Are independent directors with industry expertise more informed?

(Job Market Paper)

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November 2017

Abstract

This paper examines the informational advantage of independent directors with industry expertise compared to independent directors without such expertise. I find that independent directors with industry expertise earn significantly higher trading returns when purchasing their firms' stocks than do independent directors without industry expertise. The impact of industry expertise on independent directors' trading profits is more pronounced for firms with higher information asymmetry, for more complex firms, and for firms with higher business risk. Trades made by independent directors with industry expertise have greater predictive power regarding future stock price changes. Moreover, an increase in the proportion of independent directors with relevant industry expertise on the board is associated with better alliance performance, a higher probability of M&A deal completion, and a lower investment-to-price sensitivity. Overall, the results suggest that independent directors with industry expertise have superior knowledge about the firm and enhance board effectiveness in performing both monitoring and advisory roles.

Keywords: independent directors; industry expertise; insider trading

JEL codes: G30; G34

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1. Introduction

The legislative and regulatory reform on corporate governance since 2002 has put a lot of effort on increasing the proportion of independent directors on the board.[1] The idea is that outside directors are expected to have the right incentives to monitor mangers and to alleviate agency problems. Nevertheless, the evidence that links board independence and firm performance so far has been mixed.[2] One possible explanation is that greater board independence could be associated with the reduction in the amount of information available to board of directors, which in turn limits the board effectiveness in monitoring and advising managers (Fama and Jensen, 1983; Coles, Daniel, and Naveen, 2008; Duchin, Matsusaka, and Ozbas, 2010).[3]

In recent years, legislators, practitioners, as well as scholars have shifted their focus toward not only directors' independence but also their qualifications and expertise. In December 2009, the Securities and Exchange Commissions (SEC) adopted the amendments to the disclosure rules, which require increased disclosure on directors' background and qualifications.[4] In particular, industry expertise has become one of the most sought-after attributes for board members (PricewaterhouseCoopers LLP, 2012; Deloitte LLC, 2014; Corporate Board Member, 2016). Several recent studies show that the presence of independent directors with industry expertise has a positive and significant impact on firm value and performance.[5] These studies propose that independent directors with industry expertise are expected to possess superior knowledge about the risk and opportunities associated with the firm and to have better understanding about the firm's operational and regulatory environment. Therefore, industry experienced independent directors may enhance board monitoring and advising by bringing valuable information to the board. Nevertheless, the direct evidence regarding the informational advantage of independent directors with industry expertise is still missing in the literature.

In this paper, I examine whether independent directors with industry expertise have superior

[1] In 2002, the US Congress passed the Sarbanes-Oxley Act (SOX), which requires publicly-traded firms in US to have a fully independent audit committee. In 2003, New York Stock Exchange (NYSE) and NASDAQ introduced the new listing rules that all listed firms in US to have a majority independent board.

[2] Please see, for example, Bhagat and Bolton (2008), Duchin, Matsusaka, and Ozbas (2010), and Nguyen and Nielsen (2010).

[3] Adams and Ferreira (2007) and Harris and Raviv (2008) show theoretically that greater board independence may not be optimal for shareholders. This is because while independent directors may have stronger incentives to act on behalf of shareholders' interests, how effective independent directors can perform their monitoring and advisory role also depends on the amount of information available to them as well as their ability to process such information. Senior executives, who do not want to be closely monitored, may be reluctant to fully reveal firm's information to the board dominated by independent directors, and therefore hinder board effectiveness in performing its dual role.

[4] https://www.sec.gov/rules/final/2009/33-9089.pdf

[5] Please see, Masulis et al. (2012), Faleye, Hoitash, and Hoitash (2014), Wang, Xie, and Zhu (2015), and Drobetz et al. (2016), among others.

information about the firm than independent directors without such expertise. Following prior research, I use abnormal returns earned by independent directors when trading on their firms' stocks as a proxy for the amount of information about the firm possessed by independent directors (e.g. Ravina and Sapienza, 2010; Cao et al., 2015). I define an independent director as having industry expertise if she/he has worked at another firm in the same 2-digit SIC industry as the focal firm (Cohen et al., 2014; Faleye, Hoitash, and Hoitash, 2014; Wang, Xie, Zhu, 2015; Drobetz et al., 2016). My analyses mainly focus on open-market purchases as purchase transactions are more likely to be information-driven while sales transactions could be motivated by portfolio rebalancing and/or liquidity needs (Lakonishok and Lee, 2001; Ravina and Sapienza, 2010; etc.). Using a sample of open-market transactions made by independent directors in U.S. public firms from 2000 to 2013, I find that, over the 180 days following the purchase transaction, independent directors with industry expertise earn abnormal returns that are around 4% higher than the returns earned by independent directors without such expertise. The results are robust to the inclusion of transaction-, director-, and firm-level characteristics, as well as firm-fixed effects, in the analyses.

To the extent that prior work experience in the focal industry allows independent directors to have privileged knowledge about the focal firm, I expect that their informational advantage depends on the firm's information environment, the complexity of the firm, as well as the level of business risk associated with the firm. Following previous literature, I use analyst coverage to proxy for the degree of information asymmetry of the firm. I find that when independent directors purchase their firms' stocks, the effect of industry expertise on their trading returns is significantly stronger for firms with lower analyst coverage. The evidence suggests that the informational advantage of industry experienced independent directors is greater for firms with higher information asymmetry. I also find that the effect of industry expertise on directors' trading returns is stronger for firms with higher R&D intensity, suggesting that industry experienced independent directors are more likely to have an informational advantage over inexperienced independent directors for firms with higher operational complexity. Finally, I show that the effect of industry expertise on independent directors' trading returns is more pronounced for firms with a higher level of cash flow volatility. The evidence is consistent with the prediction that independent directors with industry expertise have a greater informational advantage over independent directors without such expertise for firms with higher business risk. This is in line with the intuition that previous experience in the same industry could provide independent directors with a better assessment about the risk and opportunities associated with the firm.

One potential concern of the above findings is that independent directors who have experience in the focal industry may have cross paths with their firms' CEO/CFOs. As a result, their

informational advantage might come from their connections with CEO/CFOs instead of their industry expertise. To address this issue, I explicitly control for social connections between independent directors and their CEO/CFOs in the analyses. The evidence shows that my previous findings remain unchanged after controlling for social connections between independent directors and their firms' senior executives.

Another concern of the previous analyses is that insiders, such as independent directors, may trade for a variety of reasons. As a result, trading returns do not purely reflect the amount of private information held by independent directors. Cohen, Malloy, and Pomorski (2012) show that opportunistic insider trades are more likely to be motivated by private information compared to routine trades. Following their methodology, I re-examine the effect of industry expertise on independent directors' trading returns in a subsample of opportunistic purchase transactions. The results show that in terms of economic significance, the effect of industry expertise on abnormal returns earned by independent directors over 180 days following the purchase transaction almost quadrupled in opportunistic trades.

To supplement the above analyses, I also compare the trading performance between independent directors with industry expertise and the ones without industry expertise in a portfolio approach following the spirit of Cook and Wang (2011). I construct zero-investment portfolios based on purchases and sales transactions, respectively. The results show that a long-short portfolio strategy that invests in stocks purchased by independent directors with industry expertise and shorts stocks purchased by independent directors without such expertise earns a factor-adjusted abnormal return of 170 basis points per month. However, an analogous portfolio strategy based on sales transactions executed by independent directors does not yield a significant abnormal return.

Next, following Ravina and Sapienza (2010) and Akbas, Jiang, and Koch (2017), I investigate whether transactions made by independent directors with industry expertise are more informative about large stock price changes in the near future. The results show that purchase (sales) transactions made by independent directors with industry expertise have greater predictive power regarding imminent positive (negative) shocks on stock prices compared to trades made by independent directors without such expertise.

The above results support the prediction that independent directors with industry expertise have superior knowledge about the firm than independent directors without such expertise. In the additional tests, I further examine whether the presence of industry experienced independent directors on the board is associated with better firm performance. Since these independent directors would have the right incentives to perform their tasks and privileged knowledge about the firm, they are expected to be at a better position to monitor and advise managers. First, I corroborate the

findings in the previous literature that an increase in the proportion of independent directors with industry expertise on the board is associated with a significant improvement in the firm's operating performance. Next, I focus on major corporate events that are more likely to involve board monitoring and advising, that is, alliances and acquisitions. The results show that a higher proportion of independent directors with experience in the alliance industry is related to better alliance performance, i.e. 26 basis points higher announcement return. I also find that the presence of independent directors who have experience in the target industry is associated with a higher likelihood that the acquirer successfully consummates the takeover deal.

Finally, I investigate whether independent directors with industry expertise contribute to corporate investment decisions through the information channel. I find that a higher proportion of independent directors with experience in the focal industry is associated with a decrease in investment-to-price sensitivity. The evidence is consistent with the notion that independent directors with industry expertise could serve as an alternative source of information to managers and thus allow managers to rely less on the private information embedded in stock prices.

This paper contributes to the existing literature in several ways. First, this paper adds to the corporate governance literature that studies the value of independent directors' industry expertise. To the best of my knowledge, this paper is the first to formally examine the informational advantage of independent directors with industry expertise. I also complement the extant literature by presenting new evidence regarding the relationship between industry experienced independent directors and the alliance performance as well as the acquisition outcome. Moreover, the findings of this study suggest that independent directors with industry expertise could bring incremental information to managers and thus lessen the need for managers to learn from stock prices when making investment decisions.

Second, this paper contributes to the literature that studies the dual role of board of directors, as monitors and advisors. Adams and Ferreira (2007) show theoretically that there exists a trade-off between monitoring intensity and the quality of board advising, which is largely affected by managers' willingness to share information related to the firm. Faleye, Hoitash, and Hoitash (2011) present evidence that an improvement in board oversight is associated with a deterioration in the quality of board advising. The results in this paper complement the work by Masulis et al. (2012) and Faleye, Hoitash, and Hoitash (2014) by showing that independent directors with industry expertise could enhance board effectiveness in performing the dual role through the information channel.

Last but not least, this paper contributes to a nascent stream of insider trading literature that examines the trading performance of independent directors. Building on the work by Ravina and Sapienza (2010), Cook and Wang (2011) document that multi-firm independent directors outperform single-firm independent directors, and Cao et al. (2015) find that independent directors who have

social connections with senior executives earn significantly higher trading returns than unconnected independent directors when executing sales transactions. This paper shows that independent directors with industry expertise earn higher trading profits in purchase transactions than independent directors without such expertise, suggesting that industry expertise is another key determinant of independent directors' trading returns.

The remainder of this paper is organized as follows. Section 2 discusses related literature and develops main hypotheses. Section 3 describes data and empirical testing issues. Section 4 presents main empirical results. Section 5 presents robustness tests. Section 6 presents further analyses. Section 7 concludes.

2. Literature review and hypotheses

2.1 Literature review

This paper relates to the nascent literature that studies the value of independent directors with industry expertise. Masulis et al. (2012), Faleye, Hoitash and Hoitash (2014), Drobetz et al. (2016), and Kang, Kim, and Lu (2017) provide evidence that the presence of independent directors with industry expertise is positively and significantly associated with firm performance, investments in innovative projects, cash holdings, and CEO pay (turnover)-performance sensitivity. In addition, Cohen et al. (2014) and Wang, Xie, Zhu (2015) find that audit committee members with industry expertise significantly reduce the firm's earnings management. Furthermore, von Meyerinck, Oesch, and Schimid (2016) show that firms experience more favourable market reactions around the appointments of independent directors with industry expertise. Dass et al. (2014) show that the presence of directors with experience in related industries on the board increases firm value, improves the firm's short-term liquidity, and alleviates the firm's financial constraints.

In addition, this paper relates to a stream of literature that studies the dual role of board of directors. Adams and Ferreira (2007) suggest that the optimal level of board independence depends on the trade-off between monitoring intensity and the quality of board advising, which is largely affected by managers' willingness to share information related to the firm. Kim, Mauldin, and Patro (2014) find that longer independent director tenure enhances the quality of both monitoring on excess CEO compensation and advising regarding acquisition and investment decisions. Faleye, Hoitash and Hoitash (2011) show that greater board monitoring intensity is associated with compromised board advising effectiveness in terms of acquisition performance and corporate

innovation.

Finally, this paper adds to a large body of literature on insider trading. Prior research has shown that insider trading profits are associated with firm characteristics, such as firm size (Lakonishok and Lee, 2001), the quality of corporate governance (Ravina and Sapienza, 2010; Jagolinza, Larcker, and Taylor, 2011; etc.), analyst coverage (Frankel and Li, 2004; Ellul and Panayide, 2016), R&D expenditures (Aboody and Lev, 2000), as well as concentrated sales relationships (Alldredge and Cicero, 2015). Moreover, the literature also relates the information content of insider trades with trader- and trade-level characteristics. Ravina and Sapienza (2010) show that the trades made by executive officers earn higher abnormal returns than trades made by independent directors, especially for firms with weaker governance. Cook and Wang (2011) find that independent directors who hold multiple board seats outperform single-firm independent directors. Cao et al. (2015) document that independent directors who are socially connected with their CEO/CFOs earn higher returns than unconnected independent directors when executing sales transactions. Hillier, Korczak, and Korczak (2015) find that individual attributes can explain around one-third of the differences in insider trading performance. Furthermore, several recent studies provide evidence that the informativness of insider trades also varies with insider trading patterns (Cohen, Malloy, and Pomorski, 2012; Akbas, Jiang, and Koch, 2017).

2.2 Hypotheses development

Independent directors often work under a limited amount of time, and face information acquisition costs when monitor and advise managers. Managers, due to agency conflicts, may not be willing to fully reveal information about the firm to outside directors. Therefore, independent directors, when performing their dual role, need to draw on their expertise to process information available to the board and/or acquire additional information from other sources. Independent directors with relevant industry experience are expected to have a better understanding about the challenges, opportunities, competition, as well as regulatory environment around the firm (Masulis et al., 2012; Faleye, Hoitash, and Hoitash, 2014). Based on their experience and knowledge in a similar framework, independent directors with industry expertise may be able to process information related to the firm in a more efficient and effective manner (Day and Lord, 1992; Carpenter and Westphal, 2001). Moreover, independent directors with industry expertise might obtain incremental information related to the focal firm from their connections with other industry players.

Following the literature on insider trading, I use the abnormal return earned by an independent director when trading her/his firm's stock as a proxy for the amount of information

she/he has about the firm. Based on the above discussion, the main hypothesis in this paper is as follows:

Hypothesis 1: Ceteris paribus, independent directors with industry expertise earn significantly higher abnormal returns when trading their firms' stocks than do independent directors without industry expertise.

To complement my investigation of Hypothesis 1, I further examine the cross-sectional variation in the effect of industry expertise on independent directors' trading returns as potential falsification tests. I expect that the effect of industry expertise on independent directors' trading returns will be stronger for firms with higher information asymmetry. This is because independent directors with relevant industry experience may be able to obtain information related to the focal firm from other sources, such as industry peers, and thus enjoy a lower information acquisition cost compared to inexperienced independent directors. In addition, I expect that the impact of industry expertise on independent directors' trading profits would be greater for more complex firms with higher operational uncertainty. The idea is that relevant industry experience and knowledge could help independent directors cope with complex issues. Finally, I expect the effect of industry expertise on independent directors' trading returns to be more pronounced for firms with higher business risk. To the extent that firms with higher business risk may face more uncertainty over future earnings and growth opportunities, independent directors with experience in the focal industry may be able to assess the risk and opportunities associated with the firm more accurately, and they may be better able to anticipate future firm performance. I therefore propose the following as a corollary to Hypothesis 1:

Hypothesis 2: The effect of industry expertise on independent directors' trading returns will be stronger for: a) firms with higher information asymmetry, b) more complex firms, and c) firms with higher business risk.

3. Data and empirical testing issues

3.1 Data and sample construction

In this paper, I obtain data from various sources. I start by collecting insider trading data from ThomsonReuters' Insiders Filing database. Following previous studies, the sample is restricted

to open-market purchases and sales transactions.[6] I exclude insider trades that are partially or fully related to option exercises, as well as transactions that do not involve common stocks (share code other than 10 or 11). Following Alldredge and Cicero (2015), I require insider transactions included in the analyses to have a cleanse code of R, H, L, C, or Y. To focus on more meaningful trades, I exclude transactions involving less than 100 shares from the sample (Akbas, Jiang, and Koch, 2017). I also exclude transactions where the number of shares traded exceeds 20% of shares outstanding and/or the prices deviate from CRSP closing prices by more than 20% (Sias and Whidbee, 2010; Ali, Wei, and Zhou, 2011; Chiang and Chung, 2012). Penny stocks with prices lower than $2 at the beginning of each calendar year are eliminated from the sample (Chiang and Chung, 2012). In addition, if an insider trades the same stock in the same direction and on the same day, I combine these transactions to a single trade as these transactions are most likely to be motivated by the same information (Cao et al., 2015).

The information of independent directors in U.S. public firms from 2000 to 2013 as well as their detailed employment history are obtained from BoardEx. I also obtain stock data from Center for Research on Security Prices (CRSP), financial statement data from Compustat, analyst coverage data from I/B/E/S, and institutional ownership data from ThomsonReuters. Financial firms (SIC 6000-6999), utility firms (SIC 4900-4999), and firms listed on stock exchanges other than NYSE, AMEX or Nasdaq are excluded from the analyses. I also drop firms with missing or negative total assets, book equity, or sales. Finally, following the spirit of Hillier, Korczak, and Korczak (2015), I focus on firms whose stocks are traded for at least 3 years during the sample period. After making sure all the variables are non-missing, the final sample includes 26,996 open-market transactions (9,699 purchases and 17,297 sales) made by 6,571 unique independent directors from 2,155 unique firms over the period of 2000 to 2013.

3.2 Variables

Following the insider trading literature, I use the abnormal return earned by an independent director from trading her/his firm's stock to proxy for the amount of information that she/he has about the firm. As in Jagolinzer (2009) and Ravina and Sapienza (2010), for each transaction made by an independent director, I compute the market-adjusted buy-and-hold abnormal return (*BHAR*) by subtracting the compounded market return, proxied by the value-weighted CRSP portfolio return, from the compounded stock return over the following 90 and 180 trading days, respectively.

[6] Please see, Ravina and Sapienza (2010), Cao et al. (2015), Alldredge and Cicero (2015), Akbas, Jiang, and Koch (2017), among others.

Following Jagolinzer et al. (2011) and Cao et al. (2015), I also employ the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 90 and 180 days, respectively, following each transaction to measure the abnormal performance of trades made by independent directors.[7]

The main variable of interest is the industry expertise of independent directors. Using data from the employment history file of BoardEx, I compile a list of employment record for each independent director with the primary SIC code for each firm that the director has served.[8] Following prior research, I define an independent director as having industry expertise (*IDIE=1*) if she/he has worked at a different firm in the same 2-digit SIC industry as the focal firm where she/he currently serves as an independent director (e.g. Cohen et al., 2014; Faleye, Hoitash, and Hoitash, 2014; Wang, Xie, Zhu, 2015; Drobetz et al., 2016). I focus on executive-level and director-level positions, since these positions are more likely to allow an individual to obtain valuable information about the firm or the industry (Wang, Xie, Zhu, 2015).[9] To supplement the analyses, I also employ a discrete variable, *IEYEARS*, equal to the number of years that an independent director has worked at another firm in the focal industry, and zero if the independent director has no industry expertise.

Following Ravina and Sapienza (2010) and Cao et al. (2015) among others, I control for firm and individual characteristics that could affect independent directors' trading profits, including firm size, book-to-market ratio (*BM*), transaction size (*TRANSIZE*), and director ownership in the firm (*DOWN*) prior to the transaction date. Since independent directors might be 'contrarian' traders, I also control for the buy-and-hold abnormal return over the 90 trading days before each transaction (*PRET90*) (Piotrosk and Roulstone, 2005; Hillier, Korczak, and Korczak, 2015). In addition, I add several control variables that could affect independent directors' access to the firm's information as well as their trading profitability. I control for whether independent directors hold multiple board seats (*MULTIBOARD*) at the time of the transaction since multi-firm directors may earn greater trading profits due to superior ability and/or having alternative sources of information (Cook and Wang, 2011). I include director age (*LNAGE*) and tenure in the focal firm as additional control variables since senior directors and/or directors who have worked for a longer period of time in the same firm are expected to have a better understanding about the firm (Kim, Mauldin, and Patro, 2014). I also control for a dummy variable, *CEOCFO*, equal to one if an independent director has

[7] For completeness, I also compute the market-adjusted BHAR and the four-factor alpha over the 30 and 60 trading days, respectively, following each trade. In the analyses, I mainly focus on the 180-days horizon because insiders are prohibited from making profits through 'short-swing' transactions within six months based on Rule 16(b) of the Securities Exchange Act of 1934.

[8] For public firms, the primary SIC codes are retrieved from Compustat, and for private firms, the primary SIC codes are retrieved from Capital IQ database.

[9] For the full list of positions in the employment history that is considered in this study, please refer to Wang, Xie, Zhu (2015).

worked as CEO and/or CFO at another firm, and zero otherwise. The idea is that independent directors with CEO/CFO experience may have better skills to process information. Furthermore, I control for directors' committee memberships on the audit committee (*AUDIT*), the compensation and nomination committee (*COMP_NOMI*), because directors who are members of these committees may have privileged access to information related to the firm (e.g. Ravina and Sapienza, 2010; Cook and Wang, 2011; etc.). Moreover, I also control for board size, board independence (*ID_PCT*), and institutional ownership (*FRCIO*), because these factors may affect the quality of corporate governance and thus affect the trading returns earned by independent directors (Ravina and Sapienza, 2010; Cao et al., 2015). Last but not least, I add an indicator variable, *BLACKOUT*, equal to one if the transaction occurs during the period of [-46,+1] calendar days around a quarterly earnings announcement, and zero otherwise (Jagolinzer et al., 2011; Cao et al., 2015).

3.3 Summary Statistics

Table 1 presents the summary statistics for variables of interest for the sample of purchase transactions, which is also the focus of the main analyses. Panel A of Table 1 shows that 12.9% of the purchase transactions are executed by independent directors with industry expertise.[10] The average 180-days market-adjusted buy-and-hold abnormal return (*BHAR180*) in the sample is 8.878%, and the average (daily) 180-days abnormal return estimated from the Fama and French (1993) and Carhart (1997) four-factor model (*Alpha180*) is 0.049%, suggesting that independent directors earn profits when purchasing their firms' stocks. On average, independent directors are approximately 60 years old (with *AGE* of 60.238) and have worked in the firm for almost 6 years (with *TENURE* of 5.834). Panel A of Table 1 also shows that 60% of independent directors are members of audit committees (*AUDIT*), and 75.2% of these directors are members of compensation or nomination committees (*COMP_NOMI*). Since independent directors with committee memberships could have superior access to information about the firm compared to the ones without committee memberships, these statistics seem to suggest that independent directors with committee memberships are more likely to trade on their firms' stocks, at least during good times, and that these transactions are likely to be driven by private information.[11] Furthermore, around 21% of independent directors are 'busy' directors who are board members of at least two firms (with *MULTIBOARD* of 20.9%). Finally,

[10] For independent directors with industry expertise in the sample, the average (median) length of industry experience they have is 7.14 (6) years.

[11] At the firm-year level, 39.3% of independent directors sit on audit committees, and 49.7% of independent directors sit on either compensation or nomination committees.

17.6% of the open-market purchases occur during the blackout window around the quarterly earnings announcement (*BLACKOUT*).

[Insert Table 1 here]

Table 1 also presents the univariate comparisons of trading returns and other characteristics between independent directors with industry expertise (*IDIE=1*) and the ones without industry expertise (*IDIE=0*) for the sample of open-market purchases. Panel B of Table 1 shows that independent directors with industry expertise earn significantly higher trading returns from insider purchase transactions than do independent directors without such expertise. The differences are positive and statistically significant at 1% level during the 30, 60, 90, and 180-days period following each transaction, suggesting that industry experienced independent directors are likely to possess superior information related to the focal firm.

Moreover, consistent with the findings in Drobetz et al. (2016), independent directors with industry expertise are more likely to sit in firms with better corporate governance, more specifically, firms with higher board independence, higher institutional ownership, and smaller board size.[12] Moreover, independent directors with industry expertise are more likely to sit in smaller firms and firms with higher growth potentials. These findings are consistent with the argument in Fahlenbrach et al. (2010) and Faleye, Hoitash, and Hoitash (2014) that small and growth firms may have greater needs for board advising and thus have a higher demand for highly skilled independent directors, such as independent directors with industry expertise. In accordance with recent surveys where industry expertise has become one of the most sought-after attributes for independent directors, the evidence shows that industry experienced independent directors are more likely to hold multiple board seats than inexperienced independent directors (PricewaterhouseCoopers LLP, 2012; Deloitte LLC, 2014; Corporate Board Member, 2016). Panel B of Table 1 also shows that there are no statistically significant differences in director age and transaction size between independent directors with industry expertise and independent directors lack of such expertise. Furthermore, independent directors with industry expertise are less likely to sit on audit committees, but are more likely to sit on compensation and nomination committees than independent directors without industry expertise. Finally, compared to inexperienced independent directors, industry experienced independent directors have lower equity ownership in the focal firm, and are less likely to trade during the blackout period.

[12] In the summary statistics and univariate comparisons, *BOARDSIZE* is the total number of board members for descriptive purpose. In regression analyses, I use the natural logarithm of the number of board members as the control variable for board size.

4. Empirical results

4.1 Industry expertise and independent directors' trading performance

Table 2 presents the regression results for the main hypothesis that independent directors with industry expertise earn higher trading returns when trading their firms' stocks than do independent directors without such expertise. To test this prediction, I employ the following OLS regression model:

$$\mathrm{AR}_{\mathrm{ijt}} = \alpha + \beta \cdot \mathrm{IDIE}_{\mathrm{ijt}} + \theta \cdot \mathrm{Controls}_{\mathrm{ijt}} + \gamma_{\mathrm{i}} + \varepsilon_{\mathrm{ijt}}$$

where *AR* is one of the measures of the abnormal return of firm *i* earned by independent director *j* in a purchase transaction on date *t*. The main explanatory variable, *IDIE*, is an indicator variable equal to one if independent director *j* has worked at another firm in the same 2-digit SIC industry as the focal firm *i* when she/he executes the trade, and zero otherwise. Following Ravina and Sapienza (2010), I also include firm fixed effects in the analyses and standard errors are clustered at individual level. Regarding control variables, I employ two different specifications. The first specification, which corresponds to Columns 1, 3, 5, and 7 in Panel A of Table 2, controls for common factors that affect independent directors' trading returns, including transaction size, firm size and book-to-market ratio, past returns, director ownership in the firm, and the director's experience as the CEO or CFO. The second specification, which corresponds to Columns 2, 4, 6 and 8 in Panel A of Table 2, controls additionally for board size and board independence, institutional ownership, director age, director tenure, and the director's committee membership in the firm, whether the director holds multiple board seats, and whether the transaction occurs during the blackout period.

[Insert Table 2 here]

Panel A of Table 2 shows that independent directors with industry expertise earn significantly higher returns than independent directors without such expertise over the 90-days period following each transaction, and the difference is significant at 5% level for both measures of trading returns. Columns 3 and 7 of Panel A show that the coefficient of *IDIE* is positive and statistically significant at 10% (5%) level when using *BHAR180* (*Alpha180*) as the dependent variable. After including additional control variables in the analyses, Columns 4 and 8 show that the coefficients of *IDIE* are still positive and become statistically significant at 5% level for both measures of abnormal returns over the 180-days horizon. The coefficient estimates suggest that, on average, independent directors with industry expertise earn a market-adjusted (four factor-adjusted) abnormal return that is 4.138 (4.140) percentage points higher than the return earned by independent

directors without such expertise over the 180 days following each transaction.[13] Consistent with the prediction of Hypothesis 1, these results suggest that independent directors with industry expertise have an informational advantage over independent directors without such expertise.

Consistent with prior literature, the results show that trading returns earned by independent directors are positively associated with transaction size, book-to-market ratio, director tenure and the director's membership on audit committee, while negatively associated with firm size and past returns (*PRET90*) (Ravina and Sapianza, 2010; Hillier, Korczak, and Korczak, 2015; Cao et al., 2015, etc.). Panel B of Table 2 presents additional evidence using the alternative main explanatory variable, *IEYEARS*. Columns 4 and 8 of Panel B show that the coefficients of *IEYEARS* are positive and statistically significant at 5% level for abnormal returns measured over the 180-days horizon following the purchase transaction. It suggests that longer industry experience can help independent directors obtain more information related to the focal firm. Overall, the results in Table 2 are consistent with my prediction that industry experienced independent directors possess more information about the firm than inexperienced independent directors.[14]

4.2 Industry expertise and trading performance: cross-sectional analyses

In this section, I examine the cross-sectional variations in the effect of industry expertise on independent directors' trading profits.

Hypothesis 2a posits that the informational advantage of independent directors with industry expertise is more pronounced for firms with higher information asymmetry. Following previous literature, I use the number of analysts following the firm to proxy for the level of information asymmetry (Frankel and Li, 2004; Ellul and Panayides, 2016; Hillier, Korczak, and Korczak, 2015). Specifically, I define an indicator variable, *LOWANALYST*, equal to one (zero) if the number of analysts following the firm belongs to the bottom (top) tercile of the distribution of analyst coverage across firms in the same 2-digit SIC industry in a given year. I expect the effect of industry expertise on independent directors' trading returns to be stronger for firms with lower analyst coverage.

[Insert Table 3 here]

Panel A of Table 3 presents the results of the above analysis. Columns 1 and 2 in Panel A of

[13] Column 8 in Panel A of Table 2 shows that the coefficient estimate of *IDIE* is 0.023. The difference in the four factor-adjusted abnormal return over the 180-day period following each transaction is 0.023*180/100=4.14%.

[14] Untabulated analyses show that the results are also robust to adding independent directors' experience in financial industries as well as the number of analysts following the firm as additional control variables.

Table 3 show that the interaction term between *IDIE* and *LOWANALYST* is positive and statistically significant at 1% (5%) level for *BHAR180* (*Alpha180*) as the dependent variable, suggesting that the effect of industry expertise on independent directors' trading performance is more pronounced for firms with lower analyst coverage. This might be because industry experienced independent directors could obtain more private information about the firm from other sources, such as industry peers, and therefore enjoy a lower information acquisition cost.

Hypothesis 2b states that independent directors with industry expertise have a greater informational advantage compared to independent directors without such expertise for more complex firms with higher operational uncertainty. Following Faleye (2007) and Masulis et al. (2012), I use R&D intensity as a proxy for the operational complexity and uncertainty associated with the firm. And I define a dummy variable, *HIR&D*, equal to one (zero) if the R&D expenditure of the firm belongs to the top (bottom) tercile of the distribution of R&D expenditures across firms in the same 2-digit SIC industry in a given year.

Columns 3 and 4 in Panel A of Table 3 show that the coefficients of the interaction term, *IDIE*HIR&D*, are positive and statistically significant at 10% level. The results suggest that the differences between trading returns earned by independent directors with industry expertise and the returns earned by independent directors without such expertise are more pronounced for firms with higher R&D intensity. These findings are also consistent with the evidence in prior research that board industry expertise fosters corporate innovation and that the presence of industry expert directors is positively and significantly associated with firm performance for firms with positive R&D expenditures (Masulis et al., 2012; Faleye, Hoitash, and Hoitash, 2014; Drobetz et al., 2016; and Kang, Kim, and Lu, 2017).

Finally, hypothesis 2c expects that independent directors with industry expertise will have a greater information advantage over independent directors without such expertise for firms with higher business risk. I use cash flow volatility as a proxy for business risk, where cash flow volatility is defined as the standard deviation of operating cash flows over the previous 12 quarters. And I create a dummy variable, *HICFVOL*, equal to one (zero) if the cash flow volatility of the firm belongs to the top (bottom) tercile of the distribution of cash flow volatility across firms in the same 2-digit SIC industry in a given year.

Columns 5 and 6 in Panel A of Table 3 show that the interaction term, *IDIE*HICFVOL*, is positive and significant at 1% and 5% level, respectively. The evidence shows that independent directors with industry expertise earn higher trading returns than inexperienced independent directors for firms with higher cash flow volatility. Consistent with my prediction, these results suggest that prior work experience in the focal industry allows independent directors to have a better

understanding about the firm, especially for firms associated with higher business risk. Panel B of Table 3 shows that the results remain qualitatively similar when using *IEYEARS* as the alternative main explanatory variable.

5. Robustness tests

5.1 Trading performance and other individual characteristics

One potential concern of the above analyses is that independent directors with industry expertise are more likely to be 'friendly' directors who have social connections with their focal firms' CEO/CFOs (Faleye, Hoitash, and Hoitash, 2014; Wang, Xie, and Zhu, 2015). As a result, they may receive private information about the firm from their CEO/CFOs and thus enjoy higher trading returns.[15] In particular, Cao et al. (2015) document that independent directors who are socially connected to their CEO/CFOs outperform unconnected independent directors when selling their firms' stocks. In this section, I examine whether the effect of industry expertise on trading returns persists after controlling for independent directors' connections with their CEO/CFOs.

I use two proxies to measure the social ties between independent directors and senior executives. First, I define a dummy variable, *CONNECT*, equal to one if an independent director is socially connected to the CEO/CFO of the focal firm based on her/his past work experience and nonprofessional activities, and zero otherwise (Fracassi and Tate, 2012; Cao et al., 2012).[16] Second, I indirectly measure the connections between independent directors and CEO/CFOs through their trading behaviors. I expect that senior executives (CEO/CFOs) and connected independent directors who trade on the same piece of private information are likely to trade in the same direction around the same time. Therefore, I define an indicator variable, *FOLLOW*, equal to one if the independent director executes a purchase transaction during the window of [-3, +3] days around an insider purchase made by the CEO/CFO of the focal firm, and zero otherwise.[17]

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[15] Indeed, the univariate comparisons in Panel B of Table 1 show that independent directors with industry expertise are more likely to have social connections with the CEO/CFO of the focal firm than independent directors without such expertise.

[16] Following Fracassi and Tate (2012), I examine an independent director's social connections with the CEO/CFO from the following four dimensions: (1) whether they are currently working in the same firm other than the focal firm; (2) whether they previously worked in the same firm other than the focal firm; (3) whether they attended the same school around the same time; and (4) whether they have been executives in the same non-profit organizations.

[17] While this measure may capture some unobserved social connections between independent directors and senior executives, it might also overestimate such connection because unconnected independent directors might mimic the trades made by senior executives to earn higher trading profits. Nevertheless, both possibilities should be ruled out in order to isolate the effect industry expertise on

[Insert Table 4 here]

Panel A of Table 4 show that the coefficients of *IDIE* are positive and statistically significant at 5% level even after controlling for independent directors' connections with their CEO/CFOs. Consistent with the evidence in Cao et al (2015), Columns 1 and 2 show that the coefficients of *CONNECT* are positive but statistically insignificant, suggesting that independent directors do not benefit from social connections with the CEO/CFO of the focal firm when making purchase transactions. This might be because senior executives would be willing to share good news about the firm to all the board members to prove their competence. In addition, the results in Columns 3 and 4 in Panel A of Table 4 indicate that independent directors earn higher returns when they trade around the same time as insider trades made by senior executives. Panel B of Table 4 presents the results using the alternative main explanatory variable, *IEYEARS*. It shows that the coefficients of *IEYEARS* are positive and significant at 5% level across all specifications. Taken together, these results suggest that independent directors with industry expertise have an informational advantage over independent directors without industry expertise, even after controlling for their social connections with senior executives of the focal firm, at least during good times.

5.2 Industry expertise and opportunistic trades

In this section, I perform another robustness analysis by focusing on open-market purchases that are more likely to be motivated by private information. Cohen, Malloy, and Pomorski (2012) propose that even though corporate insiders (such as managers and independent directors) possess private information about the firm, they may still trade for various reasons. They show that insider trades made by opportunistic traders have a strong predictive power for future stock returns, while insider trades made by routine traders do not predict future stock returns.

Following Cohen, Malloy, and Pomorski (2012), I classify purchase transactions made by independent directors into two groups: routine trades versus opportunistic trades. In order to classify insider trades into the above two groups, I require the independent director to trade the company's stock at least once during the consecutive two years. If the independent director traded in the same month during a consecutive two-year period, then all of her/his subsequent trades in the same month are classified as routine trades, and her/his subsequent trades in other months are classified as opportunistic trades. If there is no obvious trading pattern during the first two consecutive years, then all of the independent director's subsequent trades are classified as opportunistic trades. Next, I

independent directors' trading returns.

repeat the main analyses in the subsample of opportunistic purchases made by independent directors, since these transactions are more likely to be information-driven.

[Insert Table 5 here]

Table 5 presents the results. Table 5 shows that, in general, the coefficients of *IDIE* are positive and become statistically more significant after focusing on the subsample of opportunistic purchases. The increase in the economic significance of *IDIE* is also quite large. Columns 2 and 4 of Table 5 show that the economic significance of *IDIE* becomes 3.76 (4.43) times larger compared to the results in the full sample, when using *BHAR180* (*Alpha180*) as the dependent variable.[18] More specifically, for opportunistic purchase transactions, independent directors with industry expertise earn a market-adjusted (four factor-adjusted) abnormal return which is 15.544 (18.360) percentage points higher than that earned by independent directors lack of such expertise over the 180 days following each transaction.[19] Overall, the evidence suggests that independent directors with industry expertise earn significantly higher trading profits than independent directors without industry expertise, especially when they execute opportunistic purchases that are more likely to be driven by private information.

5.3 Industry expertise and trading performance: portfolio analyses

The above analyses show that independent directors with industry expertise, on average, earn higher returns than independent directors without such expertise in purchase transactions. And these results support the notion that industry experienced independent directors have superior information about the firm than inexperienced independent directors. In this section, I investigate the informational advantage of industry experienced independent directors by examining abnormal returns of zero-investment portfolios for purchase and sales transactions, respectively.

I construct zero-investment portfolios by investing in the stocks traded by independent directors with industry expertise and shorting the stocks traded by independent directors without industry expertise. Following Cook and Wang (2011), I hold each stock in the portfolio for 6 months and the portfolios are rebalanced each month. Following Cohen, Malloy, and Pomorski (2012), I use alpha estimated from the CAPM, Fama-French three-factor model, and Carhart four-factor model to

[18] Columns 4 and 8 in Panel A of Table 2 show that the coefficient estimate of *IDIE* is 4.138 (0.023) for *BHAR180* (*Alpha180*) as the dependent variable.

[19] Column 4 of Table 5 shows that the coefficient estimate of *IDIE* is 0.102. The difference in the factor-adjusted abnormal return over the 180-day period following each transaction is 0.102*180/100=18.36%

measure portfolio returns. To account for differences in firm-, individual-, and transaction-level characteristics, I construct the long-short portfolios using matched transactions based on the firm's 2-digit SIC industry, firm size and book-to-market ratio, director age, director tenure, as well as transaction size. And I focus on transactions made by independent directors who do not have social connections with their CEO/CFOs.

[Insert Table 6 here]

Panel A and Panel B of Table 6 report the abnormal returns for value-weighted and equal-weighted portfolios, respectively. Panel A of Table 6 shows that for purchase transactions, the portfolio strategy that invests in stocks purchased by independent directors with industry expertise earns a positive and statistically significant abnormal return, while the portfolio strategy that invests in stocks purchased by independent directors without industry expertise does not earn a significant abnormal return. Moreover, the portfolio strategy that goes long stocks purchased by industry experienced independent directors and short stocks purchased by inexperienced independent directors earns a four-factor alpha of 170 basis points per month (t-statistics 2.65). For sales transactions, Panel A shows that the portfolio that is long stocks sold by independent directors with industry expertise earns a negative and significant abnormal return at 10% level, while the portfolio that is long stocks sold by independent directors without industry expertise does not earn a significant abnormal return. Furthermore, a portfolio strategy that goes long stocks sold by industry experienced independent directors and short stocks sold by inexperienced independent directors yields a negative but insignificant abnormal return. Panel B shows that the results are similar, although become statistically weaker, when looking at equal-weighted portfolio returns.

Taken together, these findings support the previous conclusion that independent directors who have experience in the focal industry earn significantly higher trading profits than independent directors who lack of such experience when making open-market purchases.

5.4 Industry expertise and future stock price changes

In this section, I investigate the informational advantage of independent directors with industry expertise by examine the informativeness of trades executed by independent directors before large stock price changes, following Ravina and Sapienza (2010) and Akbas, Jiang, and Koch (2017). To do so, I include both open-market purchases and sales transactions in the analyses.

Following Akbas, Jiang, and Koch (2017), for each independent director *j* of firm *i* in month *t*, I define the independent director's trading strength as:

$$STR_{ijt} = \frac{P_{ijt} - S_{ijt}}{VOL_{it}}$$

where P_{ijt} (S_{ijt}) is the number of shares purchased (sold) by independent director *j* at firm *i* during month *t*, and VOL_{it} is the total trading volume of firm *i* during month *t*.

Next, for each firm *i*, I compute the three-day market-adjusted cumulative abnormal return, CAR(-1, +1), around each trading day *t* throughout the sample period. I identify firm *i* as having a large increase (decrease) in the stock price on day *t* if the CAR(-1, +1) on day *t* belongs to the top (bottom) 10% of the distribution of CAR(-1, +1) of firm *i* across the same calendar year. Finally, I create a dummy variable, ΔP_PCTL90 (ΔP_PCTL10), equal to one if the large stock price increase (decrease) event occurs within 10 days following an independent director's trade, and zero otherwise (Akbas, Jiang, and Koch, 2017).[20] Then I examine whether trades made by independent directors with industry expertise are more informative about upcoming large stock price changes using the following probit model:

$$Prob(\Delta\text{P\_PCTL90/10})_{it} = \alpha + \beta_1 \cdot STR_{ijt} + \beta_2 \cdot STR_{ijt} * IDIE_{ijt} + \beta_3 \cdot IDIE_{ijt} + \theta \cdot Controls_{it} + \varepsilon_{ijt}$$

Following Cohen, Malloy, and Pomorski (2012) and Akbas, Jiang, and Koch (2017), I control for firm size, book-to-market ratio, the one-month lagged stock return (*RET(t-1)*), and the 11-months cumulative stock returns from month *t-12* to *t-2* (*RET(t-12, t-2)*), asset growth (*ASSETGR*), profitability (*PROFIT*), and stock return volatility (*RETVOL*). I also include month fixed effects in the analyses, and standard errors are clustered at firm level.

[Insert Table 7 here]

The results of the above analyses are presented in Table 7. Columns 1 and 2 report the difference in the predictability of independent directors' trades for future large stock price increases, and Columns 3 and 4 report the analogous results for future large stock price decreases. Column 2 shows that the coefficient of the interaction term, *STR*IDIE*, is positive and statistically significant at 1% level (t-statistics 3.30) when using ΔP_PCTL90 as the dependent variable, and Column 4 shows that the coefficient of the interaction term is negative and significant at 5% level (t-statistics -2.14) when using ΔP_PCTL10 as the dependent variable. Overall, the evidence in Table 7 indicates that transactions made by independent directors with industry expertise are more likely to be associated with imminent shocks in stock prices in the same direction compared to transactions made by independent directors without such expertise. It suggests that trades made by independent directors

[20] Following Akbas, Jiang, and Koch (2017), in cases where an independent director executes multiple trades in a given month, I use the date of the last transaction as the independent director's trading day for that month.

who have worked in the focal industry contain greater predictive power regarding future stock price changes. [21]

6. Further analyses

6.1 Board industry expertise and operating performance

The results thus far suggest that independent directors with industry expertise have an informational advantage over independent directors without industry expertise. In this section, I examine whether the independent director's industry expertise translates into firm performance. To do so, I employ the following model specification:

$$\Delta Performance_{it} = \alpha + \beta \cdot \Delta IDIE\_PCT_{i,t-1} + \theta \cdot Controls_{i,t-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where the dependent variable, *ΔPerformance*, is measured by the change in return-on-assets (*ΔROA*), the change in return-on-equity (*ΔROE*), and sales growth (*SALESGR*), respectively. The main explanatory variable, *ΔIDIE_PCT*, is the one-year lagged change in *IDIE_PCT*, where *IDIE_PCT* is defined as the number of independent directors with experience in the focal industry scaled by the total number of independent directors on the board. Similar to previous studies, I control for characteristics that could affect firm performance in the analyses, including firm size, book-to-market ratio (*BM*), capital expenditure (*CAPEX*), R&D intensity (*R&D*), board size, board independence (*ID_PCT*), firm age, leverage, return volatility (*VOLATILITY*), sales growth (*SALESGR*), and institutional ownership (*FRCIO*) (Bhogat and Bolton, 2008; Duchin, Matsusaka, and Ozbas, 2010; Dass et al., 2014; etc.). Furthermore, the level of *ROA* and *ROE* are included in the analyses when using *ΔROA* and *ΔROE* to measure the change in firm performance, respectively. Year fixed effects and firm fixed effects are also included.

[Insert Table 8 here]

Table 8 reports the results. Table 8 shows a positive and statistically significant relationship between an increase in the proportion of industry experienced independent directors on the board and an improvement in the firm's profitability and operating performance. Column 1 in Table 8 shows

[21] One potential concern of this approach is that some of the imminent price changes might occur as a result of the independent director's trades, because the market interprets the purchases/sales by independent directors are a signal of good/poor future prospects of the firm (Ravina and Sapienza, 2010). This concern may be partially mitigated by the evidence in Lakonishok and Lee (2001) that the market does not respond to transactions made by top executives and directors over the short horizon. Nevertheless, I acknowledge that the above concern cannot be fully eliminated.

that an increase in the proportion of industry experienced independent directors, *ΔIDIE_PCT*, is positively and significantly associated with the increase in return-on-assets, *ΔROA*, in the following year at 5% level (t-statistics 2.36). Untabulated summary statistics indicate that the sample firms, on average, have six independent directors on the board, one of whom is an independent director with industry expertise. In terms of the economic significance, the coefficient estimate suggests that adding one more industry experienced independent director on the board is associated with an increase of 4.83% in *ΔROA* for an average firm in the sample ((2/6-1/6)*0.029). Columns 2 and 3 in Table 8 show that the results are qualitatively similar when using *ΔROE* and *SALESGR* as alternative dependent variables. Overall, the evidence suggests that a higher proportion of industry experienced independent directors on the board is associated with better operating performance.

6.2 Board industry expertise and alliance performance

In this section, I examine whether independent directors with relevant industry experience can perform the monitoring and advisory role more effectively. To do so, I focus on one type of important and complex corporate events that is more likely to require board oversight and/or advice and that the board would have greater influence over firm value. Specifically, I examine the effect of independent directors with relevant industry experience on alliance performance.

I collect the data on alliances involving U.S. public firms from the Securities Data Corporation Platinum (SDC Platinum) database. Following Bodnaruk, Massa, and Simonov (2013), I include joint ventures, strategic alliances, research and development agreements, sales and marketing agreements, manufacturing agreements, supply agreements, and licensing and distribution agreements in the analyses. After merging the alliances data with accounting data from Compustat, stock data from CRSP, and board data from BoardEx, the final sample includes 4,092 alliances involving 1,383 non-financial and non-utility firms for the period of 2001-2013.

To investigate the impact of industry experienced independent directors on alliance performance, I perform the following OLS regression:

$$CAR_{it} = \alpha + \beta \cdot IDIEA\_PCT_{it} + \theta \cdot Controls_{it} + \varepsilon_{it}$$

where the dependent variable, *CAR*, is the cumulative abnormal return estimated using Fama and French (1993) and Carhart (1997) four-factor model over 3-, 5-, 7-, and 11-days period around the announcement date, respectively. The main explanatory variable, *IDIEA_PCT*, is defined as the number of independent directors with experience in the alliance industry divided by the total number of independent directors on the board. Following Bodnaruk, Massa, and Simonov (2013), I add a set of control variables in the analyses, including firm size, book-to-market ratio (*BM*), sales growth

(*SALESGR*), R&D intensity (*R&D*), cash holding (*CASH*), capital expenditure (*CAPEX*), return-on-equity (*ROE*), price-earnings ratio (*PE*), debt-to-equity ratio (*DE*), and institutional ownership (*FRCIO*). I also include board independence (*ID_PCT*) and board size as additional control variables. Last but not least, I control for an indicator variable, *CEOIEA*, equal to one if the firm's CEO has experience in the alliance industry, and zero otherwise. Year fixed effects and industry fixed effects are also included.

[Insert Table 9 here]

The results are presented in Table 9. Column 1 in Table 9 shows that the percentage of independent directors with experience in the alliance industry on the board is positively and significantly associated with the 3-day alliance announcement return, *CAR(-1, +1)*, at 5% level (t-statistics 2.55). In terms of the economic significance, the coefficient estimate suggests that a one standard deviation increase in the proportion of industry experienced independent directors on the board increases the alliance announcement return by 26 basis points (0.012 × 0.215).[22] The evidence in Columns 2-4 indicates that the results are qualitatively similar using abnormal returns estimated over different horizons as the dependent variable. Overall, these findings suggest that independent directors with relevant industry expertise contribute to value creation for firms entering alliances.

6.3 Board industry expertise and M&A deal completion

In this section, I examine the effect of industry experienced independent directors on acquisition outcomes. I predict that the acquisition is more likely to be successfully completed when the acquirer firm has independent directors with relevant industry experience on the board. An independent director is considered to have relevant industry experience if she/he has worked as an executive officer or independent director in the target 2-digit SIC industry. There are several reasons why this might be the case. First of all, the presence of independent directors with experience in the target industry may allow the acquirer to have superior knowledge about the target industry and a better assessment about the true value of the target firm. As a result, the acquirer managers might be able to make a more precise initial offer, and/or they may be less likely to encounter a bidding contest because their informational advantage could deter competing bids in the first place (Fishman, 1988; Povel and Singh, 2006; Hukkanen and Keloharju, 2015). Second, the acquirer firm that has independent directors with experience in the target industry might be less likely to encounter target resistance, because independent directors who have experience in the target industry may have

[22] The standard deviation of *IDIEA_PCT* in the sample is 0.215.

direct/indirect connections with the target firm that could smooth the negotiation process (Renneboog and Zhao, 2013). Third, the target firm might be more inclined to accept the offer from the acquirer with relevant board industry expertise because the acquirer could be more competent in the post-merger integration stage.

Luo (2005) and Kau, Linck, and Rubin (2008) show that the acquisition announcement return predicts the likelihood of deal completion, suggesting that managers in the acquirer firm take into account the market assessment of the deal when deciding whether to consummate the bid offer. Luo (2005) argues that managers are more likely to learn from the market through stock prices when the outsiders have more information that is new to managers, such as macroeconomic or industrial issues that are related to the deal. To the extent that independent directors with relevant industry experience would have a better understanding about the opportunities and challenges in the target industry, they could act as an alternative conduit of information to help the acquirer managers understand industrial issues related to the deal, and thus allow the acquirer managers to be less dependent on stock prices.

Using a sample of 2,815 M&A deals during the period of 2000-2013, I employ the following probit model to test the effect of independent directors with relevant industry experience on the likelihood that the acquisition will be successfully completed:[23]

$$Prob(COMPLETE)_{ijt} = \alpha + \beta \cdot IDIET\_PCT_{it} + \theta \cdot Controls_{ijt} + \varepsilon_{ijt}$$

where the main variable of interest, *IDIET_PCT*, is defined as the number of independent directors in the acquirer firm who have work experience in the target industry scaled by the total number of independent directors on the acquirer's board. I also employ an alternative main explanatory variable, *IDIET_D*, which is a dummy variable equal to one if at least one of the independent directors on the acquirer's board has experience in the target industry, and zero otherwise. Following prior literature, I control for acquirer size, Tobin's Q, cash flow, ROA, leverage, as well as whether the acquirer has equity ownership in the target firm before the transaction (*TOEHOLD*). I also include deal characteristics in the analyses, including whether the bid is a tender offer (*TENDER*), whether the acquirer uses stock to finance the transaction (*STOCK*), whether the target board recommends the bid offer (*FRIENDLY*), whether the acquirer is granted an option to purchase shares or assets in the target firm (*ALOCKUP*), whether the acquirer encounters a competing bid offer (*COMPETE*), whether the bid involves a target/acquirer payable termination fee (*TTERM/ATERM*), and whether the deal is a diversifying acquisition (*DIVERSIFY*). Moreover, I control for whether the target is a public firm (*TPUBLIC*), and whether the target firm employs a takeover defence tactic (*DEFENSE*).

[23] Data on M&A transactions are obtained from ThomsonReuters' SDC Database.

Last but not least, I control for whether the acquirer CEO has experience in the target industry (*CEOIET_D*).

[Insert Table 10 here]

Table 10 presents the results of the above analysis. Columns 1 and 4 in Table 10 show that the proportion (presence) of independent directors with experience in the target industry on the acquirer's board is positively and significantly associated with the likelihood of deal completion at 10% (5%) level. Furthermore, Columns 2 and 5 show that the effect of independent directors with experience in the target industry persists even after controlling for the acquirer announcement return (*CAR*).[24] Finally, Column 6 in Table 10 shows that the coefficient of the interaction term, *IDIET_D*CAR*, is negative and statistically significant at 5% level, suggesting that the acquirer firm that has at least one independent directors with relevant industry experience could rely less on market reactions when deciding whether to complete the acquisition. Overall, the results are consistent with my predictions that independent directors with experience in the target industry could facilitate acquirer firms to consummate the deal, and that these directors could act as an alternative source of information which allow acquirer managers to rely less on stock prices to extract additional information related to the deal.

6.4 Board industry expertise and investment-to-price sensitivity

Previous studies have provided theoretical ground and empirical evidence that managers use the firms' stock prices to guide corporate investment decisions. The idea is that stock prices aggregate private information from different market participates trading on the firms' stocks, therefore managers can learn additional information about the firms' fundamentals and prospects from stock prices (Dow and Gorton, 1997; Subrahmanyam and Titman, 1999; Chen, Goldstein, and Jiang, 2008). Chen, Goldstein, and Jiang (2008) argue that one type of new information that managers could learn from the stock price is about the firm's competition with other firms. Since independent directors who have worked at other firms in the focal industry are likely to have privileged knowledge about the firm's industry peers, they could provide private information about industry competition that is new to mangers. As a result, I expect that independent directors with industry expertise could serve as an alternative source of supplementary information and allow managers to rely less on the firms' stock prices when making investment decisions.

[24] *CAR* is defined as the 3-day market-adjusted cumulative abnormal return around the acquisition announcement of the acquirer firm (Kau, Linck, and Rubin, 2008).

Following Chen, Goldstein, and Jiang (2007), I use the following specification to test the relationship between the representation of industry experienced independent directors on the board and the investment-to-price sensitivity:

$$CAPEX_{it} = \alpha + \beta_1 \cdot Q_{i,t-1} + \beta_2 \cdot Q_{i,t-1} * IDIE\_PCT_{i,t-1} + \beta_3 \cdot IDIE\_PCT_{i,t-1} + \theta \cdot Controls_{i,t-1} + \gamma_i + \delta_t + \varepsilon_{it}$$

where the dependent variable, *CAPEX*, is the firm's capital expenditure scaled by total assets. I expect the coefficient of the interaction term between Tobin's Q and the percentage of industry experienced independent directors on the board, *Q*IDIE_PCT*, to be negative. Following Chen, Goldstein, and Jiang (2007), I control for price nonsynchronicity (*NONSYNC*), the interaction between Tobin's Q and price nonsynchronicity (*Q*NONSYNC*), the probability of informed trading (*PIN*), the interaction between Tobin's Q and the probability of informed trading (*Q*PIN*), cash flow (*CF*), the inverse of total assets (*INVASSET*), as well as the market-adjusted cumulative return over the next three years (*CRET36*).[25] In addition, I include the interaction between cash flow and the percentage of industry experienced independent directors (*CF*IDIE_PCT*) as an additional control variable in the analyses. Year fixed effects and firm fixed effects are also included.

[Insert Table 11 here]

Table 11 presents the results of the above analysis. Columns 1-3 in Table 11 show that the coefficients of the interaction term, *Q*IDIE_PCT*, are negative and significant at 1% level across all specifications. These results indicate that an increase in the proportion of independent directors with industry expertise is associated with the decrease in investment-to-price sensitivity, suggesting that independent directors with industry expertise seem to possess private information that is new to managers, and thus could serve as an alternative source of information when managers making investment decisions. Columns 4-6 present the results using *IDIE_D* instead of *IDIE_PCT*, where *IDIE_D* is an indicator variable equal to one if at least of one the independent directors on the board has experience in the focal industry, and zero otherwise. It shows that the coefficient estimates of the interaction term, *Q*IDIE_D*, are also negative and significant at 1% level across all specifications. These results suggest that for firms without industry experienced independent directors on the board, managers tend to use stock prices to guide their investment decisions. However, for firms with industry experienced independent directors on the board, managers seem to rely significantly less on stock prices when making investment decisions. This might be because, managers could obtain part of the additional information from independent directors with industry expertise.

[25] I thank Stephen Brown for making probability of informed trading (PIN) data publicly available on his website.

7. Conclusion

This paper examines whether independent directors who have experience in the relevant industry possess superior knowledge related to the firm. I find that independent directors with industry expertise earn significantly higher abnormal returns than independent directors without such expertise when purchasing their firms' stocks. The results support the hypothesis that independent directors with industry expertise have more information about the firm than independent directors without such expertise, at least during good times. I also find that the informational advantage of industry experienced independent directors is more pronounced for firms with higher information asymmetry, for more complex firms, and for firms with higher business risk. Further analyses indicate that the results are robust to the inclusion of social connections between independent directors and their CEO/CFOs in the analyses.

Furthermore, I find that the effect of industry expertise on independent directors' trading profits is stronger for opportunistic purchases that are more likely to be motivated by private information. The evidence also shows that a zero-investment arbitrage portfolio strategy that invests in stocks purchased by industry experienced independent directors and shorts stocks purchased by inexperienced independent directors earns a positive and significant abnormal return. Moreover, I find that trades made by independent directors with industry expertise have greater predictive power regarding large stock price changes in the near future.

Next, I document that a higher proportion of industry experienced independent directors on the board is associated with better operating performance and higher profitability. For firms entering alliances, an increase in the proportion of independent directors with experience in the alliance industry is associated with a more favourable market reaction around the alliance announcement. Moreover, the presence of independent directors with experience in the target industry could facilitate the acquirer firm to successfully complete a takeover bid. Finally, the results show that an increase in the proportion of independent directors with industry expertise is associated with the decline in investment-to-price sensitivity.

Overall, the results support the notion that prior experience in the related industry could provide independent directors with knowledge, expertise and connections that are valuable to the focal firm. As a result, independent directors with industry expertise have superior information that facilitates the board to better perform the monitoring and advisory tasks. Furthermore, the evidence suggests that industry experienced independent directors could also serve as an alternative source of information that allow managers to rely less on stock prices when making investment decisions.

Appendix A. Variable Definitions

Dependent variables	
BHAR180	The difference between the compounded stock return and the compounded market return, proxied by value-weighted Center for Research on Security Prices (CRSP) portfolio return, over the 180 trading days following each transaction. BHAR30, 60, and 90 are defined in the analogous way.
Alpha180	The alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 180 days following each transaction. Alpha30, 60, and 90 are defined in the analogous way.
Main explanatory variable	
IDIE	An indicator variable equal to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise.
IEYEARS	The number of years that an independent director has worked at another firm in the same 2-digit SIC industry as the focal firm.
Other variables	
SIZE	The natural logarithm of book value of total assets (AT).
BM	Book value of total assets (AT) divided by market value of equity plus book value of total assets minus book value of equity minus deferred taxes (when available) (i.e. PRCC_F*CSHO + AT - CEQ - TXDB).
TENURE	The independent director's tenure in the focal firm.
TRANSIZE	The number of shares traded by an independent director scaled by the stock's daily trading volume.
LNAGE	The natural logarithm of an independent director's age.
ID_PCT	The number of independent directors divided by the total number of directors on the board.
DOWN	The number of shares held by the independent director as a fraction of the firm's total number of shares outstanding before the transaction.
AUDIT	A dummy variable equal to one if the independent director sits on the audit committee, and zero otherwise.
NOMI_COMP	A dummy variable equal to one if the independent director sits on the nomination committee and/or compensation committee, and zero otherwise.
MULTIBOARD	A dummy variable equal to one if the independent director holds multiple board seats, and zero otherwise.
BOARDSIZE	The natural logarithm of the number of board members.
FRCIO	The fraction of institutional investors' ownership in the firm.
BLACKOUT	A dummy variable equal to one if the transaction occurs during the period of [-46, +1] around a quarterly earnings announcement date, and zero otherwise.
PRET90	The market-adjusted buy-and-hold abnormal return over the 90 trading days prior to each transaction.
CEOCFO	A dummy variable equal to one if the independent director has held a CEO and/or CFO position at another firm, and zero otherwise.
CONNECT	A dummy variable equal to one if the independent director has social connections with the CEO/CFO of the focal firm, and zero otherwise, where social connections are defined following Fracassi and Tate (2012).
FOLLOW	A dummy variable equal to one if the independent director purchases the firm's stock during the [-3.+3] window around an open-market purchase made by the firm's CEO/CFO, and zero otherwise.
LOWANALYST	A dummy variable equal to one (zero) if the number of analysts following the firm belongs to the bottom (top) tercile of the distribution of analyst coverage across firms in the same 2-digit SIC industry in a given year.
HIR&D	A dummy variable equal to one (zero) if the R&D expenditure of the firm belongs to the top (bottom) tercile of the distribution of R&D expenditures across firms in the same 2-digit SIC industry in a given year.
HICFVOL	A dummy variable equal to one (zero) if the cash flow volatility of the firm belongs to the top (bottom) tercile of the distribution of the cash flow volatility across firms in the same 2-digit SIC industry in a given year, where cash flow volatility is defined as the standard deviation of operating cash flows over the past 12 quarters.
STR	The independent director's trading strength defined following Akbas, Jiang, and Koch (2017).
RET(t-1)	The one-month lagged stock return of a given firm.
RET(t-12, t-2)	The 11-months cumulative stock return over the past year of a given firm, excluding month *t-1*.

ASSETGR	The difference in total assets (AT) between year *t* and *t-1*, divided by total assets at year *t-1*.
PROFIT	The difference between total sales (SALE) and cost of goods sold (COGS), scaled by total assets (AT).
RETVOL	Standard deviation of daily stock returns of a given firm in a given month.
CAPEX	The ratio of capital expenditure (CAPX) to total assets (AT).
ΔROE	The change in ROE between year *t* and *t*-1, where ROE is defined as the ratio of earnings (IBADJ) divided by the average of equity (CEQ) over the most recent two-years.
CASH	The ratio of cash holdings (CHE) to total assets (AT).
ΔROA	The change in ROA between year *t* and *t-1*, where ROA is defined as the ratio of operating income before depreciation (OIBDP) to total assets (AT).
SALESGR	The difference in total sales (SALE) between year *t* and *t-1*, divided by total sales at year *t-1*.
PE	The ratio of end-of-the-year stock price (PRCC) to earnings per share (EPSPX).
DE	The ratio of long-term debt (DLTT) to total equity (CEQ).
FIRMAGE	The natural logarithm of firm age.
LEVERAGE	The ratio of debt (DLTT+DLC) to total assets (AT).
VOLATILITY	The standard deviation of daily stock return of a given firm over fiscal year *t*.
Q	The inverse of *BM*.
R&D	The ratio of research and development expenditures (XRD) to total sales (SALE).
NONSYNC	1-R2, where R2 is R-square from the regression of weekly stock return on value-weighted market and industry return (at 3-digit SIC code level) (Chen, Goldstein, and Jiang, 2007).
CF	The sum of net income before extraordinary item, depreciation and amortization expenses and R&D expenses (IB+DP+XRD), divided by lagged total assets (AT).
INVASSET	The inverse of total assets (AT).
CRET36	Cumulative market-adjusted return over the subsequent 36 months.
PIN	The probability of informed trading, data obtained from Stephon Brown's website.
ALOCKUP	A dummy variable equal to one if the acquirer is granted an option to purchase target shares, and zero otherwise.
TENDER	A dummy variable equal to one if the bid involves a tender offer, and zero otherwise.
STOCK	A dummy variable equal to one if the acquirer uses stock to finance the deal, and zero otherwise.
COMPETE	A dummy variable equal to one if the acquirer encounters a competing bid where its bid offer is pending, and zero otherwise.
DEFENSE	A dummy variable equal to one if the target firm employs a takeover defense tactic, and zero otherwise.
FRIENDLY	A dummy variable equal to one if the target board recommends the bid offer, and zero otherwise.
TTERM	A dummy variable equal to one if the bid involves a target termination fee, and zero otherwise. The dummy variable, *ATERM*, is defined analogously.
TOEHOLD	A dummy variable equal to one if the acquirer has a pre-bid toehold in the target firm, and zero otherwise.
TPUBLIC	A dummy variable equal to one if the target is a public firm, and zero otherwise.
RELATIVEDEALSIZE	The ratio of deal value to the market value of the acquirer measured at the end of the fiscal year prior to the acquisition announcement.

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Table 1
Summary statistics

This table presents the summary statistics (Panel A) and univariate comparisons (Panel B) for the sample of purchase transactions. The sample consists of 9,969 open-market purchases made by independent directors with (and without) industry expertise from 2000 to 2013. Definitions of main variables are defined as follows. *BHAR180* is the market-adjusted buy-and-hold abnormal return over the 180 trading days following each transaction. *BHAR30*, *60*, and *90* are defined in the analogous way. *Alpha180* is the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 180 days following each transaction. *Alpha30*, *60*, and *90* are defined in the analogous way. *IDIE* is an indicator variable equal to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise. *IEYEARS* is the number of years that an independent director has worked at another firm in the same 2-digit SIC industry as the focal firm. Appendix A presents definitions for the remaining variables. All continuous variables are winsorized at 1st and 99th percentile level.

Panel A. Purchase transactions

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
BHAR180 (%)	9699	8.878	39.025	-15.839	3.393	26.843
BHAR90 (%)	9699	5.597	27.143	-10.896	2.574	18.457
BHAR60 (%)	9699	4.528	21.691	-8.440	2.723	15.275
BHAR30 (%)	9699	3.378	15.062	-5.426	1.859	10.188
Alpha180 (%)	9699	0.049	0.198	-0.065	0.041	0.160
Alpha90 (%)	9699	0.060	0.286	-0.101	0.051	0.209
Alpha60 (%)	9699	0.070	0.354	-0.131	0.064	0.262
Alpha30 (%)	9699	0.099	0.517	-0.182	0.072	0.360
IDIE	9699	0.129	0.336	0	0	0
IEYEARS	9699	0.924	3.128	0	0	0
AGE	9699	60.238	8.611	54	61	66
ID_PCT	9699	0.750	0.127	0.667	0.778	0.857
TRANSIZE	9699	0.051	0.108	0.001	0.007	0.039
TENURE	9699	5.834	6.147	1.600	3.900	8
MULTIBOARD	9699	0.209	0.407	0	0	0
CONNECT	9699	0.130	0.336	0	0	0
CEOCFO	9699	0.146	0.353	0	0	0
BOARDSIZE	9699	8.527	2.307	7	8	10
AUDIT	9699	0.600	0.490	0	1	1
COMP_NOMI	9699	0.752	0.432	1	1	1
SIZE	9699	6.272	1.959	4.824	6.181	7.596
BM	9699	0.653	0.291	0.428	0.645	0.849
FRCIO	9699	0.610	0.282	0.403	0.664	0.839
PRET90	9699	-0.063	0.282	-0.244	-0.084	0.071
DOWN (%)	9699	0.844	3.452	0.009	0.043	0.221
BLACKOUT	9699	0.176	0.381	0	0	0

Table 1
Summary statistics (cont.)

Panel B. Univariate comparisons						
	IDIE=1		IDIE=0		Diff	
Variable	N	Mean	N	Mean		
BHAR180 (%)	1255	11.971	8444	8.418	3.553	***
BHAR90 (%)	1255	8.384	8444	5.183	3.201	***
BHAR60 (%)	1255	6.812	8444	4.188	2.624	***
BHAR30 (%)	1255	4.535	8444	3.206	1.329	***
Alpha180 (%)	1255	0.062	8444	0.047	0.015	***
Alpha90 (%)	1255	0.086	8444	0.056	0.030	***
Alpha60 (%)	1255	0.105	8444	0.065	0.040	***
Alpha30 (%)	1255	0.154	8444	0.091	0.063	***
AGE	1255	60.098	8444	60.258	-0.160	
ID_PCT	1255	0.782	8444	0.745	0.037	***
TRANSIZE	1255	0.052	8444	0.050	0.002	
TENURE	1255	5.348	8444	5.907	-0.559	***
MULTIBOARD	1255	0.399	8444	0.181	0.218	***
CONNECT	1255	0.209	8444	0.118	0.091	***
CEOCFO	1255	0.210	8444	0.137	0.073	***
BOARDSIZE	1255	8.194	8444	8.576	-0.382	***
AUDIT	1255	0.491	8444	0.617	-0.126	***
COMPENSATION	1255	0.604	8444	0.582	0.022	
NOMINATION	1255	0.517	8444	0.438	0.079	***
SIZE	1255	5.946	8444	6.321	-0.375	***
BM	1255	0.587	8444	0.663	-0.076	***
FRCIO	1255	0.642	8444	0.606	0.036	***
PRET90	1255	-0.077	8444	-0.061	-0.016	*
DOWN (%)	1255	0.637	8444	0.875	-0.238	**
BLACKOUT	1255	0.157	8444	0.178	-0.021	*

Table 2

Industry expertise and independent directors' trading performance

This table presents the effect of industry expertise on independent directors' trading returns in an OLS regression model. Panel A employs *IDIE* as the main explanatory variable, and Panel B employs *IEYEARS* as the main explanatory variable. *BHAR90* (*180*) is the market-adjusted buy-and-hold abnormal return over the 90 (180) trading days following each transaction. *Alpha90* (*180*) is the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 90 (180) days following each transaction. *IDIE* is an indicator variable equal to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise. *IEYEARS* is the number of years that an independent director has worked at another firm in the same 2-digit SIC industry as the focal firm. Appendix A presents definitions for the remaining variables. All continuous variables are winsorized at 1st and 99th percentile level. Firm fixed-effects are included in the regressions, and standard errors are clustered at individual level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Table 2
Industry expertise and independent directors' trading performance (cont.)

Panel A.																
Main explanatory variable: IDIE																
Dep. Variable:	BHAR90				BHAR180				Alpha90				Alpha180			
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
IDIE	2.691	**	2.824	**	3.618	*	4.138	**	0.030	**	0.031	**	0.023	**	0.023	**
	(2.00)		(2.01)		(1.80)		(2.00)		(2.05)		(2.04)		(1.97)		(2.01)	
CEOCFO	0.606		0.785		-1.021		-0.912		0.005		0.008		-0.002		-0.002	
	(0.56)		(0.72)		(-0.63)		(-0.56)		(0.47)		(0.78)		(-0.31)		(-0.26)	
TRANSIZE	2.266		1.969		17.119	***	17.260	***	0.061		0.060		0.131	***	0.131	***
	(0.60)		(0.52)		(3.24)		(3.27)		(1.40)		(1.38)		(4.49)		(4.49)	
SIZE	-11.323	***	-10.174	***	-20.169	***	-20.008	***	-0.103	***	-0.097	***	-0.097	***	-0.093	***
	(-7.74)		(-6.34)		(-10.80)		(-9.18)		(-7.10)		(-6.04)		(-10.37)		(-8.25)	
BM	35.451	***	34.962	***	58.317	***	58.601	***	0.306	***	0.306	***	0.253	***	0.251	***
	(11.05)		(10.48)		(14.09)		(13.50)		(8.68)		(8.38)		(11.72)		(11.07)	
PRET90	-9.773	***	-9.890	***	-20.623	***	-20.721	***	-0.085	***	-0.084	***	-0.086	***	-0.087	***
	(-4.55)		(-4.60)		(-7.64)		(-7.74)		(-4.04)		(-3.95)		(-5.76)		(-5.87)	
DOWN	2.163		-1.369		16.522		23.975		0.079		0.032		0.140		0.156	
	(0.05)		(-0.03)		(0.32)		(0.47)		(0.21)		(0.09)		(0.52)		(0.58)	
LNAGE			-3.849				-2.916				-0.024				-0.004	
			(-1.34)				(-0.73)				(-0.80)				(-0.19)	
ID_PCT			-5.786				-2.771				-0.056				0.009	
			(-1.12)				(-0.37)				(-1.03)				(0.21)	
TENURE			0.080				-0.074				0.001	*			-0.000	
			(0.90)				(-0.56)				(1.85)				(-0.26)	
MULTIBOARD			0.432				-1.590				0.004				-0.002	
			(0.44)				(-1.12)				(0.36)				(-0.30)	
BOARDSIZE			1.792				2.415				-0.022				-0.010	
			(0.41)				(0.39)				(-0.51)				(-0.31)	
AUDIT			0.640				0.625				0.017	**			0.005	
			(0.82)				(0.54)				(2.14)				(0.86)	
COMP_NOMI			0.408				-0.209				0.010				0.006	
			(0.44)				(-0.15)				(0.99)				(0.90)	
FRCIO			-5.549				-0.569				-0.001				-0.028	
			(-1.07)				(-0.07)				(-0.02)				(-0.68)	
BLACKOUT			0.236				-1.291				-0.005				-0.008	
			(0.21)				(-0.95)				(-0.41)				(-1.08)	
Firm FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R-square	0.378		0.378		0.462		0.462		0.371		0.373		0.434		0.435	
N	9699		9699		9699		9699		9699		9699		9699		9699	

Table 2
Industry expertise and independent directors' trading performance (cont.)

Panel B																
Main explanatory variable: IEYEARS																
Dep. Variable:	BHAR90				BHAR180				Alpha90				Alpha180			
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
IEYEARS	0.256	*	0.275	**	0.360	*	0.439	**	0.002		0.002		0.002	**	0.002	**
	(1.89)		(1.96)		(1.80)		(2.15)		(1.42)		(1.39)		(2.10)		(2.17)	
CEOCFO	0.634		0.800		-0.997		-0.916		0.006		0.009		-0.002		-0.002	
	(0.59)		(0.74)		(-0.62)		(-0.56)		(0.55)		(0.85)		(-0.30)		(-0.26)	
TRANSIZE	2.204		1.908		17.034	***	17.167	***	0.060		0.060		0.130	***	0.130	***
	(0.58)		(0.50)		(3.23)		(3.26)		(1.38)		(1.37)		(4.47)		(4.48)	
SIZE	-11.268	***	-10.131	***	-20.100	***	-19.952	***	-0.102	***	-0.097	***	-0.096	***	-0.093	***
	(-7.72)		(-6.31)		(-10.77)		(-9.16)		(-7.05)		(-5.99)		(-10.31)		(-8.20)	
BM	35.484	***	35.036	***	58.363	***	58.714	***	0.306	***	0.307	***	0.253	***	0.252	***
	(11.07)		(10.51)		(14.10)		(13.53)		(8.69)		(8.40)		(11.74)		(11.10)	
PRET90	-9.788	***	-9.913	***	-20.646	***	-20.762	***	-0.085	***	-0.084	***	-0.086	***	-0.087	***
	(-4.56)		(-4.62)		(-7.65)		(-7.75)		(-4.05)		(-3.96)		(-5.77)		(-5.88)	
DOWN	1.114		-2.249		15.067		22.638		0.069		0.024		0.131		0.149	
	(0.03)		(-0.05)		(0.29)		(0.44)		(0.18)		(0.06)		(0.48)		(0.55)	
LNAGE			-4.164				-3.435				-0.026				-0.007	
			(-1.45)				(-0.87)				(-0.87)				(-0.32)	
ID_PCT			-5.764				-2.791				-0.055				0.009	
			(-1.11)				(-0.37)				(-1.01)				(0.21)	
TENURE			0.076				-0.080				0.001	*			-0.000	
			(0.87)				(-0.61)				(1.81)				(-0.32)	
MULTIBOARD			0.480				-1.563				0.005				-0.002	
			(0.49)				(-1.11)				(0.51)				(-0.27)	
BOARDSIZE			1.851				2.505				-0.022				-0.009	
			(0.43)				(0.41)				(-0.50)				(-0.29)	
AUDIT			0.637				0.626				0.017	**			0.005	
			(0.82)				(0.54)				(2.12)				(0.86)	
COMP_NOMI			0.433				-0.185				0.010				0.006	
			(0.47)				(-0.14)				(1.05)				(0.92)	
FRCIO			-5.414				-0.377				0.000				-0.026	
			(-1.04)				(-0.05)				(0.01)				(-0.65)	
BLACKOUT			0.208				-1.336				-0.006				-0.008	
			(0.18)				(-0.98)				(-0.42)				(-1.11)	
Firm FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
R-square	0.377		0.378		0.462		0.462		0.371		0.372		0.434		0.435	
N	9699		9699		9699		9699		9699		9699		9699		9699	

Table 3

Industry expertise and trading performance: cross-sectional analyses

This table presents the cross-sectional variations in the effect of industry expertise on independent directors' trading returns. In Panel A, the main variables of interest are the interactions between *IDIE* and *LOWANALYST*, *HIR&D*, and *HICFVOL*, respectively. In Panel B, the main variables of interest are the interactions between *IEYEARS* and *LOWANALYST*, *HIR&D*, and *HICFVOL*, respectively. *BHAR180* is the market-adjusted buy-and-hold abnormal return over the 180 trading days following each transaction. *Alpha180* is the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 180 days following each transaction. *IDIE* is an indicator variable equal to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise. *IEYEARS* is defined as the number of years that an independent director has worked at another firm in the same 2-digit SIC industry as the focal firm. *LOWANALYST* is a dummy variable equal to one (zero) if the number of analysts following the firm belongs to the bottom (top) tercile of the distribution of analyst coverage across firms in the same 2-digit SIC industry in a given year. *HIR&D* is a dummy variable equal to one (zero) if the R&D expenditure of the firm belongs to the top (bottom) tercile of the distribution of R&D expenditures across firms in the same 2-digit SIC industry in a given year. *HICFVOL* is a dummy variable equal to one (zero) if the cash flow volatility of the firm belongs to the top (bottom) tercile of the distribution of the cash flow volatility across firms in the same 2-digit SIC industry in a given year, where cash flow volatility is defined as the standard deviation of operating cash flows over the past 12 quarters. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Firm fixed-effects are included in the regressions, and standard errors are clustered at individual level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Table 3
Industry expertise and trading performance: cross-sectional analyses (cont.)

Panel A												
Main explanatory variable: IDIE												
Dep. Variable:	BHAR180		Alpha180		BHAR180		Alpha180		BHAR180		Alpha180	
	(1)		(2)		(3)		(4)		(5)		(6)	
IDIE	-4.453		-0.015		-1.558		-0.020		-2.951		-0.003	
	(-1.57)		(-1.00)		(-0.51)		(-1.37)		(-1.04)		(-0.17)	
IDIE*LOWANALYST	11.609	***	0.048	**								
	(2.78)		(2.00)									
LOWANALYST	5.395		0.038	*								
	(1.38)		(1.95)									
IDIE*HIR&D					11.773	*	0.062	*				
					(1.75)		(1.70)					
HIR&D					-0.407		-0.029					
					(-0.08)		(-1.07)					
IDIE*HICFVOL									17.293	***	0.063	**
									(3.17)		(2.44)	
HICFVOL									-3.738		-0.016	
									(-1.40)		(-1.12)	
Control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes		Yes		Yes	
R-square	0.523		0.500		0.512		0.494		0.550		0.520	
N	6883		6883		3367		3367		5532		5532	

Table 3
Industry expertise and trading performance: cross-sectional analyses (cont.)

Panel B												
Main explanatory variable: IEYEARS												
Dep. Variable:	BHAR180		Alpha180		BHAR180		Alpha180		BHAR180		Alpha180	
	(1)		(2)		(3)		(4)		(5)		(6)	
IEYEARS	-0.088		0.000		-0.150		-0.002	*	-0.283		-0.001	
	(-0.34)		(0.09)		(-0.54)		(-1.75)		(-0.97)		(-0.41)	
IEYEARS*LOWANALYST	0.718	*	0.003									
	(1.85)		(1.42)									
LOWANALYST	6.089		0.040	**								
	(1.56)		(2.09)									
IEYEARS*HIR&D					0.846	*	0.006	**				
					(1.74)		(2.37)					
HIR&D					0.724		-0.024					
					(0.14)		(-0.88)					
IEYEARS*HICFVOL									1.511	***	0.006	***
									(3.02)		(2.61)	
HICFVOL									-2.896		-0.013	
									(-1.09)		(-0.95)	
Control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes		Yes		Yes	
R-square	0.523		0.500		0.511		0.494		0.549		0.520	
N	6883		6883		3367		3367		5532		5532	

Table 4

Industry expertise and trading performance: additional controls

This table presents the effect of industry expertise on independent directors' trading returns with additional control variables. Panel A employs *IDIE* as the main explanatory variable, and Panel B employs *IEYEARS* as the main explanatory variable. *BHAR180* is the market-adjusted buy-and-hold abnormal return over the 180 trading days following each transaction. *Alpha180* is the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 180 days following each transaction. *IDIE* is an indicator variable equal to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise. *IEYEARS* is the number of years that an independent director has worked at another firm in the same 2-digit SIC industry as the focal firm. *CONNECT* is a dummy variable equal to one if the independent director has social connections with the CEO/CFO of the focal firm, and zero otherwise, where social connections are defined following Fracassi and Tate (2012). *FOLLOW* is a dummy variable equal to one if the independent director purchases the firm's stock during the [-3.+3] window around an open-market purchase made by the firm's CEO/CFO, and zero otherwise. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Firm fixed-effects are included in the regressions, and standard errors are clustered at individual level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Panel A								
Main explanatory variable: IDIE								
	BHAR180		Alpha180		BHAR180		Alpha180	
	(1)		(2)		(3)		(4)	
IDIE	4.111	**	0.023	**	4.073	**	0.023	**
	(1.98)		(1.96)		(1.97)		(2.00)	
CONNECT	0.502		0.010					
	(0.26)		(0.95)					
FOLLOW					4.577	**	0.021	*
					(2.07)		(1.81)	
Control variables	Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes	
R-square	0.462		0.435		0.463		0.435	
N	9699		9699		9699		9699	

Table 4
Industry expertise and trading performance: additional controls (cont.)

Panel B								
Main explanatory variable: IEYEARS								
	BHAR180		Alpha180		BHAR180		Alpha180	
	(1)		(2)		(3)		(4)	
IEYEARS	0.437	**	0.002	**	0.432	**	0.002	**
	(2.14)		(2.13)		(2.11)		(2.14)	
CONNECT	0.631		0.011					
	(0.33)		(1.02)					
FOLLOW					4.584	**	0.021	*
					(2.07)		(1.80)	
Control variables	Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes	
R-square	0.462		0.435		0.463		0.435	
N	9699		9699		9699		9699	

Table 5

Industry expertise and trading performance: opportunistic trades

This table presents the effect of industry expertise on independent directors' trading returns for a subsample of opportunistic purchase transactions, where opportunistic purchases are classified following Cohen, Malloy, and Pomorsk (2012). The main explanatory variable is *IDIE*. *BHAR90* (*180*) is the market-adjusted buy-and-hold abnormal returns over the 90 (180) trading days following each transaction date. *Alpha90* (*180*) is the alpha estimated from the Fama and French (1993) and Carhart (1997) four-factor model over the 90 (180) days following each transaction. *IDIE* is an indicator variable equals to one if an independent director has worked at another firm (as a top executive/independent director) in the same 2-digit SIC industry as the focal firm, and zero otherwise. Appendix A presents definitions for the remaining variables. All continuous variables are winsorized at 1st and 99th percentile level. Firm fixed-effects are included in the regressions, and standard errors are clustered at individual level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

	BHAR90		BHAR180		Alpha90		Alpha180	
	(1)		(2)		(3)		(4)	
IDIE	15.410	***	15.544	**	0.201	***	0.102	*
	(3.49)		(2.05)		(4.62)		(1.93)	
Control variables	Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes	
Clustered SE by individual	Yes		Yes		Yes		Yes	
R-square	0.442		0.557		0.428		0.506	
N	2214		2214		2214		2214	

Table 6

Industry expertise and trading performance: portfolio analyses

This table presents the effect of industry expertise on independent directors' trading returns by constructing long-short portfolios based on independent directors' purchase and sales transactions, respectively. I form zero-investment portfolios by investing in stocks purchased (sold) by independent directors with industry expertise and shorting the stocks purchased (sold) by independent directors without industry expertise. Each stock is held in the portfolio for 6 months and the portfolios are rebalanced each month. The portfolio abnormal returns are measured using alpha estimated from CAPM, Fama-French three-factor model, and Carhart four-factor model. To account for differences in firm-, individual-, and transaction-level characteristics, I construct the long-short portfolio using matched transactions based on firms' 2-digit SIC industry, firm size and book-to-market ratio, director age and tenure, as well as transaction size. Transactions made by independent directors who have social connections with their CEO/CFOs are excluded from the analyses. Panel A presents results for valuel-weighted portfolios, and Panel B presents results for equal-weighted portfolios. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

	IDIE=1 Buys		IDIE=0 Buys	L/S Buys		IDIE=1 Sells		IDIE=0 Sells	L/S Sells
Panel A. Value-weighted									
CAPM alpha	0.025	***	0.008	0.017	**	-0.008	*	-0.001	-0.007
	(3.88)		(1.12)	(2.56)		(-1.75)		(-0.46)	(-1.53)
Fama-French alpha	0.023	***	0.006	0.017	***	-0.008	*	-0.002	-0.006
	(3.81)		(0.76)	(2.68)		(-1.68)		(-0.59)	(-1.42)
Carhart alpha	0.023	***	0.006	0.017	***	-0.008	*	-0.002	-0.006
	(3.78)		(0.74)	(2.65)		(-1.66)		(-0.60)	(-1.41)
Panel B. Equal-weighted									
CAPM alpha	0.021	***	0.010	0.011	*	0.000		0.001	-0.001
	(3.17)		(1.51)	(1.81)		(0.05)		(0.11)	(-0.18)
Fama-French alpha	0.019	***	0.007	0.012	*	-0.001		-0.002	-0.000
	(2.84)		(1.02)	(1.94)		(-0.21)		(-0.44)	(-0.08)
Carhart alpha	0.018	***	0.006	0.012	*	-0.001		-0.002	-0.000
	(2.81)		(1.01)	(1.93)		(-0.17)		(-0.46)	(-0.02)

Table 7

Industry expertise and future stock price changes

This table presents the effect of industry expertise on the predictability of independent directors' trades regarding large stock price changes in the near future in a probit model. The large stock price increase (decrease) events is identified following Akbas, Jiang, and Koch (2017). For each firm *i*, I compute the three-day market-adjusted cumulative abnormal return, CAR(-1, +1), around each trading day *t* during the sample period, and I identify firm *i* as experienced a large increase (decrease) in the firm's stock price on day *t* if the CAR(-1, +1) for day *t* belongs to the top (bottom) 10% of the distribution of CAR(-1, +1) of firm *i* across the same calendar year. Next, I define a dummy variable, Δ*P_PCTL90* (Δ*P_PCTL10*), equal to one if the large stock price increase (decrease) event occurs within 10 days following an independent director's trade, and zero otherwise. The main variable of interest is the interaction term, *STR*IDIE*, where *STR* is defined as the net purchase by independent director *j* at firm *i* during month *t*, scales by the total trading volume in firm *i* during month *t*. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Monthly fixed-effects are included in the regressions, and standard errors are clustered at firm level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

	ΔP_90PCTL		ΔP_90PCTL		ΔP_10PCTL		ΔP_10PCTL	
	(1)		(2)		(3)		(4)	
STR	1.288	**	0.757		-0.112		-0.478	
	(2.48)		(1.48)		(-0.25)		(-1.02)	
STR*IDIE	7.784	***	7.746	***	-5.238	**	-5.319	**
	(3.22)		(3.30)		(-2.14)		(-2.14)	
IDIE	0.014		0.004		0.030		0.027	
	(0.54)		(0.16)		(1.17)		(1.03)	
BM	0.106	***	0.091	**	-0.009		0.004	
	(2.93)		(2.35)		(-0.25)		(0.11)	
SIZE	-0.030	***	0.005		0.001		0.022	***
	(-5.12)		(0.86)		(0.25)		(3.78)	
RET(t-1)	-0.875	***	-0.644	***	0.285	***	0.407	***
	(-12.70)		(-9.51)		(4.49)		(6.45)	
RET(t-12, t-2)	-0.132	***	-0.115	***	0.121	***	0.127	***
	(-7.88)		(-7.09)		(7.69)		(8.08)	
ASSETGR			-0.055	*			-0.005	
			(-1.94)				(-0.18)	
PROFIT			-0.021				0.044	
			(-0.49)				(0.99)	
RETVOL			8.956	***			5.238	***
			(17.05)				(10.64)	
Month FE	Yes		Yes		Yes		Yes	
Clustered SE by firm	Yes		Yes		Yes		Yes	
Pseudo R-square	0.018		0.030		0.006		0.010	
N	26143		26143		26143		26143	

Table 8

Industry expertise and operating performance

This table presents the relationship between the change in the proportion of independent directors with industry expertise on the board and the change in the firm's operating performance. The main explanatory variable, *ΔIDIE_PCT*, is the lagged change in *IDIE_PCT*, where *IDIE_PCT* is the number of independent directors with experience in the focal industry divided by the total number of independent directors on the board. Appendix A presents definitions for the remaining variables. All continuous variables are winsorized at 1st and 99th percentile level. Year fixed-effects and firm fixed effects are included in the regressions, and standard errors are clustered at firm level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Dep. Variable:	ΔROA		ΔROE		SALESGR	
	(1)		(2)		(3)	
ΔIDIE_PCT	0.029	**	0.052	*	0.080	**
	(2.36)		(1.79)		(2.13)	
ROA	-0.839	***				
	(-49.92)					
ROE			-0.782	***		
			(-40.16)			
SIZE	-0.033	***	-0.058	***	-0.100	***
	(-9.10)		(-7.32)		(-10.34)	
BM	-0.129	***	-0.220	***	-0.229	***
	(-17.38)		(-14.79)		(-13.18)	
CAPEX	-0.046	*	-0.174	**	-0.311	***
	(-1.71)		(-2.48)		(-3.56)	
R&D	-0.114	**	-0.506	***	-0.619	***
	(-2.29)		(-4.43)		(-4.20)	
FRCIO	-0.017	***	-0.037	**	-0.002	
	(-2.60)		(-2.50)		(-0.09)	
SALESGR	0.014	***	0.022	**		
	(2.80)		(2.14)			
BOARDSIZE	0.007		0.016		-0.006	
	(0.83)		(0.86)		(-0.31)	
ID_PCT	-0.003		-0.007		-0.022	
	(-0.20)		(-0.24)		(-0.69)	
FIRMAGE	0.014	***	-0.002		-0.040	***
	(3.00)		(-0.15)		(-3.35)	
LEVERAGE	0.004		0.012		0.093	***
	(0.36)		(0.33)		(3.02)	
VOLATILITY	0.033	**	0.084	**	-0.085	
	(2.02)		(1.98)		(-1.57)	
Year FE	Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes	
Clustered SE by firm	Yes		Yes		Yes	
R-square	0.484		0.320		0.097	
N	23954		23954		23954	

Table 9

Industry expertise and alliance performance

This table presents the relationship between the proportion of independent directors with experience in the alliance industry on the board and the alliance announcement return. The dependent variable, *CAR(-1, +1)*, is the cumulative abnormal returns estimated using Fama and French (1993) and Carhart (1997) four-factor model over 3-days around the alliance announcement. *CAR(-2, +2)*, *CAR(-3, +3)*, and *CAR(-5, +5)* are defined in the analogous way. The main explanatory variable, *IDIEA_PCT*, is the number of independent directors with experience in the alliance industry divided by the total number of independent directors on the board. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Year fixed-effects and industry fixed effects are included in the regressions, and standard errors are robust to heteroskedasticity. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Dep. Variable:	CAR(-1, +1)		CAR(-2, +2)		CAR(-3, +3)		CAR(-5, +5)	
	(1)		(2)		(3)		(4)	
IDIEA_PCT	0.012	**	0.014	**	0.014	**	0.017	**
	(2.55)		(2.54)		(2.07)		(2.23)	
CEOIEA_D	-0.002		-0.005	*	-0.003		-0.005	
	(-0.95)		(-1.80)		(-0.80)		(-1.06)	
ID_PCT	0.000		0.001		-0.003		-0.003	
	(0.01)		(0.13)		(-0.25)		(-0.27)	
BOARDSIZE	-0.001		0.000		0.003		-0.002	
	(-0.31)		(0.05)		(0.49)		(-0.22)	
SIZE	-0.001	*	-0.001	*	-0.001	*	-0.001	
	(-1.81)		(-1.75)		(-1.80)		(-0.97)	
BM	0.015	***	0.023	***	0.031	***	0.041	***
	(3.16)		(3.88)		(4.54)		(4.89)	
SALESGR	0.002		-0.002		0.001		0.005	
	(0.74)		(-0.61)		(0.32)		(1.19)	
R&D	0.001		0.000		0.001		0.004	
	(0.33)		(0.08)		(0.33)		(1.17)	
CASH	0.011	**	0.012	*	0.015	*	0.012	
	(2.01)		(1.66)		(1.82)		(1.21)	
CAPEX	0.007		-0.009		-0.014		-0.033	
	(0.27)		(-0.27)		(-0.37)		(-0.75)	
ROE	-0.004		-0.003		-0.000		0.002	
	(-0.95)		(-0.71)		(-0.02)		(0.25)	
PE	0.000	**	0.000	**	0.000	*	0.000	
	(2.47)		(1.96)		(1.74)		(1.59)	
DE	0.000		0.001		0.002	**	0.003	**
	(0.04)		(1.43)		(2.07)		(2.06)	
FRCIO	-0.016	***	-0.018	***	-0.016	**	-0.011	
	(-3.50)		(-3.25)		(-2.43)		(-1.41)	
Year FE	Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes	
Robust SE	Yes		Yes		Yes		Yes	
R-square	0.041		0.035		0.032		0.036	
N	4092		4092		4092		4092	

Table 10

Industry expertise and M&A deal completion

This table presents the relationship between the proportion of independent directors with experience in the target industry on the acquirer's board and the likelihood of M&A deal completion. The dependent variable, *COMPLETE*, is a dummy variable equal to one if the acquisition is successfully completed, and zero otherwise. The main variables of interest are *IDIET_PCT* (*IDIET_D*) and the interaction term, *IDIET_PCT*CAR* (*IDIET_D*CAR*). *IDIET_PCT*, is the number of independent directors on the acquirer's board who have work experience in the target industry, scaled by the total number of independent directors on the acquirer's board. *IDIET_D* is a dummy variable equal to one if there is at least one independent director who has experience in the target industry on the acquirer's board, and zero otherwise. *CAR* is the 3-day market-adjusted cumulative abnormal return around the acquisition announcement of the acquirer firm. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Year fixed-effects and industry fixed effects are included in the regressions, and standard errors are robust to heteroskedasticity. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

Dependent Variable.: COMPLETE												
	(1)		(2)		(3)		(4)		(5)		(6)	
IDIET_PCT	0.504	*	0.511	*	0.480	*						
	(1.77)		(1.80)		(1.74)							
IDIET_D							0.298	**	0.291	**	0.281	**
							(2.08)		(2.03)		(1.99)	
CAR			1.853	*	2.545	**			1.785	*	3.592	***
			(1.94)		(1.99)				(1.87)		(2.59)	
IDIET_PCT*CAR					-4.090							
					(-0.85)							
IDIET_D*CAR											-4.087	**
											(-2.05)	
Control variables	Yes		Yes		Yes		Yes		Yes		Yes	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes		Yes		Yes	
Pseudo R-square	0.521		0.524		0.525		0.522		0.526		0.530	
N	2812		2812		2812		2812		2812		2812	

Table 11

Industry expertise and investment-to-price sensitivity

This table presents the relationship between the proportion of independent directors with industry expertise on the board and the investment-to-price sensitivity. The main variables of interest are the interaction terms, *Q*IDIE_PCT* and *Q*IDIE_D*, respectively. *IDIE_PCT* is the number of independent directors with experience in the focal industry divided by the total number of independent directors on the board. *IDIE_D* is a dummy variable equal to one if there is at least one independent director with industry expertise on the board, and zero otherwise. Appendix A presents definitions for the remaining control variables. All continuous variables are winsorized at 1st and 99th percentile level. Year fixed-effects and firm fixed effects are included in the regressions, and standard errors are clustered at firm level. t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level.

	Dependent variable: CAPEX											
	(1)		(2)		(3)		(4)		(5)		(6)	
Q	0.008	***	0.010	***	0.008	***	0.009	***	0.011	***	0.009	***
	(9.70)		(6.81)		(6.04)		(10.93)		(7.18)		(8.47)	
Q*IDIE_PCT	-0.008	***	-0.008	***	-0.008	***						
	(-3.64)		(-3.69)		(-2.87)							
IDIE_PCT	0.021	***	0.021	***	0.017	**						
	(2.82)		(2.87)		(1.97)							
Q*IDIE_D							-0.004	***	-0.004	***	-0.004	***
							(-3.73)		(-3.81)		(-3.51)	
IDIE_D							0.008	***	0.009	***	0.008	***
							(3.61)		(3.69)		(2.94)	
Q*NONSYNC			-0.003						-0.003	*		
			(-1.49)						(-1.82)			
NONSYNC			0.004						0.006			
			(1.07)						(1.36)			
Q*PIN					0.002						0.001	
					(0.46)						(0.30)	
PIN					0.007						0.009	
					(0.61)						(0.91)	
CF*IDIE_PCT	-0.040	**	-0.040	**	-0.028							
	(-2.18)		(-2.18)		(-1.34)							
CF*IDIE_D							-0.007		-0.007		0.003	
							(-0.79)		(-0.79)		(0.39)	
CF	0.060	***	0.060	***	0.059	***	0.057	***	0.057	***	0.053	***
	(10.32)		(10.28)		(9.31)		(8.34)		(8.33)		(7.49)	
INVASSET	-0.078		-0.071		-0.080		-0.074		-0.066		-0.073	
	(-0.62)		(-0.56)		(-0.67)		(-0.60)		(-0.53)		(-0.62)	
CRET36	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***	-0.002	***
	(-4.48)		(-4.47)		(-4.07)		(-4.46)		(-4.45)		(-4.11)	
Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
Firm FE	Yes		Yes		Yes		Yes		Yes		Yes	
Clustered SE by firm	Yes		Yes		Yes		Yes		Yes		Yes	
R-square	0.119		0.119		0.120		0.119		0.119		0.121	
N	21528		21528		18169		21528		21528		18169	