(0.87)				(0.87)	
Stock Dummy	-0.021	***			-0.021	***
	(-2.93)				(-2.91)	
Friendly Deal	0.002				0.003	
	(0.37)				(0.43)	
Diversifying Deal	-0.001				-0.001	
	(-0.21)				(-0.20)	
Tobin's Q	0.001				0.001	
	(0.36)				(0.38)	
Size	-0.002				-0.002	
	(-0.38)				(-0.35)	
Leverage	0.013				0.014	
	(0.75)				(0.84)	
Past No of Deals	-0.001				-0.003	**
	(-0.91)				(-2.13)	
CEO Duality	0.002				0.002	
	(0.58)				(0.65)	
Board Size	0.003				0.003	
	(0.24)				(0.25)	
Independent Board	-0.019				-0.019	
	(-1.11)				(-1.10)	
Board Busyness	0.053	***			0.050	***
	(2.73)				(2.64)	
Female Board	0.015				0.017	
	(0.49)				(0.58)	
Board Age	-0.000				-0.000	
	(-0.19)				(-0.14)	
Board Tenure	-0.000				-0.000	
	(-0.21)				(-0.28)	
Constant	0.016		-0.009		0.012	
	(0.24)		(-0.98)		(0.18)	
Year and Acquirer Fixed Effects	yes		yes		yes	
Observations	3,716		3,716		3,716	
Adj. R²	0.028		0.007		0.030	

suggest that directors who have engaged in M&A transactions in the immediate past develop a general expertise about the M&A process enhancing their M&A decision-making ability, which, in turn, has a positive impact on deal outcomes.

3.3.3 Robustness Tests: Alternative Definitions

In Table 3.3, I rerun the baseline acquirer fixed effects regression using alternative definitions of *M&A Experience* while controlling for deal and acquirer controls and year dummies.

To ensure that my results are not driven by the time frame during which directors accumulated M&A experience, I employ alternative time windows in Panel A of Table 3.3. Following the literature, I use M&A experience gained over a 12-month (Column (1)) and a 36-month (Column (2)) time window (e.g., DeLong and DeYoung, 2007; Aktas, DeBodt, and Roll, 2011). Moreover, to account for Hayward's (2002) argument that individuals are unable to learn from very recent acquisitions, I determine, in Column (3), the fraction of directors who conducted at least five transactions 24 to 12 months prior to the deal announcement (*M&A experience (12 to 24 Months)*). The results do not change notably.

Next, in Panel B of Table 3.3 I test the sensitivity of my results with respect to the quantity and manner of directors accumulating M&A experience. In Column (1), I rerun the baseline regression using the fraction of directors on the board who conducted at least three transactions within 24 months prior to the deal announcement (*M&A Experience (≥ 3 M&As)*). Following Kroll, Walters, and Wright (2008) and McDonald, Westphal, and Graebner (2008), I go on to analyze, in Column (2), whether my results hold when I consider only M&A experience gained from directors' outside directorships (*M&A Experience from Other Firms*). Finally, in Column (3) I determine the effect of the board's excess M&A experience relative to the firm's M&A experience (*Abnormal M&A Experience*). Confirming previous results, I find a positive, statistically significant relation between director M&A experience and acquirers' stock reactions upon the deal announcement. The use of *M&A Experience from Other Firms* and *Abnormal M&A Experience* helps me isolate the effect of director M&A expertise from acquirer-specific skills.

3.3.4 Robustness Tests: Alternative Explanations

There are alternative explanations for the results, including the influence of external financial advisors, external governance mechanisms, the acquirer's CEO, and other board director characteristics. I therefore rerun the baseline regression, while controlling for these potential drivers (Table 3.4).

Table 3.3: Robustness Tests Alternative Definitions
The table reports acquirer fixed effects regression results of acquirer announcement returns on director M&A experience using alternative definitions. In Panel A, M&A experience is measured over alternative time periods before the deal announcement. *M&A Experience (12 Months)*, *M&A Experience (36 Months)*, and *M&A Experience (12 to 24 Months)* are computed as the fraction of directors who conducted five or more M&As within the 12 months, 24 months, and between 12 and 24 months prior to the deal announcement, respectively. In Panel B, alternative definitions of M&A experience are used. *M&A Experience (≥ 3 M&As)* is the fraction of directors who conducted three or more M&As within the 24 months prior to the deal announcement. *M&A Experience from Other Firms* is the board average of the number of M&As each director conducted via his outside directorships within the 24 months before the deal announcement. *Abnormal M&A Experience* is the board average of the difference between the number of M&As each director was involved in and the number of M&As the firm conducted within the 24 months prior to the deal announcement. All regressions employ the full set of control variables as in Column (3) of Table 3.2. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Definitions for all variables can be found in Appendix 3.A.

	CARs		
	(1)	(2)	(3)
Panel A: Alternative Duration			
M&A Experience (12 Months)	0.038 ***		
	(2.84)		
M&A Experience (36 Months)		0.024 ***	
		(2.91)	
M&A Experience (12 to 24 Months)			0.028 *
			(1.96)
Constant	0.018	0.013	0.015
	(0.26)	(0.19)	(0.22)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes
Observations	3,716	3,716	3,716
Adj. R²	0.030	0.030	0.028
Panel B: Alternative Definitions			
M&A Experience (≥ 3 M&As)	0.011 *		
	(1.86)		
M&A Experience from Other Firms		0.013 *	
		(1.85)	
Abnormal M&A Experience			0.009 *
			(1.82)
Constant	0.016	0.024	0.001
	(0.23)	(0.36)	(0.02)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes
Observations	3,716	3,716	3,716
Adj. R²	0.029	0.029	0.026

Acquirers employ external financial advisors to assist in identifying suitable targets and designing negotiation strategies (Bao and Edmans, 2011). If acquirers with M&A-experienced directors are correlated with the use of or with certain types of external

Table 3.4: Robustness Tests Alternative Explanations
The table reports acquirer fixed effects regression results of acquirer announcement returns on director M&A experience using additional control variables. *M&A Experience* is the fraction of directors on the board who conducted five or more M&As within the 24 months prior to the deal announcement. Panel A controls for external financial advisor characteristics. Panel B controls for acquirer CEO characteristics. Panel C controls for acquirer monitoring variables, additional board characteristics, and director fixed effects. To control for director fixed effects, I run director-level regressions in which *M&A Experience* is an indicator variable equaling one if the director conducted five or more transactions within the 24 months prior to the deal announcement and board controls are adjusted to the director level. All regressions employ the full set of control variables as in Column (3) of Table 3.2. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Definitions for all variables can be found in Appendix 3.A.

	CARs					
	(1)		(2)		(3)	
Panel A: Advisor Controls						
M&A Experience	0.025	***	0.026	***	0.025	***
	(2.84)		(2.92)		(2.79)	
Advisor	0.005					
	(1.62)					
Top-Tier Advisor			0.013	***		
			(3.10)			
Advisor Fixed Effects	no		no		yes	
Controls	yes		yes		yes	
Observations	3,716		3,716		3,716	
Adj. R²	0.031		0.035		0.043	
Panel B: CEO Controls						
M&A Experience	0.025	***	0.057	***	0.019	**
	(2.70)		(3.46)		(2.06)	
CEO Age	-0.000					
	(-0.74)					
CEO Tenure	0.000					
	(0.05)					
CEO Pay for Performance			-0.001			
			(-0.07)			
CEO Fixed Effects	no		no		yes	
Controls	yes		yes		yes	
Observations	3,537		1,218		3,654	
Adj. R²	0.029		0.116		0.114	
Panel C: Monitoring and Board Controls						
M&A Experience	0.053	**	0.024	***	0.014	***
	(2.24)		(2.61)		(5.91)	
G-Index	0.006					
	(0.69)					
Institutional Ownership	-0.065					
	(-0.50)					
Board Financial Expertise			0.000			
			(0.01)			
Board Ph.D.			0.014			
			(0.45)			
Director Fixed Effects	no		no		yes	
Controls	yes		yes		yes	
Observations	131		3,623		35,764	
Adj. R²	0.022		0.032		0.033	

advisors, then the positive relationship between director M&A experience and acquirer announcement returns may be attributed to advisor characteristics. For example, firms employing directors with M&A experience may in general be more likely to employ a financial advisor. Accordingly, I control for the use of external advisors in Column (1) of Panel A. *Advisor* is an indicator variable taking the value of one if the acquirer employs at least one external financial advisor, and zero otherwise (Custódio and Metzger, 2013).[37] Golubov, Petmezas, and Travlos (2012) find that top-tier advisors deliver higher acquirer announcement returns than do non-top-tier advisors because they are able to identify more synergistic targets and negotiate lower prices. Therefore, in Column (2), I further control for the use of a top-tier advisor. Following Golubov, Petmezas, and Travlos (2012), I construct a dummy variable taking the value of one if the hired external financial advisor is one of the top five investment banks in Thomson One's league tables ranked by deal value for the respective year (*Top-Tier Advisor*). Finally, in Column (3) I use a broader approach to examine whether external advisors drive the enhanced acquisition outcomes and use advisor fixed effects (Bao and Edmans, 2011). Confirming the baseline regression results, I find a positive statistically significant relation between director M&A experience and acquirer announcement returns. Moreover, in line with Golubov, Petmezas, and Travlos (2012), my results indicate that acquirers hiring top-tier advisors exhibit higher abnormal returns upon the announcement of the deal.

The positive relation between director M&A experience and acquirer announcement returns could be driven by certain CEO characteristics. Therefore, in Panel B of Table 3.4, I rerun the baseline regression while controlling for acquirer CEO characteristics. To account for CEO quality, I follow Yim (2013) and in Column (1) control for the CEO's age (*CEO Age*) and the number of years the CEO has held his position (*CEO Tenure*). Datta, Iskandar-Datta, and Raman (2001) observe that acquirers generate higher announcement returns if the CEO receives higher equity compensation packages, as this situation aligns the CEO's incentives with shareholder interests. Consequently, I include *CEO Pay for Performance* in Column (2) and define it as the sum of the CEO's stock and option compensation divided by the CEO's total compensation (Masulis, Wang, and Xie, 2007).[38] To further buttress the robustness of my findings, I control for unobservable time-invariant CEO characteristics in Column (3) by including CEO fixed effects. Overall, I find that the coefficients on M&A experience remain positive and statistically significant while controlling for CEO characteristics.

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[37] In unreported results, I replace the external advisor dummy with the number of external financial advisors employed. The results remain robust.

[38] I obtain CEO compensation data from ExecuComp.

As anti-takeover provisions delay transaction processes and increase takeover costs, acquirers with strong anti-takeover protections are less likely to be acquired and to be punished for engaging in value-destroying acquisitions (Masulis, Wang, and Xie, 2007). Accordingly, Masulis, Wang, and Xie (2007) find that acquirers with more anti-takeover provisions generate lower abnormal returns upon deal announcement. To account for anti-takeover provisions, I control for the *G-Index*, which is the sum of 24 anti-takeover provisions, with each provision scoring the value of one and higher scores indicating weaker shareholder rights (Gompers, Ishii, and Metrick, 2003).[39] Following Custódio and Metzger (2013), I further control for institutional ownership. I define institutional ownership as the fraction of shares owned by institutional investors. I present the results in Column (1) of Panel C and find that acquirers employing directors with M&A experience generate higher abnormal returns upon the deal announcement.

It may also be that M&A-experienced directors have other expertise, skills, or abilities that drive the enhanced transaction outcome. Econometrically, it is difficult to identify these competencies and separate them from each other and from firm-specific characteristics. To mitigate this concern, I first include proxies for expertise and skill that are measurable and observable (Column (2) of Panel C). Specifically, I control for the fraction of directors on the board with financial expertise[40] (*Board Financial Expertise*) and the fraction of directors on the board who have a Ph.D. (*Board Ph.D.*). Guener, Malmendier, and Tate (2008) show that directors' financial expertise affects corporate decisions, while Nguyen and Nielsen (2010) argue that having a Ph.D. signals the possession of high skills. My results hold when controlling for *Board Financial Expertise* and *Board Ph.D.* Second, to account for unobservable director expertise, skills, and abilities, I run director-level regressions using director fixed effects in Column (3) of Panel C. To this end, I replace *M&A Experience* with a dummy taking the value of one if the director conducted at least five M&A transactions within the 24 months prior to the deal announcement. Likewise, the board controls *Independent Board*, *Board Busyness*, *Board Age*, and *Board Tenure* are replaced with the corresponding director-level variable.[41] The other control variables are identical to the controls in Column (3) of Table 3.2 and standard errors are robust and clustered at the director level. Based on this

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[39] In unreported results, I replace the *G-Index* with the *E-Index*. The *E-Index*, proposed by Bebchuk, Cohen, and Ferrell (2009), includes only six provisions of the *G-Index*. The results remain robust. Data on the *G-Index* and the *E-Index* are obtained from Risk Metrics.

[40] Directors are defined as having financial expertise if they satisfy the requirements in the SEC Regulation S-K, Item 407(d)(5).

[41] As I conduct director fixed effects regressions, *Female Board* is excluded from the analysis.

director fixed effects regression, I find a positive statistically significant relation between director M&A experience and acquirer announcement returns.

Overall, I find that after controlling for external advisor, CEO, external monitoring, and alternative director characteristics, *M&A Experience* is positively and statistically significantly associated with acquirer announcement returns.

3.4   Channels

To this point, my results show that acquirers employing directors with M&A experience generate higher stock returns upon the deal announcement. In this section, I explore the potential sources through which directors with M&A experience contribute to the enhanced M&A outcome (Table 3.5). Specifically, I conjecture that directors with M&A experience help in screening and recommending more appropriate targets. Moreover, I conjecture that directors with M&A experience help the acquirer reduce the costs of the deal by means of paying lower price premiums for targets and less fees to external financial advisors.

3.4.1   Target Selection

Directors who have been involved in multiple transactions may have superior knowledge in regard to the identification and selection of targets. Therefore, in Panel A of Table 3.5, I conduct acquirer fixed effects regressions of proxies for target selection on *M&A Experience*, while controlling for the full set of control variables used in Column (3) of Table 3.2. Directors who have learned from previous transactions may be able to identify targets that will generate higher synergy gains. Thus, I analyze the relation between *Acquirer Synergy Gains* and *M&A experience* (e.g., Golubov, Petmezas, and Travlos, 2012; Wang, Xie, and Zhang, 2014). The results in Column (1) report a positive, statistically significant relation between directors with M&A experience and the synergy gains of acquirers. In unreported tests, I examine whether the increased acquirer synergy gains accrue at the expense of the target firm. For this, I replace *Acquirer Synergy Gains* with the corresponding target synergy gain variable. I find that *M&A Experience* is positive but statistically insignificant, suggesting that acquirers with M&A-experienced directors enhance acquirer synergy gains, but not at the expense of the target's synergy gains.

In Column (2) of Table 3.5 Panel A, I determine whether directors with M&A experience are more likely to pursue value-enhancing targets and avoid value-diminishing transactions (Rau, 2000). To this end, I include in my analysis deals that were withdrawn.

Table 3.5: M&A Experience and Synergy Gains, Price Premium, External Advisors
The table reports acquirer fixed effects regression results of proxies for the target selection and for deal costs on director M&A experience. *M&A Experience* is the fraction of directors on the board who conducted five or more M&As within the 24 months prior to the deal announcement. In Panel A, I use proxies for the identification of the target as dependent variables. In Panel B, I use proxies for the deal costs as dependent variables. All regressions employ the full set of control variables as in Column (3) of Table 3.2. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Definitions for all variables can be found in Appendix 3.A.

Panel A: Synergy Gains	Acquirer Synergy Gains		Good Advice	
M&A Experience	1.197	**	0.659	*
	(2.06)		(1.73)	
Constant	1.483		0.872	
	(0.35)		(1.42)	
Acquirer and Deal Characteristics	yes		yes	
Year and Acquirer Fixed Effects	yes		yes	
Observations	740		4,081	
Adj. R²	0.088		0.015	
Panel B: Deal Costs	Price Premium 4 Weeks		Advisory Fees	
M&A Experience	-0.838	**	-0.021	***
	(-1.97)		(-13.14)	
Constant	0.379		1.101	***
	(0.43)		(26.39)	
Acquirer and Deal Characteristics	yes		yes	
Year and Acquirer Fixed Effects	yes		yes	
Observations	708		153	
Adj. R²	0.072		0.997	

Using a logistic acquirer fixed effects regression, I find that directors with M&A experience are more likely to recommend the completion of transactions with positive deal announcements and the withdrawal from transactions with negative deal announcements.

Overall, the results support the notion that directors with M&A experience screen targets more accurately, which results in the selection and prosecution of more appropriate targets.

3.4.2 Deal Costs

In addition to selecting more appropriate targets, directors who learned from past experience with M&As may be able to value the target and potential synergy gains more accurately, thus reducing the probability of overpaying for the target. To test this conjecture, I use acquirer fixed effects regressions of *Price Premium* on *M&A Experience* and the full set of controls used in Column (3) of Table 3.2. I compute *Price Premium* as the final offer price divided by the target's stock price four weeks prior to

the deal announcement (e.g., Wang, Xie, and Zhang, 2014).[42] The results (Column (1) of Panel B of Table 3.5) evidence that M&A-experienced directors are negatively, statistically significantly related to the price premium.

Generally, acquirers hire investment banks to help in identifying targets and facilitating the transaction (Huang et al., 2014). If directors have M&A experience, they are likely to have less need of external financial advisors and they might be able to negotiate more favorable advisory fees. In Table 3.5, Panel B, Column (2), I therefore run acquirer fixed effects regressions of the fraction of external financial advisor fees paid by the acquirer relative to the deal value (*Advisory Fees*) on *M&A Experience*, while controlling for the full set of controls as in the baseline regression.[43] I find that M&A experience is negatively and statistically significantly related to *Advisory Fees*. Overall, the results in Panel B of Table 3.5 suggest that directors with M&A experience reduce the costs of the deal via lower prices for targets and lower fees for external advisors.

3.5   Heterogeneous Treatment

In this section, I determine whether the relation between M&A experience and acquirer announcement returns varies under different scenarios using the set-up of the baseline regression.

3.5.1   Heterogeneous M&A Experience and Directors

In Table 3.6, I analyze whether the positive valuation effect changes for different kinds of M&A experience (Panel A) and for heterogeneous directors with M&A experience (Panel B).

Panel A of Table 3.6 reports the results for heterogeneous *M&A Experience*. Specifically, I examine M&A experience in the target's industry versus M&A experience in other industries (Column (1)), M&A experience in small transactions versus M&A experience in large transactions (Column (2)), and M&A experience in value-generating deals versus M&A experience in value-destroying deals (Column (3)). Acquisition experience may be more useful in when potential transactions is relatively similar to ones conducted in the past. Specifically, directors who have been involved in acquiring several targets in the

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[42] In unreported robustness checks, I also test the effects on the final offer price divided by the target's stock price one and two weeks prior to the deal announcement and on the initial offer price divided by the target's stock price four weeks prior to the deal announcement. The results remain robust.

[43] In unreported robustness tests, I replace the dependent variable with the natural logarithm of one plus the dollar-value of advisory fees paid by the acquirer (Huang et al., 2014). The results remain similar in size and are statistically significant.

Table 3.6: Heterogeneous M&A Experience and Directors

The table reports acquirer fixed effects regression results of acquirer announcement returns on directors with various kinds of M&A experience (Panel A) and on heterogeneous directors with M&A experience (Panel B). *M&A Experience* is the fraction of directors who conducted five or more M&As within the 24 months prior to the deal announcement. *Target Industry* (*Not in Target Industry*) indicates that the acquirer and the target share (do not share) the same four-digit SIC code. *Small Transactions* (*Large Transactions*) indicates deals below (above) $1 billion. *Deals with Positive CARs* (*Deals with Negative CARs*) refers to transactions in which acquirer CARs are above (below) zero. *Busy Directors* (*Not Busy Directors*) indicates directors who hold three or more (less than three) outside directorships. *Investment Banking Directors* (*Not Investment Banking Directors*) indicates directors who simultaneously serve (do not serve) as directors at investment banks. *Long Tenure* (*Short Tenure*) refers to directors who have served for more than five years (five years or less) as directors at the acquirer. All regressions employ the full set of control variables as in Column (3) of Table 3.2. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	CARs		
	(1)	(2)	(3)
Panel A: Heterogeneous M&A Experience			
M&A Experience in Target Industry	0.038 ***		
	(2.66)		
M&A Experience Not in Target Industry	0.022 **		
	(2.22)		
M&A Experience in Small Transactions		0.516 ***	
		(4.87)	
M&A Experience in Large Transactions		0.014 **	
		(1.97)	
M&A Experience in Deals with Positive CARs			0.015
			(1.45)
M&A Experience in Deals with Negative CARs			0.021 **
			(2.01)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes
Panel B: Heterogeneous Directors			
M&A Experience * Busy Directors	0.086 *		
	(1.65)		
M&A Experience * Not Busy Directors	0.027 **		
	(2.21)		
M&A Experience * Investment Banking Directors		0.320 **	
		(2.56)	
M&A Experience * Not Investment Banking Directors		0.033 ***	
		(2.70)	
M&A Experience * Long Tenure			0.055 ***
			(2.66)
M&A Experience * Short Tenure			0.023 *
			(1.89)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes

same industry may possess industry-specific knowledge that may increase their ability to value targets more accurately or negotiate more favorable terms (Custódio and Metzger, 2013). However, directors learning from transactions only in the target's industry may

lack generalist M&A skills that would allow them to recognize alternative acquisition opportunities (Levinthal and March, 1993). Therefore, in Column (1), I determine whether M&A experience in the target's industry (*M&A Experience in Target Industry*) has a different effect on acquirer CARs than M&A experience with targets in industries than other than that of the current target (*M&A Experience Not in Target Industry*). I define targets as being in the same industry if they share the same four-digit SIC code. Hayward (2002) indicates that firms engage in smaller transactions to learn about transaction processes and the market. In contrast, larger transactions represent a strong commitment for which firms will need superior strategies (Wang, Xie, Zhang, 2014). Therefore, in Column (2), I compute two M&A experience measures: M&A experience gained from previous transactions that exceeded $1 billion (*M&A Experience in Large Transactions*) and from transactions that were equal to or less than $1 billion (*M&A Experience in Small Transactions*).[44] After conducting transactions, directors receive either positive or negative reinforcement of their decisions from which they can learn and extrapolate to other decisions. Arguably, directors involved in M&As that resulted in negative announcement returns might learn from their mistakes (Hayward, 2002) and avoid harming their reputations by repeating them. Similarly, directors involved in winning transactions might remember and use methods that worked well in previous transactions and apply these to subsequent transactions. On the other hand, directors involved in repeatedly successful transactions may become overconfident (Gervais and Odean, 2001), which in turn may harm acquisition outcomes (Malmendier and Tate, 2008). In Column (3) I take the performance of previous transactions into account by replacing *M&A Experience* with *M&A Experience in Deals with Positive CARs* and *M&A Experience in Deals with Negative CARs*, which indicate, respectively, that the transactions from which the director learned generated positive or negative announcement returns. All M&A experience variables in this section are computed as the fraction of directors who conducted at least five of the indicated transactions within the 24 months prior to the deal announcement. Overall, I find that regardless of which M&A experience measure I use, the coefficients are always positively and statistically significantly related to acquirer announcement returns. The exception is the coefficient on *M&A Experience in Deals with Positive CARs*, which is positive but statistically insignificant. These results suggest that being involved in M&A processes that led to negative acquirer CARs resulted in directors learning from their mistakes.

In Panel B of Table 3.6, I examine the relation between acquirer CARs and the M&A experience of heterogeneous directors. Field, Lowry, and Mkrtchyan (2013) argue that

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[44] In unreported robustness tests, I further group large and small transactions by a $500 million and a $50 million cut-off. The results remain robust.

directors holding three or more outside directorships gain experience in a variety of corporate issues and are better connected, which makes them great advisors and hence enhances firm value. On the contrary, Falato, Kadyrzhanova, and Lel (2014) provide evidence that these busy directors are worse monitors and thus diminish shareholder value. Therefore, in Column (3), I analyze the influence of M&A-experienced directors who hold three or more outside directorships (*M&A Experience * Busy Directors*) and of directors with M&A experience who hold less than three outside directorships (*M&A Experience * Not Busy Directors*) on acquirer abnormal stock returns upon the deal announcement. My results show that the coefficients on M&A experience for both busy and non-busy directors are positive and statistically significant. Huang et al. (2014) find that board directors with investment banking experience have valuable transaction knowledge, enabling them to identify more appropriate targets and reduce the deal costs, thereby enhancing acquirer announcement returns. Accordingly, I test in Column (2) whether directors with M&A experience who simultaneously serve on the board of an investment bank[45] (*M&A Experience * Investment Banking Directors*) influence acquirer announcement returns differently than directors with M&A experience who do not serve on the board of an investment bank (*M&A Experience * Not Investment Banking Directors*). I find that both investment banking directors and non-investment banking directors with M&A experience are positively related to acquirer announcement returns. Directors are not matched randomly to firms; instead, firms actively choose directors. Therefore, one might argue that firms anticipating beneficial transactions might deliberately appoint directors with M&A experience so as to facilitate these transactions. However, the average director with M&A experience has a tenure of eight years, which reduces the selection bias concern. Nevertheless, I test whether the positive valuation effect of directors with M&A experience varies by tenure. To that end, I sort directors with M&A experience into the categories *Long Tenure* and *Short Tenure*, indicating that the directors were either appointed five or more years prior to or within the four years prior to the deal announcement, respectively. The results in Column (3) indicate that selection bias does not explain the positive returns of experienced directors, as directors with M&A experience who have served at the firm for longer periods and for shorter periods both enhance acquirer announcement returns.

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[45] Similar to Huang et al. (2014), I define an investment bank as being one of the top 20 external financial advisors based on Thomson One's league tables ranked by deal value.

3.5.2 Heterogeneous Acquirer, Deal, and Target Characteristics

I compare the size of the effects of acquirer CARs on *M&A Experience* across different types of acquirers, deals, and targets in Table 3.7. The setup is identical to the baseline regression.

In Panel A of Table 3.7, I test the relation between director M&A experience and acquirer announcement returns for heterogeneous acquirers and deals. First, I determine whether director M&A experience is more valuable for larger or smaller acquirers. Smaller acquirers may rely more heavily on the advice of directors and acquisitions may have a relatively substantial impact on smaller acquirers. Therefore, in Column (1), I interact *M&A Experience* with dummy variables indicating whether the acquirer is above (*Larger Size*) or below (*Smaller Size*) median firm size in my sample. As the financial industry is subject to stronger regulations and is more opaque and complex than other industries (Levine, 2004), governance attributes in this industry often have a different influence on firm outcomes (Adams, 2012). To analyze whether director M&A experience is more relevant for nonfinancial or financial acquirers, I interact *M&A Experience* with a dummy variable indicating that the acquirer is in the financial industry (*Financial Acquirer*) and with a dummy variable indicating that the acquirer is not in the financial industry (*Nonfinancial Acquirer*) in Column (2). A firm is considered to be in the financial industry if its SIC code falls between 6000 and 6999. Finally, I investigate whether the characteristics of the deal process affect the positive valuation effect of directors' transaction experience. To do so, I interact *M&A Experience* with a dummy variable taking the value of one if the deal is friendly (*Friendly Deal*) and a dummy equaling one if the deal is a tender offer (*Tender Offer*) in Column (3). Over all specifications, I find that M&A-experienced directors are positively, statistically significantly related to acquirer announcement returns irrespective of the acquirer's size, of whether the acquirer is in the financial industry, and of whether the deal is friendly or a tender offer.

I next determine whether the positive influence of director M&A experience on acquirer announcement returns is particularly valuable for certain targets (Panel B of Table 3.7). As directors with M&A experience identify more synergistic targets and help design better negotiation strategies, their superior M&A knowledge might be more valuable for larger targets (Huang et al., 2014), given that larger targets generally have more negotiation power (Golubov, Petmezas, and Travlos, 2012), and for targets with higher information asymmetries, as these are more difficult to value (Wang, Xie, Zhang, 2014). To this end, I interact *M&A Experience* with dummies reflecting the higher and lower

Table 3.7: Heterogeneous Acquirer, Deal, and Target Characteristics
The table reports acquirer fixed effects regression results of acquirer announcement returns on M&A experienced directors for heterogeneous targets, acquirers, and deals. Panel A reports heterogeneous treatment effects for acquirer and deal characteristics. Larger Size and Smaller Size are dummy variables indicating whether the acquirer is above or below the sample median of Size. Financial Acquirer (Nonfinancial Acquirer) indicates that the acquirer has (has not) a SIC code ranging between 6000 and 6999. Friendly Deal (Tender Offer) indicates that the deal is a friendly (tender) takeover. Panel B reports regression results of acquirer CARs on director M&A experience for different targets in which higher and lower values are split by the sample median of Deal Value, PIN, and Bid-Ask Spread. Deal Value is defined as the total dollar value offered for the target. PIN is the probability of a privately informed investor to execute a particular trade. Bid-Ask Spread is the target's average daily bid-ask spread over the year. All regressions employ the full set of control variables as in Column (3) of Table 3.2. The t-values are based on robust standard errors and are reported in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	CARs		
	(1)	(2)	(3)
Panel A: Heterogeneous Acquirers and Deals			
M&A Experience * Larger Size	0.025 **		
	(2.52)		
M&A Experience * Smaller Size	0.027 **		
	(2.41)		
M&A Experience * Financial Acquirer		0.014 *	
		(1.94)	
M&A Experience * Non-Financial Acquirer		0.038 ***	
		(3.25)	
M&A Experience * Friendly Deal			0.024 ***
			(2.89)
M&A Experience * Tender Offer			0.039 **
			(2.26)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes
Panel B: Heterogeneous Targets			
M&A Experience * Higher Deal Value	0.029 **		
	(2.47)		
M&A Experience * Lower Deal Value	0.024 **		
	(2.42)		
M&A Experience * Target Higher PIN		0.141 **	
		(2.39)	
M&A Experience * Target Lower PIN		0.045	
		(1.22)	
M&A Experience * Target Higher Bid-Ask Spread			0.118 **
			(2.35)
M&A Experience * Target Lower Bid-Ask Spread			0.078
			(1.64)
Acquirer and Deal Characteristics	yes	yes	yes
Year and Acquirer Fixed Effects	yes	yes	yes

values of the sample's median deal value (Column (1)), the target's *PIN* (Column (2)), and the target's bid-ask spread (Column (3)). I define *PIN* as the probability of a privately informed investor executing a particular trade (Brown et al., 2004) and retrieve

it from Stephen Brown's webpage.[46] The bid-ask spread is computed as the average daily bid-ask spread over one year before the deal announcement and is based on data obtained from CRSP. Higher values of *PIN* and the bid-ask spread indicate higher information asymmetry. The results indicate that M&A experience increases acquirer announcement returns both in larger and smaller deals, but is more valuable in transactions with higher information asymmetries between targets and acquirers.

3.6   Conclusion

In this paper, I analyze whether and, if so, how directors with M&A experience influence acquisition performance using a sample of U.S. S&P 1500 firms that acquired U.S. public, private, or subsidiary firms between January 1, 2000 and December 31, 2013. My results indicate that directors who have conducted at least five M&A transactions within the 24 months prior to the deal announcement increase acquirer abnormal stock returns upon the announcement of a deal, while controlling for acquirer fixed effects, deal characteristics, and acquirer financial and governance characteristics. My results are robust to various tests addressing endogeneity. Further, I explore the potential channels through which directors with M&A experience enhance acquirer announcement returns. I find that the improvement in acquirer returns comes from M&A-experienced directors' ability to identify targets with higher synergies, to pursue more appropriate targets, and to withdraw from deals involving value-diminishing targets. Moreover, I find that directors with M&A experience negotiate more favorable prices and reduce external financial advisory fees.

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[46] http://scholar.rhsmith.umd.edu/sbrown/pin-data?destination=node/998

3.7   Appendix 3.A

Panel A: Acquirer Director M&A Experience	
M&A Experience	Fraction of directors on the board that were involved in five or more M&As as directors within the 24 months prior to the deal announcement.
M&A Experience (12 Months)	Fraction of directors on the board that were involved in five or more M&As as directors within the 12 months prior to the deal announcement.
M&A Experience (36 Months)	Fraction of directors on the board that were involved in five or more M&As as directors within the 36 months prior to the deal announcement.
M&A Experience (12 to 24 Months)	Fraction of directors on the board that were involved in five or more M&As as directors between 12 and 24 months prior to the deal announcement.
M&A Experience ($\geq$ 3 M&As)	Fraction of directors on the board that were involved in three or more M&As as directors within the 24 months prior to the deal announcement.
M&A Experience from Other Firms	Average number of M&As in which the directors on the board were involved through their outside directorships within the 24 months prior to the deal announcement.
Abnormal M&A Experience	Board average of the difference between the number of M&As a director was involved in and the number of M&As the acquirer conducted within the 24 months prior to the deal announcement.

Panel B: Deal Characteristics	
Relative Deal Size	Deal value divided by the acquirer's market value of equity 20 days prior to the deal announcement.
Public Target	Indicator variable that equals one if the target firm is public.
Private Target	Indicator variable that equals one if the target firm is private.
Cash Dummy	Indicator variable that equals one if the deal is financed fully with cash.
Stock Dummy	Indicator variable that equals one if the deal is financed fully with stock.
Friendly Deal	Indicator variable that equals one if the deal is friendly.
Diversifying Deal	Indicator variable that equals one if the target is not within the same four-digit SIC industry as the acquirer.

Panel C: Acquirer Characteristics	
Leverage	Book value of debt over the book value of assets.
Tobin's Q	The firm's market value of assets divided by its book value of assets, where market value of assets is the book value of assets plus the market value of common equity minus the book value of common equity.
Size	Natural logarithm of the book value of total assets in millions.
Past No of Deals	Natural logarithm of one plus the total number of deals the acquirer conducted during the 24 months prior to the deal announcement.
CEO Duality	Indicator variable that equals one if the CEO is also the chairman of the acquirer's board.
Board Size	Natural logarithm of the total number of directors on the acquirer's board.
Independent Board	Fraction of independent directors (NYSE and NASDAQ guidelines) on the acquirer's board.
Female Board	Fraction of directors on the acquirer's board holding at least three or more outside directorships.
Board Age	Fraction of female directors on the acquirer's board.
Board Tenure	Average age of the directors on the acquirer's board.
Board Busyness	Average number of years the directors served on the acquirer's board

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Panel D: Dependent Variables	
CARs	Acquirer's cumulative abnormal returns calculated using the market model estimated over the period starting 346 days and ending 21 days prior to the announcement.
Acquirer Synergy Gains	Acquirer's dollar-denominated gain divided by total synergy gains if total synergy gains are positive and one minus acquirer's dollar-denominated gain divided by total synergy gains if total synergy gains are negative. Total synergy gains is the sum of the dollar-denominated gains of the acquirer and the target, where the dollar-denominated gain is the market capitalization times CARs (–2, +2) of the respective firms.
Good Advice	Indicator variables that equal one if acquirer CARs are positive (negative) and the deal is completed (withdrawn) and zero otherwise.
Price Premium	The final offer price per share relative to the target's share price four weeks prior to the deal announcement.
Advisory Fees	The total advisory fees paid by the acquirer relative to the deal value.
Panel E: Additional Controls	
Advisor	Indicator variable that equals one if the acquirer hires at least one external advisor.
Top Tier Advisor	Indicator variable that equals one if the acquirer hires a top five advisor based on Thomson One's deal value ranking.
CEO Age	The age of the acquirer's CEO.
CEO Tenure	Average number of years the CEO served as the acquirer's CEO.
CEO Pay for Performance	Fraction of the acquirer CEO's stock- and option-based compensation over his total compensation.
G-Index	Governance index proposed by Gompers, Ishii, and Metrick (2003), consisting of 24 anti-takeover provisions.
Institutional Ownership	Percentage ownership of institutional investors.
Board Financial Expertise	Fraction of directors on the acquirer's board who are indicated to be financial experts based on the SEC guidelines.
Board Ph.D.	Fraction of directors on the acquirer's board with a Ph.D.

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