FAMILY OWNERSHIP, LIQUIDITY, AND INSIDER TRADING IN NEW PUBLIC FIRMS

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ABSTRACT

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IPOs have long been considered as a potential way of exit for founders. Yet the existing literature has largely failed to examine founders' exit decisions and its influence on both the firm's information environment and the liquidity of its stock. In this paper, using a sample of new public firms, we examine founders' sales in the open market and relate them to the level of information asymmetry and various aspects of the liquidity of the firm's stock. We find that family ownership has a significant influence on the extent of founders' exit. In particular, founders with low (high) levels of ownership are more (less) likely to engage in sale transactions, indicating relatively faster (slower) exit. We also find that, in order to facilitate their exit, founders try to improve the market liquidity by engaging in additional information disclosure. This is reflected in the negative relation between the level of firm asymmetric information in the equity market and the extent of founders' sales. While the lower level of asymmetric information appears to translate into lower adverse selection risk, the founder trading patterns increase inventory risk for the market maker, leading to a wider bid-ask spread.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APENDIX B TABLES

1. Introduction

As pointed out by Schwert (1985), the founder is probably the most important asset of a firm in its formative stage. Since the firm does not have an established reputation yet, it has to rely heavily on founders' reputation. In addition, founders usually own a significant fraction (majority) of a firm's equity and are actively involved in the management and governance of their firms. At the same time, founding family's loyalty to the firm may not have been established yet (compared to the case of a firm which has been a family firm for decades). Therefore founders' exit is a real possibility. In fact, as reported by Stein (2001), eighty percent of family firms never make it to the second generation. IPO is a crucial step in the evolution of a family firm into a public corporation and in the separation of ownership and control.[1]

In many cases, however, IPOs are also exit vehicles for founders. Despite the importance of founders in the new public family firms, and the potential influence of founders' exit on their firm's current and future performance, there is surprisingly little evidence on this important transition in a firm's life. While some of the studies that examine the evolution of ownership and board characteristics in new public firms have documented the evolution of the founders' presence in the firm (see, e.g., Boone et al., 2007), we are not aware of any study that has explicitly examined either the determinants or the ways founders exit new public firms. In this paper, using a unique, hand-collected data on the evolution of ownership in new public firms from IPO up to seven years after

[1] See, e.g., Brennan and Franks (1997).

the IPO, we examine not only the determinants, but also the influence of founders' exit on both the firm's information environment and the liquidity of its stock.[2] [3]

We hypothesize that the extent of founders' exit will be influenced by, among other things, their ownership positions.[4] In particular, we expect ownership to have two opposing effects on the extent of founders' exit. On the one hand, high levels of founders' ownership indicate their intention to remain with the firm for the long-run and this can be seen as a reflection of their loyalty to the firm ("loyalty effect"). On the other hand, to the extent that a higher ownership position in the firm means a lower level of diversification, founders may trade their shares purely for diversification reasons. Therefore, ownership may also have a positive influence on the extent of founders' exit ("diversification effect"). The relative dominance of these two effects at particular levels of ownership is an empirical issue. Our results suggest a concave relation between the extent of founders' exit and ownership. In other words, founders with low levels of ownership engage in more extensive sell transactions than do founders with high levels of ownership, indicating that the loyalty (diversification) effect dominates at high (low) levels of ownership.

We also find that the extent of founders' exit influences both the firm's information environment and the liquidity of its stock. An examination of the relation between the extent of founder exit and the level of asymmetric information about the firm in the equity market reveals that firms with low levels of family ownership (i.e., those

[2] The paper closest to ours is that by Cao et al. (2005). They examine insider trading around lock-up expirations. Their focus, however, is on the 30-day period following the lock-up expiration. In addition, they do not explicitly examine the differences between various types of insiders.

[3] Since most founders in our sample exit over a relatively long period of time, we have chosen to use continuous measures of exit (rather than a discreet dummy variable). This choice of measures allows us to examine not only the decision to exit, but also the influence of the exit process on both the information environment and the firm's liquidity.

[4] For now onwards, ownership will refer to family ownership.

with the highest extent of founders' exit) have the lowest level of information asymmetry. This finding is consistent with the predictions of Hong and Huang (2005) who argue that the firms with the highest level of insider trading will engage in more extensive investor relations, thus decreasing the level of information asymmetry about their firms.

The influence of the lower level of asymmetric information on the bid-ask spread, however, remains unclear. The market microstructure literature views bid-ask spreads as the sum of three different costs incurred by the market maker: inventory cost, order processing cost, and adverse selection cost.[5] While a lower level of asymmetric information can lead to a decrease in the adverse selection cost faced by the market maker, the founders' transactions themselves can have a significant influence on both the adverse selection and inventory cost components of the bid-ask spread. In particular, founders who are timing their sell transactions tend to sell at a higher price and their sells are followed by price declines. Their transactions will therefore, increase adverse selection costs of trading. At the same time, founders who are not timing the market will create higher inventory costs for the market maker.

We find a convex (concave) relation between the adverse selection (inventory) costs of trading and family ownership. This implies that founders with high levels of ownership may be timing the market, while founders with low levels of ownership are less likely to do so. Consistent with this, our examination of founders' timing ability reveals a convex (concave) relation between the pre-trade (post-trade) performance and ownership. In other words, founders with low levels of ownership tend to sell after a (relatively) smaller price increase and their sales are followed by an increase in the stock

[5] From now onwards the term "information asymmetry" will refer to the information asymmetry between firm insiders and outsiders, while "adverse selection" will refer to the information asymmetry between informed traders in the market and the uninformed market maker.

price (potentially due to their exit). Founders with high levels of ownership, however, tend to sell after a (relatively) larger price increase and their sales are followed by a price decline.

The relative importance of the two influences on the bid-ask spread (influence of lower information and influence of trading itself) is an empirical question. Our findings suggest that the inventory concerns seem to dominate adverse selection issues over the entire range of ownership, therefore these concerns are the main driving forces driving the observed concave relation between the bid-ask spread and ownership.

The rest of the paper is organized as follows. Section 2 reviews the literature. Section 3 develops the hypothesis that will serve as the basis for the empirical tests. Section 4 discusses the sample characteristics, while section 5 describes the methodology and reports the results. Section 6 concludes.

2. Literature review

This paper is related and contributes to several areas of research: family firms, insider trading, and market liquidity.

2.1 Family firm literature

Founding families represent a unique group of active, long-term owners, holding concentrated equity positions in their firms. Although family firms have recently started to receive attention in the academic literature, most of this emerging literature has focused on mature and index-listed family firms (see, among others, Anderson and Reeb, 2003; Villalonga and Amit, 2006). In their paper, Villalonga and Amit (2006) examine the effects of family control, ownership, and management on firm value. However, they

acknowledge that their estimates of the relative importance of family firms are likely to be conservative because the firms in their sample are among the largest in the world, are listed on an exchange in a country with a high degree of shareholder protection, are frequently included in the index funds, and are generally mature and thus more difficult to maintain under family control. Anderson and Reeb (2003) explore the relation between founding-family ownership and firm performance, and observe that, contrary to their expectations, family firms perform better than non-family firms. Nevertheless, they also focus their attention only on large and mature companies that are part of Standard & Poor's 500 index.

New public family firms, on the other hand have received very little attention.[6] It is in these firms that the costs and benefits of family ownership are likely to be more pronounced. Our conjecture is based on the following three reasons. First, for new public firms, the founding family is likely to own a significant fraction (majority) of its equity and exert a more significant and direct influence on the firm (either positive or negative) than it would at the mature stage. Second, their ownership is usually concentrated in the hands of a single individual (as opposed to a group of top managers). Third, as shown by Paeglis and Tirtiroglu (2008), new public family firms are less likely to be the subject of monitoring and scrutiny by various financial market participants (such as financial analysts and institutional investors), allowing the founding family a more unhindered control over the firm.

[6] The only papers dealing explicitly with new public family firms that we are aware of are those by Paeglis and Tirtiroglu (2008) and Basu, Dimitrova, and Paeglis (2008).

2.2 Insider trading literature

Several studies have examined the performance of insider trades. In their paper Eckbo and Smith (1998) use three different measures of performance and document zero or negative abnormal performance of insider trading. Further, they find evidence that the average mutual fund outperforms insider portfolios. Other studies on the profitability of insider trading show the opposite results. Seyhun (1986) finds that insiders purchase stock prior to an abnormal rise in stock prices and sell stock prior to an abnormal decline in stock prices. In addition, the study also finds that the loss incurred by market makers due to their trading with insiders is negatively related to firm size. Therefore, market makers would face higher percentage losses when trading with insiders from small firms. This is consistent with the fact that smaller firms are associated with wider bid-ask spreads.[7] Markarian and Bricker (2007) find a negative relation between the presence of institutional investors (and their monitoring efforts) and insider trading profitability.

2.3 Market microstructure literature

There is growing literature that examines the empirical relation between insider trading and market liquidity. Glosten and Milgrom (1985) show that the presence of traders with superior information leads to wider bid-ask spreads. Market makers are compensated for their anticipated losses to informed traders by widening the spread. In related literature, Copeland and Galai (1983) find that bid-ask spread increases with price volatility and the price level of the assets being traded, and decreases with trading volume.

[7] See also Baesel and Stein (1979) and Jaffe (1974).

While the aforementioned papers study the impact of informed trading on liquidity, their findings are consistent with those of papers examining the impact of insider trades on liquidity. Cornell and Sirri (1992) test the market reaction to informed trading using the post-court records of the individual insider transactions of informed group of people who traded on information leaked prior to the announcement of the acquisition of Campbell Taggart by Anheuser-Busch. They conclude that trading volume and liquidity increase when insiders are active. Similarly, when studying the cross-sectional association between bid-ask spreads and insider trading, Chung and Charoenwong (1998) find that market makers widen the spread for stocks with greater extent of insider trading. In their time-series analysis, the authors, however, do not find evidence of changes in the spread. They conclude that since the market makers are generally unable to predict the exact timing of insider trading, they protect themselves by maintaining larger spreads for stocks with greater extent of insider trading.

Other studies employ different liquidity measures, such as the bid-ask spread and trading volume, to test for the change in liquidity before and after an anticipated or unanticipated information event (see, e.g., Venkatesh and Chiang, 1986; Krinsky and Lee, 1996; Chae, 2005). Examining earnings and dividend announcements, Venkatesh and Chiang (1986) find that market makers widen the spread only around unanticipated earnings announcements (that is, those that are separated from a previous announcement by more than ten days but less than thirty days). According to Krinsky and Lee (1996), although earnings announcements result in increased adverse selection costs, they may have an insignificant impact on the total bid-ask spread due to the simultaneous decrease in inventory and order processing costs. Chae (2005) shows that trading volume

decreases prior to scheduled announcements, and increases after the announcements. Further, trading volume is negatively related to the level of information asymmetry prior to an announcement. Although, the author finds that volume significantly increases before an unscheduled announcement, this result cannot be explained by the level of information asymmetry.

Lockup expirations after IPOs are also seen as attractive events for testing the significance of information asymmetry between insiders and outsiders. In their paper, Cao, Field, and Hanka (2005) study the pre-announced, large-scale entry of possibly informed traders into the equity markets around IPO lockup expirations and the resulting changes in share price and trading volume. They find that even though lockup expirations are associated with higher than usual level of insider trading, they have little effect on the bid-ask spread. In contrast, market depth and trading activity improve substantially. The authors argue that the improved liquidity is probably caused by the fact that the expected losses due to insider trading are small relative to the other costs of making a market and therefore have little effect on bid-ask spread and quoted depth.

Finally, several previous papers investigate the effect of ownership stake on market liquidity. For example, Sarin et al. (2000) show that fractional ownership of insiders and institutions is positively related to spreads and negatively related to quoted depths. However, while the loss of liquidity stemming from higher insider ownership is due to a higher adverse selection cost, the observed result is caused by higher inventory cost, in the case of higher institutional ownership. Heflin and Shaw (2000) provide similar evidence that firms with greater blockholder ownership (entities holding at least 5% of a firm's outstanding shares), either by managers or external parties, are associated

with larger spreads and adverse selection components of the spread and with smaller quoted depths. On one hand, blockholders aid in the process of price discovery by monitoring the firm, and thereby reduce adverse selection problems. In turns this should lead to narrower bid-ask spreads. On the other hand, the market maker may regard blockholders as informed traders, based on their access to valuable firm-relevant information, and therefore widen the spread. The authors' results support the second argument, suggesting that higher blockholder ownership is associated with higher adverse selection costs of trading and therefore lower liquidity. In contrast, Kini and Mian (1995) find opposing evidence when they examine the relation between bid-ask spreads and ownership structure. Their findings suggest that there is a negative relation between bid-ask spreads and institutional holdings and that the relation between spreads and insider holdings is never positive. Similarly, Dennis and Strickland (2003) report that changes in liquidity are negatively related to the level of institutional ownership when they examine the effect of stock splits on liquidity.

While a large body of literature has studied the relationship between ownership and liquidity, to our knowledge the only study that looks at the relationship between family ownership and liquidity is that by Attig et al. (2006). Using a sample of Canadian firms, the authors investigate the effect of ultimate control and ownership on stock liquidity, measured by the bid-ask spread. They find that family firms with greater difference between control (voting) and cash flow rights have higher agency costs, which lead to wider bid-ask spreads and lower stock liquidity.[8]

[8] They, however, do not examine if the liquidity of the stock depends on the fraction of the firm's equity owned by the founding family.

3. Theory and hypotheses

Consider founders deciding upon the extent of their exit from a new public family firm. We hypothesize that their decision will be influenced by, among other things, their ownership positions. In particular, we expect the ownership to have two opposing effects on the extent of founders' exit. First, founders' ownership indicates their intentions to remain with the firm for the long-run, and this can be seen as a reflection of their loyalty to the firm. This implies a negative relationship between the extent of founders' exit and ownership. From now on, we will refer to this negative relationship as the "loyalty effect". Second, if high ownership position in the firm means a lower level of founders' diversification, ownership may have a positive influence on the extent of founder exit. In other words, founders may trade for purely diversification reasons. From now on we will refer to this positive influence of ownership on the extent of founders' exit as the "diversification effect".

For a founder with very low level of ownership, the loyalty effect is likely to be low, and so is the diversification effect. As the level of ownership increases, so will both effects. While the dominance of one effect over the other remains an empirical matter, we hypothesize that at some point the loyalty effect will start to dominate the diversification effect. For a founder with a high level of ownership, on the other hand, the loyalty effect will dominate the diversification effect. This leads to our first hypothesis.

Hypothesis 1: The relation between the extent of founder exit and ownership should be non-linear and concave.

Founders' ability to sell their shares in the open market, however, depends upon the liquidity of the firm's shares.[9] In a recent paper, Hong and Huang (2005) argue that investor relations can be used by insiders to decrease the level of asymmetric information about the firm in the equity market thereby increasing liquidity of firm's stock and making it easier for insiders to sell their shares.[10] The above arguments lead to two predictions. First, if founders indeed use investor relations to increase the liquidity of firm shares, the relation between the level of asymmetric information and ownership should be the inverse of that observed between ownership and the extent of founders' exit. Second, firms with higher intensity of founders' exit should have the lowest level of asymmetric information. These two predictions form the basis of our second hypothesis.

Hypothesis 2A: The relation between the level of asymmetric information about the firm in the equity market and ownership should be the inverse of the relation between ownership and the extent of founders' exit.

Hypothesis 2B: There should be a negative relation between the extent of founders' exit and the level of asymmetric information about the firm in the equity market.

We now turn to the liquidity implications of insider trading. The market microstructure literature views the bid-ask spread as the sum of three different costs incurred by the market maker: inventory cost, order processing cost, and adverse selection cost. The inventory cost arises because the market maker is forced to hold a non-diversified portfolio, which exposes the market maker to non-systematic risks (see,

[9] The SEC Rule 144, for example, caps what an insider who holds restricted stock can sell over a three-month period at the greater of one percent of the number of shares outstanding or the average weekly trading volume over the four weeks preceding the sale (see, e.g., Kahl et al., 2003).

[10] Hong and Huang (2005) define investor relations as "activities [that] include voluntary information disclosures, competition for analyst coverages, and interactions with investors for the purpose of expanding the shareholder base". In addition, the authors argue that the benefits from investor relations should be more pronounced in the new public firms such as those examined in this paper.

Demsetz, 1968; Ho and Stoll, 1981). The market maker incurs the order-processing cost in the process of making the market for a given security. The adverse selection cost results from the information asymmetry between informed traders in the market and the uninformed market maker. While the decrease in the level of asymmetric information can lead to a decrease in the adverse selection costs of trading (see, e.g., Kyle, 1985), the timing of founders' transactions may have a significant influence on both the adverse selection cost of trading and the inventory costs of the market maker. In particular, if founders are good at timing their sales, their trading will increase the importance of adverse selection concerns of the market makers (relative to their inventory concerns).

Consider the following example. Suppose the founders sell during an upward trend of the firm's stock price. By timing their trades to immediately precede the stock price decline, founders are creating an adverse selection concern for the market maker because the latter will be facing a loss due to the decline in the value of the shares they acquired from the founders. If, on the other hand, founders are not timing their trades (i.e., if they trade with the market), they will increase the relative importance of the inventory concerns of the market maker. This stems from the fact that by trading with the market the founders sells at a time when other investors do so. Thus, their selling is likely to increase the market makers' inventory and therefore their inventory holding costs. Market makers will therefore widen the bid-ask spread to reflect these higher inventory costs. This leads to our third hypothesis.

Hypothesis 3: The better the timing of founders' trades, the higher the adverse selection cost of trading and the lower the inventory costs of the market maker.

Finally, since the influence of information asymmetry on the adverse selection component of the bid-ask spread ("information asymmetry effect") and the influence of trading itself ("trading effect"), either due to adverse selection or inventory concerns, are expected to work in opposite directions, the overall effect of the founders' trading on the bid-ask spread is an empirical matter. Our fourth and last hypothesis, therefore, is as follows.

Hypothesis 4: The relation between the ownership and the bid-ask spread should reflect the relative importance of the information asymmetry effect and trading effect.

4. Data and sample selection

The list of IPOs of common equity between 1993 and 1996 is from the SDC/Platinum New Issue database. We eliminate REITs, closed-end funds, unit offerings, equity carve-outs, financial (all firms with SIC codes between 6000 and 6999), and foreign firms. This screening leaves us with a sample of 1,554 firms. We then exclude previous leveraged buyouts and roll-ups (a total of 91 firms). There are 12 firms, which are not found in the Center for Research in Security Prices (CRSP) database. For an additional three firms, the CRSP and the SDC databases show different first dates of trading. The elimination of these leaves us with a total of 1,448 firms.

We next classify the firms as either family or non-family, based on the information in the management sections of IPO prospectuses. Finally, we eliminate firms listed on exchanges other than NASDAQ. As shown by Affleck-Graves et al (1994), the relative importance of various components of the bid-ask spreads varies across different exchanges. Therefore, to avoid any confounding effects of due to these differences, we are examining only the NASDAQ-listed firms. Of the initial 1,448 firms, 777 that are

classified as NASDAQ-listed family firms represent our final sample.[11] We collect the family ownership data for these firms at the time of IPO and from the first, third, fifth, and seventh proxy statements after the time of going public. The distribution of our final sample over time is described in Panel A of Table 1. By the time of the seventh proxy statement after the IPO, only 353 of the initial 777 firms are still publicly-listed. Founder trading data is obtained from SEC form 4 filings. Panel B of Table 1 presents the distribution of founder trades over the seven year period after the initial public offering. It is interesting to note that, consistent with IPOs being an exit vehicle, most of founders' sales take place between the 1st and the 3rd proxy statement after public listing.

The accounting data used in the paper comes from COMPUSTAT. The stock price data is retrieved from the CRSP. The analysts' coverage data is from IBES. Intraday transactions data are obtained from the Trade and Quote (TAQ) database. To be included in our sample, the stock's price must be within $5 and $999. This filter is applied to avoid the influence of extreme price levels. Trades that are out of sequence, recorded before the market open or after the market close, are also discarded. Several other filters are also employed to ensure the validity of the TAQ data.[12]

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[11] We define a firm as a "family firm" if its founder is actively involved in either its management, governance, or both. We acknowledge, however, that there are other possibilities for a founders' (or a family member's) involvement, such as a senior manager and a member of the board of director.

[12] We drop all trades with a correction indicator other than 0 or 1, and retain only those trades for which the condition is B, J, K, or S. We also drop all trades with non-positive trade size or price. Finally, we omit all trades recorded before opening time or after the closing time of the market. Negative bid-ask spreads and transaction prices are also eliminated. In addition, we eliminate all quotes for which the quoted spread is greater than 20% of the quote midpoint when the quote midpoint is greater than $10, or for which the quoted spread is greater than $2 when the quote midpoint is less than $10. We also eliminate all quotes for which either the ask or the bid moves by more than 50%. Since no reliable method can exclude auto-quotes in TAQ, only BBO (best bid or offer) eligible primary market (NYSE) quotes were used (Chordia, Roll, and Subrahmanyam 2001). Thus, we exclude all quotes with condition 5, 7, 8, 9, 11, 13, 14, 15, 16, 17, 19, 20, 27, 28, 29.

As discussed above, our paper consists of two parts. From now onwards, we will refer to the first part, examining the relation between ownership, the level of asymmetric information, and the extent of founder exit, as the "panel data part of the paper". We will refer to the second part, examining the timing and profitability of founders' trading, as the "event data part of the paper". For the event data part, we aggregate founders' sales at a daily level. We define the day of a sale as date 0 and define our pre-event and post-event windows, relative to that date. Our sample for the event data part consists of all events with non-overlapping event windows.

Table 2 provides summary statistics of the variables used in our empirical tests. In particular, Panel A of Table 2 reports summary statistics of variables we use for the panel data part of the paper. The average (median) family ownership in our sample is 22.7% (15.9%). The average (median) market capitalization of our sample firms is $321 ($95) million, while the average (median) idiosyncratic volatility of the firm's stock is 4.8% (4.5%). The average number of sales is 2.22 and the average percentage of shares sold is 0.5% of firm's outstanding shares.

In Panel B of Table 2 we report the summary statistics of the variables we use in the event data part of the paper. The average (median) of the equity stake of the family is 18.6% (12.0%).[13] The average (median) market capitalization of the firms is $908 ($324) million.

[13] The difference between these values and those reported above for the full sample seems to suggest a higher trading frequency for low family ownership firms. We will explore this observation in detail in the following sections.

5. Empirical tests and results

This section describes the methodology and reports the results of our empirical tests. In Section 5.1 we examine the relation between ownership and the extent of founders' exit. In Section 5.2 we report our findings about the relation between information asymmetry and ownership. Finally, the relation between the extent of founders' exit and the liquidity of the firm's stock are explored in Section 5.3.

5.1 The extent of founders' exit and ownership

We start our analysis by examining the relation between ownership and the extent of a founders' selling in the open market. We do so by estimating the following regression:

$$FEXIT_{it} = \beta_0 + \beta_1 FAMOWN_{it-1} + \beta_2 FAMOWNSQ_{it-1} + \beta_3 WEDGE_{it-1} + \beta_4 LMKT_{it-1} + \beta_5 RSD_{it-1} + \beta_k YEAR\_DUMMIES_{it-1} + \varepsilon_i \quad (1)$$

We measure the extent of founders' exit, FEXIT, in two ways. The first measure, %_SOLD, is the number of shares sold by the founder as a percentage of the shares outstanding. The second measure, LSELL, is the natural logarithm of one plus the number of sell transactions executed by each founder. The extent of founders' sales influences their ownership positions. Therefore, causality cannot be inferred if the two variables are contemporaneously measured. As a result, we have chosen to measure ownership at the time of the proxy statement and the extent of founders' exit over the *following* one- or two- year period (i.e., until the next proxy statement for which there is available ownership data). To allow for non-linearity in the relation between ownership and the extent of founders' exit, we use a quadratic specification. FAMOWN is the percentage of cash flow rights controlled by the founding family, as reported in the proxy

statement. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural logarithm of the market capitalization of the firm, measured on the day before the proxy statement filing date.[14] RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. We also control for a possible time trend in the market, by using year dummies.

In contrast to mature family firms, the founders' loyalty to the new public firm may not have been established yet, and therefore founders' exit can be a real possibility. A potential exit strategy for founders is to sell their shares in the open market. In our first hypothesis (H1), we conjecture that founders' choice to exit through trading would depend on the level of ownership. In particular, we expect the coefficient estimates of β_1 to be positive and the coefficient estimate of β_2 to be negative.

The results are reported in Table 3. We find that the coefficient estimate for β_1 is positive, while the coefficient estimate for β_2 is negative. Both coefficient estimates are statistically significant at the 1% level, in the full form as well as all reduced forms. Our results suggest that founders with low levels of ownership engage in more frequent sell transactions and sell a larger fraction of their holdings than do founders with high levels of ownership. This is consistent with the diversification effect dominating at low levels of ownership and loyalty effect dominating at high levels of ownership.

As a robustness test, we also estimate our models using a balanced subset of the data (a complete panel with no missing observations). The results, reported in columns 3

[14] In these and subsequent tests, we have also controlled for the differences between venture-backed and non-venture backed firms. The results, reported in Appendix B, suggest that there is no difference between the two subsamples. In addition, we also controlled for the differences between various degrees of founders' involvement in the management and governance of the firm (e.g., founder-CEO, founder-CEO-and-chairman, etc) and found no significant differences between them.

and 4 of Table 3, suggest that our initial results are robust to potential biases due to an unbalanced panel.

5.2 Information asymmetry and ownership

This section examines the relation between ownership and the level of information about the firm in the equity market. We do that by estimating the following regression:

$$INF\_ASYM_i = \beta_0 + \beta_1 FAMOWN_i + \beta_2 FAMOWNSQ_i + \beta_3 WEDGE_i + \beta_4 LMKT_i + \beta_5 INTANG_i + \beta_6 RDSALES_i + \beta_7 LEVER_i + \beta_K YEAR\_DUMMIES_i + \beta_L IND\_DUMMIES_i + \varepsilon_i \quad (2)$$

We measure information asymmetry between the firm and the market, INF_ASYM in two different ways. Dispersion in analysts' forecasts, DISP, is the ratio of the standard deviation of analysts' forecasts to the stock price on the day before the forecast report date. Forecast error, FORERR, is the ratio of the absolute difference between actual and the mean forecast of earnings to the stock price on the day before the forecast report date.[15] We use the analyst forecasts and their standard deviation as reported by IBES for the last month of the fiscal year preceding the proxy statement filing date.[16] Our first proxy for information asymmetry, DISP, measures the disagreement among analysts about the true value of the firm. Since this disagreement is likely to be due to the lack of available information about the firm, we expect that higher dispersion in analysts' forecasts will be associated with higher level of asymmetric information. Similarly, for

[15] These measures of asymmetric information have been used by, among others, Krishnaswami and Subramaniam (1999) and Thomas (2002). We also used the idiosyncratic volatility as an alternative measure of the level of asymmetric information about the firm in the equity market. The results are qualitatively similar to those obtained with the other measures.

[16] As shown by O'Brien (1988), analysts overestimate future earnings at the beginning of the fiscal year and systematically lower them until the end of the fiscal year. This implies that analysts' forecasts for the last month of the fiscal year are the most accurate. Thus, by using the forecasts as of the last month of the fiscal year preceding the proxy statement filing date, we are minimizing the impact of the analysts' "optimism bias".

the second measure of information asymmetry, FORERR, we expect that higher error in analysts' forecasts will be associated with firms with higher information asymmetry.

Following Thomas (2002) we use INTANG, RDSALES, and LEVER, as control variables. INTANG is the ratio of intangible assets (COMPUSTAT data item 33) to total assets (COMPUSTAT data item 6), measured at the end of the fiscal year preceding the proxy filing date. RDSALES is the ratio of R&D expense (COMPUSTAT data item 46) to sales (COMPUSTAT data item 12), measured at the end of the fiscal year preceding the proxy filing date. LEVER is the ratio of long term debt and debt in current liabilities to total assets, measured at the end of the fiscal year preceding the proxy filing date (a ratio of data item 9 plus data item 34 to the sum of data items 9, 34, and 60).[17] The first two variables control for the difficulties in forecasting associated with high growth companies, while the last one controls for higher volatility of earnings (which is usually associated with higher leverage). Finally, we also control for possible industry effect using industry dummies (as classified by Brav, 2000).

Hypothesis 2A suggests that founders with low (high) levels of ownership who, as reported above, have a greater (lower) extent of exit, will be more (less) likely to engage in investor relations. Therefore, the corresponding firms should have lower (higher) levels of asymmetric information. As a result, we expect a negative sign for the coefficient estimate of β_1 and a positive sign for the coefficient estimate of β_2.

The results are reported in Table 4. Consistent with our predictions, for both measures of information asymmetry, the coefficient estimates of β_1 are found to be negative, while the coefficient estimates of β_2 are positive. All four coefficient estimates

[17] For firms without R&D expense on Compustat, we set R&D equal to zero. For observations where leverage is greater than one, LEVER is set equal to one.

are statistically significant at the 1% level. The results suggest that, in order to facilitate their exit, founders with low ownership try to improve the market liquidity of their stock by engaging in additional information disclosure. As a result, their firms are associated with a lower level of information asymmetry (compared to firms with high levels of family ownership). In columns 3 and 4 of Table 4 we present results for the balanced panel subsample. The results remain qualitatively unchanged.

In light of the relation between the level of asymmetric information and ownership, we now control for the influence of the level of asymmetric information on the extent of founders' exit. The coefficient estimates of DISP and FORERR, reported in Panel A of Table 5 suggest that, consistent with the prediction with Hypothesis 2B, there is a significant negative relation between the level of asymmetric information about the firm in the equity market and the extent of founders' selling. We also use two-stage least squares (2SLS) methodology to re-estimate the relation between the extent of founders' selling and ownership, controlling for a potential endogeneity problems. The results are reported in Panel B of Table 5. The coefficient estimates of β_1 and β_2 remain qualitatively unchanged in this alternative specification.

5.3 Microstructure implications of founders' trading

The negative relation between the level of asymmetric information and the extent of founders' trading documented above, however, does not necessarily imply a lower bid-ask spread for firms with higher extent of founders' exit. In particular, trading is likely to influence both the adverse selection and inventory concerns of the market maker. In this

section we examine the influence of founders' trading and their ownership on the components of the bid-ask spread, and on the overall spread.

5.3.1 Components of bid-ask spread, ownership, and founders' sales

We explore the relation between the adverse selection and the inventory costs of trading and ownership by estimating the following two regressions:

$$ADV_i = \beta_0 + \beta_1 FAMOWN_i + \beta_2 FAMOWNSQ_i + \beta_3 WEDGE_i + \beta_4 LMKT_i + \beta_5 RSD_i + \beta_6 SADKA\_PV + \beta_7 LMKTMKR + \varepsilon_i \quad (3)$$

$$INVENT_i = \gamma_0 + \gamma_1 FAMOWN_i + \gamma_2 FAMOWNSQ_i + \gamma_3 WEDGE_i + \gamma_4 LMKT_i + \gamma_5 RSD_i + \gamma_6 SADKA\_TF_i + \gamma_7 LMKTMKR + \psi_i \quad (4)$$

ADV is the adverse selection component of the bid-ask spread, estimated using Lin, Sanger, and Booth (LSB, 1995) model over 45 trading days ending on the day before the proxy statement filing date. INVENT is the LSB inventory cost component of the bid-ask spread and is measured over 45 trading days ending on the day before the proxy filing date.[18] Both ADV and INVENT are estimated as a percentage of the effective spread.[19] We control for possible systematic adverse selection risk using the systematic permanent component of price impact, SADKA_PV, as computed by Sadka (2006) and the transitory component of price impact, SADKA_TF, to control for the systematic inventory risks in the market. Finally, we use LMKTMKR, the natural logarithm of one

[18] We have also used the Glosten and Harris (1988) model as an alternative measure of the adverse selection costs of trading. Our results are qualitatively unchanged in this alternative specification. For the sake of brevity, we only report the results corresponding to the Lin, Sanger, Booth (1995). Moreover, unlike Glosten and Harris (1988), LSB (1995) is a three-way decomposition, which allows us to separately estimate the inventory and the order processing cost components.

[19] Both dependent variables are winsorized at zero and one. These restrictions result in a loss of 23.3% of observations for the regressions with ADV as the dependent variable and 15.3% of observations for the regressions with INVENT as the dependent variable.

plus the number of market makers, as reported by CRSP for the month of the proxy statement filing, to control for the presence of multiple market makers.

As shown above, founders with low levels of ownership tend to reduce information asymmetry about their firm in the equity market, and therefore should be less able to time the market. As discussed in Section 3, if the founder is not timing the market, the adverse selection cost of trading in the firm's equity should be low and the corresponding inventory costs should be high (H3). Hence, we expect the coefficient estimates of β_1 to be negative and γ_1 to be positive. For founders with high levels of ownership (who face higher level of information asymmetry) we expect the coefficient estimates of β_2 to be positive and γ_2 to be negative.

We report the results from both equations in Table 6. For the adverse selection cost component of the bid-ask spread, we find that the coefficient estimate for β_1 is negative and the coefficient estimate for β_2 is positive (columns 1, 3, and 5). For the inventory cost component, the coefficient estimates are positive for γ_1 and negative for γ_2 (columns 2, 4, and 6). The coefficient estimates of β_1 and γ_1 are statistically significant at the 1% level, while the coefficient estimates of β_2 and γ_2 are statistically significant at the 10% level. In other words, founders with low (high) levels of ownership produce lower (higher) adverse selection cost and higher (lower) inventory cost for market makers. A possible explanation for these results is the market timing ability of founders. These results are consistent with the notion that founders with high (low) ownership are (are not) timing the market. The selling behavior of founders with low levels of ownership reduces the adverse selection cost of trading but increases the market maker's inventory

costs. Founders with high levels of ownership, on the other hand, exacerbate the adverse selection concerns of the market makers relative to their inventory concerns.

We use the stock price changes around the founder trading dates, to examine their ability to time the market. We do so by estimating the following regression equations:

$$TIMING_i = \beta_0 + \beta_1 FAMOWN_i + \beta_2 FAMOWNSQ_i + \beta_3 WEDGE_i + \beta_4 LMKT_i + \varepsilon_i \quad (5)$$

$$PROFIT_i = \gamma_0 + \gamma_1 FAMOWN_i + \gamma_2 FAMOWNSQ_i + \gamma_3 WEDGE_i + \gamma_4 LMKT_i + \psi_i \quad (6)$$

TIMING is measured as the difference between the trading price and the closing price on the 10^{th} trading day prior to the trade, divided by the closing price on the 10^{th} trading day prior to the trade. PROFIT is measured as the ratio of the difference of the closing price on the 10^{th} trading day after the trade and the price at the time of the trade to the price at the time of the trade. The first variable measures the pre-trade stock price performance, while the second one measures the post-trade stock price performance. FAMOWN, the percentage of cash flow rights controlled by the founding family, is collected from the proxy statement immediately preceding the insider trading date. LMKT, the natural logarithm of market capitalization of the firm, is measured on the day before the insider trading date.

If founders with high levels of ownership are indeed able to time the market, we expect the coefficient estimate of β_2 to be positive and γ_2 to be negative. For founders with low level of ownership, who, according to the previous findings, are less likely to time the market, we expect the coefficient estimate of β_1 to be lower than the coefficient estimate of β_2 and γ_1 to be non-negative.

The results are reported in Table 7. We find that the coefficient estimates of β_1 are negative and statistically significant at the 5% level and the coefficient estimates of β_2 are

positive, but insignificant. The coefficient estimate for γ_1 is positive, while the coefficient estimate for γ_2 is negative. Neither of the coefficient estimates is statistically significant. As expected, the results suggest that founders with low levels of ownership are not timing the market. Founders with high levels of ownership, on the other hand, appear to time their transactions. They tend to sell at a higher price, relative to founders with low levels of ownership and their sales are followed by price declines.

5.3.2 Liquidity, ownership, and founders' sales

As shown above, the inventory concerns of the market maker seem to, at least partly, offset the reduced adverse selection concerns stemming from the lower level of asymmetric information about the firm in the equity market. Therefore, the overall influence of founder ownership on the liquidity (as measured by the bid-ask spread), is an empirical matter, which we examine by estimating the following regression:

$$SPREAD_i = \beta_0 + \beta_1 FAMOWN_i + \beta_2 FAMOWNSQ_i + \beta_3 WEDGE_i + \beta_4 LMKT_i + \beta_5 RSD_i + \beta_6 \%\_SOLD_i + \beta_7 LSELL_i + \beta_k YEAR\_DUMMIES_i + \varepsilon_i \quad (7)$$

SPREAD, the quoted average bid-ask spread, is calculated over 45 trading days ending on the day before the proxy filing date.[20] If the adverse selection costs of trading dominate the market maker's inventory costs, we expect the coefficient estimate of β_1 to be negative and the coefficient estimate β_2 to be positive. If, on the other hand, the market maker's inventory costs dominate the adverse selection costs of trading, we

[20] The individual stock daily spread is constructed by averaging the spread for all transactions for the stock on any given trading day. We repeat our empirical tests with the effective spread, which is two times the difference between the trade execution price and the midquote scaled by the midquote, and find similar results (unreported).

expect the coefficient estimate of β_1 to be positive and the coefficient estimate β_2 to be negative.

The results are reported in Table 8. We find that the coefficient estimate of β_1 is positive and the coefficient estimate of β_2 is negative. All coefficient estimates are statistically significant at the 1% level. Thus, we find wider spreads for firms with low levels of ownership and narrower spreads for firms with high levels of ownership, indicating that the inventory costs of market makers seem to dominate their adverse selection costs.

Consistent with previous studies, the coefficient estimates of %_SELL and LSOLD, β_6 and β_7 respectively, are found to be positive and statistically significant at the 1% level. This suggests that firms with higher levels founders' selling have wider bid-ask spreads as compared to firms with lower levels of founders' selling. In columns 4 and 5 of Table 8 we report the results of the second stage results of the two-stage least squares (2SLS) regressions, which we use to control for endogeneity of the extent of founders' exit. Since the results remain qualitatively unchanged, we conclude that our findings are robust.

6. Conclusion

In this paper, using unique, hand-collected data on the evolution of ownership in the new public firms from IPO up to seven years after the IPO, we examine not only the determinants, but also the influence of the extent of founders' exit on both the firm's information environment and the liquidity of its stock. Our results suggest a concave relation between the extent of founders' exit and ownership. In other words, founders

with low levels of ownership tend to sell more than founders with high levels of ownership, indicating that the loyalty (diversification) effect dominates at high (low) level of ownership.

We also find that the extent of founders' exit influences both the firm's information environment and the liquidity of its stock. An examination of the relation between the extent of founders' exit and the level of asymmetric information about the firm in the equity market reveals that firms with low level of family ownership (i.e., those with the highest extent of founders' exit) have the lowest level of information asymmetry.

The influence of the lower levels of asymmetric information on the bid-ask spread, however, remains unclear. We find a convex (concave) relation between the adverse selection (inventory) costs of trading and family ownership. This implies that founders with high levels of ownership may be timing the market, while the founders with low levels of ownership are less likely to do so. Consistent with this, our examination of the founders' timing ability reveals a convex (concave) relation between the pre-trade (post-trade) performance and ownership. In other words, founders with low levels of ownership tend to sell after a (relatively) smaller price increase and their sales are followed by an increase in the stock price (potentially due to their exit). Founders with high levels of ownership, however, tend to sell after a (relatively) larger price increase and their sales are followed by a price decline.

Overall, our findings suggest that the inventory concerns seem to dominate the adverse selection issues over the entire range of ownership. Therefore these concerns are the main driving force behind the observed concave relation between the bid-ask spread and ownership.

Appendix A: Spread decomposition models

Lin, Sanger, and Booth (1995)

Lin, Sanger, and Booth (LSB, 1995) method is related to the approach described in Huang and Stoll (1997). LSB use a regression approach to estimate the proportion of the effective spread that can be attributed to information asymmetry. The basic idea is that the quote revision reflects the adverse selection component of the spread, while the change in the transaction price reflects the order processing costs and bid-ask bounce.

In the LSB model, information revealed by the trade at time t is reflected in the quote revisions. If P_t is the transaction price at time t, and Q_t is the quote midpoint at time t, then $B_t = B_{t-1} + \lambda S_{t-1}$ and $A_t = A_{t-1} + \lambda S_{t-1}$, where B_{t-1} and A_{t-1} are the prevailing bid and the ask prices at time t. λ can be interpreted as the proportion of the effective spread due to adverse selection. $S_{t-1} = P_{t-1} - Q_{t-1}$ is one-half of the effective spread. The revision in the quote mid point is expressed as

$$\Delta Q_t = \lambda S_{t-1} + \varepsilon_t \qquad \text{(A. 1)}$$

$$S_t = \theta S_{t-1} + \eta_t \qquad \text{(A. 2)}$$

where $\Delta Q_t = Q_t - Q_{t-1}$ and $Q_t = \frac{(B_t + A_t)}{2}$. θ represents the order processing cost component of the spread, and $(1-\lambda-\theta)$ represents the inventory component of the bid-ask spread.

Glosten and Harris (1988)

In the Glosten and Harris (1988) model, the adverse-selection, the inventory-holding, and order-processing components, are expressed as a linear function of transaction volume. The model is described as follows:

$$\Delta P_t = c_0 \Delta I_t + c_1 \Delta I_t V_t + z_0 I_t + z_1 I_t V_t + \varepsilon_t \qquad \text{(A. 3)}$$

In this case, I_t is a trade indicator that equals 1 if the transaction is buyer-initiated, and -1 if it is seller-initiated; P_t is the transaction price at time t; V_t is the volume traded at time t; and ε_t captures public information innovations and errors. In this model, the adverse-selection component is $2(z_0 + z_1 V_t)$, and other components (inventory-holding and order-processing components) are measured as $2(c_0 + c_1 V_t)$. We use the average transaction volume for the stock to obtain an estimate of the adverse-selection component as a percentage of the bid-ask spread:

$$\lambda = \frac{2(z_0 + z_1 V)}{2(c_0 + c_1 V) + 2(z_0 + z_1 V)} \times 100 \qquad \text{(A. 4)}$$

Appendix B: Additional robustness tests

Table B1 Founder trading and ownership
The dependent variables are %_SOLD, shares sold by the founder as a percentage of shares outstanding, and LSELL, the natural logarithm of one plus the number of sell transactions. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. The results reported in columns 1 and 2 are for the full data sample. The results reported in columns 3 and 4 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	%_SOLD Full	LSELL Full	%_SOLD Balanced	LSELL Balanced
FAMOWN	0.036	1.583	0.043	1.672
	(6.66)***	(4.87)***	(5.55)***	(3.67)***
FAMOWNSQ	-0.041	-2.080	-0.055	-2.572
	(5.83)***	(5.11)***	(5.23)***	(4.40)***
FAMOWN_VC	0.016	-0.189	0.023	0.139
	(1.55)	(0.28)	(1.72)*	(0.14)
FAMOWNSQ_VC	-0.025	-1.053	-0.045	-1.644
	(1.09)	(0.76)	(1.40)	(0.72)
WEDGE	-0.011	-0.845	-0.014	-1.022
	(3.18)***	(4.43)***	(3.43)***	(4.53)***
WEDGE_VC	-0.012	-0.058	-0.013	-0.052
	(2.58)***	(0.08)	(2.42)**	(0.06)
VC	-0.001	0.178	-0.002	0.136
	(0.93)	(2.57)**	(1.81)*	(1.45)
LMKT	0.001	0.170	0.002	0.184
	(6.27)***	(12.40)***	(5.51)***	(10.46)***
RSD	-0.020	-2.301	-0.014	-2.730
	(2.03)**	(3.22)***	(1.12)	(3.48)***
Intercept	-0.012	-1.033	-0.015	-1.102
	(3.89)***	(4.74)***	(3.83)***	(4.24)***
N	2842	2906	1655	1703
Adj R-sq	0.05	0.10	0.07	0.12

Table B2 Information asymmetry and ownership

The dependent variable reported in columns 1 and 3, DISP is the ratio of the standard deviation of analysts' forecasts to the stock price the day before the forecast report date. The dependent variable reported in columns 2 and 4, FORERR is the ratio of the absolute difference between actual earnings and mean forecast to the stock price the day before the forecast report date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. INTANG is the ratio of intangible assets to total assets, measured at the end of the fiscal year preceding the proxy filing date. RDSALES is the ratio of R&D expense to sales, measured at the end of the fiscal year preceding the proxy filing date. LEVER is the ratio of long term debt and debt in current liabilities to total assets, measured at the end of the fiscal year preceding the proxy filing date. The results reported in columns 1 and 2 are for the full data sample. The results reported in columns 3 and 4 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	DISP	FORERR	DISP	FORERR
	Full	Full	Balanced	Balanced
FAMOWN	-0.003	-0.019	-0.009	-0.014
	(1.22)	(1.91)*	(2.47)**	(1.23)
FAMOWNSQ	0.006	0.023	0.015	0.022
	(1.52)	(1.92)*	(2.68)***	(1.47)
FAMOWN_VC	-0.005	0.024	0.005	0.006
	(1.02)	(1.40)	(0.74)	(0.27)
FAMOWNSQ_VC	0.003	-0.037	-0.016	-0.011
	(0.39)	(1.14)	(1.18)	(0.23)
WEDGE	0.003	0.004	0.004	0.006
	(1.24)	(0.71)	(1.65)*	(0.93)
WEDGE_VC	0.006	0.005	0.007	-0.001
	(0.99)	(0.56)	(1.04)	(0.10)
VC	0.000	-0.003	-0.001	-0.000
	(0.57)	(1.33)	(1.12)	(0.07)
LMKT	-0.001	-0.004	-0.001	-0.004
	(8.30)***	(11.10)***	(6.78)***	(8.47)***
INTANG	-0.000	0.002	-0.001	0.002
	(0.04)	(0.57)	(1.07)	(0.60)
RDSALES	0.000	0.001	0.000	0.001
	(3.39)***	(2.66)***	(2.61)***	(2.33)**
LEVER	0.002	0.009	0.002	0.009
	(4.21)***	(5.93)***	(3.00)***	(3.71)***
Intercept	0.013	0.048	0.014	0.046
	(8.28)***	(7.67)***	(6.87)***	(6.11)***
N	1436	1718	862	1023
Adj R-sq	0.16	0.23	0.19	0.20

Table B3 Founder trading, asymmetric information, and ownership

The dependent variables are %_SOLD, shares sold by the founder as a percentage of shares outstanding, and LSELL, the natural logarithm of one plus the number of sell transactions. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC.LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. DISP is the ratio of the standard deviation of analysts' forecasts to the stock price the day before the forecast report date. FORERR is the ratio of the absolute difference between actual earnings and mean forecast to the stock price the day before the forecast report date. The results reported in columns 1 to 4 are for the full data sample. The results reported in columns 5 and 8 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: OLS results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	%_SOLD Full	%_SOLD Full	LSELL Full	LSELL Full	%_SOLD Balanced	%_SOLD Balanced	LSELL Balanced	LSELL Balanced
FAMOWN	0.043	0.040	1.856	1.890	0.054	0.048	1.818	1.811
	(5.07)***	(5.26)***	(3.65)***	(4.17)***	(4.71)***	(4.73)***	(2.72)***	(3.03)***
FAMOWNSQ	-0.051	-0.045	-2.599	-2.530	-0.068	-0.058	-3.007	-2.726
	(4.55)***	(4.54)***	(4.15)***	(4.53)***	(4.36)***	(4.20)***	(3.58)***	(3.64)***
FAMOWN_VC	0.009	0.015	-0.340	-0.127	0.012	0.016	0.202	0.269
	(0.62)	(1.11)	(0.37)	(0.15)	(0.55)	(0.77)	(0.15)	(0.22)
FAMOWNSQ_VC	-0.012	-0.019	-1.090	-1.336	-0.012	-0.013	-1.935	-2.021
	(0.34)	(0.56)	(0.61)	(0.79)	(0.20)	(0.22)	(0.65)	(0.71)
WEDGE	-0.019	-0.018	-1.114	-1.089	-0.021	-0.020	-1.264	-1.229
	(4.80)**	(4.71)***	(4.22)***	(4.38)***	(4.92)***	(4.88)***	(4.40)***	(4.56)***
WEDGE_VC	-0.004	-0.006	-0.033	0.233	-0.007	-0.009	-0.153	0.182
	(0.65)	(1.11)	(0.04)	(0.30)	(1.10)	(1.52)	(0.15)	(0.19)
VC	-0.000	-0.001	0.222	0.189	-0.000	-0.001	0.196	0.155
	(0.29)	(0.66)	(2.18)**	(2.04)**	(0.25)	(0.75)	(1.46)	(1.27)
LMKT	0.001	0.001	0.159	0.148	0.001	0.001	0.184	0.171
	(2.82)***	(3.45)***	(7.42)***	(7.51)***	(3.29)***	(3.43)***	(6.98)***	(7.13)***
RSD	-0.045	-0.023	-3.636	-2.367	-0.049	-0.039	-4.795	-3.650
	(1.82)*	(0.97)	(2.08)**	(1.47)	(1.33)	(1.20)	(1.92)*	(1.70)*
DISP	-0.061		-2.578		-0.071		-1.373	
	(3.04)***		(1.51)		(2.08)**		(0.51)	
FORERR		-0.026		-2.454		-0.024		-1.986
		(1.25)		(2.18)**		(0.77)		(1.30)
Intercept	-0.006	-0.009	-0.748	-0.666	-0.014	-0.014	-0.998	-0.873
	(1.30)	(2.12)**	(2.09)***	(2.10)**	(2.15)**	(2.38)**	(2.33)**	(2.32)**
N	1723	1982	1760	2031	1038	1188	1067	1229
Adj R-sq	0.06	0.05	0.07	0.07	0.08	0.08	0.08	0.08

Panel B: 2SLS results

	(1)	(2)	(3)	(4)
	% SOLD	% SOLD	LSELL	LSELL
FAMOWN	0.039	0.032	1.320	1.294
	(3.83)***	(3.45)***	(1.92)*	(2.15)**
FAMOWNSQ	-0.050	-0.038	-1.991	-1.817
	(3.72)***	(3.11)***	(2.32)**	(2.40)**
FAMOWN_VC	0.003	0.026	-0.246	1.210
	(0.16)	(1.62)	(0.20)	(1.09)
FAMOWNSQ_VC	0.006	-0.032	-1.153	-3.813
	(0.16)	(0.82)	(0.49)	(1.76)*
WEDGE	-0.014	-0.012	-0.870	-0.811
	(3.04)***	(2.56)**	(2.46)**	(2.22)**
WEDGE_VC	0.000	-0.003	0.350	0.566
	(0.04)	(0.38)	(0.30)	(0.55)
VC	-0.001	-0.002	0.145	0.073
	(0.55)	(1.49)	(1.07)	(0.62)
LMKT	-0.000	-0.000	0.037	0.020
	(0.77)	(0.69)	(0.75)	(0.46)
RSD	0.097	0.100	8.574	7.475
	(1.54)	(1.96)*	(1.67)*	(2.02)**
DISP	-0.683		-58.613	
	(2.76)***		(2.99)***	
FORERR		-0.367		-32.294
		(2.89)***		(3.67)***
Intercept	0.008	0.008	0.651	0.942
	(1.04)	(1.00)	(1.03)	(1.59)
N	1464	1674	1496	1718

Table B4 Bid-ask spread decomposition and ownership

The dependent variable reported in columns 1 and 2, ADV is the adverse selection component of the bid-ask spread, estimated using Lin, Sanger, and Booth (1995) model over 45 trading days ending on the day before the proxy filing date. The dependent variable reported in columns 3 and 4, INVENTORY is the LSB inventory cost component of the bid-ask spread and is measured over 45 trading days ending on the day before the proxy filing date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC.LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. SADKA_PV is a variable measuring the unexpected systematic (market-wide) variations of the permanent-variable component (the adverse selection component of the bid-ask spread) of price impact. SADKA_TF is a variable measuring the unexpected systematic (market-wide) variations of the transitory-fixed component (the inventory cost component of the bid-ask spread) of price impact. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(3)	(2)	(4)	(5)	(6)
	ADV	INVENT	ADV	INVENT	ADV	INVENT
FAMOWN	-0.074	0.173	-0.065	0.116	-0.067	0.116
	(1.96)**	(1.68)*	(1.76)*	(1.13)	(1.79)*	(1.13)
FAMOWNSQ	0.033	-0.058	0.028	-0.005	0.030	-0.005
	(0.72)	(0.44)	(0.62)	(0.04)	(0.65)	(0.04)
FAMOWN_VC	-0.126	0.534	-0.129	0.519	-0.127	0.519
	(1.91)*	(3.03)***	(1.96)*	(2.96)***	(1.93)*	(2.95)***
FAMOWNSQ_VC	0.199	-0.841	0.194	-0.744	0.192	-0.744
	(1.64)	(2.47)**	(1.62)	(2.18)**	(1.61)	(2.17)**
WEDGE	0.041	-0.140	0.044	-0.155	0.045	-0.155
	(1.36)	(1.68)*	(1.48)	(2.00)**	(1.54)	(1.99)**
WEDGE_VC	-0.013	-0.139	-0.007	-0.138	-0.005	-0.138
	(0.30)	(0.84)	(0.16)	(0.88)	(0.11)	(0.88)
VC	-0.004	-0.018	-0.002	-0.014	-0.002	-0.014
	(0.47)	(0.93)	(0.21)	(0.72)	(0.23)	(0.72)
LMKT			-0.001	-0.020	-0.001	-0.020
			(0.71)	(5.61)***	(0.76)	(5.61)***
RSD			0.329	-1.696	0.320	-1.697
			(3.51)***	(8.08)***	(3.40)***	(8.07)***
SADKA_PV					-1.345	
					(2.30)**	
SADKA_TF						0.459
						(0.15)
Intercept	0.094	0.488	0.088	0.807	0.089	0.807
	(15.18)***	(30.55)***	(4.10)***	(16.36)***	(4.12)***	(16.36)***
N	2141	2297	2141	2297	2141	2297
Adj R-sq	0.02	0.03	0.02	0.05	0.03	0.05

Table B5 Timing of founders' trades

The reported results are for sell transactions. The dependent variable reported in columns 1 and 2, TIMING, is measured as the difference between the price at the time of the trade and the closing price on the 10^{th} trading day prior to the trade, divided by the closing price on the 10^{th} trading day prior to the trade. The dependent variable reported in columns 3 and 4, PROFIT, is measured as the difference between the closing price on the 10^{th} trading day after the trade and the price at the time of the trade, divided by the price at the time of the trade. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected from the proxy statement immediately preceding the insider trading date. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC.LMKT is the natural log of market capitalization, measured on the day before the insider trading date. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	TIMING	TIMING	PROFIT	PROFIT
FAMOWN	0.004	0.009	0.020	0.019
	(0.04)	(0.08)	(0.20)	(0.19)
FAMOWNSQ	-0.054	-0.067	-0.050	-0.045
	(0.33)	(0.42)	(0.40)	(0.36)
FAMOWN_VC	-0.451	-0.455	0.328	0.330
	(1.90)*	(1.93)*	(1.55)	(1.56)
FAMOWNSQ_VC	0.769	0.800	-0.870	-0.892
	(1.41)	(1.49)	(1.58)	(1.62)
WEDGE	0.023	-0.020	0.048	0.062
	(0.42)	(0.36)	(1.04)	(1.34)
WEDGE_VC	0.242	0.301	-0.170	-0.190
	(0.79)	(0.96)	(1.76)*	(1.95)*
VC	0.053	0.046	-0.021	-0.017
	(2.31)**	(1.97)**	(0.99)	(0.84)
LMKT		0.012		-0.004
		(3.06)***		(1.17)
Intercept	0.029	-0.118	0.001	0.050
	(1.59)	(2.33)**	(0.06)	(1.09)
N	1268	1268	1313	1310
Adj R-sq	0.01	0.02	-0.00	-0.00

Table B6 Bid-ask spread and ownership

The dependent variable SPREAD is the quoted mean bid-ask spread calculated over 45 trading days ending on the day before the proxy filing date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. VC is a dummy variable that takes on a value of one if the firm receives venture capital funding, and zero otherwise. FAMOWN_VC is the interaction between FAMOWN and VC. FAMOWNSQ_VC is the interaction between FAMOWNSQ and VC. WEDGE is the difference between voting rights and cash flow rights controlled by the family. WEDGE_VC is the interaction between WEDGE and VC.LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. %_SOLD is shares sold by the founder as a percentage of shares outstanding. LSELL is the natural logarithm of one plus the number of sell transactions. The results of the second stage estimation of the Heckman selection model are reported in columns 4 and 5. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	SPREAD OLS	SPREAD OLS	SPREAD OLS	SPREAD 2SLS	SPREAD 2SLS
FAMOWN	0.210	0.200	0.167	0.132	0.122
	(3.32)***	(3.14)***	(2.59)***	(1.61)	(1.49)
FAMOWNSQ	-0.225	-0.212	-0.176	-0.194	-0.185
	(2.82)***	(2.63)***	(2.17)**	(1.92)*	(1.83)*
FAMOWN_VC	-0.021	-0.024	0.003	-0.017	-0.012
	(0.16)	(0.19)	(0.03)	(0.11)	(0.07)
FAMOWNSQ_VC	-0.026	-0.008	-0.046	0.259	0.273
	(0.09)	(0.03)	(0.17)	(0.71)	(0.75)
WEDGE	-0.058	-0.054	-0.058	-0.101	-0.098
	(1.33)	(1.23)	(1.34)	(1.86)*	(1.78)*
WEDGE_VC	-0.003	-0.001	0.006	0.021	0.015
	(0.04)	(0.01)	(0.08)	(0.24)	(0.18)
VC	0.003	0.001	-0.001	-0.018	-0.020
	(0.21)	(0.11)	(0.06)	(1.12)	(1.31)
LMKT	0.009	0.008	0.009	0.004	0.004
	(3.73)***	(3.17)***	(3.64)***	(1.11)	(1.10)
RSD	-0.809	-0.796	-0.801	-1.509	-1.500
	(5.08)***	(4.97)***	(4.97)***	(6.35)***	(6.28)***
%_SOLD			0.553	0.688	
			(2.78)***	(3.02)***	
LSELL		0.008			0.012
		(2.45)**			(3.17)***
Intercept	-0.023	-0.015	-0.020	0.065	0.069
	(0.63)	(0.42)	(0.54)	(1.30)	(1.38)
N	2714	2714	2653	1682	1682
Adj R-sq	0.37	0.37	0.38	0.40	0.40

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Table 1 Sample distribution

Panel A. The number of family firms by proxy statement

Proxy statement #	*IPO*	*1*	*3*	*5*	*7*
Number of firms	777	769	638	459	353

Panel B. The number of post - IPO insider trades between consecutive proxy statements

Proxy statement #	*IPO - 1*	*1 - 3*	*3 - 5*	*5 - 7*
Number of founder sales	225	957	161	13

Table 2 Summary statistics

Panel A provides summary statistics of dependent and independent variables for the panel data part of the study, while Panel B summarizes dependent and independent variables for the event data part. FAMOWN is the percentage of cash flow rights controlled by the founding family. In Panel A family ownership is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. In Panel B FAMOWN is collected from the proxy statement immediately preceding the insider trading date. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. MKT is the market capitalization, measured on the day before the proxy filing date (in Panel A) and on the day before the transaction date (in Panel B). %_SOLD is shares sold by the founder as a percentage of shares outstanding. LSELL is the natural logarithm of one plus the number of sell transactions. DISP is the ratio of the standard deviation of analysts' forecasts to the stock price the day before the forecast report date. FORERR is the ratio of the absolute difference between actual earnings and the median forecast to the stock price the day before the forecast report date. INTANG is the ratio of intangible assets to total assets, measured at the end of the fiscal year preceding the proxy filing date. RDSALES is the ratio of R&D expense to sales, measured at the end of the fiscal year preceding the proxy filing date. LEVER is the ratio of long term debt and debt in current liabilities to total assets, measured at the end of the fiscal year preceding the proxy filing date. ADV is the adverse selection component of the bid-ask spread, estimated using Lin, Sanger, and Booth (1995) model over 45 trading days ending on the day before the proxy filing date. INVENTORY is the LSB inventory cost component of the bid-ask spread and is measured over 45 trading days ending on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. SADKA_PV is a variable measuring the unexpected systematic (market-wide) variations of the permanent-variable component (the adverse selection component of the bid-ask spread) of price impact. SADKA_TF is a variable measuring the unexpected systematic (market-wide) variations of the transitory-fixed component (the inventory cost component of the bid-ask spread) of price impact. SPREAD is the quoted mean bid-ask spread calculated over 45 trading days ending on the day before the proxy filing date. TIMING, the pre-trade stock price performance, is measured as the difference between the price at the time of the trade and the closing price on the 10th trading day prior to the trade, divided by the closing price on the 10th trading day prior to the trade. PROFIT, the post-trade stock price performance, is measured as the difference between the closing price on the 10th trading day after the trade and the price at the time of the trade, divided by the price at the time of the trade.

Panel A. Summary statistics of dependent and independent variables for the panel data part

	Min	Mean	Median	Max	SD	N
FAMOWN	0.000	0.227	0.159	0.928	0.208	2961
FAMOWNSQ	0.000	0.095	0.025	0.861	0.145	2961
WEDGE	-0.223	0.012	0.000	0.802	0.071	2961
MKT	1,208	320,891	95,389	68,000,000	1,487,416	3118
%_SOLD	0.000	0.005	0.000	0.095	0.013	3821
LSELL	0.000	0.606	0.000	5.690	0.881	3885
DISP	0.000	0.003	0.001	0.029	0.005	1717
FORERR	0.000	0.011	0.003	0.113	0.018	2066
INTANG	0.000	0.063	0.000	0.865	0.135	2607
RDSALES	0.000	0.357	0.006	18.812	1.453	2522
LEVER	0.000	0.535	0.523	1.000	0.426	3885
ADV	0.001	0.076	0.055	0.993	0.083	2173
INVENTORY	0.004	0.526	0.53	0.99	0.212	2331
RSD	0.003	0.048	0.045	0.095	0.016	3172
SADKA_PV	-0.014	0.000	0.000	0.010	0.003	2996
SADKA_TF	-0.003	0.000	0.000	0.012	0.001	2996
SPREAD	0.000	0.311	0.280	1.670	0.224	2747

Panel B. Summary statistics of dependent and independent variables for the event data part

	Min	Mean	Median	Max	SD	N
FAMOWN	0.000	0.186	0.120	0.870	0.181	1268
FAMOWNSQ	0.000	0.067	0.014	0.757	0.117	1268
WEDGE	-0.142	0.009	0.000	0.553	0.062	1268
MKT	3,754	908,219	324,624	47,400,000	2,370,264	1306
TIMING	-0.663	0.040	0.028	0.959	0.168	1306
PROFIT	-0.668	-0.001	-0.005	0.927	0.148	1352

Table 3 Founder trading and ownership

The dependent variables are %_SOLD, shares sold by the founder as a percentage of shares outstanding, and LSELL, the natural logarithm of one plus the number of sell transactions. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. All regressions include year dummies to control for a possible time trend in the market. The results reported in columns 1 and 2 are for the full data sample. The results reported in columns 3 and 4 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	%_SOLD Full	LSELL Full	%_SOLD Balanced	LSELL Balanced
FAMOWN	0.039	0.999	0.049	1.219
	(9.18)***	(3.88)***	(7.82)***	(3.47)***
FAMOWNSQ	-0.046	-1.552	-0.063	-2.178
	(7.61)***	(4.44)***	(6.91)***	(4.48)***
WEDGE	-0.013	-0.874	-0.016	-1.048
	(4.50)***	(4.43)***	(4.67)***	(4.49)***
LMKT	0.001	0.177	0.001	0.188
	(6.68)***	(13.16)***	(5.50)***	(10.86)***
RSD	-0.019	-2.351	-0.013	-2.783
	(1.91)*	(3.33)***	(1.01)	(3.60)***
Year dummies	yes	yes	yes	yes
Intercept	-0.012	-0.963	-0.016	-1.031
	(4.23)***	(4.48)***	(4.03)***	(4.01)***
N	2842	2906	1655	1703
Adj R-sq	0.05	0.10	0.07	0.11

Table 4 Information asymmetry and ownership

The dependent variable reported in columns 1 and 3, DISP is the ratio of the standard deviation of analysts' forecasts to the stock price the day before the forecast report date. The dependent variable reported in columns 2 and 4, FORERR is the ratio of the absolute difference between actual earnings and mean forecast to the stock price the day before the forecast report date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. INTANG is the ratio of intangible assets to total assets, measured at the end of the fiscal year preceding the proxy filing date. RDSALES is the ratio of R&D expense to sales, measured at the end of the fiscal year preceding the proxy filing date. LEVER is the ratio of long term debt and debt in current liabilities to total assets, measured at the end of the fiscal year preceding the proxy filing date. All regressions include year dummies to control for possible time trend in the market. Regressions 5 and 6 include industry dummies, based on Brav (2000). The results reported in columns 1 and 2 are for the full data sample. The results reported in columns 3 to 6 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DISP Full	FORERR Full	DISP Balanced	FORERR Balanced	DISP Balanced	FORERR Balanced
FAMOWN	-0.007	-0.017	-0.010	-0.024	-0.008	-0.020
	(3.19)***	(2.68)***	(3.66)***	(2.87)***	(2.97)***	(2.29)**
FAMOWNSQ	0.009	0.020	0.016	0.034	0.014	0.028
	(2.91)***	(2.10)**	(3.47)***	(2.63)***	(3.01)***	(2.20)**
WEDGE	0.003	0.002	0.004	0.004	0.004	0.004
	(1.48)	(0.38)	(1.77)*	(0.55)	(1.80)*	(0.57)
LMKT	-0.001	-0.005	-0.001	-0.005	-0.001	-0.005
	(9.73)***	(13.68)***	(7.93)***	(10.01)***	(7.95)***	(10.22)***
INTANG	-0.000	0.001	-0.000	0.003	-0.001	0.004
	(0.24)	(0.29)	(0.39)	(0.76)	(0.43)	(1.02)
RDSALES	0.000	0.001	0.000	0.001	0.000	0.000
	(3.69)***	(3.11)***	(2.83)***	(2.82)***	(1.99)**	(1.65)*
LEVER	0.002	0.009	0.002	0.008	0.002	0.008
	(4.06)***	(5.78)***	(2.74)***	(3.48)***	(2.79)***	(3.37)***
Year dummies	yes	yes	yes	yes	yes	yes
Industry dummies					yes	yes
Intercept	0.019	0.077	0.019	0.069	0.019	0.068
	(11.77)***	(13.36)***	(9.75)***	(10.06)***	(9.49)***	(9.86)***
N	1436	1718	862	1023	862	1023
Adj R-sq	0.13	0.17	0.16	0.16	0.18	0.18

Table 5 Founder trading, asymmetric information, and ownership

The dependent variables are %_SOLD, shares sold by the founder as a percentage of shares outstanding, and LSELL, the natural logarithm of one plus the number of sell transactions. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. DISP is the ratio of the standard deviation of analysts' forecasts to the stock price the day before the forecast report date. FORERR is the ratio of the absolute difference between actual earnings and mean forecast to the stock price the day before the forecast report date. All regressions include year dummies to control for possible time trend in the market. The results reported in columns 1 to 4 are for the full data sample. The results reported in columns 5 to 8 are for the balanced data sample. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: OLS results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	%_SOLD Full	%_SOLD Full	LSELL Full	LSELL Full	%_SOLD Balanced	%_SOLD Balanced	LSELL Balanced	LSELL Balanced
FAMOWN	0.047	0.045	1.055	1.243	0.059	0.055	1.277	1.399
	(7.59)***	(8.01)***	(2.98)***	(3.80)***	(6.58)***	(6.86)***	(2.71)***	(3.26)***
FAMOWNSQ	-0.056	-0.052	-1.852	-1.950	-0.075	-0.067	-2.592	-2.416
	(6.26)***	(6.48)***	(3.79)***	(4.37)***	(5.76)***	(5.75)***	(3.92)***	(4.03)***
WEDGE	-0.019	-0.019	-1.044	-0.998	-0.022	-0.021	-1.225	-1.150
	(6.02)***	(6.22)***	(3.96)***	(3.96)***	(6.19)***	(6.29)***	(4.17)***	(4.12)***
LMKT	0.001	0.001	0.171	0.158	0.001	0.002	0.194	0.183
	(3.44)***	(3.95)***	(8.20)***	(8.23)***	(3.61)***	(3.81)***	(7.42)***	(7.85)***
DISP	-0.076		-3.887		-0.092		-3.233	
	(4.22)***		(2.33)**		(3.12)***		(1.23)	
FORERR		-0.030		-3.030		-0.032		-2.724
		(1.55)		(2.86)***		(1.08)		(1.91)*
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes
Intercept	-0.010	-0.012	-0.859	-0.722	-0.017	-0.018	-1.151	-1.040
	(2.39)**	(3.00)***	(2.67)***	(2.50)**	(2.96)***	(3.23)***	(2.97)***	(3.09)***
N	1723	1982	1760	2031	1038	1188	1067	1229
Adj R-sq	0.06	0.05	0.07	0.07	0.08	0.08	0.08	0.08

Panel B: 2SLS results

	(1)	(2)	(3)	(4)
	% SOLD	% SOLD	LSELL	LSELL
FAMOWN	0.043	0.040	0.645	0.883
	(5.73)***	(5.96)***	(1.34)	(2.08)**
FAMOWNSQ	-0.054	-0.049	-1.397	-1.589
	(5.06)***	(5.09)***	(2.08)**	(2.72)***
WEDGE	-0.016	-0.014	-0.960	-0.774
	(4.37)***	(3.59)***	(2.79)***	(2.20)**
LMKT	-0.001	-0.001	0.035	0.013
	(0.93)	(0.90)	(0.62)	(0.26)
DISP	-0.617		-48.506	
	(2.87)***		(2.86)***	
FORERR		-0.340		-28.610
		(2.89)***		(3.49)***
Year dummies	yes	yes	yes	yes
Intercept	0.014	0.013	1.100	1.381
	(1.33)	(1.31)	(1.36)	(1.88)*
N	1464	1674	1496	1718

Table 6 Bid-ask spread decomposition and ownership

The dependent variable reported in columns 1 and 2, ADV is the adverse selection component of the bid-ask spread, estimated using Lin, Sanger, and Booth (1995) model over 45 trading days ending on the day before the proxy filing date. The dependent variable reported in columns 3 and 4, INVENTORY is the LSB inventory cost component of the bid-ask spread and is measured over 45 trading days ending on the day before the proxy filing date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. SADKA_PV is a variable measuring the unexpected systematic (market-wide) variations of the permanent-variable component (the adverse selection component of the bid-ask spread) of price impact. SADKA_TF is a variable measuring the unexpected systematic (market-wide) variations of the transitory-fixed component (the inventory cost component of the bid-ask spread) of price impact. LMKTMKR is the natural logarithm of one plus the number of market makers, as reported by CRSP for the month of the proxy statement filing. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ADV	INVENT	ADV	INVENT	ADV	INVENT	ADV	INVENT
FAMOWN	-0.084	0.289	-0.083	0.235	-0.083	0.235	-0.054	0.123
	(3.07)***	(4.09)***	(3.05)***	(3.33)***	(3.07)***	(3.33)***	(1.90)*	(1.70)*
FAMOWNSQ	0.063	-0.231	0.066	-0.186	0.066	-0.186	0.036	-0.067
	(1.71)*	(2.24)**	(1.79)*	(1.81)*	(1.80)*	(1.81)*	(0.92)	(0.63)
WEDGE	0.040	-0.176	0.044	-0.193	0.046	-0.193	0.021	-0.139
	(1.64)	(2.42)**	(1.83)*	(2.82)***	(1.93)*	(2.82)***	(0.76)	(2.14)**
LMKT			-0.002	-0.018	-0.002	-0.018	-0.009	0.008
			(1.19)	(5.08)***	(1.24)	(5.08)***	(5.29)***	(1.83)*
RSD			0.325	-1.671	0.316	-1.673	0.094	-0.816
			(3.51)***	(8.18)***	(3.40)***	(8.17)***	(1.00)	(3.84)***
SADKA_PV					-1.372		-1.036	
					(2.33)**		(1.67)*	
SADKA_TF						0.595		2.430
						(0.19)		(0.75)
LMKTMKR							0.033	-0.121
							(8.42)***	(11.51)***
Intercept	0.087	0.488	0.092	0.784	0.093	0.784	0.102	0.760
	(24.03)***	(57.92)***	(4.34)***	(16.45)***	(4.37)***	(16.45)***	(4.58)***	(15.98)***
N	2141	2297	2141	2297	2141	2297	1963	2104
Adj R-sq	0.01	0.02	0.02	0.04	0.02	0.04	0.05	0.11

Table 7 Timing of founders' trades

The reported results are for sell transactions. The dependent variable reported in columns 1 and 2, TIMING, is measured as the difference between the price at the time of the trade and the closing price on the 10^{th} trading day prior to the trade, divided by the closing price on the 10^{th} trading day prior to the trade. The dependent variable reported in columns 3 and 4, PROFIT, is measured as the difference between the closing price on the 10^{th} trading day after the trade and the price at the time of the trade, divided by the price at the time of the trade. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected from the proxy statement immediately preceding the insider trading date. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the insider trading date. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	TIMING	TIMING	PROFIT	PROFIT
FAMOWN	-0.209	-0.179	0.083	0.071
	(2.50)**	(2.18)**	(1.22)	(1.07)
FAMOWNSQ	0.189	0.155	-0.131	-0.118
	(1.52)	(1.27)	(1.37)	(1.25)
WEDGE	0.078	0.044	0.012	0.023
	(1.11)	(0.60)	(0.30)	(0.53)
LMKT		0.012		-0.004
		(3.04)***		(1.07)
Intercept	0.066	-0.088	-0.007	0.040
	(6.95)***	(1.73)*	(0.90)	(0.91)
N	1268	1268	1313	1310
Adj R-sq	0.01	0.02	-0.00	-0.00

Table 8 Bid-ask spread and ownership

The dependent variable SPREAD is the quoted mean bid-ask spread calculated over 45 trading days ending on the day before the proxy filing date. FAMOWN is the percentage of cash flow rights controlled by the founding family and is collected for the time of IPO as well as the 1st, 3rd, 5th, and 7th year after going public. FAMOWNSQ is family ownership squared. WEDGE is the difference between voting rights and cash flow rights controlled by the family. LMKT is the natural log of market capitalization, measured on the day before the proxy filing date. RSD is the standard deviation of the market model residual, calculated over 250 trading days ending on the day before the proxy filing date. %_SOLD is shares sold by the founder as a percentage of shares outstanding. LSELL is the natural logarithm of one plus the number of sell transactions. All regressions include year dummies to control for possible time trend in the market. The results of the second stage estimation of the Heckman selection model are reported in columns 4 and 5. Heteroskedasticity-adjusted (White) standard errors are used in calculation of t-statistics that are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	SPREAD	SPREAD	SPREAD	SPREAD	SPREAD
	OLS	OLS	OLS	2SLS	2SLS
FAMOWN	0.193	0.188	0.163	0.208	0.210
	(4.24)***	(4.09)***	(3.46)***	(3.76)***	(3.80)***
FAMOWNSQ	-0.205	-0.195	-0.171	-0.263	-0.264
	(3.22)***	(3.05)***	(2.63)***	(3.37)***	(3.41)***
WEDGE	-0.058	-0.053	-0.057	-0.099	-0.097
	(1.53)	(1.39)	(1.50)	(2.16)**	(2.08)**
LMKT	0.009	0.008	0.009	0.003	0.003
	(3.73)***	(3.12)***	(3.64)***	(1.01)	(0.99)
RSD	-0.822	-0.809	-0.809	-1.525	-1.516
	(5.20)***	(5.09)***	(5.08)***	(6.49)***	(6.42)***
%_SOLD			0.552		0.012
			(2.78)***		(3.03)***
LSELL		0.008		0.687	
		(2.44)**		(3.02)***	
Year dummies	yes	yes	yes	yes	yes
Intercept	-0.018	-0.011	-0.017	0.054	0.057
	(0.51)	(0.31)	(0.49)	(1.13)	(1.17)
N	2714	2714	2653	1682	1682
Adj R-sq	0.37	0.37	0.38		