Competitive Threats, Information Asymmetry, and Insider Trading

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Abstract

This paper provides evidence that intensified product market competition increases information asymmetry between corporate insiders and investors. I use volume and gains from insider trading as proxies for information asymmetry. I show that when a firm faces competitive threats insiders purchase and sell more stocks and their trading better predicts future stock returns and long-term profitability changes. These results hold for several alternative measures of competitive intensity and they are related to the degree of restrictiveness of insider trading regulation. I show that future firm performance turns more idiosyncratic when competition intensifies increasing forecasting relevance of firm-specific information better known to insiders. Furthermore, I provide evidence that firms reduce informativeness of mandatory and voluntary disclosures leaving investors in a disadvantage.

Keywords

competition, product market, fluidity, information asymmetry, insider trading

JEL Classification

*G*14, *G*15, *G*30

1. Introduction

This paper investigates how intensified product market competition affects information asymmetry between corporate insiders and investors. Intensity of competition is a major determinant of a firm's business environment and a defining characteristic of many microeconomic models. Intensified competition increases firm uncertainty, which incentivizes managers to exert greater effort (Raith 2003) and to make more conservative business decisions. Intensive competition is associated with lower capital expenditures (CapEx) (Frésard and Valta 2013), less investment in research and development (R&D) (Frésard and Valta 2013), greater likelihood of forming business alliances (Li, Qiu, and Wang 2015), lower financial leverage (Xu 2012), and higher cash holdings (Alimov 2014; Chi and Su 2015; Hoberg, Phillips, and Prabhala 2014). Investors consider firms facing intensive competition riskier and they require higher return on equity (Hou and Robinson 2006) and on debt (Valta 2012; Platt 2014).

I argue that the greater uncertainty resulting from intensified competition disproportionately affects outside investors and so it increases insiders' relative information advantage. When new rivals enter a product market a firm's future performance heavily depends on the outcome of the competitive process. Anticipating individual firms' success relies on firm-specific information that is better known to insiders. Hutton, Lee, and Shu (2012) compare relative precision of managers' and analysts' earnings forecasts and they conclude that analysts' forecasts are more precise when company performance is mostly driven by the overall macroeconomic factors, e.g. GDP growth or changes in energy prices. On the other hand, managers issue more accurate forecasts when earnings depend on firm-specific factors that are difficult to anticipate for

outsiders, e.g. abnormal inventory levels or excess production capacity. These findings suggest that the more firm-specific earnings determinants are the greater is insiders' information advantage. I propose that intensified competition increases insiders' information advantage by making firm-specific factors more important for forecasting their firm's future performance.

I further suggest that firms are likely to respond to intensified competition by reducing informativeness of their disclosures. Theory suggests that when deciding on their disclosures firms trade off benefits of communicating their quality to investors (Grossman 1981; Milgrom 1981) against proprietary costs of informing their rivals (Verrecchia 1983). Verrecchia (1990) and Clinch and Verrecchia (1997) argue that intensive competition increases proprietary cost of disclosure because firm rivals act more aggressively on disclosed information. Consistent with this prediction, Verrecchia and Weber (2006) and Boone, Floros, and Johnson (2015) find that firms in competitive industries are more likely to withhold proprietary information from investors by redacting the information from their material contract filings or from the Securities and Exchange Commission (SEC) registration filings. I thus expect firms facing competitive threats to provide less informative disclosures, which implies greater insiders' information advantage.

I use product market fluidity (*Fluidity*) (Hoberg, Phillips, and Prabhala 2014) as the main proxy for competitive intensity. *Fluidity* is based on a linguistic comparison of product descriptions provided in 10-K filings. The construction of the measure reflects the idea that when a firm's rivals enter its product market their product descriptions likely become more similar to the firm's own product description. Increasing similarity of rival firms' product descriptions thus indicates growing competitive pressure on the firm. *Fluidity* has a number of advantages relative to the

conventional proxies for competitive intensity. It directly captures the dynamic aspect of competition, it is forward looking, it is independent of industry definitions (e.g. SIC, NAICS, GICS), and it is mostly determined by competitors' moves towards the firm's product space, which alleviates endogeneity concerns. In a subsequent analysis I use three additional measures of competitive intensity: (i) industry-adjusted number of competition-related words in firms' 10-K filings (Li, Lundholm, and Minnis 2013), (ii) large non-transitory industry-wide decreases in import tariffs (Schott 2010), and (iii) the Herfindahl–Hirschman industry concentration index. I provide detailed description of the measures in Section 3.

I use volume and profitability of insider trading as a proxy for insiders' information advantage. Kyle (1985) and Baiman and Verrecchia (1996) show analytically that insiders' trading profits increase in their information advantage conceptualized as the relative precision of insiders' private versus public information. Prior empirical research shows that insiders form their own view on a firms' fundamental value and they condition trading on their (dis)agreement with the current stock price (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Jenter 2005; Piotroski and Roulstone 2005). On average, insider trading tends to be informative about future stock returns (Seyhun 1986; Lakonishok and Lee 2001; Jeng, Metrick, and Zeckhauser 2003) and earnings changes (Ke, Huddart, and Petroni 2003; Piotroski and Roulstone 2005). Furthermore, informativeness of insider trading is higher in firms that are harder to value for outsiders, due to greater idiosyncratic volatility of stock returns (Ben-David and Roulstone 2009) or R&D intensity (Aboody and Lev 2000), which is consistent with insiders trading more often and more profitably when their information advantage is greater. Volume and profitability of insider trading are used as proxies for insiders' information advantage in a number of previous studies (Frankel and Li

2004; Huddart and Ke 2007; Fahlenbrach and Stulz 2011; Ravina and Sapienza 2010).

I find that insiders purchase and sell larger volumes of stocks when *Fluidity* is high. The result is significant both for the top level insiders (CEO and the CFO) and for the other insiders. To increase confidence that the trading volume is driven by information-driven trades[1] reflecting the greater information asymmetry I partition the sample around the implementation of the Sarbanes-Oxley Act (SOX) that constrained information-driven trading (Brochet 2010). I show that the association between *Fluidity* and insider sales volume is more pronounced before the implementation of SOX when insider trading regulation was more lax. Furthermore, I find that when *Fluidity* is high insider trading volume is a stronger predictor of future stock returns. Again this association is more pronounced in the pre-SOX period. Investigating the nature of insiders' information advantage I find that when competition intensifies higher insider trading volume does not predict one-year changes in earnings per share (EPS), but instead it predicts five-year EPS changes. This suggests that the trades reflect insiders' superior ability to assess the impact of intensified competition on long-term profitability rather than foreknowledge of upcoming disclosures.

I explore two explanations for my findings. First, I propose that the disruptive effect of competitive threats makes forecasting idiosyncratic profitability of individual firms more

[1] I consider a trade to be driven by information if insiders condition their trading decision on their own assessment of the firm's fundamental value, as opposed to trades driven purely by liquidity or portfolio rebalancing needs that disregard current stock price. I take no position on whether information-driven trades are legal or ethical.

challenging, which increases usefulness of firm-specific information that is better known to insiders. Consistent with this explanation I document that *Fluidity* is associated with more heterogeneous (cross-section) and more variable (time-series) operating profitability, which suggests that forecasting performance is more difficult when *Fluidity* is high. Furthermore, when competition intensifies firm-specific component of operating profitability in less persistent, which likely increases forecasting usefulness of firm-specific information that is better known to insiders. In addition, price responses to earnings announcements are larger when *Fluidity* is high, consistent with greater investors' surprises and larger updating of beliefs around earnings announcements.

Second, I suggest that intensified competition increases proprietary cost of disclosure and it incentivizes firms to provide less informative disclosures that leave investors in an information disadvantage. Consistent with this explanation, I find that firms facing competitive threats are more likely to declare that they possess material undisclosed proprietary information (Hoberg and Maksimovic 2015)[2], they provide less detailed numerical information in their 10-K reports (Chen, Miao, and Shevlin 2015), their annual reports contain more words and their 10-K file size is larger (Loughran and Mcdonald 2014), and they contain longer sentences and more complex words (Li 2008). Furthermore, I find that firms facing competitive threats are less likely to provide management earnings guidance (CIG), which is often viewed as a proxy for voluntary disclosure (e.g. Ali, Klasa, and Yeung 2014). In addition, CIGs provided by firms under competitive pressure are less precise. Taken together, these results suggest that firms facing competitive threats provide

[2] I am grateful to Gerard Hoberg for letting me use the data on material undisclosed proprietary information.

less informative mandatory and voluntary disclosures.

Related to my paper, Peress (2010) develops a model that suggests that firms with market power have more efficient equity prices. He posits that market power insulates firms from competition by allowing them to pass on shocks to customer. Lower uncertainty about future profitability of these firms encourages trading in their equity (by both investors and insiders) which helps incorporating dispersed information into stock prices. I extend Peress (2010) by documenting that insiders are better than outsiders in evaluating the consequences of the higher uncertainty resulting from intensified competition. Peress (2010) suggests that insider trading makes prices more efficient *ex post*. I consider an insider's decision to trade endogenous and dependent (besides other factors) on the magnitude of perceived mispricing *ex ante*. The more insiders disagree with the current stock price the more likely they are to trade. When insiders' information advantage increases I expect them to more often disagree with stock prices and to trade upon the disagreement. I thus use volume of insider trading as a proxy for insiders' *ex ante* information advantage.[3]

Documenting the impact of intensified competitive pressure on a firm's information environment makes several important contributions. First, the study contributes to research evaluating the precision of analyst earnings forecast (Clement 1999; Brown 2001; Clement,

[3] Peress's (2010) paper is mostly analytical. In its empirical section he uses industry-adjusted price cost margin (*PCM*) as a proxy for competitive intensity. Past research suggests that *PCM* does not reliably capture intensity of competition (Boone 2008). Replicating Peress' (2010) results I indeed find a positive association between *PCM* and insider trading volume, which is in contrast to the negative association I document for the four proxies of competitive intensity used in this study.

Koonce, and Thomas J. Lopez 2007; Kadan et al. 2012; So 2013) and portfolio managers' stock picking skills (Carhart 1997; Kosowski et al. 2006; French 2008; Fama and French 2010; Guercio and Reuter 2014; Berk and van Binsbergen 2015) by suggesting that predicting future performance is more challenging when a firm faces greater competitive threats. Evaluating financial analysts' and portfolio managers' abilities should take into consideration the increased complexity of their task for firms facing intensified competition. Second, the paper contributes to the recent literature that aims at distinguishing between information-driven and liquidity-/rebalancing-driven insider trades (Cohen, Malloy, and Pomorski 2012; Ali and Hirshleifer 2016). I conclude that insider trades are more likely to be informed when a firm faces competitive threats. Third, viewing insider trading gains as a component of executive compensation (Roulstone 2003) I extend existing research on the impact of competition on executive compensation (e.g. Cuñat and Guadalupe 2009a). The greater insider trading gains imply that competitive pressure is not only associated with greater sensitivity of compensation to performance but also with higher levels of total compensation.[4]

The remainder of the paper is organized as follows. Section 2 reviews prior literature and specifies the hypotheses. In section 3 I discuss the methodology and the data sample. Section 4 presents the empirical results and Section 5 concludes.

[4] Furthermore, I indirectly contribute to research on the effectiveness of SOX (e. g. Brochet 2010) by showing the association between competitive intensity and insider trading is stronger before its implementation.

2. Literature Review and Hypotheses

It is widely acknowledged that intensity of product market competition has numerous implications for a firm's economic environment affecting managerial incentives, firm profitability, and risk. Competition endangers a firm's survival and thereby it incentivizes management to exert grater effort and to reduce corporate slack (Schmidt 1997; Raith 2003; Baggs and de Bettignies 2007). Hicks (1935) remarks that "the best of all monopoly profits is a quiet life" (p. 8). On the other hand, competition depresses firm profits, which lowers marginal benefits of potential performance improvements, which may partly offset the performance incentives. Raith (2003) shows analytically that intensive competition unambiguously leads to higher managerial effort when the market structure is determined endogenously as falling profits make some firms exit the market, which lets the surviving firms produce larger output giving them greater incentive to improve performance. Intensive competition also makes company owners seek managerial talent more aggressively (Baggs, Bettignies, and Ries 2013) and to tie their compensation more closely to performance (Cuñat and Guadalupe 2005, 2009a, 2009b).

Besides adjusting their effort levels managers strategically respond to intensified competition by making more conservative operating and financing decisions. Consistent with the theoretical prediction that competition weakens incentives to innovate as lower market power impairs a firm's ability to coordinate prices and reap benefits of innovation (Chen and Schwartz 2013), firms facing intensive competition reduce R&D and CapEx (Ghosal and Loungani 1996; Frésard and Valta 2013). Intensive competition also prompts firms to form strategic alliances to that help them share the cost of technological innovation (Li, Qiu, and Wang 2015). In terms of financing, intensive product market competition is associated with lower financial leverage

(Chevalier 1995; Xu 2012), and lower dividend payout (Hoberg, Phillips, and Prabhala 2014; Booth and Zhou 2015).[5] Firms facing competitive threats accumulate cash and liquid assets to fend off possible predatory attempts by competitors (Alimov 2014; Chi and Su 2015; Hoberg, Phillips, and Prabhala 2014).

Despite of this strategic adaptation intensive product market competition increases firm risk. Peress (2010) and Gaspar and Massa (2006) argue that firms with lower market power find it more difficult to pass idiosyncratic cost shocks onto their customers. Intensified competition increases investors' uncertainty about firm average profitability, which leads to higher idiosyncratic volatility of stock returns. In a similar vein, Irvine and Pontiff (2009) identify intensified economy-wide competition as a likely driver of the recent surge in idiosyncratic volatility of stock returns and cash flows. Investors seem to acknowledge the relationship between competition intensity and firm risk and they require higher return when providing equity (Hou and Robinson 2006) and debt financing (Valta 2012; Platt 2014).

I extend prior research by providing evidence that insiders are better than outsiders in evaluating the consequences of the higher uncertainty resulting from intensified competition. I argue that when new rivals enter a firm's product space its future performance crucially relies on its success in the competitive process. As a firm's success depends its idiosyncratic strengths and

[5] A notable exception is a study by Grullon and Michaely (2008) who reach opposite conclusions perhaps due their choice of the proxy for competitive intensity. See Farre-Mensa, Michaely, and Schmalz (2014) for a discussion of these contradictory findings.

weaknesses forecasting relevance of firm-specific information increases. Corporate insiders who are directly involved in key business decisions made in the firm are likely to be better informed about firm-specific factors. I therefore propose that insiders' information advantage increases when competition intensifies and firm-specific aspects become more relevant.

I expect insiders to benefit from their information advantage in timing their trades. Prior research shows that insiders form their own views on the firm's fundamental value and they condition trading on their (dis)agreement with the current stock price (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Jenter 2005; Piotroski and Roulstone 2005). On average insider trading is informative of future stock returns (Seyhun 1986; Lakonishok and Lee 2001; Jeng, Metrick, and Zeckhauser 2003) and earnings changes (Ke, Huddart, and Petroni 2003; Piotroski and Roulstone 2005). Following prior research that uses volume and profitability of insider trading as proxies for insiders' information advantage (Frankel and Li 2004; Huddart and Ke 2007; Fahlenbrach and Stulz 2011; Ravina and Sapienza 2010) I predict that when competition intensifies insiders benefit from their greater information advantage by trading larger volumes of stocks.

Hypothesis 1: *There is a positive association between intensity of product market competition and volume of insider trading.*

Prior research also shows that when insiders' information advantage is greater their trading better predicts future stock returns. Insiders are in a relatively stronger position to estimate their firm's value when it is followed by fewer analysts and when its inherent characteristics make it more difficult to value for outsiders. Past research shows that insider trading gains are larger in smaller firms that likely attract less investor and analyst attention (Lakonishok and Lee 2001).

Furthermore, insider trading is more informative about future stock returns in firms that have greater idiosyncratic stock return volatility (Ben-David and Roulstone 2009) and in R&D intensive firms (Aboody and Lev 2000).

I posit that success in competition is firm specific and highly value relevant. I propose that insiders benefit from their superior understanding of their firm's competitive strengths and weaknesses by making their trades when the market misjudges the likely impact of the competitive process on their firm value. Thus, I expect intensity of product market competition to be positively associated with insider trading gains.

Hypothesis 2: *Volume of insider purchases (sales) is a stronger predictor of higher (lower) future stock returns when product market competition is intensive.*

In the U.S. insider trading regulation obliges insiders not to trade while in possession of material non-public information (the 'disclose or abstain' rule). Prior research shows in their decisions to trade insiders weigh trading gains against potential legal and reputational costs that informed trading involves. Insiders rarely sell immediately before negative earnings news, but they are more likely to sell three to nine quarters prior to a break in a string of consecutive quarterly earnings increases where the legal jeopardy is milder (Ke, Huddart, and Petroni 2003). Insiders also condition their trading on foreknowledge of information in Form 10-K and 10-Q filings (Huddart, Ke, and Shi 2007) and in Form 8-K filings (Cohen, Jackson, and Mitts 2015) as these filings attract less investor attention than earnings announcements. Insider trading gains are larger in firms with ineffective internal control (Skaife, Veenman, and Wangerin 2013) and before the implementation of SOX that imposed stricter penalties for violation of insider trading rules

(Brochet 2010). In this paper, I use SOX as an exogenous shock to the personal costs of insider trading. I predict that the insider trading results are stronger before the implementation of SOX when the more lax regulation allowed greater space for informed insider trading.

I suggest that intensified competition affects the information asymmetry between insiders and investors by changing relative forecasting relevance of firm-specific and industry-wide information. When more rivals compete in a given product market a firm's future performance depends on its ability to succeed in the competitive process. Due to their exposure to key business decisions insiders have better knowledge of their firm's strengths and weaknesses and so they are better able to anticipate how well it will withstand the competitive challenge. The increased relative forecasting relevance of firm-specific factors that are better known to insiders thus increases their informative advantage over investors. I predict that intensified competition increases heterogeneity and reduces persistence of firm operating performance and that the reduction is driven mostly by lower persistence of firm-specific rather than industry-wide performance component. To illustrate Appendix A1 provides anecdotal evidence on two instances when intensified competition was associated with significant insider sales (Research in Motion Ltd.) and insider purchases (Wynn Resorts Ltd.). In both cases insider trades were highly predictive of future firm performance indicating that insiders were able to assess how well their firm would handle the intensified competition.

I further suggest that firms are likely to respond to intensified competition by reducing informativeness of their disclosures. Providing evidence on the impact of intensified competition on firm disclosures is important as there seems to be little consensus in past research as to how

competitive intensity impacts on corporate disclosure. Tirole (1988) argues that theoretical predictions are ambiguous and Beyer et al. (2010) and Lang and Sul (2014) suggest that empirical results are mixed. Beyer et al. (2010) conclude their survey of literature by suggesting that "there is no clear empirical evidence to date on how proprietary costs, as proxied by the level of competition in an industry, are related to voluntary disclosures." (p. 306). Healy and Palepu (2001, p. 424) reach a similar conclusion.

In formulating my predictions concerning the effect of competition on corporate disclosures I follow Verrecchia (1983) who proposes that firms trade off benefits of communicating their quality to investors (Grossman 1981; Milgrom 1981) against proprietary costs of informing their rivals. Verrecchia (1990) and Clinch and Verrecchia (1997) argue that intensive competition increases proprietary cost of disclosure because firm rivals act more aggressively on disclosed information. Consistent with this prediction, Verrecchia and Weber (2006) and Boone, Floros, and Johnson (2015) find that firms in competitive industries are more likely to withhold proprietary information from investors by redacting the information from their material contract filings or from the Securities and Exchange Commission (SEC) registration filings. I thus expect firms facing competitive threats to provide less informative mandatory and voluntary disclosures, which implies greater insiders' information advantage.

3. Research Design

3.1. Empirical Models

I use two main specifications for my empirical tests related to the two hypotheses. The first specification investigates whether higher level of competitive intensity is associated with greater insider trading volume and the second specification examines whether insider trading volume is more informative of future stock returns when competition intensifies. The trading volume specification has the following form:

$$TradVol_{it} = \beta_0 + \beta_1 Compet_{it} + \Sigma \beta_k Controls_{it} + \Sigma \beta_l IFE_{it} + \varepsilon_{it} \quad (1)$$

where $TradVol_{it}$ is the aggregate annual insider trading volume of either sales or purchases for firm *i* and year *t*, $Compet_{it}$ is one of the measures of competitive intensity, $Controls_{it}$ are control variables and IFE_{it} are the Fama and French (1997) industry fixed effects. Hypothesis 1 suggests that the coefficient β_1 is positive as I expect intensified competition to be associated with higher insider trading volume. I discuss and motivate the choice of individual variables below and I provide the definition of all variables in Appendix A2.

The second specification examines whether subsequent stock price changes exhibit a greater association with insider purchases and sales when competition is high.

$$ExRet_{it} = \beta_0 + \beta_1 Compet_{it} + \beta_2 BuyVol_{it} + \beta_3 SellVol_{it} + \beta_4 Compet_{it} \cdot BuyVol_{it} + \beta_5 Compet_{it} \cdot SellVol_{it} + \Sigma \beta_k Controls_{it} + \Sigma \beta_l IFE_{it} + \varepsilon_{it} \quad (2)$$

where $ExRet_{it}$ is the one-year market-adjusted stock return, $BuyVol_{it}$ is the aggregate annual volume of insider purchases, and $SellVol_{it}$ is the aggregate annual volume of insider sales. I measure of the market-adjusted stock return over 53 weeks starting one week after the fourth quarter earnings announcement. I include control variables for size measured as the natural logarithm of the market value of equity, the natural logarithm of book to market ratio, past year stock returns, and volatility of past stock returns. Despite of these control variable this specification does not fully control for risk. I do not claim that insiders are able to generate abnormal return when competitive pressure intensifies. The purpose of this analysis is solely to demonstrate that when competitive pressure intensifies insider transactions better predict future stock returns that reflect incorporation of future news into stock prices. Hypothesis 2 suggests that the coefficient β_4 is positive and the coefficient β_5 is negative as I expect the volume of insider purchases (sales) to be more strongly associated with higher (lower) stock returns when competition intensifies.

3.2. Competitive Intensity

I use product market fluidity (*Fluidity*) provided by Hoberg, Phillips, and Prabhala (2014) as the proxy for the intensity of competitive pressure a firm faces in its product markets. *Fluidity* captures an increase in verbal similarity of rival firms' product descriptions provided in 10-K filings relative to the firm's own product description. Product descriptions in 10-K filings are regulated pieces of disclosure. Regulation S-K under the U.S. Securities Act of 1933 stipulates that product descriptions shall be representative and significant. Hence, vocabulary used in product descriptions should be characteristic of a firm's product portfolio.

To compute *Fluidity* Hoberg, Phillips, and Prabhala (2014) first list all words used in

product descriptions of all firms. Then for every firm-year they code a vector of zeros and ones indicating whether a given word is used in a given product description. For example, if the first seven words in the list are Telephone, Cellular, Digital, Analog, Internet, iPhone, and Android, a vector $W_{i,t}$ = [1, 1, 0, 1, 1, 0, 1] indicates that a firm *i* in year *t* uses words Telephone, Cellular, Analog, Internet, and Android and it does not use words Digital and iPhone. Then for every firm-year the authors compute a change vector as the difference between this year's and past year's word vector. If the above company last year only used words Telephone, Cellular its past year's word vector is $W_{i,t-1}$ = [1, 1, 0, 0, 0, 0, 0] and hence its change vector is $C_{i,t}$ = [0, 0, 0, 1, 1, 0, 1] indicating that this year the firm is newly using words Analog, Internet, and Android.

Change vectors of all other firm in the economy are then aggregated by adding up their corresponding elements. An aggregate change vector reflecting changes in rival firms' vocabulary $G_{i,t}$ = [0, 0, 0, 0, 2, 1, 1] indicates that there are no annual changes in the way a firm *i*'s rivals use words Telephone, Cellular, Digital, and Analog. However, this year two more competitors newly use the word Internet, one competitor started using the word iPhone and one competitor newly mentions the word Android. The word vectors and the aggregate change vectors are then normalized to unit length by adding up the sum of squares of their elements (equal to 6 for the aggregate change vector $G_{i,t}$ from the example above, 0 + 0 + 0 + 0 + 4 + 1 + 1 = 6) and multiplying each vector element by the square root of one over the sum of squares of vector elements (equal to 0.408 for the aggregate change vector $G_{i,t}$ from the example above, $(1/6)^{0.5}$ = 0.408).

Fluidity is defined as the dot product of the normalized word vector for a firm and normalized aggregate change vector (in the example above $Fluidity_{i,t}$ = [0.447, 0.447, 0, 0.447,

0.447, 0, 0.447] · [0, 0, 0, 0, 0.816, 0.408, 0.408] = 0 + 0 + 0 + 0 + 0.365 + 0 + 0.183 = 0.548). *Fluidity* thus captures the cosine similarity between a firm's normalized word vector and its normalized aggregate change vector. In other words, *Fluidity* shows how much more similar the competitors' product descriptions have become over the past year relative to the firm's own product description. See Hoberg, Phillips, and Prabhala (2014) for more details on the construction of the measure. Appendix A3 shows median *Fluidity* for individual Fama and French (1997) industries. *Fluidity* is the highest in Pharmaceuticals, Communication, Coal, Healthcare, Oil and Gas, and Medical Equipment and it is the lowest in Beer and Liquor, Transportation, Consumer Goods, Food Products, Shipping Containers, and Textiles.

Fluidity has a number of advantages relative to the conventional measures of competitive intensity. First, by construction the measure explicitly captures impending competitive threats. Conventional variables capture competitive intensity only indirectly assuming a negative association between intensity of competition and industry concentration or profit margins. Past research shows that neither industry concentration (Berger 2014) nor profit margins (Boone 2008) reliably capture intensified competition. Second, *Fluidity* is forward looking and hence better suited for capturing competitive dynamics. The use of words in product descriptions likely reflects recent or perhaps even intended future moves of rivals into a firm's product space. Measures based on industry concentration assume industry structure that is expected to result from intensive competition in equilibrium. Fast changing industries may never reach a state that can be reasonably approximated by equilibrium characteristics.

Third, the aggregate change vector comprises all 'other' firms in the economy and so

computing *Fluidity* is independent of industry definitions. Industries can be defined using several criteria and so any conventional industry classification (e.g. SIC, NAICS, GIGS) is subject to judgment. Past research shows that the correlation between concentration measures using different industry definitions is quite low and so inferences that are based on them may be sensitive to the way industries are defined (Bhojraj, Lee, and Oler 2003; Krishnan and Press 2003; Ali, Klasa, and Yeung 2009; Hrazdil and Zhang 2012). Fourth, *Fluidity* is chiefly determined by competitors' choice of language in describing their products and so the measure is less likely to be subject to conventional endogeneity concerns. It is not likely that managers choose their product description vocabulary so that they induce changes in competitors' product descriptions that would prepare grounds for profitable insider trading in the future.

In addition to *Fluidity* I use three other measures of competitive intensity. First, I use industry-adjusted number of competition-related words in a firm's 10-K filings (*CompWrds*) provided by Li, Lundholm, and Minnis (2013). Similarly to Hoberg, Phillips, and Prabhala (2014) also Li, Lundholm, and Minnis (2013) infer competitive intensity using textual analysis of 10-K filings. They count the number of competition-related words – 'competition', 'competitor', 'competitive', 'compete', and 'competing' removing cases where these words are preceded with 'not', 'less', 'few', or 'limited'. I scale the number of competition-related words by the median number of competitive words for a 2-digit SIC industry in a given years to isolate firm-specific competitive pressure. Variable *CompWrds* does not measure competitive intensity as directly as *Fluidity*, nevertheless, due to its construction it is unlikely to be driven by factors unrelated to competitive intensity. Li, Lundholm, and Minnis (2013) provide evidence that reference to competitive words is associated with a faster mean-reversion of return on existing operating assets

and on new investments, consistent with competition eroding abnormal profitability.

Reverse causality between insider trading and *Fluidity* is unlikely because *Fluidity* is essentially determined by vocabulary chosen by a firm's rivals. To further alleviate endogeneity concerns I use large non-transitory declines in import tariffs (*TariffDrop*) as an alternative measure of competitive intensity. Reductions in import tariffs increase international competitors' incentives to enter or to become more active in given product markets, which puts pressure on the incumbent firms. Import tariff drops are largely independent of individual firms' decisions and so they provide a fairly clean quasi-experimental setting with exogenous variation to competitive intensity. Reductions in import tariffs are used as a proxy for increased competitive intensity in a number of prior studies (e.g. Valta 2012; Frésard and Valta 2013; Alimov 2014; Berger 2014).

I use data on U.S. imports that is available for manufacturing firms between 1992 and 2005 (Feenstra 1996; Feenstra, Romalis, and Schott 2002; Schott 2010). Following Valta (2012) I aggregate the data at 3-digit SIC level and then for every combination of industry and year I compute ad valorem tariff rate as the ratio of duties collected to dutiable value of the goods. I then compute a median annual change in import tariff rates for each industry and I identify a large decline as one that is larger than twice the industry median change. Following Valta (2012) I exclude tariff rate reductions that are preceded or followed by correspondingly large increases as such declines likely do not represent permanent shocks to competitive conditions. Finally, assuming that large declines in import tariffs affect competitive intensity for several years I define a dummy variable *TariffDrop* equal to 1 in the year of a large decline and in five years that follow.

Finally, I use a conventional measure of competitive intensity frequently used in past

research. For every combination of 2-digit SIC industry and year I compute the Herfindahl-Hirschman concentration index based on a firm's market share in aggregate net sales. As large players in concentrated industries enjoy some market power that insulates them from competitive pressures, higher levels of the index imply less intensive competition. To facilitate the interpretation of all competitive intensity measures, I define *negHHI* as the negative of the concentration index. Higher *negHHI* values indicate more dispersed industries characterized by more intensive competition.

3.3. Insider Trading

I use volume and return on insider trading as proxies for the information asymmetry between corporate insiders and outside investors. I collect data on insider transactions from the Thomson Financial Insider Filing Data (TFN), which contains trades mandated by Section 16 of the Securities Exchange Act of 1934. I disregard firms in financial services with Standard Industry Classification (SIC) codes between 6000 and 6999. I only consider observations reported on Form 4 as open market purchases or sales (including sales after option exercise) (transaction codes 'P' and 'S') in a firm's common stock (transaction codes 'COM' and 'ORD'). I only include observations identified as verified (cleanse code 'R') or cleansed with a very high level of confidence (cleanse code 'H') in the systematic data accuracy check performed by the TFN database provider.

I define a key date based on which I classify observations to individual fiscal years. Until August 2002 insiders were obliged to file their transactions with the Security and Exchange Commission (SEC) within 10 days after the end of the calendar month of the transaction. After

August 2002 Section 403 of SOX mandates Form 4 filing within two business days after the transaction. Consequently, for transactions occurring after August 2002 I set the key date equal to the SEC reporting date. For transactions before August 2002 the key date is equal to the third trading day after the transaction date. I only keep observations reported within 82 days in the pre-SOX period and within 7 days in the post-SOX period. As insider trading typically occurs after earnings announcements (Sivakumar and Waymire 1994) I aggregate purchases and sales by fiscal years starting one day after the previous year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement.

When no transactions are recorded in the TFN database in a given year I assume no shares were purchased and sold. To ensure that 'no trading' observations are not an artifact of a company not being covered in the TFN database, I keep 'no trading' years only for firms with at least one transaction of any kind in one of preceding and following years. I compute the volume of insider purchases and sales by dividing the number of shares traded by the number of shares outstanding at the key date and then aggregating separately purchases and sales over a fiscal year as defined above. The trading volume measures *BuyVol* and *SellVol* are defined as the natural logarithm of one plus the scaled number of shares aggregated over a fiscal year.

3.4. Control Variables

Past research shows that insiders are contrarian traders and they are more likely to buy (sell) after stock price declines (increases) and when stock prices are low (high) relative to accounting fundamentals (Rozeff and Zaman 1998; Lakonishok and Lee 2001; Jenter 2005). Past research also shows that insiders are more likely to trade when uncertainty about a firm's stock price is high

(Ben-David and Roulstone 2009). Thus, I control for firm size measured as the natural logarithm of the market value of equity (*lnME*), relative market valuation measured as the natural logarithm of a firm's book-to-market equity ratio (*lnBE/ME*), past price development measured by the stock excess return over the past fiscal year defined as the raw return on the stock including dividends less the return on S&P 500 index (*ExRet*), and stock price volatility defined as the standard deviation of daily raw returns over the past fiscal year (*sdRet*). I collect data on control variables from CRSP and COMPUSTAT Annual. In additional analysis I use analyst consensus earnings forecast collected from I/B/E/S. Appendix A2 provides definitions of all variables. [6]

Table 1 shows descriptive statistics for competitive intensity, insider trading and other measures after Winsorizing all continuous variables but for stock returns at top and bottom one per cent. My data sample period starts in 1998 as few observations for insider trading are available before 1998 and it ends in 2008 for most of the test as *Fluidity* is provided up till 2008. *Fluidity* is available for 40,135 firm-years and its mean of 7.159 is fairly close to the median 6.638. *CompWrds* has a median of zero by construction and its distribution is positively skewed. Mean (median) industry concentration is 6.6 percent (4.4 percent). About 44.5 percent observations are in industries that experienced a significant drop in import tariffs in past 5 years. Consistent with prior insider trading literature I observe more sales than purchases as some sales result from insiders' liquidating a portion of their equity based compensation. In an average year insiders purchase (sell) about 1.7 per cent (6.0 per cent) of a firm's market capitalization. Both measures are highly

[6] Additional analysis shows that the results are not qualitatively affected by the inclusion of R&D expenditures scaled by net sales as an additional control variable (not tabulated).

positively skewed with some large transactions.

Table 2 shows a correlation matrix of variables used in the main tests. As expected, *Fluidity* is positively correlated with the remaining three competitive intensity measures (all correlations statistically significant). At the same time, the four measures do not seem to capture the same aspect of competition as the Pearson's (Spearman's) correlation coefficients range between 0.048 and 0.362 (0.073 and 0.380). Pearson's and Spearman's coefficients send opposite signals about the correlation of *Fluidity* with past and future stock returns. As expected, *Fluidity* is higher for firm with more volatile past stock returns, for growth firms (low *lnBE/ME*), and for larger firms. I observe similar correlations between the three control variables and alternative proxies of competitive intensity with the exception of *TariffDrop* that more often affects small firms and is unrelated to *lnBE/ME*. If *Fluidity* is primarily determined by firm rivals, it is reasonable to expect that they are particularly interested in moving into areas with high expected growth (low *lnBE/ME*). In contrast, an exogenous shock in the form of import tariff drop should intensify competition regardless of growth potential.

Figure 1 and Figure 2 provide preliminary evidence about the empirical relationship between competitive intensity, insider trading volume and stock returns. Figure 1 shows the proportion of outstanding shares by all insiders in a fiscal year in individual *Fluidity* quintiles. Both the volume of insider purchases (green) and insider sales (red) tend to increase when moving from the least competitive quintile on the left to the most competitive quintile on the right. This suggests that insiders trade larger volumes when competition intensifies. Figure 2 shows annual excess stock returns for the least competitive (grey) and the most competitive (blue) lagged *Fluidity* quintile

following firm-years when insiders only sold stocks (left), only purchased stocks (right), and both purchased and sold stocks (middle). As expected, future stock returns are highest after years of pure insider purchases, they are lower after years of mixed trading, and even lower after years following insider sales. More importantly, the difference between the right and the left column is more pronounced for the blue (the most competitive) quintile than for the grey (the least competitive) *Fluidity* quintile, which suggests that insider trading is more indicative of future stock returns when competition is intensive.

4. Results

4.1. Volume of Insider Trading

Table 3 provides evidence on the positive association between intensified competition and volume of insider trading proposed in Hypothesis 1. The table shows that the aggregate annual trading volume of both insider sales and purchases is positively associated with lagged *Fluidity*. The slope coefficients of 0.062 (*t*-stat 3.78) for insider sales and 0.041 (*t*-stat 2.52) for insider purchases suggest that an increase in *Fluidity* from 4.547 (25th percentile) to 9.260 (75th percentile) is associated with 34% increase in the volume of insider sales and 21% increase in the volume of insider purchases. To test the robustness of this finding I aggregate separately transactions by the CEO and the CFO (*Top2*) and transactions by the other insiders (*Oth2*). *Fluidity* is associated with higher volume of insider sales of both *Top2* (coef. 0.050, *t*-stat 2.94) and *Oth2* (coef. 0.054, *t*-stat 3.96). Similarly, I observe a positive association between *Fluidity* and the volume of insider purchases by *Top2* (coef. 0.020, *t*-stat 2.05) and by *Oth2* (coef. 0.034, *t*-stat 2.15).

CEOs and CFOs likely are best informed about the company's prospects and so larger trading volumes could be expected from the two executives. On the other hand, although CEOs and CFOs may be better informed, their trading is subject to greater scrutiny, which prevents them from trading too aggressively (Fidrmuc, Goergen, and Renneboog 2006). The comparable results between the two sub-samples are thus broadly consistent with Fidrmuc, Goergen, and Renneboog (2006), who find that middle-level insider trades are most informative.[7]

I argue that the higher insider trading volume reflects insiders benefiting from their greater information advantage. Hence, I expect the effect to be stronger before the implementation of SOX that imposed stricter rules and penalties for illegal insider trading. As the interpretation of what is 'material non-public information' is subject to judgement I expect the stricter regulation to lead to more conservative insider trading decisions in general as risk-averse insiders may forgo even some profitable trades that could be considered legal. Brochet (2010) shows that SOX indeed lowered the incidence of informed insider trading. As legal jeopardy of selling before bad news is greater than of buying before good news (Noe 1999; Ke, Huddart, and Petroni 2003; Cheng and Lo 2006;

[7] Firms of different maturity may differ in the amount of equity-based compensation (restricted equity and stock options) they pay to their executives. Volume of insider sales may be affected by liquidation of equity they receive. I use the ratio of accumulated retained earnings to total equity as a proxy for firm maturity (DeAngelo, DeAngelo, and Stulz 2006) and I find that its inclusion as an additional control does not affect the positive association between *Fluidity* and *SellVol All* (not tabulated). Furthermore, I collect data on executive compensation from Execucomp and I compute two measures of CEO's equity-based compensation: the sum of restricted equity grants and stock option grants scaled by total direct compensation and the sum of restricted equity grants and stock option grants scaled by market value of equity. Inclusion of these measures reduces the number of observations but the association between *Fluidity* and *SellVol All* remains significantly positive (not tabulated).

Huddart, Ke, and Shi 2007) I expect the effect of more stringent regulation to be more pronounced for insider sales rather than purchases. Consistent with this expectation the interaction term of the *preSOX* dummy and *Fluidity* reported in Table 3 is positive for the volume of insider sales (coef. 0.099, *t*-stat 2.50) and it is insignificant for the volume of insider purchases (coef. -0.004, *t*-stat -0.16).[8]

4.2. Insider Trading Returns

Table 4 reports the findings from estimation of equation (2) that tests whether insider trading is more informative about future stock returns when *Fluidity* is high. The interaction terms reported in Table 4 provide support for Hypothesis 2.[9] Both the volume of insider purchases and insider sales predict future stock returns better when a firm faces intensified competitive pressure. The slope coefficient at the interaction term between volume of insider sales and *Fluidity* is significantly negative (-0.001, *t*-stat -2.01) and it is significantly positive for the interaction of volume of insider purchases and *Fluidity* (0.003, *t*-stat 4.30). The effect is significant when considering trading volume by all insiders as well as when considering separately the trades by

[8] When estimating the regressions separately for pre-SOX and post-SOX years *Fluidity* is associated with higher volume of insider purchases both in the pre-SOX and post-SOX period (*t*-statistics 3.38 and 2.29 respectively). *Fluidity* strongly predicts the volume of insider sales before SOX (*t*-statistic 4.96) and it is only marginally significant after SOX (*t*-statistic 1.71, *p*-value 0.087) (not tabulated).

[9] When included in the regression without *Fluidity* and its interactions volume of insider purchases (sales) predicts higher (lower) stock returns (not tabulated). Furthermore, *Fluidity* is positively associated with following year's stock returns when included without insider trading volume (not tabulated), consistent with Hou and Robinson (2006) who show that firms facing competition have higher stock returns.

CEOs and CFOs and the trades by other insiders. The triple interactions suggest that the tendency of *Fluidity* to amplify the predictive power of insider trading is stronger in the pre-SOX period where insider trading regulation was more lax and therefore more frequent incidence of informed trading can be expected. The slope coefficient at the triple interaction including the volume of insider sales is negative significant (-0.005, *t*-stat -3.80) and the triple interaction including the volume of insider purchases is positive significant (0.004, *t*-stat 2.93). Taken together these results suggest that insider trades better predict future stock returns when a firm faces competitive threats, which is consistent with competitive pressure increasing insiders' information advantage.

4.3. Alternative Measures of Competitive Intensity

To assess the robustness of my findings to the choice of the empirical proxy for competitive intensity I complement the main results with three additional measures: (i) industry-adjusted number of competition-related words in firms' 10-K filings (Li, Lundholm, and Minnis 2013), (ii) large non-transitory industry-wide decreases in import tariffs (Schott 2010), (iii) negative of Herfindahl–Hirschman industry concentration index. As discussed in Section 3 these measures capture competitive intensity less directly and therefore they are less well suited for my analysis. Nevertheless, insofar the other dimensions of competitive intensity capture some aspects of the fast-changing, less predictable competitive landscape brought about by intensive competition they should be associated with increased insiders' information advantage.

Table 5 reports the insider trading volume and stock returns results for the three alternative measures of competitive intensity. The findings are mostly in line with the expectations, albeit less consistent than the results based on *Fluidity*. Greater use of competition related words in a firm's

10-K is (*CompWrds*) is associated with higher volume of both insider sales (coef. 0.007, *t*-stat 2.51) and insider purchases (coef. 0.010, *t*-stat 4.88). Also consistent with the expectations, the volume of insider sales is associated with lower future stock returns (interaction term coefficient -0.000, *t*-stat -2.02). On the other hand, the interaction term for volume of insider purchases is positive but not significant (*t*-stat 0.92). A large recent decline in import tariffs (*TariffDrop*) is associated with significantly higher volume of insider purchases (coef. 0.787, *t*-stat 3.93), but significantly lower volume of insider sales (coef. -0.310, *t*-stat -4.34).[10] Consistent with the expectations future stock returns are more positive after insider purchases following a recent drop in import tariffs (coef. 0.019, *t*-stat 3.31) and they are more negative after insider sales (coef. -0.013, *t*-stat -2.37).

As expected, I observe least consistent results for the negative industry concentration index (*negHHI*). In line with the expectations I find evidence suggesting that insiders sell greater stock volumes in more dispersed industries (coef. 1.940, *t*-stat 3.35). For the volume of insider purchases the result is positive, but only marginally significant (coef. 1.002, *t*-stat 1.81, *p*-value 0.070). Volume of insider purchases is a stronger predictor of future stock returns in more dispersed industries (coef. 0.066, *t*-stat 2.42), but the interaction term for the volume of insider sales is insignificant (coef. 0.038, *t*-stat 1.36). Even though the results on the alternative competition intensity measures are weaker than the results on *Fluidity*, overall they seem to support the

[10] It is conceivable that a decline in import tariffs is a salient event and so perhaps some insiders refrain from selling even though they understand the stock is overvalued as their sales may be interpreted as a negative signal to the market implying their lack of confidence that the company will be able to withstand the new international competition.

proposition that intensified competition increases insiders' information advantage.

4.4. Nature of Information Advantage

I further explore the nature of insiders' information advantage. Potentially, insiders can trade profitably either because (i) they benefit from foreknowledge of upcoming public disclosures, or because (ii) they have superior ability to process historical public information and to draw inferences about their firm's intrinsic value. The superior information processing ability can result from insiders' access to rich 'patchwork' information that does not meet the 'materiality' criteria but helps insiders interpret and synthesize public information and better evaluate their firm's long-term earnings prospects. Suppose that a firm i's earnings at time t (X_{it}) are drawn from a distribution with a mean μ_i and a standard deviation σ_i. Insiders can condition their trading on foreknowledge of upcoming earnings realizations (X_{it+1}). Alternatively, they may be better able to use public information to evaluate whether there is a shift in the level of expected long-term profitability (μ_i). In the former case insiders use information that is material and not public at the time of the transaction, which violates insider trading rules. In contrast, in the latter case insiders trade legally as current legislation does not prevent them from benefiting from their superior ability to process public information.

Naturally, distinguishing empirically between the two cases is challenging and so in this paper I do not take any position on the legality of the observed trades. Nevertheless, I provide suggestive evidence consistent with the latter 'legal trading' case. First, I argue that if insiders condition their trades on foreknowledge of non-public information and this information is more valuable when competitive pressure intensifies insider trades should be related to earnings

announcements in the near future. In contrast, if the higher trading volume reflects insiders' superior judgement about their firm's inherent profitability potential that is based on public information, insider trading should be associated with long-term profitability shifts. Second, if investors understand that insiders are more likely to benefit from foreknowledge of public disclosures when competition intensifies, I expect them to treat insiders' transactions as valuable signals about firm prospects and to react on them by updating their own estimates of firm value.[11]

Table 6 provides evidence on the association between insider trading and EPS adjusted for their historical mean. For every firm and year I compute earnings before extraordinary items per share scaled by the stock price at the end of the fiscal year. I define variable *dEPS* as the difference between the current year's scaled EPS less its mean over the past five years requiring at least three non-missing observations. Furthermore, I define variable *dEPS5y* as the difference between mean scaled EPS over the following five years and past five years. Table 6 shows no evidence that insider trading is more predictive of short term earnings changes when competition intensifies. On the contrary, when *Fluidity* is high insider sales predict more positive upcoming EPS relative to their historical average (coef. 0.001, *t*-stat 3.63) and insider purchases predict more negative upcoming EPS (coef. -0.001, *t*-stat -3.30). This is inconsistent with insiders exploiting their foreknowledge of upcoming public disclosures. Instead, these results suggest that insiders are particularly cautious not to sell before bad news or buy before good news when their firm faces competitive threats.

In contrast, the results are consistent with the proposition that insiders' superior ability to

[11] I am grateful to David Hirshleifer for pointing this out.

process and synthesize public information is particularly valuable when their company faces competitive threats. Volume of insider purchases is a stronger predictor of shifts in long-term EPS levels when a firm faces competitive pressure (coef. 0.001, *t*-stat 3.45). The corresponding result for the volume of insider sales is negative, but insignificant when considering transactions by all insiders (coef. -0.000, *t*-stat -0.93). Nevertheless, the result is significant when counting only CEOs' and CFOs' (*Top2*) transactions (coef. -0.000, *t*-stat -2.02). Past literature shows that stock prices reflect information faster than accounting earnings, i.e. 'prices lead earnings' (e.g. Ball and Brown 1968; Basu 1997). Thus, the stock returns that follow insider transactions reported in Table 4 may reflect gradual learning by the market about the new long-term profitability potential resulting from the competitive situation in a firm's product markets.

To provide additional support for the proposition that insider trading predicts long-term profitability shifts I compute market-adjusted price response (-3, +3 days) to the filing of insider transactions in the post-SOX period when insiders are obliged to report their transactions within 2 business days. I find that the price reactions on neither insider sales nor insider purchases are affected by *Fluidity* (not tabulated). This suggests that investors do not perceive insider transactions as a signal about upcoming disclosures when competition intensifies. Instead, they seem to ignore the predictive ability of insider transactions about the long-term profitability potential and only gradually adjust the stock price. These results suggest that rather than trading on foreknowledge of upcoming public disclosures insiders exploit price inefficiencies in the semi-strong sense. In doing so they use their superior ability to process and synthesize public information that seems to be particularly beneficial when product market competition intensifies.

4.5. Forecasting Complexity

I further examine two potential explanations for my findings. The *complexity* explanation proposes that intensified competition makes future firm performance more uncertain and more dependent on firm-specific factors that are better known to insiders. Investors with limited access to firm-specific information thus have greater difficulty to forecast firm performance when competition intensifies. Evidence provided in Table 7 supports the proposition that *Fluidity* is associated with greater uncertainty about firm performance. Higher *Fluidity* is associated with a lower likelihood of a firm's survival in the sample in the following five years (*Survive5y*, coef. -0.041, *t*-stat -7.42). A firm's exit from the sample may have both negative and positive implications for firm value. For example, firms may exit the database if they go bankrupt, if the stock market terminates their listing (Macey, O'Hara, and Pompilio 2008), or if they decide to 'go dark' and terminate their listing in markets requiring periodic filing of company's financials (Leuz, Triantis, and Wang 2008). These events tend to have negative impact on firm value. On the other hand, firms may 'go private' (Bharath and Dittmar 2010) or they may be a target of a merger or an acquisition (M&A), both of which on average increase firm value. As the consequences of a firm's exit are difficult to predict firms with a lower survival rate likely are more difficult to value for outside investors.

For the surviving firms I measure the absolute value of the change in mean return on assets (ROA) between future five years and past five years (*absdROA* (*y*+5)). Table 7 shows that higher *Fluidity* is associated with greater long-term operating profitability changes (coef. 0.006, *t*-stat 6.66). The results are similar when comparing annual ROA of year *t*+5 with the current year's ROA (not tabulated). This suggests that when competition intensifies historical ROA is a less good proxy

for future ROA. I also observe greater heterogeneity in operating profitability in the cross-section of more fluid industries. I compute median *Fluidity* (*mdFluid*) for each combination of Fama and French (1997) industry and a year. Table 7 shows a positive association between *mdFluid* and within-industry heterogeneity in operating performance measured as a standard deviation of current year ROA in a given industry (*sdROA*, coef. 0.038, *t*-stat 2.14). The greater are the performance differences among firms in a given industry, the less can firm performance forecasts rely on industry-wide information, and the more they depend on firm-specific factors that are better known to insiders than to investors.

Furthermore, I decompose a firm's operating profitability into industry-wide and firm-specific part and I examine how *Fluidity* affects the ability of the two profitability components to predict future operating profitability. I compute industry median operating profitability in a given year (*InduROA*) and I define the 'excess' (i.e. company-specific) return on assets (*ExROA*) as the difference between a firm's ROA and *InduROA*. Table 7 shows that both *InduROA* and *ExROA* are strong predictors of ROA five years into the future. However, the interaction term suggests that the firm-specific component (*ExROA*) is less persistent when a firm faces competitive threats (coef. -0.023, *t*-stat -3.04). Thus, naïve forecasting based on extrapolating past firm-specific profitability leads to larger forecasting errors when competitive pressure intensifies. Lower persistence of firm-specific profitability component thus increases usefulness of other firm-specific information relevant for anticipating idiosyncratic profitability changes. As investors have only limited access to this kind of information I expect them to find it more challenging to forecast future profitability.

Similarly to operating profitability, higher *Fluidity* is also associated with more volatile

stock returns. Consistent with past research (Gaspar and Massa 2006; Peress 2010) I expect value of firms facing greater competitive threats to be more sensitive to news on a firm's likely success in the competitive process, which implies greater stock return volatility. Furthermore, I expect larger long-term changes in a firm's market value of equity resulting from a firm's success or a failure in the competitive process. Results presented in Table 7 are broadly consistent with these predictions. *Fluidity* is positively associated with variability of daily stock returns (*sdRet*, coef. 0.001, *t*-stat 3.95). I find weak support for the association between *Fluidity* and the absolute value of 5-year changes in a firm's market capitalization (*absdME* (*y*+5), coef. 0.043, *t*-stat 1.76, *p*-value 0.078).

Next, I investigate how *Fluidity* affects the persistence of a firm's market position in its industry. A firm's relative size has important implications for its market power and product pricing. The less persistent a firm's position is the more challenging it likely is for investors to estimate its value. Every year I rank firms within each Fama and French (1997) industry based on the market capitalization of their equity and I regress a firm's industry rank 5 years into the future (*rankME* (*y*+5)) on its current rank (*rankME*). As expected, the current industry rank a very strong predictor of a firm's future rank. Consistent with the intuition that new competitors disrupt existing industry structure and challenge the position of the incumbents, the negative coefficient at the interaction term (coef. -0.005, *t*-stat -2.25) suggests that *Fluidity* weakens the relationship between current and future market position.

Finally, I investigate the association between *Fluidity* and precision of financial analysts' and equity investors' expectations about future earnings. I measure the magnitude of analyst

forecast error (*absErrorEA*) as the difference between actual EPS and the last mean consensus earnings forecast scaled by the stock price at the time of the earnings announcement. When regressing *absErrorEA* on *Fluidity* and control variables capturing forecasting complexity the coefficient for *Fluidity* is positive but not statistically significant (coef. 0.002, *t*-stat 1.32) providing weak support for the proposition that competitive threats make it harder for analysts to forecast earnings.[12] In contrast, Table 7 provides evidence that stock price reaction on earnings announcements tends to be larger when *Fluidity* is high, which suggests that investors are less good in anticipating future earnings and they are more likely to be surprised when earnings are announced. I measure the magnitude of stock price response to earnings announcements by the absolute value of 3-day (-1, +1) market-adjusted return around the earnings announcement day (*absReactEA*). The positive coefficient for *Fluidity* (coef. 0.001, *t*-stat 2.41) suggests that operating profitability is harder to forecast for the outsiders when competitive pressure intensifies, which is consistent with the *complexity* explanation.[13] In contrast, the *disclosure* explanation would presume less informative disclosures that should likely induce weaker stock price reaction on earnings announcements.

[12] The results are marginally stronger for *Fluidity* lagged by two years (*t*-statistics 1.64) and they are statistically significant when standard errors are only one-way clustered at the firm level (*t*-statistics 2.76 for *Fluidity* (*y*-2)).

[13] Alternatively, price response to earnings announcements may be stronger if earnings are more persistent and hence more predictive of future earnings. In supplementary analysis I verify that *Fluidity* does not increase the ability of current EPS (scaled by stock price) to predict EPS in any of the following five years (not tabulated).

4.6. Disclosure

Table 8 provides empirical evidence on the complementary explanation suggesting that intensified competition increases proprietary cost of disclosure and incentivizes firms to disclose less, which leaves investors in an information disadvantage. As firm disclosures may have various forms I use several proxies for the informativeness of mandatory and voluntary disclosure. Consistent with the expectations, I find that when completive pressure on a firm increases it is more likely to declare that it possesses material undisclosed proprietary information (Hoberg and Maksimovic 2015) (coef. 0.004, *t*-stat 2.56). Furthermore, firms facing intensified competition provide less detailed numerical information in their 10-K reports (Chen, Miao, and Shevlin 2015) (coef. -0.002, *t*-stat -3.50). Chen, Miao, and Shevlin (2015) document a positive association between *DisQualWA* and analyst forecast accuracy and a negative association between *DisQualWA* and analyst forecast dispersion. This suggests that lower level of disaggregation of numerical data makes forecasting firm performance more complicated for outside investors.

In contrast to fewer reported numbers Table 8 shows that when competitive pressure increases firms provide large 10-K filings (coef. 0.014, *t*-stat 7.42) that contain more words (coef. 0.015, *t*-stat 7.32). Prior research suggests that long reports are less readable (Loughran and Mcdonald 2014), which suggests that investors may find it more challenging to interpret verbal information in 10-K reports provided by firms facing intensified competitive pressure and to use the information in forecasting future firm performance. Table 8 also shows that higher *Fluidity* is associated with higher *Fog* Index (Li 2008), which captures complexity of language used in 10-K

reports.[14] Firms facing competitive threats use longer sentences and more complex words. Consistent with the previous findings this result suggests that investors are likely to find interpretation of high *Fluidity* firms' 10-K reports more challenging.

Managers may conceivably compensate for the less comprehensive and less readable mandatory disclosure by providing more frequent and more precise voluntary disclosure. Past research often uses management earnings guidance (CIG) as a proxy for voluntary disclosure (e.g. Ali, Klasa, and Yeung 2014). Table 8 shows that firms facing competitive threats are less likely to provide management earnings guidance (coef. from the Tobit regression censored at zero -0.039, *t*-stat -2.03) and the mean squared error of CIGs is larger (coef. 0.007, *t*-stat 2.52). Taken together, these results suggest that mandatory disclosure provided by firms facing competitive threats is less detailed and more complex and that managers provide less frequent and less precise voluntary disclosure. These results are consistent with competitive threats incentivizing firms to provide less informative disclosure further amplifying the information asymmetry between insiders and investors.

5. Conclusion

This paper provides evidence that intensified competition increases information asymmetry between insiders and investors. I show that insiders trade larger volumes of stocks and their trading

[14] The results are similar for *Flesch* and *Kincaid* readability scores provided by Loughran and McDonald (2014) (not tabulated).

is more informative about future stock returns when competition intensifies. Intensified competition renders firm performance more uncertain and more dependent on firm-specific factors that are better known to insiders. Insiders are better able than investors to anticipate the impact of intensified competition on long-term changes in operating profitability than investors who tend to be surprised when firms announce earnings. Furthermore, firms facing intensified competition provide less informative disclosures leaving investors in disadvantage.

The paper suggests that financial analysts and portfolio managers face a more challenging task when analyzing firms active in fluid product markets. In contrast, corporate insiders benefit from their information advantage by realizing larger trading gains. By implication insider trading is on average more informative about future stock returns when a firm faces greater competitive threats. Investors do not seem to acknowledge the higher informative value of insider trades in firms facing greater competitive pressure. The paper thus also contributes to recent research efforts aimed at distinguishing between informed and uninformed trades.

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Appendix A1 – Anecdotal Evidence

Research in Motion Ltd.

Michael Lazaridis founded Research in Motion Ltd. (RIM) in 1984 in Waterloo, Ontario. In 1992 Michael Lazaridis hired James Balsillie, a chartered accountant with an M.B.A. from Harvard University and executive experience from Ernst & Young. The two gentlemen became RIM's co-CEOs and they witnessed its phenomenal rise and subsequent fall. In 1999 RIM introduced BlackBerry personal digital assistant (PDA) that revolutionized access to e-mail. Already in the following year BlackBerry named as the 'Product of the Year' by the *InfoWorld* magazine, which said that "The BlackBerry wins hands down when it comes to easy and timely access to email messages." [15] BlackBerry sales surged reaching 2 million subscribers globally by 2004 when Michael Lazaridis Jim Balsillie were named in the 'Time 100' list by the *TIME* magazine. In 2007 RIM surpassed Royal Bank and it became Canada's most valuable company with market cap of $67.35 billion.[16]

On January 9, 2007 Apple Inc. announced its plans to introduce iPhone 1. The device was launched later in the year on June 29, 2007. RIM's initial reaction to iPhone 1 was reserved. On February 12, 2007 Jim Balsillie told Reuters Canada: "It's kind of one more entrant into an already very busy space with lots of choice for consumers. But in terms of a sort of a sea-change for

[15] Source: http://www.referenceforbusiness.com/history2/75/Research-In-Motion-Ltd.html.

[16] Source: http://www.cbc.ca/news/business/rim-becomes-canada-s-most-valuable-company-1.656142.

BlackBerry, I would think that's overstating it."[17] At the time, many of financial analysts covering technology stocks agreed with this assessment. In an equity report on RIM from January 10, 2007 Rob Sanderson of American Technology Research suggests: "RIMM shares sold off sharply yesterday on AAPL's announcement of the iPhone. […] However, concern that AAPL's entry will limit RIMM's growth opportunities is misguided in our view. iPhone is clearly focused on the consumer segment and will not alter RIMM's dominance of the enterprise segment."

Despite of the declared skepticism about iPhone's ability to challenge BlackBerry's market position on November 23, 2007, less than five months after iPhone's launch, eight RIM's top executives including Michael Lazaridis and James Balsillie adopted Automatic Securities Disposition Plans (ASDP) that allowed them to sell significant amount on RIM's equity in the following year while reducing the risk that the selling would be challenged by stock market regulators. [18] The ASDP was combined with significant donations of RIM's equity to charity. The above mentioned press release states: "Mr. Balsillie's ASDP provides for the donation of Cdn$38 million of common shares of RIM to certain charitable organizations and educational or research institutions, as well as the sale of Cdn$86 million of common shares of RIM over the 13-month term of the ASDP (including in each case common shares issuable upon exercises of stock options held by Mr. Balsillie). These amounts represent a small portion of Mr. Balsillie's beneficial

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[17] Source: http://www.reuters.com/article/us-rim-iphone-idUSN1236561320070212.

[18] Source: http://us.blackberry.com/content/dam/bbCompany/Desktop/Global/PDF/Investors/Documents/2008/11232007_press_release.pdf

ownership of RIM's shares." Cdn$86 million represented about 2 per cent of Mr. Balsillie's equity stake in RIM at a time, while at the same time representing about 30 times his annual base salary and bonus as stated in the Management Information Circular for the Annual Meeting of Shareholders released on July 15, 2008.[19]

Media that covered the event often accentuated the charitable donations RIM's executives announced. In an article "RIM brass redirect millions in profit to charity" from November 24, 2007 The Globe and Mail states in the first paragraph: "Top executives at Research In Motion plan to donate as much as $150-million worth of their stock to charity as they cash in on the dizzying ascent of the BlackBerry maker's shares." After discussing the RIM's impressive success and the resulting wealth of its executives and after providing some detail on the recipients of the donations, the article adds in paragraph 9: "In addition to the donations for undisclosed charities, the company announced yesterday that executives will now be able to set up plans to sell stock automatically, independent of any inside information that may later emerge."[20]

Some, however, voiced criticism of the ASDPs. J. Richard Finlay of Toronto-based Centre for Corporate and Public Governance that claims to be "North America's first fully independent think tank dedicated to improving boardroom practices and strengthening standards of

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[19] Source: http://us.blackberry.com/content/dam/bbCompany/Desktop/Global/PDF/Investors/Governance/Proxy_Circular_Fiscal_2008.pdf.

[20] Source: http://www.theglobeandmail.com/news/national/rim-brass-redirect-millions-in-profit-to-charity/article18150122/.

accountability and stakeholder service in major corporations and public institutions"[21], suggested: "RIM is obviously still scrambling to recover from its backdating scandal and at the same time trying to look good to the [SEC]. […] I am never a fan of companies where there is a lot of insider stock selling. They are the leaders. Would they like other stockholders to sell too?"[22]

In hindsight, other stockholders would benefit if their sold their stakes in RIM's equity when the ASDPs were announced. On November 23, 2007 RIM's stock price was at $114. The stock price reached its all-time high of $148 on June 19, 2008. Afterwards, it dropped to $39 by the end of 2008, and it traded at $7 at the end of June 2016.

Wynn Resorts Ltd.

Competition in the gaming industry has intensified in late 2015. Between 2007 and 2012 on average one major property was opened a year in Macau, China. No casinos were opened in 2013 and 2014. In contrast, two major casinos opened in 2015 and four now casinos were opened or are expected to open in 2016. [23] These new casinos likely deal out new cards in the gaming industry and the intensified competition rises uncertainty about how the industry players will handle the new competitive situation. CNN Money article from December 1, 2015 cites Moody's Investors Service report on the gaming industry that suggest: "We expect more casino closures to

[21] Source: http://thecentreforgovernance.org/.

[22] Source: http://www.financialpost.com/story.html?id=f3291f01-37ac-400b-9813-10d50bedadc3.

[23] Source: https://en.wikipedia.org/wiki/Cotai_Strip.

occur in Atlantic City as some struggle to grow their business and face additional competition."[24]

Wynn Resorts, Ltd. was incorporated on June 3, 2002. The company is a developer, owner and operator of casino resorts. Its operations are concentrated in Macau, China and in Las Vegas, Nevada.[25] Similarly to other competitors Wynn Resorts faced significant competitive pressure in late 2015. In a equity report on Wynn Resorts from October 15, 2015 Credit Suisse states the following: "Near-term Outlook Challenging: While mass gaming revenue came in largely flat QoQ, VIP is still suffering from major declines in Macau. […] With Wynn Palace scheduled to open March 25, 2016, we believe this could help WYNN balance its cost structure to support a change in market dynamics, however it will not be sufficient to offset top line weakness. Until there is a clearer picture on the environment going forward, we believe results will continue to be choppy."

In early December 2015 Steve Wynn – the CEO – bought one million worth of shares in the company. These purchases were immediately reflected in the media. CNN Money article from December 9, 2015 suggests: "Casino owner goes 'all-in' on own stock. Wynn Resorts announced late Tuesday that Steve Wynn had purchased more than 1 million shares between December 4 and December 8. […] Insider buying – especially by a CEO – is usually considered an unabashedly bullish sign. While corporations have been on a stock buyback binge lately, individual executives

[24] Source: http://money.cnn.com/2015/12/01/news/companies/atlantic-city-casinos-moodys/.

[25] Source: http://www.reuters.com/finance/stocks/companyProfile?symbol=WYNN.O.

are typically less willing to put their own money at risk."[26] Similarly, an article from December 13, 2015 in The Montley Fool suggests: "Steve Wynn's Big Buy Could Signal Turnaround for Wynn Resorts. What does the CEO know that led him to add a million shares to his stake in the gaming giant? There hasn't been a lot of good news for Wynn Resorts' (NASDAQ:WYNN) investors in the past year. VIP players in Macau have dried up, which has decimated revenue and earnings, and as a result, the stock is down 57%. But the market got a surprise late Tuesday when Steve Wynn bought 1 million shares of the company's stock. Could this signal a turnaround for Wynn Resorts?"[27]

Despite of these speculations the stock market was not particularly impressed. The stock price rose from $62 to $70 on December 9, 2015, but it was back to $63 by December 14, 2015. Then the price fluctuated between $63 and $70 till January 5, 2016, after which the stock price dropped to $52 on January 14, 2016. The perception started to change in spring 2016 when Steve Wynn started to reveal his plans. Morgan Stanley's equity report from March 22, 2016 is still fairly cautious: "WYNN and LVS have done well navigating a deteriorating Asia gaming mkt, and now the mkt may be turning. Following our Macau trip, there's still too much mkt risk to recommend both here, but we think DCF value and share gain potential make WYNN a good bet. […] Given LVS's liquidity and dividend, one could argue it's a safer investment than WYNN." Two weeks after that Morgan Stanley's optimistic perception is rather clear. In the equity report issued on April 6, 2016 they claim: "Wynn Resorts, Bull Case Clear. WYNN's investor day shed light on why

[26] Source: http://money.cnn.com/2015/12/09/investing/steve-wynn-buying-stock-macau-casinos/.

[27] Source: http://www.fool.com/investing/general/2015/12/13/steve-wynns-big-buy-turnaround-wynn-resorts.aspx.

mgmt have been buying stock. If WYNN can achieve its way above MSe / cons ests for Macau, Palace and Boston, the stock is worth $175 on our DCF methodology. We need to decide what warrants credit or not, but the potential is a key reason we upgraded on 3/22." On April 7, 2016 Wynn Resort's stock price rose from $90 to $100.

Appendix A2 – Definition of Variables

Competitive Intensity

CompWrds	2-digit SIC industry-adjusted number of competition-related words in a firm's 10-K filing based on Li, Lundholm, and Minnis (2013).
Fluidity	Product market fluidity. The difference between a firm's vector of words used in its 10-K filing product description and the aggregate change in firm rivals' product description word vector. See Hoberg, Phillips, and Prabhala (2014) for more details.
mdFluid	Median product market fluidity for a combination of an industry as defined by Fama and French (1997) and year.
negHHI	Negative of Herfindahl–Hirschman industry concentration index based on a firm's net sales market share within 2-digit SIC industry and year.
TariffDrop	Indicator variable equal to 1 if a firm experienced in past 5 years a significant non-transitory decline in ad valorem U.S. import tariff rate and zero otherwise.

Insider Trading

BuyShr All	Number of shares sold multiplied by 1,000 by firm insiders scaled number of shares outstanding, aggregated over a fiscal year starting one day after the past year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement.
BuyVol All	Natural logarithm of one plus the number of shares sold by firm insiders scaled number of shares outstanding, aggregated over a fiscal year starting one day after the past year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement.
SellShr All	Number of shares purchased multiplied by 1,000 by firm insiders scaled number of shares outstanding, aggregated over a fiscal year starting one day after the past year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement.
SellVol All	Natural logarithm of one plus the number of shares purchased by firm insiders scaled number of shares outstanding, aggregated over a fiscal year starting one day after the past year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement.

Other Variables

absdME (y+5)	Absolute value of change in market value of equity between fiscal year +5 and the current fiscal year. Market value of equity defined as the stock price times the number of shares outstanding at the last trading day of a fiscal year.
absdROA (y+5)	Absolute value of change in return on assets between fiscal year +5 and the current fiscal year. Return on assets defined as operating income after depreciation normalized for 12 months in non-standard fiscal years divided by total assets.
absReactEA	Absolute value of stock price reaction on earnings announcement defined as the 3-day S&P500-adjusted stock return around the earnings announcement day.
absErrorEA	Absolute value of analyst forecast error defined as the difference between actual earnings before extraordinary items per share and the mean consensus analyst forecast as provided by IBES scaled by stock price at the time of the earnings announcement.
dEPS	Earnings before extraordinary items per share scaled by the stock price at the end of the fiscal year less its past five year historical mean requiring at least three non-missing observations.

dEPS5y	Historical five-year mean EPS less mean EPS in the preceding 5 years requiring in each case at least three out of five non-missing observations. EPS defined as earnings before extraordinary items per share scaled by the stock price at the end of the fiscal year.
DisQualWA	Disaggregation quality (DQ) based on Chen, Miao, and Shevlin (2015). Represents the number of non-missing financial items reported in firms' annual reports, including items both in the financial statements and in the footnotes, as captured by Compustat. Weighted average of income statement and balance sheet score. A higher count of non-missing accounting data items represents higher disclosure quality.
ExRet (*y+1*)	Excess return defined as the raw stock return including dividends less the return on S&P 500 index over 53 weeks starting one week after the current year's quarter 4 earnings announcement.
ExROA	Industry-adjusted return on assets defined as a difference between a company's return on asset and median return on asset in a combination of 2-digit SIC industry and year. Return on assets defined as operating income after depreciation normalized for 12 months in non-standard fiscal years divided by total assets.
Flesch	Flesch Reading Ease Score based on Loughran and McDonald (2014) reflecting the complexity of words used based on syllable count. Scaled to 0 – 100.
Fog	The Fog Index based on Li (2008) capturing readability of a firm's 10-K filings. Defined as 0.4 times the sum of average words per sentence length and the proportion of complex words. Complex words are words with more than two syllables.
InduROA	Median industry return on assets measured within 2-digit SIC industry and year. Return on assets defined as operating income after depreciation normalized for 12 months in non-standard fiscal years divided by total assets.
Kincaid	*Kincaid* readability score based on Loughran and McDonald (2014).
lnBE/ME	Natural logarithm of market value of equity defined as the stock price times the number of shares outstanding at the last trading day of current fiscal year.
lnME	Natural logarithm of market value of equity defined as the stock price times the number of shares outstanding at the last trading day of current fiscal year.
mnHorizCIG	Mean horizon of the management earnings forecasts for annual earnings per share (EPS) obtained from the Company Issued Guidelines (CIG) database maintained by First Call. Forecasts issued earlier than 540 days or later than 52 days after fiscal year end disregarded (1 per cent of observations on each side). CIG matched for fiscal years 1995 to 2011.
maxHorizCIG	Maximum horizon of the earliest management earnings forecast for annual earnings per share (EPS) obtained from the Company Issued Guidelines (CIG) database maintained by First Call. Forecasts issued earlier than 540 days before fiscal year end disregarded (1 per cent of observations). CIG matched for fiscal years 1995 to 2011.
mnErrSqCIG	Mean squared error of management earnings forecast for annual earnings per share (EPS) obtained from the Company Issued Guidelines (CIG) database maintained by First Call. Forecasts issued earlier than 540 days before fiscal year end disregarded (1 per cent of observations). CIG matched for fiscal years 1995 to 2011.
NetSize	Net file size of a firm's annual report based on Loughran and McDonald (2014).
numCIG	Number of management earnings forecasts for annual earnings per share (EPS) obtained from the Company Issued Guidelines (CIG) database maintained by First Call. Forecasts issued earlier than 540 days or later than 52 days after fiscal year end disregarded (1 per cent of observations on each side). CIG matched for fiscal years 1995 to 2011.
rankME	Percentage rank of a firm's market value of equity in its industry as defined by Fama and French (1997) at the end of a fiscal year. Market value of equity defined as the stock price times the number of shares outstanding at the last trading day of a fiscal year.
ROA	Return on assets defined as operating income after depreciation normalized for 12 months in non-standard fiscal years divided by total assets.
sdRet	Stock price volatility defined as the standard deviation of daily raw stock returns over the past fiscal year.
sdROA	Standard deviation of return on assets within a given Fama and French industry in the current fiscal year. Return on assets defined as operating income after depreciation normalized for 12 months in non-standard fiscal years divided by total assets.
Survive5y	Indicator variable equal to one if a firms survives in the sample till the end of fiscal year +5 and zero otherwise.

TotWords	The total number of words in a firm's annual report based on Loughran and McDonald (2014).
UndiscInfo	Indicator variable equal to one if a firms declare that they possess material undisclosed proprietary information (Hoberg and Maksimovic 2015).

Conditions

All	All considered insiders.
Oth2	Insiders other than CEO or CFO.
Post-SOX	For fiscal years 2003 and onwards.
Pre-SOX	For fiscal years up to 2002.
Top2	CEO and CFO.

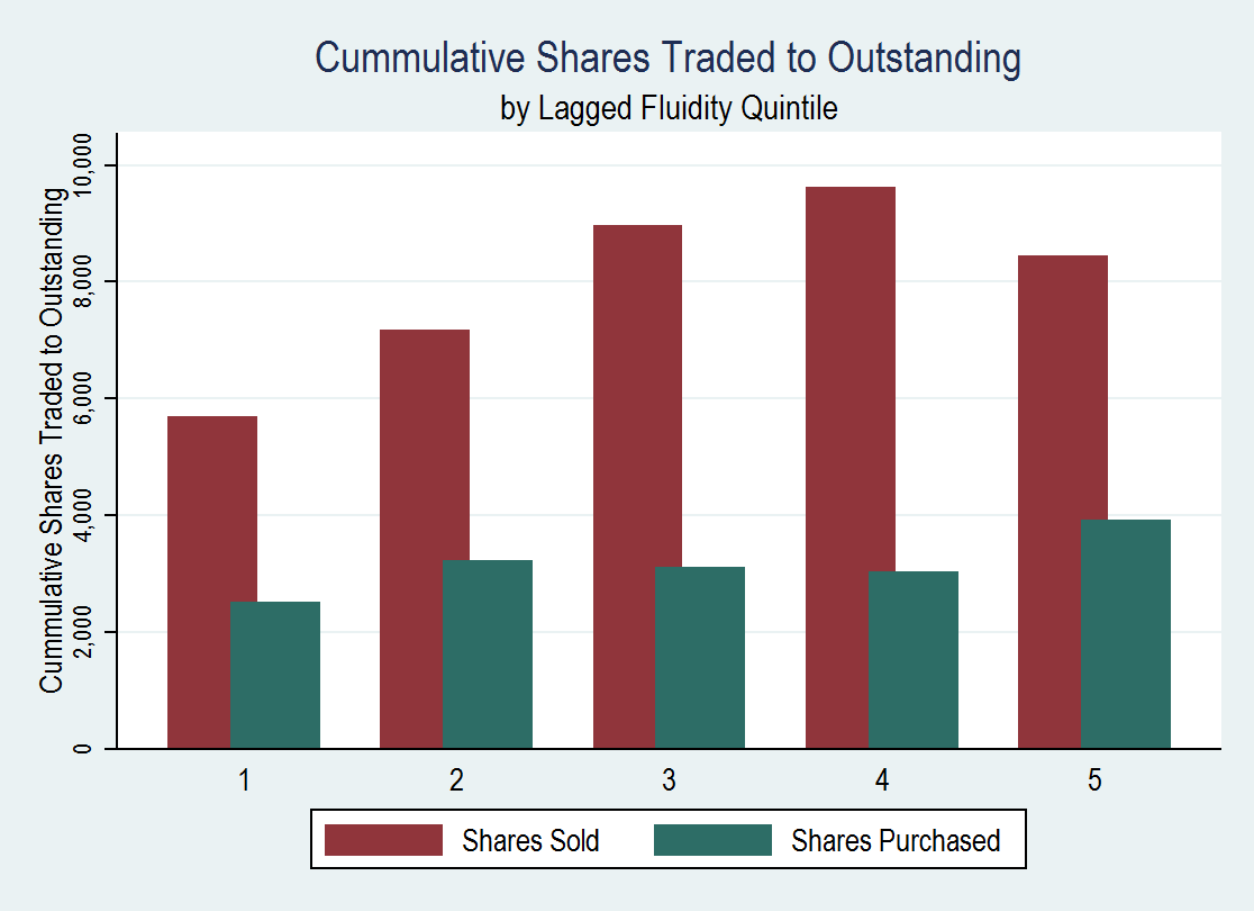
Definitions of variables used in the study. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent.

Appendix A3 – Median Fluidity per Industry

Indu_ID	*Indu_Label*	*mdFluid*
13	Pharmaceutical Products	12.1
32	Communication	10.3
29	Coal	10.0
11	Healthcare	9.6
30	Petroleum and Natural Gas	8.3
12	Medical Equipment	8.3
36	Electronic Equipment	8.3
31	Utilities	7.9
35	Computers	7.8
7	Entertainment	7.6
5	Tobacco Products	7.4
49	Other	7.3
37	Measuring and Control Equipment	7.1
33	Personal Services	6.9
34	Business Services	6.3
27	Precious Metals	6.3
38	Business Supplies	6.2
41	Wholesale	6.0
44	Banking	5.9
28	Non-Metallic and Industrial Metal Mining	5.8
18	Construction	5.7
26	Defense	5.6
24	Aircraft	5.1
19	Steel Works	5.1
8	Printing and Publishing	5.0
42	Retail	5.0
43	Restaraunts, Hotels, Motels	4.9
14	Chemicals	4.9
6	Recreation	4.9
22	Electrical Equipment	4.8
3	Candy and Soda	4.7
25	Shipbuilding, Railroad Equipment	4.7
1	Agriculture	4.6
17	Construction Materials	4.5
21	Machinery	4.5
23	Automobiles and Trucks	4.2
15	Rubber and Plastic Products	4.1
10	Apparel	4.1
20	Fabricated Products	4.0
4	Beer and Liquor	3.9
40	Transportation	3.9
9	Consumer Goods	3.8
2	Food Products	3.8
39	Shipping Containers	3.6
16	Textiles	3.4

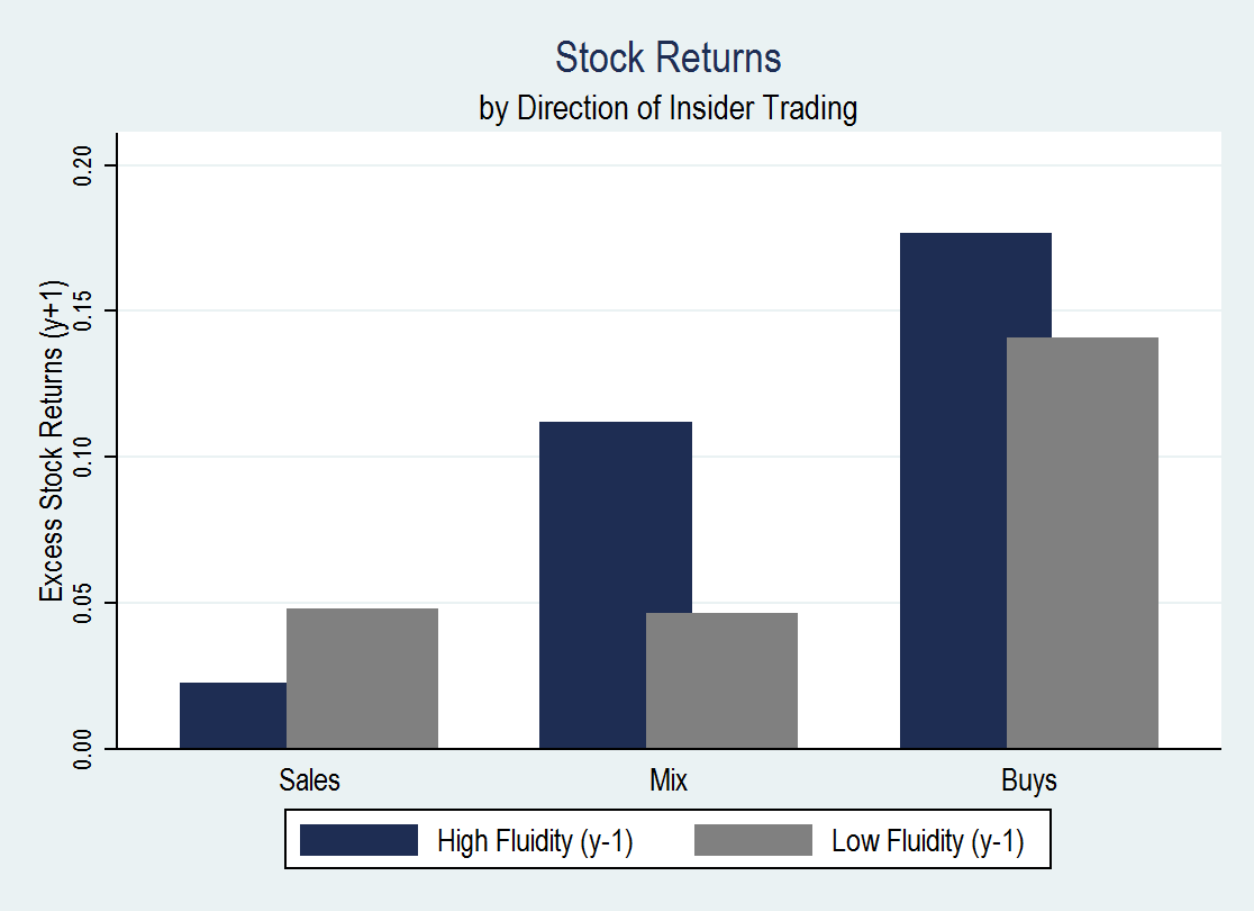
The table shows pooled sample median market fluidity (*mdFluid*) for each Fama and French (1997) industry. Table sorted on *mdFluid*.

Figure 1 – Percentage Market Capitalization Traded by Insiders



Percentage (x 10,000) of shares outstanding purchased (green) and sold (red) by all insiders in a fiscal year starting one day after the previous year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement by lagged *Fluidity* quintile (horizontal axis). Variable definitions in Appendix A2.

Figure 2 – Stock Returns Following Insider Trades



Stock returns following insider purchases, sales, and mix of purchases and sales in a fiscal year starting one day after the previous year's fourth quarter earnings announcement and ending at the current year's fourth quarter earnings announcement for the highest lagged *Fluidity* quintile (blue) and the lowest lagged *Fluidity* quintile (grey). Variable definitions in Appendix A2.

Table 1 – Descriptive Statistics

	N	*mean*	*sd*	*p25*	*p50*	*p75*
Competitive Intensity						
CompWrds	23 109	2.999	12.807	-5.111	0.000	7.553
Fluidity	40 135	7.159	3.435	4.547	6.638	9.260
negHHI	59 838	-0.064	0.062	-0.071	-0.044	-0.032
TariffDrop	17 323	0.445	0.497	0.000	0.000	1.000
Insider Trading						
BuyShr_All	59 970	1 726.561	4 558.023	0.000	0.000	554.064
BuyVol_All	59 970	3.029	3.564	0.000	0.000	6.319
SellShr_All	59 970	5 978.804	11 745.543	0.000	592.475	5 428.057
SellVol_All	59 970	4.997	4.098	0.000	6.386	8.600
Other Variables						
absdME (y+5)	26 405	1.686	3.354	0.299	0.641	1.450
absdROA (y+5)	31 177	0.178	0.501	0.021	0.051	0.128
absReactEA	49 756	0.068	0.070	0.019	0.045	0.091
absErrorEA	40 552	0.062	0.294	0.001	0.002	0.011
ExRet	46 346	0.146	1.017	-0.287	-0.018	0.286
ExROA	58 675	-0.077	0.496	-0.061	0.015	0.083
chgCapEx	53 742	-0.026	0.173	-0.109	-0.020	0.051
chgGrowth	48 104	-0.100	0.420	-0.241	-0.054	0.069
chgR&D	52 973	-0.024	0.167	-0.002	0.000	0.000
InduROA	58 827	0.002	0.112	-0.013	0.044	0.069
lnBE/ME	50 882	-0.761	0.888	-1.275	-0.702	-0.193
lnME	53 085	5.789	2.074	4.286	5.778	7.200
rankME	53 085	0.525	0.285	0.283	0.533	0.770
ROA	59 858	-0.087	0.576	-0.056	0.055	0.110
sdRet	52 369	0.040	0.023	0.023	0.034	0.050
sdROA	59 970	0.835	0.334	0.634	0.863	1.072
Survive5y	59 970	0.736	0.441	0.000	1.000	1.000

Number of observations (*N*), pooled-sample mean (*mean*), standard deviation (*sd*), first quartile (*p25*), median (*p50*), third quartile (*p75*) for variables used in the study. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. Variable definitions in Appendix A2.

Table 2 – Correlation Matrix

	Fluidity	*CompWrds*	*TariffDrop*	*negHHI*	*SellVol All*	*BuyVol All*	*ExRet (y+1)*	*ExRet (y-1)*	*lnME*	*lnBE/ME*	*sdRet*
Fluidity		0.378	0.056	0.204	0.112	-0.053	-0.037	-0.022	0.073	-0.216	0.320
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.056)	(0.000)	(0.000)	(0.000)
CompWrds	0.352		-0.033	-0.022	0.052	-0.025	-0.053	0.000	0.113	-0.096	0.129
	(0.000)		(0.005)	(0.065)	(0.000)	(0.029)	(0.000)	(0.986)	(0.000)	(0.000)	(0.000)
TariffDrop	0.031	0.008		0.105	-0.046	0.121	0.032	-0.156	-0.126	0.038	0.290
	(0.008)	(0.511)		(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.001)	(0.000)
negHHI	0.165	0.019	0.026		-0.003	-0.014	-0.033	-0.018	0.069	-0.129	0.131
	(0.000)	(0.097)	(0.026)		(0.798)	(0.243)	(0.005)	(0.120)	(0.000)	(0.000)	(0.000)
SellVol All	0.099	0.045	-0.050	-0.000		-0.137	-0.081	0.249	0.258	-0.322	-0.100
	(0.000)	(0.000)	(0.000)	(0.970)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BuyVol All	-0.052	-0.034	0.123	-0.003	-0.145		0.032	-0.148	-0.237	0.179	0.172
	(0.000)	(0.004)	(0.000)	(0.808)	(0.000)		(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
ExRet (y+1)	0.046	0.015	0.084	0.013	-0.074	0.072		-0.027	-0.059	0.123	0.003
	(0.000)	(0.196)	(0.000)	(0.276)	(0.000)	(0.000)		(0.022)	(0.000)	(0.000)	(0.770)
ExRet (y-1)	0.044	0.036	-0.078	-0.005	0.201	-0.108	-0.062		0.198	-0.223	-0.149
	(0.000)	(0.002)	(0.000)	(0.639)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
lnME	0.104	0.133	-0.124	0.013	0.306	-0.277	-0.143	0.108		-0.586	-0.514
	(0.000)	(0.000)	(0.000)	(0.265)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
lnBE/ME	-0.229	-0.095	0.022	-0.079	-0.319	0.194	0.121	-0.186	-0.578		0.185
	(0.000)	(0.000)	(0.056)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
sdRet	0.253	0.092	0.283	0.119	-0.150	0.182	0.130	-0.004	-0.492	0.173	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.717)	(0.000)	(0.000)	

Pearson's correlation coefficients below the main diagonal, Spearman's rank correlations above the main diagonal. *P*-values in brackets below coefficients. Based on non-missing observations for all variables. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. Variable definitions in Appendix A2.

Table 3 – Trading Volume

Panel A – Insider Sales

	SellVol All (y0)	*SellVol | Top2 (y0)*	*SellVol | Oth2 (y0)*	*SellVol All (y0)*	*SellVol | Top2 (y0)*	*SellVol | Oth2 (y0)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	3.405***	0.675	2.908***	3.885***	1.065**	3.325***
	(4.74)	(1.06)	(4.15)	(6.19)	(2.00)	(5.32)
Fluidity (y-1)	0.062***	0.050***	0.054***	0.017	0.021	0.014
	(3.78)	(2.94)	(3.96)	(0.68)	(0.91)	(0.61)
preSOX				-1.079***	-1.016***	-0.922***
				(-3.23)	(-4.07)	(-3.02)
*preSOX * Fluidity (y-1)*				0.099**	0.062**	0.088**
				(2.50)	(1.99)	(2.48)
lnME (y-1)	0.337***	0.299***	0.341***	0.325***	0.288***	0.331***
	(13.88)	(16.22)	(14.18)	(12.05)	(15.01)	(12.57)
lnBE/ME (y-1)	-0.361***	-0.340***	-0.338***	-0.374***	-0.363***	-0.348***
	(-6.59)	(-7.71)	(-6.24)	(-7.24)	(-8.03)	(-6.81)
ExRet (y-1)	0.844***	0.705***	0.787***	0.823***	0.675***	0.770***
	(11.96)	(9.62)	(12.32)	(10.72)	(9.52)	(10.81)
sdRet (y-1)	-16.80***	-12.43***	-14.58***	-15.24***	-9.12***	-13.49***
	(-4.08)	(-3.33)	(-3.74)	(-4.06)	(-2.99)	(-3.80)
Industry FE	yes	yes	yes	yes	yes	yes
N observations	35 413	35 413	35 413	35 413	35 413	35 413
Adjusted R2	0.123	0.113	0.115	0.127	0.121	0.118

Panel B – Insider Purchases

	BuyVol All (y0)	*BuyVol | Top2 (y0)*	*BuyVol | Oth2 (y0)*	*BuyVol All (y0)*	*BuyVol | Top2 (y0)*	*BuyVol | Oth2 (y0)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	6.641***	2.559***	5.995***	6.401***	2.495***	5.771***
	(9.04)	(4.57)	(9.35)	(10.39)	(4.79)	(10.61)
Fluidity (y-1)	0.041**	0.020**	0.034**	0.047***	0.016*	0.040***
	(2.52)	(2.05)	(2.15)	(3.06)	(1.75)	(2.77)
preSOX				0.892**	0.350*	0.815**
				(2.48)	(1.66)	(2.39)
*preSOX * Fluidity (y-1)*				-0.004	0.014	-0.005
				(-0.16)	(1.00)	(-0.22)
lnME (y-1)	-0.477***	-0.203***	-0.419***	-0.468***	-0.200***	-0.412***
	(-10.51)	(-8.57)	(-10.08)	(-12.88)	(-10.34)	(-12.40)
lnBE/ME (y-1)	-0.163**	-0.044	-0.158***	-0.127**	-0.025	-0.125**
	(-2.53)	(-1.24)	(-2.71)	(-2.11)	(-0.74)	(-2.30)
ExRet (y-1)	-0.372***	-0.245***	-0.321***	-0.330***	-0.224***	-0.283***
	(-6.58)	(-7.55)	(-6.26)	(-5.86)	(-5.97)	(-6.67)
sdRet (y-1)	-1.44	3.01	-3.68	-7.39***	-0.25***	-9.01***
	(-0.33)	(1.10)	(-0.95)	(-2.27)	(-0.12)	(-3.31)
Industry FE	yes	yes	yes	yes	yes	yes
N observations	35 413	35 413	35 413	35 413	35 413	35 413
Adjusted R2	0.079	0.043	0.061	0.092	0.051	0.073

The table shows the association between product market fluidity (*Fluidity*) and the volume of insider trading sales (Panel A) and purchases (Panel B). Column labels show the dependent variable. *Top2* denotes transactions by CEO and CFO, *Oth2* transactions by other insides. *PreSOX* denotes to fiscal years till 2002, *PostSOX* denotes fiscal years after 2002. Variable definitions in Appendix A2. All continuous variables Winsorized at top and bottom 1 per cent. Reported *t-statistics* in parentheses based on two-way clustered standard errors at the firm and year level (Petersen 2009). Fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.

Table 4 – Stock Returns

	ExRet (y+1)	*ExRet (y+1)*	*ExRet (y+1)*	*ExRet (y+1)*	*ExRet (y+1)*	*ExRet (y+1)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	0.124	0.104	0.103	0.286***	0.265***	0.271***
	(1.39)	(1.21)	(1.17)	(2.93)	(2.87)	(2.83)
Fluidity (y-1)	0.013***	0.015***	0.016***	-0.013**	-0.011***	-0.011**
	(2.60)	(4.55)	(3.21)	(-2.53)	(-3.16)	(-2.24)
SellVol All (y0)	-0.007**			-0.015***		
	(-1.99)			(-3.54)		
BuyVol All (y0)	-0.008*			0.007		
	(-1.87)			(1.27)		
*SellVol All (y0) * Fluidity (y-1)*	-0.001**			0.001*		
	(-2.01)			(1.65)		
*BuyVol All (y0) * Fluidity (y-1)*	0.003***			0.000		
	(4.30)			(0.28)		
SellVol Top2 (y0)		-0.001			-0.010***	
		(-0.17)			(-2.61)	
BuyVol Top2 (y0)		-0.016*			-0.001	
		(-1.95)			(-0.09)	
*SellVol Top2 (y0) * Fluidity (y-1)*		-0.002***			0.001	
		(-3.48)			(1.23)	
*BuyVol Top2 (y0) * Fluidity (y-1)*		0.004***			0.002	
		(3.31)			(1.35)	
SellVol Oth2 (y0)			-0.007*			-0.015***
			(-1.80)			(-3.57)
BuyVol Oth2 (y0)			-0.004			0.010**
			(-0.97)			(2.01)
*SellVol Oth2 (y0) * Fluidity (y-1)*			-0.001**			0.001*
			(-2.08)			(1.67)
*BuyVol Oth2 (y0) * Fluidity (y-1)*			0.002***			-0.000
			(3.58)			(-0.50)
preSOX				-0.222***	-0.214***	-0.231***
				(-3.39)	(-5.45)	(-3.87)
*SellVol All (y0) * preSOX*				0.019**		
				(2.37)		
*BuyVol All (y0) * preSOX*				-0.024***		
				(-2.88)		
*preSOX * Fluidity (y-1)*				0.069***	0.064***	0.068***
				(6.25)	(9.30)	(6.90)

*preSOX * Fluidity (y-1) * SellVol All (y0)*				-0.005***		
				(-3.80)		
*preSOX * Fluidity (y-1) * BuyVol All (y0)*				0.004***		
				(2.93)		
*SellVol Top2 (y0) * preSOX*					0.020***	
					(2.77)	
*BuyVol Top2 (y0) * preSOX*					-0.022	
					(-1.48)	
*preSOX * Fluidity (y-1) * SellVol Top2 (y0)*					-0.005***	
					(-4.62)	
*preSOX * Fluidity (y-1) * BuyVol Top2 (y0)*					0.002	
					(0.90)	
*SellVol Oth2 (y0) * preSOX*						0.020**
						(2.50)
*BuyVol Oth2 (y0) * preSOX*						-0.024***
						(-2.75)
*preSOX * Fluidity (y-1) * SellVol Oth2 (y0)*						-0.005***
						(-3.90)
*preSOX * Fluidity (y-1) * BuyVol Oth2 (y0)*						0.004***
						(2.96)
lnME (y-1)	-0.012***	-0.015***	-0.012***	-0.015***	-0.018***	-0.016***
	(-2.97)	(-4.01)	(-3.14)	(-3.84)	(-4.67)	(-3.93)
lnBE/ME (y-1)	0.019*	0.018*	0.019*	0.026**	0.027**	0.026**
	(1.78)	(1.73)	(1.79)	(2.51)	(2.57)	(2.53)
ExRet (y-1)	-0.068***	-0.072***	-0.070***	-0.061***	-0.065***	-0.062***
	(-7.34)	(-7.80)	(-7.56)	(-6.62)	(-7.12)	(-6.80)
sdRet (y-1)	1.992***	2.013***	2.067***	0.153	0.252	0.212
	(5.08)	(5.14)	(5.28)	(0.36)	(0.60)	(0.50)
Industry FE	yes	yes	yes	yes	yes	yes
N observations	32 371	32 371	32 371	32 371	32 371	32 371
Adjusted R2	0.022	0.021	0.021	0.037	0.035	0.037

The table shows the association between product market fluidity (*Fluidity*), the volume of insider trading, and future stock returns. Column labels show the dependent variable. *Top2* denotes transactions by CEO and CFO, *Oth2* transactions by other insides. *PreSOX* denotes to fiscal years till 2002, *PostSOX* denotes fiscal years after 2002. Variable definitions in Appendix A2. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. Reported *t-statistics* in parentheses are clustered at the firm level (Cohen, Malloy, and Pomorski 2012). Fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.

Table 5 – Alternative Measures of Competitive Intensity

	SellVol All (y0)	*BuyVol All (y0)*	*ExRet (y+1)*	*SellVol All (y0)*	*BuyVol All (y0)*	*ExRet (y+1)*	*SellVol All (y0)*	*BuyVol All (y0)*	*ExRet (y+1)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	3.956***	6.689***	0.150	3.886***	5.199***	0.102	4.282***	7.201***	0.016
	(4.81)	(7.40)	(1.42)	(5.77)	(7.62)	(1.24)	(5.97)	(10.56)	(0.21)
CompWrds (y-1)	0.007**	0.010***	0.003*						
	(2.51)	(4.88)	(1.66)						
TariffDrop (y-1)				-0.310***	0.787***	0.220***			
				(-4.34)	(3.93)	(5.13)			
negHHI (y-1)							1.940***	1.002*	-0.620**
							(3.35)	(1.81)	(-2.48)
SellVol All (y0)			-0.012***			-0.006**			-0.010***
			(-6.88)			(-2.40)			(-4.26)
BuyVol All (y0)			0.011***			0.004			0.017***
			(5.56)			(1.35)			(6.74)
*SellVol All (y0) * CompWrds (y-1)*			-0.000**						
			(-2.02)						
*BuyVol All (y0) * CompWrds (y-1)*			0.000						
			(0.92)						
*SellVol All (y0) * TariffDrop (y-1)*						-0.013**			
						(-2.37)			
*BuyVol All (y0) * TariffDrop (y-1)*						0.019***			
						(3.31)			
*SellVol All (y0) * negHHI (y-1)*									0.038
									(1.36)
*BuyVol All (y0) * negHHI (y-1)*									0.066**
									(2.42)
lnME (y-1)	0.244***	-0.512***	-0.014***	0.337***	-0.420***	-0.020***	0.338***	-0.510***	-0.010***
	(7.61)	(-9.79)	(-3.78)	(11.12)	(-10.36)	(-3.18)	(12.54)	(-11.09)	(-3.40)

lnBE/ME (y-1)	-0.565***	-0.261***	0.021**	-0.382***	-0.128	-0.011	-0.393***	-0.180***	0.012
	(-8.59)	(-3.56)	(2.19)	(-4.95)	(-1.28)	(-0.63)	(-7.63)	(-3.37)	(1.50)
ExRet (y-1)	0.783***	-0.452***	-0.045***	0.792***	-0.303***	-0.068***	0.784***	-0.350***	-0.073***
	(11.64)	(-6.97)	(-4.70)	(10.71)	(-4.86)	(-4.92)	(10.72)	(-6.96)	(-9.18)
sdRet (y-1)	-20.745***	0.957	1.717***	-15.099***	-1.616	1.083	-16.315***	-1.296	1.835***
	(-4.42)	(0.18)	(4.40)	(-3.88)	(-0.39)	(1.61)	(-3.92)	(-0.30)	(5.53)
Industry FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
N observations	22 766	22 766	21 186	14 538	14 538	13 380	44 797	44 797	39 560
Adjusted R2	0.114	0.090	0.020	0.116	0.086	0.032	0.119	0.091	0.018

The table shows the association between alternative measures of competitive intensity (*CompWrds*, *TariffDrop*, and *negHHI*), the volume of insider trading, and future stock returns. Column labels show the dependent variable. *Top2* denotes transactions by CEO and CFO, *Oth2* transactions by other insides. *PreSOX* denotes to fiscal years till 2002, *PostSOX* denotes fiscal years after 2002. Variable definitions in Appendix A2. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. For models (1), (2), (4), (5), (7), and (8) reported *t-statistics* in parentheses based on two-way clustered standard errors at the firm and year level (Petersen 2009), for models (3), (6), and (9) they are clustered at the firm level (Cohen, Malloy, and Pomorski 2012). Fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.

Table 6 – Earnings Per Share

	dEPS (y0)	*dEPS (y0)*	*dEPS (y0)*	*dEPS5y (y+5)*	*dEPS5y (y+5)*	*dEPS5y (y+5)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	-0.004	-0.025	-0.010	-0.142***	-0.153***	-0.147***
	(-0.08)	(-0.43)	(-0.17)	(-3.45)	(-3.81)	(-3.62)
Fluidity (y-1)	-0.007***	-0.005***	-0.007***	-0.003*	-0.002	-0.003
	(-3.51)	(-4.05)	(-3.65)	(-1.65)	(-1.38)	(-1.46)
SellVol All (y0)	0.002			0.002		
	(1.31)			(1.09)		
BuyVol All (y0)	-0.004**			-0.006***		
	(-2.19)			(-3.31)		
*SellVol All (y0) * Fluidity (y-1)*	0.001***			-0.000		
	(3.63)			(-0.93)		
*BuyVol All (y0) * Fluidity (y-1)*	-0.001***			0.001***		
	(-3.30)			(3.45)		
SellVol Top2 (y0)		0.003**			0.003**	
		(2.52)			(2.22)	
BuyVol Top2 (y0)		-0.007**			-0.009***	
		(-2.33)			(-3.24)	
*SellVol Top2 (y0) * Fluidity (y-1)*		0.000**			-0.000**	
		(2.17)			(-2.02)	
*BuyVol Top2 (y0) * Fluidity (y-1)*		-0.001**			0.001***	
		(-2.05)			(3.35)	
SellVol Oth2 (y0)			0.002			0.002
			(1.54)			(1.14)
BuyVol Oth2 (y0)			-0.004*			-0.005***
			(-1.94)			(-2.85)
*SellVol Oth2 (y0) * Fluidity (y-1)*			0.001***			-0.000
			(3.50)			(-0.97)
*BuyVol Oth2 (y0) * Fluidity (y-1)*			-0.001***			0.001***
			(-3.08)			(3.08)
lnME (y-1)	-0.009***	-0.006***	-0.008***	0.015***	0.015***	0.016***
	(-5.20)	(-3.73)	(-4.85)	(8.05)	(8.22)	(8.11)
lnBE/ME (y-1)	-0.048***	-0.047***	-0.048***	0.013***	0.013***	0.013***
	(-10.45)	(-10.22)	(-10.42)	(2.79)	(2.81)	(2.78)
ExRet (y-1)	0.057***	0.060***	0.058***	-0.004	-0.004	-0.004
	(13.04)	(13.96)	(13.30)	(-1.05)	(-1.11)	(-1.05)
SdRet (y-1)	-0.319	-0.318	-0.362	2.738***	2.740***	2.739***
	(-1.41)	(-1.41)	(-1.60)	(11.02)	(11.01)	(11.03)

Industry FE	yes	yes	yes	yes	yes	yes
Number of observations	31 844	31 844	31 844	26 016	26 016	26 016
Adjusted R2	0.042	0.039	0.041	0.028	0.028	0.028

The table shows the association between product market fluidity (*Fluidity*), the volume of insider trading, and future changes in earnings per share. Column labels show the dependent variable. *Top2* denotes transactions by CEO and CFO, *Oth2* transactions by other insides. *PreSOX* denotes to fiscal years till 2002, *PostSOX* denotes fiscal years after 2002. Variable definitions in Appendix A2. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. Reported *t-statistics* in parentheses are clustered at the firm level (Cohen, Malloy, and Pomorski 2012). Fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.

Table 7 – Complexity

	Survive5y	*absdROA (y+5)*	*sdROA*	*ROA (y+5)*	*sdRet (y0)*	*absdME (y+5)*	*rankME (y+5)*	*absErrorEA (y0)*	*absReactEA (y0)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	0.074	0.008	0.460***	0.021**	0.061***	2.337***	-0.001	0.180***	0.055***
	(0.29)	(0.31)	(3.92)	(2.06)	(14.97)	(4.27)	(-0.06)	(2.59)	(6.75)
Fluidity (y-1)	-0.041***	0.006***		-0.004***	0.001***	0.043*	0.005***	0.002	0.001**
	(-7.42)	(6.66)		(-3.87)	(3.95)	(1.76)	(3.49)	(1.32)	(2.41)
mdFluid			0.038**						
			(2.14)						
ExROA (y-1)				0.647***					
				(8.89)					
InduROA (y-1)				0.480***					
				(4.36)					
*ExROA (y-1) * Fluidity (y-1)*				-0.023***					
				(-3.04)					
*InduROA (y-1) * Fluidity (y-1)*				0.043***					
				(3.71)					
rankME (y0)							0.915***		
							(64.25)		
*lnrankME * Fluidity (y0)*							-0.005**		
							(-2.25)		
lnME (y-1)	0.135***	-0.017***			-0.006***	-0.200***		-0.023***	-0.003***
	(11.99)	(-9.81)			(-16.60)	(-4.72)		(-5.42)	(-6.72)
lnBE/ME (y-1)	0.001	-0.055***			-0.002**	0.334***		-0.002	-0.004***
	(0.05)	(-11.10)			(-2.14)	(2.94)		(-0.23)	(-5.28)
ExRet (y-1)	0.052**	-0.023***			-0.001	-0.193**		-0.037***	-0.002
	(2.41)	(-3.72)			(-0.88)	(-2.20)		(-4.14)	(-1.49)
SdRet (y-1)	-0.679	2.046***				21.843***		2.346***	0.387***
	(-0.84)	(9.88)				(3.23)		(4.10)	(4.59)

Industry FE	yes	yes			yes	yes		yes	yes
N observations	35 413	23 197	506	27 227	35 069	21 987	24 189	27 265	36 615
Adjusted R2	.	0.158	0.039	0.230	0.360	0.090	0.710	0.070	0.058

The table shows the association between product market fluidity (*Fluidity*) and complexity in forecasting firm perfromance. Column labels show the dependent variable. Variable definitions in Appendix A2. All continuous variables but for stock returns Winsorized at top and bottom 1 per cent. Reported *t-statistics* in parentheses based on two-way clustered standard errors at the firm and year level (Petersen 2009). Model 1 estimated by two-way clustered Probit. In Model 3 standard errors are two-way clustered industry and year level. Fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.

Table 8 – Disclosure

	UndiscInfo (y0)	*DisQualWA (y0)*	*lnNetSize (y0)*	*lnTotWords (y0)*	*Fog (y0)*	*numCIG (y0)*	*mnErrSqCIG (y0)*
	coef/t	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*	*coef/t*
Intercept	0.221***	0.526***	11.803***	9.659***	18.865***	-7.098***	-0.090
	(8.28)	(56.69)	(320.43)	(247.56)	(43.12)	(-6.65)	(-0.95)
Fluidity (y-1)	0.004**	-0.002***	0.014***	0.015***	0.049***	-0.039**	0.007**
	(2.56)	(-3.50)	(7.42)	(7.32)	(5.75)	(-2.03)	(2.52)
lnME (y-1)	0.038***	0.036***	0.129***	0.135***	0.030**	1.071***	0.000
	(8.92)	(23.11)	(20.98)	(20.87)	(2.23)	(32.55)	(0.04)
lnBE/ME (y-1)	0.041***	0.044***	0.136***	0.144***	0.055	0.413***	0.017
	(8.60)	(23.80)	(18.34)	(18.60)	(1.60)	(5.90)	(1.20)
ExRet (y-1)	0.004	0.012***	0.010**	0.010**	-0.007	0.413***	-0.053***
	(1.38)	(12.89)	(2.35)	(2.27)	(-0.25)	(9.02)	(-3.56)
SdRet (y-1)	-0.268**	-0.815***	-1.067***	-1.103***	-2.019	-32.576***	3.858***
	(-1.97)	(-17.11)	(-5.05)	(-4.96)	(-0.80)	(-11.92)	(3.08)
Firm FE	yes	yes	yes	yes			
Industry FE					yes	yes	yes
N observations	35 160	35 085	33 392	33 392	28 916	36 063	9 551
Adjusted R2	0.010	0.126	0.043	0.043	0.051	0.111	0.038

The table shows the association between product market fluidity (*Fluidity*) and informativeness of mandatory and voluntary firm disclosure. Column labels show the dependent variable. Variable definitions in Appendix A2. Models 1 to 4 estimated using firm fixed effects. In Model 5 and 7 reported *t-statistics* in parentheses based on two-way clustered standard errors at the firm and year level (Petersen 2009). Model 6 estimated using Tobit regression censored at zero (Ali, Klasa, and Yeung 2014). All continuous variables Winsorized at top and bottom 1 per cent. Industry fixed effects based on Fama and French (1997). ***, **, * indicate statistical significance at 1%, 5%, and 10% level respectively.