Why do Institutional Investors use Reputable Brokers?

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Abstract

Using a long term sample, our study examines why institutional traders may prefer reputable full-service brokers. In particular, we examine two possible determinants in this choice: execution ability and information. We find that, while top-tier brokers achieve better trading costs for their clients, this is not the primary reason why institutional investors route their orders to them. Rather, the choice is driven by information value. We argue that the superior research offered by top-tier brokers distinguishes broker channel.

Keywords: Institutional Traders; Trading Costs; Brokerage Commissions; Informed Trading; Global Financial Crisis

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1 Introduction

Institutional investors have competitive access to brokers who execute orders on their behalf. In a typical scenario, institutional investors determine their buy and/or sell orders for a list of securities prior to the market open, and submit those orders for execution to brokers. Routing those orders via a discount broker, or a full service broker is an important decision as the execution ability of the broker impacts the investment returns institutional investors earn on behalf their investors. The important choice and motivations behind the use of discount and full service brokers remains a contentious issue in the academic literature. Using a unique dataset of Australian fund managers that spans over 18 years (1992 to mid 2010), this study investigates some of the factors that determine an institutional investor's choice between brokers.

Australia is an interesting setting to examine institutional investors' choice between brokers. It is a market where trading and stock broking activities are highly concentrated. There are three areas of concentration in Australian markets. First, during our sample period, trading occurs exclusively on the ASX. This is in contrast to North American markets which are much more fragmented. In some of these market fragments, brokers hold the dual role of an exchange and that of a traditional broker, blurring the lines of exchange fees and brokerage commissions. Second, there are far fewer brokers to choose from in Australia, creating a high level of concentration in broker activity. Qualitatively, there are also fewer variations in the types of services that they offer. Finally, traders in Australia typically focus on the largest and most liquid stock, despite having over 2,000 stocks to choose from. For example, the top 10 stocks on the S&P/ASX200 index accounts for over 50% of the market capitalisation and similarly a disproportionate share of its trading value.

Most capital markets have seen a large growth in discount brokerage services over the last 20 years. In Australia, several players such as Commonwealth Securities (Commsec) and E-Trade, have attracted significant market share from traditional brokers. These discount brokers offer lower commissions, but also provide fewer services to institutional investors. By choosing to use discount brokers, investors may forgo superior execution and/or research services typically offered by a traditional full service broker.[1] To a lesser extent, the same argument applies to less reputable full-service brokers in comparison to more reputable ones. This leads us to two natural and plausible reasons behind the choice between various brokers: execution ability and information.

Brokers offer varying degrees of execution service to their clients. On the one side, discount brokers offer no execution services other than access to markets through a trading platform. Full service brokers conversely devote significant resources to research and the implementation of

[1] As of 2010, there are 43 registered brokers operating at the ASX, 10 of which offer discount internet and/or telephone broking services, and 34 of these offer full-service brokerage, providing additional value-added services such as research and execution

trading strategies aimed at minimising the price impact of orders for their clients or maximising investment returns. There are also differences in execution ability between various full service brokers. The fact that analyst/broker rankings (e.g. the East Coles Survey in Australia) actively rank brokerage houses in the area of brokerage and market making is a testament of to this fact. Moreover, the development of automated execution algorithms has in recent years added a further dimension in differentiating brokers.[2] Those with superior execution algorithms (and those that executed customer orders as the lowest cost) may be selected more frequently by the institutional investors.

Given these differences in execution ability, one would expect best execution brokers to charge higher levels of economic rent, or brokerage commissions. However, there appears to be limited, or at best, mixed empirical evidence on the relationship between broker commissions and execution costs. For example, Keim and Madhavan (1997), Domowitz, Glen and Madhavan (2001) and Comerton-Forde, Fernandez, Frino and Oetomo (2005) find a positive relationship between commissions and execution ability, while Berkowitz, Logue, and Noser (1988), Chan and Lakonishok (1993, 1995), and Conrad, Johnson, and Wahal (2001) do not.

Institutional investors may also discern between brokers based on their research capability to pick winners. The information content of analyst recommendations and forecasts has been well documented in the literature. Goldstein, Irvine, Kandel and Wiener (2009) suggest that higher commissions represent a convenient way for full-service brokers to charge a pre-negotiated fee for the additional services, such as research, and consequently may not be related to execution ability. Therefore, it is plausible that institutional traders choose particular brokers not only for their ability to execute, but also for the information that they provide. However, to the best of our knowledge, studies that hypothesise this do not explicitly test this. To the extent that execution costs are unrelated (or weakly related) to execution quality, this has been widely interpreted as evidence for brokerage commissions being a reward for research.

This study examines the relationship between trading motivation (i.e. liquidity vs. information), and an institutional trader's choice of brokers (and implicitly, the brokerage commissions that they pay). In order to examine this relationship one would need a classification of trades on an ex-ante basis. The literature has approached this using various proxies based on related factors such as: (1) trade size (2) trade aggression and (3) investment style. In terms of trade size, Easley and O'Hara (1987) argue that larger trades are more informed. However, Barclay and

[2] In December 2008, the ASX introduced a co-location hosting service for the execution engines of brokers. By placing the trading equipment of its members in the same location as the primary ITS matching engine, co-location aims to reduce network latency to less than one millisecond. This vastly improved the execution certainty of orders placed by participating brokers, and encouraged the use of automated trading algorithms.

Warner (1993), and later Chakravarty (2001), argue that for stealth reasons, it is in the informed trader's best incentive to trade in medium lots to avoid detection in the market. In a related school of thought, fleshed out from the works of Glosten (1994), Rock (1996) and Seppi (1997), it is argued that informed traders have access to information that is perishable, and require greater execution immediacy. This is especially true when informed traders compete with others who have the same information. Consistent with rationale, Chan and Lakonishok (1995) argue that investment style determines the level of patience in institutional traders, and therefore their demand for immediacy.

Despite these arguments, more recent evidence suggests that informed traders prefer to use limit orders rather than market orders [e.g. Harris, 1998; Bloomfield, O'Hara, and Saar, 2005; and Kaniel and Liu, 2006], or optimise their trading strategies (i.e. a mixture of limit and market orders) to concurrently minimise execution costs and risk of non-execution [e.g. Anand, Chakravarty and Martell, 2005]. Overall, the notion that informed investors are more aggressive, and generally that the characteristics mentioned above can be used to determine trading intention, is weak at best.

In this study we develop a novel new proxy for informed trades. Using a subset of our dataset that contains fund flows, we identify trades that occur around fund liquidity shocks. Our assertion is that a purchase (sale) order following (before) a cash inflow (outflow) is likely to be motivated by liquidity, whereas a trade that occurred without any fund cash flows is likely to be motivated by information. Using this classification of information and liquidity motivated trades, we examine institutional investors' choice between reputable and other brokers: do they select brokers based on execution quality, or is it based on other services such as research?

Our results demonstrate that top-tier full service brokers achieve lower implicit trading costs while charging similar percentage commissions as discount brokers. This provides institutional investors with an economic rationale for utilizing reputable full-service brokers, even in the absence of research services. While top-tier brokers achieve lower costs, this is not the reason why institutional investors route their orders to them. We find the choice is driven by the trade motivation, specifically, information. We argue that this is related to the superior research services offered by the top-tier brokers.

Our long-run dataset also provides some interesting results on the make-up of total trading costs. We find that amongst institutional traders, brokerage commissions is (and remains) the largest component of trading costs, dwarfing price impact costs. While brokerage commissions at the start of our sample (in 1992) exceeded 90 basis points on average, this quickly dropped and stabilised to around 15 basis points in recent years. This is consistent with the increasingly competitive brokerage environment in Australia. We find no evidence of an increase in price impact costs around the GFC for institutional traders. However, do we find a large increase in execution

uncertainty. In other words, while institutional traders did not experience inferior trading costs around the GFC (on average), there was an increase in the variability of execution costs, and less certainty in achieving good trade execution.

The remainder of this study is organised as follows. Section 2 describes the data and reports descriptive statistics. Section 3 makes an initial investigation into trading costs, while Section 4 examines the time series trends in trading costs with a particular focus around the Global Financial Crisis (GFC). Section 5 examines the determinants of brokerage commissions paid by institutional investors. In Section 6, we investigate the relationship between perceived broker quality and its relationship with implicit and explicit trading costs. In Section 7, we develop a superior ex-ante classification of trade motivation (liquidity vs. information) using net fund flows, and examine its implications on trading costs. Section 8 examines institutional investors' choice in brokers, and examines whether this is related to their trade motivation. Finally, Section 9 summarises our findings and provides some concluding remarks.

2 Data and Descriptive Statistics

Our data contain the daily trades of 62 unique institutional Australian active fund managers from January 1992 to June 2010.[3] The dataset identifies for each fund's daily trades, the security, the trade date, a numerical id for the fund, the broker executing the trade, trade direction, volume, average price, and brokerage commissions. Out of this 62 fund sample, we have in total 39 funds with investment style information, of which 16 are growth/GARP funds, 11 are value funds, and 12 are classified as other. This subset spans from 1992 to June 2002. As our broader sample includes only active funds, we do not have any funds classified as indexers. For 27 of our institutional funds we also have access to the fund manager's daily net fund flow data, that is fund applications minus fund redemptions. Institutional trade data is supplemented with transaction data sourced from Thomson Reuters, managed and distributed by the Securities Industry Research Centre of Asia Pacific (SIRCA). For each trading day we sample each stock's open, close, market VWAP, volume, and turnover.

Table 1 displays the descriptive statistics by year, with the number of sampled funds, number of stocks traded, number of (daily) trades, the mean trade value, and the total trading value. We exclude all derivatives, and other non-standard equity transactions such as rights issues, private placements, dividend reinvestment plans, and shares exchanged as a result of options/warrants exercising. Table 1 indicates that over our sample period there were 281,982 trades in total, with a

[3] Starting date and ending date on these funds vary, resulting in a different number of funds at any one time.

total traded value of $166.85 billion, and an average trade size (on a daily level) exceeding $590,000.

3 Trading Costs

Trading costs can be categorised as either explicit (i.e. commissions, exchange fees and taxes) or implicit costs (i.e. market impact, bid/ask spreads etc). Because brokerage commissions are usually levied at a predetermined rate, it is difficult for an institutional trader to vary the commission they pay after committing to trade with a particular broker. They can however, choose brokers that offer comparatively lower commissions. The implicit cost of trading includes price impact and opportunity costs. Once a broker has been selected, an institutional trader has very little control over their price impact costs; determined solely by the broker's execution ability and the market conditions. They do have some control opportunity costs (commonly measured by the implementation shortfall), if they are able to quickly communicate their trading interests to their broker in favourable market conditions. However, in most cases, the responsibility of managing opportunity costs lie with the broker. For the above reasons, brokers (and the choice of broker) is an important determinant in the trading costs of institutional traders.[4]

To measure implicit trading costs, we employ two measures ubiquitous in the academic literature, the total price impact and VWAP cost. The total price impact compares the institutional trade price to an equilibrium price prior to execution.

$$Total\ Price\ Impact_i = \log\left(\frac{Trade\ Price_i}{Prior\ Price_i}\right) x Trade\ Initiator \quad (1)$$

Where the trade initiator is +1 for buys, and -1 for sells. This conversion makes price impact costs for buys and sells comparable.

Following Chan and Lakonishok (1995,1997) we examine institutional trades (unpackaged trades) and institutional packages. A institutional 'buy package' is defined as a manager's successive purchase of a stock, which ends when the manager abstains from trading for n trading days (henceforth n-day packages in short), or when they start to sell. 'Sell packages' are likewise defined in a similar manner. As a proxy to the pre-trade price, we use the opening price on the day of the package start. With unpackaged trades, we use the open price for the day.

Consistent with Keim and Madhavan (1997), we do not adjust costs for market wide movements. Keim and Madhavan (1997) argue that trading is implicitly affected by timing costs, which arise when prices move away from the trader during the execution of their order. Therefore, it is argued that the subtraction of market returns would induce a downward bias on costs associated with a failure in timely execution. For this reason, our total price impact measure shouldn't be

[4] An exception is where institutional traders execute trades by themselves, for example, through a discount broker.

interpreted purely as a measure of price impact *per se*, but rather, as price impact plus a degree of market timing costs.

Our second measure, VWAP costs, compares the institutional trade price to the Market VWAP price.

$$VWAP\ Cost_i = \left(\frac{Trade\ VWAP_i}{Market\ VWAP_i}\right)\ x\ Trade\ Initiator \quad (2)$$

For unpackaged trades the Trade VWAP is the institutional trader's volume weighted average price for the day, and Market VWAP is the volume weighted average price of all trades in the market. For packaged trades, the Trade VWAP is defined as the VWAP of the package, and the Market VWAP is defined as the VWAP of all trades in the market, but only on days where the institutional trader participate. We exclude all trades that had zero commissions, and those that had an implicit trading cost exceeding 10%.

To measure explicit trade costs, percentage brokerage commissions are calculated as follows:

$$Percentage\ Commission_i = \frac{Dollar\ Commissions_i}{Trade\ Value_i} - 1 \quad (4)$$

Table 2 reports average institutional trading costs for unpackaged trades, 3-day packages, and 5 day packages. Results are further divided by stock liquidity and fund investment style. The average trade size of unpackaged, 3-day packaged, and 5-day packaged fund manager trades are respectively $0.59 million, $1.35 million, and $1.53 million. We observe that packaged trades are much larger than unpackaged trades. For example, 5-day packages are 2.59 time the size of unpackaged trades. This is consistent with the findings of Chan and Lakonishok (1995), who find a significant portion of institutional trades that are executed over a number of days. This observation is further consistent with the notion that larger trades are more difficult to execute quickly and cheaply, and are therefore typically broken up into parcels to be executed over a number of trading days.

In an examination of unpackaged trades, institutional traders appear to have on average, a negative total price impact. This result is inconsistent with the literature on institutional trading (e.g. Chan and Lakonishok, 1993, 1995, 1997; and Chiyachantana et. al., 2004) which show positive trading costs. Results on the VWAP ratio are largely consistent with this peculiar observation, and are typically negative and significant (with the exception of 5-day sell packages). A negative VWAP ratio indicates that fund managers on average trade at superior prices in comparison to the market's average traded price.

The negative open to trade and VWAP costs for unpackaged trades is somewhat startling. One possible explanation for this phenomenon is the fund manager's order aggressiveness (or rather, their lack of). Keim and Madhavan (1997) show that institutional trading costs are a function

their demand for immediacy. As market orders consume liquidity, they incur a cost that is at least the size of the bid-ask spread. Limit orders on the other hand provide liquidity and therefore earn the spread. One would therefore expect a trading strategy that uses predominantly limit orders to have negative trading costs on average. This is not inconsistent with the literature on order placement strategy which argues that patient traders (even when they're informed) prefer to use limit orders (e.g. Kaniel and Liu, 2006), and that fund managers are usually patient traders (e.g. see Glosten, 1994). While average trading costs for unpackaged trades are negative, the magnitude of this negative cost is nevertheless small, and is around 6 basis points. This negative trading cost may be a result of the investment style of our sampled fund managers, which we examine later on.

We find that total impact costs are higher for longer packages. For example, the average 5-day package open to trade cost is 0.045%. This is consistent with Keim and Madhavan (1997) and their belief that significant opportunity costs exist for trades that fails to be executed in a timely fashion. Interestingly, these longer packaged trades also carry higher VWAP costs. This suggests that in addition to opportunity costs, larger institutional orders are executed more aggressively in comparison to smaller orders. This may be a result of institutional traders (and their brokers) attempting to optimise between opportunity costs and price impact costs.

Brokerage commissions (explicit trading costs) are also small on average (around 27-28 basis points), and do not appear to vary with trade difficulty. These numbers are somewhat higher than those reported by Chan and Lakonishok (1995) at 19 basis points, and by Chiyachantana et. al. (2004) at 17 basis points. Notwithstanding any time period differences, this suggests that the Australian brokerage market is less competitive than more developed markets such as the US. Furthermore, these higher brokerage commissions may be a partial reflection of higher exchange fees, which are implicitly passed on to the clients of brokerage firms.[5] We examine time series trends in brokerage commissions in the following section.

Our observation that institutional trading costs are dominated by brokerage commissions is consistent with the findings of Domowitz, Glen and Madhavan (2001), who report that out of a total trading cost of 0.71 percent (implicit plus explicit), 0.46 percent (or close to two thirds) is attributable to brokerage commissions. Our findings are even more startling as brokerage commissions account for roughly 86% of all costs in 5 day packaged trades.[6] Given the large commissions in comparison to other trading costs, it seems implausible for brokerage commissions to be a reward for execution quality, at least not in its entirety. This is explored in greater detail in sections 5, 6 and 8.

[5] Exchange fees have recently dropped on the ASX in response to increased competition from Chi-X.
[6] This estimate is based off a sum of the open to trade and brokerage commissions as the total implicit and explicit trading cost.

To examine the relationship between stock size and trading costs, we repeat the previous analysis for stocks of varying liquidity. We rank all stocks on the ASX by dollar turnover on a quarterly basis. Stocks are separated into 4 groups: the top 20 stocks, the 21-100th ranked stocks, 101-200th ranked stocks, and other stocks. Our results on stock liquidity (also in Table 2) indicate that trades in less liquid stocks are smaller in size in comparison to larger and more liquid stocks. For example, with unpackaged trades, the average trade size in the respective stock groups are \$1.02 million, \$0.55 million, \$0.29 million, and \$0.13 million. This is likely to be related to the relative index weighting of traded stocks, with smaller stocks carrying smaller weights in various indices. Fund managers (whether active or passive) will typically carry larger positions in larger stocks, but also trade a larger amount in these stocks around index re-weightings. This trade size relationship may also be attributable to the overall level of trading interests from potential counterparties to the fund mangers' trades. As smaller stocks are less liquid, fund managers are unlikely to trade as much in these stocks, even if they so desired.

When examining the implicit trading costs of different sized stocks, we find no discernable pattern in the relationship between stock size and costs. This peculiar result may be the product of two factors: differences in trade size and optimal trading strategies. While larger market order trades in illiquid stocks will likely cause significant price impact, trades in smaller stocks are smaller in size. Optimal trading strategies (with respects to limit and market orders) are also likely to differ in different stocks. If liquidity is lower in smaller stocks, then immediate or quick execution in these stocks using market orders will be costly. Under these circumstances, institutional traders may prefer limit orders. It is also possible that these differences are driven by investment style, adding a further layer of obfuscation to our analysis.

In a comparison of explicit trading costs (brokerage commissions), we find that stocks outside of the top 200 by turnover have higher commissions. For example, with unpackaged trades, percentage commissions are on average 0.328% for stocks in the smallest group, while they are 0.281%, 0.269%, and 0.328% respectively for respectively the top 20, 21-100, and 101-200 stocks. T-tests (unreported) indicate that differences between the largest and smallest groups are significant at the 1% level. There are two possible explanations for this. First, brokers may charge higher commissions in smaller stocks due to the difficulty of these trades. Alternatively, this may be driven by the greater likelihood of using reputable full service brokers in the execution of these difficult trades. If these reputable full service brokers charge higher commissions on average, then one would expect trades in smaller stocks to have higher commissions.

Keim and Madhavan (1997) show that growth traders incur higher trading costs in comparison to value traders. As an additional test of our dataset, we report (also in Table 2), institutional trading costs by investment style from a subset of data from 1992 to June 2002. We

have in total 39 funds with investment style information, of which 16 are growth/GARP funds, 11 are value funds, and 12 are classified as other. As our broader sample includes only active funds, we do not have any funds classified as indexers. Consistent with Keim and Madhavan (1997), we find that trading costs vary with a fund manager's investment style. Specifically, we find that growth funds have higher trading costs in comparison to value funds. This result is consistent across packaged and unpackaged trades, and across the different measures of institutional trading costs, whether explicit or implicit. This result is firstly consistent with the notion that value investors are more patient, thereby creating lower price impact costs. This is evident from value investors having negative open to trade and VWAP costs, in comparison to growth investors, who have positive costs. Our results also indicate that growth investors are on average charged higher commissions. There are two potential reasons for this. First, orders submitted by a growth trader may be more difficult to execute on average, justifying a premium. However, the observed similarity in the trade size of value and growth traders waters down the strength of this argument. Second, growth traders are perhaps more likely to have an arrangement with their broker with respects to research services. If these research services are priced into the commission, then they will be higher for growth traders.

4 Time Trends in Trading Costs

This section provides a quick overview of the time series trends in Australian institutional trading costs. We compute for each calendar year, the average open to trade, VWAP, and percent brokerage commission costs. All results reported in this section are for unpackaged trades. Table 3 reports these results. To aid in the visualisation of these trends, we also plot the contents of Table 3 in Figure 1.

Table 3 and Figure 1 show that brokerage costs associated with institutional trades have gradually decreased over our sample period. This reduction is sizable, with a drop from 0.903% in 1992 to 0.155% in 2010 representing a fall in brokerage commissions of over four fifths. Furthermore, this reduction is exponential[7], and is consistent with the time series trends reported in Goldstein, Irvine, Kandel and Wiener (2009). We do, however, observe a stabilisation in brokerage commissions towards the latter part of our sample. As trading technologies mature and competition saturates, we will likely see a trough in brokerage commissions in the near future. This minimum cost in commissions is likely to be driven by unavoidable fixed costs associated with execution, namely the cost of the technology used in trade execution.

[7] This pattern in reducing brokerage commissions is more apparent when we plot log percentage commissions against log of the number of years from 1 Jan 1992. This relationship between the two variables is one that closely mimics a linear relationship. This has strong implications for our commissions modelling in the latter parts of our study.

This large reduction in commissions is consistent with the increased level of competition in the Australian brokerage market, especially from discount brokers such as Commsec and E-Trade. It is also consistent with an improvement in the technologies used by brokers to execute client trades. These improvements come from three major areas: the improvement in telecommunication technologies (allowing greater bandwidth throughput), computing technologies (allowing faster processing), and execution algorithms (that better predict liquidity conditions allowing for better execution). In combination, these technological improvements reduce the need for human traders, who not only incur higher cost overheads for brokerage firms, but are also more prone to behavioural biases, and are limited in their capacity to respond in a timely fashion.

Table 3 and Figure 1 also show that implicit institutional trading costs, as measured by VWAP costs has been gradually declining. This is also consistent with the improvement in execution technologies over the years. Trends in open to trade costs are less obvious, but costs have typically remained low in our sample. The onset of the Global Financial Crisis (GFC) in 2008 (or late 2007 with the subprime crisis), and later, the European Debt Crisis (EDC), does not appear to have had any noticeable impact on institutional trading costs. This is a peculiar result, given the large increase in information asymmetry around the GFC and its likely impact on implicit trading costs.

To investigate this issue further, we also compute the standard deviation of institutional trading costs. This measure can be seen as a proxy to the levels of execution uncertainty in institutional trades (much like the use of standard deviation of returns as a measure of risk). Of particular interest are the years affected by the GFC in 2008 and 2009. While the trends in trading costs indicate that the GFC did not have a large impact average institutional trading costs, further analysis indicates a large increase in the level of execution uncertainty between 2007 and 2008. For example, when examining the standard deviation of VWAP costs, it was 0.528% in 2007, while this jumped to 0.905% in 2008. In other words, the GFC almost doubled the level of execution uncertainty in institutional trading, a pattern that is not apparent when looking at average trading costs. This heightened level of uncertainty has since fallen in 2009-10 (with the onset of recovery in global equity markets), and is now comparable to pre-GFC levels. Therefore, as the first study to examine institutional trading costs using data that includes the GFC, we document a large increase in the level of execution uncertainty, with average trading costs relatively unaffected.[8]

[8] In untabulated results, we find that execution uncertainty is stronger for the less liquid stocks.

5 Execution Quality and Brokerage Commissions

This section investigates the relationship between execution quality and commissions. The literature's evidence on the relationship between brokerage commissions and execution quality has been mixed. For example, Keim and Madhavan (1997), Domowitz, Glen and Madhavan (2001) and Comerton-Forde, Fernandez, Frino and Oetomo (2005) find a positive relationship between commissions and execution ability, while Berkowitz, Logue, and Noser (1988), Chan and Lakonishok (1993, 1995), and Conrad, Johnson, and Wahal (2001) do not.

There are two ways for a broker to earn higher brokerage commissions (in dollars). The first is a higher percentage commission. While a high degree of correlation between commissions and execution quality may suggest that brokers with an aptitude in trade execution are rewarded for their superior services, higher commissions is by no means the only reward. The second way to earn higher dollar commissions is to obtain a larger order flow. When percentage commissions remain the same, a greater order flow will still result in larger dollar commissions.[9] We are therefore of the view that, a good broker receiving greater order flow is a reward by itself. A search for a relationship between execution quality and commissions is somewhat misguided.

In summary of our results related to brokerage commissions so far, we find that trades in smaller stocks are typically charged at larger percentage commissions by brokers. This may be related to the greater difficulty of trading in smaller illiquid stocks. However, we find no discernable evidence that trades executed over longer day packages (which can be seen as having greater trade difficulty) are charged at higher percentage commissions.

We model brokerage commissions using an OLS model with the following specification:

$$PercentCommission_i = \alpha + \beta \times Time_i + \gamma \times RelativeVolume_i$$
$$+\delta \times VWAP_i + \theta \times QuarterTurnover_i + \sum \pi_j \times DFund_{ij} + \varepsilon_i \qquad (4)$$

Where 'PercentCommission' is log of one plus the percentage commissions and 'Time' is the log of the number of years since 1 Jan 1992[10]. 'RelativeVolume' is log of the ratio of the fund's volume to the market's volume on the day of trading. 'VWAP' is the VWAP cost as previously defined. 'QuarterTurnover' is the quarterly dollar turnover of the stock being traded. We also include a series of dummy variables ('Dfund') that controls for the identity of fund managers, and any potential differences in investment style and the effect this may have on commissions. This approach is consistent with Goldstein, Irvine, Kandel and Wiener (2009), who find relative stability

[9] For those familiar with financial statement analysis, there is a stark similarity between our argument and the DuPont model. Under DuPont, return on assets is affected by the profit margin and the asset turnover. Increasing either will result in a higher return. Within our argument, percentage commissions correspond to profit margins, while the size of the order flow corresponds to the asset turnover. Increasing either will result in higher dollar commissions for the broker.

[10] The relationship between the log of time and the log of the average percentage commissions closely mimics that of a linear relationship.

in the commissions charged to each fund. In essence, these dummy variables control for the possibility of certain institutional traders having pre-negotiated their commissions. Using this model, we seek to test two hypotheses:

H1: that brokers charge a premium for quality execution

H2: that commissions are charged in relations to trade difficulty.

If H1 is true, then one would expect a negative relationship between VWAP costs and commissions, that is, higher VWAP costs are on average, associated with lower commissions. To test H2, we have two variables of trade difficulty: 'RelativeVolume' and 'QuarterTurnover'. A higher 'RelativeVolume' implies greater trade difficulty while a higher 'QuarterTurnover' implies a more liquid stock and hence lower trade difficulty. If greater trade difficulty reduces execution quality, and lower execution quality reduces commissions, then one would expect (at least in equilibrium) for brokers to require a premium for executing difficult trades.

Table 4 reports our regression results on commissions. For brevity, parameter estimates on the dummy variables are omitted; serving only as controls. Table 4 indicates that our OLS model explains approximately half of all the variation in brokerage commissions in our sample of Australian institutional trades. A large part of this variation however, is from our time variable and our control variable on the identity of the fund manager. Consistent with Table 3, Figure 1, and the declining commissions over time, we find a coefficient for our time variable of -0.00030703, or roughly a reduction of 3.07 basis points a year in commissions.

Consistent with H1, we find that implicit trading costs (as measured by VWAP costs) are on average, negatively correlated with percentage commissions. When interpreted naively, this suggests that brokers charge lower commissions on trades where they performed poorly and conversely, charge higher commissions when they perform well. This interpretation however, is fraught with danger. The argument that brokers somehow charge commissions on a case-by-case basis appears far removed from reality, where percentage commissions are likely to be fixed for the duration of a contract. There is a high likelihood that the relationship between commissions and execution quality may not be a causal one. It is very plausible for this relationship to be driven by the quality of brokers used in executing trades. If reputable full-service brokers provide better execution costs on average, but charge higher fixed percentage commissions, then one would expect a similar outcome in the regressions.

Results related to H2 are mixed. Consistent with H2, a negative coefficient from 'QuarterTurnover' suggests that less liquid stocks are typically charged higher commissions. One may once again interpret this, albeit rather dangerously, as a causal relationship. That is, brokers discriminate when charging commissions to trades executed in stocks of varying liquidity. Another

plausible alternative interpretation for this is that institutional investors are more likely to use discount brokers on the very liquid stocks, who on average, charge lower commissions.

Contrary to H2, we find that larger 'RelativeVolumes' do not incur higher commissions. This is somewhat intriguing, given that larger trades are more difficult to execute, and devote brokers a greater part of their time and resources. Given the literature's treatment of the relationship between commissions and execution quality, it seems almost irrational for brokers not to require a premium on large and difficult trades! This however, adds support to our earlier argument that the search for a relationship between commissions and execution quality is somewhat misguided. Being profit maximising firms, it is unlikely that brokers are trying to maximise profit margins, but rather, total profits, which is a function of both profit margins and the size of their revenue. A small decrease in percentage commissions, but a large increase in order flow, will still result in a larger dollar commission for the broker.

Another factor at play may be the presence of economies of scale in large trades. This is plausible, especially if large trades are executed using automated algorithms. These algorithms (and the computers behind them) will likely have very large fixed costs for brokers, but very little variable costs associated with trade size. Given this cost structure, it is in the brokers' best interest to attract larger trades by offering small discounts to percentage brokerage commissions.

Overall, our results here do not provide sufficiently concrete evidence to suggest that commissions are related to trade difficulty. Specifically, 'RelativeVolume', a variable of trade difficulty did not exhibit a positive relationship with percentage commissions. While we find evidence that implicit execution costs are negatively related to percentage commissions, this may not be a causal relationship. It is plausible for this to be driven by the reputation of brokers. If reputable brokers are better at executing trades, but on average charge higher commissions, then one would expect a similar result to arise. We examine the effect of broker reputation on trading costs in the following section.

6 Perceived Broker Quality and Trading Costs

Goldstein, Irvine, Kandel and Wiener (2009) reason that that higher commissions charged by full-service brokers represent a convenient way to charge a pre-negotiated fee for the additional services they provide (e.g. research). Therefore, brokerage commissions are argued to be unrelated to execution ability. This contrasts with Comerton-Forde, Fernandez, Frino and Oetomo (2005), who find lower execution costs for trades executed by brokers with greater ability. This suggests that higher quality brokers may be in a position to charge higher levels of economic rent (i.e. commissions) in comparison with lower quality brokers. As discussed in the previous section, an observed relationship between commissions and execution quality may be driven by high quality

brokers providing better than average execution quality, but simultaneously charging a higher commission. This is akin to the best active fund managers charging higher fees. This section of our study examines the relationship between broker ability and trading costs. We hypothesise that:

H3: Brokers with higher reputation provide lower implicit trading costs, but

H4: Charge higher commissions.

As a proxy to broker quality, we use the East Coles Best Brokers Survey, which rates brokers in three categories based on research, trade execution, and market making. These rankings are the Australian equivalent to the one produced in the US by *Institutional Investor*. As only institutions are surveyed in the East Coles rankings, they represent the quality of brokers as perceived by institutional investors. We select the top 10 brokers from the trade execution category as our sample of 'top-tier full-service brokers', and classify the remaining brokers as 'other brokers'. While rankings within these top 10 firms vary from year to year, the same firms always appear within our sample period.[11] Coincidently, these same firms are also consistently ranked as the top brokers in the research and market making categories. We exclude any observation where the identity of the broker is unknown. All results reported in this section are for unpackaged trades.

Table 5 Panel A reports that a large proportion of trades are executed through top-tier brokers. Approximately 68% of the total 207,795 trades are executed through top-tier brokers. Furthermore, top-tier brokers have on average, a larger trade size in comparison to other brokers: $0.69 million for top-tier, and $0.50 million for other brokers. Despite their large trade size, top-tier brokers appear to incur lower implicit trading costs as measured by open to trade or VWAP costs. This is consistent with the predictions of H3. Surprisingly, and inconsistent with H4, percentage brokerage costs are almost identical for top-tier and other brokers. This suggests that despite top brokers doing better than other brokers in execution, they do not charge higher levels of economic rent.

This adds further support to our argument that the search for a relationship between percentage commissions and execution quality is misguided. We show that while top-tier brokers achieve better execution, they do not charge higher commissions on average. Does this suggest that top-tier brokers are not being rewarded for lower execution costs? Not quite. As previously noted, brokerage firms attempt to maximise profits (as with any other firm). A higher level of execution quality would on average, ceteris paribus, result in greater order flow from the market. Therefore, while charging the same level of commission leaves their profit margins unchanged, they will nevertheless earn higher profits from greater order flow. Overall, our results in this section suggest

[11] These firms include (in alphabetical order): ABN AMRO/Royal Bank of Scotland, Citigroup/Smith Barney, Credit Suisse, Deutsche, Goldman Sachs/JB Were, JP Morgan, Macquarie, Merrill Lynch, Morgan Stanley, and UBS.

that the use of reputable full service brokers is economically justified: they obtain better execution (even though they're larger on average), while charging similar commissions.

The literature suggests two reasons why brokerage commissions may be different amongst brokers: execution ability and research ability. If brokers of different quality charge similar commissions, then commissions are unlikely to be related to execution quality. Goldstein, Irvine, Kandel and Wiener (2009) argue that the higher commissions charged by full-service brokers represent a fee on research. If this is true, then one would expect brokers with higher research ability to charge higher commissions. In our sample, ranked research brokers also happen to be the ranked brokers in terms of execution. Despite this, we do not find any evidence that the most reputable research brokers charge higher percentage commissions.

We find that percentage commissions are not related to execution quality, and are also unlikely to be related to research ability. So what determines brokerage commissions then? Revisiting an earlier point, the search for a relationship in commissions and execution/research ability is deeply misguided. Quality execution and research will naturally attract order flow, which results in larger dollar commissions. In a competitive market for brokerage services, brokers are sometimes restrained in terms of the commissions they are able to charge. That is, commissions are possibly exogenous, determined by market forces. However, while they are unable to compete in terms of prices (i.e. commissions), brokers certainly can compete in quality: quality of execution and quality of research.

Putting aside the search for a relationship between commissions and execution/research quality, a more interesting question would be: why do institutional investors choose reputable brokers over others? This is examined in sections 7 and 8.

7 Trade Motivation and Trading Costs

There are two reasons why institutional traders may prefer to use reputable brokers: for execution ability and for research. Our motivation is to examine the determinants of a choice between reputable versus other brokers. In theory, the two reasons can be approached directly, by examining the impact of perceived execution and research ability on the choice. In reality however, highly perceived brokers for execution are also highly perceived in terms of research ability. This makes it difficult to distinguish between the two reasons. We circumvent this issue by identifying the institutional traders' *ex-ante* trading motivations.

The literature has approached this using various proxies based on related factors such as: (1) trade size [e.g. Easley and O'Hara, 1987; Barclay and Warner, 1993; and Chakravarty, 2001] (2) trade aggression [e.g. Glosten, 1994; Rock, 1996; and Seppi 1997] and (3) investment style [e.g.

Chan and Lakonishok, 1995]. These proxies are not without contention, and are especially crude and noisy.

Using our trades of institutional investors, we develop an *ex-ante* separation in information motivated and liquidity motivated trades. We achieve this, by taking advantage of a unique feature of our data: fund flow. For a subset of our data (from 2002 onwards), we have each fund manager's net fund flow for the day. Net fund flow is a fund manager's fund inflows (i.e. fund deposits) net of any outflows (i.e. fund redemptions). Our classification is based off the simple premise that trades around fund flows are more likely to be liquidity motivated. For example, if a fund manager receives $10 million in new deposits, it's likely for their subsequent trades to be driven by a need to invest quickly, and to minimise cash drag. On the other hand, when a fund manager trades in the absence of fund flow, they are more likely to be trading on information uncovered through in-house or external research, and thus more likely to be informed.

On our measure specifically: buys that occur between the day of the fund inflow and three days after the date of the inflow (inclusive) are classified as liquidity motivated trades. Determinants of liquidity motivated sells are slightly more complex, given the settlement procedure used under the Australian settlement and registry system (i.e. CHESS). When fund managers sell shares, they do not receive the actual cash until 3 full business days later. This causes a 3 full-day time gap between the trade date of liquidity motivated sells and the date on which cash is distributed to underlying investors. We take this delay into consideration when classifying liquidity motivated sells, but are the method is otherwise identical to liquidity motivated buys. We exclude trades where the inflow and outflow windows overlap, that is, there is both a net inflow and a net outflow around this trade. These trades are excluded because of the large ambiguity in their information content.

For example, imagine the following series of events. On Monday, a particular fund manager receives new fund deposits totalling $10 million dollars, and the same manager subsequently made net purchases in stocks worth $9m on Tuesday. On Friday, the fund has a net outflow of $9 million as a result of a fund redemption previously requested by one of their clients. When one examines the fund manager's purchase on Tuesday in the context of a recent fund inflow, this trade will appear to be motivated by liquidity reasons. However, in the context of the fund outflow on Friday, it would appear that the fund manager is buying, despite having a fund redemption. This would suggest that the fund manager's trades are information motivated, which is opposite to the previous conclusion.

Trades that do not occur around fund inflows and outflows are classified as information-motivated. In addition to removing the ambiguous trades noted above, we also exclude trades that occur around index rebalancing dates. While none of the fund managers in our dataset are index

funds, index weights may nevertheless play an important role in determining relative stock positions in their portfolios, and therefore their trading motivations. We therefore exclude all trades where there is an index re-weight in the S&PASX 100, 200, 300, and All Ordinaries Indices, within 3 trading days on either side of the trade date.[12] We do not package trades in our current analysis as this makes our filters unnecessarily complex. For example, a package executed across 2 weeks is more likely to cut across multiple inflow and outflow events, which makes their trading motivation more difficult to determine.

Table 5 Panel B reports the trading costs associated with information and liquidity motivated trades. There are in total 10,274 liquidity motivated trades and 22,932 information motivated trades. Trade size for liquidity motivated trades are on average, $0.57 million while for information motivated trades, they are $0.43 million.

Our results indicate that information-motivated trades have higher implicit trading costs in comparison to liquidity motivated ones, which is evident from both the open to trade and VWAP costs. This indicates that information motivated trades are more aggressive than liquidity motivated ones. Despite this, the VWAP cost for information motivated trades are still negative, indicating that these trades, while being more aggressive, still execute at prices better than the average market price. There is also no evidence to suggest that information motivated trades pay significantly higher percentage brokerage commissions.

As an extension, we place the quality of our research design to the test under an exogenous change in market design. On 28 November 2005, the ASX removed the display of broker identifiers, which made the market more anonymous. In transparent a market, one would expect informed traders to be wary of aggressive trading behaviour, as this would send strong signals to the market about the information content of their trades. When the market becomes anonymous, and broker identifiers are no longer displayed, the market place loses an important piece of information to second guess one's trading intentions. This makes informed traders less wary of their own aggressive trading behaviour, increasing their level of order aggressiveness.

While we do not have any order level data, we can impute the level of order aggressiveness from their ex-post transaction costs. To do this, we sample a 1-year period before and after the introduction of anonymity.[13] An examination of the trading costs of information and liquidity motivated trades in the two transparency regimes is also reported in Panel B of Table 5.

[12] Active fund managers can be flexible with regards to index rebalancing, and no not have to perfectly track the performance of an index. They may therefore spread their rebalancing over a number of days to minimise transactions costs. They may even anticipate any index reweights, and trade ahead of any scheduled index rebalance.

[13] For robustness, we also sample 6 months and 2 years before and after the introduction of anonymity. Our conclusions do not change.

Upon initial inspection, average trade size appears to have decreased across the board, with liquidity motivated trades decreasing from $0.86 million to $0.46 million, and information motivated trades decreasing from $0.59 million to $0.36 million. Two sample t-tests (not reported in the table) indicate that in the transparent regime, open to trade costs are not significantly different between information and liquidity motivated trades (at the10% level), but information motivated trades do have higher VWAP costs (at the 5% level). In the anonymous regime, the differentiation is much clearer, with informed trades having significantly higher trading costs in both of our implicit trading cost measures (under a two sample t-test at the 5% level of significance). On percentage commissions, there is very little evidence to suggest that information motivated trades pay higher commissions on average.

Overall, our results above show that informed trades are comparatively more aggressive in the anonymous regime. Anonymity (in our case the lack of broker IDs specifically) reduces the information content of a broker's order flow. Prior to the removal of broker IDs, other market participants can partially infer a broker's trading interests from their order flow, that is, their series of trades and/or orders. However, upon the removal of broker IDs, the market only observes the trades and orders, but is unable to identify who the originating broker is. Letting everything else being equal, this makes the same series of trades and orders less informative to other market. Therefore, anonymity allows the brokers acting on behalf of informed traders to be more aggressive in executing their orders. While this may increase price impact for informed traders, it also increases execution certainty and reduces potential opportunity costs from implementation shortfall.

8 Why Choose the Top Brokers?

In this section, we model an institutional investor's choice between reputable versus other brokers. As noted previously, reputable brokers in research also happen to have high reputation in execution quality. This makes it difficult to use perceived quality directly in modelling the choice between brokers. Using the method of classifying trading motivations discussed in the previous section, we examine whether institutional traders are more (or less) likely to use reputable brokers for information-motivated trades. To examine whether institutional traders prefer reputable brokers for execution quality, we use measures of execution difficulty as proxies. We model this choice using a logistic regression with the following specification:

$$Y_i^* = \alpha + \beta \times RelativeVolume_i + \gamma \times QuarterTurnover_i + \delta \times DInformed_i + \sum \theta_j \times DYear_{i,j} + \sum \pi_j \times DFund_{i,j} + \varepsilon_i \quad (5)$$

Where Y* is a latent variable for the choice of brokers, which takes on a value of 1 if the trade uses a top-tier broker, and 0 otherwise. 'RelativeVolume' and 'QuarterTurnover' are measures of trade

difficulty and are as previously defined. We hypothesise that trades of higher difficulty are more likely to be routed to brokers with a higher reputation in execution quality. 'DInformed' is a dummy variable which takes on the value of 1 if it is information motivated and 0 otherwise. 'DYear' are a series of dummy variables that control for time-varying effects in the choice of brokers. 'DFund' controls for variations in the choice of brokers across different funds. This approach is consistent with Goldstein, Irvine, Kandel and Wiener (2009), who argue that brokers and fund managers have long term relationships. Using this model we test two possible reasons for executing through a top-tier broker: (1) because they are good at executing difficult trades, and/or (2) because the institutional trader is looking to trade for information reasons (rather than liquidity reasons). In short, we are asking the question: do institutional investors choose reputable brokers for their execution ability, or because of information? Table 6 reports the results of our logistic regression. For brevity, estimates on the two series of control variables 'DTime' and 'Dfund' are not reported.

Table 6 indicates that for an information-motivated trade, institutional traders are more likely to use reputable brokers, as can be seen in the positive and significant coefficient for 'DInformed'. There may be two scenarios under which institutional investors' trades are information motivated: when they trade based on analysis generated in-house, or when they trade on the information provided to them by the broker. While the former is possible, it is difficult to see why using a top-tier broker would be different to say, a second tier broker, when fund managers trade based on in-house research. The latter provides a more intuitive economic rationale. The literature has shown that forecasts and recommendations provided by equity analysts contain information, and can be profitable to those who have access to them [e.g. Givoly and Lakonishok, 1979; Lys and Sohn, 1990; Womack, 1996; and Green, 2006;]. This benefit is even greater when one can obtain this information through tips prior to their market-wide release [e.g. Irvine, Lipson and Puckett, 2007; and Lepone, Leung, and Li, 2012]. Any potential trading cost is likely to be swamped by the benefits of information.

Examining 'RelativeVolume', we find no evidence that institutional investors choose top-tier brokers for their ability to execute larger trades. 'QuarterTurnover' has a negative coefficient, suggesting that trades in less liquid stocks are less likely to be routed to a reputable broker. One would have expected a positive coefficient here if the reputable broker was perceived to be better at executing a difficult trade in a smaller stock. We therefore find no evidence that institutional traders choose reputable brokers for their ability to execute difficult trades. The peculiar result may be one that is related to the level of analyst coverage in small stocks. While some analyst firms do cover stocks outside of the top 200, coverage is typically sparse in comparison to the larger stocks. Therefore, given this preference in covering large stocks, top-tier brokers can be argued to be more

informed in the larger stocks. This lends further support to the notion that institutional investors choose top-tier brokers for their information, rather than their ability to execute difficult trades.

To examine the quality and the goodness of fit of our model, we apply a simple test. We have in total 33,167 observations, of which 79.58% are routed to top-tier brokers. Therefore under a naïve guess, there is a 79.58% probability that a trade would be executed by a top-tier broker. If the probability estimate (from our model) is greater than 79.58% for a particular trade, then we classify it as having been predicted to be routed to a top-tier broker. A model with no additional explanatory power in comparison to the naïve guess would provide an accurate guess 50% of the time. Our model however, provided a predictive accuracy of 63.39%, suggesting a 13.39% improvement over a naïve guess.

Overall, our results show that institutional investors choose top-tier brokers not for their execution ability, but rather, because of the research that they provide. To a large extent, our findings are consistent with Goldstein, Irvine, Kandel and Wiener (2009) who find that brokerage commissions are unrelated to brokerage commission, but rather, information content. However, in stark contrast, we do not find any evidence that reputable brokers charger higher commissions (for either research or execution quality). This however, does not suggest that top-tier brokers are not rewarded for their research services. The greater order flow that is routed to these brokers is a reward on its own. Even when reputable brokers charge the same percentage commission, a larger order flow results in larger revenues.

9 Conclusion

Using a dataset of Australian fund managers that spans 18.5 years, this study examines why institutional traders may prefer reputable full-service brokers in comparison to less reputable or discount brokers. In particular, we examine two possible determinants in this choice: execution ability and information. This is an important research question for academics, but especially relevant to practitioners in the area, who are making these sorts of choices on a regular basis. The difficulty in this research question lies in the lack of a method to classify trades as informed or liquidity motivated on an ex-ante basis. Making use of fund flows, we are able to separate these two types of trades. In summary of our main results, we find that:

1) Top-tier full service brokers achieve lower implicit trading costs while charging similar percentage commissions as other brokers.
2) While top-tier brokers achieve better costs, this is not the reason why institutional investors route their orders to them. Rather, the choice is driven by the trade motivation, specifically, information. We argue that this is driven by the superior research services offered by the top-tier brokers.

To a large extent, our findings are consistent with Goldstein, Irvine, Kandel and Wiener (2009) who find that brokerage commissions are unrelated to brokerage commission, but rather, information content. However, in stark contrast, we do not find any evidence that information motivated trades pay higher percentage commissions. This however, does not suggest that top-tier brokers are not rewarded for their research services. The greater order flow that is routed to these brokers is a reward on its own. Even when reputable brokers charge the same percentage commission, a larger order flow results in larger revenues.

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Table 1:
Descriptive Statistics

This table provides descriptive statistics on our sample spanning 1992 to 2010. It reports the number of funds, number of unique stocks traded, the number of trades, the mean trade value, and the total value traded by calendar year. Note that we do not have data at the trade level. Therefore the number of trades and the mean trade value are based off a fund's trades in a single stock in single day.

Year	# Funds	# Stocks Traded	# Trades	Mean Trade Value	Total Value ($m)
1992	3	98	562	$80,839	$45.43
1993	6	194	3,743	$117,034	$438.06
1994	10	299	5,663	$262,739	$1,487.89
1995	12	293	5,623	$305,056	$1,715.33
1996	13	295	8,315	$323,393	$2,689.01
1997	15	323	11,066	$397,312	$4,396.66
1998	21	304	16,655	$400,375	$6,668.25
1999	25	336	25,542	$393,018	$10,038.47
2000	31	409	33,996	$419,502	$14,261.39
2001	33	342	37,854	$512,152	$19,387.02
2002	23	239	4,541	$434,690	$1,973.93
2003	8	244	6,838	$1,025,908	$7,015.16
2004	11	274	8,129	$1,415,451	$11,506.20
2005	20	302	13,968	$785,128	$10,966.66
2006	20	316	16,674	$809,674	$13,500.51
2007	22	336	17,746	$898,854	$15,951.06
2008	25	335	24,245	$782,435	$18,970.14
2009	26	382	27,266	$637,216	$17,374.34
2010	24	321	13,556	$624,174	$8,461.30
Total Sample	62	1206	281,982	$591,693	$166,846.80

Table 2:
Institutional Trading Costs

This table reports the number, the mean value, and trading costs of packaged and unpackaged trades following the methodology of Chan and Lakonishok (1995, 1997). Three trading cost measures are reported: the open-to-trade, the VWAP cost, and the brokerage commissions. We also examine trading costs by stock liquidity (stock turnover) and fund investment style. Stock turnover is ranked on a quarterly basis and separated into 4 groups: the top 20 stocks, 21-100, 101-200, and stocks ranked 201 or above. We have in total, 39 funds with information on their investment styles. This subset starts in 1992, and ends June 2002. We classify funds as being growth (which includes GARP), value, or other styles.

Group (Liquidity or Style)	**Basic Statistics**		**Trading Costs**		
	N	*Mean Trade Value ($m)*	*Open to Trade*	*VWAP Cost*	*Brokerage*
Panel A: Unpackaged					
All	282641	$0.59	-0.062%	-0.059%	0.275%
			(0.000)	(0.000)	
1-20	74534	$1.02	-0.046%	-0.017%	0.281%
			(0.000)	(0.000)	
21-100	136621	$0.55	-0.081%	-0.058%	0.269%
			(0.000)	(0.000)	
101-200	45350	$0.29	-0.017%	-0.098%	0.250%
			(0.024)	(0.000)	
201+	26136	$0.13	-0.082%	-0.116%	0.328%
			(0.000)	(0.000)	
Growth	67386	$0.44	0.034%	0.013%	0.472%
			(0.000)	(0.000)	
Value	80727	$0.45	-0.238%	-0.077%	0.371%
			(0.000)	(0.000)	
Other	42446	$0.19	0.278%	0.073%	0.196%
			(0.000)	(0.000)	
Panel B: 3 Day Packages					
All	118167	$1.35	0.029%	-0.006%	0.277%
			(0.000)	(0.000)	
1-20	35272	$2.08	0.014%	0.013%	0.267%
			(0.114)	(0.000)	
21-100	54078	$1.31	0.010%	-0.005%	0.268%
			(0.212)	(0.019)	
101-200	17381	$0.71	0.119%	-0.020%	0.265%
			(0.000)	(0.000)	
201+	11436	$0.28	0.032%	-0.045%	0.363%
			(0.090)	(0.000)	
Growth	25826	$1.02	0.121%	0.025%	0.675%
			(0.000)	(0.000)	
Value	28727	$1.11	-0.327%	-0.058%	0.438%
			(0.000)	(0.000)	
Other	17128	$0.31	0.414%	0.123%	0.268%
			(0.000)	(0.000)	

Panel C: 5 Day Packages

All	102163	$1.53	0.045%	0.002%	0.274%
			(0.000)	(0.369)	
1-20	30743	$2.35	0.024%	0.019%	0.264%
			(0.014)	(0.000)	
21-100	46739	$1.48	0.024%	0.002%	0.266%
			(0.011)	(0.401)	
101-200	14832	$0.81	0.141%	-0.010%	0.261%
			(0.000)	(0.058)	
201+	9849	$0.31	0.065%	-0.037%	0.361%
			(0.002)	(0.000)	
Growth	22664	$1.17	0.181%	0.028%	0.695%
			(0.000)	(0.000)	
Value	24869	$1.29	-0.349%	-0.051%	0.432%
			(0.000)	(0.000)	
Other	14549	$0.37	0.446%	0.136%	0.275%
			(0.000)	(0.000)	

Table 3:
Trends in Institutional Trading Costs and Uncertainty

This table reports time series trends in institutional trading costs. In order to examine the statistical significance of trading costs (from zero), P-values to t-tests are also provided on the open-to-trade and VWAP cost metrics. In addition, we report the standard deviation of the open to trade and the VWAP costs as measures of execution uncertainty.

Year	N	Open to Trade	P	VWAP Cost	P	Brokerage	S.D. of Open to Trade	S.D. of VWAP Cost
1992	560	0.096%	(0.086)	0.020%	(0.479)	0.903%	1.321%	0.658%
1993	3725	-0.001%	(0.947)	0.019%	(0.088)	0.793%	1.364%	0.668%
1994	5664	-0.023%	(0.206)	0.018%	(0.027)	0.664%	1.357%	0.626%
1995	5602	-0.108%	(0.000)	-0.007%	(0.363)	0.541%	1.312%	0.569%
1996	8297	-0.139%	(0.000)	-0.020%	(0.002)	0.465%	1.239%	0.571%
1997	11036	-0.179%	(0.000)	-0.019%	(0.001)	0.398%	1.431%	0.609%
1998	16613	-0.152%	(0.000)	-0.028%	(0.000)	0.375%	1.440%	0.571%
1999	25484	-0.057%	(0.000)	-0.007%	(0.046)	0.334%	1.424%	0.536%
2000	34591	-0.038%	(0.000)	-0.012%	(0.000)	0.306%	1.583%	0.591%
2001	39130	-0.043%	(0.000)	-0.044%	(0.000)	0.261%	1.429%	0.560%
2002	4512	0.011%	(0.588)	-0.001%	(0.949)	0.237%	1.414%	0.599%
2003	6800	0.000%	(0.973)	-0.062%	(0.000)	0.237%	1.210%	0.658%
2004	8098	-0.007%	(0.600)	-0.067%	(0.000)	0.222%	1.120%	0.514%
2005	13934	-0.013%	(0.151)	-0.082%	(0.000)	0.197%	1.098%	0.479%
2006	16591	-0.007%	(0.454)	-0.080%	(0.000)	0.185%	1.136%	0.481%
2007	17687	-0.044%	(0.000)	-0.088%	(0.000)	0.176%	1.218%	0.528%
2008	23791	-0.101%	(0.000)	-0.148%	(0.000)	0.167%	2.188%	0.905%
2009	27056	-0.075%	(0.000)	-0.133%	(0.000)	0.153%	1.709%	0.763%
2010	13470	-0.084%	(0.000)	-0.117%	(0.000)	0.155%	1.346%	0.631%

Figure 1:
Trends in Institutional Trading Costs and Uncertainty

This chart reports graphically, the information presented in Table 5 on trends in institutional trading costs and trading cost uncertainty.

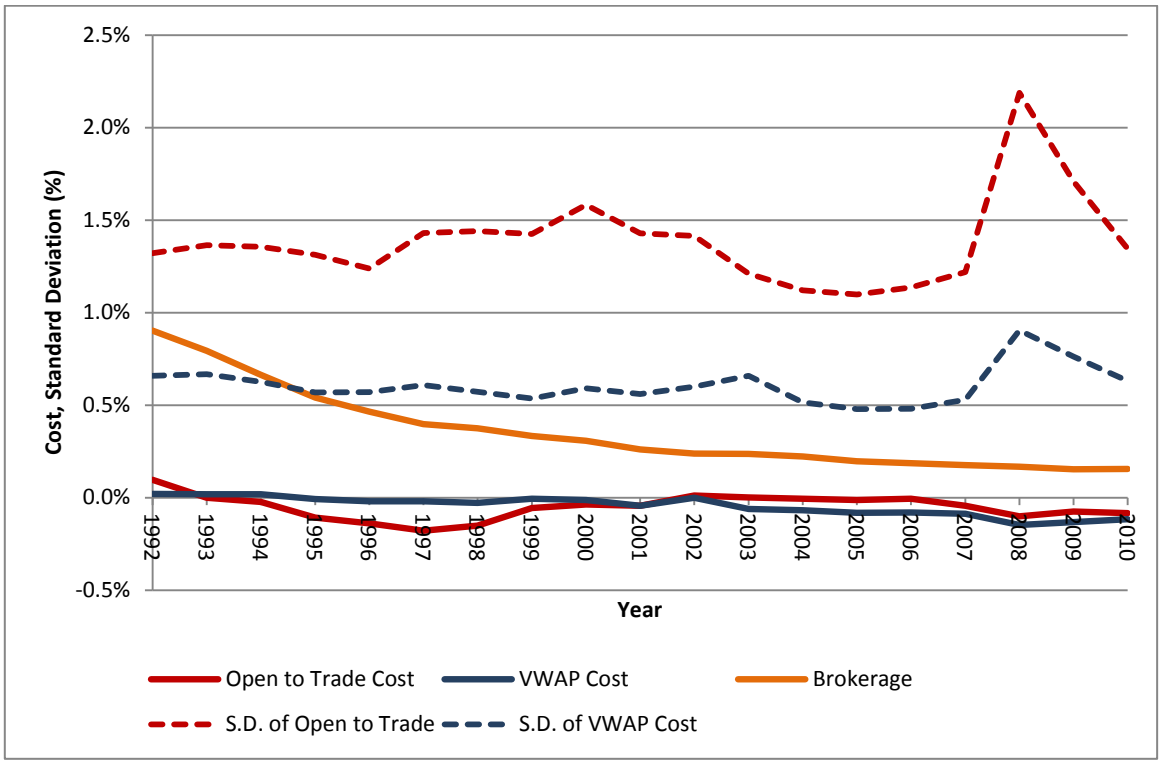

Table 4:
Execution Quality and Brokerage Commissions

This table reports the results of an OLS regression with the following specifications:

$$PercentCommission_i = \alpha + \beta \times Time_i + \gamma \times RelativeVolume_i$$
$$+\delta \times VWAP_i + \theta \times QuarterTurnover_i + \sum \pi_j \times DFund_{ij} + \varepsilon_i$$

Where 'PercentCommission' is log of one plus the percentage commissions and 'Time' is the log of the number of years since 1 Jan 1992. 'RelativeVolume' is log of the ratio of the fund's volume to the market's volume on the day of trading. 'VWAP' is the VWAP cost as previously defined. 'QuarterTurnover' is the quarterly dollar turnover of the stock being traded. We also include a series of dummy variables ('Dfund') that controls for the identity of fund managers. For brevity, estimated coefficients on these dummy variables are not reported.

Variable	Parameter Estimate	Standard Error	t-Value	P-Value
Intercept	0.005780	0.00003654	158.30	(0.000)
Time	-0.000307	0.00000150	-204.43	(0.000)
RelativeVolume	-0.000170	0.00001403	-12.15	(0.000)
VWAP	-0.001280	0.00045145	-2.84	(0.005)
QuarterTurnover	-0.000071	0.00000183	-38.78	(0.000)

N = 282,641; F = 4713.43; P-Value of F <0.001; R-Sq = 50.02%, Adj. R-Sq = 50.01%

Table 5:
Broker Reputation, Trade Motivation and Institutional Trading Costs

This table reports the trading costs by broker reputation and trading motivation. Brokers are classified as either top-tier or other brokers. Top-tier brokers are those that consistently remain in the top 10 as according to the East Coles survey, in the category of trade execution. All other brokers are classified into the 'other' group. Trading intention is determined using a manager's fund flows. We also examine the interaction between market transparency, trading motivation, and trading costs.

Broker Type	**Basic Statistics**		**Trading Costs**		
	N	*Mean Trade Value ($m)*	*Open to Trade*	*VWAP Cost*	*Brokerage*
Panel A: Broker Reputation and Trading Costs					
Top-Tier	141209	$0.69	0.026%	-0.054%	0.221%
			(0.000)	(0.000)	
Others	66586	$0.50	0.039%	-0.019%	0.219%
			(0.000)	(0.000)	
Panel B: Trading Motivation and Trading Costs					
Liquidity	10274	$0.57	-0.077%	-0.128%	0.175%
			(0.000)	(0.000)	
Information	22932	$0.43	0.040%	-0.085%	0.178%
			(0.000)	(0.000)	
Liquidity, Transparent	926	$0.46	0.069%	-0.100%	0.199%
			(0.031)	(0.000)	
Liquidity, Anonymous	1807	$0.86	-0.042%	-0.105%	0.195%
			(0.092)	(0.000)	
Information, Transparent	1917	$0.36	0.058%	-0.057%	0.189%
			(0.013)	(0.000)	
Information, Anonymous	3348	$0.59	0.067%	-0.065%	0.199%
			(0.000)	(0.000)	

Table 6:
Choice in Brokers

To examine this choice, we use a logistic regression with the following specification:

$$Y_i^* = \alpha + \beta \times RelativeVolume_i + \gamma \times QuarterTurnover_i + \delta \times DInformed_i + \sum \theta_j \times DYear_{i,j} + \sum \pi_j \times DFund_{i,j} + \varepsilon_i$$

Where Y* is a latent variable for the choice of brokers, which takes on a value of 1 if the trade uses a top-tier broker, and 0 otherwise. 'RelativeVolume' and 'QuarterTurnover' are measures of trade difficulty and are as previously defined. 'DInformed' is a dummy variable which takes on the value of 1 if it is information motivated and 0 otherwise. 'DYear' are a series of dummy variables that control for time-varying effects in the choice of brokers. 'DFund' controls for variations in the choice of brokers across different funds. For brevity, 'DYear' and 'DFund' are not reported.

Variable	Parameter Estimate	Standard Error	Wald Chi-Sq	P-Value
Intercept	1.593500	0.04890000	1059.83	(0.000)
RelativeVolume	0.000038	0.00039400	0.01	(0.922)
QuarterTurnover	-0.391500	0.03200000	149.22	(0.000)
DInformed	0.158000	0.02920000	29.35	(0.000)

N Top-Tier = 26,393; N others = 6774, Naïve P (Top-Tier) = 79.58%, Pred. Accuracy = 63.39%