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An Empirical Analysis of Local Trader Profitability

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This study examines the profitability of local traders on the Sydney Futures Exchange. Specifically, local income is decomposed into two central components; liquidity and position-taking profits. Liquidity profits represent the income that arises (is forgone) from supplying (demanding) liquidity, whilst position-taking profits refer to the gains (losses) resulting from price movements subsequent to a local establishing a position. The decomposition of local profitability reveals that locals on the trading floor make significant position-taking profits. Moreover, the ability of locals on the floor to derive position-taking profits is positively related to order-flow related information, and negatively related to the presence of exogenous information, local liquidity profits and the length of a locals inventory cycle. Accordingly, this paper characterises locals as active informed traders.

Keywords:

LIQUIDITY SUPPLY AND DEMAND; LOCAL MEMBERS; SYDNEY FUTURES EXCHANGE; LIQUIDITY PROFITS; POSITION-TAKING PROFITS.

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This study examines the profitability of local traders on the Sydney Futures Exchange. Specifically, local income is decomposed into two central components; liquidity and position-taking profits. Liquidity profits represent the income that arises (is forgone) from supplying (demanding) liquidity, whilst position-taking profits refer to the gains (losses) resulting from price movements subsequent to a local establishing a position. The decomposition of local profitability reveals that locals on the trading floor make significant position-taking profits. Moreover, the ability of locals on the floor to derive position-taking profits is positively related to order-flow related information, and negatively related to the presence of exogenous information, local liquidity profits and the length of a locals inventory cycle. Accordingly, this paper characterizes locals as active informed traders.

1. Introduction

Most floor-traded securities exchanges provide a special class of trader with direct access to the trading floor and allow them to trade on their own account. Examples include specialists on the New York Stock Exchange and local traders on various futures exchanges around the world including the Chicago Mercantile Exchange, Chicago Board of Trade and Sydney Futures Exchange. An understanding of the role of such traders is important, as it can provide some economic justification for the trading privileges they are afforded. This paper examines trading by locals in futures markets to provide evidence on their economic role.

Hasbrouck and Sofianos (1993) examine the profitability of transactions by specialists on the floor of the NYSE. They find that specialist although implied specialist trading profits are sharply reduced when trades are assumed to take place at the midpoint of the spread, profit components in the quote midpoint profits do remain. This suggests that specialists profit from the provision of liquidity as well as through transacting on the basis of superior order flow information.[1] There are a number of specific characteristics of NYSE specialists that may account for the findings of Hasbrouck and Sofianos (1993). These include 'affirmative obligation stabilisation' practices (see Harris, 1999), specialists' control of order flow which allows them to 'hide' limit orders (McInish and Wood, 1995) and other quasi-monopoly trading practices which allow them to extract rents from other traders (Brock and Kleidon, 1992). All of these factors can influence the ability of specialists to earn profits from the provision of liquidity and/or ability to transact on the basis of order-flow related information in generating profits. In contrast, local traders do not control order flow, and have the same access to order-flow related information as other floor traders. This suggests the findings of Hasbrouck and Sofianos (1993) are not generalisable to locals trading in futures markets.

A number of prior studies have analyzed data for US futures markets which identify traders to quantify total profits earned by local traders (eg. Silber, 1984). Further, some analysis of the profitability of local traders in US markets has taken place. For example, Kuserk and Locke (1996) compare profits of locals on days in which futures prices hit price limits to other days, while Fishman and Longstaff (1992) compare the profits of locals to other classes of trader. While most exchanges around the world suggest that locals provide liquidity (quote something from CME), there is no evidence that locals serve this function. Indeed, there are suggestions in the literature that they may have some sort of information advantage which allows them to predict and trade on order-flow related information (eg. Silber, 1984). The profits earned by locals represent their reward for providing liquidity and/or trading on order-flow related information. Hence an analysis of the profits of locals can provide evidence on their economic role.

This study decomposes the profits of local traders by comparing prices at which they trade to standing quoted bid and offer prices in a manner similar to Hasbrouck and Sofianos (1993). While data detailing the identity of local traders in US markets exists, these exchanges do not collect quote information (see Smith and Whaley, 1990). Unlike US futures markets, the Sydney Futures Exchange collects quote information as well as transaction data identifying the parties involved in trades for settlement purposes. This provides a unique opportunity for decomposing the profits of local traders into liquidity and profit-taking trades

The remainder of this study is organised as follows. Section 2 contains the literature review and hypothesis development. Section 3 outlines the data and methodology employed. Section 4 describes the results attained, while Section 5 contains conclusions and directions for future research.

2. Theory & Hypothesis Development

2.1. Source of local trader income

A dominant theme in the theoretical market maker and asymmetric information literature [Glosten and Milgrom (1985), Admati and Pfleiderer (1989)] is that market makers trade with two main types of counter-parties - informed and liquidity traders. This literature typically asserts that while market makers expect to gain in their transactions with liquidity motivated traders, they are unlikely to profit from trading with informed traders.[2] Locals are often portrayed as unofficial market makers in futures exchanges, implying that they offer quotes and thereby provide liquidity to other traders.[3] If locals trade in a manner consistent with that implied by the market maker literature, they should almost exclusively derive their income from the provision of liquidity. Moreover, locals should incur losses resulting from price movements unfavourable to their position, following trading with informed traders.

A recent paper by Manaster and Mann (1996) provides indirect evidence that locals do not derive income entirely in the manner described by the traditional literature. In an examination of a large sample of market makers on the CME, Manaster and Mann (1996) found that locals make inventory reducing trades on more favourable terms than inventory increasing trades. On this basis they suggest that locals behave in an informed manner, implying that locals profit by correctly predicting price movements.

The possibility that market makers profit by means other than the provision of liquidity has also been discussed in market maker literature. Madhavan and Smidt (1993) present a theoretical model in which they assume that the market maker is at times an "active" investor, who uses information in order-flow to adjust prices and inventory in anticipation of favourable price movements. Similarly, Hasbrouck and Sofianos (1993) provide evidence that NYSE market makers generate profits over and above liquidity profits. On the basis of this literature, this paper hypothesises:

H1: **Locals derive a significant component of their income from price movements favourable to their inventory position (position-taking profits).**

2.2 Determinants of local trader position-taking profits

The ability of locals to derive positive position-taking profits implies that they are informed traders. This paper examines the determinants of position-taking profits.

Local trader liquidity profits

Traditional market maker literature, including Copeland and Galai (1983) identify an inverse relation between a market makers liquidity and position-taking profitability. These models assert that in the process of supplying liquidity (and thus earning positive liquidity profits), market makers are likely to face adverse price movements (and thus earn negative position-taking profits) as a consequence of dealing with informed traders. This implies that locals are likely to realise negative position-taking profits when they earn positive liquidity profits in providing a market.

Recent literature also posits that an inverse relationship may arise between the two components of market maker profitability even when the market maker is relatively informed. Madhavan and Smidt (1993) suggest that market makers may actively invest when they possess information relating to impending order flow. This implies that market makers are likely to derive positive position-taking profits when they actively build positions (and thus earn negative liquidity profits). This theory is likely to be applicable to locals in a futures market setting given the short-term nature of locals informational advantages [Silber (1984)]. The short-lived nature of locals information may mean it is necessary for a local to actively invest in order to ensure they are able to realise a return on their information.[4] Accordingly this leads to the following hypothesis:

H2: **There is a significant negative relationship between locals' "position-taking" and "liquidity" profits.**

Market conditions

In order for a local to derive position-taking profits (or losses), a movement in the "true" price of the security traded by the local is necessary.[5] The nature of the information that drives price volatility may be an important determinant of local position-taking profits. Locals are unlikely to derive position-taking profits on the basis of volatility driven by "fundamental" market information. Pirrong (1996) notes that floor traders have significantly less real time access to fundamental information in comparison to off-floor traders.[6] Similarly, Brorsen (1989) implies that locals profits are a decreasing function of the extent of fundamental information in the market. This leads to the following hypothesis:

H3: **Locals' "Position-taking" profits will be significantly lower in the presence of exogenous non-order flow related information.**

This hypothesis implies that local position-taking profitability is likely to be positively related to the presence of order-flow related information, such as order-flow imbalances. Consistent with this, Madhavan and Smidt (1993) suggest that NYSE specialists profit in the short-term from information about impending order imbalances, attained through their central position on the trading floor.

The ability of locals to realise position-taking profits from their order-flow related informational advantages is likely to be greater during times of high volume. During times of high volume, phone brokers in a floor-traded environment are more likely to "flash" orders to the pit, as opposed to carrying messages. This increases the likelihood of locals attaining pre-trade information. Furthermore, in high volume periods, locals have an increased ability to establish and close positions in order to act upon their short-term informational advantages. Consistent with this proposition, both Working (1977) and Brorsen (1989) suggest that scalping returns are highest in the most liquid contracts.[7] The proposition that locals position-taking profits increase with trading volume is also consistent with the findings of Hasbrouck and Sofianos (1993). They find that over a short- to medium-term horizon, the bid-ask spread is not the sole contributor to specialist profits. This leads to the following hypothesis:

H4: **There is a significant positive relationship between trading frequency and locals' "position-taking" profitability.**

Given that locals are more likely to participate in trade when they are informed, and can potentially generate higher profits from their information during periods of high volatility, leads to the following hypothesis:

H5: **There is a significant positive relationship between security price volatility and locals' "position-taking" profits.**

Trader Characteristics

The length of a locals inventory cycle is also likely to be a determinant of local position-taking profitability[8]. Given that locals informational advantages are theorised to relate to short-run imbalances in order-flow, locals position taking profits should be greatest on average when inventory positions are held for a short period of time. Silber (1984) found that inventory cycles of a short duration are more likely to be profitable. Hasbrouck and Sofianos (1993) find market makers have a short-term ability to generate income from a source other than the provision of liquidity. This leads to the following hypothesis:

H6: **There is a significant negative relationship between the length of an inventory cycle and locals' "position-taking" profits.**

3. Data

The SFE provided both Inter-exchange Technical Committee (ITC) and STACS trading floor data for the period 24 July 1997 to 31 December 1997. The data is provided for the four actively traded contracts on the SFE; the 90-Day BABs, 3-Year Bonds, 10-Year Bonds and Share Price Index (SPI) futures contracts. ITC data is collected by price reporters on the floor of the exchange, and contains best bid-ask quotes, transaction prices and volumes. The STACS host allocation file data includes trade and allocation records, as well as details of trader identification (buyer or seller), the time of the trade (to the nearest minute), price, volume, a unique transaction number and a customer trade indicator (CTI). CTI 1 trades are either trades made by members for outside clients (agency), or trades by local members for their own personal account. CTI 2 trades are executed on behalf of the trader's clearing member (ie, house business). CTI 3 are trades executed for the account of any other clearing member (ie, "give-up" business). In order to reconstruct "local" inventory positions, this paper focuses on CTI 1 trades, excluding trades for outside clients.

4. Method

This study develops an approach similar to Hasbrouck and Sofianos (1993) to decompose local profitability in a futures market setting. A key feature of this technique is the use of the midpoint of the bid-ask quotes to distinguish between liquidity income and income attributable to movements in the “true” price of inventory.

4.1 Measurement of liquidity profits

Prior literature, including Glosten (1987), and Stoll (1989) recognises that the bid-ask spread measures the price of liquidity. Glosten and Milgrom (1985) present a model in which the bid and ask prices straddle the price that would prevail if all traders had the same information as market makers.[9] Accordingly, this paper assumes that the mid-point of the bid-ask spread is a proxy for the "true" price of inventory. Following this, the revenue a local derives from supplying liquidity is given by the amount the buy price "B_0" (sell price "S_0") is below (above) the prevailing midpoint quote "X_0". Conversely, in demanding liquidity, the local crosses the spread and incurs a cost equal to half the spread. Given that local income is also a function of the quantity of inventory traded, local liquidity profits within each inventory cycle are given by:

$$1(b) \quad \sum_{t=1}^{n} Q_{tl}^{B} * (X_B - B_{tl}) \qquad \text{Buy-side liquidity profits}$$

$$1(b) \quad \sum_{t=1}^{n} Q_{tl}^{S} * (S_{tl} - X_S) \qquad \text{Sell-side liquidity profits}$$

where Q^S_{tl} and Q^B_{tl} refer to the quantities sold and bought by local *l* at time *t*, X_b and X_s refer to the prevailing quote mid-point at the time the purchases and sales take place, and B_{tl} and S_{tl} refer to the buy and sell prices of local trader *l* at time *t*.

4.2 Measurement of position-taking profits

Position-taking profits (losses) refer to the component of total income that arises following movements in the "true" price of inventory as proxied by the mid-point of the bid-ask spread, subsequent to a local establishing a position. The use of quote midpoints to capture income from factors other than the spread is consistent with the methodology employed in Hasbrouck and Sofianos (1993). A long (short) inventory position generates positive position-taking profits whenever there is an appreciation (depreciation) in the quote mid-point. The extent of position-taking profits is dependent on both the quote midpoint price movement, and the quantity of inventory subject to this price movement. For each transaction in a round trip, position-taking profits are thus calculated as follows:

$$\sum_{t=1}^{n} Q_{tl}^{B} * (X_c - X_B) \qquad \text{Position-taking profits for purchases} \qquad 2(a)$$

$$\sum_{t=1}^{n} Q_{tl}^{S} * (X_S - X_c) \qquad \text{Position-taking profits for sales} \qquad 2(b)$$

where X_B and X_S are the mid-points of the bid-ask spread at the time of buy and sell transaction respectively, and X_c is the prevailing mid-point at the end of the inventory cycle. The profits from all the purchases and sales within a round trip are then summed to provide the total position-taking profits derived during the round trip.

It is important to note that while position-taking profits arise whenever there is a movement in the mid-point of the bid-ask spread, they are unrealised whenever a position remains open. If an inventory cycle is incomplete at the end of a trading day, the remaining open positions are marked to market using the midpoint (X_e) of the bid and ask quotes prevailing at the end of the day, instead of the midpoint prevailing at the end of the cycle. It is thus assumed that any positions that are open at the end of the trading day are closed out at this quote-midpoint price. Kuserk and Locke (1993,

1994) note that both scalpers and day traders do not tend to hold positions overnight, and if they do the positions are typically small. This suggest that the mark to market process is unlikely to have a major impact on the analysis.

4.3 Reconciliation of the two elements of profit

Total local trader profitability (π_{Total}) can thus be expressed as a function of both liquidity and position-taking profits.

$$\pi_{Total} = \sum_{t=1}^{n} Q_{tl}^{S} * (S_{tl} - X_S) + \sum_{t=1}^{n} Q_{tl}^{B} * (X_B - B_{tl}) + \sum_{t=1}^{n} Q_{tl}^{S} * (X_S - X_c) + \sum_{t=1}^{n} Q_{tl}^{B} * (X_c - X_B) \quad (3)$$

This expression of total local profitability simplifies to the expression derived by Fishman and Longstaff (1992).[10] This is demonstrated in Appendix 2. The measure of total trader profitability outlined in this study is also consistent with the mark to market approach of calculating total trader profitability outlined in Hasbrouck and Sofianos (1993). This is demonstrated in Appendix 3.

3.4 The Determinants of local position-taking profitability

This study examines the determinants of local position-taking profitability identified in hypotheses H2 to H6 using a regression approach. The dependent variable examined is the total position taking profit in contract points for all trades for each local "*l*" during each cycle "*c*" as measured by equations 2(a) and 2(b) for inventory increasing and decreasing trades respectively (denoted PT_{lc}). In order to test hypotheses 2 to 6, the following model is estimated:

$$PT_{lc} = \alpha + \beta_1 LIQ_{lc} + \beta_2 MAC_{lc} + \beta_3 VOL_{lc} + \beta_4 VOLAT_{lc} + \beta_5 TIME_{lc} + \beta_6 OPEN_{lc} + \varepsilon_{lc} \qquad (4)$$

where;

LIQ_{lc} = Local *l's* liquidity profits during inventory cycle "*c*" (in contract points).

MAC_{lc} =	A macroeconomic dummy variable that equals 1 (0) when there is a macroeconomic announcement (no announcement) on the day of inventory cycle "*c*".
VOL_{lc} =	The log of the time-weighted volume of trade per minute in local "*l's*" inventory cycle "*c*".
$VOLAT_{lc}$ =	The standard deviation of midpoint returns during local "*l's*" inventory cycle "*c*".
$TIME_{lc}$ =	The length in seconds, of local trader "*l's*" inventory cycle "*c*".
$OPEN_{lc}$ =	An end of day dummy variable that equals 1 (0) when a local has an open position (is flat) at the end of the trading session.

Volume is time-weighted in order to scale for cycles of differing length.[11] In a manner similar to Grunbichler, Longstaff and Schwartz (1994), volatility is calculated using the squared standard deviation of midpoint returns.[12] The midpoint of the bid-ask quotes is employed to avoid problems associated with bid-ask bounce, as outlined in Venkatesh (1988). To adjust *t* statistics for the effect of heteroskedasticity, the approach outlined in White (1980) is used.

In order to analyse the relative contribution of position-taking and liquidity profits to total local income, a unit of observation needs to be specified. While liquidity profits are realised immediately at the time of each transaction, position-taking profits are not realised until an inventory position has been reversed out (closed) by an offsetting trade/(s). Position-taking profits thus cannot be computed with certainty until a local is flat (zero inventory). As such, a round-trip provides the ideal means to examine position-taking profits.[13] A round-trip (or inventory cycle) refers to the sequence of trades in which a trader departs and returns to a zero (flat) inventory position.[14]

In order to analyse local profitability by way of a round trip, it is necessary to identify the starting point (ie, when a local is flat) for each inventory cycle for each local. Both Manaster and Mann (1996) and Duffy, Forrest and Frino (1998) find that local daily inventory changes are concentrated around zero.[15] This suggests that locals commence their day with a zero inventory position, and manage their inventory in such a way as to go home "flat".[16] Accordingly, this paper assumes that each local is flat at the commencement of each trading session. If a cycle remains open at the end of a trading session, all open positions are marked to market at the closing quote mid-point.[17] On the SFE, the closing quote midpoint is analogous to the settlement price.

4. Empirical Results

Table 1 provides descriptive statistics relating to the profitability of all local trading in the Share Price Index, 90 Day Bank Accepted Bills and the Three and Ten Year Bond futures contracts.

INSERT TABLE 1

Panel A of this table reveals that the majority of all local inventory cycles are profitable. In fact, the ratio of profitable to negative cycles across all contracts ranges between 1.98 and 3.75. This is consistent with the findings in Silber (1984), who found in an analysis of a representative scalper on the New York Cotton Exchange, that 48% of inventory cycles were positive, whilst only 22% were unprofitable.

An interesting point to note from Panel A in Table 1, is that only between 6 and 13% of all inventory cycles, across all the contracts analysed, are associated with zero total profitability. In contrast, Silber (1984) found that 30% of the representative scalper's inventory cycles were "scratches".[18] These conflicting findings are likely to be reconciled by differences in the types of locals examined. Silber (1984) only examines the profitability of a representative scalper, whose mean inventory cycle is less than 2 minutes long. This paper however, examines locals as an entirety. It thus incorporates a wide variety of locals including day traders and long-term position-takers. These traders are likely to undertake inventory cycles of a longer duration than scalpers. This is confirmed later in table 6 which reports that the median length of local inventory cycle in this study is 20 minutes. As the length of a inventory cycle increases, there is reduced probability that prices will remain constant. This provides a likely explanation, for the lower proportion of scratch trades documented in this paper.

Given the perceived importance of locals as suppliers of liquidity, table 2(a) outlines local liquidity profits for the four contracts analysed.

INSERT TABLE 2(A)

Panel A of Table 2(a) reveals that across all contracts, locals do indeed appear to be net suppliers of liquidity. Panel B also illustrates that total liquidity profits are positive for all local cycles over the sample period. Locals thus appear to derive income from supplying liquidity. It is apparent however in Panel A of Table 2(b), that there are a large number of cycles with both negative and zero liquidity profits. In fact the percentage of cycles with negative and zero liquidity profits ranges between 42.2 to 53.2% of all cycles.[19] Thus in nearly half of all cycles, locals are either net demanders of liquidity, or the amount of liquidity they demand is equal to the amount of liquidity they supply. This appears to contradict prior scalper literature including Working (1977) and Silber (1984), in which locals are portrayed as passive market makers. In fact, Silber (1984) found that his representative scalper supplied liquidity in 77% of all transactions. In this paper however, locals are net liquidity suppliers in only 50% (approximately) of all cycles.

One of the main objectives of this study is to determine the manner in which locals derive their income. Table 2(b) below provides descriptive statistics for local position-taking profitability across all inventory cycles in the sample period.

INSERT TABLE 2(B)

For all contracts analysed, locals undertake more cycles with positive position-taking profits, than cycles with negative position-taking profits. Table 2(b), Panel B documents the relative contribution of total local position-taking profits to total profitability. Consistent with hypothesis 1, position-taking profits make up between 24.29 % and 76.19% of total profitability across the four contracts examined.

Panel C provides a comparison of the relative inventory cycle profitability on a per contract basis for each type of futures contract. In all cases, the mean profit on the trading floor is significantly greater than zero at the 1% level. Similarly, the median per contract position-taking profits in each inventory cycle is significantly greater than zero at the 1% level, based on a non-parametric sign and sign rank tests for three of the four contracts on the trading floor.

Table 3 documents the relationship between the locals position-taking and liquidity profits. In this table local liquidity profits are partitioned into three groups, and the position-taking profits are provided in each group.

INSERT TABLE 3

Panel A of Table 3 provides an insight into the relative distribution of position-taking profits when locals are relatively active traders (make negative liquidity profits). Locals appear to derive positive position-taking profits on considerably more occasions than they incur losses from position-taking when they are net demanders of liquidity. Specifically, depending on the contract, locals make position taking profits between 62% and 71% of trades when they demand liquidity and between 22% and 41% of trades when they supply liquidity. These results are consistent with hypothesis 2, these results suggest that when locals have information regarding the direction of a price movement, they will give up some of their liquidity profits, in order to make a trade with positive position-taking profits.

Table 3, Panel B, outlines the distribution of position-taking profits for cycles with positive liquidity profits. This panel documents that when locals are net suppliers of liquidity they are far less successful in predicting future price movements. Among the subset of cycles with positive liquidity profits, there is a higher proportion of cycles with negative position taking profitability than cycles with positive position-taking profitability.

4.2 Regression results

Table 4 below reports results analysing the determinants of position-taking profits made by locals.

INSERT TABLE 4

This model analyses the determinants of local position-taking profitability. Consistent with the hypothesis 2, there is a significant negative relation between locals liquidity and position-taking profits across all contracts on the trading floor. This supports the conjecture made by Madhavan and Smidt (1993), that market makers are active traders when they possess information relating to impending order flow. Locals appear willing to sacrifice their liquidity profits in order to profit from favourable price movements.

The coefficient on the macroeconomic dummy variable (MAC_{lc}) while negative across all contracts is significant at a 0.1 level for the SPI contract. This provides very weak evidence for hypothesis 3, that local position-taking profits are lower during periods of exogenous information arrival. The coefficient on trading volume (VOL_{lc}) is positive and significant in three of the four contracts analysed. This supports hypothesis 4 in that locals are more likely to have an order-flow related informational advantage during periods of intense trading activity. This is consistent with the finding in Hasbrouck and Sofianos (1993), that profits from sources other than the spread increase as trading frequency increases. The coefficient on volatility is positive across all contracts, and significant for the SPI and 10 Year Bond futures contracts. This finding is consistent with hypothesis 5, and supports the notion that locals tend to hold inventory positions mainly when they have information about future price movements.

The results reported in Table 4 document a negative relation between the length of a locals inventory cycle, and the per contract position-taking profitability derived in that cycle across all contracts. This relationship is significant for the 3 Year and 10 Year Bond contracts. This finding supports hypothesis 6 and implies that locals order-flow related informational advantages are short-term in nature. Silber (1984) also documents the presence of an inverse relation between total scalper profitability, and the length of the scalpers inventory cycle. Further, a dummy variable for whether the local held a position overnight is negative, indicating that locals were less likely to make a position-taking profit if they held a position overnight. This is consistent with the hypothesis that local trades are more profitable when they are able to close out of their positions in a shorter period of time.

5. Summary and Future Research Directions

This paper examines the source and determinants of local trader profitability on the Sydney Futures Exchange. The findings in this paper indicate that locals on the floor play a more complex role than is traditionally outlined in the futures market literature.

Locals are more than merely suppliers of liquidity, who derive their profits to this extent. Locals on the floor derive a substantial proportion of their total profitability from price movements favourable to their inventory position (position-taking profits). Furthermore, locals appear to be willing to demand liquidity (and sacrifice their liquidity profits), in order to realise these position-taking profits. Locals on the floor thus appear best characterised as net liquidity suppliers, who may actively trade, when in the possession of information relating to future price movements.

This paper also models the conditions under which locals are more likely to derive positive position-taking profitability. Several findings in this paper, in particular a comparison of local income on a floor and screen traded market, indicate that the ability of locals to earn positive position-taking profits is related to their presence on the trading floor. Furthermore, the extent of local position-taking profitability on the trading floor appears to increase with trading frequency and volatility, and decline with the length of a locals inventory cycle, and the extent of exogenous information present in the market. Together these findings indicate, that the ability of locals to derive positive position-taking profits arises from short-term order-flow informational advantages, that they attain as a result of their presence on the trading floor.

Several possible areas of future research stem from this paper. First, a cross-sectional examination of all locals could be undertaken, to ascertain whether locals with certain trading characteristics, are more likely to derive their income in a particular manner. Second, with the use of more detailed data, local inventory positions could be ascertained at a set point in time, and their inventory positions could be exactly followed from that point. While this procedure would generate similar results as found by this paper for the majority of all locals who go home “flat”, it would provide a useful insight into the trading behaviour and profitability of locals who hold longer-term (inter-day) positions. Finally, further work is needed to properly document the trading behaviour of locals in a screen-traded environment.

Appendix 1

a) Institutional Detail

The Sydney Futures Exchange (SFE), Australia's only futures exchange, is the largest financial futures exchange in the Asia Pacific Region, and in 1997, was ranked the eleventh largest exchange in the world in terms of contract volumes.[20] SFE's broad product range encompasses futures and options contracts written on interest rate, equity and commodity products, the four most liquid of which are the 90-Day Bank Accepted Bill, 3-Year and 10-Year Bonds and the All Ordinaries Share Price Index (SPI) futures contracts.

Trading on the SFE for the interest rate and equity contracts takes place in two distinct trading environments, these being continuous open outcry on the trading floor, and screen-trading via the Sydney Computerised Market (SYCOM).[21] For the interest rate contracts, floor trading on the SFE commences at 8.30am and ends at 4.30pm, while for the SPI contract, floor trading begins at 9.50am and finishes at 4.15pm. All contracts cease trading for lunch between 12.30pm and 2.00pm. Trading on SYCOM occurs between 4.40pm and 6.00am the next morning for these contracts (to 7.00am during the Australian Eastern Daylight Time).

b) Market Structure and Information Dissemination

Currently, the majority of trading on the SFE (approximately 85%)[22] is conducted via continuous "open-outcry" in trading pits on the floor of the exchange, in a manner analogous to the Chicago Mercantile Exchange (CME).

The manner in which information is transmitted from the floor of the exchange to traders off the floor is similar to practices on US exchanges. Each pit is occupied by a “price reporter”, who is an exchange official. Price reporters use microphones to communicate prices, quotes, and volume details to data entry clerks located on the catwalk above the trading floor. The clerks then enter the information into computer terminals, which in turn is routed to information vendors on-line in real time. This data collection system is referred to as the Price Reporting System (PRS). The manual nature of the reporting process implies that there is a lag between the time a trade or quote occurs, and the information appearing on the screen of traders off the floor. In contrast, traders on the floor directly observe trade information.

Following floor trade, a trading chit is filled out by the seller and is presented to the buying party. The chit contains all details to the trade including the Executing Trader (buyer and seller) and Executing Member (buyer and seller), trade price and volume. If the buyer agrees to the terms of the trade, the chit is initialled, submitted to the Exchange and entered into the SFE Trade Allocation and Confirmation System (STACS).

Clearing on the SFE is via STACS, an electronic network used by the Sydney Futures Exchange Clearing House (SFECH) and Executing Members for registration of each Executing Member’s respective position. When a trade is processed on STACS, an electronic record (or log) of all stages of processing is generated and stored. An example of these records, and a description of each stage of the processing is provided in Appendix No 1. Ultimately, each trade assigned to either a client account or house account.

Although the majority of trading takes place during the day on the trading floor, electronic overnight trading on SYCOM is continuing to increase in importance. SYCOM now accounts for approximately 15% of the Exchange's total traded volume [Introduction to the Sydney Futures Exchange (1998)].[23] Introduced in 1989, SYCOM has now extended SFE's total trading to 21 hours per day. This has provided domestic financial institutions with the capacity to effect real time portfolio adjustments in response to changes in offshore markets. Furthermore, it allows international investors and traders with the ability to access the SFE's full range of contracts during their normal business hours.

SYCOM operates on personal computers linked by dedicated communication lines to the SFE's host computer. SYCOM terminals, which are located in the offices of SFE floor members, allows members to electronically communicate bids and offers and thus to trade SFE futures. All market participants who trade on SYCOM receive market information directly from the SYCOM host. Therefore, on SYCOM, no traders receive information in a more timely manner, as is the case on the trading floor.

c) Market participants

There are three classes of membership available on the SFE, these being floor members, associate members, and local members. Floor members have direct access to the SFE's trading facilities, the trading floor and SYCOM, and may act as either principal (on their own account) or as an agent (for customers). Associate members are not entitled to trade on the trading floor or SYCOM, and must pass on any SFE business to floor members for execution. Local membership is designed to cater for those who wish to have access to the trading floor and/or SYCOM in order to trade on their own account. Local members compete for order flow against each other, as well as orders submitted by floor members (brokers). Locals are permitted to execute orders for other brokers on a “give-up” basis. In doing so, locals temporarily suspend their principal trading activity and trade on behalf of other brokers for a fee.

Appendix 2

A reconciliation of this papers methodology with Fishman and Longstaff (1992)

This paper expresses total profits as a function of both liquidity and position-taking profitability. This is done as follows:

$$\pi_{\text{Total}} = \sum_{t=1}^{n} Q_{tl}^{S} * (S_{tl} - X_S) + \sum_{t=1}^{n} Q_{tl}^{B} * (X_B - B_{tl}) + \sum_{t=1}^{n} Q_{tl}^{S} * (X_S - X_c) + \sum_{t=1}^{n} Q_{tl}^{B} * (X_c - X_B) \quad (1)$$

where Q^S_{tl} and Q^B_{tl} refer to the quantities sold and bought by local *l* at time *t*, X_b and X_S refer to the quote mid-point prices at which purchases and sales take place, and B_{tl} and S_{tl} refer to the local trader "*l's*" actual buy and sell prices at time *t*.

Expanding equation 1, gives rise to the following:

$$\pi_{\text{Total}} = \sum_{t=1}^{n} Q_{tl}^{S} S_{tl} - \sum_{t=1}^{n} Q_{tl}^{S} X_S + \sum_{t=1}^{n} Q_{tl}^{B} X_B - \sum_{t=1}^{n} Q_{tl}^{B} B_{tl} + \sum_{t=1}^{n} Q_{tl}^{S} X_S - \sum_{t=1}^{n} Q_{tl}^{S} X_c + \sum_{t=1}^{n} Q_{tl}^{B} X_c - \sum_{t=1}^{n} Q_{tl}^{B} X_B \quad (1a)$$

After eliminating the common terms, the following equation results:

$$\pi_{\text{Total}} = \sum_{t=1}^{n} Q_{tl}^{S} S_{tl} - \sum_{t=1}^{n} Q_{tl}^{B} B_{tl} - \sum_{t=1}^{n} Q_{tl}^{S} X_c + \sum_{t=1}^{n} Q_{tl}^{B} X_c \quad (1b)$$

Simplifying, this reduces to:

$$\pi_{\text{Total}} = \sum_{t=1}^{n} Q_{tl}^{S} S_{tl} - \sum_{t=1}^{n} Q_{tl}^{B} B_{tl} + X_S \left(\sum_{t=1}^{n} Q_{tl}^{B} - \sum_{t=1}^{n} Q_{tl}^{S} \right) \quad (1c)$$

where X_S is the midpoint prevailing at the end of the day which is used to mark open positions to market, which is analogous to the settlement price on the SFE.

This is consistent with the methodology employed in Fishman and Longstaff (1992) to calculate trader profitability.

Appendix 3

A reconciliation of this papers methodology with Hasbrouck and Sofianos (1993)

This appendix provides a reconciliation between the mark to market profitability measure employed in Hasbrouck and Sofianos (1993), and the manner in which this study computes total local profitability.

Hasbrouck and Sofianos (1993) examine specialist trading profits on the NYSE on a mark to market basis. Under this approach, the specialist profits attained over a given period t (Π_t), are a function of both the inventory level of the specialist at the beginning of the interval (N_{T-1}), and the price change that arises during that interval (P_t - P_{t-1}). Accordingly, mark to market specialist profits are given by the following equation:

$$\Pi_t = N_{t-1}(P_t - P_{t-1}) \qquad (1)$$

A specialist with positive (negative) inventory as denoted by a positive (negative) value of *"N"*, earns positive (negative) profits when there is an appreciation in prices *"P"* between times *t-1* and *t*. A similar approach may also be applied to local traders in a futures market setting.

Hasbrouck and Sofianos (1993) calculate this profitability measure for all NYSE transactions, not just the transactions in which the specialist is involved. Consequently, they compute specialist mark-to-market profits (Π_t) over all price changes (not just those involving the specialist). Over a period t = 0 ……, T, in which all price changes are represented by [(P_1 - P_0), (P_2 - P_1),……….., (P_T - P_{T-1})] and the specialists corresponding inventory positions at the beginning of these associated intervals are denoted by $N_{0,} N_{1, \ldots} N_{T-1}$, the total mark-to-market profits derived by the specialist are given by:

$$\Pi_{0,T} = N_0 (P_1 - P_0) + N_1 (P_2 - P_1) + N_2 (P_3 - P_2) + \ldots\ldots + N_{T-1} (P_T - P_{T-1}) \qquad (2)$$

This mark to market approach thus effectively defines specialist profitability in the interval 0 to T, as a function of both all the price changes during this interval, and the levels of inventory prevailing at the time of these price changes.

In order to reconcile this measure of profitability with the specification of total local profitability outlined in this study, equation 2 is rearranged to give the following:

$$\Pi_{0,T} = -N_0P_0 - P_1(N_1 - N_0) - P_2(N_2 - N_1) - P_3(N_3 - N_2) - \ldots - P_T(N_T - N_{T-1}) + N_TP_T \quad (3)$$

As aforementioned, although Hasbrouck and Sofianos (1993) are able to track specialist inventory, they consider all NYSE price changes during a given interval. When a price change between time t-1 and t does not involve participation by a specialist, the specialist inventory level will stay the same between time t-1 and time t. Thus ($N_T - N_{T-1}$) will equal zero, and the term relating to this price change, ie $- P_T(N_T - N_{T-1})$ will drop out of equation 3. Thus, the terms in equation 3 are only defined when $N_T \neq N_{T-1}$, ie, when a local (or specialist) undertakes an inventory increasing or decreasing trade.

When a local (or specialist) undertakes a purchase at time t, their inventory at time t will exceed their inventory level at the point in time immediately preceding that purchase, ie, at time t-1. Thus, for purchases by locals, (N_T - N_{T-1}) is positive and the term -P_T(N_T - N_{T-1}) in equation 4 will consequently be negative in value. This is expected given that purchases are associated with cash outflows. The difference between the inventory levels before and after the purchase is equal to the quantity purchased (Q^B). Hence for purchases, $Q^B = (N_T - N_{T-1})$. Following this, when a local undertakes a purchases, the cash outflow can also be denoted as $-P_T*(Q^B)$.

Similarly, when a local undertakes a sale at time t, their inventory at time t will be below their inventory level immediately preceding that sale, ie, at time t-1. Thus, when a local undertake a sale, (N_T - N_{T-1}) is negative, and accordingly the term - P_T(N_T - N_{T-1}) will be positive in value. This reflects the fact that sales are associated with cash inflows. The difference between a locals inventory at time t, ie, $N_{T,}$ and that locals inventory at t-1, ie, N_{T-1} thus effectively represents the quantity sold at time t. Given that (N_T - N_{T-1}) is negative, the quantity sold is "-Q^S". Thus cash inflow associated with sales is represented by $-P_T*(-Q^S)$, or $P_T*(Q^S)$.

The first and last terms in equation 3, ($-N_0P_0$ and N_TP_T) relate to a purchase and sale of a certain quantity "*N*" of inventory at prices P_0 and P_T respectively. Similarly, this paper defines the purchase and sale of *Q* units of inventory as $-Q^SS_0$ and Q^BB_T respectively. Thus, it is possible to rewrite all of the components in equation 3 in a manner consistent with the measure of total profitability employed in this paper, ie:

$$\Pi_{0,T} = -P_0*(-Q^S \text{ or } Q^B) - \ldots\ldots - P_T(-Q^S \text{ or } Q^B) \qquad (4)$$

The reconciliation between the profitability measure outlined in this paper, and that of Hasbrouck and Sofianos (1993) is well illustrated in terms of a long round trip that involves the purchase of two units of inventory (Q_X and Q_Y) at prices P_1 and P_2 respectively, and the subsequent sales of these two units of inventory at prices denoted P_3 and P_4. Under the redefined Hasbrouck and Sofianos (1993) approach outlined in equation 3, the profitability derived in this round-trip is given by:

$$\Pi_{0,T} = -Q_X P_1 - P_2 * (Q_{[X+Y]} - Q_X) - P_3(Q_Y - Q_{[X+Y]}) - P_4(0 - Q_Y) \qquad (5)$$

This simplifies to give:

$$\Pi_{0,T} = -P_1(Q_X) - P_2 (Q_Y) + P_3(Q_X) + P_4(Q_Y) \qquad (6)$$

The mark to market profitability measure outlined in Hasbrouck and Sofianos (1993) thus effectively computes profitability by subtracting the value of all purchases, from the value attained from all sales. This is consistent with the methodology outlined in this paper, which captures the value of all sales and purchases, ie,

$$\pi_{\text{Total}} = \sum_{t=1}^{n} Q_{tl}^{S} P_{tl} - \sum_{t=1}^{n} Q_{tl}^{B} P_{tl} \qquad (7)$$

[1] This definition of liquidity is consistent with Harris (1990) whereby when a trade occurs above (below) the midpoint of the spread, the buyer (seller) is considered the initiator of that trade and the seller (buyer) the supplier of liquidity.

[2] Copeland and Galai (1983) apply this to dealer markets under both monopoly and perfect competition.

[3] The SFE brochure on local membership states “Local traders perform a very important market function by … adding to the markets, liquidity” (p.2). Massimb and Phelps (1994) use the term “local” interchangeably with “market maker”. Similarly, Manaster and Mann (1996) call local traders “futures market makers”.

[4] If a local does not hold a position, then they will not be able to derive a return on their information.

[5] As distinct from a movement between the bid and the ask prices

[6] Off-floor traders typically have access to computer terminals that provide information concerning prices in other markets, market analytics and breaking news.

[7] Brorsen (1989) suggests that as volume increases, the time between transactions decreasesed, and thus the amount of fundamental information between transactions is small.

[8] The length of a locals inventory cycle simply represents the difference in minutes, between the time when a local first departs from a zero inventory position, and the time when a local is once again flat.

[9] Similarly, Massimb and Phelps (1994) note that the provision of liquidity is a service that has a cost. This cost is related to the bid-ask spread, which straddles the equilibrium price.

[10] On the SFE, the midpoint of the daily closing bid-ask spread is analogous to the daily settlement price. Thus the variable used in this paper to market open positions to market, is consistent with Fishman and Longstaff (1992).

[11] As the length of a locals cycle increases, the volume of all trade also increases, given that volume is cumulated over a cycle and over time.

[12] Volatility is also estimated using the difference between the highest and lowest prices in each locals inventory cycle, scaled by the length of the inventory cycle (similar to a measure used by Lee, Ready and Seguin (1994)). This measure yielded results consistent with the standard deviation of returns measure.

[13]Silber (1984) also notes that the most obvious unit of observation for a scalper is a "round-trip”.

[14]As noted in Silber (1984) there are several advantages associated with calculating statistics in terms of a "round-trip", rather than on per transaction basis, or by a specified interval. The primary advantage is that by analysing income in terms of a round trip, this study avoids the "LIFO-FIFO" problem of arbitrarily assigning specific opening transactions with specific closing transactions. This problem is particularly pronounced when a series of opening transactions (eg, -3, -4) is followed by a series of closing transactions (eg, +4, +1, +2), or when openings and closings are interspersed within a complete trade (eg, -3, -5, +1, -1, +4, +1, +3).

[15] Discussions with local traders reveal that their reluctance to carry overnight positions is motivated both by inventory risk, and by margin funding costs.

[16] A potential concern is that locals use other markets to hedge their inventory positions. If this was the case it would mean that locals futures positions would not accurately capture their total trading profits. Manaster and Mann (1996) note that futures floor traders do not use futures options to hedge. They are also unlikely to use the underlying market to hedge, given the high cost of doing so.

[17] This thus assumes that all positions open at the end of the trading day can be sold at that price. This assumption is not overly problematic as positions remaining open at the end of the trading day are typically quite small relative to daily trading volume. See Kuserk and Locke (1993), Fishman and Longstaff (1992), Manaster and Mann (1996) and Duffy, Forrest and Frino (1998).

[18] "Scratches" refers to inventory cycles with zero total profits.

[19] These figures are attained by summing the percentage of cycles with zero and negative profits.

[20] March 1998, Futures Industry Association and the 1998 *Australian Financial Markets Report*

[21] The SFE's wool, wheat and electricity contracts trade exclusively on SYCOM.

[22] Introduction to the SFE (1998)

[23] During the record setting trading days in June 1998, turnover on SYCOM accounted for around 20% of overall volume on the SFE. The average SYCOM session volume was 14,862 contracts in 1997-98, up from 13,205 in 1996-97: *Australian Financial Markets Report (1998).*

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Table 1
Total Local Profitability: Descriptive Statistics

This table reports descriptive statistics relating to the total profitability of all local inventory cycles in the Share Price Index, 90 Day Bank Accepted Bills, and the 3 and 10-Year Treasury bond futures contracts. They are reported separately for trading that takes place on the floor and on SYCOM, for the period from 1 July 1997 to 30 June 1998. The ratio of positive to negative cycles in Panel A is computed by dividing the number of cycles with positive total profits, by the number of cycles with negative total profits. Total local profit in Panel B is attained by summing the total profit derived across all local inventory cycles for the sample period. Panel C outlines the distribution of total local profitability in each inventory cycle on a per contract traded basis. In both Panel A and B, profit is expressed in terms of index points. Panel C reports a sign and Wilcoxon sign rank that examines whether the distribution is centred around zero. The respective *p*-values for these tests are the probabilities of a greater absolute value for the centred statistic. The t-statistic test examines whether the mean is significantly different to zero.

	SPI	90 Day BABs	3-Yr Bonds	10-Yr Bonds
Panel A: Distribution of total local profitability across all local cycles				
Cycles with positive total profit	62.1%	67.0%	70.7%	66.0%
Cycles with negative total profit	31.3%	20.1%	18.9%	23.1%
Cycles with zero total profit	6.6%	13.0%	10.4%	10.8%
Ratio : Positive:Negative cycles	1.98	3.34	3.75	2.85
Panel B: Total local profitability across all local cycles (sum of all cycles)				
Total local profit	139483	618.49	1119.9	424.91
Panel C: Total local per contract profitability per inventory cycle				
Median	0.729	0.001	0.000	0.000
Mean	0.455	0.003	0.002	0.001
25^{th} percentile	-1.000	0.000	0.000	-0.005
75^{th} percentile	2.000	0.010	0.007	0.010
Std Dev.	2.815	0.007	0.006	0.028
p-value (sign test)	0.0001	0.0001	0.0001	0.0001
p-value (sign rank test)	0.0001	0.0001	0.0001	0.0001
t-stat (mean = 0)	28.697	37.249	52.606	40.219
Number of inventory cycles	31540	6839	17595	27073

Table 2(a)
Local Liquidity Profits: Descriptive Statistics

This table reports descriptive statistics for local liquidity profits over the period 1 July 1997 to 30 June 1998, for the Share Price Index, 90 Day Bank Accepted Bills, 3 and 10 Year Bond futures contracts. Panel A outlines the frequency of cycles with positive, negative and zero liquidity profits, as well as the ratio of profitable to unprofitable liquidity profit cycles. Panel B computes the total liquidity profitability across all locals over the sample period. It is also expressed as a % of total summed local profitability. Panel C outlines the per contract liquidity profits for all local inventory cycles. Panel C reports a sign and Wilcoxon sign rank that examines whether the distribution is centred around zero. The respective *p*-values for these tests are the probabilities of a greater absolute value for the centred statistic. The t-statistic test examines whether the mean is significantly different to zero.

	SPI	90 Day BABs	3-Yr Bonds	10-Yr Bonds
Panel A: Distribution of local liquidity profits across all local cycles				
Positive liquidity profits	50.9%	57.8%	47.7%	46.9%
Negative liquidity profits	41.0%	21.1%	25.2%	37.6%
Zero liquidity profits	8.1%	21.2%	27.1%	15.6%
Ratio : Positive:Negative cycles	1.24	2.74	1.89	1.25
Panel B: Total local liquidity profitability across all local cycles (sum of all cycles)				
Total liquidity profit	84424	468.23	639.72	101.08
Percentage of total profit	61%	76%	57%	24%
Panel C: Local per contract liquidity profitability per inventory cycle				
Median	0.083	0.003	0.000	0.000
Mean	0.217	0.003	0.001	0.000
25^{th} percentile	1.648	0.006	0.005	0.004
75^{th} percentile	-0.750	0.000	0.000	-0.002
Std Dev.	1.000	0.008	0.050	0.003
p-value (sign test)	0.0001	0.0100	0.0001	0.0001
p-value (sign rank test)	0.0001	0.0100	0.0001	0.0001
t-stat (mean = 0)	23.285	40.861	18.037	20.255

Table 2(b)
Local Position-taking Profits: Descriptive Statistics

This table reports descriptive statistics for local position-taking profitability over 1 July 1997 to 30 June 1998. Panel A outlines the frequency of cycles with positive, negative and zero position-taking profitability, as well as the ratio of profitable to unprofitable cycles. Panel B computes the total position-taking profitability across all locals over the sample period. It is also expressed as a percentage of total summed local profitability. Panel C outlines the per contract position-taking profits for all local cycles. Both Panel B and C express profitability in index points. Panel C reports a sign and Wilcoxon sign rank that examines whether the distribution is centred around zero. The respective *p*-values for these tests are the probabilities of a greater absolute value for the centred statistic. The t-statistic test examines whether the mean is significantly different to zero.

	SPI	90 Day BABs	3-Yr Bonds	10-Yr Bonds
Panel A: Distribution of local position-taking profits across all local cycles				
Positive position-taking profits	50.0%	28.7%	37.6%	45.4%
Negative position-taking profits	39.1%	28.0%	26.5%	31.4%
Zero position-taking profits	10.9%	43.3%	35.9%	23.2%
Ratio : Positive:Negative cycles	1.28	1.03	1.42	1.45
Panel B: Total local position-taking profitability across all local cycles (sum of all cycles)				
Total position-taking profit	55059	150.26	480.19	323.73
Percentage of total profit	39.5%	24.3%	42.9%	76.2%
Panel C: Local per contract position-taking profitability per inventory cycle				
Median	0.000	0.000	0.000	0.000
Mean	0.238	0.000	0.001	0.001
25^{th} percentile	2.742	0.007	0.006	0.005
75^{th} percentile	-1.000	-0.001	-0.001	-0.002
Std Dev.	1.625	0.002	0.005	0.005
p-value (sign test)	0.0001	0.4222	0.0001	0.0001
p-value (sign rank test)	0.0001	0.0534	0.0001	0.0001
t-stat (mean = 0)	15.401	3.259	20.827	26.902

Table 3
Interaction between Local Liquidity and Position-taking Profitability

This table partitions local inventory cycle liquidity profits on the SFE floor into three states; negative, positive and zero liquidity profitability. For each of these states of liquidity profits, this table reports descriptive statistics for local "round-trip" position-taking profitability. This analysis is conducted for the Share Price Index, 90 Day Bank Accepted Bill and 3 and 10 Year Treasury Bond futures contracts from 1 July 1997 to 30 June 1998. Position-taking profits in each inventory cycle are calculated as the movement in the mid-point of the bid-ask quotes between when an inventory position is opened and closed. Liquidity profits in each inventory cycle are calculated as the difference between the transaction price and the quote midpoints. The ratio of positive to negative cycles is computed by dividing the number of cycles with positive position-taking income by the number of cycles with negative position-taking profitability.

	SPI	90 Day BAB's	3 Yr Bonds	10 Yr Bonds
	Panel A: Cycles with negative liquidity profits			
Cycles with				
Positive position-taking profits	62.07%	66.97%	70.75%	66.03%
Negative position-taking profits	31.29%	20.06%	18.86%	23.15%
Zero liquidity profits	6.64%	12.98%	10.39%	10.82%
Ratio: Positive:Negative cycles	1.98	3.34	3.75	2.85
Number of cycles	12944	1441	4437	10166
	Panal B: Cycles with positive liquidity profits			
Cycles with				
Positive position-taking profits	40.97%	21.16%	33.73%	37.65%
Negative position-taking profits	47.52%	39.97%	42.61%	45.08%
Zero liquidity profits	11.51%	38.86%	23.66%	17.28%
Ratio: Positive:Negative cycles	0.86	0.53	0.79	0.84
Number of cycles	16041	3950	8393	12694
	Panal C: Cycles with zero liquidity profits			
Cycles with				
Positive position-taking profits	44.97%	11.40%	13.62%	18.97%
Negative position-taking profits	26.14%	3.25%	5.08%	10.11%
Zero liquidity profits	28.88%	85.36%	81.30%	70.92%
Ratio: Positive:Negative cycles	1.72	3.51	2.68	1.88
Number of cycles	2555	1448	4765	4213

Table 4
Determinants of Position-taking Profits

This table reports the regression coefficient for the regression model detailed below:

$$PT_{lc} = \alpha + \beta_1 LIQ_{lc} + \beta_2 MAC_{lc} + \beta_3 VOL_{lc} + \beta_4 VOLAT_{lc} + \beta_5 TIME_{lc} + \beta_6 OPEN_{lc} + \varepsilon_{lc}$$

The dependent variable specified represents the average position-taking profits per contract earned by local "*l*" in inventory cycle "*c*". The model was estimated for all local inventory cycles on the trading floor for the Share Price Index, 90 Day Bank Accepted Bill and 3 and 10 Year Treasury Bond futures contracts for the period from 1 July 1997 to 30 June 1998.

	SPI			90 Day BAB's			3-Yr Bonds			10-Yr Bonds		
Variables	Coefficient	t-stat		Coefficient	t-stat		Coefficient	t-stat		Coefficient	t-stat	
Intercept	0.650143	9.931		0.001249	1.302		0.001293	2.8557		0.002779	8.2108	
LIQ	-0.438325	-44.140	*	-0.538522	-34.299	*	-0.430363	-42.42	*	-0.421604	-49.978	*
MACRO	-0.053133	-1.743	***	-0.000151	-0.846		-5.76E-05	-0.669		-5.581E-05	-0.6095	
VOLUME	0.052353	2.600	*	0.000207	2.332	*	9.371E-05	4.0989	*	1.909E-06	0.0735	
VOLAT	0.06199	2.602	*	8.356E-05	0.585		2.537E-05	0.3632		0.000229	4.5939	*
TIME	-4.342E-06	-0.805		-8.9E-09	-0.556		-1.3E-08	-2.157	**	-1.521E-08	-1.6819	***
OPEN	-0.628173	-7.931	*	-0.000548	-2.271	**	-0.000303	-2.091	**	-0.001085	-4.4095	*
Adjusted R-squared		7.40%			18.6%			12.8%			10.1%	
F-Value		348.41			182.17			283.85			414.51	
DW Statistic		1.911			1.777			1.821			1.849	

* Significant at 1%
** Significant at 5%
***Significant at 10%