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Market Timing and Managerial Portfolio Decisions

DIRK JENTER*

ABSTRACT

This paper provides evidence that top managers have contrarian views on firm value. Managers' perceptions of fundamental value diverge systematically from market valuations, and perceived mispricing seems an important determinant of managers' decision making. Insider trading patterns shows that low valuation firms are regarded as undervalued by their own managers relative to high valuation firms. This finding is robust to controlling for noninformation motivated trading. Further evidence links managers' private portfolio decisions to changes in corporate capital structures, suggesting that managers try to actively time the market both in their private trades and in firm-level decisions.

[...] Two years ago we were selling at 10 times revenue when we were at \$64. At 10 times revenue, to give you a 10-year payback, I have to pay you 100% of revenues for 10 straight years as dividends. That assumes I can get that by my shareholders. That assumes that I have zero cost of goods sold, which is very hard for a computer company. That assumes zero expenses, which is really hard with 39,000 employees. That assumes I pay no taxes, which is very hard. And that assumes that you pay no taxes on your dividends, which is kind of illegal. And that assumes with zero R&D for the next 10 years, I can maintain the current revenue rate. [...] Do you realize how ridiculous those basic assumptions are? [...]

Scott McNealy, CEO of Sun Microsystems, March 14, 2002.¹

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¹ Interview in *Business Week*, April 1, 2002, p. 67. Scott McNealy sold between \$90 and \$100 million worth of Sun stock in the fiscal year ending June 2000.

This paper provides evidence that managers tend to have contrarian views on the valuation of their own firms and that perceived mispricing is an important determinant of managers' decision making. Empirically, important corporate finance decisions are related to relative stock price valuations as measured by the book-to-market, cash flow-to-price, or earnings-to-price ratios. Mergers, seasoned equity issues, and initial public offerings tend to occur when stock prices are high, while equity repurchases tend to occur when stock prices are low.² This pattern could be due to managers in high valuation firms viewing their stock as overpriced, and managers in low valuation firms viewing their stock as underpriced. However, more traditional explanations based on variation in investment opportunities, the cost of capital, or the degree of asymmetric information are equally consistent with much of the existing empirical evidence.

To test the hypothesis that managers perceive their own stock as misvalued when making corporate decisions, I use managers' own portfolio trades as a window into their beliefs. With insider trading decisions, managers put their own money on the line; if their opinion about fundamental value turns out to be false, it is their own wealth that is affected. Trading in the personal portfolio is therefore a strong and direct indicator of whether managers view their company stock as mispriced. I then examine whether managers' perceptions of mispricing is cross-sectionally correlated with the valuation ratios and with the determination of firm-wide corporate decisions.

The hypothesis that managers perceive their own stock as misvalued and accordingly attempt to take advantage of misvaluations through their corporate decisions has been advanced by different authors and in a number of different contexts. Ritter (1991) and Loughran and Ritter (1995) argue that firms issue equity when they are overvalued, which would explain both low post-issue returns and the concentration of equity issuance activity in times of high market valuations. Ikenberry, Lakonishok, and Vermaelen (1995) argue that firms repurchase equity when they are undervalued, potentially explaining high subsequent returns and the concentration of repurchases among low valuation firms. Shleifer and Vishny (2003) argue that high valuation firms use their own equity as inflated acquisition currency for takeovers. Graham and Harvey (2001) report survey evidence that two thirds of CFOs agree that "the amount by which our stock is undervalued or overvalued was an important or very important consideration in issuing equity," and nearly as many agree that "if our stock price has recently risen, the price at which we can sell is 'high'." The common theme among these papers is that managers tend to view high valuation firms as overvalued and low valuation firms as undervalued, and try to take advantage of these (perceived) misvaluations through their capital structure and investment decisions.

² Baker and Wurgler (2002) provide an extensive overview of the literature. Seasoned equity issues tend to coincide with high valuations in Taggart (1977), Marsh (1982), Jung, Kim, and Stulz (1996), and Hovakimian, Opler, and Titman (2001). The same is true for initial public offerings in Loughran, Ritter, and Rydqvist (1994), Lerner (1994), and Pagano, Panetta, and Zingales (1998). Repurchases are associated with low valuations in Ikenberry, Lakonishok, and Vermaelen (1995).

My results on insider trading are supportive of the perceived mispricing view and suggest that managers' views on valuations diverge in a systematic fashion from market valuations. Managers in firms with low market valuations relative to book equity, earnings, or cash flow appear to view their firms as undervalued and actively purchase additional shares for their private accounts. At the opposite end of the spectrum, executives in high valuation firms sell larger amounts of equity than predicted by their level of equity ownership, compensation grants, and recent stock price history. Finally, seasoned equity issues and insider sales are closely related in the data. Managers sell more equity in firms which issue new equity in a given year, and the additional selling is most pronounced in high valuation firms. Hence, managers act like contrarians in both their private and their corporate decision making. My results are difficult to reconcile with the view that managers perceive their stock as correctly priced by the market and simply react to variation in investment opportunities, the cost of capital, or the degree of asymmetric information.

While the evidence presented is consistent with the view that managers try to take advantage of perceived mispricing, it is difficult to prove conclusively that this is the case. In this paper, I use the notion of real or perceived misvaluation for insider trading that is not explained by portfolio rebalancing and diversification motives. Inevitably, this leaves out a whole host of other reasons for trading, including optimal contracting explanations, tax management, and mechanistic trading with the goal of staying clear of insider trading laws. Hence, the results should be interpreted as consistent with the "perceived mispricing" view, not as proof thereof. Any other motivation for insider trading that is correlated with valuation levels and capital structure decisions in the observed manner would explain the results.

Alternative explanations for the observed insider trading patterns might invoke changing investment opportunity sets, variation in the degree of asymmetric information both over time and across firms, signaling, and optimal contracting between executives and the board. I discuss several alternative explanations in Section IV below and argue that they have considerable difficulty explaining the joint evidence on insider trading and equity issuance patterns. For example, Myers (1977) predicts that firms with good investment opportunities reduce leverage. Hence, good investment opportunities may explain the association between high valuations and equity issues. However, this explanation does not explain why managers sell equity out of their private portfolios whenever investment opportunities are supposedly good and purchase additional equity whenever investment opportunities are supposedly bad. Nor does this explanation address why seasoned equity issues are associated with additional inside sales.

Arguments based on adverse-selection problems in the spirit of Myers and Majluf (1984) have been proposed to explain the relationship between equity issuance and valuations. If adverse-selection problems are mitigated in good times, that is, when stock prices are high, then seasoned equity issues should be associated with high stock prices (Lucas and McDonald (1990), Choe, Masulis, and Nanda (1993), Bayless and Chaplinsky (1996)). In fact, the asymmetric

information stories and the perception of mispricing stories are based on the same idea: Managers try to time the market by selling stock when they think it is overvalued and by sitting out when it is undervalued. The only difference is whether investors fully account for this motive. My evidence supports the perception of mispricing over the asymmetric information view. Insider trading is strongly affected by equity valuations and is correlated with the equity issuance decision, suggesting that managers do not believe that the market correctly accounts for asymmetric information. Furthermore, managers are most likely to purchase additional shares for their private portfolio in low valuation firms, that is, in firms which are supposedly suffering from high degrees of asymmetric information and illiquid secondary markets.

Finally, theories based on the risk and return preferences of managers and correct equity valuations do not help much in understanding the empirical evidence either. It is conceivable that managers try to take advantage of attractively (but rationally) priced risk factors by selling growth firms and investing the proceeds into a value ("distress") fund. This hypothesis is contradicted by the observation that managers in value firms purchase additional shares in their own companies, and does not explain why growth firms are associated with frequent equity issues and simultaneous excess insider selling.

While not the focus of this paper, an obvious and interesting question is whether managers' perceptions of misvaluation are born out by subsequent returns. I find little evidence that managers use valid inside information in their trades. The excess returns to insider trades after controlling for size and book-to-market effects are indistinguishable from zero. While this finding could be due to the data-imposed imprecision with which returns are measured below, it is in line with the results of the recent insider trading literature. For instance, the comprehensive study of insider trading by Lakonishok and Lee (2001) finds that insider trades in most firms do not predict subsequent returns once size and book-to-market effects are controlled for.³ Lee (1997) finds that managerial trading before primary seasoned equity offerings (SEOs) does not predict subsequent excess returns. Chan, Ikenberry, and Lee (2003) find that insider trades by managers concurrent to share repurchases do not predict subsequent excess returns. Finally, Piotroski and Roulstone (2003) provide evidence that insider trading is primarily determined by managers' contrarian beliefs and that the inclusion of future cash flow news and future excess returns into their model adds little explanatory power.

The lack of evidence for economically significant excess returns earned by managers with their trades suggests that managers may not use much valid inside information in their decisions above and beyond the information contained in observable firm characteristics such as size and book-to-market. At the same time, managers appear to be contrarians (see e.g., Rozeff and Zaman (1988, 1998), Lakonishok and Lee (2001), Piotroski and Roulstone (2003), and

³ There is some predictability of excess returns remaining when using equity purchases in small firms, but no predictability of excess returns at all is found on the sell side, nor for medium-sized and large firms (on both the buy and sell side).

Sections II and III below) and managers trade before and concurrent to corporate events as if they are trying to time the market (Karpoff and Lee (1991), Lee (1997), Kahle (2000), Chan et al. (2003), and Section III below). These results suggest that the confidence of managers in their timing ability may be larger than their actual timing skills, as suggested by Malmendier and Tate (2002). The results are also consistent with several recent studies questioning whether managers are able to time the market with their corporate decisions (Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), Schultz (2003)). When perceiving “windows of opportunity” for issuing or repurchasing equity in the sense of Loughran and Ritter (1995), managers may in reality be reacting mechanistically to unusually high or low valuation levels.⁴

The study most closely related to the current paper is Rozeff and Zaman (1998) who document that managers in growth firms tend to sell more equity than managers in value firms. The current paper makes two significant improvements. First, it strengthens the claim that this pattern is due to contrarian views on stock valuations and is not simply driven by diversification and portfolio rebalancing motives. To do so, I need to control for noninformation-based motives of insider trading. Many high valuation firms have experienced recent price run-ups, inflating the value of managerial equity holdings. Also, managers in growth firms own considerably more equity than managers in value firms and receive larger grants of stock and options (Smith and Watts (1992)). The finding that these managers subsequently sell more equity is not informative about their motivation to do so and could simply be caused by the desire of managers to diversify and rebalance their portfolios. Using the Standard and Poor's ExecuComp database from 1992 to 2000, I am able to hold managerial ownership levels and compensation grants constant, and to control for recent changes in the value of managers' equity stakes. The results show a strong empirical relationship between market valuations and insider trading that is not caused by the desire of managers to diversify or rebalance. Second, I document a direct relationship between equity issues and insider trading, and the effect of valuation levels on the magnitude of this relationship. Hence, managers' contrarian views on stock prices not only affect their private trading, but also seem to directly impact their corporate decision making.⁵

⁴ This is not to suggest that managers never use valid inside information when making private or corporate decisions. Averaging the actions of sufficiently many managers does seem to provide a valid signal about future excess returns for at least a subset of all firms (Baker and Wurgler (2000), Lakonishok and Lee (2001)). For each individual manager, however, beliefs about misvaluation seem to be determined mainly by contrarian attitudes to observable information.

⁵ There are several further differences between my analysis and Rozeff and Zaman (1998). The analysis below uses an estimate of the actual dollar values of insiders' trades, while Rozeff and Zaman simply count the number of buy and sell transactions. The measure employed below accounts for stock sales associated with option exercises, while Rozeff and Zaman do not consider option-related sales. My measure of insider trades tracks transactions year-round, while Rozeff and Zaman focus on a 4-month test period from February to May of each year. Finally, firms with no inside transactions in a year are included in the analysis below, while Rozeff and Zaman do not consider firms with no trades during their test period.

The finding that managers fail to earn economically significant excess returns with their insider trades helps to interpret the results in Rozeff and Zaman (1998). Rozeff and Zaman document that managers are contrarians and interpret this as evidence that the scaled-price ratios measure mispricing. The implicit assumption behind this interpretation is that managers use valid inside information in their trading decisions. The lack of excess returns to managers' trades once the scaled-price ratios are controlled for suggests that managers may simply be reacting to the scaled-price ratios themselves and may not be using much actual inside information. Hence, Rozeff and Zaman's findings, as well as the results in this paper, may tell us more about how managers think about firm values than about what the scaled-price ratios are actually measuring. Whether managers' perceptions of misvaluation are incorrect depends on whether one interprets the size and book-to-market adjustments to returns as accounting for risk or mispricing. At the same time, the results of this paper can be interpreted as suggestive evidence in favor of the hypothesis that the book-to-market effect is due to mispricing. Top managers in publicly traded companies are sophisticated and financially literate economic actors with substantial private wealth. It is troubling for the risk factor interpretation of the book-to-market effect to see that these sophisticated actors are contrarians and do not hesitate to load up on the alleged risk factor.

The next section develops the hypotheses about the expected relationship between insider trading and the scaled-price ratios and describes the empirical strategy. Section II presents the empirical results on the relationship between insider trading and relative stock price levels. Section III reports evidence on the link between capital structure decisions and insider trading. The fourth section discusses the results and contrasts several alternative explanations for the empirical patterns. Section V examines the predictive power of insider trades and capital structure decisions for subsequent stock returns. The final section summarizes and concludes.

I. Methodology and Hypotheses

This section examines the theoretically expected relationship between insider trading and the scaled-price ratios. In the interpretation of my empirical results, I use the notion of real or perceived misvaluation as the explanation for insider trading not explained by portfolio rebalancing and diversification motives. In reality, managers trade in the stock of their company for a variety of reasons. They may exercise options and sell stock to rebalance their portfolios, maintain or achieve stock ownership targets set by their employers, meet needs for personal liquidity, or manage taxes. Managers may trade mechanically in order to stay clear of insider trading laws. Given managers tend to be undiversified in both their financial wealth and human capital, standard portfolio choice theory predicts them to sell equity from vested grants and other sources unless they perceive the stock price as temporarily too low. When executive stock options reach their maturity date and are in the money,

the executive has to exercise and decide whether to hold or sell the acquired shares.⁶

What, if anything, do these considerations imply for the expected relation between insider trades and the level of stock prices? There is ample evidence that valuation measures like the book-to-market ratio are positively correlated with subsequent returns. One interpretation, advanced by Fama and French (1993, 1996), is that book-to-market is correlated with the exposure of a stock to a priced risk factor. Under this interpretation, value stocks earn high average returns because they load more strongly on this “distress” factor, and growth stocks earn low average returns because they load less strongly on the same factor.⁷ An alternative view of the positive relation between book-to-market and average returns is that the book-to-market ratio proxies for mispricing: High book-to-market stocks have high average returns because these stocks are neglected or because investors have overreacted to negative information about the company. As new information is gradually released, the underpricing is slowly corrected and high book-to-market stocks earn superior returns. The reverse is true for low book-to-market stocks. Extreme values of book-to-market have been connected to extreme investor expectations by La Porta (1996), La Porta et al. (1997), and Shleifer (2000).

It is important to understand that any opinion a manager might have about the interpretation of the scaled-price ratios across firms should not be reflected in insider trading. Managers are not allowed to hedge or short-sell company stock and are therefore subject to both the idiosyncratic and the systematic risk in company stock returns.⁸ Thus, without (perceived) private information about mispricing in their own stock, managers have an incentive to sell as much company stock as they can.⁹ Managers can always make themselves better off by selling company stock and taking their desired position in a well-diversified value or growth fund. This allows them to take advantage of cross-sectional mispricing or an attractively priced risk factor without exposing themselves to diversifiable risk.

⁶ Some compensation contracts offer the possibility of cashless option exercise, which does not require that the manager ever takes possession of the underlying shares.

⁷ Everything said in this paragraph applies equally to the earnings-to-price ratio and other scaled-price variables.

⁸ This takes away their ability to hedge the idiosyncratic risk in firm returns, but not necessarily their ability to hedge the systematic risk component in returns. Garvey and Milbourn (2003), Core and Guay (2001), and Jenter (2002) have demonstrated that managers optimally reduce the exposure of their private portfolio to systematic risk in response to an increase in exposure through equity-based compensation grants. Acharya and Bisin (2002) explore the implications of managers hedging aggregate risk for project selection. Managers may also find means to hedge the idiosyncratic risk in stock returns through, for example, collars or equity swaps (Bettis, Bizjak, and Lemmon (2001)).

⁹ Managers may decide to hold on to company stock for noninvestment reasons. Examples are signaling of confidence in the company to employees, customers, or capital markets; the postponement of capital gains taxes; and corporate control considerations. See also Section IV.

Suppose, on the other hand, that insider trades are motivated, at least in part, by disagreement between the manager and the equity market about the fundamental value of the manager's firm. Managers who believe that their own firm is undervalued by the market have an incentive to postpone insider sales of company stock and to probably even acquire more shares on the open market. If the perceived deviations of market prices from fundamental values arise randomly across firms, then there should be no cross-sectional relationship between the scaled-price ratios and insider trading. In particular, there is no reason to expect insider buying to be concentrated in value stocks and insider selling to be concentrated in growth stocks. This is true independent of whether the disagreement is due to valid inside information held by the manager or due to any perceptual bias, such as managerial overoptimism.

Alternatively, disagreements between managers and equity markets about fundamental value may be concentrated in particular kinds of stocks. The hypothesis advanced in previous research and confirmed in the empirical analysis below is that managers in value firms are more likely to view their stock as undervalued, and managers in growth firms are more likely to view their stock as overvalued. Hence, managers in growth firms are expected to sell equity in their firm more aggressively than managers in value firms, who are expected to postpone equity sales or acquire more shares for their private portfolio. Under this hypothesis, managers do not regard value or growth firms in general as mispriced, but the managerial perception of mispricing in their own stock is correlated with the scaled-price ratios in the cross section and over time.

A. Control Variables

Any attempt to isolate the effect of valuation levels on insider trading requires controlling for managers' incentives to diversify away from company stock and to rebalance their holdings after stock and option grants and after substantial price movements (Rozeff and Zaman (1998)). This is especially important since, as will be shown shortly, ownership levels and compensation grants are systematically related to relative firm values.

Managers who receive larger stock or option grants in the current year can be expected to sell more shares on the open market (Ofek and Yermack (2000)). To control for this portfolio rebalancing motive, the values of stock and option grants during the fiscal year are included in all regressions. Similarly, the levels of company stock and option holdings at the beginning of the fiscal year are included in all regressions to account for managers' incentives to diversify.

Core and Guay (1999) provide evidence that some companies set target ownership levels for managers and attempt to manage ownership through stock and option grants. This implies that managers may not be free to simply sell shares after option exercise or after the vesting of stock grants and may bias the results. Given the endogeneity of both compensation grants and levels of managerial ownership, the relation between these variables and insider selling becomes ambiguous. Managers who receive more stock and option grants and own more shares have a greater incentive to sell equity for diversification

reasons. At the same time, larger grants and ownership levels may indicate that the board desires that managers hold more equity, decreasing the ability of managers to sell shares. Ultimately, the effect of grants and ownership on insider trading is an empirical question to be answered by the data.

Managers are more likely to rebalance their portfolios after large changes in equity prices. In particular, managers have an increased incentive to sell shares after their inside holdings have appreciated in value. Even if prior levels of ownership were second-best optimal, rapid price appreciation drives the level of a manager's exposure above optimal levels. Thus, the dollar changes in the value of inside holdings over the current and previous years are included in all regressions.

Previous research has shown that managers in large firms are more likely to sell company shares than managers in small firms. There can be several reasons for this empirical regularity, including private benefits of control and entrepreneurial overoptimism. Independent of the cause of the size effect on insider trading, firm size is included as an additional control variable in all regressions. In the regression results shown below, firm size is measured as the log of total assets. Measuring firm size alternatively as market capitalization or as the log of sales yields similar results, both qualitatively and quantitatively.¹⁰

Finally, managers who hold company stock are subject to both the systematic and the idiosyncratic risk in stock returns. Meulbroek (2000) shows that managers in more risky companies tend to sell equity more aggressively. Total stock return volatility is therefore included as an explanatory variable in all regressions. If managers' equity holdings are determined by optimal contracting considerations, then changes in total firm risk should induce changes in managers' holdings and thus sales or purchases of shares (see e.g., Aggarwal and Samwick (1999, 2003), Jin (2002)). To control for changing firm risk, all regressions include two terms that capture changes in total stock return volatility: the change in volatility between $t - 2$ and $t - 1$, and the change in volatility between $t - 1$ and the current year t . Stock return volatility is calculated from daily stock returns using all trading days for 1 year.¹¹

B. Data Sources

Standard and Poor's ExecuComp database provides individual-level information on managerial equity ownership, option holdings, equity and option grants, and several other compensation items. It also reports option exercises

¹⁰ It is interesting to note that the observation that managers in small firms are more willing to hold on to company shares might pose a puzzle if managers agree with Fama and French (1993, 1996) and interpret firm size as a proxy for risk. For the purpose of this paper, I simply include firm size as a control variable for managerial trading without taking a stance on the underlying mechanism.

¹¹ Ideally, more variables related to managers' trading incentives should be included in the analysis. Portfolio holdings unrelated to the firm and the value of home-ownership are important omissions, as are age, tenure, and other proxies for human capital and the firm-specificity of human capital. Unfortunately, this data are not publicly available.

made during each fiscal year. The data are collected from annual reports. ExecuComp reports information for the five highest-paid executives in three groups of firms: the S&P 500, the S&P MidCap 400, and the S&P SmallCap 600.

The database includes compensation data for the years 1992 to 2000. To derive the net number of shares bought and sold by each executive on the open market in a year, I take the annual change in stock holdings and subtract the number of shares acquired through option exercises and stock grants. The value of a manager's open market trades is calculated by multiplying the net number of shares bought or sold during a year by the stock price at the end of the fiscal year. I call this measure the "dollar value of net open market purchases":

$$\begin{aligned} &\text{Dollar value of net open market purchases}_t \\ &= (\text{Change in number of shares owned} \\ &\quad - \text{number of shares obtained from option exercises} \\ &\quad - \text{number of shares obtained from stock grants}) \times \text{stock price}_t. \end{aligned} \quad (1)$$

Taking first differences of the number of shares owned implies the loss of 1 year of data. The procedure requires that an executive be in the data set for at least two consecutive years to be included in the analysis. Stock ownership is defined in the database as shares held directly, including restricted shares but excluding options. Compensation data include stock options awarded during the year, options held at the end of the year, and the dollar value of restricted stock awarded during the year. All share quantities and prices are adjusted for stock splits and stock dividends such that variables are stated in year-2000 units.

Data on book equity, earnings, cash flow, and other financial statement variables are taken from the Compustat files. All information on stock prices, market capitalization, and returns is taken from the monthly CRSP files. Companies report stock ownership as of some date between the end of the fiscal year and the date of the proxy statement. Hence, changes in stock ownership and net open market purchases are calculated based on dates up to 10 weeks after fiscal year-end. This should not create a serious bias, however, especially since it gives managers more time to react to grants and price changes during the fiscal year.

Firm-years with ending stock prices below \$0.50 are deleted to minimize the effect of microstructure-induced return volatility (Conrad and Kaul (1993), Loughran and Ritter (1996)). Only firm-years with positive book equity are included in the sample. Finally, observations with missing shareholdings, negative reported shareholdings, and negative reported stock or option grants are eliminated from the sample. This leaves a usable total of 2,010 firms, 10,658 firm-years, and 42,131 person-firm years.

II. Insider Trading

The empirical analysis proceeds in two steps. Section II documents the contrarian nature of the insider trading behavior of managers. I find that

managers in low book-to-market firms dispose of company shares much more frequently and aggressively than in high book-to-market firms, with similar results for the cash flow-to-price and the earnings-to-price ratio. Subsection II.A describes selected sample characteristics. Subsection II.B illustrates the univariate relationship between insider trading, the book-to-market ratio, and selected control variables. Subsection II.C documents the same relationships in a regression framework. Subsection II.D shows that the documented patterns are robust to including industry-year and firm fixed effects, to using Fama–MacBeth regressions, and to using the information in time-averaged variables only. Subsection II.E examines managers' purchases of company equity in more detail. Subsequently, Section III shows that managers' contrarian views also affect their decisions regarding whether to issue seasoned equity, and documents a strong correlation between equity issues and insider sales.

A. Descriptive Statistics

Table I reports descriptive statistics for the sample. Panel A presents the frequency of stock and option grants and option exercises. On average, 73% of the managers in the sample receive options from their firms in a given year, while 18% receive grants of restricted stock; 37% of the managers exercise stock options in a given year. These numbers are only modestly higher than the ones reported by Ofek and Yermack (2000) for the 1993–1995 period, suggesting that the usage of equity-based compensation may have reached a plateau after its rapid rise in the 1980s and early 1990s.

Panel B gives descriptive statistics on managerial ownership and executive compensation. The median manager in the sample owns about \$1 million worth of company stock and stock options with an intrinsic value of \$0.6 million. The distribution is extremely skewed, with mean stock ownership of \$30.8 million and mean intrinsic option value of \$5.6 million. The year-to-year increases in median stock and option holdings are small at \$46,000 for stock and \$7,200 for the intrinsic option value, despite a rising stock market during the sample period. Given managers also receive a median (mean) Black-Scholes value of \$176,000 (\$0.9 million) in option awards per year, and this suggests that managers on average sell company stock. The value of median (mean) stock purchases by managers is indeed negative at $-\$8,000$ ($-\$2.6$ million).

B. Insider Trading and Book-to-Market: Univariate Results

Table II examines the relationship between the trading behavior of managers and the book-to-market ratio. The definitions of book equity and market equity follow those of Fama and French (1996).¹² I use fiscal year $t - 1$ data to sort firms

¹² Book equity is defined as the Compustat book value of shareholders' equity, plus balance sheet deferred taxes and investment tax credits (if available), minus the book value of preferred stock. Depending on availability, I use redemption, liquidation, or par value (in that order) to estimate the book value of preferred stock. Market equity is the market valuation of common equity at the end of the fiscal year.

Table I
Sample Description

The sample consists of 42,131 person-firm-year observations in the S&P ExecuComp database from 1993 to 2000. The values of new options awarded are calculated by ExecuComp using the Black-Scholes formula. I calculate the value of net share purchases as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price.

Panel A: Average Frequency of Grants and Exercises per Year		
Number of observations	42,131	
Percentage of person-years with		
New options awarded	73.1%	
Old options exercises	37.0%	
Restricted stock awarded	17.9%	
Panel B: Descriptive Statistics		
	Mean	Median
Value of shares owned (\$000)	30,841	1,049
Percentage of firm owned	1.24%	0.07%
Intrinsic value of options owned (\$000)	5,649	586
Value of restricted shares owned (\$000)	786	0
Annual change in		
Value of shares owned (\$000)	5,311	46
Number of options owned (000)	42	12
Intrinsic value of options owned (\$000)	1,404	7
Value of restricted shares owned (\$000)	47	0
Value of		
New options awarded (\$000)	900	176
Option exercises (\$000)	813	0
Restricted stock awarded (\$000)	126	0
Value of		
Salary and bonus (\$000)	629	443
Total pay (\$000)	1,827	820
Value of net share purchases (\$000)	-2,607	-8

into 10 book-to-market deciles and examine the trading behavior of managers in fiscal year t in each decile. A manager is a “net buyer” if the number of shares purchased during the year is larger than the number of shares sold. A manager is a “net seller” if the number of shares purchased is less than the number of shares sold.¹³ The dollar value of a manager’s net equity purchases

¹³ ExecuComp does not provide information on the prices at which the insider trades were executed during the year. Hence, a manager who sells a small number of shares at a high price and purchases a larger number of shares at a much lower price is categorized as a net buyer, even though his net investment in the firm may have been negative. The absence of trade prices introduces noise into the analysis and makes finding significant results less likely but should not be a source of bias.

Table II
Insider Trading and Equity Ownership by Book-to-Market Deciles

The sample consists of 42,131 person-firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. A manager is defined as a net buyer (seller) if the number of shares purchased on the open market is larger (smaller) than the number of shares sold. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. A manager's ownership has increased (decreased) if the number of shares owned at the end of the year is larger (smaller) than the number of shares owned at the beginning of the fiscal year. Stock price changes are the split-adjusted percentage change in stock price over the course of a fiscal year. All dollar values are reported in units of thousands.

Panel A: Insider Trading									
B/M Deciles	Percentage of Net Buyers/Net Sellers		Median/Mean Dollar Value of Net Purchase (\$000)		Percentage of Managers with Ownership Increases/Decreases		Median/Mean Dollar Value of Net Ownership Change (\$000)		
1 (Growth)	24%	68%	-626	-17,280	51%	37%	1	-12,305	
2 (Growth)	28%	64%	-250	-2,691	52%	34%	2	-616	
3 (Growth)	30%	60%	-134	-3,066	53%	33%	4	-1,313	
4 (Growth)	34%	56%	-47	-626	57%	29%	13	726	
5 (Growth)	35%	55%	-40	-816	59%	28%	14	260	
6 (Growth)	37%	51%	-4	-764	59%	27%	14	116	
7 (Growth)	41%	48%	0	-676	61%	26%	13	-25	
8 (Growth)	42%	46%	0	-234	61%	24%	14	231	
9 (Growth)	49%	40%	0	130	66%	20%	16	480	
10 (Value)	54%	33%	2	-270	66%	19%	12	23	

Panel B: Equity Ownership, Grants, and Price Appreciation									
B/M Deciles	Median/Mean Value of Stock Ownership at Beginning of the Fiscal Year (\$000)		Median/Mean Intrinsic Value of Option Holdings at Beginning of the Fiscal Year (\$000)		Median/Mean Value of Option Grants (\$000)		Median/Mean Value of Stock Grants (\$000)		Price Appreciation in Previous Year
1 (Growth)	2,393	128,799	3,468	20,132	517	2,520	0	452	80%
2 (Growth)	1,667	31,457	1,953	6,642	393	1,354	0	106	49%
3 (Growth)	1,555	25,568	1,237	4,761	297	1,223	0	112	31%
4 (Growth)	1,346	14,163	899	3,366	210	990	0	115	27%
5 (Growth)	1,146	13,066	729	2,808	205	705	0	75	20%
6 (Growth)	1,003	13,952	472	1,925	196	608	0	82	14%
7 (Growth)	771	8,645	302	1,314	155	524	0	83	7%
8 (Growth)	573	7,889	169	1,018	98	413	0	81	4%
9 (Growth)	420	9,979	58	625	80	402	0	72	0%
10 (Value)	269	3,415	2	300	41	282	0	84	-5%

is estimated as the net number of shares purchased times the fiscal year closing price.

The first column of Panel A reports the percentage of net buyers and net sellers in each book-to-market decile. Going from decile 1 (growth firms) to decile 10 (value firms), the number of net buyers increases from 24% to 54%, while

the number of net sellers falls from 68% to 33%.¹⁴ Managers in high valuation firms are much more likely to be net sellers than managers in low valuation firms. Examining the size of managers' net equity purchases in column 2, the median manager in growth firms sells considerable amounts of equity, while net sales are essentially zero for the four deciles with the lowest valuations. These results are qualitatively similar to Rozeff and Zaman (1998) but do not reveal much about the motivation behind managers' trading behavior: All other theoretical determinants of managerial trading described previously vary systematically across book-to-market deciles, providing a multitude of alternative explanations for the observed pattern.

The third column of Panel A adds equity grants and shares acquired through option exercises to open market purchases to arrive at the net change in a manager's stock holdings. The contrarian pattern observed in net trades persists but is distinctly weaker than that for net purchases. This suggests that stock grants and option exercises add to stock ownership especially in those portfolios in which managers sell equity on the open market. This conjecture is confirmed in Panel B, which reports managers' equity stakes, option holdings, annual option grants, and annual stock grants across book-to-market deciles. The median stock ownership is \$269,000 in value firms and rises to \$2.4 million in the growth decile, with similar patterns for option holdings, option grants, and stock grants. Finally, the average stock price appreciation in fiscal year $t - 1$ is -5% in value firms and increases across deciles to reach $+80\%$ for growth firms.

The finding that managers in growth firms sell more equity than managers in value firms is not surprising in light of the results in Panel B. The same managers also own much more equity, receive considerably larger grants, and have seen their equity stakes appreciate rapidly in the recent past. These results differ from those of Rozeff and Zaman (1998), who do not find a strong relationship between managerial equity ownership and valuation levels. The difference in results is likely due to the fact that Rozeff and Zaman analyze an earlier time period in which equity-based compensation was less prevalent, and also due to their focus on percentage ownership rather than dollar ownership. Given the results in Table II, all considerations of diversification and portfolio rebalancing imply that one should see pronounced selling by managers in high valuation firms; and the data confirm this expectation. Whether there is a book-to-market effect on trading distinct from the effect of stock ownership and equity-based compensation is still an open question to be answered in the next section.

C. Insider Trading and Book-to-Market: Regression Results

The above analysis is repeated in a regression framework to simultaneously assess the effects of book-to-market, stock ownership, equity-based

¹⁴ The percentage numbers do not add to one because of managers who do not trade during the year or whose trades add up to zero.

compensation, and stock price movements on insider trading. A dummy variable is included for each book-to-market decile, allowing for a nonlinear relationship between valuation levels and managerial insider trading as documented by Rozeff and Zaman (1998). I include a number of controls intended to capture managers' incentives for diversification and portfolio rebalancing. To capture the effect of prior exposure to company stock, I include the value of managerial equity holdings and the intrinsic value of in-the-money and out-of-the-money stock options measured at the end of fiscal year $t - 1$. To capture the effect of contemporaneous equity-based compensation, I include the dollar value of stock grants and the Black-Scholes value of option grants made in fiscal year t . To capture the effect of current and lagged price changes on the value of stock holdings, I include an interaction term between end-of-fiscal year $t - 1$ stock holdings and the stock price change in $t - 1$ and a second interaction term between end-of-fiscal year $t - 1$ stock holdings and the stock price change in fiscal year t . To account for the effect of risk and changes in risk on trading incentives, all regressions include total stock return volatility, as well as both the change in volatility between $t - 2$ and $t - 1$, and the change in volatility between $t - 1$ and the current year. Finally, the log of total assets at the end of fiscal year $t - 1$ is included as the measure of firm size.¹⁵

Table III reports the results. The dependent variable in column 1 is the dollar value of managers' net open market purchases of company stock as defined above.¹⁶ The coefficients on the valuation dummies are economically and statistically significant and increase strongly with book-to-market. Managers in the high valuation (growth) decile sell net \$3.75 million worth of shares more than managers in the low valuation (value) decile, with a robust t -statistic of 16.19.

The control variables are mostly significant with coefficients of the expected sign. Prior equity ownership has a negative effect on open market purchases, as do prior option holdings. Contemporaneous stock and option grants similarly reduce managers' purchases. Return volatility has the expected negative coefficient and is strongly significant. Increases in return volatility are negatively related to open market purchases. Consistent with previous research, firm size has a large negative effect on managerial equity purchases. The interaction between prior equity ownership and current stock price changes has the predicted negative coefficient but is insignificant. Somewhat surprisingly, the interaction variable meant to capture the valuation change of managers' equity

¹⁵ In a previous version of the paper, the realized value from options exercised in fiscal year t is included as an independent variable to control for mechanical selling after option exercises. The regression results with this additional explanatory variable are qualitatively and quantitatively similar to the ones presented but are more difficult to interpret. The current specification treats both nonoption and option-related sales equally as a decrease in managerial holdings.

¹⁶ The distribution of the dependent variable "value of net open market purchases" is extremely fat tailed due to the fact that the sample contains both the fifth highest-paid manager at relatively small firms and multibillionaire CEOs from large firms. To avoid having the results dominated by a small number of extremely large trades in each year, the dependent variable is winsorized at the first percentile in each tail of the distribution.

Table III
Regressions of Insider Purchases on Book-to-Market Deciles and Other Control Variables

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. All dollar values are in units of thousands, that is, a coefficient of 1,000 on a dummy variable indicates a \$1 million change in the dependent variable. The dependent variables are the net dollar value of individual inside purchases (column 1), the average of the same variable across all managers in a given firm-year (column 2), the log of one plus the ratio of individual inside purchases to prior exposure (column 3), and the average of the same variable across all managers in a firm-year (column 4). Prior exposure to firm risk is measured as the sum of managerial equity holdings at the beginning of the year, the intrinsic value of options held at the beginning of the year, restricted stock granted during the year, and the Black-Scholes value of options granted during the year. Coefficient estimates are reported first and robust *t*-statistics with clustering at the manager level (columns 1 and 3) or firm level (columns 2 and 4) are reported second in each column; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables					
	Dollar Value of Individual Net Purchases of Company Stock		Dollar Value of Net Purchases of Company Stock Averaged by Firm-Years		Individual Net Purchases of Company Stock as Percentage of Prior Exposure	
	4,906	(12.72)**	4,000	(7.99)**	23%	(9.31)**
Intercept					23%	(5.65)**
Independent Variables						
B/M-decile						
1 (Growth)	-3,753	(16.19)**	-3,413	(11.07)**	-19%	(15.07)**
2 (Growth)	-2,046	(13.79)**	-1,969	(9.94)**	-17%	(14.59)**
3 (Growth)	-1,643	(13.04)**	-1,545	(9.12)**	-16%	(13.59)**
4 (Growth)	-1,214	(11.89)**	-1,102	(7.99)**	-17%	(13.94)**
5 (Growth)	-1,133	(11.11)**	-1,079	(8.07)**	-16%	(13.00)**
6 (Growth)	-696	(8.12)**	-623	(5.19)**	-12%	(10.40)**
7 (Growth)	-634	(7.84)**	-602	(5.37)**	-11%	(9.15)**
8 (Growth)	-460	(6.25)**	-392	(4.14)**	-10%	(8.34)**
9 (Growth)	-330	(4.72)**	-340	(3.54)**	-5%	(4.38)**
10 (Value)	-		-		-	

Dollar value of equity stake	-0.0015	(3.45)**	-0.0013	(3.79)**	0.0010%	(1.65)	0.0016%	(1.79)
Intrinsic value of exercisable options	-0.0015	(1.64)	-0.0019	(1.43)	0.0017%	(2.81)**	0.0004%	(0.41)
Intrinsic value of unexercisable options	-0.0608	(3.80)**	-0.0616	(2.60)**	0.0284%	(2.62)**	0.0660%	(2.02)*
Dollar value of stock grants	-0.0735	(3.56)**	-0.1002	(7.38)**	-0.0195%	(0.51)	-0.0568%	(0.57)
Black-Scholes value of option grants	-0.0970	(2.08)*	-0.1892	(3.19)**	-0.0162%	(0.51)	-0.4211%	(2.56)*
Dollar change in value of equity stake in current year	-0.0004	(0.65)	-0.0025	(2.44)*	-0.0001%	(0.33)	-0.0038%	(1.30)
Dollar change in value of equity stake in prior year	0.0007	(2.70)**	0.0005	(2.51)*	0.0001%	(0.59)	0.0009%	(2.10)*
Total return volatility ($t - 2$)	-3,365	(11.66)**	-2,861	(7.42)**	-25%	(11.50)**	-27%	(7.36)**
Change in total return volatility ($t - 1$)	-697	(2.34)*	-486	(1.21)	-6%	(2.04)*	-5%	(1.09)
Change in total return volatility (t)	-792	(3.15)**	-367	(1.03)	-2%	(0.95)	-4%	(1.02)
Log of total assets	-481	(12.01)**	-394	(7.49)**	-2%	(8.80)**	-2%	(5.32)**
Year dummies	Yes		Yes		Yes		Yes	

stakes in fiscal year $t - 1$ has a significantly positive effect on purchases. This may reflect a positive wealth effect on current stock purchases.

The trading decisions of managers in the same firm are unlikely to be independent, giving rise to the concern that the t -statistics reported in column 1 are inflated. To eliminate this problem, I average the dependent and explanatory variables across managers in the same firm and repeat the regression analysis on these firm-year averages.¹⁷ The results are reported in column 2 of Table III and are similar to the manager-level regression. The difference in net purchases between the lowest and the highest valuation decile is estimated to be \$3.4 million, with a robust t -statistic of 11.07. The effect of the other control variables is similar to column 1.

The most relevant measure of managerial trading behavior may not be absolute trade size but trade size relative to some measure of wealth or total equity holdings. A manager's total wealth is not observable, so scaling net purchases by managers' total holdings of company equity becomes the next best alternative. I define "total exposure" as the sum of managerial stock and option holdings at the beginning of the year plus the value of stock and option grants received during the fiscal year. The relative change in managerial exposure due to insider trades is then defined as the log of one plus the ratio of net stock purchases to prior exposure. The regression results using this dependent variable are reported in column 3 of Table III. Again the effect of the book-to-market dummies on trading is monotonic and economically large. Managers in growth firms shed an additional 19% of total exposure compared to managers in value firms. Repeating the analysis on firm-year averages (column 4) confirms the book-to-market effect, with managers in growth firms again selling 19% of total exposure more than managers in value firms.

Table III provides strong evidence that there is a distinct effect of firm valuations on managerial trading behavior, even if the effect of ownership levels, current compensation, and contemporaneous and lagged stock price movements is held constant. This pattern appears to be unrelated to the noninformation based motives for insider trades and suggests an explanation based on a perception of mispricing. In the subsequent regression analyses, I focus on the dollar value of insider trading as the dependent variable, and I do not report results for the ratio of insider trades to prior exposure to conserve on space. All regressions have been estimated using the ratio of trades to exposure with similar results to the ones for dollar values and are available upon request.

D. Time-Series, Cross-sectional, and Industry Effects Analyses

This subsection performs several robustness checks and shows that the basic result is robust to various changes in the estimation procedure. I start with an attempt to disentangle the cross-sectional and times-series elements of the valuation effect on insider trading. The time-series component can be elicited

¹⁷ This strategy follows Anderson, Banker, and Ravindran (2000).

by adding firm fixed effects to the regressions. With firm fixed effects, the book-to-market dummies pick up the effect of firms switching between deciles over time. The results are reported in column 1 of Table IV and show that book-to-market still has a strong and significant effect on insider trading. Repeating the analysis on firm-year averages for the dependent and control variables does not alter the result (column 2).

In order to isolate the pure cross-sectional component of the book-to-market effect on insider trading, cross-sectional regressions are estimated by averaging all annual observations from 1993 to 2000 for either an individual or a firm. The results using individual managers as data points are reported in column 3, and the results using firms as data points are in column 4. Again the book-to-market effect is economically large and statistically significant and is of the same order of magnitude as the pure time-series effect. It therefore appears that managerial trading decisions are related to relative market valuations both in the cross section and over time. Keeping in mind that the sample period is only 8 years, the cross-sectional effect could either be a time-series effect in disguise caused by a slow-moving book-to-market ratio or alternatively be due to persistently overconfident managers in value firms (Malmendier and Tate (2002)).

It is possible that the estimated coefficients are dominated by 1 or 2 influential years in the sample, especially given the unusual stock market performance toward the end of the sample period. Valuations as measured by the book-to-market ratio increased for most of the sample period and reached their maximum in 1999. Hence, the pronounced selling by managers in growth firms could be an isolated incident toward the end of the sample period. To test the robustness of the book-to-market effect across years, I estimate separate cross-sectional regressions for each year from 1993 to 2000. Following the approach of Fama and MacBeth (1973), the resulting time series of regression coefficients are averaged to produce the final estimates of the coefficients of interest. The results for individual managers are reported in column 1 of Table V, and the results for firm-year averages in column 2. The average coefficient on the value decile dummy is \$2.5 million in column 1 and \$2.3 million in column 2. The coefficient on the highest book-to-market decile is significant in each of the eight cross-sectional regressions. Hence, the book-to-market effect on insider trading is present in all sample years, and the results in Table III are not driven by the extreme stock market valuations at the end of the decade.

Finally, the documented pattern of insider sales and purchases across book-to-market deciles could be due to some omitted variable measuring an unobserved heterogeneity across the firms in different deciles. One crude measure of heterogeneity across firms is the industry in which they operate. It is well established that the book-to-market ratios of firms in the same industry tend to move together and that several high-tech industries were characterized by both extreme valuations and high equity-based compensation for managers toward the end of the sample period. To determine whether the book-to-market effect on managerial trading is simply an industry effect, I interact four-digit SIC dummies with year dummies and include them in a regression of net insider

Table IV
Regressions of Insider Purchases on Book-to-Market Deciles and Other Control Variables: Firm Fixed Effects Regressions and Cross-sectional Regressions

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. All dollar values are in units of thousands, that is, a coefficient of 1,000 on a dummy variable indicates a \$1 million change in the dependent variable. The dependent variables are the net dollar value of individual inside purchases (columns 1 and 3) and the firm-year average of the same variable across all managers in a given firm (columns 2 and 4). Coefficient estimates are reported first and robust *t*-statistics with clustering at the manager level (column 1) or firm level (columns 2 and 4) are reported second in each column. The regressions in columns 1 and 2 contain firm fixed effects as independent variables (not reported). For the regression in column 3 the observations for each individual are time-averaged. In column 4, the observations are averaged both over time and across individuals in the same firm; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables			
	Value of Individual Net Purchases of Company Stock (Firm Fixed Effects)	Dollar Value of Net Purchases of Company Stock Averaged by Firm- Years (Firm Fixed Effects)	Value of Individual Net Purchases of Company Stock (Time-Averaged Cross-sectional Regressions)	Value of Net Purchases of Company Stock Averaged by Firms (Time-Averaged Cross-sectional Regressions)
Intercept	6,543	5,279	3,722	4,269
	(6.62)**	(3.68)**	(7.69)**	(5.80)**
Independent Variables				
B/M-decile				
1 (Growth)	-2,306	-2,227	-2,648	-2,849
	(9.02)**	(6.03)**	(8.88)**	(7.12)**
2 (Growth)	-1,023	-998	-1,668	-1,972
	(5.35)**	(3.55)**	(8.80)**	(7.28)**
3 (Growth)	-825	-846	-1,400	-1,534
	(5.13)**	(3.58)**	(8.45)**	(6.69)**
4 (Growth)	-559	-572	-962	-827
	(3.87)**	(2.63)**	(6.43)**	(4.70)**
5 (Growth)	-497	-519	-811	-739
	(3.72)**	(2.57)*	(6.82)**	(4.27)**
6 (Growth)	-149	-190	-582	-504
	(1.18)	(1.03)	(5.17)**	(3.17)**
7 (Growth)	-79	-87	-349	-349
	(0.71)	(0.52)	(3.38)**	(2.25)*
8 (Growth)	-102	-90	-394	-227
	(1.01)	(0.59)	(3.64)**	(1.56)
9 (Growth)	-177	-212	-170	-325
	(2.21)*	(1.76)	(1.65)	(1.48)
10 (Value)	-	-	-	-

Dollar value of equity stake	-0.0014	(3.37)**	-0.0011	(2.11)*	-0.00239	(1.87)	-0.0010	(0.68)
Intrinsic value of exercisable options	-0.0013	(1.87)	-0.0015	(1.65)	-0.00658	(1.03)	-0.0023	(0.37)
Intrinsic value of unexercisable options	-0.0365	(2.52)*	-0.0269	(1.40)	-0.05082	(1.81)	-0.0548	(1.28)
Dollar value of stock grants	-0.0737	(3.51)**	-0.1039	(7.42)**	-0.07102	(1.96)	0.0160	(0.13)
Black-Scholes value of option grants	-0.0626	(1.78)	-0.1378	(2.44)*	-0.17857	(2.53)*	-0.3026	(3.57)**
Dollar change in value of equity stake in current year	-0.0003	(0.46)	-0.0019	(1.31)	0.00003	(0.02)	-0.0039	(1.59)
Dollar change in value of equity stake in prior year	0.0006	(3.37)**	0.0006	(1.72)	0.00012	(0.35)	-0.0003	(1.24)
Total return volatility ($t - 2$)	-23	(0.04)	189	(0.25)	-3,196	(7.82)**	-3,955	(5.36)**
Change in total return volatility ($t - 1$)	971	(2.33)*	996	(1.62)	-1,119	(1.64)	201	(0.09)
Change in total return volatility (t)	32	(0.11)	226	(0.51)	-83	(0.16)	-1,564	(0.97)
Log of total assets	-1,058	(7.48)**	-896	(4.25)**	-369	(7.25)**	-424	(5.74)**
Year dummies	Yes		Yes		No		No	

Table V
Regressions of Insider Purchases on Book-to-Market Deciles and Other Control Variables: Fama-MacBeth and Industry-Year Fixed Effects Regressions

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. All dollar values are in units of thousands, that is, a coefficient of 1,000 on a dummy variable indicates a \$1 million change in the dependent variable. The dependent variables are the net dollar value of individual inside purchases (columns 1 and 3) and the firm-year average of the same variable across all managers in a given firm (columns 2 and 4). The coefficients in columns 1 and 2 are the time-series averages of the coefficients from separate cross-sectional regressions for each year from 1993 to 2000. Industry fixed effects based on four-digit SIC codes are interacted with year dummies in columns 3 and 4 (not reported). Coefficient estimates are reported first and robust *t*-statistics with clustering at the manager level (column 3) or firm level (column 4) second; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables			
	Value of Individual Net Purchases of Stock (Fama- MacBeth Regressions)	Value of Net Purchases of Stock Averaged by Firm- Years (Fama- MacBeth Regressions)	Value of Individual Net Purchases of Stock (Industry-Year Fixed Effects)	Value of Net Purchases of Stock Averaged by Firm- Years (Industry- Year Fixed Effects)
	2,946 (2.57)*	2,279 (2.18)*	5,083 (6.47)**	4,563 (4.30)**
Intercept				
Independent Variables				
B/M-decile				
1 (Growth)	-2,454 (4.55)**	-2,305 (5.42)**	-3,684 (13.95)**	-3,379 (9.14)**
2 (Growth)	-1,358 (5.53)**	-1,318 (6.36)**	-1,861 (9.91)**	-1,790 (6.78)**
3 (Growth)	-1,216 (4.53)**	-1,126 (3.75)**	-1,539 (9.64)**	-1,469 (6.31)**
4 (Growth)	-846 (5.08)**	-729 (5.12)**	-1,057 (7.87)**	-939 (4.81)**
5 (Growth)	-843 (5.80)**	-805 (5.49)**	-1,037 (7.47)**	-995 (4.90)**
6 (Growth)	-390 (4.22)**	-326 (3.90)**	-583 (4.89)**	-492 (2.71)**
7 (Growth)	-423 (3.59)**	-428 (3.87)**	-598 (5.33)**	-558 (3.47)**
8 (Growth)	-298 (4.04)**	-249 (3.05)**	-349 (3.73)**	-279 (2.05)**
9 (Growth)	-209 (2.18)*	-239 (2.08)*	-155 (1.81)*	-152 (1.19)
10 (Value)	-	-	-	-

Dollar value of equity stake	-0.0060	(3.58)**	-0.0045	(2.77)**	-0.0015	(3.50)**	-0.0013	(3.83)**
Intrinsic value of exercisable options	-0.0746	(4.02)**	-0.0727	(3.68)**	-0.0013	(1.46)	-0.0010	(0.67)
Intrinsic value of unexercisable options	-0.1165	(3.57)**	-0.1409	(3.17)**	-0.0574	(3.66)**	-0.0649	(3.53)**
Dollar value of stock grants	-0.1037	(1.08)	-0.0267	(0.17)	-0.0673	(3.57)**	-0.0846	(9.50)**
Black-Scholes value of option grants	-0.1764	(4.26)**	-0.2422	(4.35)**	-0.0811	(1.87)*	-0.1701	(2.86)**
Dollar change in value of equity stake in current year	-0.0004	(0.17)	-0.0030	(0.68)	-0.0003	(0.50)	-0.0020	(2.03)**
Dollar change in value of equity stake in prior year	0.0029	(1.60)	0.0019	(0.70)	0.0007	(2.89)**	0.0005	(2.70)**
Total return volatility ($t - 2$)	-2.371	(2.54)*	-1.927	(2.25)*	-1.243	(3.39)**	-1.013	(1.95)**
Change in total return volatility ($t - 1$)	-8	(0.03)	54	(0.18)	748	(2.01)**	835	(1.52)
Change in total return volatility (t)	-96	(0.17)	197	(0.37)	-76	(0.24)	246	(0.54)
Log of total assets	-293	(2.68)**	-221	(2.25)*	-492	(10.62)**	-401	(6.13)**
Industry-year dummies	No		No		Yes		Yes	

purchases on the book-to-market decile dummies and other controls. The results are reported in column 3 of Table V and show that the book-to-market effect on insider trading remains large and statistically highly significant. Repeating the regression with firm-year averages for both the dependent and the control variables confirms this result (column 4). Finally, the regressions from Table III are repeated with firms ranked using either the cash flow-to-price ratio or the earnings-to-price ratio (Lakonishok, Shleifer, and Vishny (1994)). The insider trading patterns across valuation deciles are quantitatively and qualitatively similar to rankings by book-to-market and are omitted to conserve on space.

E. Open Market Purchases of Company Equity by Managers

The results presented in the previous sections show that managers in high valuation firms dispose of company shares more aggressively than managers in low valuation firms. These findings are consistent with the hypothesis that managers believe their firms to be mispriced by the market and that this perception of mispricing is correlated with the scaled-price ratios. Managers seem to view value firms as relatively undervalued by the stock market, and managers are reluctant to sell at prices perceived as below fundamental value. Growth firms, on the other hand, are seen as overvalued (or at least not sufficiently undervalued to forgo the benefits of diversification) and managers sell them at the first opportunity.

The results presented in Tables III–V could be entirely driven by different rates at which managers in value and growth firms sell the equity they receive as compensation. The coefficients do not allow one to directly observe whether some managers are purchasing equity in their employer, nor note how any purchasing activity is distributed across the valuation deciles. There are at least two reasons why equity purchases by managers are of special interest: The first reason is that perceived undervaluation, if sufficiently large, should lead managers to purchase additional shares with their own money. The second reason is that company stock purchases by value managers cannot be explained by missing controls for the diversification and rebalancing motives. The controls for the noninformation motives for insider sales used in the regressions are likely to be imperfect. It is at least theoretically possible that an important control variable has been omitted and that the included controls understate the diversification motive for managers in growth firms relative to managers in value firms. An obvious candidate for an omitted control is the private wealth of managers. If, for given levels of compensation and stock and option holdings in the firm, value managers tend to have more outside wealth than growth managers, then growth managers may feel more pressure to diversify away from company stock.

The same concern does not apply to equity purchases by managers. Even if, *ceteris paribus*, value managers were richer and had a higher effective risk tolerance with regard to company stock, they should still not purchase company equity unless they believe the stock to be undervalued. Assuming that on average managers agree with the valuations produced by the stock market, the

number of managers who regard their firms as undervalued should equal the number of managers who regard their firms as overvalued. Disregarding all other motives for trading, this implies that the number of net sellers should be equal to the number of net buyers. Once diversification and consumption motives are taken into account, the number of inside sellers should always exceed the number of inside buyers. Finding a subset of firms in which the number of buyers systematically exceeds the number of sellers is evidence that these firms are regarded as undervalued by their own managers. Hence, finding a concentration of managerial equity purchases in low valuation firms would indeed suggest that managers' perceptions of mispricing is not randomly distributed across firms and that managers in value firms tend to regard their firms as undervalued.¹⁸

Table VI shows that equity purchases by managers increase strongly in the book-to-market ratio and exceed inside sales in value firms. Panel A of Table VI reports the relative proportion of managers in each book-to-market decile who are net purchasers and net sellers of company stock. In book-to-market decile nine, 49% of executives purchase equity on the open market, while only 40% sell equity. In the top book-to-market decile, 54% of executives buy additional equity and only 33% sell. The differences are statistically highly significant. This is strong evidence that managers in value firms tend to view their own stock as undervalued by the market. A concern is that the standard errors in Panel A may be understated if trading is correlated across managers in the same firm. An even more stringent test compares the number of firms with majority buying to the number of firms with majority selling (Panel B) or compares the number of firms with only buyers to the number of firms with only sellers (Panel C). These classifications lead to similar results, with inside buying significantly exceeding inside selling in low valuation firms.

Further evidence that the desire of managers to purchase equity in their firms is linked to relative valuation levels is provided in Table VII. A dummy variable is created and set to one for managers who are net purchasers of company stock and to zero for managers who are net sellers. This dummy variable is then regressed in a probit framework on the book-to-market decile dummies and the same set of control variables as in Table III. Controlling for equity and option holdings and recent stock price movements, the probability that a manager is a net buyer of company stock is found to be strongly increasing in book-to-market (column 1). The implied probability that a manager is a net purchaser of company stock rises from 26.9% in growth firms to 52.3% in value firms.¹⁹ This pattern also holds when the dependent variable is a dummy variable set to one if there are more net buyers in a firm-year than net sellers (column 2), and when the dependent variable is a dummy variable set to one if there are only net buyers and no net sellers in a firm-year (column 3). All control variables are replaced by their firm-year averages for the regressions in columns 2 and 3.

¹⁸ Section V discusses several alternative hypotheses.

¹⁹ The implied probabilities are calculated by evaluating the probit model at the means of all explanatory variables with the exception of the book-to-market decile dummies.

Table VI
Comparing the Frequency of Buyers and Sellers across
Book-to-Market Deciles

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. A manager is defined as a net buyer (seller) if the number of shares purchased on the open market is larger (smaller) than the number of shares sold. Standard errors are reported in parentheses.

Panel A				
B/M Deciles	Percentage of Net Buyers (SE)		Percentage of Net Sellers (SE)	
1 (Growth)	24%	(0.66%)	68%	(0.72%)
2 (Growth)	28%	(0.69%)	64%	(0.74%)
3 (Growth)	30%	(0.71%)	60%	(0.76%)
4 (Growth)	34%	(0.74%)	56%	(0.77%)
5 (Growth)	35%	(0.73%)	55%	(0.76%)
6 (Growth)	37%	(0.74%)	51%	(0.77%)
7 (Growth)	41%	(0.75%)	48%	(0.77%)
8 (Growth)	42%	(0.76%)	46%	(0.76%)
9 (Growth)	49%	(0.77%)	40%	(0.76%)
10 (Value)	54%	(0.77%)	33%	(0.73%)
Panel B				
B/M Deciles	Percentage of Firms with More Buyers Than Sellers (SE)		Percentage of Firms with More Sellers Than Buyers (SE)	
1 (Growth)	19%	(1.19%)	72%	(1.38%)
2 (Growth)	23%	(1.30%)	67%	(1.44%)
3 (Growth)	26%	(1.34%)	62%	(1.49%)
4 (Growth)	29%	(1.39%)	57%	(1.52%)
5 (Growth)	30%	(1.41%)	59%	(1.51%)
6 (Growth)	36%	(1.47%)	52%	(1.53%)
7 (Growth)	39%	(1.49%)	49%	(1.53%)
8 (Growth)	42%	(1.51%)	45%	(1.53%)
9 (Growth)	50%	(1.53%)	39%	(1.50%)
10 (Value)	56%	(1.52%)	31%	(1.42%)
Panel C				
B/M Deciles	Percentage of Firms with Only Buyers and No Sellers (SE)		Percentage of Firms with Only Sellers and No Buyers (SE)	
1 (Growth)	9%	(0.90%)	47%	(1.54%)
2 (Growth)	10%	(0.93%)	41%	(1.51%)
3 (Growth)	13%	(1.03%)	41%	(1.52%)
4 (Growth)	15%	(1.13%)	35%	(1.49%)
5 (Growth)	14%	(1.08%)	34%	(1.46%)
6 (Growth)	19%	(1.21%)	33%	(1.45%)
7 (Growth)	20%	(1.23%)	29%	(1.40%)
8 (Growth)	23%	(1.30%)	29%	(1.41%)
9 (Growth)	31%	(1.43%)	25%	(1.34%)
10 (Value)	37%	(1.51%)	20%	(1.24%)

Table VII
Probit Regressions of "Buyer Dummy" on Book-to-Market Deciles and Other Control Variables

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. The dependent variable in column 1 is a dummy taking a value of one if the value of net purchases for a manager is positive and zero otherwise. The dependent variable in column 2 is a dummy taking a value of one if more managers are net buyers than net sellers in a firm-year and zero otherwise. The dependent variable in column 3 is a dummy taking a value of one if all managers in a firm-year are buyers of company stock (or do nothing) and no managers are net sellers and zero otherwise. All dollar values are in units of thousands. Coefficient estimates are reported first and robust *z*-statistics with clustering at the manager level (column 1) or firm level (columns 2 and 3) are reported second in each column; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables		
	Dummy Variable for Manager Being a Net Buyer in a Firm-Year	Dummy Variable for More Net Buyers Than Net Sellers in a Firm-Year	Dummy Variable for Only Net Buyers and No Net Sellers in a Firm-Year
Intercept	0.49	(6.72)**	0.35 (2.26)* -0.09 (0.50)
Independent Variables			
B/M-decile			
1 (Growth)	-0.67	(18.16)**	-0.76 (9.56)** (7.26)**
2 (Growth)	-0.59	(17.18)**	-0.69 (9.34)** (9.89)**
3 (Growth)	-0.57	(17.15)**	-0.68 (9.74)** (9.22)**
4 (Growth)	-0.49	(14.73)**	-0.64 (9.37)** (8.53)**
5 (Growth)	-0.47	(14.51)**	-0.61 (9.12)** (9.40)**
6 (Growth)	-0.42	(12.87)**	-0.45 (6.73)** (7.36)**
7 (Growth)	-0.34	(10.75)**	-0.42 (6.47)** (7.45)**
8 (Growth)	-0.31	(9.70)**	-0.34 (5.31)** (5.57)**
9 (Growth)	-0.15	(5.08)**	-0.17 (2.74)** (2.51)*
10 (Value)	-	-	-

(continued)

Table VII—Continued

	Dependent Variables			
	Dummy Variable for Manager Being a Net Buyer in a Firm-Year	Dummy Variable for More Net Buyers Than Net Sellers in a Firm-Year	Dummy Variable for Only Net Buyers and No Net Sellers in a Firm-Year	
Intercept	0.49 (6.72)**	0.35 (2.26)*	-0.09 (0.50)	
Dollar value of equity stake	-0.00000031 (2.45)*	-0.0000012 (2.55)*	-0.00000128 (1.30)	
Intrinsic value of exercisable options	-0.00000129 (0.95)	-0.0000164 (2.73)**	-0.00002871 (3.22)**	
Intrinsic value of unexercisable options	-0.00000134 (0.89)	-0.0000139 (1.73)	-0.00001222 (1.16)	
Dollar value of stock grants	-0.00002244 (1.16)	-0.0000323 (0.54)	-0.00010456 (1.64)	
Black-Scholes value of option grants	-0.00000084 (0.42)	-0.0000140 (1.16)	0.00000602 (0.93)	
Dollar change in value of equity stake in current year	0.00000009 (1.95)	-0.0000024 (3.07)**	-0.00000369 (2.79)**	
Dollar change in value of equity stake in prior year	0.00000004 (2.06)*	0.0000001 (1.19)	-0.00000241 (1.44)	
Total return volatility ($t - 2$)	-1.01 (15.77)**	-0.83 (6.13)**	-0.43 (2.91)**	
Change in total return volatility ($t - 1$)	-0.56 (6.70)**	-0.38 (2.17)*	-0.11 (0.61)	
Change in total return volatility (t)	-0.14 (2.18)*	0.01 (0.07)	0.08 (0.57)	
Log of total assets	-0.02 (2.18)*	0.00 (0.02)	-0.02 (1.41)	
Year dummies	Yes	Yes	Yes	

The results in this section show that managers in value firms aggressively purchase equity in their employers. This finding seems hard to reconcile with the notion that value managers on average agree with the market valuation of their firms, and instead suggests that they tend to view their firms as undervalued. Taking the results from Sections II.C, II.D, and II.E together, managers behave like contrarians in their insider trading behavior. Managers seem to view low valuation firms as temporarily undervalued, are at least reluctant to sell, and often even decide to purchase additional shares. Growth firms are seen as overvalued (or at least not sufficiently undervalued to forgo the benefits of diversification) and managers sell them at the first opportunity.

III. Insider Trading and Equity Issuance

The findings in the previous section are important in light of the close empirical relationship between corporate decisions and the scaled-price ratios. Capital structure changes in particular seem to be closely related to the level of stock prices, as emphasized by Jung, Kim, and Stulz (1996) and especially Baker and Wurgler (2002). Several explanations have been advanced for this relationship. The results on insider trading presented above suggest that a perception of mispricing by managers is a prime hypothesis for explaining the joint evidence on insider trading and corporate decisions. This section provides direct evidence on the relationship between capital structure changes and managers' perceptions of misvaluation.

With both equity issues and insider sales associated with growth firms in the data, the obvious question is whether the two are directly linked. Karpoff and Lee (1991) and Kahle (2000) show that insider selling increases and purchasing decreases in the months prior to SEOs. The motivation behind the insider sales associated with SEOs is not clear. SEOs tend to occur after recent price run-ups, implying that managers may mechanically rebalance their portfolios. Even more importantly, SEOs are concentrated in low book-to-market firms in which managers tend to have larger equity holdings, implying that managers' needs to rebalance are likely to be stronger than that in control firms with similar price run-ups. Controlling for recent changes in the value of managerial holdings allows one to control for the rebalancing motive and to get at the motivation for the increased selling activity by insiders.

I use two measures of equity issuance activity. The first one is simply SEOs as reported by the Securities Data Corporation (SDC) and is the measure used by Karpoff and Lee (1991) and Kahle (2000). This results in 712 firm-years with reported SEOs. The second measure is similar to the one used by Baker and Wurgler (2002) and uses balance sheet information from Compustat to back out the change in paid-in share capital during each fiscal year. Using the identity that book equity equals balance sheet retained earnings plus paid-in share capital, net equity issues are defined as the change in book equity minus

Table VIII
The Distribution of SEOs and Net Equity Issuers across
Book-to-Market Deciles

The sample consists of 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. Seven hundred and twelve firm-years have seasoned equity issues recorded in the SDC database. The distribution of these firm-years across book-to-market deciles is reported in column 1. In column 2, net equity issues are defined as the change in book equity, minus the change in balance sheet retained earnings, divided by total assets. This definition follows Baker and Wurgler (2002). A firm is defined as an "issuer" if net equity issues are larger than +5%.

	Percentage of Firms with SEOs (SDC Database)	Percentage of Firms with Net Equity Issuance (Baker–Wurgler)
Full Sample	7%	18%
B/M deciles		
1 (Growth)	12%	42%
2 (Growth)	9%	29%
3 (Growth)	9%	23%
4 (Growth)	6%	17%
5 (Growth)	7%	18%
6 (Growth)	6%	15%
7 (Growth)	5%	13%
8 (Growth)	5%	12%
9 (Growth)	4%	8%
10 (Value)	4%	6%

the change in balance sheet retained earnings divided by total assets.²⁰ A firm is labeled an equity issuer if its net equity issuance in any given fiscal year is larger than 5% of total assets.

The empirical regularity that growth firms tend to issue equity more frequently than value firms is confirmed in the data set used in this paper. Table VIII reports the frequency of equity issuance for the full sample of firms and for the subsamples as sorted by book-to-market decile. Column 1 reports the frequency of SEOs as reported by SDC, and column 2 reports the frequency of equity issuers using the Baker–Wurgler measure. Both measures agree that equity issues are more frequent among growth firms than value firms. According to the SDC data, the percentage of issuing firms drops from 12% in the growth decile to 4% in the value decile. According to the change in paid-in capital, the percentage of issuers drops monotonically from 42% among growth firms to 6% among value firms.

Tables IX and X examine whether equity issuance activity and insider trading by managers are directly related. In Table IX, a dummy variable is created

²⁰ For the purpose of calculating net equity issues, book equity is defined as total book assets less total liabilities less the value of preferred stock. Preferred stock is measured as the liquidating value if available, or else as the redemption value if available, and finally as the carrying value if both the other measures are missing. Unlike Baker and Wurgler (2002), I do not add convertible debt to book equity. Doing so does not change any of the results.

Table IX
Regressions of Insider Purchases on Book-to-Market Deciles and Other Control Variables
Seasoned Equity Issues as Reported by SDC

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. All dollar values are in units of thousands, that is, a coefficient of 1,000 on a dummy variable indicates a \$1 million change in the dependent variable. The dependent variables are the net dollar value of individual inside purchases (columns 1 and 3) and the firm-year average of the same variable across all managers in a given firm (columns 2 and 4). Coefficient estimates are reported first and robust *t*-statistics with clustering at the manager level (columns 1 and 3) or firm level (columns 2 and 4) are reported second in each column. A firm is defined as an "issuer" in a given year if a seasoned equity issue is recorded in the SDC database for the same year; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables			
	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years
Intercept	4,872	3,986	4,838	3,939
	(12.68)**	(8.02)**	(12.58)**	(7.92)**
Independent Variables				
B/M-decile				
1 (Growth)	-3,661	-3,316	-3,590	-3,228
	(15.81)**	(10.77)**	(15.39)**	(10.41)**
2 (Growth)	-1,982	-1,902	-1,920	-1,825
	(13.36)**	(9.62)**	(12.80)**	(9.11)**
3 (Growth)	-1,578	-1,475	-1,516	-1,399
	(12.63)**	(8.85)**	(12.04)**	(8.41)**
4 (Growth)	-1,186	-1,074	-1,162	-1,044
	(11.65)**	(7.80)**	(11.51)**	(7.67)**
5 (Growth)	-1,091	-1,030	-1,067	-1,001
	(10.79)**	(7.82)**	(10.82)**	(7.79)**
6 (Growth)	-658	-584	-634	-555
	(7.68)**	(4.86)**	(7.41)**	(4.60)**
7 (Growth)	-609	-579	-584	-549
	(7.54)**	(5.20)**	(7.21)**	(4.95)**
8 (Growth)	-435	-373	-448	-382
	(5.91)**	(3.95)**	(6.07)**	(4.05)**
9 (Growth)	-324	-341	-325	-337
	(4.65)**	(3.54)**	(4.66)**	(3.51)**
10 (Value)	-	-	-	-

(continued)

Table IX—Continued

	Dependent Variables					
	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years
Intercept	4,872 (12.68)**	3,986 (8.02)**	4,838 (12.58)**	3,939 (7.92)**		
SEO dummy	-1,448 (7.63)**	-1,588 (6.14)**	-	-	-	-
Issuer B/M 1-3 (Growth)	-	-	-1,869 (5.21)**	-2,097 (4.27)**	-	-
Issuer B/M 4-7	-	-	-1,398 (5.20)**	-1,504 (4.14)**	-	-
Issuer B/M 8-10 (Value)	-	-	-619 (3.21)**	-618 (2.45)*	-	-
Dollar value of equity stake	-0.0015 (3.46)**	-0.0013 (3.83)**	-0.0015 (3.47)**	-0.0013 (3.84)**	-	-
Intrinsic value of exercisable options	-0.0015 (1.65)	-0.0019 (1.47)	-0.0015 (1.65)	-0.0020 (1.48)	-	-
Intrinsic value of unexercisable options	-0.0612 (3.82)**	-0.0624 (2.64)**	-0.0613 (3.82)**	-0.0626 (2.65)**	-	-
Dollar value of stock grants	-0.0738 (3.56)**	-0.1009 (7.40)**	-0.0739 (3.56)**	-0.1011 (7.42)**	-	-
Black-Scholes value of option grants	-0.0961 (2.08)*	-0.1870 (3.20)**	-0.0962 (2.08)*	-0.1872 (3.21)**	-	-
Dollar change in value of equity stake in current year	-0.0004 (0.66)	-0.0025 (2.46)*	-0.0004 (0.66)	-0.0025 (2.47)*	-	-
Dollar change in value of equity stake in prior year	0.0007 (2.67)**	0.0005 (2.44)*	0.0007 (2.67)**	0.0005 (2.43)*	-	-
Total return volatility ($t - 2$)	-3,148 (10.98)**	-2,635 (6.95)**	-3,131 (10.89)**	-2,613 (6.90)**	-	-
Change in total return volatility ($t - 1$)	-619 (2.09)*	-410 (1.03)	-621 (2.10)*	-408 (1.03)	-	-
Change in total return volatility (t)	-722 (2.90)**	-300 (0.85)	-728 (2.93)**	-306 (0.87)	-	-
Log of total assets	-474 (11.87)**	-387 (7.40)**	-475 (11.90)**	-388 (7.41)**	-	-
Year dummies	Yes	Yes	Yes	Yes	-	-

Table X
Regressions of Insider Purchases on Book-to-Market Deciles and Other Control Variables
Net Equity Issues

The sample consists of 42,131 person-firm-year and 10,658 firm-year observations in the S&P ExecuComp database from 1993 to 2000. All firm-years are pooled, ranked by book-to-market (B/M), and sorted into 10 B/M deciles. The value of net share purchases is calculated as the change in the number of shares held, minus the number of shares acquired through option exercises and grants, multiplied by the year-end stock price. All dollar values are in units of thousands, that is, a coefficient of 1,000 on a dummy variable indicates a \$1 million change in the dependent variable. The dependent variables are the net dollar value of individual inside purchases (columns 1 and 3) and the firm-year average of the same variable across all managers in a given firm (columns 2 and 4). Coefficient estimates are reported first and robust *t*-statistics with clustering at the manager level (columns 1 and 3) or firm level (columns 2 and 4) are reported second in each column. Net equity issues are defined as the change in book equity minus the change in balance sheet retained earnings divided by total assets. This definition follows Baker and Wurgler (2002). A firm is defined as an "issuer" in a given year if net equity issues are larger than +5% in the same year; * and ** indicate significance at the 10% and 5% level, respectively.

	Dependent Variables			
	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm- Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm- Years
Intercept	4,554	3,715	4,499	3,678
	(12.16)**	(7.50)**	(12.08)**	(7.44)**
Independent Variables				
B/M-decile				
1 (Growth)	-3,451	-3,149	-3,210	-2,966
	(14.88)**	(10.00)**	(13.70)**	(9.13)**
2 (Growth)	-1,858	-1,811	-1,675	-1,670
	(12.58)**	(9.05)**	(11.07)**	(8.06)**
3 (Growth)	-1,488	-1,420	-1,335	-1,301
	(11.91)**	(8.35)**	(10.48)**	(7.45)**
4 (Growth)	-1,109	-1,018	-1,151	-1,042
	(10.91)**	(7.35)**	(11.40)**	(7.60)**
5 (Growth)	-990	-953	-1,033	-978
	(9.86)**	(7.19)**	(10.50)**	(7.56)**
6 (Growth)	-611	-548	-642	-566
	(7.13)**	(4.50)**	(7.55)**	(4.60)**
7 (Growth)	-567	-547	-588	-556
	(6.97)**	(4.81)**	(7.19)**	(4.83)**
8 (Growth)	-390	-334	-420	-357
	(5.27)**	(3.46)**	(5.59)**	(3.66)**
9 (Growth)	-290	-314	-302	-321
	(4.15)**	(3.24)**	(4.34)**	(3.34)**
10 (Value)	-	-	-	-

(continued)

Table X—Continued

	Dependent Variables					
	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years	Value of Individual Net Purchases of Stock	Value of Net Purchases of Stock Averaged by Firm-Years
Intercept	4,554	(12.16)**	3,715	(7.50)**	4,499	(12.08)**
Net equity issuers	–1,149	(10.22)**	–1,003	(6.83)**	–	–
Issuer B/M 1–3 (Growth)	–		–		–1,715	(8.41)**
Issuer B/M 4–7	–		–		–744	(5.45)**
Issuer B/M 8–10 (Value)	–		–		–597	(3.19)**
Dollar value of equity stake	–0.0015	(3.40)**	–0.0013	(3.56)**	–0.0015	(3.39)**
Intrinsic value of exercisable options	–0.0015	(1.66)	–0.0021	(1.50)	–0.0015	(1.68)
Intrinsic value of unexercisable options	–0.0586	(3.58)**	–0.0584	(2.36)*	–0.0582	(3.58)**
Dollar value of stock grants	–0.0747	(3.58)**	–0.1027	(7.55)**	–0.0754	(3.58)**
Black-Scholes value of option grants	–0.0938	(2.05)*	–0.1861	(3.13)**	–0.0930	(2.04)*
Dollar change in value of equity stake in current year	–0.0004	(0.62)	–0.0023	(2.41)*	–0.0004	(0.61)
Dollar change in value of equity stake in prior year	0.0006	(2.72)**	0.0005	(2.48)*	0.0007	(2.75)**
Total return volatility ($t - 2$)	–2,460	(9.14)**	–2,084	(5.68)**	–2,388	(8.92)**
Change in total return volatility ($t - 1$)	–362	(1.25)	–231	(0.58)	–302	(1.04)
Change in total return volatility (t)	–589	(2.35)*	–223	(0.62)	–585	(2.34)*
Log of total assets	–466	(11.82)**	–383	(7.30)**	–470	(11.91)**
Year dummies	Yes		Yes		Yes	
					Yes	Yes
					–387	(7.35)**
					0.0005	(2.50)*
					–2,033	(5.57)**
					–196	(0.49)
					–219	(0.61)
					–387	(7.35)**

for issuing firms reported in the SDC database. This dummy is used as an additional explanatory variable in a regression of the net value of insider purchases on the book-to-market decile dummies and the same set of controls as in Table III. The results in column 1 indicate that managers sell \$1.4 million more equity in the year of an equity issue than in years with no issuance, holding everything else constant. Repeating the analysis on firm-year averages produces the same result, with the additional selling rising to \$1.6 million (column 2). Thus, equity issuance and insider sales are positively correlated even when controlling for valuation levels.

To assess whether the increase in managerial equity sales differs between value and growth firms, the dummy variable for equity issuers is interacted with the dummies for the book-to-market deciles. Given the relatively small number of SDC-reported SEOs in my sample of firms, using interaction terms for each book-to-market decile makes the estimated coefficients excessively noisy. I therefore create three interaction terms only, for the three lowest book-to-market deciles (growth), for the intermediate four deciles (intermediate) and for the top three book-to-market deciles (value). The results in column 3 of Table IX show that managers in issuing firms sell more equity across all book-to-market deciles. In the three-value deciles, managers in issuing firms sell an additional \$619,000 worth of equity. The effect gets larger as the book-to-market ratio falls, with managers in issuing growth firms selling an additional \$1.87 million. The difference between issuers and nonissuers as well as the difference between issuing value and growth firms is statistically significant. The decision to issue equity is associated with large insider sales and more strongly so for growth firms than for value firms. Capital structure decisions and insider trading decisions are jointly supportive of the hypothesis that managers opportunistically time the stock market to take advantage of perceived misvaluations. Repeating the analysis using firm-year averages rather than individual managers strengthens this result (column 4).

Table X repeats the analysis of the joint effect of book-to-market and issuance activity on insider trading, but uses the Baker–Wurgler measure of equity issuance to identify issuing firms. The results are quantitatively and qualitatively similar to the ones using SEOs identified from the SDC database. Managers in issuing firms sell an additional \$1.1 million worth of equity compared to managers in nonissuing firms. The difference rises to \$1.72 million for managers in issuing growth firms, and the effect is again smallest for issuing value firms at \$597,000.

IV. Interpretation and Alternative Hypotheses

Contrarian views by managers with regard to the valuation of their firms are a straightforward explanation for the joint evidence on insider trading and seasoned equity issuance presented so far. Managers' perceptions of mispricing does not seem to be randomly distributed across firms. Instead, managers appear to be contrarians, acting on their contrarian views both in their insider trading and in their equity issuance decisions. Seasoned equity issues

are concentrated among high valuation firms, which are also associated with intense inside selling. Among high valuation firms, inside sales are distinctly higher for issuing firms than for nonissuers, suggesting that both activities may be due to the same motivation.

While the evidence presented is consistent with the view that managers try to take advantage of perceived mispricing, it does not prove that this is the case. Alternative explanations might invoke changing investment opportunity sets, variation in the degree of asymmetric information over time and across firms, and signaling theories. I discuss these alternative explanations below and argue that they have considerable difficulty explaining the joint evidence on insider trading and equity issuance patterns.

A. The Changing Investment Opportunities View

High valuation firms may be issuing seasoned equity because they have good investment opportunities and thus want to reduce leverage (Myers (1977)). Low valuation firms, on the other hand, may have bad investment opportunities and may not require outside funding. This hypothesis is consistent with the observation in, among others, Jung et al. (1996) and Hovakimian, Opler, and Titman (2001) that firms tend to issue new equity whenever market valuations are high relative to book values. Moreover, this hypothesis can potentially explain both the cross-sectional and the time-series variation in equity issues.²¹ The changing investment opportunities view does not predict a cross-sectional relation between insider trades and the book-to-market ratio and does not predict a relation between insider trades and equity issues.

The evidence in Tables VIII–X suggests that variations in investment opportunities alone are unable to explain the joint pattern of insider trades and equity issuances. In particular, the hypothesis fails to provide a rationale as to why managers would sell their equity holdings whenever investment opportunities are supposedly good. Similarly, no explanation is given for why managers in value firms with bad investment opportunities would be more inclined to hold on to their shares and to purchase more shares with their own money. While variation in investment opportunities almost definitely plays a role in firms' decisions to issue equity, it does not seem to be the only factor determining managers' actions.

B. The Variation in Asymmetric Information View

While the variation in asymmetric information hypothesis is per se a more promising explanation for the observed patterns, it also turns out to be inconsistent with the data. Asymmetric information may be low in high valuation firms (Lucas and McDonald (1990), Choe et al. (1993), Bayless and Chaplinsky

²¹ This is true even if time-invariant asymmetric information is prevalent (Myers (1984), Myers and Majluf (1984), Jung et al. (1996)) and firms follow a pecking order, issuing equity only when all other sources of funds are exhausted.

(1996)). Low asymmetric information implies small bid-ask spreads and price impacts for trades (Kyle (1985), Admati and Pfleiderer (1988)). Hence, insider sales are cheaper to execute and therefore more attractive. At the same time, growth firms may be known to have good investment opportunities, making the adverse selection problem for equity issues less severe. Under this hypothesis, growth firms are characterized by high liquidity for stock trades and little negative price impact from seasoned equity issues.²²

Value firms, on the other hand, may be associated with high asymmetric information and an illiquid market for company stock. Value firms are also not known for good investment opportunities, and equity issues suffer from severe adverse selection discounts. Thus, both insider sales and primary seasoned equity issues are expensive to execute and therefore rare. What would be incompatible with an illiquid market for company stock is pronounced inside buying by managers in value firms. Since spreads are predicted to be high, these managers would incur large transaction costs when purchasing shares. All they would receive in return is exposure to idiosyncratic risk and illiquid stock holdings without any associated benefits.

The results in Tables VI and VII demonstrate a strong tendency by managers in value firms to purchase equity for their own account and generally a strong positive relationship between inside buying and the book-to-market ratio. This is hard to reconcile with the view that variation in asymmetric information and bid-ask spreads is the main driver behind managers' actions. While liquidity may well be higher for growth firms, it does not appear to determine managerial behavior, as evidenced by the tendency of managers to purchase additional equity in value firms. Managers in low valuation firms seem to view their own stock as undervalued.²³

C. The Managerial Signaling View

Another potential explanation for the observed insider trading and equity issuance patterns is that managers are signaling private information to financial markets or other interested parties. According to the signaling hypothesis, managers in value firms find it necessary to signal their confidence in the firm (or themselves) by purchasing equity for their private accounts. Managers in growth firms do not need to do so, probably because financial markets

²² It is important to distinguish between the price impact of trades and the price impact of a seasoned equity issue. The former form of liquidity is determined by the degree and structure of information asymmetry between participants in the secondary market for the stock. The latter form of liquidity is determined by the degree of asymmetric information between managers and investors about the quality of the firm's assets and new projects. There is no a priori reason to expect liquidity in the primary (SEO) market and liquidity in the secondary market to move together in the cross section.

²³ Baker and Stein (2004) argue that high liquidity is indicative of stock market overvaluation and that managers may be following a simple rule of thumb to issue equity whenever liquidity is high. My results are compatible with this hypothesis but indicate that managers are more sophisticated and recognize both under- and overvaluations.

are already convinced of the quality of the investments (or of the managers themselves).

It is impossible to rule out all signaling explanations for the observed patterns, even though it appears highly unlikely that a single signaling story could explain all the results.²⁴ It is plausible that managers of (temporarily) distressed firms may be required to signal their confidence in their firms in equilibrium. It seems less plausible that managers in growth firms would be expected to sell equity in equilibrium. By definition, most of the value of a growth firm is embedded in its growth options, and hence any negative signal sent by managers should have devastating effects on market value.²⁵ It would be most surprising to see managers cash out when raising equity in the market. SEOs are moments in which firms are selling new equity based on the promise of good investment opportunities, and the need for managers to signal confidence in the firms' prospects should be high.

To summarize, the evidence presented in this paper is clearly consistent with the view that managers disagree with the market about the valuation of their firms, that this disagreement is systematically related to valuation levels, and that managers try to take advantage of the perceived mispricing. Without directly observing managers' expectations, it is difficult to provide a conclusive proof that this is the case. Nonetheless, changing investment opportunities, changing liquidity, and signaling stories seem incapable by themselves of explaining the joint evidence on insider trades and equity issuance activity. This does not rule out the possibility that a combination of these explanations could account for the observed patterns or that some alternative explanation drives management behavior. It may be possible, for example, to develop a model in which the optimal equity incentives of managers change with valuation levels in exactly the manner observed. Such a model would have managers in low valuation firms be forced to increase their equity incentives through purchases, and would allow managers in high valuation firms to lower their equity incentives through sales.

V. Subsequent Returns

The empirical results presented above suggest that managers actively increase their exposure to value firms and actively reduce their exposure to growth firms during the sample period. Since the returns on value firms and growth firms, respectively, tend to move together (Fama and French (1992)), the performance of managers' portfolios will largely be determined by how these two categories perform. In periods in which value stocks outperform the overall market, managers will on average do better than the market; the reverse will be true in periods in which growth stocks outperform.

²⁴ The evidence on the stock market reaction to insider trades suggests rather small event returns (Seyhun (1986), Meulbroek (2000)). This is not necessarily incompatible with a signaling story since the equilibrium signal may have been anticipated.

²⁵ In fact, many authors use the presence of growth opportunities as a proxy for information asymmetries between managers and investors. See, for example, Smith and Watts (1992).

It is useful to examine how the managers' picks perform relative to firms in the same size and book-to-market category. The hypothesis advanced in this paper is that managers disagree with the market and that the perceived mispricing is systematically related to book-to-market. If managers' perceptions are based on valid inside information, then managers' picks should outperform firms in the same size and book-to-market categories. If, on the other hand, managers' picks do not outperform relative to a size and book-to-market matched control group, then insider trades are unlikely to be motivated by valid inside information. Managers may simply be reacting to valuation levels and other publicly observable information when making insider trades, or insider trades may be driven by optimal contracting considerations and may have nothing to do with actual or perceived mispricing.

The sample used in this study is not well suited to assess the long-run returns to managers' insider trades. The need to control for noninformation motivated insider trades restricts the analysis to the S&P's ExecuComp sample period from 1992 to 2000. First-differencing the data to extract changes in managerial ownership eliminates an additional year from the sample, leaving a total of eight calendar years. The exact date of the insider trade cannot be determined from the data, and hence performance measurement can only start from the beginning of the next fiscal year. It is important to keep these caveats in mind when interpreting the results.

I measure returns both as absolute returns and as excess returns relative to size and book-to-market matched control portfolios. Returns are calculated starting 0, 1, 3, and 6 months after the end of the fiscal year in which insider trading and equity issues are observed. To calculate excess returns, each firm is matched to its corresponding 10×10 Fama–French size and book-to-market portfolio. The matching portfolios, which are constructed at the end of each June, are the intersections of 10 portfolios formed on size and 10 portfolios formed on the ratio of book equity to market equity. The portfolios for July of year t to June of $t + 1$ include all NYSE, AMEX, and NASDAQ stocks with market equity data for December of $t - 1$ and June of t , and positive book equity data for $t - 1$. The breakpoints and monthly benchmark portfolio returns are taken from Kenneth French's web page. Buy-and-hold returns are measured over 12 months starting 0, 1, 3, and 6 months after the end of the fiscal year for both the sample firm and the control portfolios, and the difference is recorded as the abnormal buy-and-hold return to the sample firm. Significance levels are calculated as empirical p -values by resampling from the original sample with 5,000 repetitions and are based on a one-sided test. Hence, a p -value of 10% means that 10% of the resampled mean returns were smaller than the measured in-sample mean return. Barber, Lyon, and Tsai (1999) have shown that this empirical p -value procedure yields improved power in random samples relative to standard t -values.

Table XI reports the absolute returns and excess returns as a function of managers' insider trades in the preceding year. Panel A reports raw returns and Panel B reports size and book-to-market adjusted excess returns. A firm is defined as "majority buying" in a given year if more managers are net purchasers

Table XI
Total and Excess Stock Returns Subsequent to Insider Trades and SEOs

The sample consists of 10,436 firm-years. Returns are calculated starting 0, 1, 3, and 6 months after the end of the fiscal year in which insider trading and equity issues are observed. To calculate excess returns, each firm is matched to its corresponding 10 × 10 Fama-French size and book-to-market portfolio. The matching portfolios, which are constructed at the end of each June, are the intersections of 10 portfolios formed on size and 10 portfolios formed on the ratio of book equity (BE) to market equity (ME). The size breakpoints for year t are the NYSE market equity deciles at the end of June of t . The BE/ME for June of year t is the book equity in December $t - 1$ divided by ME for December of $t - 1$. The BE/ME breakpoints are NYSE deciles. The portfolios for July of year t to June of $t + 1$ include all NYSE, AMEX, and NASDAQ stocks with market equity data for December of $t - 1$ and June of t , and positive book equity data for $t - 1$. The breakpoints and portfolio return data were made available by Kenneth French. Buy-and-hold returns are measured over 12 months starting 0, 1, 3, and 6 months after the end of the fiscal year for both the sample firm and the control portfolios, and the difference is recorded as the abnormal buy-and-hold return to the sample firm. Significance levels are calculated as empirical p -values by resampling from the original sample with 5,000 repetitions and are based on a one-sided test. Hence, a p -value of 10% means that 10% of the resampled mean returns were smaller than the measured in-sample mean return. Panel A reports raw returns and Panel B reports size and book-to-market adjusted excess returns; *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Panel A: Average Returns over 12 Months Starting 0, 1, 3, and 6 Months after the End of the Fiscal Year t as a Function of Insider Trading in Year t													
Zero-Month Gap between Fiscal Year and Return Measurement Period				One-Month Gap between Fiscal Year and Return Measurement Period				Three-Month Gap between Fiscal Year and Return Measurement Period				Six-Month Gap between Fiscal Year and Return Measurement Period	
	Firm- Years	Stock Return	p -Value	Firm- Years	Stock Return	p -Value	Firm- Years	Stock Return	p -Value	Firm- Years	Stock Return	p -Value	
Majority buying firms	3,695	18.9%	(63.2%)	3,695	17.4%	(56.6%)	3,695	20.4%	(84.2%)	3,658	17.5%	(79.9%)	
Majority selling firms	5,675	17.3%	(8.0%)*	5,675	16.5%	(16.4%)	5,669	17.6%	(4.6%)*	5,631	15.9%	(18.0%)	
Difference	–	1.6%	(87.2%)	–	1.0%	(77.1%)	–	2.8%	(96.0%)*	–	1.6%	(88.4%)	
Pure buying firms	1,966	19.1%	(63.5%)	1,966	17.6%	(59.4%)	1,967	20.9%	(84.8%)*	1,949	18.7%	(92.4%)*	
Pure selling firms	3,478	16.7%	(5.7%)*	3,477	16.3%	(17.5%)	3,474	17.5%	(6.9%)*	3,448	16.0%	(27.6%)	
Difference	–	2.3%	(88.2%)	–	1.3%	(75.7%)	–	3.5%	(95.5%)*	–	2.7%	(93.9%)*	
Nonissuing firms	9,912	19.3%	(86.9%)	9,911	18.0%	(87.4%)	9,904	20.1%	(87.0%)	9,824	17.4%	(89.5%)	
Issuing firms	723	8.0%	(0.0%)*	723	7.3%	(0.0%)*	722	7.8%	(0.0%)*	718	6.0%	(0.0%)*	
Difference	–	11.3%	(100.0%)*	–	10.7%	(100.0%)*	–	12.2%	(100.0%)*	–	11.4%	(100.0%)*	
Issuing firms with majority buying	166	12.1%	(10.6%)	166	8.8%	(3.2%)*	165	13.3%	(14.0%)	165	7.7%	(2.7%)*	
Issuing firms with majority selling	494	7.7%	(0.0%)*	494	8.0%	(0.0%)*	494	6.8%	(0.0%)*	490	6.5%	(0.0%)*	
Difference	–	4.5%	(78.1%)	–	0.9%	(58.2%)	–	6.5%	(85.6%)	–	1.2%	(59.7%)	
Issuing firms with pure buying	86	8.5%	(6.4%)*	86	6.1%	(3.8%)*	86	9.1%	(7.0%)*	86	12.6%	(27.6%)	
Issuing firms with pure selling	325	7.3%	(0.0%)*	325	9.1%	(0.5%)*	325	6.8%	(0.0%)*	321	5.6%	(0.0%)*	
Difference	–	1.1%	(57.6%)	–	–3.0%	(35.9%)	–	2.3%	(63.5%)	–	7.0%	(82.4%)	

than net sellers of equity. A firm is defined as “pure buying” in a given year if all managers are either purchasing equity or doing nothing and at least one manager is buying. Out of a total of 10,436 firm-years with complete data, 3,695 firm-years are majority buying and 5,675 firm-years are majority selling. The difference in subsequent annual returns is between 1.0% and 2.8% and at most marginally statistically significant. Looking at excess returns instead, the difference between majority buying and majority selling firms is between -1.1% and 0.6% and never significant. Comparing pure buying with pure selling firms reveals a similar pattern with a difference between 1.3% and 3.5% in absolute returns with marginal significance, and no significant differences in excess returns. Hence, there is weak evidence that managers’ trades do well in terms of absolute returns, but absolutely no evidence that managers use information not already contained in size and book-to-market. This pattern is similar to Rozeff and Zaman (1988) and Lakonishok and Lee (2001).

Next, I examine the joint predictive power of insider trading and equity issues for subsequent stock returns. Using the seasoned equity issues from the SDC database, there are 723 firm-years with equity issues and 9,912 firm-years without equity issues. The absolute returns on firms with equity issues are between 10.7% and 12.2% lower than that on firms without equity issues. These differences are statistically significant at any level. In terms of excess returns, the difference between issuing and nonissuing firms is between 5.9% and 7.6% and still highly significant. Equity issues are followed by bad returns during the sample period. There is some evidence that the negative excess returns are driven mostly by firms in which managers cashed out—the excess returns on issuing firms with either majority buying or pure buying are not statistically different from zero. The excess returns on issuing firms with majority selling or pure selling, on the other hand, are negative and almost all statistically significant. These results are similar to the patterns documented in Kahle (2000).

The results in Table XI call into question whether managers are able to earn abnormal returns with their trades once we control for the size and book-to-market effects. This finding looks baffling in light of the older insider trading literature (e.g., Jaffe (1974), Finnerty (1976), Seyhun (1986)), which suggests that insiders are able to beat the market with their trades. This raises the possibility that the results in Table XI are simply due to measurement error because, for example, the inside information may already be imputed into prices by the time the return measurement period starts. In fact, the differences in raw returns between purchases and sales are smaller than those found in prior papers which use the SEC insider trading data (e.g., Lakonishok and Lee (2001)). On the other hand, the recent insider trading literature confirms the finding that most excess returns to managers’ insider trades can be explained by the size and book-to-market effects and suggests that the economically significant excess returns in older studies are due to the lack of control for these observable firm characteristics (Rozeff and Zaman (1988)). The most comprehensive study of insider trading, both in terms of sample period and controls employed, is Lakonishok and Lee (2001). They show that most of the return predictability

through insider trades vanishes once they control for size and book-to-market. There is some predictability of excess returns left using equity purchases in small firms, but no predictability of excess returns at all is found on the sell side, nor for medium-sized and large firms on either the buy or sell side.

Similar results are found by studies looking at insider trading before and during corporate events. Lee (1997) and Kahle (2000) look at managerial trading before SEOs. They confirm the finding of Karpoff and Lee (1991) that inside sales increase relative to inside purchases before SEOs, which is consistent with the view that insiders at issuing firms believe their shares to be overvalued. At the same time, Lee (1997) finds that excess returns subsequent to primary offerings are negative independent of managerial trading.²⁶ Kahle (2000) finds insignificant excess returns if managers in equity issuers purchase shares, and negative excess returns if managers sell, which is consistent with the results in Panel B of Table XI. Chan et al. (2003) consider the interaction of share repurchases with concurrent trades made by insiders. They find that the long-run excess return to repurchasing firms is positive, but that there is no evidence that firms with concurrent inside purchases outperform firms with concurrent inside sales. This finding, in combination with unusually high levels of inside purchases in repurchasing firms, is again consistent with managers trying to time the market but failing to earn excess returns by doing so.

In summary, there is little evidence that managers are able to earn economically significant excess returns with their trades. This could be due to a variety of reasons, among them that insider trades may be driven by motivations other than inside information. If, for example, optimal contracting considerations drive managers' purchases and sales of equity, then there would be no reason to expect managers to earn excess returns on their trades. In any case, the evidence suggests that managers do not use much inside information in their trading decisions. At the same time, managers are contrarians and managers trade around corporate events as if they are trying to time the market. In Graham and Harvey's (2001) survey, managers state explicitly that they time the market in their corporate decision making.

It is possible that managers' beliefs in their timing ability may exceed their actual timing skills, as suggested by Malmendier and Tate (2002). This would also be consistent with several recent papers that question whether managers are in fact able to time the market with their corporate decisions (Brav et al. (2000), Eckbo et al. (2000), Schultz (2003)). When managers perceive "windows of opportunity" for issuing or repurchasing equity in the sense of Loughran and Ritter (1995), they may in fact be reacting mechanistically to valuation levels. This is obviously not meant to suggest that managers never use actual inside information when making private or corporate decisions. Averaging the actions of sufficiently many managers does seem to provide a valid signal about

²⁶ Lee (1997) provides some evidence that the performance of equity issuers differs depending on whether they are issuing mostly primary or secondary shares. In particular, he finds that issues which are mostly secondary offerings underperform if managers sold shares in the 6 months prior to the offering.

future excess returns for at least a subset of all firms (Baker and Wurgler (2000), Lakonishok and Lee (2001)). For each individual manager, however, beliefs about misvaluation may be determined mainly by contrarian attitudes to observable information.

VI. Summary and Conclusion

My results suggest that top managers tend to have contrarian views with regard to their own company stock. Managers' disagreements with the market are not randomly distributed across firms and seem instead to be described by managers in low valuation firms evaluating their stock as undervalued and managers in high valuation firms evaluating their stock as overvalued. It therefore appears likely that a perception of mispricing is an important force behind the market timing behavior documented for initial public offerings, SEOs, stock repurchases, and mergers and acquisitions.

These results are of considerable importance given corporate executives make frequent decisions about corporate investment policies and takeovers. Even if equity markets are fully rational and stock prices reflect fundamental value, the allocative role of equity markets is distorted if a group of decision makers as important as corporate managers regards the price signals as irrational. Initial public offerings and capital structure changes may be motivated by the opportunity to take advantage of misvaluations and not by investment opportunities and the need for funds. Baker and Wurgler (2002) go even further and argue that corporate capital structures can best be understood as the cumulative outcome of past attempts to time the equity market. Mergers and acquisitions may occur because overpriced equity can be used as a means of payment and not because the transaction adds value. Negative net present value projects may be undertaken when equity is perceived as "cheap," and positive net present value projects may be forgone when equity is perceived as "expensive."

It is beyond the scope of this paper to develop all implications of a world in which managers optimize against a stock market which they perceive to be systematically mispricing their firms. Stein (1996) develops a model of capital budgeting by rational managers faced with an irrational stock market. Shleifer and Vishny (2003) present a model of mergers and acquisitions based on stock market misvaluations of the combining firms. My results provide support for the underlying assumption in Stein (1996) that managers may view their firms as misvalued, and the assertion in Shleifer and Vishny (2003) that the scaled-price ratios are systematically correlated with managers' perceptions of misvaluation. Finally, my results can be interpreted as tentative evidence in favor of the hypothesis that the book-to-market effect is due to mispricing. The top executives of publicly traded companies are sophisticated and financially literate economic actors with substantial private wealth. It is troubling for the risk factor interpretation of the book-to-market effect to see that these sophisticated actors are contrarians and do not seem to regard book-to-market as a risk factor.

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