**Style Timing with Insiders**

November 19, 2009

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## Abstract

Aggregate demand by insiders predicts time-series variation in the value premium—between 1978 and 2004, a one standard deviation increase in aggregate insider demand in the previous six months forecasts a 53 basis point decline (6.54% annualized) in the expected value premium in the month following publication of the insider trading data. Further tests suggest that insider trading forecasts the value premium because insiders trade against systematic investor sentiment-induced mispricing and growth stocks are more sensitive to changes in sentiment than value stocks, i.e., insiders sell (buy) when markets, and growth stocks especially, are overvalued (undervalued). As a result, our analysis suggests that investors can use signals from aggregate insider behavior to adjust style tilts and exploit sentiment-induced mispricing.

**Style Timing with Insiders**

Although value stocks average higher returns than growth stocks (e.g., Chan and Lakonishok, 2004), a value tilt does not ensure a positive alpha over any given period because growth often outperforms value. Our analysis demonstrates, however, that investors can use aggregate demand by insiders to help forecast time-series variation in the value premium—a high level of insider buying signals that the future value premium will be lower (growth beats value), while insider selling portends a higher value premium. In fact, over our primary sample period (1978-2004) aggregate insider demand forecasts the value premium better than either the difference in growth and value stock valuations (the "value spread") or lag returns. Consistent with previous work, aggregate insider demand also forecasts market returns. The relation between aggregate insider demand and future market returns, however, largely results from aggregate insider demand forecasting growth stock returns. We find no evidence of a meaningful relation between aggregate insider demand and future value stock returns.

We evaluate three potential explanations for why aggregate insider demand forecasts the value premium: (1) aggregate insider demand is related to time-series variation in fundamental risk and value stocks are fundamentally riskier; (2) insiders trade on private cash flow signals and growth stocks have larger "cash flow betas"; and (3) insiders trade against mispricing induced by investor sentiment and growth stocks are more sensitive to investor sentiment. Results of additional tests support the third explanation and suggest that insider demand forecasts the value premium because insiders exploit systematic sentiment-induced mispricing and growth stocks suffer larger valuation errors than value stocks.

Last, we run out of sample tests that incorporate the most recent market turmoil (forecasting returns from July 2004-September 2009). Contrary to previous work (e.g., Lakonishok and Lee, 2001) and our own results for the primary sample period (ending mid-2004), the analysis over the most recent period reveals no evidence that aggregate insider demand forecasts market returns or returns on either the growth or value portfolio. We continue to find, however, some evidence that short term insider demand (measured over the previous month) forecasts the value premium (statistically significant at the 10% level). Further analysis reveals that the weaker relation between aggregate insider demand and the subsequent value premium in the

out of sample period is fully driven by the final seven months in the period (returns from March 2009-September 2009) when, although aggregate insider demand dropped sharply, it remained high relative to insider demand over the previous five years. Thus, aggregate insider demand continued to forecast a reduction in the value premium at a time when the value premium recovered.

**Data**

For our primary tests, we use the SEC's Ownership Reporting System (ORS) database (July 1978-December 1995) and Thomson Financials' Value-Added Insider Data Feed (January 1996-April 2004) to collect information on insider trading.[1] "Insiders" required to file with the SEC include officers and directors, large shareholders (those who own more than 10% of the outstanding shares), and affiliated shareholders (e.g., an officer of an investment advisor).[2] Following most previous work, we exclude transactions by affiliated shareholders from our analysis.[3] Over the entire 26 year primary sample period, our data include more than 1.7 million insider transactions in nearly 17,000 firms.

Following Lakonishok and Lee (2001), we compute net aggregate demand by insiders as the ratio of the net number of insider purchases (in all companies) over period *t* to the number of insider transactions over the same period:

$$Aggregate\ Insider\ Demand_t = \frac{\#Insider\ Purchases_t - \#Insider\ Sales_t}{\#Insider\ Purchases_t + \#Insider\ Sales_t}. \quad (1)$$

[1] Both data sources provide the number of shares traded by company insiders as reported on SEC Form 4. Following previous work (e.g., Lakonishok and Lee, 2001), we exclude duplicate filings, transactions with missing price data, transactions with prices less than $2, transactions involving fewer than 100 shares, transactions with prices that deviate from CRSP prices by more than 20%, and transactions involving more than 20% of the shares outstanding. For the Thomson Financial data, we require cleanse codes of R, H, or L.

[2] Exchange Act Rule 16a-1(f) defines the term "officer" to mean "an issuer's president, principal financial officer, principal accounting officer (or, if there is no such accounting officer, the controller), any vice-president of the issuer in charge of a principal business unit, division or function (such as sales, administration or finance), any other officer who performs a policy-making function, or any other person who performs similar policy-making functions for the issuer. Officers of the issuer's parent(s) or subsidiaries shall be deemed officers of the issuer if they perform such policy-making functions for the issuer…"

[3] We find similar (untabulated) results when including all shareholders or excluding large shareholders.

We follow Fama and French (1993) in forming value and growth portfolios. We begin by sorting all firms (including those that did not experience any insider trades) into three book to market groups at the end of each June. Firms below the 30th New York Stock Exchange (NYSE) book to market percentile are classified as "Growth" and firms above the 70th NYSE book to market percentile are classified as "Value" (firms between the 30th and 70th percentile are classified as "Neutral"). Book to market ratios for the end of June of year *t* are based on book value of equity (computed from Computstat data) from the fiscal year end in year *t*-1 divided by market capitalization at the end of December in year *t*-1.[4] Firms are also classified by capitalization: securities with end of June market capitalization below the median for NYSE firms are classified as "Small" and those above the median are classified as "Large."[5]

Further following Fama and French (1993), we compute the value-weighted return (using the Center for Research in Security Prices data) on securities within each of the six size and value classification groups (small-value, small-neutral, small-growth, large-value, large-neutral, and large-growth) and define the return for the "value" portfolio as the average return on the large- and small-capitalization value portfolios (i.e., 1/2*(large value + small value)), the return on the "growth" portfolio as the average return on the large- and small-capitalization growth portfolios (i.e., 1/2*(large growth + small growth)), and the value premium as the return on the value portfolio less the return on the growth portfolio. The market return is the value-weighted return on all securities. Because we use the Fama and French definitions, these portfolios' returns are essentially identical to those reported on Ken French's website.[6]

Previous work (e.g., Asness, Friedman, Krail, and Liew, 2000; Cohen, Polk, and Vuolteenaho, 2003; Zhang, 2005) demonstrates that the "value spread" (the relative valuations of growth and value stock

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[4] Following Fama and French (2006), we compute book value of equity as total assets less liabilities plus balance sheet deferred taxes and investment tax credits (if available), minus book value of preferred stock (liquidating value, redemption value, or carrying value, in order of availability).

[5] Although size and book to market breakpoints are based on NYSE firms (following Fama and French, 1993), all firms (with adequate data) are included in the sample. We include firms with insufficient data to compute book to market ratios in the measure of aggregate insider demand.

[6] The time-series correlation between the monthly value premium we estimate and the value premium reported on Ken French's website, for example, is 0.97. We form our own value and growth portfolios because our tests include: (1) measures of insider demand in value or growth stocks only, and (2) the returns of value and growth portfolios that exclude stocks with insider trading.

portfolios) can be used to forecast the value premium. Thus, in our robustness tests, we include the value spread as an explanatory variable. We operationalize the value spread as the ratio of the median book to market ratio for value stocks to the median book to market ratio for growth stocks (following Asness, Friedman, Krail, and Liew). Book values are from year-end in year *t*-2 for January-June of year *t* and year-end in year *t*-1 for July-December of year *t*. Market values are updated at the beginning of each month, so that the value spread is updated each month.

Panel A in Table 1 reports descriptive statistics for monthly portfolio returns, insider demand (measured over the previous month, three months, six months, and year), changes in monthly insider demand, and the value spread over the August 1978-May 2004 period (310 months). Although the value premium averages 34.6 basis points per month (over our sample period), it has substantial volatility (the standard deviation is 288 basis points per month).[7] Moreover, although not reported in the table, the value premium is negative in 44% of the months.

[Insert Table 1 about here]

**Does Aggregate Insider Demand Predict the Value Premium?**

Until August 2002, insiders had to report their trades to the SEC within 10 days of the end of the month of the trade (beginning August 2002, insiders must report trades within two days of the transaction). In addition, Seyhun (1986) points out that there is some delay between when the SEC receives the data and when it publishes the *Official Summary*. Bettis, Vickrey, and Vickrey (1997) note, however, that such delays were eliminated in 1985 when CDA/Investnet began compiling data for the SEC. Thus, after 1985, investors are assured of having complete insider trading data sometime within the month following the insider trade. Because our focus is on whether investors can use insider trading to help time portfolio style tilts, we primarily forecast portfolio returns one month forward ($t$=1). That is, we skip a month ($t$=0) between the

[7] The average value premium is statistically different from zero at the 5% level over our sample period.

insider trading and the subsequent return to ensure that the insider trading data are available to investors prior to forecasting the value premium.

Following Lakonishok and Lee (2001) we begin to investigate the relation between aggregate insider demand and subsequent returns by regressing subsequent returns on lag aggregate insider demand:

$$Return_{t+1} = \alpha + \gamma\left(Aggregate\ \ Insider\ \ Demand_{t-X\ to\ t-Y}\right) + \varepsilon_{t+1}. \quad (2)$$

We measure aggregate insider demand over four different intervals: the previous month (*t*-1), three months (*t*-1 to *t*-3), six months (*t*-1 to *t*-6), and year (*t*-1 to *t*-12).

Consistent with previous studies (e.g., Lakonishok and Lee, 2001), the results (reported in Table 2) reveal that aggregate insider demand forecasts market returns (statistically significant at the 5% level in every case). The next two rows reveal that the relation between aggregate insider demand and subsequent market returns primarily arises from a strong positive relation between aggregate insider demand and subsequent growth stock portfolio returns. Because the value premium is simply the difference between the value and growth portfolio returns (and covariances are linear in the arguments), the coefficient for the value premium is the difference between coefficients for the value and growth portfolios, i.e., $\gamma_{value\ premium} = \gamma_{value} - \gamma_{growth}$. As a result, aggregate insider demand is strongly inversely related to the subsequent value premium (statistically significant at the 1% level in all four cases).

[Insert Table 2 about here]

To gauge the economic significance of the relation, recall (from Table 1) that the standard deviations of insider demand measured over the previous month, three months, six months, and year are 0.276, 0.253, 0.232, and 0.202, respectively. Thus, for example, the coefficient associated with insider demand over the previous six months suggests that a one standard deviation increase in aggregate insider demand results in a 52.9 basis point decline (6.54% annualized) in the expected monthly value premium (i.e., 0.232*-2.282=-0.529). For insider demand measured over the previous month, three months, or year, a one standard deviation increase in aggregate insider demand forecasts a 51.2, 57.5, and 53.3 basis point decline in the expected monthly value premium. Because the results do not appear sensitive to the interval over which

insider demand is measured, we primarily focus on aggregate insider demand measured over the previous six months (following Lakonishok and Lee, 2001) throughout most of the study.

To begin to explore investors' ability to use aggregate insider demand to forecast style tilts, we sort the entire time series of observations into three groups ($n$=101, 102, and 102 months in the low, medium, and high insider demand groups, respectively) based on aggregate insider demand over the previous six months and examine subsequent portfolio returns. Although this method suffers from a look-ahead bias (i.e., breakpoints are based on the entire sample period from August 1978 to May 2004), it provides a simple and intuitive measure of value and growth returns following high and low levels of insider demand. (We address the look-ahead bias later in the study.) Because lag insider demand is based on insider trades over the previous six months, the monthly variable is autocorrelated, which suggests there may be substantial runs without changing from one classification to another. To examine this issue, Figure 1 plots aggregate insider demand (equation (1)) in the previous six months over time. The top and bottom dashed lines are the breakpoints for high-, medium-, and low-insider demand. Figure 1 demonstrates that this scheme generates relatively frequent signals. Specifically, there are 36 signal changes (every time the solid line crosses a dashed line) in the 305 observations or, equivalently, a signal change once every 8.5 months (on average).

[Insert Figure 1 about here]

Table 3 reports the mean insider demand (equation (1)) over the previous six months ($t$=-1 to -6), the mean subsequent ($t$=1) monthly market return (and associated $t$-statistic), value portfolio return, growth portfolio return, and value premium following low insider demand (first column), medium insider demand (second column), and high insider demand (third column). The last two columns report a $t$-statistic from a difference in means test and a $z$-statistic from a Wilcoxon rank sum test, respectively, of the null hypothesis that portfolio returns following low aggregate insider demand equal portfolio returns following high aggregate insider demand. The last row reports the fraction of observations with a positive monthly value premium.

[Insert Table 3 about here]

Consistent with Table 2, aggregate insider demand forecasts market returns—the monthly market return averages 1.628% following high insider demand versus 0.203% following low insider demand. The

difference is statistically significant (at the 5% level) using either the parametric *t*- or non-parametric $z$-test. Results in the next two rows reveal, however, that the ability of aggregate insider demand to forecast market returns largely arises from a strong relation between aggregate insider demand and subsequent growth portfolio returns (statistically significant at the 1% level for both the *t*-and $z$-tests). We find no evidence of a meaningful relation between aggregate insider demand and subsequent value stock portfolio returns. As a result, aggregate insider demand is inversely related to the subsequent value premium. The value portfolio outperforms the growth portfolio by 1.122%, on average, in months following low insider demand (statistically significant at the 1% level). Conversely, growth beats value by 0.440%, on average, in months following high insider demand (marginally significant at the 10% level). The difference in the value premium following low and high insider demand is statistically significant at the 1% for both the parametric *t*-test and the nonparametric $z$-test. The annualized difference in the value premium following high- and low-insider demand is over 20% (i.e., $(1+0.0112-(-0.00440))^{12}-1$).

The results in Table 3 can also be used to compare the performance of a style neutral strategy to a style timing (based on insider demand) strategy. Consider, for example, the performance of an investor holding the value portfolio following low insider demand, the growth portfolio following high insider demand, and a 50/50 mix of value and growth following medium insider demand versus an investor holding a constant 50/50 mix of value and growth. Following low insider demand, the style timing manager earns 0.822% per month (i.e., the value portfolio return) versus 0.261% per month for the style neutral manager (i.e., the average of the value and growth portfolio returns following low insider demand). Following high insider demand, the style timing manager earns 1.939% per month (i.e., the growth portfolio return) versus 1.720% per month for the style neutral manager (i.e., the average of the value and growth portfolio returns following high insider demand). Following medium insider demand, both the style timing manager and the style neutral manager earn 1.724% per month. Over all months, the style timing manager outperforms the

style neutral manager by the weighted average of these three differences.[8] Specifically, the style timing manager averages a 0.259% per month (approximately 316 basis points annually) larger return than the style neutral manager. The difference is statistically significant at the 1% level.[9]

**Accounting for Lag Returns and the Value Spread**

Lakonishok and Lee (2001) point out that aggregate insider demand may forecast market returns because the market portfolio exhibits negative autocorrelation (e.g., Poterba and Summers, 1988) and insiders are "contrarians." To examine whether differences in value and growth portfolio return autocorrelations help explain the relation between aggregate insider demand and the subsequent value premium, we add the value premium over the previous 24 months (following Lakonishok and Lee) to the regressions (i.e., the difference between value and growth portfolio returns over months $t$=-1 to -24). Results, reported in Panel A of Table 4, reveal no evidence of meaningful autocorrelation in the value premium. Moreover, as shown in the second row of Panel A, the relation between aggregate insider demand and the subsequent value premium remains intact when controlling for lag returns.[10]

[Insert Table 4 about here]

Several studies (e.g., Asness, Friedman, Krail, and Liew, 2000; Cohen, Polk, and Vuolteenaho, 2003; Zhang, 2005) report that the relative valuations of growth and value portfolios (the "value spread") can predict the value premium. That is, when growth stock valuations are much higher than value stock

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[8] Because there are 101 months in the first period and 102 months each in the second and third periods, the first period contributes slightly less to the difference between the style timing and style neutral managers' returns.

[9] In untabulated analysis, we also examine value and growth portfolios controlling for capitalization and momentum. The style timing manager beats the style neutral manager by 0.266% per month (on average), based on these capitalization- and momentum-stratified value and growth portfolios. Specifically, we use the intersection of capitalization and momentum quintiles (downloaded from Russ Wermers' website: http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/). Within each of these 25 groups, we use book-to-market ratios from Russ Wermers' website to create value and growth portfolios (with the top 30% book-to-market ratios identifying value firms and the bottom 30% identifying growth firms). We use CRSP returns and market capitalization data to calculate value-weighted portfolio returns within each of the 25 groups. We compute the capitalization- and momentum-stratified value portfolio as the average return across the 25 value portfolios and the capitalization- and momentum-stratified growth portfolio as the average return across the 25 growth portfolios. See the above referenced website, Daniel, Grinblatt, Titman, and Wermers (1997) and Wermers (2004) for additional detail.

[10] Untabulated results reveal that both the value and growth portfolios exhibit similar negative autocorrelation. As a result, the value premium exhibits no evidence of meaningful autocorrelation.

valuations, the subsequent value premium is large. Thus, we next examine the relation between the subsequent value premium, aggregate insider demand, and the value spread (as noted above, the value spread is measured as the ratio of the median book to market ratio for value stocks to the median book to market ratio for growth stocks).[11]

The first row in Panel B of Table 4 reveals, consistent with previous work, a positive relation between the value spread and the subsequent value premium (statistically significant at the 5% level). The second row in Panel B demonstrates, however, that once including lag aggregate insider demand: (1) the relation between the value spread and the subsequent value premium is no longer statistically significant, and (2) the relation between aggregate insider demand and the subsequent value premium remains strong (and statistically significant at the 1% level).

Panel C reports the results of a regression of the value premium on all three variables—lag insider demand, lag returns, and the value spread. Only aggregate insider demand remains meaningfully related to the subsequent value premium.

**Over Time and Across Capitalizations**

As a robustness check, we partition our sample into two equal periods (197901-199109 and 199110-200406). Subperiod results, reported in the first two rows of Panel D, show that the inverse relation between aggregate insider demand and the subsequent value premium holds in both the early and more recent periods. The results also remain intact when we include lag returns and the value spread (last two rows of Panel D).

Lakonishok and Lee (2001) report that aggregate insider demand is more strongly related to subsequent small stock returns than large stock returns. Moreover, several studies (e.g., Loughran, 1997; Fama and French, 2006; Phalippou, 2008) suggest that small stocks play a more important role than large

[11] We try several different measures of the value spread including the ratio of the value-weighted average book to market ratio in the value portfolio to the value-weighted average book to market ratio in the growth portfolio and the ratio of value (70th percentile) and growth portfolio (30th percentile) breakpoints. For our sample, the median ratio used by Asness, Friedman, Krail, and Liew (2000), however, generates the strongest results for the value spread. In all cases, the coefficient associated with aggregate insider demand remains statistically significant at the 1% level.

stocks in driving the value premium in post-1963 U.S. markets. Thus, we next examine if insider demand (over all stocks) predicts the small stock value premium and/or the large stock value premium. (As noted above, small stocks are defined as those below the median NYSE capitalization.) Results, reported in Panel E, reveal that aggregate insider demand forecasts both the small stock value premium (i.e., small value stock returns less small growth stock returns) and the large stock value premium (analogously defined). The results remain qualitatively identical when adding lag returns and the value spread.

**Predicting Annual Returns**

Lakonishok and Lee (2001) find a stronger relation between aggregate insider demand and subsequent annual market returns than subsequent quarterly market returns. Thus, we next examine the relation between subsequent annual returns ($t$=1 to 12) and lag aggregate insider demand ($t$=-1 to -6). Because the dependent variable consists of overlapping observations, we report Newey and West (1987) autocorrelation and heteroskedasticity consistent $t$-statistics. Panel A in Table 5 reports the regression results for market returns, value portfolio returns, growth portfolio returns, and the value premium.

[Insert Table 5 about here]

Consistent with Lakonishok and Lee (2001), aggregate insider demand is positively related (statistically significant at the 1% level) to the subsequent annual market return. Moreover, consistent with Table 2, the results confirm that the ability of aggregate insider demand to forecast annual market returns largely arises from the strong relation between aggregate insider demand and future annual returns on the growth stock portfolio. And, as a result, aggregate insider demand forecasts the subsequent value premium (statistically significant at the 1% level). Specifically, a one standard deviation increase in aggregate insider demand (0.232 from Table 1) forecasts a 5.04% decrease (0.232*-21.724) in the value premium the following year.

Panel B in Table 5 reports results when including lag returns and the value spread in the subsequent annual return regressions. The results are fully consistent with the monthly return regressions reported in

Table 2. Aggregate insider demand is the only variable that remains statistically significant in predicting the subsequent annual value premium.

**Can Investors Use Insider Demand to Forecast the Value Premium?**

The results reported in Tables 2-5 suggest an investor may be able to use insider demand as a signal to adjust style tilts. In practice, an investor could not replicate the results in Table 3, of course, because the investor would need to know the breakpoints for high, medium, and low insider demand based on insider demand in future periods, e.g., in the first month (January 1979), an investor would not know whether lag insider demand was high or low relative to insider demand over the balance of the period (1979-2004).

To test whether an investor without this foresight could use insider demand to signal style tilts, we repeat the analysis in Table 3, but update the low, medium, and high breakpoints every month based on insider trading in the five years prior to that month. This ensures the investor has the necessary data prior to investing and allows breakpoints to vary over time reflecting more recent average levels of insider sales.[12] Because we require five years of data before the first breakpoints are estimated, the analysis in Table 6 covers December 1983 (insider demand measured over June-November 1983, return for January 1984) through May 2004.

[Insert Table 6 about here]

Because the breakpoints are updated monthly based on historical data, the number of observations in the high, medium, and low insider demand groups are not equal (the larger number of observations in the low insider demand group reflects the rise in insider selling over time). The results in Panel A reveal evidence that an investor could use insider demand to adjust style tilts. In the month following low insider demand signals, value stocks outperform growth stocks by 1.156% (14.8% annualized) on average. In contrast, in the month following high aggregate insider demand, growth stocks outperform value stocks by 0.44% (5.4% annualized)

[12] We find similar results, however, when we use all historical data (available at that point) rather than the most recent five years.

on average. The difference is statistically significant at the 1% level using either the differences in means test or the Wilcoxon rank sum test.

Analogous to our discussion of Table 3, the results in Table 6 can also be used to compare the performance of a style timing strategy to a style neutral strategy absent the look-ahead bias. Again, consider an investor holding the value portfolio following low insider demand, the growth portfolio following high insider demand, and a 50/50 mix of value and growth following medium insider demand versus an investor holding a constant 50/50 mix of value and growth. Over all months, the style timing manager beats the style neutral manager by an arithmetic average of 0.318% per month (approximately 388 basis points annually).[13] The difference is statistically significant at the 1% level.[14] The geometric average return for the style timing manager is 1.299% per month versus 0.99% per month for the style neutral manager. Thus, if both managers began the period, with $1, the style timing manager would end the 246 month period holding a portfolio worth $23.90 versus $11.25 for the style neutral manager (ignoring any transactions costs).[15]

As noted in our discussion of the data, it is possible that prior to 1985 when CDA/Investnet began compiling data for the SEC, there may have been a delay between insiders reporting their trades to the SEC and investors receiving the information via the *Official Summary*. To ensure our results are not meaningfully impacted by this possibility, we repeat the analysis in Panel A but limit the sample to the post-1984 CDA/Investnet period. Results, reported in Panel B, are essentially identical to those reported in Panel A.

**Why Does Aggregate Insider Demand Forecast the Value Premium?**

Our empirical tests reveal a strong inverse relation between aggregate insider demand and the future value premium. In this section, we consider three explanations for this relation: (1) aggregate insider demand is related to changes in fundamental risk and value stocks are fundamentally riskier; (2) insiders trade based

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[13] As before, the figure is a weighted (by number of months) average of the difference between the style timing and style neutral managers' returns.

[14] Similarly, the style timing manager outperforms the style neutral manager by 0.311% (statistically significant at the 1% level) based on the capitalization- and momentum-stratified value and growth portfolios (see footnote 9).

[15] The style timing manager's ending portfolio value is $1(1+0.012985)^{246}$ versus the style neutral manager's ending portfolio value of $1(1+0.009888)^{246}$.

on private information about future cash flows and growth stocks have larger "cash flow betas"; and (3) insiders trade against systematic market sentiment and growth stocks suffer larger sentiment-induced pricing errors than value stocks.

*Aggregate Insider Demand and Risk*

As is well-known, value stocks may average larger returns than growth stocks because value metrics (such as the book to market ratio) proxy for fundamental risk. A number of authors (e.g., Gomes, Kogan, and Zhang, 2003; Zhang, 2005; Kiku, 2006) note that this explanation suggests the value premium should primarily accrue in high risk environments (i.e., when the business cycle is low). And, as a result, the value premium should be counter-cyclical—large in poor economic conditions and small (or even negative) in strong economic conditions.

Thus, theoretically, aggregate insider demand may be related to the future value premium because either: (1) insiders increase their buying when risk and the subsequent value premium are large, or (2) insiders increase their selling when risk and the subsequent value premium are large. The former scenario implies, contrary to our empirical results, a positive relation between aggregate insider demand and the subsequent value premium. Under the latter scenario, aggregate insider demand will be inversely related to the future value premium. Unfortunately, this interpretation does not fit the evidence. Specifically, if insiders sell when risk is large (and expected returns are high, especially for value stocks), then we should document an inverse relation between aggregate insider demand and future market returns, growth portfolio returns, and especially, value portfolio returns.[16]

[16] Our tests do not suggest that risk plays no role in explaining the value premium or time-series variation in the value premium. Rather, our results suggest the relation between aggregate insider demand and the value premium is not explained by fundamentally riskier value stocks and time-varying fundamental risk.

*Aggregate Insider Demand and Future Cash Flows*

Insiders may forecast returns either because they trade against mispricing or because they have (and trade on) superior knowledge regarding future cash flows (e.g., Piotroski and Roulstone, 2005). A number of authors (e.g., Seyhun, 1988, 1998) propose that the positive relation between aggregate insider demand and subsequent market returns results from the latter, i.e., insiders' private "firm-specific" cash flow signals may be correlated across companies. For example, although an insider may not directly forecast a decline in GDP growth, the insider may see a decrease in the number of orders, forecast a decline in future cash flows, and sell shares. Thus, a second possible interpretation of the relation between aggregate insider demand and the subsequent value premium is that insiders trade on superior cash flow forecasts that contain a systematic component and growth stocks are more sensitive to changes in expected cash flows. Consistent with this explanation, growth stocks tend to have higher market betas than value stocks (e.g., Chan and Lakonishok, 2004).

As Campbell and Vuolteenaho (2004) and Cohen, Polk, and Vuolteenaho (2009) point out, however, non-zero abnormal returns imply either cash flow news or discount rates news. As a result, a portfolio's (or stock's) market beta can be partitioned into a cash flow beta and a discount rate beta, i.e., $\beta_{i,M} = \beta_{i,Cash\ flow\ News} + \beta_{i,Discount\ Rate\ News}$. In a clever paper, Campbell and Vuolteenaho use a Vector Autoregression (VAR) model to partition the market return into its cash flow and discount rate components. John Campbell graciously provided us with these monthly estimates that allow us to compute cash flow betas and discount rate betas for our growth and value portfolios.[17] Consistent with previous work (e.g., Campbell and Vuolteenaho; Cohen, Polk, and Vuolteenaho), and contrary to the explanation that aggregate insider demand forecasts the value premium as a result of private cash flow forecasts and growth stocks' larger cash flow betas, we find the

[17] As shown in Campbell and Vuolteenaho (2004), the (unexpected) market return is the sum of the return due to cash flow news ($N_{CF,t}$) and the negative of discount rate news ($-N_{DR,t}$), i.e., a higher discount rate results in a lower price. As a result, portfolio *i*'s market beta can be written as the sum of the cash flow beta and discount rate beta: $\beta_{i,M}=\text{cov}(r_i,N_{CF,t}-N_{DR,t})/\sigma^2(N_{CF,t}-N_{DR,t})= \text{cov}(r_i,N_{CF,t})/\sigma^2(N_{CF,t}-N_{DR,t})+ \text{cov}(r_i, -N_{DR,t})/\sigma^2(N_{CF,t}-N_{DR,t})$. We estimate cash flow and discount rate betas for our growth and value portfolios over the 282 months with data overlapping with Campbell and Vuolteenaho's period. Consistent with previous studies, we also find that the growth portfolio has a larger market beta than the value portfolio (due to its larger discount rate beta).

estimated cash flow beta for the value portfolio (0.0677) is larger than the estimated cash flow beta for the growth portfolio (-0.0089).

A related possibility is that insiders in growth stocks have more private (correlated) signals regarding future cash flows than insiders in value stocks. And, as a result, time-series variation in aggregate insider demand is primarily driven by aggregate insider demand in growth stocks.[18] To examine this possibility we regress subsequent monthly portfolio returns on insider demand in value stocks (i.e., equation (1) limited to value stocks) or insider demand in growth stocks (analogously defined). Results are reported in Table 7.

[Insert Table 7 about here]

The results in the first two rows of Table 7 reveal a positive relation between subsequent market returns and aggregate insider demand in either value stocks (statistically significant at the 10% level) or growth stocks (statistically significant at the 5% level). The results in the next four rows show that insider demand in *either* value or growth stocks is related (statistically significant at the 5% level or better) to the subsequent growth portfolio return. In contrast, we find no evidence of a meaningful relation between value stock returns and lag insider demand in *either* value or growth stocks. And, as a result, aggregate insider demand in either value stocks or growth stocks forecasts the value premium. (We find qualitatively identical results when including lag returns and the value spread in the regressions.) In sum, the results in Table 7 are inconsistent with the hypothesis that time-series variation in aggregate insider demand is primarily driven by correlated signals of insiders in growth stocks, but not correlated signals of insiders in value stocks (regardless of whether those signals are due to superior cash flow forecasts or systematic valuation errors).

*Aggregate Insider Demand and Market Sentiment*

Baker and Wurgler (2007) propose (but do not test) that if investor sentiment leads to correlated mispricings (i.e., has a systematic component) and insiders trade against mispricing, then aggregate insider

[18] Inconsistent with this explanation, however, aggregate insider demand in value stocks and aggregate insider demand in growth stocks are highly correlated ($\rho$ =0.78). Moreover, both value stock aggregate insider demand and growth stock aggregate insider demand are highly correlated with aggregate insider demand ($\rho$ =0.89 and 0.95, respectively).

demand will be inversely related to market sentiment. Moreover, Jenter (2005) notes that because their own wealth is impacted, managers' trades are a direct and powerful indicator of managers' view of their security's misvaluation. Consistent with the hypothesis that insiders trade against mispricing, a number of recent studies (e.g., Rozeff and Zaman, 1998; Lakonishok and Lee, 2001; Piotroski and Roulstone, 2005; Jenter, 2005; Sias and Whidbee, 2008) demonstrate that cross-sectional variation in insider demand is inversely related to lag returns and valuation levels. This evidence is largely interpreted as insiders trading against cross-sectional variation in sentiment-induced mispricing.

We run four tests of the explanation that aggregate insider demand forecasts the value premium because insiders trade against systematic sentiment and growth stocks have larger sentiment-induced pricing errors than value stocks. First, if investor sentiment is systematic, insiders trade against systematic sentiment, and growth stocks are impacted by sentiment more so than value stocks, then aggregate insider demand should forecast the value premium even in those stocks without insider trading. Thus, we examine whether aggregate insider demand can forecast the value premium computed from stocks that do not report any insider trading. We begin by computing value and growth portfolio returns for month $t$+1 excluding any security that has an insider trade in months $t$-1 to $t$-6. Specifically, we maintain the same size and book to market breakpoints and value-weight the individual small-value, large-value, small-growth, and large-growth portfolios excluding stocks with insider trades in months $t$-1 to $t$-6. The "*x-insiders*" value portfolio is the equal-weighted average of the large and small *x-insider* value portfolios (consistent with the Fama and French portfolio definitions). We analogously form the *x-insider* growth portfolio. Excluding those securities from month $t$+1 with insider trades in months $t$-1 to $t$-6 eliminates, on average, 54% of value companies and 80% of growth companies.[19] Results, reported in Panel F of Table 4, are fully consistent with our previous analysis. In short, aggregate insider trading forecasts the value premium even in stocks without any insider trading

[19] On average, eliminating firms with lag insider trades excludes 62% of large capitalization value companies and 45% of small capitalization value companies. The 54% figure is the average of these two figures. Similarly, eliminating firms with lag insider trading excludes, on average, 84% of large growth stocks and 57% of small growth stocks.

consistent with the explanation that insiders trade against systematic investor sentiment and growth stocks suffer from larger sentiment-induced pricing errors than value stocks.

As a second test of the sentiment explanation, we examine the relation between changes in aggregate insider demand and contemporaneous growth and value returns. The idea is straightforward—if insiders trade against systematic sentiment and growth stocks are more strongly impacted by changes in sentiment, then insider selling should increase as growth outperforms value and decrease as value outperforms growth. That is, under the sentiment explanation, if sentiment is positive, an increase in investor sentiment will generate greater mispricing and greater insider selling.[20] Because growth stocks are more sensitive to investor sentiment, however, the increase in growth stocks' valuations will be greater than the increase in value stocks' valuations.

To examine whether changes in insider demand are more strongly related to contemporaneous growth stock returns than value stock returns, we estimate regressions of portfolio returns on contemporaneous changes in aggregate insider demand (aggregate insider demand in month $t$ less aggregate insider demand in month $t$-1)[21]:

$$Return_t = \alpha + \gamma\left(\Delta Aggregate\ \ Insider\ \ Demand_t\right) + \varepsilon_t . \tag{3}$$

Regression results, reported in Panel A of Table 8, reveal that changes in aggregate insider demand are inversely related to contemporaneous returns. Moreover, consistent with the explanation that insiders trade against systematic sentiment and growth stocks are more sensitive to changes in sentiment, the relation between changes in aggregate insider demand and contemporaneous growth stock returns is stronger than the relation between aggregate insider demand and contemporaneous value stock returns. And, as a result, changes in aggregate insider demand are positively correlated with the contemporaneous value premium, e.g., insiders increase their selling when growth outperforms value. The results are also consistent with several

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[20] Under this hypothesis, an increase in sentiment will cause a decline in insider demand (i.e., an inverse relation between insider demand and contemporaneous returns) regardless of whether market sentiment is currently positive or negative. If, for example, sentiment is negative and investors become less pessimistic (an increase in sentiment), insider demand will decline as undervalued securities become more fairly valued.

[21] Where aggregate insider demand in month $t$ is defined as the number of insider purchases less the number of insider sales in month $t$ divided by the number of insider transactions in month $t$, i.e., equation (1) measured over month $t$.

recent studies (e.g., Eleswarapu and Reinganum, 2004; Frazzini and Lamont, 2008; Glushkov, 2006) that find growth stocks are more sensitive to investor sentiment than value stocks.[22]

[Insert Table 8 about here]

As a third test of the sentiment explanation, we examine the relation between changes in aggregate insider demand and changes in a different market sentiment proxy. If insiders trade against systematic sentiment, then changes in aggregate insider demand should be inversely related to changes in other sentiment proxies (because sentiment is unobservable, one must use a proxy). Specifically, we use the Baker and Wurgler (2006, 2007) change in investor sentiment proxy which is calculated from the first principle component of changes in six metrics: NYSE turnover, dividend premium (a measure of investor demand for dividend paying stocks operationalized as the log difference in the average book to market ratio for dividend payers and non-payers), the value-weighted average closed-end fund discount, the number of IPOs, the average first day returns on IPOs, and the equity share of all new issues (debt and equity).[23] Panel B in Table 8 reports regression results of the Baker and Wurgler change in sentiment proxy on changes in aggregate insider demand. Consistent with the hypothesis that aggregate insider demand inversely varies with market sentiment, we document a strong inverse relation between the Baker and Wurgler proxy and changes in aggregate insider demand.[24]

As a final test of the sentiment explanation, we examine the relations between lag market returns, net demand by insiders, net demand by insiders in value stocks, and net demand by insiders in growth stocks. If the relation between aggregate insider demand and the future value premium results from insiders trading against systematic sentiment-induced mispricing and growth stocks are subject to greater levels of mispricing,

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[22] Baker and Wurgler (2006), however, are an exception. Specifically, their results suggest a "U" shaped relation between sensitivity to investor sentiment and book to market ratios.

[23] See Baker and Wurgler (2006, 2007) for estimation details. The authors also measure a change in sentiment proxy orthogonalized to business cycle measures (industrial production growth, growth in consumer durables, nondurables, and services, and a dummy variable for NBER recessions). We find nearly identical results when using the orthogonalized values.

[24] In untabulated analysis we add Baker and Wurgler's (2006, 2007) sentiment proxy to the value premium regression tests in Tables 4. Although the Baker and Wurgler proxy forecasts the value premium when it is the only independent variable, the relation is only marginally significant in the monthly regressions (at the 10% level) when the other variables (insider demand, lag returns, and value premium) are included. The coefficient associated with lag insider demand remains statistically significant (at the 5% level).

then we expect aggregate insider demand in growth stocks will be more strongly related to lag market returns than aggregate insider demand in value stocks. That is, growth insiders should be 'more contrarian' than value insiders.

Following Lakonishok and Lee (2001), we begin by sorting monthly aggregate insider demand (equation (1)) into quintiles and examining the value-weighted market return over the previous year. The first two columns of Table 9 report mean and median market returns for the aggregate insider demand quintiles. The bottom two rows report a *t*- and *z*-statistic (based on a difference in means test and a Wilcoxon rank sum test, respectively) of the null hypothesis that lag market adjusted returns are equal in to the top and bottom aggregate insider demand quintiles. Consistent with Lakonishok and Lee (2001), the point estimates indicate that insiders are contrarians, i.e., lower insider demand is associated with higher lag market returns. Differences in lag market returns for the top and bottom insider demand quintiles, however, are not statistically significant at traditional levels.

[Insert Table 9 about here]

The middle two columns of Table 9 report lag market adjusted returns based on the level of insider demand in value stocks. Similar to the first two columns, the point estimates suggest insiders in value firms are contrarian. Again, however, differences in lag market returns for the top and bottom insider demand quintiles are not statistically significant at traditional levels. The final two columns in Table 9 report mean and median lag market returns for aggregate demand by insiders in growth stocks quintiles. The results suggest that insiders in growth stocks are strongly contrarian. The mean difference in market returns for the top and bottom growth insiders demand quintiles (fifth column) is nearly twice as large as that for all insiders (first column) or insiders in value stocks (third column). In addition, differences in lag market returns for the top and bottom quintiles are statistically significant at the 5% level.

**Out of Sample Tests**

Following submission of the original manuscript, one referee suggested that the most recent market turmoil provides an excellent out of sample test of the relation between aggregate insider demand, market

returns, value portfolio returns, growth portfolio returns, and the value premium. Thus, subsequent to our initial submission, we purchased additional insider trading data (Thomson Financials' Value-Added Insider Data Feed) for May 2004-July 2009. To extend our sample period as far as possible, we use the market, value, and growth portfolio returns through September 2009 (downloaded from Ken French's website).[25] Thus, our out of sample data covers 63 monthly returns from July 2004-September 2009. Over this period (henceforth the "out of sample" period), the data include more than 1.64 million insider trades in more than 6,900 stocks.

The descriptive statistics over the out of sample period, reported in Table 10, reveal a number of striking differences from the original sample period. First, the average market return is small relative to the earlier period (averaging 30 basis points per month in the more recent period versus 112 basis points per month in the earlier sample period). Second, insiders are, on average, strongly selling over the more recent period. The average monthly aggregate insider demand (see equation (1)) in the previous month averages -0.618 in the more recent period versus -0.227 in the earlier sample period. The volatility (time-series standard deviation) in aggregate insider demand, however, is similar over the two periods.

[Insert Table 10 about here]

We begin to investigate the relation between aggregate insider demand and subsequent returns in the out of sample period by repeating the regressions reported in Table 2, but forecasting returns over the July 2004-September 2009 period. Contrary to Table 2 and the results of previous studies (e.g., Lakonishok and Lee, 2001), the results reported in Table 11 reveal no evidence that aggregate insider demand measured over the previous month, three months, six months, or year forecasts subsequent market returns, value portfolio returns, or growth portfolio returns, i.e., none of the coefficients reported in the first three rows of Table 11 differ meaningfully from zero. The results in the last row of Table 11, however, reveal some evidence that short term aggregate insider demand still forecasts the value premium. Specifically, the coefficient associated

[25] At the time of this writing, our CRSP data ended in 2008. Thus, we used the monthly market, value, and growth portfolio returns posted on Ken French's website. As a result, we did not run the same filters on our out of sample insider trading data as our original sample (e.g., excluding transactions with missing price data; excluding stocks with price less than $2). Nonetheless, in untabulated analysis, we repeat the original sample period tests without running these filters and find effectively identical results.

with aggregate insider demand in month $t$-1 forecasts the value premium in month $t$+1 (marginally statistically significant at the 10% level based on a two tail test). When measuring aggregate insider demand over longer intervals, however, we find no evidence of a meaningful relation between insider trading and the subsequent value premium.

[Insert Table 11 about here]

To test how an investor following the style timing strategy described in our earlier tests would perform over the out of sample period, we repeat the analysis in Table 6 for returns from July 2004 to September 2009. As before, we focus on insider demand over the previous six months ($t$=-1 to -6) and update the low, medium, and high insider demand breakpoints every month based on insider trading in the five years prior to that month. Results are reported in Panel A of Table 12.

[Insert Table 12 about here]

The results in Panel A reveal relatively little evidence that an investor could successfully use aggregate insider demand over the previous six months to adjust style tilts in the post-2004 period. Following low insider demand signals, value stocks outperform growth stocks by 0.476% (5.9% annualized) on average. In the month following high aggregate insider demand, value stocks still outperform growth stocks, on average, by 0.290% (3.5% annualized). Although the point estimates are "in the right direction," the difference is not statistically significant at traditional levels.

Nonetheless, an investor following lag six month insider trading to forecast the value premium is no worse off. That is, analogous to our discussions of Tables 3 and 6, we can easily compare the performance of a style timing strategy to a style neutral strategy for the out of sample period. Again, consider an investor holding the value portfolio following low insider demand, the growth portfolio following high insider demand, and a 50/50 mix of value and growth following medium insider demand versus an investor holding a constant 50/50 mix of value and growth. Over all months, the style timing manager beats the style neutral

manager by 0.084% per month (approximately 101 basis points annually).[26] Moreover, although not reported in the table, the style timing manager experiences lower volatility than the style neutral investor.[27]

Because the regression analysis suggests that short term insider demand (i.e., over month $t$=-1) better forecasts the value premium over the out of sample period, Panel B in Table 12 repeats the analysis based on insider demand over the previous month ($t$=-1). In this case, the low, medium, and high insider demand breakpoints are updated every month based on monthly insider trading in the five years prior to that month. The results reveal somewhat stronger evidence that aggregate insider demand forecasts the value premium. Specifically, in months following low monthly insider demand, the value portfolio outperforms the growth portfolio by 0.673%, on average (statistically significant at the 5% level). In months following high monthly insider demand, the value portfolio averages only 0.173% larger return than the growth portfolio. The annualized difference in the value premium following high- and low-insider demand over the out of sample period is over 6% (i.e., $(1+0.00673-(0.00173))^{12}-1$). Moreover, in this case, a style timing manager outperforms the style neutral manager by 0.133% per month (161 basis point per year). Again, although not reported in the table, the style timing manager also experiences lower volatility than the style neutral manager.[28]

To better understand the relation between aggregate insider demand, market returns, and the value premium over recent years, Figures 2A and 2B plot monthly aggregate insider demand (solid line), the cumulative market return (dotted line), and the cumulative value premium (dashed line) over the July 2004-September 2009 period. We calculate the cumulative value premium as the difference between the cumulative return (beginning July 2004) on the value portfolio and the cumulative return on the growth portfolio. Un-shaded areas in the graphs indicate low *lag* insider demand, while lightly shaded areas indicate medium *lag* insider demand, and darkly shaded areas indicate high *lag* insider demand. Insider demand breakpoints are the same as those used in Table 12. Thus, unlike the constant breakpoints in Figure 1, the breakpoints in Figure 2

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[26] As before, the figure is a weighted (by number of months) average of the difference between the style timing and style neutral managers' returns.
[27] The standard deviation of monthly returns for the style neutral manager is 5.54% versus 4.97% for the style timing manager.
[28] The standard deviation of monthly returns for the style neutral manager is 5.54% versus 5.00% for the style timing manager.

are updated (and therefore changing) each month based on insider trading in the five years prior to that month.

If insiders are forecasting the value premium, we expect a rising cumulative value premium in un-shaded regions, a relatively flat cumulative value premium in lightly shaded areas, and a declining cumulative value premium in darkly shaded areas. The results in Figures 2A and 2B reveal that the strategy largely "works" until the cumulative value premium (and market) bottoms in February of 2009. Specifically, until May 2007, lag insider demand was low and the cumulative value premium was rising. Between June 2007 and February 2009, lag insider demand increased and the cumulative value premium declined sharply. Since the cumulative value premium (and market) bottom in February 2009, lag insider demand declined sharply, but compared to the previous sixty months, remained relatively strong and continued to generate a "buy growth signal" despite the increase in the cumulative value premium.

[Insert Figure 2 about here]

In short, the relatively weaker relation between lag aggregate insider demand and the subsequent value premium is driven by the last seven months in the sample (returns over March-September 2009). Excluding the last seven months of the out of sample period, for example, the difference in the average value premium following low versus high aggregate insider demand is nearly identical to the difference in the original sample period.[29] Moreover, repeating the regressions in Table 11 (untabulated), but excluding the most recent seven months, we once again document a strong negative relation (statistically significant at the 1% level in every case) between the subsequent value premium and aggregate insider demand regardless of the measurement interval (aggregate insider demand over the previous month, three months, six months, or year).

[29] As shown in Table 3, the difference in the value premium following low and high insider demand averages 156.2 basis points per month (i.e., 1.122-(-0.440)) in the original sample period. Excluding the last seven months of the sample period, the difference in the value premium averages 148.9 basis points per month based on aggregate insider demand over the previous six months and 175.6 basis points per month based on aggregate insider demand over the previous month.

There are several potential reasons why aggregate insider demand fails to forecast the value premium over the most recent period. First, as noted by previous authors, the value premium may reflect both a mispricing component and a risk component. If insiders trade against the former, but not the latter, then to the extent that the most recent market meltdown/subsequent recovery primarily resulted from changes in risk, aggregate insider demand may be somewhat more independent of the value premium. Nonetheless, Figure 2 clearly indicates that as the market and value premium fell in 2008, insider demand sharply increased consistent with the hypothesis that insiders increasingly viewed 2008 as a buying opportunity.

Second, the relations between insider trading, market returns, and the value premium in the out of sample period is unusual relative to historical norms. For example, contrary to earlier periods, there appears to be no systematic relation between aggregate insider demand and subsequent market returns. In addition, the value premium tended to move with the market over this period. In fact, for this 63 month period (and contrary to previous work, e.g., Chan and Lakonishok, 2004) the value portfolio market beta was larger than the growth portfolio beta. Moreover, the overall level of insider trading was unusually large in the out of sample period (relative to historical norms). For example, insiders average more than 26,000 transactions per month in the out of sample period versus slightly fewer than 7,000 transactions per month in the original sample period.[30]

**Summary**

Aggregate insider demand predicts the value premium—greater insider selling implies a higher future value premium. Mechanically, this arises because aggregate insider demand is more strongly (positively) related to future growth stock returns than value stock returns. In fact, the previously documented relation between aggregate insider demand and future market returns is largely driven by the strong relation between insider demand and future growth stock returns. Further tests suggest that the relation between aggregate insider demand and the future value premium arises because insiders trade against systematic investor

[30] To ensure these figures are directly comparable, insider volume is computed before running the filters on the early period sample (see footnotes 1 and 25).

sentiment and growth stocks suffer from larger sentiment-induced pricing errors than value stocks. As a result, our analysis suggests that investors can use signals from aggregate insider behavior to adjust style tilts and exploit sentiment-induced mispricing.

The out of sample tests reinforce, however, that aggregate insider demand is no panacea for predicting either market returns or the value premium. Specifically, in the last five years, we find no evidence that aggregate insider demand forecasts market returns or returns on either the growth or value portfolio. We do find some evidence, however, that short term aggregate insider demand continues to forecast the value premium in the 2004-2009 period. Compared to the primary sample (1978-2004), however, the relation between aggregate insider demand and the subsequent value premium is weak. Additional tests reveal that the relatively weaker relation between aggregate insider demand and the future value premium over the July 2004-September 2009 period largely results from the last few months in the sample when insider demand was high (relative to the previous 60 months), while the value premium (and market) recovered.

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**Table 1. Descriptive Statistics (August 1978-May 2004)**

| | Mean | Standard Deviation | Minimum | Median | Maximum |
|---|---|---|---|---|---|
| **Market Return$_1$** | 1.124 | 4.547 | -22.557 | 1.524 | 12.761 |
| **Value Return$_1$** | 1.382 | 4.361 | -23.533 | 1.936 | 10.650 |
| **Growth Return$_1$** | 1.036 | 5.734 | -27.890 | 1.487 | 16.378 |
| **Value Premium$_1$** | 0.346 | 2.880 | -11.690 | 0.415 | 11.015 |
| **Insider Demand$_{-1}$** | -0.227 | 0.276 | -0.847 | -0.231 | 0.621 |
| **Insider Demand$_{-1 \text{ to } -3}$** | -0.232 | 0.253 | -0.839 | -0.226 | 0.576 |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.232 | 0.232 | -0.827 | -0.246 | 0.362 |
| **Insider Demand$_{-1 \text{ to } -12}$** | -0.231 | 0.202 | -0.801 | -0.254 | 0.234 |
| **ΔInsider Demand$_0$** | -0.002 | 0.185 | -0.489 | -0.231 | 0.621 |
| **Value Spread$_{-1}$** | 5.134 | 1.062 | 3.428 | 4.910 | 8.840 |

*Note*: Base period (month *t*) for the data is August 1978–May 2004 (310 months). Returns (month *t*+1) for Market$_1$, Value$_1$, Growth$_1$, and the Value Premium$_1$ (Value Return$_1$ – Growth Return$_1$) are monthly and in percent. Insider demand$_{-X \text{ to } -Y}$ is the number of insider purchases less the number of insider sales over the number of insider transactions in months *t*-X to *t*-Y. ΔInsider Demand$_0$ is Insider Demand$_0$ less Insider Demand$_{-1}$. The Value Spread$_{-1}$ is the ratio of the median book to market ratio for value stocks to the median book to market ratio for growth stocks at the end of month *t*=-1.

**Table 2. Time-series Regressions of Monthly Portfolio Return on Lag Aggregate Insider Demand (August 1978-May 2004)**

| Dependent Variable | Insider Demand Measured Over: Previous Month ($t$=-1) | | | Previous Three Months ($t$=-1 to -3) | | | Previous Six Months ($t$=-1 to -6) | | | Previous Year ($t$=-1 to -12) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** |
| **Market Return$_1$** | 0.017 | 2.334 | 1.70% | 0.018 | 2.518 | 1.68% | 0.023 | 2.314 | 1.08% | 0.018 | 2.937 | 1.37% |
| | (4.99)*** | (2.52)** | | (5.06)*** | (2.50)** | | (2.08)** | (2.08)** | | (4.57)*** | (2.26)** | |
| **Value Return$_1$** | 0.017 | 1.447 | 0.52% | 0.018 | 1.351 | 0.32% | 0.017 | 1.029 | -0.02% | 0.017 | 1.498 | 0.16% |
| | (5.35)*** | (1.62) | | (5.30)*** | (1.40) | | (4.76)*** | (0.97) | | (4.61)*** | (1.22) | |
| **Growth Return$_1$** | 0.018 | 3.301 | 2.22% | 0.019 | 3.622 | 2.31% | 0.018 | 3.311 | 1.50% | 0.020 | 4.135 | 1.81% |
| | (4.28)*** | (2.83)*** | | (4.49)*** | (2.87)*** | | (4.01)*** | (2.38)** | | (4.04)*** | (2.55)** | |
| **Value Premium$_1$** | -0.001 | -1.854 | 2.85% | -0.002 | -2.271 | 3.66% | -0.002 | -2.282 | 3.03% | -0.003 | -2.637 | 3.01% |
| | (-0.36) | (-3.17)*** | | (-0.87) | (-3.56)*** | | (-0.78) | (-3.24)*** | | (-1.06) | (-3.20)*** | |

*Note*: Monthly portfolio returns are in percent. The sample size is 310 months for insider demand measured over the previous month (August 1978-May 2004), 308 months for insider demand measured over the previous three months (October 1978-May 2004), 305 months for insider demand measured over the previous six months (January 1979-May 2004), and 299 months for insider demand measured over the previous year (July 1979-May 2004). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 3. The Value Premium following Low, Medium, and High Aggregate Insider Demand**

| | Low Insider Demand$_{-1 \text{ to } -6}$ | Medium Insider Demand$_{-1 \text{ to } -6}$ | High Insider Demand$_{-1 \text{ to } -6}$ | High Insider Demand-Low Insider Demand | |
|---|---|---|---|---|---|
| | | | | *t*-statistic | Wilcoxon *z*-statistic |
| ***N*** | 101 | 102 | 102 | | |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.482 | -0.239 | 0.022 | | |
| **Market Return$_1$** | 0.203<br>(0.44) | 1.599<br>(3.60)*** | 1.628<br>(3.75)*** | 2.26** | 2.11** |
| **Value Return$_1$** | 0.822<br>(1.92)* | 1.911<br>(4.66)*** | 1.500<br>(3.47)*** | 1.11 | 0.86 |
| **Growth Return$_1$** | -0.300<br>(-0.54) | 1.536<br>(2.70)*** | 1.939<br>(3.57)*** | 2.88*** | 2.65*** |
| **Value Premium$_1$** | 1.122<br>(3.85)*** | 0.375<br>(1.31) | -0.440<br>(-1.67)* | -3.97*** | -3.58*** |
| **%(Value Premium$_1$>0)** | 63.37% | 55.88% | 50.00% | | |

*Note*: This table reports the mean aggregate insider demand over the previous six months (*t*-1 to *t*-6), the mean subsequent (*t*=1) monthly market portfolio return (and associated *t*-statistic), value portfolio return, growth portfolio return, value premium, and the fraction of observations when the value premium is positive following low, medium, and high insider demand over January 1979-May 2004. The last two columns report a *t*-statistic from a difference in means test and a *z*-statistic from a Wilcoxon rank sum test, respectively, of the null hypothesis that portfolio returns following low insider demand equal portfolio returns following high insider demand. The last row reports the fraction of observations with a positive monthly value premium. Returns are in percent. Insider demand$_{-1 \text{ to } -6}$ is the number of insider purchases less the number of insider sales over the number of insider transactions in months *t*-1 to *t*-6.

**Table 4. Time-series Regressions of Monthly Portfolio Return on Lag Aggregate Insider Demand, Lag Returns, and the Value Spread**

| | Intercept | Insider Demand$_{-1 \text{ to } -6}$ | Dep. Var. Return$_{-1 \text{ to } -24}$ | Value Spread$_{-1}$ | Adjusted $R^2$ |
|---|---|---|---|---|---|
| | **Panel A: Value Premium on Lag Insider Demand and Lag Returns** | | | | |
| **Value Premium$_1$** | 0.407 | | -0.006 | | -0.17% |
| | (2.18)** | | (-0.70) | | |
| **Value Premium$_1$** | -0.106 | -2.591 | -0.013 | | 3.52% |
| | (-0.45) | (-3.56)*** | (-1.60) | | |
| | **Panel B: Value Premium on Lag Insider Demand and Value Spread** | | | | |
| **Value Premium$_1$** | -1.482 | | | 0.356 | 1.42% |
| | (-1.86)* | | | (2.34)** | |
| **Value Premium$_1$** | -1.253 | -1.949 | | 0.223 | 3.30% |
| | (-1.52) | (-2.62)*** | | (1.36) | |
| | **Panel C: Value Premium on Lag Insider Demand, Lag Returns, and Value Spread** | | | | |
| **Value Premium$_1$** | -0.664 | -2.350 | -0.010 | 0.112 | 3.31% |
| | (-0.66) | (-2.78)*** | (-1.01) | (0.57) | |
| | **Panel D: By Subperiod** | | | | |
| **Value Premium$_1$ (197901-199109)** | 0.008 | -2.066 | | | 2.35% |
| | (0.03) | (-2.16)** | | | |
| **Value Premium$_1$ (199110-200405)** | -0.732 | -3.427 | | | 3.82% |
| | (-1.43) | (-2.65)*** | | | |
| **Value Premium$_1$ (197901-199109)** | -0.571 | -2.134 | -0.001 | 0.126 | 1.21% |
| | (-0.31) | (-2.07)** | (-0.05) | (0.34) | |
| **Value Premium$_1$ (199110-200405)** | -2.466 | -3.628 | -0.019 | 0.326 | 6.09% |
| | (-1.51) | (-2.44)** | (-1.31) | (1.11) | |
| | **Panel E: By Capitalization** | | | | |
| **Small Stocks Value Premium$_1$** | -0.120 | -2.933 | | | 3.38% |
| | (-0.43) | (-3.41)*** | | | |
| **Large Stocks Value Premium$_1$** | -0.240 | -1.631 | | | 1.39% |
| | (-1.03) | (-2.30)** | | | |
| **Small Stocks Value Premium$_1$** | -0.955 | -2.823 | -0.005 | 0.196 | 3.40% |
| | (-0.79) | (-2.78)*** | (-0.62) | (0.86) | |
| **Large Stocks Value Premium$_1$** | -0.276 | -2.124 | -0.022 | 0.016 | 2.55% |
| | (-0.30) | (-2.55)** | (-2.09)** | (0.09) | |
| | **Panel F: Value Premium for Stocks without Insider Trades** | | | | |
| **Value Premium$_1$** | -0.664 | -2.350 | -0.010 | 0.112 | 3.31% |
| **(No Insider Trading)** | (-0.66) | (-2.78)*** | (-1.01) | (0.57) | |

*Note*: Monthly portfolio returns are in percent. In Panel F, the value premium in month $t$+1 is computed only from securities that do not have insider trades in months $t$=-1 to -6. The sample size is 305 months (January 1979-May 2004). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 5. Time-series Regressions of Annual Portfolio Return on Lag Aggregate Insider Demand, Lag Returns, and the Value Spread**

| | Intercept | Insider Demand$_{-1 \text{ to } -6}$ | Dep. Var. Return$_{-1 \text{ to } -24}$ | Value Spread$_{-1}$ | Adjusted $R^2$ |
|---|---|---|---|---|---|
| | **Panel A: Returns on Lag Insider Demand** | | | | |
| **Market Return$_{1 \text{ to } 12}$** | 20.472 | 26.067 | | | 11.90% |
| | (7.15)*** | (2.95)*** | | | |
| **Value Return$_{1 \text{ to } 12}$** | 22.002 | 16.351 | | | 4.83% |
| | (6.45)*** | (1.62) | | | |
| **Growth Return$_{1 \text{ to } 12}$** | 21.839 | 38.075 | | | 16.57% |
| | (5.75)*** | (3.59)*** | | | |
| **Value Premium$_{1 \text{ to } 12}$** | 0.164 | -21.724 | | | 14.16% |
| | (0.06) | (-3.51)*** | | | |
| | **Panel B: Returns on Insider Demand, Lag Returns, and Value Spread** | | | | |
| **Market Return$_{1 \text{ to } 12}$** | 63.513 | 16.134 | -0.133 | -8.015 | 33.12% |
| | (6.82)*** | (2.30)** | (-1.43) | (-4.90)*** | |
| **Value Return$_{1 \text{ to } 12}$** | 58.211 | 4.307 | -0.297 | -5.411 | 15.86% |
| | (3.73)*** | (0.57) | (-2.38)** | (-2.46)** | |
| **Growth Return$_{1 \text{ to } 12}$** | 57.459 | 31.345 | -0.224 | -6.070 | 31.23% |
| | (5.19)*** | (3.13)*** | (-2.27)** | (-3.07)*** | |
| **Value Premium$_{1 \text{ to } 12}$** | -10.965 | -21.235 | -0.135 | 2.471 | 25.43% |
| | (-1.10) | (-2.87)*** | (-1.43) | (1.30) | |

*Note*: Returns are measured in percent. The *t*-statistics (reported in parentheses) are based on Newey and West (1987) standard errors. The sample size is 305 months (January 1979-May 2004). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 6. The Value Premium following Low, Medium, and High Aggregate Insider Demand—No Look Ahead Bias**

| | Low Insider Demand$_{-1 \text{ to } -6}$ | Medium Insider Demand$_{-1 \text{ to } -6}$ | High Insider Demand$_{-1 \text{ to } -6}$ | High Insider Demand-Low Insider Demand | |
|---|---|---|---|---|---|
| | | | | *t*-statistic | Wilcoxon *z*-statistic |
| | **Panel A: 198312-200405 (*n*=246 months)** | | | | |
| ***N*** | 104 | 60 | 82 | | |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.451 | -0.245 | 0.001 | | |
| **Market Return$_1$** | 0.268<br>(0.61) | 2.100<br>(4.51)** | 1.308<br>(2.38)** | 1.48 | 1.67* |
| **Value Return$_1$** | 1.064<br>(2.50)** | 2.078<br>(4.86)*** | 0.985<br>(1.90)* | -0.12 | -0.37 |
| **Growth Return$_1$** | -0.093<br>(-0.17) | 2.017<br>(3.40)*** | 1.424<br>(2.07)** | 1.73* | 1.75* |
| **Value Premium$_1$** | 1.156<br>(3.91)*** | 0.061<br>(0.22) | -0.439<br>(-1.37) | -3.66*** | -3.35*** |
| **%(Value Premium$_1$>0)** | 61.54% | 55.00% | 48.78% | | |
| | **Panel B: 198501-200405 (*n*=233 months)** | | | | |
| ***N*** | 101 | 55 | 77 | | |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.456 | -0.254 | 0.002 | | |
| **Market Return$_1$** | 0.310<br>(0.69) | 2.111<br>(4.33)*** | 1.315<br>(2.34)** | 1.39 | 1.67* |
| **Value Return$_1$** | 1.075<br>(2.47)** | 2.079<br>(4.60)*** | 0.979<br>(1.80)* | -0.14 | -0.36 |
| **Growth Return$_1$** | -0.005<br>(-0.01) | 2.034<br>(3.35)*** | 1.453<br>(2.06)** | 1.62 | 1.67* |
| **Value Premium$_1$** | 1.080<br>(3.63)*** | 0.045<br>(0.16) | -0.474<br>(-1.43) | -3.48*** | -3.17*** |
| **%(Value Premium$_1$>0)** | 60.40% | 52.73% | 48.05% | | |

*Note*: This table reports mean aggregate insider demand over the previous six months (*t*-1 to *t*-6), the mean subsequent (*t*=1) monthly market portfolio return (in percent), value portfolio return, growth portfolio return, value premium (and associated *t*-statistic), and the fraction of observations when the value premium is positive following low, medium, and high insider demand. Insider demand breakpoints for low, medium, and high categories are updated every month based on insider trading in the five years prior to that month. The last two columns report a *t*-statistic from a difference in means test and a *z*-statistic from a Wilcoxon rank sum test, respectively, of the null hypothesis that portfolio returns following low insider demand equal portfolio returns following high insider demand. The last row reports the fraction of observations with a positive monthly value premium. Insider demand$_{-1 \text{ to } -6}$ is the number of insider purchases less the number of insider sales over the number of insider transactions in months *t*-1 to *t*-6. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 7. Predicting Value and Growth Returns with Insiders' Demand in Value and Growth**

| | Intercept | Value Insider Demand$_{-1 \text{ to } -6}$ | Growth Insider Demand$_{-1 \text{ to } -6}$ | Adjusted $R^2$ |
|---|---|---|---|---|
| **Market Return$_1$** | 0.953 | 2.012 | | 0.92% |
| | (3.45)*** | (1.96)* | | |
| **Market Return$_1$** | 2.721 | | 3.167 | 1.27% |
| | (3.60)*** | | (2.22)** | |
| **Value Return$_1$** | 1.284 | 1.338 | | 0.29% |
| | (4.90)*** | (1.37) | | |
| **Value Return$_1$** | 2.144 | | 1.470 | 0.06% |
| | (2.98)*** | | (1.08) | |
| **Growth Return$_1$** | 0.776 | 2.988 | | 1.77% |
| | (2.24)** | (2.32)** | | |
| **Growth Return$_1$** | 3.429 | | 4.757 | 1.97% |
| | (3.63)*** | | (2.67)*** | |
| **Value Premium$_1$** | 0.509 | -1.649 | | 1.73% |
| | (2.90)*** | (-2.52)** | | |
| **Value Premium$_1$** | -1.285 | | -3.287 | 3.91% |
| | (-2.70)*** | | (-3.65)*** | |

*Note*: This table reports results from regressions of monthly returns (in percent) on aggregate insider demand in value stocks or aggregate insider demand in growth stocks (*t*-statistics are reported in parentheses). The sample size is 305 months (January 1979-May 2004). ***, **, and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 8. Regression of Monthly Returns and Sentiment on Contemporaneous Changes in Aggregate Insider Demand**

| | Intercept | ΔInsider Demand$_{0 \text{ to } -1}$ | Adjusted $R^2$ |
|---|---|---|---|
| | **Panel A: Returns** | | |
| **Value Return$_0$** | 1.359 | -14.447 | 37.01% |
| | (6.89)*** | (-13.49)*** | |
| **Growth Return$_0$** | 1.006 | -19.596 | 39.41% |
| | (3.95)*** | (-14.19)*** | |
| **Value Premium$_0$** | 0.353 | 5.150 | 10.57% |
| | (2.28)** | (6.12)*** | |
| | **Panel B: Sentiment** | | |
| **ΔSentiment$_0$** | -0.006 | -1.574 | 8.56% |
| | (-0.11) | (-5.46)*** | |

*Note*: This table reports results from regressions of monthly portfolio returns (Panel A, in percent) and Baker and Wurgler's (2007) change in investor sentiment proxy (Panel B) in month $t$=0 on the change in aggregate insider demand between months $t$=0 and $t$=-1 ($t$-statistics are reported in parentheses). The sample size is 309 months (August 1978-April 2004). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 9. Lag Annual Market Returns for Aggregate Insider Demand Quintiles Portfolios**

| | Sorted on Aggregate insider Demand | | Sorted on Value Insiders' Demand | | Sorted on Growth Insiders' Demand | |
|---|---|---|---|---|---|---|
| | **Mean Market Return-$_{1 \text{ to } -12}$** | **Median Market Return-$_{1 \text{ to } -12}$** | **Mean Market Return-$_{1 \text{ to } -12}$** | **Median Market Return-$_{1 \text{ to } -12}$** | **Mean Market Return-$_{1 \text{ to } -12}$** | **Median Market Return-$_{1 \text{ to } -12}$** |
| **Low Insider Demand** | 0.146 | 0.176 | 0.160 | 0.208 | 0.170 | 0.177 |
| **2** | 0.181 | 0.175 | 0.173 | 0.179 | 0.186 | 0.193 |
| **3** | 0.180 | 0.191 | 0.195 | 0.213 | 0.153 | 0.168 |
| **4** | 0.119 | 0.133 | 0.083 | 0.103 | 0.128 | 0.154 |
| **High Insider Demand** | 0.098 | 0.102 | 0.114 | 0.126 | 0.088 | 0.087 |
| **High – Low** | -0.048 | -0.074 | -0.046 | -0.082 | -0.082 | -0.090 |
| ***t*-statistic** | (1.37) | | (1.29) | | (2.43)** | |
| ***z*-statistic** | | (1.47) | | (1.38) | | (2.37)** |

*Note*: This table reports mean and median lag market returns for portfolios sorted on aggregate insider demand (first two columns), aggregate insider demand in value stocks (second two columns), and aggregate insider demand in growth stocks (last two columns). The sample size is 310 months (July 1978–April 2004). The *t*- and *z*-statistics in the last two rows are from a difference in means tests and Wilcoxon rank sum test of the null hypothesis that lag market returns for low insider demand months equal lag market returns for high insider demand months. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 10. Out of Sample Period Descriptive Statistics (June 2004-August 2009)**

| | Mean | Standard Deviation | Minimum | Median | Maximum |
|---|---|---|---|---|---|
| **Market Return$_1$** | 0.297 | 4.841 | -18.470 | 1.150 | 11.060 |
| **Value Return$_1$** | 0.522 | 6.300 | -21.540 | 1.415 | 17.215 |
| **Growth Return$_1$** | 0.190 | 5.056 | -18.410 | 0.915 | 11.475 |
| **Value Premium$_1$** | 0.332 | 2.769 | -9.890 | 0.230 | 7.580 |
| **Insider Demand$_{-1}$** | -0.618 | 0.254 | -0.872 | -0.707 | 0.247 |
| **Insider Demand$_{-1 \text{ to } -3}$** | -0.616 | 0.245 | -0.846 | -0.698 | 0.098 |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.631 | 0.224 | -0.839 | -0.726 | 0.069 |
| **Insider Demand$_{-1 \text{ to } -12}$** | -0.673 | 0.150 | -0.813 | -0.733 | -0.212 |

*Note*: Base period (month *t*) for the data is June 2004–August 2009 (63 months). Returns (month *t*+1) for Market$_1$, Value$_1$, Growth$_1$, and the Value Premium$_1$ (Value Return$_1$ – Growth Return$_1$) are monthly and in percent. Insider demand$_{-X \text{ to } -Y}$ is the number of insider purchases less the number of insider sales over the number of insider transactions in months *t*-X to *t*-Y.

**Table 11. Regressions of Monthly Portfolio Return on Lag Aggregate Insider Demand – Out of Sample Period (June 2004-August 2009)**

| Dependent Variable | Insider Demand Measured Over: Previous Month ($t$=-1) | | | Previous Three Months ($t$=-1 to -3) | | | Previous Six Months ($t$=-1 to -6) | | | Previous Year ($t$=-1 to -12) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** | **Intercept** | **Coefficient** | **Adj. $R^2$** |
| **Market Return$_1$** | 0.022 | -0.444 | -1.58% | 0.855 | 0.907 | -1.42% | 2.138 | 2.916 | 0.21% | 2.299 | 2.975 | -0.78% |
| | (0.01) | (-0.18) | | (0.51) | (0.36) | | (1.16) | (1.06) | | (0.81) | (0.72) | |
| **Value Return$_1$** | -0.693 | -1.968 | -1.00% | 0.841 | 0.519 | -1.60% | 3.478 | 4.686 | 1.18% | 4.764 | 6.302 | 0.63% |
| | (-0.33) | (-0.62) | | (0.39) | (0.16) | | (1.46) | (1.32) | | (1.30) | (1.18) | |
| **Growth Return$_1$** | 0.495 | 0.494 | -1.58% | 1.504 | 2.133 | -0.55% | 2.589 | 3.801 | 1.24% | 2.894 | 4.017 | -0.20% |
| | (0.29) | (0.19) | | (0.87) | (0.81) | | (1.36) | (1.33) | | (0.93) | (0.93) | |
| **Value Premium$_1$** | -1.189 | -1.189 | 3.54% | -0.663 | -1.614 | 0.44% | 0.891 | 0.885 | -1.12% | 1.870 | 2.285 | -0.09% |
| | (-1.31) | (-1.81)* | | (-0.70) | (-1.13) | | (0.84) | (0.56) | | (1.15) | (0.97) | |

*Note*: Monthly portfolio returns are in percent. The sample size is 63 months (June 2004-August 2009). ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Table 12. The Value Premium following Low, Medium, and High Aggregate Insider Demand—No Look Ahead Bias; Out of Sample (June 2004-August 2009, $n$=63 months)**

| | Low Insider Demand | Medium Insider Demand | High Insider Demand | High Insider Demand-Low Insider Demand | |
|---|---|---|---|---|---|
| | | | | *t*-statistic | Wilcoxon *z*-statistic |
| | **Panel A: Insider Demand Measured over Previous Six Months ($t$=-1 to -6)** | | | | |
| ***N*** | 35 | 7 | 21 | | |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.757 | -0.732 | -0.389 | | |
| **Market Return$_1$** | 0.982<br>(2.33)* | 0.657<br>(0.61) | -0.967<br>(-0.59) | -1.15 | -0.61 |
| **Value Return$_1$** | 1.115<br>(2.16)* | 0.464<br>(0.39) | -0.447<br>(-0.20) | -0.69 | 0.14 |
| **Growth Return$_1$** | 0.638<br>(1.12) | 0.733<br>(0.60) | -0.738<br>(-0.45) | -0.80 | -0.13 |
| **Value Premium$_1$** | 0.476<br>(1.60) | -0.269<br>(-0.45) | 0.290<br>(0.327) | -0.19 | 0.15 |
| **%(Value Premium$_1$>0)** | 57.14% | 28.57% | 61.90% | | |
| | **Panel B: Insider Demand Measured over Previous Month ($t$=-1)** | | | | |
| ***N*** | 30 | 13 | 20 | | |
| **Insider Demand$_{-1 \text{ to } -6}$** | -0.771 | -0.702 | -0.332 | | |
| **Market Return$_1$** | 0.498<br>(1.12) | 1.396<br>(1.35) | -0.720<br>(-0.43) | -0.70 | -0.07 |
| **Value Return$_1$** | 0.688<br>(1.22) | 1.437<br>(1.21) | -0.321<br>(-0.14) | -0.43 | 0.45 |
| **Growth Return$_1$** | 0.015<br>(0.02) | 1.648<br>(1.52) | -0.494<br>(-0.30) | -0.29 | 0.47 |
| **Value Premium$_1$** | 0.673<br>(2.08)** | -0.211<br>(-0.54) | 0.173<br>(0.18) | -0.49 | -0.21 |
| **%(Value Premium$_1$>0)** | 60.00% | 38.46% | 60.00% | | |

*Note*: Panel A reports mean aggregate insider demand over the previous six months ($t$-1 to $t$-6), the mean subsequent ($t$=1) monthly market portfolio return (in percent), value portfolio return, growth portfolio return, value premium (and associated $t$-statistic) , and the fraction of observations when the value premium is positive following low, medium, and high insider demand. Insider demand breakpoints for low, medium, and high categories are updated every month based on insider trading in the five years prior to that month. Panel B reports analogous figures based on aggregate insider demand the previous month ($t$-1). The last two columns report a $t$-statistic from a difference in means test and a $z$-statistic from a Wilcoxon rank sum test, respectively, of the null hypothesis that portfolio returns following low insider demand equal portfolio returns following high insider demand. The last row reports the fraction of observations with a positive monthly value premium. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

**Figure 1. Insider Demand$_{-1 \text{ to } -6}$ over Time (Jan 1979-May 2004)**

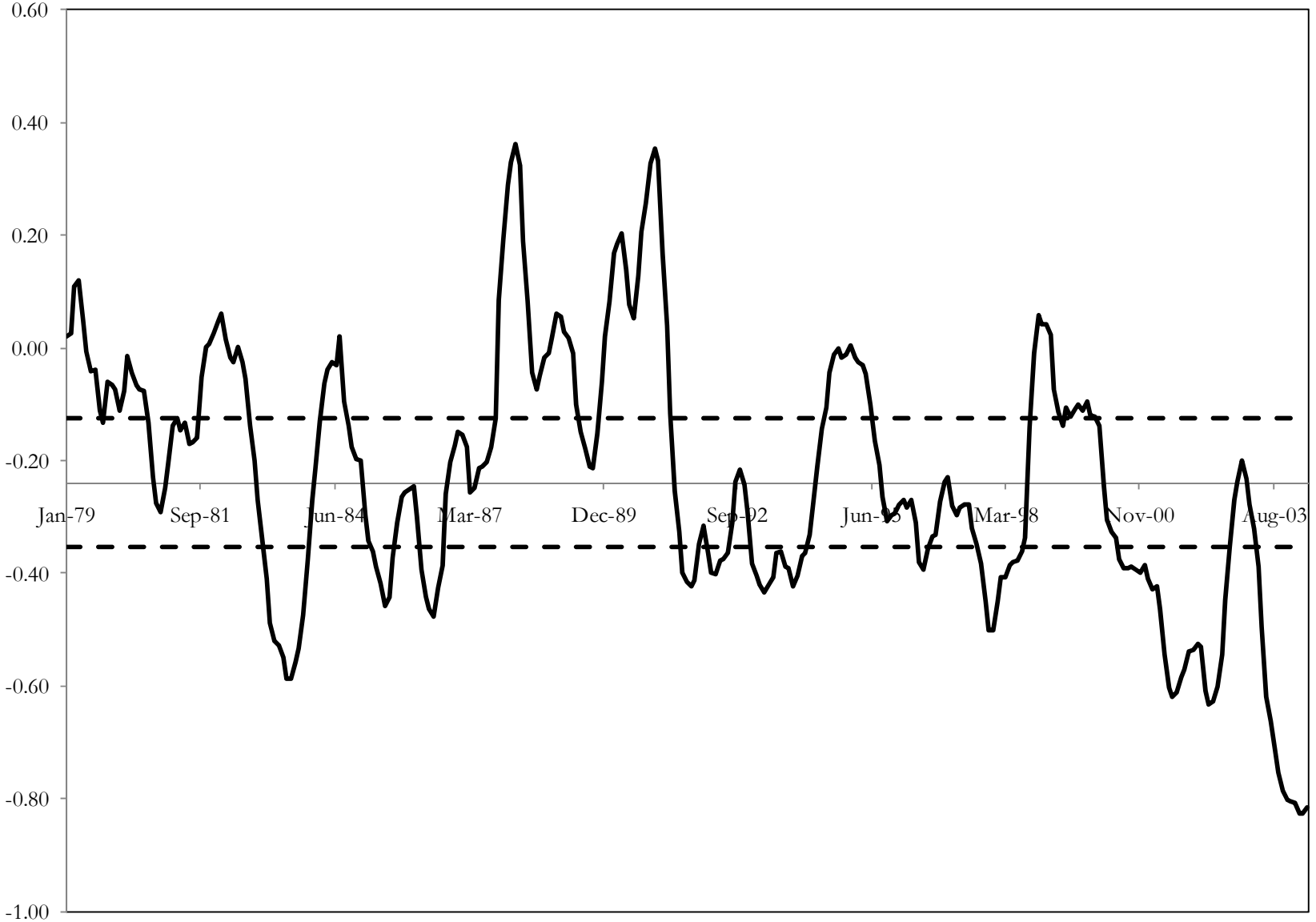

**Figure 2A. Insider Demand, Cumulative Maket Return, and Cumulative Value Premium (July 2004-September 2009); Signal Based on Aggregate Insider Demand in Previous Six Months**

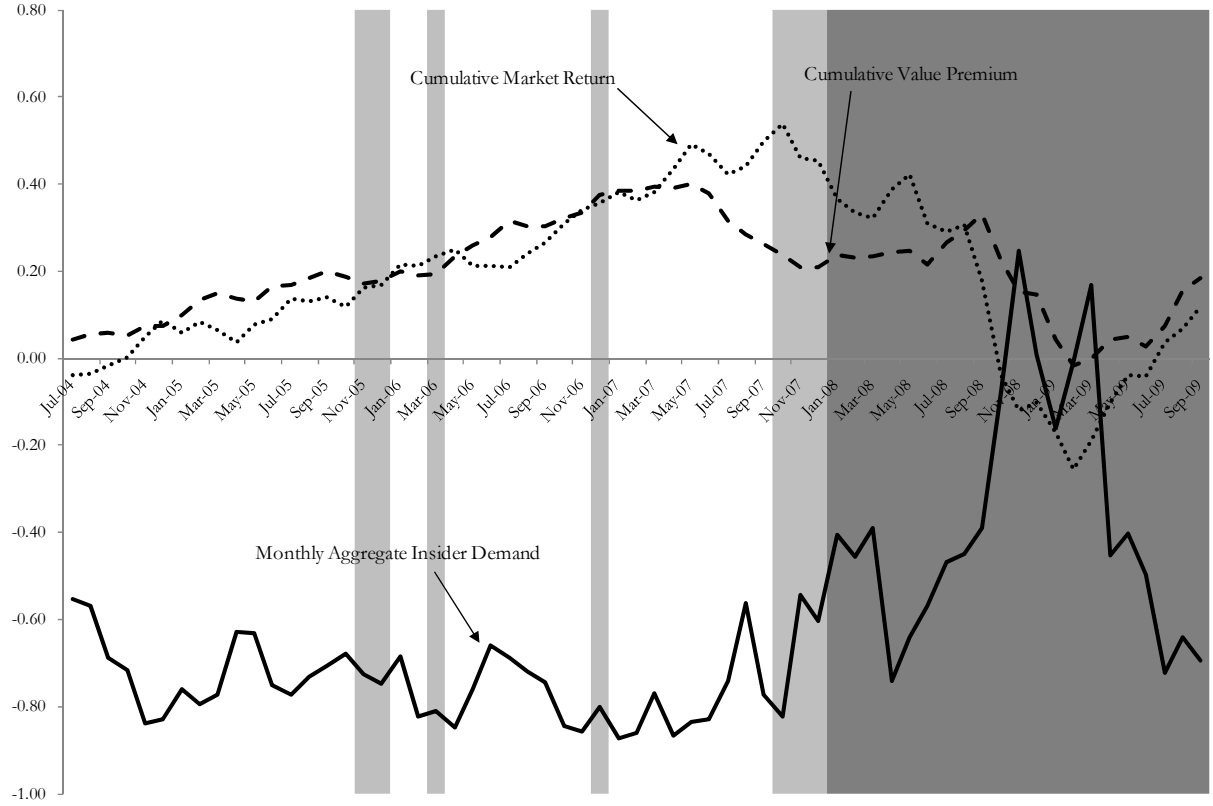


**Figure 2B. Insider Demand, Cumulative Maket Return, and Cumulative Value Premium (July 2004-September 2009); Signal Based on Aggregate Insider Demand in Previous Month**