Who Wins and Who Loses Among Individual Investors?

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Abstract

We find that individual investors incur significant losses to institutional investors from *intraday* trading, whereas their net trades earn positive returns over the first month. While individuals trading through both full service and discount brokers incur losses from intraday trading, only full service broker trades are profitable over longer holding periods. Full service broker clients' limit order trades earn positive returns over 10 to 25 days, and their market order trades earn positive profits over horizons from 1 to 254 days. The returns that discount broker clients earn on limit order trades are negative, while returns generated from market orders are not different from zero. Furthermore, discount broker client losses reduce over the course of the trading day, and during low volatility periods. Our results show clearly that discount broker clients experience their limit order trades being picked off by informed traders. We conclude that individual investors are heterogeneous, and their trading performance reflects differences in their information and broker services.

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1. Introduction

There is a rapidly growing literature on individual investor trading behavior and their effect on

asset prices. Some studies document that individual investors are over-confident, lose in trading, yet

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reluctant to realize losses, trade in a correlated manner, and gamble.[1] Other research provides evidence that individual investors earn positive returns and trade in a contrarian manner.[2] While some of the inconsistent findings across empirical studies might be due to country specific factors, the literature in general tends to discuss individual investors as a homogenous group. In this study, we provide evidence that individual investor heterogeneity matters.[3] We use eighteen years of trade data of a developed stock market to examine the trading profits of two individual investor clienteles: discount broker clients and full service broker clients. In doing so, we also shed light on the roles of individual investor clienteles in the stock market.

There are reasons to believe that full service and discount brokers attract distinct individual investor clienteles. Discount brokers focus on providing efficient order routing services at minimum costs. Full service brokers on the other hand charge more but they can also provide company research, trade recommendations, potential access to IPO allocations, and market status information in addition to execution services for their clients. Purely cost conscious individuals, e.g., those who are self-reliant, over-confident or liquidity motivated, are likely to select discount brokers to satisfy their trading requirements. Individuals who value information, financial advice, as well as execution service will choose to pay a higher fee for full service brokerage. In a Grossman and Stiglitz (1980) informational market equilibrium, we expect that full service broker clients (who effectively acquire costly

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[1] See, e.g., Odean (1999), Barber and Odean (2000) and Barber, Lee, Liu and Odean (2009) for trading profit studies and over-confidence. Feng and Seasholes (2004), Kumar and Lee (2006), Barber, Odean and Zhu (2008), and Dorn, Huberman and Sengmueller (2008) find evidence of correlated trading. Kumar (2008) and Barber, Lee, Liu and Odean (2009) find evidence of gambling behaviour.

[2] See, e.g., Jackson (2003) and Kaniel, Saar and Titman (2008).

[3] Kaniel, Saar and Titman (2008) note that investor clienteles could be a factor in explaining the difference in results across their study. However, they do not investigate this empirically.

information) should earn higher trading profits than discount broker clients before fees. However, questions as to whether and how individual investor clienteles actually trade at a profit remain unclear.

Our data allows us to directly observe the time, price, volume, order type, and broker identifier on both sides of every trade on the Australian Stock Exchange (ASX) from 1990 to 2007. The ASX (an order-driven market) is the 14th largest stock exchange in the world by market capitalization as at the end of 2007[4], and most brokers specialize in dealing with either institutional or individual clients. After consulting historical stock exchange membership documents, trade magazines and senior market practitioners, we use these broker identifiers to classify both sides of every trade as originating from an institutional broker, an individual investor utilizing a full service broker, or an individual engaging a discount broker.[5] In order to compare the trade performance of these investors, we construct portfolios that mimic the buys and sells of each clientele, and mark their trades to the market from the day of trade to the subsequent 254 trading days. We further adjust these performance measures for bid-ask bounce and factor risks. In addition, we study individual investor trade performance depending on whether they use market or limit orders and the time of the day they trade.

At an aggregated level, we find that individual investors collectively and consistently incur intraday trading losses to institutional investors, irrespective of the order type they use. However, individuals earn positive returns over 10-25 day horizons, primarily due to the profitability of their market order trades. At longer horizons, the profits that individual investors generate from market order trades cancel out the losses they incur from limit order trades.

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[4] Data from theWorld Federation of Exchanges (www.world-exchanges.org).

[5] Jackson (2003) and Griffin, Harris and Topaloglu (2003) also rely on broker identification information to classify trades. While this method is not perfect, we believe that it correctly classifies most trades and it is better than studies that rely purely on trade size to distinguish institutional and individual traders. We present several robustness checks later in the paper.

Among individual investors, we find that the bulk of the trading losses are incurred by discount broker clients. Discount broker clients lose 51 basis points from intraday trading while full service broker clients lose only 6 basis points. Their trade performance differences at longer horizon are even more striking. Despite individual investors as a group earning positive returns over 10 to 25 day horizons, full service broker clients earn modestly positive returns over 1 to 254 day horizons (0.86 percent risk-adjusted over 254 days) while discount broker clients incur losses across all horizons (-1.69 percent over 254 days).

Both market and limit order trades for both individual investor clienteles incur intraday losses, which suggests that neither group possesses short term informational advantages. Limit order trades of full service broker clients earn positive returns over 10 to 25 day horizons, but limit order trades of discount broker clients accumulate losses over time. Market order trades of full service broker clients earn positive returns from 1 to 254 day horizons, with most of the returns earned within the first 25 days. Returns on market order trades of discount broker clients are not statistically different from zero.

Taken together, our findings suggests that at an aggregate level, individual investors suffer from information disadvantages against institutional investors within an intraday horizon, yet individuals earn sufficient profits by providing liquidity to avoid trading losses over longer horizons. Among individual investors, full service broker clients are better informed and exhibit skill in liquidity provision. Discount broker clients do not appear to possess any private information, and their lack of market monitoring ability results in their limit orders being picked off by more informed investors. The difference in profits earned by the two clienteles is within the brokerage difference of discount and full service brokers, which suggests that the retail brokerage market is consistent with the Grossman and Stiglitz (1980) equilibrium related to market efficiency.

This study is closely related to several important and recent papers. Barber, Lee, Liu and Odean (2009) find that individual investors in Taiwan lose an economically significant amount to institutional and foreign investors, primarily related to their aggressive trades. Kaniel, Saar and Titman (2008) find

that individual investors earning a premium by providing liquidity to institutional investors best explains the positive return effect subsequent to intense individual investor trading on the NYSE. Our overall findings are consistent with Kaniel, Saar and Titman (2008), possibly reflecting the similarity in investor participation, and the level of market development. In addition, our evidence indicates that individual investors' trade performance depends, at least partly, on their trading motive and the type of brokerage service they adopt.

In a similar spirit to this study, Yan and Zhang (2009) also investigate investor heterogeneity, but in the institutional investor domain. They find that only the trades of short-term institutional traders are informative with respect to future stock returns.[6]

Bergstresser, Chalmers and Tufano (2007) study the mutual fund intermediated distribution and find mutual funds sold through brokers do not perform well relative to funds sold directly suggesting retail broker services are not valuable. In contrast, we find that full service retail stock brokers add value for their clients, at least on a before fee basis.

The remainder of the study is structured as follows. Section 2 details the ASX trading environment, data and research design. Section 3 presents our results. Section 4 details related literature, and Section 5 concludes.

2. Institutional Details, Data and Methodology

2.1. ASX Trading Environment

The ASX operates a consolidated electronic limit order book system called the Stock Exchange Automated Trading System (SEATS). This trading system commenced operation on 19th October 1987

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[6] We focus on individual investor clienteles, and make no claims specific to any particular type of institution (e.g. fund managers, banks, insurance companies, hedge funds, etc.). Institutions, particularly mutual funds and hedge funds strategically split trades across brokers to reduce market impact, hence broker identifiers are not very useful for identifying the type of institution.

and it fully replaced the trading floor system on 4th September 1990 (see Aitken, Brown and Walter (1996)). It is the only significant stock exchange in the country and there are no designated market makers. Stock trades of more than AUD$ 1 million, or large portfolio trades, may be arranged in the upstairs market by brokers. These upstairs trades are reported to SEATS as off-market trades, and the majority of these transactions have the same broker acting for the buyer and the seller.

SEATS opens for trading from 10:00 am and operates in a continuous open limit order book mode until 4:00 pm. The Call auction occurs prior to and after the continuous trading session. SEATS terminals display in real time the full limit order book, and the broker identifiers of the underlying bid and ask orders for the period of our analysis. Bid and ask quotes placed into SEATS also disclose the broker ID of the participating broker prior to 28 November 2005. Hereafter, the ASX removed the disclosure of broker IDs on the SEATS system.

2.2. Data and Descriptive Statistics

We obtain the ASX SEATS trading data for the period 19 February 1990 to 1 December 2007 from the Securities Industry Research Centre of Asia-Pacific (SIRCA). This data captures all trades[7] which took place on, or otherwise reported to, SEATS. Each transaction in the dataset consists of the timestamp, ticker, price, bid and ask quotes just prior to each transaction, trade flags and buyer and seller broker identifiers (IDs). Trade flags indicate whether the trade was buyer or seller initiated, an opening trade, technical crossing, an off-market trade, or an odd-lot trade. We also source closing day prices from SIRCA. Dividends, capitalization adjustments, monthly returns and month-end share market capitalization data are sourced from the Australian School of Business' Centre for Research in Finance Share Price and Price Relative Database (CRIF SPPR). Financial year-end book-value data is sourced from Aspect Financial.

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[7] Our intraday file is missing 6.70 percent of ticker/days from the SIRCA closing day price file or 0.69 percent of total turnover during the sample period. We do not believe this will alter the findings of the study.

Table 1 reports the turnover ratio[8], total turnover and the number of trades per year, as well as the average trade value and average trade price of a transaction in each year from 1990 to 2007. Total turnover during this period has grown 34 times from AUD$53.46 billion in 1991[9] to AUD$1807 billion in 2007. The total number of trades has increased at an even faster pace, and as such, the average trade value has fallen, from AUD$35,400 in 1991 to AUD$26,000 in 2007. Total Turnover during the sixteen-year period is AUD$8.17 trillion. The turnover ratio of the market has also more than doubled in this period from 32.79% of total market capitalization in 1990 to 105.65% in 2007, in line with markets around the world. Turnover on the NYSE, for example, increased from 49.23% to 186.02% during the same period.

2.3. Broker Classifications and Individual Investors Identification

We identify individual investors as those executing trades through brokerage firms which predominantly service retail clients. Jackson (2003) and Griffin, Harris and Topaloglu (2003) use the same approach. We check broker websites, the ASX publication on member firms from 1901-2001[10], newspapers archives, trade magazine articles, and consult senior practitioners in order to accurately classify brokers. We group brokers as either retail or institutional. Retail brokers are further sub-categorized as discount and full service brokers, where we identify discount brokers as those that offer

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[8] The turnover ratio is calculated as the year's total turnover divided by the year end's total domestic market capitalization and the data is sourced from the World Federation of Exchanges website (www.world-exchanges.org)

[9] The 1990 turnover is based on trading on SEATS only. Actual turnover including non-electronic trading is estimated at AUD$41.44 billion (US$40.19 billion) according to World Federation of Exchanges (www.world-exchanges.org). As mentioned in the ASX Institutional Detail section, SEATS operated for all stocks on the ASX since 4 September 1990.

[10] See http://www.asx.com.au/about/pdf/HstoricalMemberFirms.pdf.

trading services and do not offer advice or in-house research. The first discount broker appeared in 1995.[11] Each trade therefore involves at least one of these three types of executing brokers.

Commissions vary on a negotiation basis for institutional and full service brokers. We are not aware of a historical brokerage database during our sample period, yet based on our prior research from institutional investors, websites and our telephone surveys, we find brokerages range between 0.10 to 0.50 percent for institutional investors, 0.11 to 0.66 percent for discount retail brokers and 1-2 percent for full service retail brokers[12].

We apply several filters to the data for potential errors and missing information. We remove a small fraction of the trades involving unrecorded broker IDs: 0, 1, 65 and 70.[13] Also, we remove 3529 ticker/day pairings where the last on-market traded price on a day did not correspond with the closing price in the SIRCA closing day price file. Sixty-one percent of these occurred in 1990.

Several recent papers (e.g. Barber, Odean and Zhu (2009) and Hvidkjaer (2008)) use inferred trade initiator and trade size as a proxy for individual investor trading. As a robustness check of our classifications, we calculate the average price traded and average trade value and market share of each

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[11] The ASX Limited, 2006. *2006 Australian share ownership survey* (ASX, Sydney, Australia). Share Ownership Study finds that of the individual investors surveyed with direct investments in shares, 54 percent use discount brokers (internet or telephone), 37 percent use full service brokers, 5 percent use a financial advisor or other type of broker and 3 percent do not have a broker. These findings suggest individual investors predominantly use retail discount and full service brokers for trading and not institutional brokers.

[12] Percentage brokerage depends on the trade size, ordering routing method and specific agreement. Internet trades are the cheapest, followed by telephone. Brokerage across all firms are charged on a sliding scale with volume discount. Discount brokers have a minimum fee of AUD$20-40 per trade and full service retail brokers charge a minimum of AUD$80-100 per trade. Full service brokers often generate trade ideas and may charge a lower commission on losing trades. The range indicated for retail brokers are valid for trades between AUD$10,000-50,000.

[13] With the above exceptions, all broker IDs consist of only three digit codes. Broker ID 0 makes up about 4% of turnover in 1990 and represents a negligible number of trades thereafter. Broker IDs 1, 65 and 70 each consist of only one trade.

broker every year. A broker is classified as a retail broker in a year if its average traded share price and average trade size is below the year's average. If ambiguity occurs (i.e. one measure is higher than the average, while the other measure is lower), we consider the broker's past year's classification, how far away the broker's average trade size is to the yearly average and the broker's yearly market share to determine its classification. From this analysis, we verify that our broker classifications are robust.

Table 2 reports the yearly number and market share of brokers we classify as having being used by institutional or individual investors. Overall, there are 200 unique broker IDs during our sample period. The number of brokerage firms has declined from 102 in 1990 to 90 in 2007, which we attribute to industry consolidation over time, primarily in the full service brokerage segment.

Institutional brokers dominate trading on the ASX, representing 84.53 percent of turnover over the sample period from 1990 to 2007. The dominance of institutions on the market landscape has been steady over time, despite institutional brokers comprising at most a third of the total number of brokers. From 1995, discount brokers have been slowly gaining market share with respect to turnover from 0.02 percent of turnover in 1995 to 8.17 percent in 2007. Meanwhile, full service retail brokers have lost about a third of their market share during the same period, from 14.38 percent in 1995 to 10.72 percent in 2007. However, the market share across all retail brokers has been stable over time.

As a further robustness check of our identification of individual investors, Table 3 presents the turnover shares of full service, discount and all individual investors by stock size. Every month from 1990 to 2007, the largest 300 stocks (considered the investible universe of securities by fund managers and S&P) by month-end market capitalization are placed into six size groups by their respective market capitalization.[14] Stocks outside the largest 300 are placed in a separate group while other stocks such as preference stocks not in the CRIF SPPR (e.g. preference shares) are placed in another. The turnover share of each investor group over the entire sample period is then calculated. We find that the share of

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[14] The largest 300 stocks on the ASX are the most actively traded and represent about 90% of total market capitalization.

all individual investor as well as discount and full service trading increases as stock size falls. Given that individual investors tend to trade small stocks (e.g. Barber and Odean (2000)) the result reassures us that our broker classification identifies individual investors. For example, in Panel C for all individual investors, stocks ranked 201-250, 251-300 and outside the 300, account for 35.72, 44.22 and 73.44 percent of trading in these size groups, respectively. While institutions dominate about 84 percent of overall trading, individual investors represent a significant proportion of all dollar trading volume in stocks ranked 200 and beyond (i.e. smaller capitalization stocks).[15]

2.4. Investor Clientele Dollar Profits

We adapt the approach in Barber, Lee, Liu and Odean (2005) and Barber, Lee, Liu and Odean (2009) to construct portfolios on the daily net buys and net sells across investor clienteles and track their performance. Every day, each stock is categorized as either a net buy or net sell with respect to investor clienteles in terms of whether the total number of shares bought less the total number of shares sold (net volume) is positive (net buy) or negative (net sell)[16]. The intraday dollar profit (loss) in a stock follows and is calculated as:

$$\text{Profit}_{p,t} = \sum_{i=1}^{n} \Big(qty\_bought_{i,p,t} \times (closing\_price_{i,t} - price\_bought_{i,p,t}) - qty\_sold_{i,p,t} \times (closing\_price_{i,t} - price\_sold_{i,p,t}) \Big) \quad \textbf{(1)}$$

where *qty_bought>qty_sold* for buy profits and *qty_bought<qty_sold* for sell profits and *i* indexes for stock, *p* investor clientele and *t* for days. We calculate *price_bought* as the total gross buy value on the

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[15] In unreported results, we also group trades by trade price and find a similar increase in individual turnover share in price groups with declining price. For example, 87.45% of trades of stocks with prices 20 cents or less are made by individual investors.

[16] We remove all off-market and technical crossing trades. Special trading rules apply to them and they are not taken into account in computing the volume weighted average price, which institutional investors use to benchmark broker execution performance. Importantly, these trades are primarily intra-broker group trades (mostly with the same broker as buyer and seller), and hence do not affect the trade performance across investor groups.

day by an investor clientele for a stock divided by the total number of shares bought. An analogous measure is used for *price_sold*.

To address the issue of bid-ask bounce[17] affecting daily trading profit and return results, we also calculate midpoint to midpoint-close profits by replacing *price_bought* and *price_sold* with the bid-ask spread midpoint prices at the time of each trade and the bid-ask spread midpoint at the close instead of the closing price. A similar calculation is made using the volume-weighted average price (VWAP)[18] instead of the closing price as the benchmark. VWAP is a useful benchmark because institutional brokers use it in practice to measure execution quality. Also, individual investor VWAP performance is simply the inverse measure of institutional broker VWAP.

In addition to intraday profit, we calculate dollar profits at 1, 10, 25, 140 and 254-day holding periods by using net volume multiplied by the trade day's closing price and multiplied by the stock's 1, 10, 25, 140 or 254-day cumulative daily return. The 'buy minus sell' profit on a day is calculated as the difference of the buy profit less the sell profit.

2.5. Returns and Risk-adjustments

The calculation of 'buy minus sell' returns is treated similarly. The trade to the day's close return of a stock in the buy portfolio is calculated as the total dollar profit divided by net value at the day's close (net volume multiplied by the day's closing price). The trade to day's close return for the buy portfolio is therefore the net value-weighted average trade to day's close return of all stocks in the buy portfolio. An analogous measure is used for the sell portfolio. The buy portfolio return is subtracted from the sell

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[17] Porter (1992) and Aitken, Frino, Izan, Kua and Walter (1995) show that transactions at the close tend to occur at the ask price. As such there may be a negative bias in daily profit and return calculations for seller initiated trades at the bid price and using the closing price as the benchmark. Frino, Jarnecic, Johnstone and Lepone (2005) show that bid-ask bounce explains the positive abnormal return of ASX block trade sales from the trade to day's close.

[18] We calculate VWAP as the total on-market buy and sell trading value in a stock divided by the total number of shares bought and sold on a given day.

portfolio return to form the 'buy minus sell' trade to day's close return. For returns at 1, 10, 25, 140 and 254-day holding periods, the cumulative return for the given holding period is used instead of the trade to day's close return.

We risk adjust daily portfolio returns using characteristic selectivity (CS) benchmarks of Daniel et al. (1997) and Pinnuck (2003).[19] The daily characteristic selectivity return is the daily return of a stock less the daily return of benchmark stocks with similar size, book-to-market and momentum characteristics. Given our focus on the profit and returns difference between net buys and net sell portfolios, we expect factor risks to largely cancel out, and risk-adjusted results to be similar to the unadjusted returns.

3. Results

3.1. Aggregated Individual Investors Trade Performance

We begin our analysis of individual investor trade performance at an aggregate level to provide an overall picture and to facilitate comparison to prior studies. Table 4 reports the holding period dollar profits, returns, and risk adjusted returns of the net buys minus net sells portfolios for individual investors as one group. Table 4 Panel A column 2 shows that individual investors lose an average $250,000 per day (about USD$158,000 per day[20]) which is statistically significant at the one percent level. Expressed in percentage returns, Panel B shows that the loss is -0.25 percent per day and it is also statistically significant. Controlling for bid-ask bounce by using the midpoint of bid and ask quotes to

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[19] While Fong, Gallagher and Lee (2008) propose the use of an index-adjusted characteristic-based benchmark, our analysis of the entire ASX universe of stocks makes the Pinnuck (2003) benchmark more suitable. We also compute the four-factor Carhart (1997) risk-adjusted returns which show similar results.

[20] We convert buy minus sell trade daily profits at the prevailing AUD/USD exchange rate to get this estimate. If an exchange rate is missing for a day, we use the previous day's rate. Daily exchange rates are obtained from the Reserve Bank of Australia's website.

compute profit does not alter the results. Column 3 shows the level and column 4 shows the differences which are economically and statistically insignificant. Against these intraday losses when marked to market, individual investors actually perform well against the VWAP. They gain AUD$60,000 per day (column 1) statistically significant at the one percent level. In later sections, we explore how individuals generate returns and beat VWAP.

Table 4 also illustrates the symmetry and zero sum nature of trading when there are only two groups of investors. The payoffs to individuals are offset exactly by the payoffs to institutions. For brevity, and consistent with our contribution to the literature, we focus our discussion on individual investors.

For longer holding periods, Panel B shows that individual investor buys statistically outperform sells over 1 (0.06%), 10 (0.43%) and 25 (0.43%) days. For 140 days and 254 days (or 1 year), profits and returns are not statistically significant. While individual investor trades appear to show some predictive ability, their consistent intraday losses of 0.27 percent appears to offset some of their subsequent positive returns. In subsequent sections, we compute holding period returns from the traded price (rather than at the day's close) in order to measure the size and statistical significance of the overall return.

The characteristic-selectivity alphas in Panels C produce results which are in the same direction and statistical significance as the dollar profit and unadjusted return measurements in Panel A and B. These alphas are statistically significant for 1, 10 and 25 days at one percent level. This result reaffirms the short-term forecasting ability of individual investors and is consistent with the findings of Jackson (2003), Barber, Odean and Zhu (2009) and Kaniel, Saar and Titman (2008) who all find short-term return predictability of individual investors.

3.2. Individual Investor Holding Period Returns by the Year

This section calculates holding period returns from the individual investor traded prices rather than from the day's closing price on a year by year basis. We do this to establish the time series robustness of individuals' trade performance and to test whether the positive and statistically significant close to close holding period returns found in the previous section disappear when the negative intraday returns are incorporated. Table 5 reports individual investor buy minus sell trade holding period returns from mid to mid close, trade to VWAP and 1, 10, 15, 25, 140 and 254 days for yearly cross-sections and the entire sample period.

Measuring intraday returns using trade to VWAP, we find individual investors underperform VWAP pre-1998 by at most 9 basis points. Post-1998, individual investors outperform VWAP by at most 17 basis points. The positive and statistically significant returns arise every year post-1998. The VWAP results therefore contrast sharply to the trade to close and mid to mid close returns, where individual investors have negative and statistically significant returns every year, with the exception of 1990 for mid to mid close returns. Thus the ability of individual investors to outperform VWAP post-1998 does not reflect the economic reality that these trades still remain poorly timed at an intraday level. This ability of individual investors to out-perform VWAP coincides with the increased use of discount brokers. Table 2 shows that discount brokers achieved and maintained above five percent market share in 1999.

For mid to one day returns, negative and statistically significant returns occur for the entire period and across calendar years, with the exception of 1990, 1991, 1992, 1995 and 1998. However, for mid to 10 days, returns are both positive and statistically significant for the entire sample period. For longer periods, the returns are not statistically significant. The reduction in negative and statistically significant holding period returns in the yearly cross-sections, as holding period increases, is also apparent for the overall sample results. This suggests that while individual investors do suffer

statistically significant losses on the day of trade, this loss is gradually reduced over longer holding periods.

At an aggregated level, our results so far suggest that individual investors have short-term return forecast ability, but their consistently poor intraday timing results in their profit from trading on future return predictions to almost completely cancel out by their intraday losses.

3.3. Investors using Discount and Full Service Retail Brokers

We use our finer categorization of individual investors into discount and full service retail broker clients to explore the relationship between individual investor clienteles and trade performance. Our finer analysis begins from 1995, where discount brokers were first introduced into the Australian market.

Table 6 reports our results for discount and full service broker clients, with Panel A reporting unadjusted returns and Panel B reporting characteristic-selectivity returns. Our findings suggest that discount broker clients incur the majority of the trading losses that we observed earlier in Tables 4 and 5. Both discount and full service broker clients earn negative and statistically significant intraday returns from mid to mid close. Discount broker clients earn -0.51 percent, while full service broker clients have returns of -0.06 percent. Individual investors, on aggregate, exhibit a statistically significant return of -0.30 percent. Trade to day's close returns generate very similar results.

Over longer trading windows, there is a greater disparity in the returns associated with the trades by the two groups of individual investors. Full service broker client returns are monotonically increasing after the day's close, and they are able to offset their initial intraday losses. For example, trade to 254 days returns for full service broker clients is positive and statistically significant at 1.28 percent.

Conversely, discount broker clients have monotonically negative and statistically significant returns, with trade to 254 days return of -2.29 percent, statistically significant at the one percent level.[21]

Table 6 Panel B shows that the risk-adjusted returns confirm the unadjusted return results. Discount broker clients have negative and statistically significant risk-adjusted returns in trading windows of 25 days or more. Combined with the unadjusted returns result, this suggests that discount broker clients earn poor intraday returns and also have poor stock selection ability. Conversely, full service broker clients earn positive and statistically significant characteristic-selectivity returns across all trading windows and are also able to offset their initial intraday loss after holding for one day or more.

3.4. Trade Performance over the Course of a Day

One potential explanation for the trade performance difference between the investor clienteles is informational differences. Jackson (2003) argues that full service broker clients are more likely to receive timely research than discount broker clients. Similarly, institutional brokers should have been information than retail brokers. Easley and O'Hara (1992) find that information asymmetry reduces over the course of a trading day. Admati and Pfleiderer (1988) also show that liquidity traders are able to reduce their information disadvantage against better informed traders by clustering their trading to a common time. Therefore, information asymmetry predicts that trading performance differences across investor clienteles should be decreasing over the trading day and lower in auctions (see also Madhavan, Richardson and Roomans (1997).

Table 7 reports holding period returns by investor clientele over hourly intervals across the day and at the opening and closing auctions. Consistent with earlier findings, at an aggregated level, we

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[21] We also investigate whether our results are driven by full service investors having privileged allocations in IPOs. Appendix 1 repeats the analysis by removing stocks in the first year since IPO and grouping by the largest 300 stocks by lagged month-end market capitalization or not. As can be seen, the results are consistent with Table 6 with full service investors earning positive and statistically significant returns for all trade windows greater than one day.

observe that individual investor mid to mid close returns (which is free from bid-ask bounce concerns) are negative and statistically significant for all time periods and across clienteles. We find that individual investors lose the most across trading horizons when they trade during the first hour of the continuous trading session (-0.43 percent mid to mid close returns) and at the opening auction. The negative return is smallest at 3:00pm to 4:00pm (the last interval before the closing auction) of -0.11 percent, consistent with a reduction in information asymmetry as the day progresses. At an aggregated level, individual investors lose to institutional investors in intraday trading throughout the whole trading day except in the closing auction. This result is consistent with the information asymmetry explanation.

The discount and full service broker clients' results are also consistent with the information asymmetry explanation. Full service broker clients mid to mid close losses are relatively stable over the trading day between -0.07 and 0.15, without a strong pattern over the day. The losses to discount broker clients however drops from -0.76 during the first hour of trading to -0.22 during the last hour of trading. At the closing auctions both full service and discount broker client returns are positive and statistically significant over 10 days holding period. This suggests that discount broker clients are able to mitigate some of their information asymmetry costs by trading at the close.

3.5. Market and Limit Order Trades

We study the returns on portfolios that mimic the net market and net limit order trades of different investor clienteles in order to understand the role these investors play in information efficiency and liquidity provision. Limit orders offer other traders an opportunity to trade and are commonly viewed as a source of liquidity (see, e.g. Foucault, Kadan and Kandel (2005)). Market orders lead to immediate execution and Chakravarty and Holden (1995) show that informed traders are more likely to use them. We expect market order trades of informed traders to be associated with positive long holding period returns and limit order trades originating from liquidity providers would results in positive short

holding period returns. To the extent that full service retail (and institutional) broker clients are better informed than discount broker clients, we expect their market order trades to outperform those from discount brokers. In relation to limit order trades, it is an open question as to whether one or both individual investor clienteles can do so profitably give our earlier result that individual investors as a group seems to provide liquidity to institutions at short horizon.

Another reason to examine the profitability of market and limit order trades separately is pick off risk, that is, the chance a limit order being executed when asset value change (see, e.g. Hollifield, Miller and Sandås (2004) and Liu (2008)). While closer market monitoring and limit order updating by brokers or investors reduces pick off risk, Liu (2008) asserts that such monitoring is a costly activity. Given that full service brokers and institutional brokers provide order monitoring and execution services while discount brokers do not, we hypothesize that on average full service (and institutional) broker client limit orders should outperform those of discount brokers.

Table 8 reports the results by order type. Note that we now separate mid to mid close returns from holding period returns because mid to mid close returns do not accurately reflect intraday returns in this analysis. By definition, market (limit) orders would execute above (below) the midpoint spread, mid to mid close returns will be mechanically higher (lower) than the intraday return using trade prices. We can also observe that limit order trades always perform favorably against the VWAP benchmark, and market order trades would do the opposite.

For individual investors as a group, their trade to day's close returns is negative across order types. Their mid to mid close returns using market order trades are positive and statistically significant; and those on limit order trades are negative and statistically significant. Institutional brokers demonstrate their superiority in monitoring and execution in that their trades earn positive trade to day's close returns irrespective of order type. Over longer holding periods, both institutional and individual investors gain using market order trades, and lose on trades using limit orders.

The positive intraday and subsequent returns of institutional investors are consistent with their information advantage, monitoring services provided by their brokers, and the belief that informed investors prefer market orders. Individual investors on the other hand do not fair so well. In order to offset their 0.17 percent intraday loss with limit order trades, they must hold their position for 10 days. The profitability of providing liquidity over this horizon is consistent with our earlier result.

We find significant and revealing variation among individual investors' trade performance. The trade to day's close returns is negative and statistically significant for every individual investor group and trade type, except for full service broker clients utilizing limit order trades. The use of limit orders has not negatively impacted full service broker clients, but it leads to significant intraday losses to discount broker clients. Subsequent holding period returns support the liquidity provision role of individual investors, but only in relation to full service broker clients. Full service broker clients could earn significant positive returns if they hold their position between 10 and 25 days. In contrast, discount broker clients appear to be consistently picked off. Their returns are statistically negative across all horizons. For market order trades, full service broker clients lose 0.09 percent intraday but they earn positive and statistically significant returns across all subsequent horizons that are more than enough to cover their initial loss. They indeed appear to be informed investors. Discount broker clients incur five times the intraday losses of full service broker clients when they use market orders, and their holding period returns across all horizons are not statistically significantly different from zero at the five percent level. Discount broker clients therefore appear to be trading on noise when they use market orders.

3.6. Trade Performance by Counterparty Pairs

Our analysis so far shows that i) individual investors as a group lose to institutional investors at intraday trading, which then break even with their gains over 1-25 daily holding periods; and ii) the two individual investor clienteles' trading performances are in opposite directions. We provide some

evidence to support the liquidity provision, information asymmetry, and order monitoring explanations of the variation in trade performance. Here we consider the buy minus sell portfolio returns across counter-party pairs in order to further examine which investor clientele is benefiting from whom and over what holding period among investor groups.

Three investor clienteles result in the three distinct counterparty pairs: discount/institutional, full service/discount and full service/institution. Table 9 Panel A reports our results for the three pairings and by whether the stock is one of the largest 300 stocks by lagged month-end market capitalization. The split on size is motivated by the findings of Kumar and Lee (2006) and Barber, Odean and Zhu (2009) that hard to arbitrage stocks (i.e. small stocks) cause stock prices to experience short term gains to individual investors and long term (1-year) reversals. The first row discount/institution represents the trade performance that mimics discount broker clients' net purchase from institutional broker clients. The other two pairs are defined analogously.

The results show that discount brokerage clients lose to both full service brokerage clients and institutional investors. Discount broker clients generally lose across all holding periods although their losses are the worst for stocks outside the largest 300 and surprisingly, against institutions in the long term. For example, discount broker clients lose -10.28 percent (t-stat=-6.65) when trading against institutions in outside 300 stocks from midpoint trade to 254 days. This compares with weakly statistically significant and positive gains of 3.50 percent (t-stat=1.84) when full service broker clients trade against discount investors in outside 300 stocks. In the largest 300 stocks, discount broker clients lose against institutions only on the day and are able to offset these losses at longer holding periods. Conversely full service broker clients in the largest 300 stocks have positive and statistically significant returns against discount broker clients across all holding periods.

Full service broker clients gain over holding period up to 25 days across stock size groups when they trade against institutions. Together with the limit order trades result, they appear to earn a premium by providing liquidity to institutions. However the liquidity provision strategy appears risky

outside 300 stocks, as their trades are profitable over short holding periods, but incur losses over holding periods longer than 140 days.

3.7. Multivariate Analysis of Individual Investor Trading Returns

In this section, we take an alternative approach as a robustness check to the buy minus sell return portfolio methodology that we adopt throughout the study, and employ a Fama-Macbeth regression approach in analyzing individual investor trades. Specifically, we follow the methodology of Kaniel, Saar and Titman (2008) in using weekly investor group net flows in order to make our study internationally comparable. Studies on individual investors such as Barber, Odean and Zhu (2009) and Jackson (2003) also use weekly rather than daily intervals to analyze individual investor trades. As such, we estimate the coefficients using the following regression:

$$Return_{i,t+1} = Intercept + \beta_1 Return_{i,t} + \beta_2 NITDecile_{i,t} + \beta_3 TurnoverDecile_{i,t} \tag{3}$$

Where i indexes for stock and t indexes for weeks. *Return* is the weekly return from Wednesday to Wednesday following Barber, Odean and Zhu (2009). If Wednesday is a holiday, then the next trading day is used to start or otherwise end the week. *NITDecile$_{i,t}$* is calculated as the Net Individual Trading (NIT) decile rank for stock i compared to its weekly NIT in the past nine weeks. NIT is calculated as the net weekly dollar volume of buys and sells for a given investor group (discount, full service or all individual investors), divided by the past year's average weekly dollar volume. A *NITDecile$_{i,t}$* of 10 means that the NIT in week t is the highest ranked compared to the past nine weeks, and vice verse when *NITDecile$_{i,t}$* equals 1. An analogous measure is used for *TurnoverDecile$_{i,t}$* as the decile rank for weekly turnover in stock i compared to the past nine weeks. Weekly turnover is calculated as the number of shares traded in a week and is obtained from the SIRCA daily prices file. The regression is run cross-sectionally every week for each investor group and we calculate the time series average for each coefficient. The regression is also run separately for small stocks (market-cap rank of 201 or

lower), mid-cap stocks (market-cap rank from 101 to 200) and large stocks (largest 100 stocks by market-cap rank). $Return_{i,t}$ and $TurnoverDecile_{i,t}$ are used as control variables for known weekly return reversal (e.g. Jegadeesh (1990)) and turnover (e.g. Gervais, Kaniel and Mingelgrin (2001)) effects in weekly stock returns. If an individual investor group has return predictability, than the coefficient for $NITDecile_{i,t}$ is positive and statistically significant.

Table 10 reports our coefficient estimates for each individual investor clientele. Consistent with Kaniel, Saar and Titman (2008), we find that the coefficient for $NITDecile$ is positive and statistically significant for all individual investors and for all size groups, with the exception for small stocks. Also consistent with our previous results, the coefficient estimates for discount and full service broker clients display marked differences.

For full service broker clients, $NITDecile$ is statistically significant across all stocks and size groups. In contrast, for discount broker clients, the $NITDecile$ is negative and statistically significant at the ten percent for all stocks, negative and statistically significant for small stocks, and not statistically significant for mid-cap and large stocks. While this appears to be in contrast to our prior findings of negative returns of discount broker clients, our buy minus sell returns were estimated from the traded price rather than from the day's close as used in the Fama-Macbeth regressions. This suggests that at weekly intervals, the negative returns incurred by individual investors are attributable to the negative return from mid to mid close rather than from poor stock selection ability.[22]

We also confirm that the return predictability of discount and full service broker clients statistically differ as shown in the 'Full Service minus Discount' row. The coefficient difference of $NITDecile$ of discount and full service investors is positive and statistically significant. This indicates that the return

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[22] The discount broker investor characteristic selectivity returns in Table 6 Panel B confirm this conjecture. For close to 10 days, individual investors have statistically insignificant returns while from close to 25 days, the negative return of -0.33 percent is only statistically significant at the 10 percent level.

predictability of individual investors is attributable to full service broker clients and not to discount broker client trades.

3.8. Determinants of Intraday Profits and Losses

Our analysis has shown that intraday losses make up a substantial component of losses of individual investors. This final empirical test uses regression analysis to identify the factors affecting the profits and losses of specific investor clienteles. Regression analysis is commonly used in price impact studies. We use the following model building upon the specification in Chan and Lakonishok (1995):

$$
\begin{aligned}
MProfit_{i,p,t} = \alpha_0 &+ \beta_1 Market\_Vol_t + \beta_2 Aord52Week_{i,t-1} + \beta_3 IPOdum_{i,t} + \beta_4 Lag\log cap_{i,t-1} \\
&+ \beta_5 StockVol_{i,t-1} + \beta_6 LagTurnoveWeek_{i,t-1} + \beta_7 Absmom6week_{i,t-1} \\
&+ \beta_8 Absmom12month_{i,t-1} + \beta_9 Stock52Week_{i,t-1} + \varepsilon
\end{aligned}
\tag{4}
$$

$MProftt_{i,p,t}$ is an investor group p's dollar profit in stock i for day t by marking to market each trade by the midpoint trade price to the midpoint close price.[23]

$Market\_vol_t$ is the absolute difference between the markets high and low level on day t, over the market's opening level. The All Ordinaries index is used as the market proxy.

$Aord52Week_{t-1}$ is the absolute return of the All Ordinaries Index previous day's closing level divided by the midpoint of the past 52 week's All Ordinaries highest and lowest closing levels. Formally:

$Aord52Week_{t-1} = \text{Abs}(Close_{t-1}/(52WeekHigh_{t-1}+52WeekLow_{t-1})/2)-1$

$IPOdum_{i,t}$ is a dummy variable of 1 if the stock is still within one year before its IPO

$Laglogcap_{i,t-1}$ is the past month's log market capitalization

$StockVol_{i,t-1}$ is the standard deviation of the past 180 day's stock volatility

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[23] We also calculate profits using the actual traded prices marked to market by closing prices and find qualitatively similar results.

LagTurnoverWeek$_{i,t-1}$ is the moving average past week's dollar turnover in stock *i* divided by the stocks past month's market capitalization.

Absmom6week$_{i,t-1}$ is the past six weeks absolute return of a stock

Absmom12month$_{i,t-1}$ is the past twelve month absolute return of a stock

Stock52Week$_{t-1}$ is an analogous measure to Aord52Week$_{t-1}$ but for each stock

The intuition of our model is that past information, extreme stock and market movements, high turnover and volatility attracts more uninformed individual investors and consequently exacerbates this group's losses. Our hypothesis may therefore be seen as an extension to Barber and Odean (2008)'s hypothesis that individual investors are attracted to, and net buy into, attention grabbing stocks (defined as stocks in the news, with abnormal trading volume or with extreme one day returns). We predict that discount broker clients who have consistently appeared to be uninformed are likely to incur larger losses in more volatile market conditions.

Our momentum variables *Absmom6week$_{i,t-1}$* and *Absmom12month$_{i,t-1}$* test whether extreme past movements in a stock attracts more uninformed individual investors and thereby increasing their losses. For example, Grinblatt and Keloharju (2000) and Jackson (2003) show that individual investors tend to be contrarian traders, buying when the price falls and selling when the price rises. The use of 52 week high variables, *Aord52Week$_{t-1}$* and *Stock52Week$_{t-1}$* is motivated by George and Hwang (2004)'s suggestion that 52 week high and low stock prices, along with the stock's share price are readily available information to investors. As such, stocks (or the market index) near their 52-week high or low may attract more individual investors. A similar intuition is used for *Market_vol$_t$*, *IPOdum$_{i,t,}$* *LagTurnoverWeek$_{i,t-1,}$* *StockVol$_{i,t-1}$* and where a new IPO, high turnover or volatility in a stock may attract more uninformed individual investors. We thereby predict that the above variables are negatively related to individual investor returns, in particular for discount investors. We also use *Laglogcap$_{i,t-1}$* as a control for stock size and turnover as we show in Table 3 that there is more trading in large stocks than in small stocks, even by individual investors.

Table 11 reports the coefficient estimates for regressions on the dollar profits of the three investor clienteles. Note that institutional investor profits are simply the reverse signed dollar profits (losses) of discount and full service broker clients combined as profits for all groups sum to zero on a given day. The negative and statistically significant coefficients on variables for discount broker clients is consistent with them being uninformed individual investors and attracted by past extreme stock returns and market movements, even after controlling for the size of the stock. For example, the coefficient of -5.66 on *AbsMom6Weeks* suggests that discount investors lose $5.66 on a given stock per day for every one percent increase (decrease) in returns on a given stock with positive (negative) past six weeks returns. In contrast, full service broker client profits are only negatively related to past stock volatility while being positively related to the momentum variables. Our evidence therefore suggests discount broker clients and not full service broker clients become the most uninformed, and therefore lose the most money in attention grabbing and volatile stocks.

4. Discussion and Related Research

Our study uses broker identifiers to assign trades to investor clienteles and focuses on the returns they earn by the net buy minus net sell portfolios. Barber, Lee, Liu and Odean (2009) apply the same portfolio aggregation method in studying individual investor trades and order records from Taiwan. They find that the portfolios that track individual investors' net trades suffer statistically significant losses across all trading horizons. Furthermore, they provide evidence that individual investor losses are primarily due to aggressive trades.[24] Our evidence from Australia has some similarity, but also illustrates major differences: individual investors' trade performance is poor irrespective of the clientele in intraday trading. Over long holding periods, only those that trade via

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[24] The Taiwan market operates an electronic limit order book that matches orders one to two times every 90 seconds throughout the trading day. Aggressive trades are trades where the underlying limit order were submitted at prices higher than the most recent unfilled limit order prices. They are analogous to, but not the same as, what we called market order trades.

discount brokers suffer consistent losses. Discount broker client losses appear to be due to their limit (passive) orders being picked off by more informed traders.

The positive performance pattern of full service broker trades that we document is related to the findings of Kaniel, Saar and Titman (2008) and Bloomfield, O'Hara and Saar (2005). Using NYSE audit trail data, Kaniel, Saar and Titman (2008) find net individual trading intensity are negatively related to contemporaneous returns and dominate past market statistics in predicting future returns. They conclude that individual investors provide liquidity (by contrarian trading) to institutional investors. Bloomfield, O'Hara and Saar (2005) find that in experimental settings informed investors trade aggressively when prices have not fully adjusted, but they also offer liquidity when the price of liquidity is greater. Full service broker limit order trades earn positive returns between 1-25 days holding period and their market order trades earning positive profit over holding periods up to 254 days is consistent with the liquidity provision and informed trading roles.

It is important to note that the findings in our study do not imply market inefficiency. The higher profitability of the trades from full service brokers compared to discount brokers can be due to the self-selection of traders with different trading motives and strategies, as well as the value of information and advice provided by full service brokers. In any case, the difference in profits that the two individual investor clienteles earn by trading is not greater than the approximate difference between the commissions charged by the two types of brokers. In short, the Grossman and Stiglitz (1980) costly information equilibrium holds. Our findings do not imply that individual investors will achieve any net gain if they switch between discount and full service brokers. Full service brokers charge for the value they provide. While this is not surprising, it contrasts with the findings by Bergstresser, Chalmers and Tufano (2007) who find that mutual fund intermediaries do not seem to provide investment value to their clients. There are some potential reasons for full service stock brokers to perform better than mutual fund brokers. Stock broking commission is transaction-based, while there is a trailing commission applied in the mutual fund industry. To induce clients to trade repeatedly,

hence earning more commissions, stock brokers need to show they can add value, at least on average. In addition, stock brokers deal in specific stocks with scopes for information asymmetry in the market, and they are relatively well positioned to acquire tradable and particularly short term (fundamental as well as liquidity) information. The incentives and information advantage for mutual fund brokers to add value on behalf of clients is less clear.

What is also important to discuss is the individual versus institutional investor transfer in this zero sum game of trading. Overall, our results do not suggest that there is significant transfer of wealth between the two broad classes of market participants. Institutional investors are conclusively superior in intraday trading, reflecting their superior information advantage (if nothing else, at least the know if they are splitting orders). However the liquidity pressures they generate create opportunities for individual investors to gain by providing liquidity. Our results therefore suggest that these two forces balance out between the two investor groups to a large extent on before commission and taxes.

Finally, our results do not suggest that full service broker clients are the most informed group of investor in the market. They are the better informed investors among the two individual investor clienteles that our data allow us to classify. Yan and Zhang (2009) shows that institutional investors are also heterogeneous; some are better informed than others. Broker identifiers do not allow us to distinguish between those that have the incentives and ability to be informed, e.g., hedge funds and active mutual funds, from the others. We make no claim about specific groups of institutional investors. Given the resources that they could devote to acquire information, there is no doubt a subset of them would likely be the most informed in the market. Our study and contribution to this literature focuses on the wins and losses among individual investors.

5. Conclusions and Implications

We study the trade performance of three investor clienteles: investors that use discount retail brokers, full service retail brokers and institutional brokers. Our data have some advantages over those used in other studies in that it covers trade and order data across an entire developed market dominated

by institutional investors over a long sample period. We find that individual investors consistently incur intraday trading losses to institutional investors as a group. However, they earn positive returns over 10-25 day horizons. Stocks that individual investors buy do not outperform the stocks they sell beyond 25 days. Our result is consistent with the evidence and liquidity provision explanation offered by Kaniel, Saar and Titman (2008).

The aggregate individual investor performance masks significant differences across individuals who use discount and full service brokers. While all individual investors incur intraday trading losses, the burden is disproportionately born by discount broker clients. Performance differences at longer horizons are even more striking. Despite individual investors as a group earning positive returns over 10-25 day horizons, full service broker clients earn positive returns from over 1-254 day horizons (1.26 percent over 254 days) while discount broker clients lose across all horizons (1.91 percent over 254 days).

We identify several explanations for the performance differences across investor clienteles: informed trading, noise trading, liquidity provision, and the public information monitoring effort. Full service broker clients fit the experimental behavior of informed investors in Bloomfield, O'Hara and Saar (2005). Full service broker clients indeed earn positive returns over short holding periods in their limit order trades and they profit over longer horizons in their market order trades. However, full service retail investors are not intraday liquidity providers such as dealers or voluntary market makers. As such, they still lose money at the intraday level. Discount broker clients do not appear to possess any private information, and suffer from their lack of order monitoring. Discount retail investors lose consistently in intraday trading and limit order trades. Returns subsequent to their market order trades are not significantly different from zero. We conclude that individual investors are heterogeneous, and their trading performance reflects their information and the order monitoring service their brokers provide.

Many interesting questions in this rapidly growing field of individual investor trading remain to be explored. Issues such as the aggregation of individual investor trading across stocks, and their gambling tendencies are obvious extensions that could be better addressed with a set of complete investor clientele data. At the order level, the order strategies of investors with different monitoring capacity should differ in equilibrium. Our results suggest that discount broker clients may not have placed their order far enough from the best bid and offers, given their monitoring intervals. However, much empirical works need to be done to better understand these implications.

Our study offers practical implications for individual investors and exchanges. Given that individuals trading through discount brokers sustain losses, and that they continue to trade as before, they must derive some non-monetary utility from trading, e.g. liquidity needs, learning experience, a chance to get rich, thrill etc. However, our results clearly show that these investors do not exhibit informational advantages or skills to successfully monitor market conditions. Discount broker investors do not appear to be able to consistently pick stocks that perform well or poorly. Discount broker investors have not been successful in intraday trading, and could improve their trading performance by simply trading at the close where information asymmetry is at the lowest. Exchanges might be able to educate or implement mechanisms to better help this class of investor to trade at the close.

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Table 1
Summary Statistics
This table reports the turnover ratio, total turnover (in billion Australian dollars, number of trades, average trade value of each trade and average trade price of all trades in the ASX SEATS database by year. The turnover ratio is calculated as the year's total turnover divided by the year end's total domestic market capitalization and the data is sourced from the World Federation of Exchanges website (www.world-exchanges.org). The sample period is from February 19 1990 to December 31 2007.

Year	Turnover Ratio (%)	Turnover ($Billions)	No. Trades (millions)	Avg. Trade Value	Avg. Trade Price
1990	37.23	19	0.665	28,900	2.08
1991	32.79	53	1.512	35,400	2.29
1992	34.13	56	1.690	33,100	2.27
1993	33.56	89	2.861	31,100	2.04
1994	43.77	118	3.080	38,300	2.54
1995	40.38	121	3.027	39,800	2.73
1996	46.89	169	4.270	39,600	2.52
1997	57.14	212	5.403	39,300	2.87
1998	48.96	246	6.195	39,700	3.63
1999	46.34	308	9.711	31,700	2.99
2000	60.75	390	13.794	28,300	2.55
2001	65.09	487	12.919	37,700	3.82
2002	77.72	552	13.631	40,500	3.76
2003	63.54	582	15.780	36,900	2.74
2004	67.45	756	18.627	40,600	2.84
2005	83.63	974	25.984	37,500	3.35
2006	78.44	1230	38.320	32,100	3.42
2007	105.65	1807	69.535	26,000	3.56
ALL	63.20	10861	355.143	30,600	3.63

Table 2
Institutional and Individual Broker Count and Market Share by Year

Every year from 1990 to 2007, using broker IDs from the ASX SEATS database to represent each brokerage firm. Brokers are classified as institutional and individual investor brokers as defined in Section 2.3. The table reports the number of brokers and the market share of turnover for these four groupings by year.

Year	Broker Count					Market Share of Turnover (%)			
	Full Service Retail	Discount Retail	Institutional	All Retail	All Brokers	Full Service Retail	Discount Retail	Institutional	All Retail
1990	81	0	21	81	102	17.67	0.00	82.32	17.67
1991	70	0	22	70	92	15.12	0.00	84.88	15.12
1992	68	0	20	68	88	16.16	0.00	83.84	16.16
1993	67	0	18	67	85	17.82	0.00	82.18	17.82
1994	71	0	18	71	89	15.61	0.00	84.38	15.61
1995	70	1	21	71	92	15.43	0.02	84.55	15.45
1996	72	2	19	74	93	16.66	0.22	83.11	16.88
1997	71	5	18	76	94	14.01	2.28	83.71	16.29
1998	70	8	18	78	96	12.48	2.80	84.72	15.28
1999	62	10	20	72	92	11.47	5.23	83.30	16.70
2000	58	11	25	69	94	10.38	5.89	83.73	16.27
2001	55	14	26	69	95	7.49	5.26	87.26	12.75
2002	52	13	27	65	92	9.43	5.48	85.09	14.91
2003	43	13	29	56	85	8.93	6.69	84.39	15.62
2004	42	12	30	54	84	9.97	7.25	82.78	17.22
2005	45	13	27	58	85	10.99	7.92	81.09	18.91
2006	44	13	31	57	88	11.06	8.13	80.81	19.19
2007	44	13	33	57	90	10.72	8.17	81.11	18.89
1995-2007	105	19	61	124	185	9.32	6.12	84.56	15.44
1990-2007	127	19	68	146	214	9.54	5.93	84.53	15.47

Table 3
Turnover Share of Individual Investors by Size Group

Every month from 1990 to 2007, the largest 300 stocks by month-end market capitalization are ranked and placed into six groups. Stocks outside the largest 300 are placed in a separate group while preference shares and miscellaneous stocks such as preference stocks not in the AGSM SPPR are placed in another. The institutional and retail broker turnover share are calculated for each individual investor group (see Section 2.3. for individual investor definitions). Turnover is defined as the sum of buy and sell trades divided by two. The table reports turnover share as a percentage of total turnover in a size group, percentage of turnover in a size group over total turnover on the ASX and the Australian dollar turnover in a size group. Turnover shares for discount, full service retail broker individual investors and for all individuals (discount and full service) are reported in Panels A, B and C respectively.

Panel A. Full Service Investors

Size Group	Turnover Share in Size Group (%)	Overall Turnover Share (%)	Turnover ($Billions)
Unaccounted (e.g. Pref. shares)	10.11	0.21	22.36
Outside 300	42.87	1.35	146.28
251-300	27.51	0.28	30.01
201-250	22.68	0.37	40.19
151-200	17.87	0.52	55.81
101-150	13.90	0.70	76.19
51-100	6.35	1.33	143.74
1-50	7.56	4.79	518.92
ALL	9.54	9.54	1033.49

Panel B. Discount Retail Investors

Size Group	Turnover Share in Size Group (%)	Overall Turnover Share (%)	Turnover ($Billions)
Unaccounted (e.g. Pref. shares)	7.32	0.15	16.19
Outside 300	30.57	0.96	104.29
251-300	16.71	0.17	18.22
201-250	13.04	0.21	23.10
151-200	10.07	0.29	31.44
101-150	7.48	0.38	40.98
51-100	3.83	0.80	86.69
1-50	4.69	2.97	321.79
All	5.93	5.93	642.70

Panel C. All Individual Investors

Size Group	Turnover Share in Size Group (%)	Overall Turnover Share (%)	Turnover ($Billions)
Unaccounted (e.g. Pref. shares)	17.42	0.36	38.55
Outside 300	73.44	2.31	250.57
251-300	44.22	0.45	48.23
201-250	35.72	0.58	63.29
151-200	27.94	0.81	87.25
101-150	21.38	1.08	117.17
51-100	10.18	2.13	230.43
1-50	12.25	7.76	840.70
All	15.47	15.47	1676.19

Table 4
Dollar Profit and Returns of Buys minus Sells Trades of Investor Clienteles

Every trading day, from February 19 1990 to December 31 2007, all individual investor (investor using retail brokers as defined in Section 2.3.) buy and sell trades in each stock on the ASX are netted out and placed into two groups depending on whether the group's position is a net buy or net sell. The dollar profit at the day's close is calculated as the net volume multiplied by the difference of the closing day price less the closing price on the day. The buy – sell profit is calculated as the total profit in net buys less total profit in net sells on a day. The dollar profit for longer holding periods is calculated as the net buy or net sell trading value at the end of the day multiplied by the cumulative return for the given holding period. The table reports the holding period profit and returns of buy – sell trades of institutional and retail individual investor clienteles at the end of day's closing price and after 1, 10 ,25, 140 and 254 days. Panel A reports holding period profits in million Australian dollars while Panel B reports holding period returns. Panel C reports characteristic-selectivity returns following Pinnuck (2003). Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

	Trade to VWAP	Trade to close	Mid to mid close	ΔT-M	Close to 1 day	Close to 10 days	Close to 25 days	Close to 140 days	Close to 254 days
Panel A. Buys - Sells Holding Period Profit ($M)									
All Individual	0.06***	-0.25***	-0.24***	-0.01***	0.04**	0.20***	0.18	-0.20	-0.34
	(7.91)	(-17.16)	(-17.1)	(-3.56)	(2.40)	(3.31)	(1.59)	(-0.72)	(-0.71)
All Institutional	-0.06***	0.25***	0.24***	0.01***	-0.04**	-0.20***	-0.18	0.20	0.34
	(-7.89)	(17.17)	(17.09)	(3.68)	(-2.40)	(-3.31)	(-1.59)	(0.72)	(0.71)
Panel B. Buys – Sells Holding Period Returns (%)									
All Individual	0.02***	-0.27***	-0.25***	-0.01*	0.06***	0.43***	0.43***	0.26	0.44
	(3.36)	(-27.99)	(-20.76)	(-1.68)	(4.93)	(7.59)	(4.29)	(1.13)	(1.34)
All Institutional	-0.02***	0.27***	0.25***	0.01*	-0.06***	-0.43***	-0.43***	-0.26	-0.44
	(-3.31)	(28.01)	(20.77)	(1.71)	(-4.93)	(-7.59)	(-4.29)	(-1.13)	(-1.34)
Panel C. Characteristic Selectivity Returns (% per month)									
All Individual					0.07***	0.43***	0.42***	-0.08	-0.11
					(7.02)	(9.33)	(5.12)	(-0.47)	(-0.45)
All Institutional					-0.07***	-0.43***	-0.42***	0.08	0.11
					(-7.02)	(-9.33)	(-5.12)	(0.47)	(0.44)

Table 5
Individual Investor Buy minus Sell Trades Holding Period Returns by Year

Every trading day, from February 19 1990 to December 31 2007, all individual investor (investors using retail brokers as defined in Section 2.3.) buy and sell trades in each stock on the ASX are netted out and placed into two groups depending on whether the group's position is a net buy or net sell. The table reports the trade value-weighted holding period returns of buy – sell trades of retail brokers at the end of day's closing price and from trade to 1, 10 ,25, 140 and 254 days by year. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Year	Trade to VWAP	Trade to close	Mid to mid close	ΔT-M	Mid to 1 day	Mid to 10 days	Mid to 25 days	Mid to 140 days	Mid to 254 days
1990	-0.04	-0.16***	0.04	-0.20	0.04	-0.04	-0.22	1.75	0.58
	(-1.29)	(-3.94)	(0.19)	(-1.01)	(0.15)	(-0.08)	(-0.35)	(1.28)	(0.38)
1991	-0.06***	-0.14***	-0.15***	0.01	0.01	0.63***	0.45*	0.66	1.87
	(-4.05)	(-3.10)	(-4.29)	(0.28)	(0.17)	(3.25)	(1.75)	(0.87)	(1.46)
1992	-0.08***	-0.19***	-0.16***	-0.03	-0.11*	0.14	0.54**	1.80**	1.81*
	(-8.64)	(-6.15)	(-4.05)	(-0.80)	(-1.92)	(0.93)	(2.24)	(2.58)	(1.70)
1993	-0.09***	-0.18***	-0.19***	0.01	-0.11**	0.14	0.27	-0.81	-2.10**
	(-7.73)	(-7.69)	(-8.10)	(0.87)	(-2.47)	(0.75)	(0.91)	(-1.21)	(-2.42)
1994	-0.07***	-0.18***	-0.17***	-0.01	-0.12*	0.34**	0.45*	2.38***	5.17***
	(-8.27)	(-7.23)	(-4.19)	(-0.17)	(-1.86)	(2.39)	(1.87)	(4.49)	(8.88)
1995	-0.04***	-0.14***	-0.08***	-0.06***	-0.04	0.31**	0.48*	0.99**	1.63***
	(-4.48)	(-7.87)	(-3.83)	(-3.10)	(-1.02)	(2.19)	(1.94)	(2.21)	(2.65)
1996	-0.04***	-0.17***	-0.15***	-0.02	-0.10**	0.18	0.22	0.74	2.12*
	(-4.94)	(-9.09)	(-6.56)	(-1.41)	(-2.53)	(1.46)	(1.01)	(1.06)	(1.75)
1997	-0.04**	-0.22***	-0.23***	0.01	-0.18***	0.36**	0.12	-1.20*	0.10
	(-2.19)	(-9.89)	(-9.33)	(1.20)	(-2.92)	(2.03)	(0.52)	(-1.66)	(0.09)
1998	0.08	-0.2***	-0.22***	0.02***	-0.14*	0.57**	1.04***	3.15***	3.21**
	(1.09)	(-2.96)	(-3.22)	(2.76)	(-1.66)	(2.47)	(2.64)	(3.73)	(2.51)
1999	0.06***	-0.45***	-0.45***	0.01	-0.40***	0.10	-0.56	-1.99**	0.90
	(5.71)	(-12.50)	(-13.12)	(0.94)	(-4.36)	(0.39)	(-1.40)	(-2.02)	(0.85)
2000	0.06***	-0.57***	-0.59***	0.02**	-0.52***	-0.35	-0.83	-3.74**	-5.50**
	(3.97)	(-11.97)	(-12.54)	(2.05)	(-4.12)	(-0.71)	(-0.94)	(-2.17)	(-2.27)
2001	0.05***	-0.46***	-0.45***	-0.01	-0.32***	0.11	-0.05	-0.86	-1.21
	(3.30)	(-14.46)	(-14.52)	(-1.60)	(-4.70)	(0.37)	(-0.11)	(-1.16)	(-1.20)
2002	0.10***	-0.38***	-0.37***	-0.01*	-0.33***	0.38**	0.38	-0.46	-0.91
	(8.54)	(-14.64)	(-14.47)	(-1.66)	(-5.60)	(2.03)	(1.03)	(-0.61)	(-1.06)
2003	0.08***	-0.33***	-0.32***	-0.01***	-0.28***	0.07	0.37	0.57	-0.21
	(6.08)	(-14.68)	(-13.75)	(-4.01)	(-3.74)	(0.31)	(1.27)	(0.98)	(-0.27)
2004	0.02***	-0.33***	-0.33***	-0.01**	-0.26***	0.06	0.22	0.02	-1.03
	(2.79)	(-20.63)	(-19.31)	(-2.41)	(-7.17)	(0.53)	(1.21)	(0.04)	(-1.28)
2005	0.05***	-0.26***	-0.24***	-0.03***	-0.2***	-0.04	-0.01	0.34	-0.18
	(5.89)	(-14.86)	(-13.48)	(-9.52)	(-5.98)	(-0.39)	(-0.07)	(0.70)	(-0.21)
2006	0.13***	-0.21***	-0.19***	-0.02***	-0.14***	0.21	0.26	-0.30	0.74
	(13.91)	(-12.66)	(-11.34)	(-8.17)	(-3.85)	(1.41)	(1.07)	(-0.61)	(0.82)
2007	0.17***	-0.24***	-0.23***	-0.02***	-0.20***	-0.08	-0.25	-2.58***	-3.97***
	(7.32)	(-5.80)	(-5.39)	(-4.01)	(-3.05)	(-0.54)	(-1.06)	(-4.11)	(-4.19)
ALL	0.02***	-0.27***	-0.25***	-0.01*	-0.19***	0.18***	0.17*	-0.01	0.16
	(3.36)	(-27.99)	(-20.76)	(-1.68)	(-10.39)	(2.97)	(1.67)	(-0.03)	(0.48)

Table 6
Holding Period Trade Performance of Buys minus Sells Trades of Various Investor Clienteles after 1995

Every trading day, from January 1995 to December 31 2007, all trade are categorized by individual investor clienteles (discount and full service retail broker clients as defined in Section 2.3.) and buy and sell trades in each stock on the ASX are netted out and placed into two groups depending on whether the position is a net buy or net sell. The table reports the trade value-weighted holding period returns of buy – sell trades of the various individual investor clienteles at the end of day's closing price and from trade to 1, 10 ,25, 140 and 254 days. Panel A reports unadjusted returns and Panel B reports characteristic-selectivity returns. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Panel A. Buys – Sells Holding Period Returns (%)

Broker	Trade to VWAP	Trade to day's close	Mid to mid close	ΔT-M	Midpoint to 1 day	Midpoint to 10 days	Midpoint to 25 days	Midpoint to 140 days	Midpoint to 254 days
Full Service	0.04***	-0.06***	-0.03***	-0.03***	0.12***	0.65***	0.76***	0.83***	1.28***
	(6.93)	(-6.66)	(-3.14)	(-12.28)	(6.80)	(10.69)	(6.94)	(3.62)	(3.81)
Discount	0.03***	-0.51***	-0.53***	0.03***	-0.65***	-0.65***	-0.88***	-2.02***	-2.29***
	(3.54)	(-34.03)	(-33.51)	(5.57)	(-25.55)	(-8.00)	(-6.64)	(-6.58)	(-5.15)
All Individual	0.05***	-0.30***	-0.30***	-0.01***	-0.24***	0.15**	0.11	-0.41	-0.33
	(7.04)	(-27.30)	(-25.40)	(-3.46)	(-12.21)	(2.04)	(0.85)	(-1.46)	(-0.85)
All Institutional	-0.05***	0.30***	0.30***	0.01***	0.24***	-0.15**	-0.11	0.41	0.33
	(-7.00)	(27.31)	(25.39)	(3.60)	(12.20)	(-2.04)	(-0.85)	(1.46)	(0.85)

Panel B. Characteristic Selectivity Holding Period Returns (%)

Broker					Close to 1 day	Close to 10 days	Close to 25 days	Close to 140 days	Close to 254 days
Full Service					0.16***	0.63***	0.68***	0.44***	0.86***
					(13.28)	(12.36)	(7.78)	(2.58)	(3.65)
Discount					-0.09***	-0.07	-0.33***	-1.45***	-1.69***
					(-6.92)	(-1.26)	(-3.29)	(-6.57)	(-5.21)
All Individual					0.07***	0.43***	0.31***	-0.56***	-0.52*
					(6.28)	(7.83)	(3.19)	(-2.77)	(-1.86)
All Institutional					-0.07***	-0.43***	-0.31***	0.56***	0.52*
					(-6.28)	(-7.83)	(-3.19)	(2.77)	(1.86)

Table 7
Holding Period Trade Performance of Investor Clienteles' Buy minus Sell Trades by Time of Day

Every trading day, from January 1995 to December 31 2007, all trades are categorized by individual investor clienteles (discount and full service retail broker clients as defined in Section 2.3.). Trades are further categorized by the time of day that the trade was executed (10am-12pm, 12pm-2pm and 2pm-4pm). Buy and sell trades in each stock on the ASX are netted out for each group and placed into two groups depending on whether the position is a net buy or net sell. The table reports the trade value-weighted holding period returns of buy minus sell trades of the individual investor clienteles at the end of day's closing price and from trade to 1, 10 ,25, 140 and 254 days. Panel A reports unadjusted returns and Panel B reports the average daily turnover share by investor group and time of day. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Time	Broker	Trade to VWAP	Trade to day's close	Mid to mid close	ΔT-M	Midpoint to 1 day	Midpoint to 10 days	Midpoint to 25 days	Midpoint to 140 days	Midpoint to 254 days
Opening Auction	Full Service	0.09***	0.14***	0.15***	-0.01	0.24***	0.66***	1.08***	1.97***	3.22***
		(2.90)	(2.87)	(3.06)	(-1.35)	(3.55)	(4.68)	(4.71)	(3.85)	(4.56)
	Discount	-0.38***	-0.53***	-0.54***	0.00	-0.62***	-0.48***	-0.45*	-1.08*	-0.48
		(-9.86)	(-9.86)	(-10.16)	(-0.06)	(-7.31)	(-2.69)	(-1.83)	(-1.95)	(-0.63)
	All Individual	-0.22***	-0.30***	-0.3***	0.00	-0.30***	0.04	0.43*	0.94*	2.11***
		(-7.15)	(-7.10)	(-7.22)	(0.02)	(-4.40)	(0.27)	(1.84)	(1.73)	(2.85)
	All Instit.	0.22***	0.30***	0.30***	0.00	0.30***	-0.04	-0.43*	-0.94*	-2.11***
		(7.15)	(7.10)	(7.22)	(-0.02)	(4.40)	(-0.27)	(-1.84)	(-1.73)	(-2.85)
10am-11am	Full Service	-0.01	-0.01	0.00	-0.02***	0.15***	0.58***	0.65***	0.86***	1.05***
		(-0.63)	(-0.82)	(0.29)	(-4.58)	(6.71)	(9.07)	(6.46)	(4.00)	(3.35)
	Discount	-0.38***	-0.68***	-0.76***	0.08***	-0.91***	-0.95***	-1.2***	-2.23***	-2.68***
		(-30.04)	(-30.63)	(-33.41)	(15.71)	(-27.36)	(-11.09)	(-9.41)	(-7.10)	(-6.26)
	All Individual	-0.23***	-0.41***	-0.43***	0.03***	-0.41***	-0.14*	-0.22*	-0.57**	-0.71*
		(-25.24)	(-25.42)	(-26.23)	(7.62)	(-16.60)	(-1.88)	(-1.82)	(-2.13)	(-1.91)
	All Instit.	0.23***	0.41***	0.43***	-0.03***	0.41***	0.14*	0.22*	0.57**	0.71*
		(25.24)	(25.42)	(26.22)	(-7.52)	(16.59)	(1.88)	(1.81)	(2.13)	(1.91)
11am-12pm	Full Service	-0.02*	-0.11***	-0.07***	-0.04***	0.04	0.4***	0.46***	0.47**	0.87***
		(-1.65)	(-4.76)	(-3.06)	(-12.19)	(1.50)	(6.90)	(4.97)	(2.42)	(3.17)
	Discount	-0.11***	-0.46***	-0.47***	0.01	-0.58***	-0.54***	-0.70***	-1.57***	-2.07***
		(-14.82)	(-29.28)	(-26.69)	(1.31)	(-22.32)	(-7.17)	(-5.85)	(-5.69)	(-5.39)
	All Individual	-0.08***	-0.33***	-0.31***	-0.02***	-0.29***	0.02	-0.03	-0.53**	-0.45
		(-5.87)	(-15.53)	(-14.44)	(-7.45)	(-10.61)	(0.30)	(-0.25)	(-2.24)	(-1.39)
	All Instit.	0.08***	0.33***	0.31***	0.02***	0.29***	-0.02	0.03	0.52**	0.45
		(5.89)	(15.54)	(14.43)	(7.59)	(10.60)	(-0.31)	(0.25)	(2.24)	(1.39)
12pm-1pm	Full Service	0.00	-0.09***	-0.04***	-0.05***	0.09***	0.49***	0.55***	0.51***	0.90***
		(-0.09)	(-5.52)	(-2.77)	(-7.04)	(2.66)	(8.01)	(5.63)	(2.65)	(3.31)

	Discount	-0.02*	-0.41***	-0.37***	-0.04***	-0.50***	-0.48***	-0.69***	-1.46***	-1.66***
		(-1.74)	(-28.02)	(-25.59)	(-5.19)	(-20.64)	(-7.04)	(-6.1)	(-5.73)	(-4.55)
	All Individual	0.00	-0.28***	-0.23***	-0.05***	-0.20***	0.12*	0.07	-0.38*	-0.28
		(0.37)	(-17.95)	(-14.78)	(-8.70)	(-6.95)	(1.74)	(0.58)	(-1.66)	(-0.87)
	All Instit.	0.00	0.28***	0.23***	0.06***	0.20***	-0.12*	-0.07	0.38*	0.28
		(-0.32)	(17.97)	(14.76)	(8.78)	(6.94)	(-1.75)	(-0.59)	(1.66)	(0.87)
1pm-2pm	Full Service	-0.01**	-0.11***	-0.07**	-0.04***	0.03	0.38***	0.47***	0.47**	0.72**
		(-2.17)	(-3.95)	(-2.41)	(-9.21)	(0.89)	(6.34)	(4.99)	(2.22)	(2.47)
	Discount	-0.04***	-0.42***	-0.33***	-0.10***	-0.39***	-0.36***	-0.48***	-1.12***	-1.38***
		(-3.90)	(-31.08)	(-23.55)	(-16.16)	(-15.97)	(-4.78)	(-4.06)	(-4.25)	(-3.78)
	All Individual	-0.03***	-0.35***	-0.26***	-0.09***	-0.24***	0.08	0.07	-0.30	-0.24
		(-3.61)	(-13.07)	(-9.56)	(-22.12)	(-7.45)	(1.12)	(0.62)	(-1.22)	(-0.73)
	All Instit.	0.03***	0.35***	0.26***	0.09***	0.24***	-0.08	-0.08	0.29	0.22
		(3.68)	(13.09)	(9.53)	(22.18)	(7.37)	(-1.18)	(-0.70)	(1.15)	(0.67)
2pm-3pm	Full Service	0.05***	-0.08***	-0.06***	-0.02***	0.05***	0.43***	0.49***	0.45**	0.97***
		(11.15)	(-11.4)	(-8.21)	(-5.99)	(3.23)	(7.72)	(5.32)	(2.32)	(3.51)
	Discount	0.22***	-0.3***	-0.34***	0.03***	-0.40***	-0.29***	-0.39***	-1.32***	-1.56***
		(19.60)	(-29.84)	(-30.49)	(7.20)	(-17.37)	(-3.81)	(-3.43)	(-4.77)	(-4.36)
	All Individual	0.16***	-0.21***	-0.22***	0.01**	-0.17***	0.19***	0.17	-0.2	0.06
		(20.04)	(-26.55)	(-25.86)	(2.33)	(-9.72)	(3.05)	(1.59)	(-0.85)	(0.19)
	All Instit.	-0.16***	0.21***	0.22***	-0.01**	0.17***	-0.19***	-0.17	0.20	-0.06
		(-20.01)	(26.57)	(25.87)	(-2.24)	(9.72)	(-3.07)	(-1.57)	(0.88)	(-0.18)
3pm-4pm	Full Service	0.11***	-0.04***	-0.02***	-0.02***	0.09***	0.48***	0.57***	0.51***	1.01***
		(16.12)	(-9.22)	(-3.63)	(-8.30)	(6.58)	(9.06)	(6.19)	(2.69)	(3.68)
	Discount	0.49***	-0.18***	-0.22***	0.04***	-0.25***	-0.22***	-0.46***	-1.23***	-1.45***
		(29.05)	(-25.85)	(-25.41)	(5.61)	(-12.50)	(-3.29)	(-4.08)	(-4.77)	(-3.95)
	All Individual	0.33***	-0.11***	-0.11***	0.00	-0.04***	0.29***	0.27***	-0.12	0.11
		(25.74)	(-24.98)	(-21.48)	(-1.28)	(-2.71)	(5.02)	(2.60)	(-0.58)	(0.34)
	All Instit.	-0.33***	0.11***	0.11***	0.00	0.04***	-0.29***	-0.27***	0.12	-0.11
		(-25.73)	(25.00)	(21.51)	(1.28)	(2.72)	(-5.02)	(-2.60)	(0.58)	(-0.34)
Closing Auction	Full Service	0.12***		0.02	-0.02	0.10	0.36**	0.54***	0.23	-0.27
		(6.11)		(0.76)	(0.76)	(1.54)	(1.98)	(2.82)	(0.71)	(-0.49)
	Discount	0.62***		-0.08***	0.08***	0.05	0.05	-0.28*	-0.95***	-0.69
		(24.45)		(-3.15)	(3.15)	(1.26)	(0.51)	(-1.79)	(-2.63)	(-1.46)
	All Individual	0.33***		-0.03	0.03	0.08	0.24	0.31*	-0.31	-0.91

	(16.07)	(-1.03)	(1.03)	(1.32)	(1.36)	(1.67)	(-0.91)	(-1.62)
All Instit.	-0.35***	-0.02	0.02	-0.19***	-0.54***	-0.61***	-0.60*	-0.72
	(-17.56)	(-0.77)	(0.77)	(-4.72)	(-5.96)	(-4.32)	(-1.82)	(-1.64)

Table 8
Holding Period Returns of Investor Clienteles' Buy minus Sell Trades by Order Type

Every trading day, from January 1995 to December 31 2007, all trades are categorized by individual investor clienteles (discount and full service retail broker clients as defined in Section 2.3.). Trades are further categorized by whether they are resulted from market orders or limit orders. Buy and sell trades in each stock on the ASX and in each group are netted out and placed into two groups depending on whether the position is a net buy or net sell. The table reports the trade value-weighted holding period returns of buy – sell trades of the individual investor clienteles at the end of day's closing price and from trade to 1, 10 ,25, 140 and 254 days. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Order Type	Broker	Trade to VWAP	Trade to day's close	Mid to mid close	ΔT-M	Close to 1 day	Close to 10 days	Close to 25 days	Close to 140 days	Close to 254 days
Limit	Full Service	0.51***	-0.02	-1.36***	1.34***	0.02	0.45***	0.37***	0.06	0.18
		(42.39)	(-1.26)	(-51.63)	(73.07)	(1.20)	(7.69)	(3.22)	(0.27)	(0.51)
	Discount	0.6***	-0.30***	-1.47***	1.16***	-0.21***	-0.17**	-0.51***	-2.08***	-2.68***
		(45.62)	(-18.82)	(-53.02)	(72.20)	(-11.85)	(-2.34)	(-3.99)	(-6.79)	(-6.50)
	All Individual	0.64***	-0.17***	-1.66***	1.49***	-0.09***	0.20***	-0.02	-0.98***	-1.30***
		(49.59)	(-11.72)	(-63.66)	(86.75)	(-5.87)	(3.16)	(-0.17)	(-3.67)	(-3.48)
	All Institutional	0.38***	0.24***	-0.89***	1.14***	-0.13***	-0.37***	-0.49***	-1.22***	-1.99***
		(57.77)	(30.63)	(-70.83)	(85.70)	(-9.55)	(-6.69)	(-5.17)	(-5.02)	(-5.57)
Market	Full Service	-0.41***	-0.09***	1.21***	-1.30***	0.21***	0.62***	0.84***	1.12***	1.72***
		(-48.41)	(-7.49)	(55.57)	(-76.58)	(13.48)	(10.77)	(9.03)	(5.22)	(5.30)
	Discount	-0.64***	-0.52***	0.76***	-1.28***	0.03	0.03	0.07	0.02	0.28
		(-39.69)	(-36.52)	(36.9)	(-58.49)	(1.53)	(0.42)	(0.66)	(0.09)	(0.65)
	All Individual	-0.58***	-0.27***	1.24***	-1.51***	0.16***	0.47***	0.65***	0.79***	1.31***
		(-50.97)	(-24.21)	(57.76)	(-86.39)	(9.92)	(7.66)	(6.45)	(3.35)	(3.57)
	All Institutional	-0.47***	0.07***	1.30***	-1.23***	0.11***	0.03	0.24***	1.55***	2.34***
		(-45.85)	(4.96)	(67.95)	(-76.00)	(7.26)	(0.64)	(2.58)	(7.32)	(7.18)

Table 9
Trade Performance by Counterparty Pairs

Every trading day, from January 1995 to December 1 2005, all trades are categorized by, investor clienteles (discount, full service or institutional as defined in Section 2.3.). Trades are further categorized by whether the counter party (counter broker) of the trade was a discount, full service or institutional broker. Buy and sell trades in each stock on the ASX and in each group are netted out and placed into two groups depending on whether the position is a net buy or net sell. The table reports the trade value-weighted holding period returns of buy – sell trades of the broker/counter broker to the end of day's closing price, midpoint close and from midpoint trade to 1, 10 ,25, 140 and 254 days. Groups are further broken down into whether the stock is one of the top 300 largest by lagged month-end market capitalization or not. Panel A reports statistics for the 1995-2005 period and Panel B for the 1990-1994 period where there were no discount retail brokers. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Buy minus Sell Holding Period Returns (%) 1995-2005

Stock Size	Broker	Counter Broker	Trade to VWAP	Trade to day's close	Mid to mid close	ΔT-M	Midpoint to 1 day	Midpoint to 10 days	Midpoint to 25 days	Midpoint to 140 days	Midpoint to 254 days
Outside 300	Discnt.	Instit	-0.04**	-0.70***	-1.15***	0.43***	-1.38***	-2.08***	-2.82***	-8.20***	-10.28***
			(-2.10)	(-20.63)	(-8.05)	(3.10)	(-8.57)	(-5.65)	(-5.24)	(-6.11)	(-6.65)
	Non-disc.	Discnt.	0.50***	1.15***	0.52**	0.63***	1.24***	2.36***	3.03***	5.44***	3.50*
			(19.28)	(25.36)	(2.15)	(2.73)	(4.83)	(7.28)	(6.91)	(4.82)	(1.84)
	Non-disc.	Instit.	0.13***	-0.07***	0.04	-0.11**	0.31***	0.68***	0.67*	-3.03***	-3.41**
			(11.09)	(-2.71)	(0.70)	(-2.25)	(3.74)	(2.70)	(1.67)	(-2.90)	(-2.10)
Largest 300	Discnt.	Instit.	0.06***	-0.40***	-0.45***	0.05	-0.49***	0.00	-0.14	-0.99*	-1.28
			(8.35)	(-30.84)	(-11.25)	(1.28)	(-9.77)	(-0.01)	(-0.60)	(-1.78)	(-1.60)
	Non-disc.	Discnt.	0.03***	0.40***	0.33***	0.07	0.66***	1.46***	1.83***	3.27***	4.29***
			(2.79)	(19.88)	(4.14)	(0.92)	(7.12)	(8.43)	(7.10)	(6.25)	(6.12)
	Non-disc.	Instit.	0.00	-0.26***	-0.24***	-0.01*	-0.09***	0.69***	0.72***	0.59	0.99
			(-0.38)	(-24.97)	(-19.38)	(-1.90)	(-3.28)	(6.08)	(3.68)	(1.37)	(1.51)
All Stocks	Discnt.	Instit.	0.05***	-0.43***	-0.47***	0.04*	-0.52***	-0.16	-0.39	-1.38**	-1.64**
			(6.68)	(-30.70)	(-16.42)	(1.74)	(-12.36)	(-1.12)	(-1.64)	(-2.45)	(-2.08)
	Non-disc.	Discnt.	0.20***	0.67***	0.64***	0.03	1.11***	2.08***	2.49***	4.38***	4.16***
			(16.22)	(25.94)	(8.24)	(0.39)	(12.46)	(13.08)	(10.54)	(8.31)	(4.85)
	Non-disc.	Instit.	0.01*	-0.24***	-0.21***	-0.03**	-0.04	0.66***	0.67***	0.29	0.84
			(1.84)	(-22.21)	(-11.41)	(-2.09)	(-1.34)	(5.81)	(3.26)	(0.65)	(1.32)

Table 10
Weekly Investor Clienteles' Flows Fama-Macbeth Regressions

The table reports coefficient estimates running the following regression:

$$Return_{i,t+1} = Intercept + \beta_1 Return_{i,t} + \beta_2 NITDecile_{i,t} + \beta_3 TurnoverDecile_{i,t}$$

Where i indexes for stock and t indexes for weeks. $Return_t$ is the weekly return from Wednesday to Wednesday following Barber, Odean and Zhu (2009). If Wednesday is a holiday then the next trading day is used to start or end the week. *NITDecile* is calculated as the NIT decile rank for stock i compared to its weekly NIT in the past nine weeks. NIT is calculated as the net weekly dollar volume of buys and sells in an investor group, divided by the past year's average weekly dollar volume. A *NITDecile* equaling 10 means that the NIT in week t is the highest ranked compared to the past nine weeks, and vice verse when *NITDecile* equals 1. An analogous measure is used for *TurnoverDecile* as the decile rank for weekly turnover in stock i compared to its past nine weeks. Weekly turnover is calculated as the number of shares traded. The regression is run cross-sectionally every week for each investor group and times series average coefficients are calculated. The regression is also run separately for small stocks (market-cap rank of 201 or lower on the ASX), mid-cap stocks (market-cap rank from 101 to 200) and large stocks (largest 100 stocks by market-cap rank). Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Broker	Coefficient	All Stocks	Small Stocks	Mid-Cap Stocks	Large Stocks
Full Service	Intercept	-0.0059***	-0.008***	-0.0021*	-0.0011
		(-4.21)	(-4.42)	(-1.82)	(-1.23)
	Return$_{i,t}$	-0.0284***	-0.0369***	-0.0066	-0.0105
		(-4.46)	(-5.28)	(-0.57)	(-1.12)
	NITDecile$_{i,t}$	0.0005***	0.0006***	0.0005***	0.0005***
		(8.14)	(5.49)	(4.81)	(6.32)
	TurnoverDecile$_{i,t}$	0.0010***	0.0013***	0.0005***	0.0003***
		(10.87)	(10.89)	(4.64)	(3.82)
Discount	Intercept	-0.0028*	-0.0046**	0.0000	0.0002
		(-1.72)	(-1.98)	(-0.03)	(0.16)
	Return$_{i,t}$	-0.0157	-0.0362***	0.0021	0.0011
		(-1.25)	(-4.11)	(0.13)	(0.07)
	NITDecile$_{i,t}$	-0.0002*	-0.0005***	0.0001	0.0001
		(-1.76)	(-2.97)	(0.63)	(1.42)
	TurnoverDecile$_{i,t}$	0.0011***	0.0016***	0.0004**	0.0003***
		(7.92)	(8.26)	(2.07)	(2.71)
All Individuals	Intercept	-0.0039***	-0.0050***	-0.0013	-0.0007
		(-2.80)	(-2.90)	(-1.13)	(-0.79)
	Return$_{i,t}$	-0.0312***	-0.0400***	-0.0051	-0.0090
		(-4.94)	(-5.82)	(-0.45)	(-1.02)
	NITDecile$_{i,t}$	0.0002***	0.0000	0.0003***	0.0004***
		(2.62)	(0.53)	(3.23)	(5.82)
	TurnoverDecile$_{i,t}$	0.001***	0.0012***	0.0005***	0.0003***
		(11.22)	(11.02)	(4.66)	(3.79)
Full Service minus Discount	NITDecile$_{i,t}$	0.0007***	0.0012***	0.0004**	0.0003***
		(5.57)	(5.68)	(2.03)	(2.76)

Table 11
Determinants of Intraday Profits and Loses

The table reports OLS coefficients for the following model:

$$MProfit_{i,p,t} = \alpha_0 + \beta_1 Market\_Vol_t + \beta_2 Aord52Week_{i,t-1} + \beta_3 IPOdum_{i,t} + \beta_4 Lag\log cap_{i,t-1}$$
$$+ \beta_5 StockVol_{i,t-1} + \beta_6 LagTurnove\ Week_{i,t-1} + \beta_7 Absmom\ 6week_{i,t-1} + \beta_8 Absmom\ 12month_{i,t-1}$$
$$+ \beta_9 Stock52Week_{i,t-1} + \varepsilon$$

Details of the variables are in Section 4.8. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Dependent Variable – Midpoint trade to Midpoint Close Dollar Profit at the Stock/Day Level			
Independent Variables	Discount	Full Service	Institutional
Intercept	7664.92***	3547.33***	-12963.68***
	-21.89	(10.09)	(-19.04)
MarketVol	-43.18**	-1.88	49.40
	(-2.03)	(-0.06)	(0.99)
Aord52week	-1406.83***	95.82	1575.58**
	(-4.15)	(0.23)	(2.51)
IPOdum	-497.10***	-45.17	491.55***
	(-8.17)	(-0.40)	(3.68)
Laglogcap	-298.30***	-152.97***	515.68***
	(-22.59)	(-12.23)	(20.28)
StockVol	-77.31***	-49.25***	183.60***
	(-9.76)	(-6.63)	(11.03)
LagTurnover1week	-7904.44***	7105.36***	758.60
	(-4.87)	(3.04)	(0.30)
AbsMom6weeks	-5.66***	3.85***	1.52
	(-5.83)	(5.18)	(1.50)
AbsMom1year	-0.44***	0.33**	0.16
	(-2.96)	(2.26)	(0.55)
AbsStock52Week	-6.28***	0.98	5.17***
	(-7.87)	(1.34)	(5.16)
Adjusted R-Squared (%)	0.13	0.03	0.17
F-Stat	231.29	71.04	256.14

Holding Period Trade Performance of Buys minus Sells Trades of Various Investor Clienteles after 1995 by Stock Size and Removing IPOs

Every trading day, from January 1995 to December 1 2005, all trade are categorized by investor clienteles (discount retail, full service retail and institutional broker clients as defined in Section 2.3.) and buy and sell trades in each stock on the ASX are netted out and placed into two groups depending on whether the position is a net buy or net sell. Stocks are further categorized by whether it is in the largest top 300 by lagged month-end market capitalization or not. We also remove the stock if it has been one year or less after the IPO. The table reports the trade value-weighted holding period returns of buy – sell trades of the various individual investor clienteles at the end of day's closing price and from trade to 1, 10 ,25, 140 and 254 days. Newey-West t-statistics are in parenthesis. ***, **,* denotes statistical significance at the 1, 5 or 10 percent levels respectively.

Stock Size	Broker	Trade to VWAP	Trade to day's close	Mid to mid close	ΔT-M	Midpoint to 1 day	Midpoint to 10 days	Midpoint to 25 days	Midpoint to 140 days	Midpoint to 254 days
Outside 300	Non-disc.	0.51***	0.80***	1.10***	-0.30	1.51***	2.16***	2.41***	2.82***	2.74**
		(4.52)	(6.79)	(3.44)	(-1.35)	(4.62)	(6.10)	(6.04)	(4.34)	(2.05)
	Discount	-0.37***	-1.12***	-1.27***	0.15**	-1.72***	-2.45***	-3.02***	-6.15***	-5.28***
		(-6.52)	(-16.75)	(-13.22)	(2.04)	(-15.22)	(-13.47)	(-11.53)	(-8.53)	(-4.90)
	All Indivl.	0.27**	-0.14	0.13	-0.27	0.24	0.36	0.16	-2.38***	-2.53**
		(2.23)	(-1.14)	(0.40)	(-1.23)	(0.72)	(0.92)	(0.35)	(-2.82)	(-2.06)
	All Instit.	-0.27**	0.13	-0.13	0.26	-0.24	-0.35	-0.15	2.39***	2.53**
		(-2.27)	(1.10)	(-0.39)	(1.20)	(-0.72)	(-0.92)	(-0.35)	(2.82)	(2.06)
Largest 300	Non-disc.	0.01	-0.18***	-0.16***	-0.02*	-0.03	0.55***	0.61***	0.56**	0.74*
		(0.94)	(-19.34)	(-12.24)	(-1.75)	(-1.37)	(7.60)	(4.70)	(2.17)	(1.86)
	Discount	0.06***	-0.41***	-0.44***	0.03**	-0.49***	-0.33***	-0.46***	-1.32***	-2.05***
		(6.73)	(-26.6)	(-21.3)	(2.40)	(-16.55)	(-3.52)	(-3.03)	(-3.88)	(-4.20)
	All Indivl.	0.03***	-0.32***	-0.32***	0.00	-0.25***	0.26***	0.28**	-0.13	-0.31
		(4.69)	(-29.80)	(-22.49)	(0.19)	(-10.69)	(3.33)	(1.97)	(-0.43)	(-0.67)
	All Instit.	-0.03***	0.32***	0.32***	0.00	0.25***	-0.26***	-0.28**	0.13	0.31
		(-4.68)	(29.80)	(22.48)	(-0.16)	(10.69)	(-3.33)	(-1.97)	(0.43)	(0.67)
All Stocks	Non-disc.	0.06***	-0.07***	-0.02	-0.05*	0.14***	0.70***	0.76***	0.69***	0.96**
		(4.73)	(-5.05)	(-0.61)	(-1.94)	(3.68)	(8.87)	(5.55)	(2.69)	(2.43)
	Discount	0.00	-0.51***	-0.54***	0.03*	-0.65***	-0.60***	-0.8***	-2.12***	-2.37***
		(-0.25)	(-26.03)	(-20.00)	(1.93)	(-18.68)	(-6.37)	(-5.30)	(-6.05)	(-4.51)
	All Indivl.	0.04***	-0.30***	-0.27***	-0.04	-0.19***	0.27***	0.25*	-0.35	-0.31
		(3.75)	(-20.46)	(-7.35)	(-1.46)	(-4.68)	(3.14)	(1.70)	(-1.15)	(-0.70)
	All Instit.	-0.04***	0.30***	0.27***	0.04	0.19***	-0.27***	-0.25*	0.35	0.31
		(-3.78)	(20.43)	(7.35)	(1.45)	(4.69)	(-3.14)	(-1.70)	(1.15)	(0.70)