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## **Broker Recommendations and Mutual Fund Trades**

We wish this paper to be considered for the **Barclay's Global Investors Australia Prize**.

## **Broker Recommendations and Mutual Fund Trades**

### **Abstract**

We investigate the alignment of mutual fund trades with brokers' recommendations and their associated performance. Using 2,730 funds with 44,315 fund-periods between 1994 and 2005, we find that more than 20% of funds adjust their portfolios in line with brokers' recommendations. However, funds that trade counter to these recommendations, on average, earn superior excess returns. This superior performance is most pronounced in small funds holding less-liquid stocks that trade more actively, and we attribute this to their private information having greater incremental value.

*JEL Classification:* G2, G11, G14, G23

**Keywords:** Mutual fund, broker recommendations

## **Broker Recommendations and Mutual Fund Trades**

Institutional Brokers' Estimate System (IBES) is a commercial information provider that reports analysts' recommendations on a five point ordinal scale ranging from "strong buy" to "sell". These are averaged to produce monthly consensus recommendations, which are purchased by institutional investors and brokers. In an efficient market, the information contained in brokers' recommendations, which are themselves a synthesis of available information, should be rapidly incorporated into the price of the stocks they recommend. Once these adjustments occur, the recommendations should have little further value, and investors that use them to guide their trades should be unable to earn excess returns.

From one month to the next, less than 35% of the mean brokers' recommendations reported by IBES change. Accordingly, the majority of standing recommendations should have no pecuniary value, and be employed only by those who believe that the market is inefficient. However, Elton, Gruber and Grossman (1986) demonstrate that excess returns are possible by using brokers' recommendations to create hypothetical portfolios of stocks. Changes to recommendations provide greater returns, but standing recommendations also contain valuable information. Significant excess returns are earned in the month of publication of the recommendation, and in the following month. Stickel (1995) and Womack (1996) focus on changes to the recommendations with event study methodologies, and also find excess returns are possible. Indeed, Womack (1996) finds that excess returns can persist for six months after the change.

The practical value of brokers' recommendations is investigated by Barber, Lehavy, McNichols, and Trueman (2001), who examine the returns from portfolios formed using consensus recommendations, and reformed at various intervals. With more frequent

portfolio reformation, gross excess returns for the most highly (lowly) recommended portfolios increase (decrease), however, transaction costs also increase to the extent that net excess returns are no longer positive. However, as they note, investors that are required to trade for other reasons and would, in any case, incur transaction costs, are better served by buying stocks that are highly recommended, and selling those with low recommendations.

Mutual funds hold portfolios of stocks which they continuously adjust to acquire favored stocks and to respond to sales and redemptions. We add to the literature by addressing the question of whether such funds do indeed align their trades with brokers' recommendations, and the related question of whether by doing so they are able to earn excess returns. We achieve this by developing a methodology to integrate the stock holdings of mutual funds that Thomson Financial Services Inc. report quarterly, and IBES consensus recommendations. By analyzing the trades of equity mutual funds in 44,315 fund-periods between 1994 and 2005, we are able to determine whether individual funds conduct trades that are consistent with brokers' recommendations.

We investigate the relation between acceptance of brokers' recommendations and mutual fund performance by comparing the return distributions of two groups that we identify. These are the funds that align their trades with brokers' recommendations and those that trade counter to recommendations. Using alternative measures of excess return, we determine the statistical and economic significance of the difference between their mean returns and thus assess the practical value of the recommendations.

More than 20% of mutual funds conduct trades that are aligned with brokers' recommendations. Further, we determine that a number of funds trade counter to these recommendations, and that by doing so are able to earn superior returns. We explore the possibility that this performance is a return on private information which is most valuable

when it contradicts brokers' recommendations. Consistent with this explanation, we find that the greatest benefit from counter-recommendation trading is earned by funds that are smaller, hold less-liquid portfolios and are more actively managed.

Section I describes the data and outlines our research procedure. In Section II we analyze the alignment of mutual fund trades with recommendations and how this affects their returns, while Section III considers funds' stock selection and persistence of trading patterns. Section IV summarizes and concludes this article.

## **I. Data Description and Methodology**

### *A. Data Description*

We use mean brokers' recommendations, which IBES reports monthly for the period January 1994 – December 2005. Covering the same interval, we obtain the periodic stock holdings of all US equity mutual funds from Thomson Financial Services Ltd. We infer transactions from changes to the holdings, which are most commonly reported quarterly, while allowing for stock capitalization changes. Daily stock price, return and turnover data are obtained from Center for Research in Security Prices (CRSP) and used to calculate quarterly excess returns and stock liquidity measures before we combine these with the holdings data. We also use the CRSP database as our source of mutual fund returns, and match these with the Thomson's holdings data using Mutual Fund Links.

To ensure that our data covers most of the changes to a mutual fund's portfolio, we restrict our sample to funds with average equity holdings exceeding 80% and average cash holdings below 10% of fund investments. In a further restriction to limit data errors and omissions, we must be able to replicate<sup>1</sup> the value of the fund's net tangible assets

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<sup>1</sup> We allow a discrepancy of up to 10%, but exclude funds outside this range.

(NTA) by using the stock holdings data and assuming start-of-period prices for the stock for it to remain in our sample.

## *B. Method*

Initially, we estimate a relation which we use to rank stocks based on the mean brokers' recommendation and change in recommendation. We use this ranking to assign each fund's stocks to several "broker-rank" categories. This procedure allows us to use regression analysis to isolate funds that incorporate these brokers' recommendations when trading stocks. Finally, we compare the return performances of funds, which we identify as aligning their trades with brokers' recommendations with those of funds that trade counter to recommendations.

### *B.1. Ranking by brokers' recommendation*

IBES average the recommendations of a varying numbers of brokers, which are coded on a 1 to 5 scale, where 1 is a "strong buy" recommendation. The mean recommendations are reported monthly, and on average, only 36% of them change in successive months, while over three months 59% of them change. We reason that since much of the information used to form the mean brokers' recommendation is stale, funds may be more inclined to act on upgrades (or downgrades) of the recommendation in choosing stocks to buy (or sell). Notwithstanding, the level of the brokers' recommendation will moderate the decision to buy based on the magnitude of an upgrade. That is, a one point upgrade from "buy" to "strong buy" is viewed more favorably than an upgrade from "sell" to "hold". This intuition is supported by Elton, Gruber and Grossman (1986), who find both brokers' recommendation and change in brokers' recommendation are able to predict higher stock returns.

To establish the relation between changes to brokers' recommendations, brokers' recommendations and purchases of stocks by funds that we can use to rank stocks in order of their desirability of purchase, we perform a first pass regression. We identify stocks that have been traded by five or more funds in a period, and calculate the net number of funds that purchased the stock (the number of funds buying the stock minus the number of funds that were sellers) during that period for each. By using the net number of funds purchasing a stock, we implicitly give equal weight to the decisions of each fund irrespective of its size, and thus avoid a measure that is dominated by the actions of large funds.

Using a pooled regression, we estimate the following relation between "net purchasers" and mean brokers' recommendation and the change in the mean brokers' recommendation over three months.<sup>2</sup>

$$\text{Net purchasers}_{it} = 4.16 - 1.24 \text{Brok Rec}_{it} - 2.19 \Delta \text{Brok Rec}_{it} \quad (1)$$

t - stat :            (36.3)   (-23.7)            (-23.5)

Where

Net purchasers<sub>it</sub> = number of funds buying stock i in period t

– number of funds selling stock i in period t

Brok Rec<sub>it</sub> = mean brokers' recommendation for stock i at end period t

ΔBrok Rec<sub>it</sub> = change in mean brokers' recommendation over three months

We use the net number of funds purchasing a stock as a measure of its desirability, and accordingly employ the estimated model to rank stocks (broker-rank) using their mean brokers' recommendation.

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<sup>2</sup> We also estimate alternative models with contemporaneous mean brokers' recommendation and up to six lagged terms. The above model performs similarly, and is selected because of its intuitive appeal. We also establish that the regression coefficients are reasonably stable over time through successive cross-sectional regressions.



### *B.2. Assignment to Broker-Rank Categories*

To identify changes to a fund's asset portfolio that are aligned with brokers' recommendations, we rank stocks held by a fund at the start of a period by applying equation (1) to the mean brokers' recommendations. We assemble these into equal value portfolios (broker-rank categories) each containing 5% of the fund's start-of-period holdings by value. This ensures that there is no relation between the value of the broker-rank category and broker-rank. If trades are non-preferential with respect to broker-rank, then this relation should persist.

We jointly rank the stocks acquired by a fund during a period with those held at the start of the period, such that they are also assigned to one of the 20 broker-rank categories. The value of the stocks traded during a period is determined for each broker-rank category, with sell trades assigned a negative value, and buy trades a positive. The proportion that the value of each stock broker-rank category comprises of the total value of stock traded by the fund during the period is then calculated. It is the relation between these proportions and broker-rank that we examine statistically.<sup>3</sup>

### *B.3. Regression Analysis of Brokers' Recommendation Adoptions*

The initial focus of our tests is to determine whether brokers' recommendations are incorporated into a fund's decision to trade stocks. We perform regression analysis to test

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<sup>3</sup> Ideally, the portfolio would be partitioned to assign exactly 5% of the value to each stock broker-rank category. This rarely occurs because a particular stock holding straddles the desired partition. To address this issue, half the value of the holding and half the value of the stock traded are assigned to the broker-rank category on either side of the partition. When it is not possible to assign the stocks to 20 equal value categories (such as when a single stock comprises more than 5% of the value of the fund's asset portfolio), stocks are assigned to ten equal value broker-rank categories.

the association between the proportion traded and brokers' recommendation. An insignificant regression coefficient on broker-rank indicates that trades are not motivated by the brokers' recommendation.

We regress the proportion (by value) of stocks in a broker-rank category traded by a fund during a period, on the ranking of the category (CatRank) determined by the stocks held at the start of the period:

$$\text{TradeProp}_j = \alpha + \beta \text{CatRank}_j + \varepsilon_j \quad (2)$$

where

$$\text{TradeProp}_j \equiv \frac{\text{Value stock broker-rank category } j \text{ traded}}{\sum_{i=1}^n |\text{Value of stock } i \text{ traded}|};$$

$$\text{CatRank}_j \equiv \sum_{i=1}^n (\text{Stock broker-rank}_i \times \frac{\text{Value stock } i \text{ held}}{\text{Value stock broker-rank category } j \text{ held}});$$

Stock broker-rank<sub>i</sub> = Net purchases as defined in equation (1); and

n = number of stocks in broker-rank category j.

It is worth noting that the denominator of TradeProp<sub>j</sub> is simply the turnover of fund j in period t by value.

These are performed on 44,315 fund-periods between January 1994 and December 2005. By construction, similar regressions of the proportion (by value) of stocks in a broker-rank category held by a fund at the start of a period, on the ranking of the category (CatRank) would indicate that there is no relation. Accordingly, for each fund, performing regression equation (2) will isolate any trading during a period that is motivated by the brokers' recommendations when the respective coefficients, which we term "recommendation betas", are significantly negative or positive.

In these regressions, a recommendation beta that is significantly different from zero could have occurred as a random event. To determine whether the count of significant recommendation betas from 44,315 regressions could have occurred by chance, the

observed count is compared with critical values obtained from the cumulative binomial distribution. We use the number of regressions as the number of trials, the level of significance at which we find the recommendation betas to be positive or negative as the probability of a success, and the critical number of successes corresponding to a cumulative binomial probability of 1%.

#### B.4. Fund Returns

For funds that possess significant brokers' recommendation betas we obtain excess returns for the preceding three- and six-month intervals, the period in which the trades occur and the following three- and six-month intervals. Annualized excess returns (AER) are calculated by subtracting the market return from the fund's return. We use the Carhart (1997), augmented model of Fama and French (1995) and estimate equation (3) for each fund using monthly data for the period 1994–2005.

$$R_{jt} - R_{Ft} = a_{j0} + b_{j1}(R_{Mt} - R_{Ft}) + b_{j2}SMB_t + b_{j3}HML_t + b_{j4}UMD_t + \varepsilon_{jt} \quad (3)$$

where

- $R_{jt}$  = return on fund  $j$  at time  $t$ ;
- $R_{Ft}$  = risk - free return (one - month treasury bill rate)
- $R_{Mt}$  = value - weighted NYSE/AMEX market return;
- $SMB_t$  = returns for small minus large stock portfolios;
- $HML_t$  = returns for high minus low book-to-market portfolios; and
- $UMD_t$  = high prior-year return minus low prior-year return.

Following Thompson (1978) and Cheng, Copeland, and O'Hanlon (1994), we calculate annualized cumulative residuals (ACR) for each fund, but instead sum the residuals from equation (3) for the intervals.

We test whether statistically significant brokers' recommendation trades translate into return performance. Funds are partitioned into negative and positive recommendation betas. After removing return outliers exceeding three standard deviations from the

universal mean, we calculate the mean AER and ACR return for each, and use a t-test to determine whether they are statistically different.

## **II. Trade Alignment and Returns**

### *A. Descriptive Statistics*

Table I, Panel A, provides an analysis of stock returns in the three months preceding and three months following the IBES monthly consensus brokers' recommendation for the period 1994–2005. We rank stocks into quintiles based on mean brokers' recommendation. Consistent with the finding of Elton et al. (1986) that stock returns are positively related to the recommendation in the month of publication, we find a monotonic positive relation between the average return and the strength of the recommendation. However, in the following three months the relation is almost completely reversed. Individual stocks within a recommendation quintile have a wide range of returns as evidenced by their large standard deviations. The quintile extremities are characterized by the highest standard deviation and the lowest liquidity.<sup>4</sup>

[Insert Table I]

Our sample contains 2,730 distinct mutual funds, and 44,315 fund-periods that meet our selection and data quality criteria. Panel B also shows the distribution of days in each period and number of stocks in each fund. These reflect the predominance of 90-day periods (28,234), and a small number of funds holding a large number of stocks. Panel C documents annualized excess returns (AER) and annualized cumulative residuals (ACR) for 20,864 fund-periods in which we can match returns. We also present returns for

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<sup>4</sup> The liquidity measure for each stock has been standardized by dividing the liquidity of each stock held by a fund in any year by the average liquidity of all stocks held by funds for the year..

partitions based on the median size, liquidity and turnover<sup>5</sup>, and finally, we partition on both size and liquidity. The arithmetic mean return of all funds over the three-month period following the period in which we examine fund trades is -0.5% measured by AER and -0.3% measured by ACR. The partitions based on size and turnover highlight minor differences using both AER and ACR. When measured by AER, funds with less-liquid portfolios outperform by 4.5%, but perform similarly when measured by ACR. The difference between these two measures likely reflects the superior performance of the low capitalization stocks over the period of the study.

### *B. Regression Analyses*

We perform 44,315 repeat univariate linear regressions to determine if there is a relation between brokers' recommendations and proportion of stocks traded by a fund during a period. Each regression is for one fund-period, and fund-periods with recommendation betas significant at the 10% level are identified. Table II, Panel A reports the pooled count of over the twelve-year period, while Panel B provides a breakdown by year. A positive recommendation beta indicates that adjustments to a fund's portfolios during a period are consistent with brokers' recommendations; highly recommended stocks are purchased and lowly recommended stocks are sold. A negative recommendation beta suggests funds are acting perversely by buying lowly recommended stocks and selling those with high brokers' recommendations.

[Insert Table II]

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<sup>5</sup> For each variable, we determine the median for each year from the full sample and use these to partition the data. This mitigates the bias from increasing fund size and liquidity over the 12-year period.

We find that brokers' recommendations are followed by 20.7% of funds when they trade.<sup>6</sup> Using the binomial distribution, we are able to determine that the frequency of positive recommendation betas in Table II, Panel A exceeds that expected by random occurrence. Negative recommendation betas occur four times less frequently, but the count also exceeds the 1% binomial critical value (Bin CV), and is, therefore, statistically significant. Panel B reveals that while the counts of brokers' recommendation betas exhibit some variation over time, with attendant variation in the ratio of negative and positive betas, they are reasonably stable.

### *C. Fund Returns*

We compare the returns of the funds that adopt the brokers' recommendations with those that trade counter to them, for the period in which we observe the funds' trades, and for the 3- and 6-month intervals preceding and following this period using both the AER and ACR measures. Our sample reduces to 20,864 fund-periods because we are unable to match return and holdings data, and because we eliminate fund-periods with return outliers. Table III documents the mean returns for each group, along with the difference between these means. On both measures of return, funds that trade counter to the brokers' recommendations on average statistically outperform their counterparts that align their trades with brokers' recommendations. With the annualized raw return exceeding the value weighted market portfolio by 2.2% and 2.0% over the three- and six-month intervals following the period of the trades, this difference is economically significant.

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<sup>6</sup> The funds of interest are ones that align their trades with brokers' recommendations that we can statistically confirm at the 10% level. Clearly, other funds may also follow recommendations but this relation is neither linear nor statistically significant.

Notably, the superior performance of the funds that trade counter to the recommendations is also apparent in the intervals preceding the period of the trades.

A fund may exhibit a superior return performance irrespective of the alignment of its trades with brokers' recommendations because of its extant stock portfolio. That is, even if acting counter to brokers' recommendations reduces performance, funds that initially hold superior stock portfolios may continue to exhibit superior performance. This may also explain the superior performance of the funds trading counter to recommendations prior to the period in which these trades are conducted, since it cannot logically be attributed to the trades themselves. Notwithstanding, if the superior performance is due to the extant portfolio, it is not clear why funds trading counter to recommendations initially hold superior portfolios. As an alternative explanation, private information may have contributed to superior stock selection by counter-recommendation trading funds. The ability to acquire and use this information may be persistent, and be responsible for the earlier superior returns.

#### *D. Size and Liquidity Partitions*

To examine the effect of fund size and portfolio liquidity on trading preferences and returns, we partition our samples. Since the median fund size increases between 1994 and 2005, we use the median for each year to split our sample into small and large funds. Similarly, median portfolio liquidity increases over the same period. For our measure of portfolio liquidity, we use a value weighted average of the liquidity of each stock held by a fund. The liquidity of each stock is measured by the following adaptation of the Amihud (2002) illiquidity measure:

$$\text{Stockliquidity}_i \equiv -\ln \left( \frac{\sum_{t=1}^T \frac{|\text{Stock return}_{it}|}{\text{Price}_{it} \times \text{Vol}_{it}}}{T} \right) \quad (4)$$

where

Stock return<sub>it</sub> = daily stock return;

Vol<sub>it</sub> = daily market turnover of stock i;

Price<sub>it</sub> = daily price for stock i; and

T = number of days in a quarter.

Chen et al. (2004) find that smaller funds outperform larger funds. Panel C in Table I, shows that on average, small fund AERs exceed those of large funds by 1.1%, which confirms this result. If this can be attributed to larger funds experiencing higher trading costs as they suggest, then smaller funds should better able to exploit private information. Therefore, if the superior performance that we observe in counter-recommendation trading funds results from private information, then, we expect that it should be more pronounced in smaller funds. Accordingly, we investigate how fund size affects the performance of funds that align their trades with brokers' recommendations compared to funds that trade counter to them.

[Insert Table IV]

Table IV reports frequencies and fund returns for significant brokers' recommendation betas previously presented in Table III partitioned by the median fund size. The proportions of negative and positive recommendation betas are similar for small and large funds (Panel A), although smaller funds have a marginally reduced propensity to align trades with recommendations. Smaller funds exhibit the greatest difference between the returns of superior performing counter-recommendation traders compared to



funds with aligned trades, over the following three- and six-months (Panels B and C). At 3.3% on AER, the magnitude of the difference between the positive and negative betas for small funds suggests that how the recommendation beta interacts with fund size is important. Return differences preceding the period of the trades however are unrelated to fund size.

We also confirm the finding of Chen et al (2004) that the underperformance of larger funds is greater when they hold portfolios of less-liquid stocks. Panel C in Table I shows that on average, small funds with less-liquid portfolios outperform large funds with less-liquid portfolios by 0.9% on AER and 1.3% on ACR, compared to differences of 0.0% on AER and 0.6% on ACR for more-liquid portfolios. We speculate that, if the size effect is accentuated when funds hold less-liquid portfolios, then the superior performance of negative brokers' recommendation beta funds compared to those with positive betas may also be more pronounced. We reason that funds with private information may generate greater excess returns where the information concerns less-liquid stocks because these stocks react with larger price adjustments after it becomes clear to the market that they were previously incorrectly valued.<sup>7</sup>

The results reported in Table V show that the superior performance of funds that trade counter to brokers' recommendations is concentrated in the lower liquidity funds. Within three months, low-liquidity funds that traded counter to recommendations outperformed their positive recommendation counterparts by approximately 3% per

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<sup>7</sup> Empirical research supports our reasoning. Barber, Lehavy, McNichols, and Trueman (2001) argues that information asymmetry is greatest in low and medium capitalisation stocks and finds brokers' recommendations have the greatest impact on the returns of the stocks. Further, Keim and Madhavan (1998) demonstrate that price adjustments from trading stocks are greatest when the stocks have low capitalization.

annum. Consistent with this, there is a marginally greater preference for lower liquidity funds to reject brokers' recommendations.

[Insert Table V]

By way of explanation, we speculate that funds with private information about the stocks they trade are able to capture greater excess return when the information is not widely held. In the extreme, the returns will be greatest when the information runs counter to the more widely held opinion of the broking community. Small funds are best placed to exploit this information, which most valuable when it concerns the low-liquidity stocks.

#### *E. Turnover Partition*

To explore the issue of whether a fund's performance is a function of both the fund's trades during a period and its extant portfolio, we partition the funds based on median turnover. We expect that the returns of funds with high portfolio turnovers will be more attributable to the trades they conduct. Furthermore, higher turnover funds have increased scope to conduct trades that are value motivated, which Alexander, Cici and Gibson, (2007) suggest should lead to better fund performance. Therefore, these trades should be more cognizant of brokers' recommendations. Panel A in Table VI shows that high turnover funds more readily adopt brokers' recommendations.

[Insert Table VI]

From Panels B and C, it is apparent that, like low turnover funds, high turnover funds that adopt brokers' recommendations perform more poorly than those that trade counter to recommendations, but this difference is more pronounced. This inferior performance is more prominent in the interval prior to the period of the trades for the higher turnover group. This runs counter to the intuition that the superior prior performance identified in

Table III is due to the extant portfolio, and is more suggestive of previous superior stock selection.

Table VII highlights how the differences in fund returns based on their alignment with brokers' recommendations is concentrated in funds that are small, hold less liquid portfolios, with higher turnovers. Despite the reduced number of observations following the three-way partition, the superior performance of funds that trade counter to brokers' recommendations with AERs exceeding 6% for all intervals are statistically significant. In contrast, none of these differences are significant for the large, high liquidity, low turnover funds.

[Insert Table VII]

### **III. Stock Selection and Persistence of Trading Patterns**

#### *A. Ex-Post Stock Selection*

To further explore how a fund's trades versus its extant portfolio affects performance, we identify two groups of funds based on their ex-post stock selection. These are the funds that adjusted their portfolios towards acquiring stocks that performed well over the following three months while selling those that performed poorly, and the funds that made the opposite adjustment. We achieve this by applying the same methodology that we use to identify significant broker's recommendation betas, but instead rank stocks by the stocks' realized performance over the subsequent three-month interval. We assign the stocks to equal value performance categories, and regress the proportion traded in each category on the performance of the categories in 42,550 repeat univariate regressions. Ex-post, we classify funds with a statistically significant (10%) positive regression coefficient as having achieved "good stock selection" as this indicates that the fund was successful in choosing stocks that perform well over the following three months. A negative coefficient

indicates “poor stock selection” with an adjustment of the portfolio towards poorer performing stocks.

A comparison of Panels A and B of Table VIII shows that in 9.0% of fund-periods, funds were successful in adjusting their portfolios towards the better performing stocks, while 9.3% that were unsuccessful. Unsurprisingly, funds that exhibit good stock selection outperform funds with poor stock selection. However, this demonstrates that irrespective of their extant portfolio, the stocks they trade during a period affect their subsequent performance, with the average difference between their annualized excess return exceeding 11%. Between the funds that reject and accept brokers’ recommendations, the proportion of funds exhibiting good and poor selection is similar, and at around 10% is slightly elevated compared to the entire group. Between the group that realized poor stock selection (Panel A) and those that realized good stock selection, the approximate four to one ratio of funds accepting recommendations to funds that reject recommendations, persists.

Panel B shows that funds that simultaneously exhibit good stock selection and reject brokers’ recommendations achieve annualized excess returns 8% higher than funds that accept brokers’ recommendations. In contrast, in Panel A, there is no significant difference between those that accept or reject brokers’ recommendations for funds with poor stock selection. Therefore, the penalty for undertaking poor stock selection is similar whether brokers’ recommendations are followed or not, but the reward for good stock selection is greatest when it runs counter to recommendations. Curiously, however, funds that reject brokers’ recommendations outperform those that accept them by a similar amount whether they exhibit good or poor selection when performance is measured by the four-factor Fama-French-Carhart adjusted ACR returns.

[Insert Table VIII]

In turn, we partition funds by median size, liquidity and turnover and repeat the preceding analysis, but only report the differences between the returns of funds that reject and follow brokers' recommendations in Table IX. It is apparent that smaller funds, less liquid funds, and funds with higher turnover are responsible for the higher AERs when funds that reject brokers' recommendations exhibit good stock selectivity. Notably, for the smaller and less liquid funds, when performance is measured by the ACR, the difference is greatest for funds that exhibit poor selection (Panel A). The apparent conflict between the return measures; superior performance of counter recommendation traders with good selection on one hand and underperformance of recommendation traders that select poorly on the other is not observed in high turnover funds. We speculate that the momentum factor in the model used to produce the ACR is responsible.

[Insert Table IX]

#### *B. Robustness of Counter-Recommendation Trading Classification*

It is possible that the funds we identify as trading counter to brokers' recommendations are simply more efficient users of the information, and garner excess returns by first aligning their trades with the recommendations and subsequently reversing them. This would give the appearance of being counter-recommendation traders. To test this possibility, we rank the stocks in each fund-period by applying equation (1) to leading brokers' recommendations. Using our procedure with the repeat regressions (equation 2), we investigate whether there is a relation between the yet-to-be-announced brokers' recommendations and each fund's trades.

We cannot discount the possibility that the most common three-month period that our holdings data permits, is too long for us to observe trades that initially follow recommendations which are reversed during the period. Notwithstanding, we find that

less than 1.5% of funds that we previously identified as counter-recommendation traders align their trades with yet-to-be-announced recommendations. In contrast, 22.4% of the funds that we previously identified as counter-recommendation traders also trade counter to yet-to-be announced recommendations, significant at 10%.

### *C. Persistence in Fund Adoption of Brokers' Recommendations*

Our research has identified that small funds that hold less-liquid stocks with high portfolio turnover that trade counter to brokers' recommendations, outperform those funds with similar characteristics but align their trades with recommendations. Fund size, fund portfolio liquidity and portfolio turnover are likely to be somewhat persistent; however for a trading strategy to exist, it is necessary for persistence in a fund's propensity to trade on recommendations. Therefore, we examine this possibility. Table X cross-tabulates current period brokers' recommendation by subsequent period recommendation. If in the current period, a fund accepts the brokers' recommendations, there is a 28.5% probability that it will continue to do so in the subsequent period, and a 3.6% probability that it will instead reject recommendations. However, if a fund rejects the brokers' recommendations in the current period, there is an approximately equal (11.5%) probability that in the following period that it will either continue to reject recommendations or accept recommendations. Therefore, using the alignment of a fund's trades with brokers' recommendations will unfortunately not lead to a pecuniary benefit.

[Insert Table X]

## **IV. Conclusions**

Integrating the stock holdings of mutual funds that Thomson Financial Services Inc. report quarterly, and IBES consensus recommendations, we develop a methodology to

examine whether a fund aligns its trades with these recommendations. The combined dataset covers 44,315 fund-periods between 1994 and 2005.

We find that in more than 20% of fund-periods, funds align their trades with recommendations. Surprisingly, a significant proportion of funds trade counter to brokers' recommendations. When we examine the returns distinguished by whether the fund aligns or trades counter to recommendations, it is evident that counter-recommendation trades generate higher excess returns. This result is robust across different definitions of excess return. We determine that the superior performance of counter-recommendation traders is most pronounced in small funds holding less-liquid stocks that trade more actively.

We posit that a mutual fund will be reluctant to trade counter to IBES recommendations unless they are confident that the trades they will undertake are based on superior information or analysis. However, our analysis shows that ex-post, poor or good stock selection is equally likely. Alternatively, counter-recommendation traders receive the benefit of a greater price-reaction from stocks that have been misclassified by other analysts. Where the trades involve lesser known, low-liquidity stocks, the expected price reaction would be greater, and returns more easily captured by smaller funds. We discount the possibility that counter-recommendation traders are gambling for resurrection because these funds previously outperform their counterparts.

Funds that align their trades with brokers' recommendations are more likely to continue to align their trades with recommendations. However, funds that trade counter to recommendations are just as likely to follow recommendations as they are to trade counter in the following period. Thus, investing in recently counter-trading funds is unlikely to capitalize on the superior returns from this group, however, avoidance of funds that align their trades with recommendations is prudent.

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Table I  
Descriptive Statistics

The liquidity of each stock is measured by:

$$\text{Stock liquidity}_i \equiv -\ln \left( \frac{\sum_{t=1}^T \frac{|\text{Stock return}_{it}|}{\text{Price}_{it} \times \text{Vol}_{it}}}{T} \right)$$

where: Stock return<sub>it</sub> = daily stock return; Vol<sub>it</sub>= daily market turnover of stock i; Price<sub>it</sub>= daily price for stock i; and T= number of days in a quarter.

Panel A. Stock Returns and Liquidity

Brokers' Recommendation Quintile	Three-month excess return		Excess return in following three months		Standardized Log Amihud Liquidity
	Mean	Std. Dev	Mean	Std. Dev	Mean
Highly Recommended 1	0.034	0.294	-0.004	0.291	0.971
2	0.023	0.254	0.004	0.252	1.030
3	0.012	0.242	0.009	0.235	1.010
4	-0.005	0.231	0.005	0.226	1.016
Lowly Recommended 5	-0.011	0.250	0.019	0.259	0.973

Panel B. Fund Descriptive Statistics

	Mean	Median	Standard Deviation
Number of fund periods	44,315		
Number of Funds	2,730		
Days in Period	118	92	43
Number of Stocks in Portfolio	154	93	239

Panel C. Fund Returns Over Three Months Following Trading

	N	Annualized Excess Return		Annualized Cumulative Residuals	
		Mean	Standard Deviation	Mean	Standard Deviation
All Fund-Periods	20,864	-0.005	0.205	-0.003	0.126
Fund Size - Small	10,365	0.000	0.219	0.002	0.135
Fund Size - Large	10,499	-0.011	0.191	-0.008	0.116
Portfolio Liquidity - Low	10,458	0.017	0.243	-0.004	0.151
Portfolio Liquidity - High	10,406	-0.028	0.155	-0.002	0.094
Portfolio Turnover - Low	10,250	-0.008	0.195	0.000	0.115
Portfolio Turnover - High	10,614	-0.003	0.214	-0.006	0.131
Small, Low Liquidity	5,878	0.021	0.253	0.002	0.161
Small, High Liquidity	4,487	-0.028	0.159	0.001	0.091
Large, Low Liquidity	4,580	0.012	0.230	-0.011	0.137
Large, High Liquidity	5,919	-0.028	0.151	-0.005	0.097

Table II  
**Significant Recommendation Betas, 1994 to 2005**

The number of statistically significant (10%) recommendation betas is generated from linear regressions of:  $\text{TradeProp}_j = \alpha + \beta \text{CatRank}_j + \varepsilon_j$

where

$$\text{TradeProp}_j \equiv \frac{\text{Value stock broker - rank category}_j \text{ traded}}{\sum_{j=1}^{20} |\text{Value of stock}_i \text{ traded}|};$$

$$\text{CatRank}_j \equiv \sum_{i=1}^n \left( \text{Stock broker - rank}_i \times \frac{\text{Value stock}_i \text{ held}}{\text{Value stock broker - rank category}_j \text{ held}} \right);$$

$$\text{Stock broker - rank}_i = 4.16 - 1.24 \text{Brok Rec}_{it} - 2.19 \Delta \text{Brok Rec}_{it};$$

$\text{Brok Rec}_{it}$  = mean brokers' recommendation for stock  $i$  at end period  $t$ ;

$\Delta \text{Brok Rec}_{it}$  = change in mean brokers' recommendation over three months; and

$n$  = number of stocks in broker - rank category  $j$ .

Year	N	Recommendation Beta					
		Bin CV Range		Negative		Positive	
		Min	Max	Count	Percent	Count	Percent
<b>Panel A. Pooled Count 1994-2005</b>							
	44,315	2,108	2,323	2,394	5.4%***	9,176	20.7%***
<b>Panel B. Annual Breakdown</b>							
1994	2,290	90	139	120	5.2%	354	15.2%***
1995	2,653	106	159	158	6.0%**	488	18.4%***
1996	2,774	112	166	166	6.0%***	583	21.4%***
1997	3,656	152	214	173	4.7%	819	22.4%***
1998	3,827	160	223	182	4.8%	884	23.1%***
1999	3,522	146	207	173	4.9%	977	27.7%***
2000	4,353	184	252	309	7.1%***	1,020	23.4%***
2001	3,837	160	225	251	6.5%***	753	19.6%***
2002	4,194	177	243	268	6.4%***	867	20.7%***
2003	4,091	173	238	199	4.9%	666	16.3%***
2004	4,620	197	266	194	4.2%***	935	20.2%***
2005	4,498	192	260	201	4.5%	830	18.4%***

Cumulative binomial distribution critical values (Bin CV) reflect a 1% probability that a lower (Min) or greater (Max) count occurs by chance.

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table III

**Mean Returns for Funds with Significant Broker Ranking Betas.**

Mean returns and their differences for 20,864 fund-periods are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the negative and positive mean returns.

Interval	Negative betas	Positive betas	Difference
Panel A. Annualized Excess Return 1994–2005			
6-month prior	0.010 (0.005)	-0.028 (0.002)	0.038*** (0.005)
3-month prior	0.013 (0.006)	-0.022 (0.003)	0.035*** (0.007)
Period	0.005 (0.006)	-0.024 (0.003)	0.029*** (0.006)
3-month after	0.015 (0.006)	-0.007 (0.003)	0.022*** (0.007)
6-month after	0.007 (0.005)	-0.013 (0.002)	0.020*** (0.005)
Panel B. Annualized Cumulative Residuals 1994–2005			
6-month prior	0.008 (0.002)	-0.007 (0.002)	0.015*** (0.003)
3-month prior	0.007 (0.003)	-0.009 (0.002)	0.016*** (0.004)
Period	-0.002 (0.004)	-0.008 (0.002)	0.005 (0.004)
3-month after	0.010 (0.003)	-0.009 (0.002)	0.019*** (0.004)
6-month after	0.003 (0.002)	-0.006 (0.001)	0.009*** (0.003)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table IV  
**Comparison of Significant Broker Recommendation Betas and Associated Return Differences by Fund Size.**

Mean returns and their differences are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the negative and positive mean returns.

Panel A: Proportion of negative and positive recommendation betas						
Beta	Small Funds			Large Funds		
	Negative	Positive	N	Negative	Positive	N
Proportion	5.0%	20.3%***	10,365	5.6%***	21.7%***	10,499

  

	Small Funds			Large Funds		
	Negative Beta	Positive Beta	Difference	Negative Beta	Positive Beta	Difference
Panel B: Annualized Excess Return 1994–2005						
6-month prior	0.002 (0.007)	-0.030 (0.003)	0.032*** (0.008)	0.016 (0.006)	-0.026 (0.003)	0.043*** (0.007)
3-month prior	0.006 (0.010)	-0.022 (0.005)	0.028** (0.011)	0.019 (0.009)	-0.022 (0.004)	0.041*** (0.010)
Period	-0.002 (0.009)	-0.023 (0.004)	0.022** (0.010)	0.011 (0.008)	-0.024 (0.003)	0.035*** (0.008)
3-month after	0.036 (0.010)	0.003 (0.005)	0.033*** (0.011)	-0.003 (0.008)	-0.016 (0.004)	0.013 (0.009)
6-month after	0.021 (0.007)	-0.004 (0.004)	0.025*** (0.008)	-0.004 (0.006)	-0.021 (0.003)	0.017** (0.007)

  

Panel C: Annualized Cumulative Residuals 1994–2005						
6-month prior	0.006 (0.004)	-0.004 (0.002)	0.011** (0.005)	0.010 (0.003)	-0.009 (0.002)	0.019*** (0.004)
3-month prior	0.002 (0.005)	-0.004 (0.003)	0.007 (0.006)	0.011 (0.005)	-0.013 (0.003)	0.024*** (0.005)
Period	-0.002 (0.006)	-0.006 (0.003)	0.004 (0.006)	-0.003 (0.005)	-0.009 (0.002)	0.006 (0.005)
3-month after	0.024 (0.005)	-0.003 (0.003)	0.026*** (0.006)	-0.001 (0.004)	-0.014 (0.003)	0.013** (0.005)
6-month after	0.012 (0.003)	-0.001 (0.002)	0.013*** (0.004)	-0.005 (0.003)	-0.011 (0.002)	0.006 (0.004)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table V

**Comparison of Significant Broker Recommendation Betas and Associated Return Differences by Fund Liquidity.**

Mean returns and their differences are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the negative and positive mean returns

Panel A: Proportion of negative and positive recommendation betas						
Beta	Low Liquidity Funds			High Liquidity Funds		
	Negative	Positive	N	Negative	Positive	N
Proportion	5.6%***	20.7***	10,458	5.0%	21.3%***	10,406
Beta	Low Liquidity Funds			High Liquidity Funds		
	Negative Beta	Positive Beta	Difference	Negative Beta	Positive Beta	Difference
Panel B. Annualized Excess Return 1994–2005						
6-month prior	0.032 (0.008)	-0.028 (0.004)	0.060*** (0.008)	-0.016 (0.005)	-0.028 (0.002)	0.013** (0.005)
3-month prior	0.039 (0.010)	-0.012 (0.006)	0.051*** (0.012)	-0.016 (0.007)	-0.031 (0.003)	0.015** (0.008)
Period	0.026 (0.009)	-0.018 (0.005)	0.044*** (0.010)	-0.018 (0.006)	-0.029 (0.003)	0.011 (0.007)
3-month after	0.043 (0.011)	0.013 (0.005)	0.031** (0.012)	-0.017 (0.007)	-0.026 (0.003)	0.009 (0.008)
6-month after	0.035 (0.008)	0.001 (0.004)	0.034*** (0.009)	-0.023 (0.004)	-0.026 (0.002)	0.003 (0.005)
Panel C: Annualized Cumulative Residuals 1994–2005						
6-month prior	0.012 (0.004)	-0.012 (0.003)	0.024*** (0.005)	0.004 (0.003)	-0.001 (0.001)	0.006* (0.003)
3-month prior	0.011 (0.006)	-0.011 (0.004)	0.022*** (0.007)	0.002 (0.004)	-0.007 (0.002)	0.009* (0.005)
Period	0.001 (0.006)	-0.011 (0.003)	0.012* (0.007)	-0.006 (0.004)	-0.004 (0.002)	-0.002 (0.004)
3-month after	0.016 (0.005)	-0.014 (0.003)	0.030*** (0.006)	0.004 (0.004)	-0.004 (0.002)	0.008* (0.005)
6-month after	0.009 (0.003)	-0.009 (0.002)	0.019*** (0.004)	-0.004 (0.003)	-0.003 (0.001)	-0.002 (0.003)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table VI  
**Comparison of Significant Broker Recommendation Betas and Associated Return Differences by Fund Turnover.**

Mean returns and their differences are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the negative and positive mean returns

Panel A: Proportion of negative and positive recommendation betas						
Beta	Low Turnover Funds			High Turnover Funds		
	Negative	Positive	N	Negative	Positive	N
Proportion	5.8%***	19.3***	10,250	4.9%	22.7%***	10,614
	Low Turnover Funds			High Turnover Funds		
	Negative Beta	Positive Beta	Difference	Negative Beta	Positive Beta	Difference
Panel B. Annualized Excess Return 1994–2005						
6-month prior	0.007 (0.006)	-0.015 (0.003)	0.021*** (0.007)	0.013 (0.007)	-0.039 (0.003)	0.052*** (0.008)
3-month prior	0.013 (0.009)	-0.019 (0.004)	0.032*** (0.010)	0.013 (0.009)	-0.024 (0.005)	0.037*** (0.010)
Period	-0.003 (0.008)	-0.019 (0.004)	0.016* (0.009)	0.014 (0.008)	-0.028 (0.004)	0.042*** (0.009)
3-month after	0.011 (0.008)	-0.009 (0.004)	0.020** (0.009)	0.019 (0.010)	-0.005 (0.005)	0.024** (0.011)
6-month after	0.001 (0.006)	-0.012 (0.003)	0.013** (0.007)	0.014 (0.007)	-0.014 (0.003)	0.028*** (0.008)
Panel C: Annualized Cumulative Residuals 1994–2005						
6-month prior	0.006 (0.003)	0.001 (0.002)	0.005 (0.004)	0.011 (0.004)	-0.013 (0.002)	0.024*** (0.005)
3-month prior	0.006 (0.005)	-0.001 (0.003)	0.007 (0.005)	0.008 (0.006)	-0.016 (0.003)	0.023*** (0.006)
Period	-0.005 (0.005)	-0.001 (0.002)	-0.005 (0.005)	0.001 (0.005)	-0.013 (0.003)	0.014** (0.006)
3-month after	0.010 (0.004)	-0.005 (0.003)	0.015*** (0.005)	0.011 (0.005)	-0.012 (0.003)	0.023*** (0.006)
6-month after	0.003 (0.003)	-0.002 (0.002)	0.005 (0.003)	0.003 (0.004)	-0.010 (0.002)	0.012*** (0.004)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table VII

**Comparison of Significant Broker Recommendation Betas and Associated Return Differences by Fund Turnover, Liquidity and Size**

Mean returns and their differences are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the negative and positive mean returns

Panel A: Proportion of negative and positive recommendation betas						
Beta	Small, LLiq, HTO Funds			Large HLiq, LTO Funds		
	Negative	Positive	N	Negative	Positive	N
Proportion	4.2%**	22.6%***	3,470	4.8%	22.2%***	3,279
Beta	Small, LLiq, HTO Funds			Large HLiq, LTO Funds		
	Negative Beta	Positive Beta	Difference	Negative Beta	Positive Beta	Difference
Panel B. Annualized Excess Return 1994–2005						
6-month prior	0.041 (0.017)	-0.038 (0.007)	0.079*** (0.018)	-0.009 (0.008)	-0.019 (0.004)	0.010 (0.009)
3-month prior	0.046 (0.022)	-0.016 (0.010)	0.063*** (0.024)	-0.010 (0.013)	-0.027 (0.005)	0.018 (0.014)
Period	0.040 (0.021)	-0.021 (0.008)	0.061*** (0.022)	-0.007 (0.012)	-0.024 (0.005)	0.017 (0.013)
3-month after	0.081 (0.024)	0.014 (0.009)	0.066*** (0.026)	-0.017 (0.012)	-0.024 (0.005)	0.007 (0.013)
6-month after	0.071 (0.017)	0.010 (0.007)	0.061*** (0.019)	-0.018 (0.007)	-0.023 (0.004)	0.005 (0.008)
Panel C: Annualized Cumulative Residuals 1994–2005						
6-month prior	0.018 (0.009)	-0.011 (0.005)	0.029** (0.013)	0.002 (0.004)	0.004 (0.002)	-0.002 (0.005)
3-month prior	0.010 (0.013)	-0.005 (0.007)	0.015 (0.015)	-0.004 (0.007)	0.001 (0.003)	-0.005 (0.007)
Period	0.007 (0.013)	-0.012 (0.007)	0.019 (0.005)	-0.010 (0.007)	0.001 (0.003)	-0.011 (0.008)
3-month after	0.031 (0.011)	-0.009 (0.006)	0.040*** (0.013)	0.000 (0.007)	-0.007 (0.003)	0.007 (0.008)
6-month after	0.020 (0.008)	-0.004 (0.005)	0.024*** (0.009)	-0.002 (0.004)	-0.002 (0.002)	0.000 (0.005)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.



Table VIII  
**Comparison of Significant Broker Recommendation Betas and Three-Month Returns by Stock Selection Ability**

Mean returns and their differences are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference between the reject and accept brokers' recommendation beta's mean returns. AER is the annualized (raw) excess return. ACR is the annualized cumulative (four-factor) residual return.

	All Funds	Reject Brokers' Recommendations	Accept Brokers' Recommendations	Difference
<b>Panel A. Poor Realized Stock Selection</b>				
Observations	1941	115	470	
BrokRec Prop	100%	5.9%	24.2%	
Selection Prop <sup>1</sup>	9.3%	10.4%	10.7%	
3-Month AER	-0.056 (0.004)	-0.062 (0.012)	-0.066 (0.009)	0.004 (0.021)
3- Month ACR	-0.045 (0.003)	-0.032 (0.010)	-0.059 (0.007)	0.027** (0.012)
<b>Panel B. Good Realized Stock Selection</b>				
Observations	1888	113	413	
BrokRec Prop	100%	6.0%	21.9%	
Selection Prop <sup>1</sup>	9.0%	10.2%	9.4%	
3-Month AER	0.056 (0.006)	0.118 (0.027)	0.038 (0.012)	0.080*** (0.029)
3- Month ACR	0.030 (0.003)	0.042 (0.013)	0.021 (0.006)	0.021 (0.014)

<sup>1</sup> Proportions of 20,864 fund-periods for which returns can be matched, of which 1,110 reject brokers' recommendations and 4,381 accept.

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table IX  
**Three-Month Return Difference Between Significant Negative and Positive Brokers' Recommendation Betas and by Stock Selection Ability, Fund Size, Liquidity and Turnover**

The difference between the mean returns of negative and positive brokers' recommendation betas are accompanied by their standard errors in parentheses. The t-distribution is used to determine the significance of the difference. AER is the annualized (raw) excess return. ACR is the annualized cumulative (four-factor) residual return.

	Fund Size		Fund Liquidity		Fund Turnover	
	Small	Large	Low	High	Low	High
<b>Panel A. Poor Realized Stock Selection</b>						
Observations	276	309	280	305	277	308
AER	0.015 (0.033)	-0.005 (0.029)	0.027 (0.035)	-0.023 (0.024)	0.011 (0.025)	-0.015 (0.038)
ACR	0.048*** (0.017)	0.008 (0.016)	0.081*** (0.018)	-0.030 (0.014)	0.020 (0.014)	0.024 (0.019)
<b>Panel B. Good Realized Stock Selection</b>						
Observations	239	287	254	272	220	306
AER	0.106** (0.023)	0.052 (0.037)	0.105** (0.044)	0.040 (0.035)	0.057 (0.041)	0.091** (0.039)
ACR	0.028 (0.019)	0.013 (0.021)	0.024 (0.020)	0.016 (0.021)	0.017 (0.021)	0.021 (0.019)

\*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels respectively.

Table X

**Persistence in Fund Adoption of Brokers' Recommendations**

Crosstabulation of funds' alignment of trades with brokers' recommendations in one period with their alignment in the following period.

		Subsequent period			Total
		Reject Recommendation	Not Significant	Accept Recommendation	
Current Period	Reject Recommendation	258 (11.4%)	1,745 (77.1%)	260 (11.5%)	2,263 (100.0%)
	Not Significant	1,697 (5.5%)	23,012 (74.9%)	5,997 (19.5%)	30,706 (100.0%)
	Accept Recommendation	307 (3.6%)	5,857 (68.0%)	2,452 (28.5%)	8,616 (100.0%)
		2,262 (5.4%)	3,061 (73.8%)	8,709 (20.7%)	41,585