Contracts for Dummies? The Performance of Investors in Contracts for Difference[#]

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Abstract

Investors now widely use contracts for difference (CFDs) to leverage and short sell underlying financial assets. We investigate the after cost performance of investors in Australian Securities Exchange listed share CFDs. We find that their market order CFDs trades earn small positive and weakly statistically significant returns at the daily horizon and lose for horizons from one month to one year due to financing costs. Market orders also net sell positions suggesting investors use CFDs for shorting opportunities. The implication is that liquidity demanders in CFDs obtain favourable execution, inconsistent with the view that CFDs are used by naive individuals.

Keywords: Contracts for difference, CFDs, individual investors, trading costs.

JEL classification: G14

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Abstract

Investors now widely use contracts for difference (CFDs) to leverage and short sell underlying financial assets. We investigate the after cost performance of investors in Australian Securities Exchange listed share CFDs. We find that their market order CFDs trades earn small positive and weakly statistically significant returns at the daily horizon and lose for horizons from one month to one year due to financing costs. Market orders also net sell positions suggesting investors use CFDs for shorting opportunities. The implication is that liquidity demanders in CFDs obtain favourable execution, inconsistent with the view that CFDs are used by naive individuals.

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1. Introduction

We investigate the after cost performance of investors in exchange listed contracts for difference (hereafter CFDs) trades. CFDs are future-like derivatives which were originally sold to institutional investors in the 1990s. Offering the ability to leverage long and short positions on underlying financial assets at low cost, CFDs now enjoy global popularity with investors. Its popularity is also seen in the growth and substantial size of the CFDs market with Rhode (2010) estimating the UK CFDs market alone being worth £602 billion in notional amounts in 2009.

The complexity and risks of CFDs, together with the aggressiveness in which over-the-counter (OTC) CFDs providers market their products to individual investors has raised the attention of financial regulators such as the Australian Securities and Investment Commission (ASIC). ASIC's concerns stem from ASIC (2010a) which finds that while CFDs investors are confident in their CFDs investing, this did not match their knowledge of CFDs including on OTC provider pricing models, financing cost calculations and the operation of stop-loss orders. The findings have lead ASIC to produce a CFDs information booklet for individual investors (ASIC, 2010b) and rigorous product disclosure statement (PDS) guidelines for OTC providers (ASIC, 2011).

Despite the size and popularity of the CFDs market and regulator concerns, to date there has been no academic research into the trading performance of investors in CFDs.[1] The lack of research on investor trading in CFDs is perhaps not surprising as the great majority of CFDs trades are made through the proprietary trading platforms of OTC providers. We overcome these data limitations by studying Australian Securities Exchange (ASX) listed CFDs. These exchange listed CFDs are a recent innovation in the CFDs market and have a similar structure to OTC CFDs with the main difference being trading transparency. As the dataset contains all trades and quotes of ASX-listed CFDs, we are thus able to shed some light on the trading performance of investors in an usually

[1] Academic research into CFDs is also rare, with the notable exceptions of Brown *et al.* (2010) and Cacciotti and Michayluk (2012)

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opaque market.

Our study also contributes to the literature of investors in derivative instruments. While there is substantial literature on individual investor performance in stocks, which generally find that they perform poorly[2], studies on derivative performance are scarce. An exception is Bauer *et al.* (2009) who study options trading on the Euronext Amsterdam by individual investors of a discount brokerage firm. Similarly to the literature on stocks, they find that individuals incur substantial losses and attribute these losses to poor market timing and trading costs. They suggest that gambling (e.g. Kumar, 2009) and entertainment value appear to be the motivators for individuals to trade options.

We find that inclusive of the bid-ask spread but before other costs, investor market order buys statistically outperform their sell CFDs trades by 5.85 basis points per day over a one day holding period, with no statistically significant performance for longer holder periods of up to one year. This is despite the bid-ask spread on CFDs being 3.46 basis points more than when trading the underlying stock. When we take into account financing costs, the outperformance mark-to-market to the close and one day holding becomes statistical insignificant and there are negative returns for holding periods from one month to a year; with these losses driven almost entirely by financing costs.

When we split investor trades into small and large trades groups, we find the short-term performance is contained in both small (less than $10,000) and large trades ($20,000 or more). This is inconsistent with investors using small trades to earn lottery like payoffs. CFDs investor market orders also outperform market orders on the underlying for up to a one week horizon suggesting better trading performance than the average market order investor. We also find that investors show no market timing ability and that they consistently hold large net sell overnight positions with statistically significant and positive dollar trading profits and financing costs earned suggesting that

[22] See for example Barber and Odean (2000) and Griffin *et al.* (2003) for the US, Oh *et al.* (2008) for Korea, Barber *et al.* (2009a) for Taiwan and Fong *et al.* (2012) for Australia.

investors use CFDs for their ability to short. Our findings suggest that liquidity demanders in CFDs are not as unsophisticated as individual investors found in the prior literature or that regulators believe.

The structure of the paper is as follows: Section 2 is the institutional background and related literature. Section 3 is the data and the methodology used in the analysis. Section 4 reports our results and section 5 concludes.

2. CFDs

CFDs[3] are a recent financial derivative where an investor agrees to pay the counterparty the difference between the current value of the contract and the value when entering the contract, with reference to an underlying security price (e.g. commodities, indices, shares). If the current value of the contract is higher than when entering the contract then the long (short) position holder receives (forgoes) the difference, and vice versa if the current value of the contract is lower. Similar to futures, CFDs provide investors with the ability to hold leveraged long or short positions over the underlying by only requiring the holder to provide a portion of the open position as margin. Also the CFDs margin account may be interest bearing depending on the broker. For example, Commonwealth Securities currently offer the Reserve Bank of Australia (RBA) cash rate less 1.5% on cash balances in CFDs margin accounts.

CFDs however differ to futures in a few ways. Firstly, they do not have an expiry date but are instead mark-to-market daily to the underlying asset's settlement price. Secondly, financing costs which are implicit in futures prices are explicit in CFDs and paid or earned daily, based on the open position at the close of trade. In addition, CFDs holders receive or forgo dividends and other corporate actions through a cash adjustment to their account in order to mirror the underlying asset. This results in financing costs and dividends not forming part of the pricing of CFDs, unlike in futures.

[3] For a more comprehensive history of CFDs and detail of its structure, see Brown *et al.* (2010).

While the leverage and explicit financing costs for CFDs appear similar to a strategy of using margin loans and purchasing shares, it is worth noting the different tax treatments of the two products in Australia, our country of study. The Australian Tax Office (2005) and Noble (2010) generally view the realised gains or losses on CFDs (including dividends and financing costs) as income or a tax deduction, respectively. This contrasts with the taxation of shares in Australia where realised gains and losses are generally treated as capital gains or losses to the investor.[4] This distinction is important as realised capital gains on shares held for more than one year are subject to a 50% discount on capital gains tax. Furthermore, financing costs in the form of interest on margin loans are tax deductible on income regardless if the gains or losses are realised throughout the financial year. As such and given the lower before tax financing costs of CFDs compared with margin loans[5], this suggests that CFDs are favourable to investors with holding periods of less than one year. We therefore focus our analysis of CFDs trade performance to holding periods of one year or less.

2.1. ASX-Listed CFDs

On 5th November 2007, the ASX became the first exchange to list exchange-traded CFDs. At nearly the same time, the ASX delisted its individual share futures (ISFs) on ASX shares.

The ASX exchange-traded CFDs are similar in specification to OTC CFDs though with some key differences. Firstly, trading occurs on the ASX trading system which uses an electronic limit order book. This differs to 'market maker model' OTC providers who provide indicative bid-ask quotes and market depth based on the underlying asset. Secondly, trades are clearing-house backed which reduces counterparty risk. The importance of such a feature to investors is clearly seen in the recent collapse of the OTC CFDs provider, MF Global. Thirdly, the ability of authorised

[4] Professional share traders who frequently trade shares are subject to income tax instead of capital gains tax, though we do not believe many individual investors would fall into this classification.
[5] ASX-listed CFDs are 1.5% p.a. above the Reserve Bank of Australia overnight cash rate throughout our sample period while margin loans are about three to four percent per annum above the RBA rate. Brown *et al.* (2010) cite margin lending rates being on average 3.4% higher over their November 2007 – December 2008 sample period.

participants to convert CFDs contracts to the underlying through the exchange for physical facility ensures that the CFDs price does not deviate too far from the underlying during intraday trade. From a pricing perspective, this provides the link between the CFDs and its underlying.

A final difference is the assignment of designated price makers (DPMs) by the ASX to provide liquidity to the ASX-listed CFDs. According to the ASX-listed CFDs glossary[6], DPMs receive incentives from the exchange based on their success in trading ASX Listed CFDs. The presence of the DPM in providing bid-ask quotes is important as this better enables us to differentiate between investor and DPM trades.

While the above differences between ASX-listed and OTC CFDs are important for CFDs market and pricing integrity, the predominance of OTC providers suggests that these features are not of high priority to investors. Indeed in a recent survey of CFDs traders in Australia, Investment Trends (2010) find that low commission and platform features were the main factors for those surveyed to switch providers. As the ASX exchange listed CFDs do have similar costs to major OTC providers in trading Australian share CFDs, there is no a priori belief that investors using either exchange listed or OTC providers would have different levels of sophistication. For example, as at the time of writing, financing costs of ASX-listed CFDs are RBA rate and +/- 1.5% for buys and sells respectively. This compares with financing costs of the RBA rate +/-2% and +/-2.5% for the two largest OTC providers, CMC Markets and IG Markets, respectively. Brokerage rates were 0.11% for ASX-listed CFDs traded through Commonwealth Securities - the largest ASX retail broker by trade volume, while CMC Markets and IG Markets both charged 0.1%. Therefore it appears the ASX-listed CFDs are at least cost competitive in comparison to its well established CFDs competitors.[7]

3. Data and Methodology

[6] See: http://www.asx.com.au/products/glossary.htm

[7] According to their respective corporate websites, CMC Markets (http://www.cmcmarkets.com.au/why-cmc/our-story) and IG Markets (www.igmarkets.com.au/cfd/about-us.html) began CFDs operations in Australia in 2002.

3.1. Data

We obtain trade and quote data on ASX-listed share CFDs and their underlying stocks from Thomson Reuters Tick History (TRTH) through the Securities Industry Research Centre of Asia-Pacific (SIRCA). Daily settlement prices and returns of the underlying stocks and index returns are obtained from the SIRCA Core Research Database (CRD) and TRTH respectively.

We use the trade and quote data of all 71 listed share CFDs[8] from when exchange-traded CFDs were first listed on the ASX from 5 November 2007 to 30 June 2010. The choice of underlying stocks for CFDs is made by the ASX and represent the most liquid ASX stocks.

3.2. Summary Statistics

Table 1 presents descriptive statistics for trades on ASX-listed CFDs and their underlying stocks from 5 November 2007 to 30 June 2010. Statistics are shown for the entire sample as well as for a select sample of individual CFDs and their underlying stocks.[9] As CFDs only trade during ASX continuous trading hours, summary statistics for underlying stocks omit trading during the opening and closing auctions.

Trading volume in CFDs pales in comparison to the underlying stocks as seen in columns two to four of Table 1 Panel A which report the mean, median and standard deviation of the daily dollar trade volume. For the entire sample, the average CFDs trading volume is $7.8 million per day while trading on the underlying stocks is 382 times larger at almost $3 billion per day. The light volume in CFDs is also seen in individual stocks. For example, BHP stock has 350 times larger trading volume than its CFDs. The lack of volume indicates that there is still much room for the listed CFDs market to grow.

Perhaps more surprising are the average trade sizes of CFDs and underlying stocks as seen in the last three columns of Table 1 Panel A. The average daily trade size is $22,269 for CFDs and

[8] We remove the Telstra Instalment Receipt from our analysis as we do not have reliable returns data on it.
[9] The full sample of individual CFDs summary statistics is available from the authors upon request.

larger than the $15,068 for underlying stocks. This suggests that algorithmic trading is dominant in the underlying stocks, despite its larger overall volume. The smaller underlying stock trade sizes also occurs in individual stocks, with Cochlear showing the largest trade size discrepancy with an average daily CFDs trade size of $23,514 compared with the underlying stock of just $3,482. The lower medians for all CFDs and stocks suggests that most trade are smaller than the average size.

[Insert Table 1 Here]

While the lower trading volume in CFDs would deter institutional investors, the larger trade size in CFDs than in the underlying stock requires some explanation. Firstly, small investors such as retail investors incur minimum brokerage costs[10] and therefore cannot cheaply break up trades as easily as institutional investors. Secondly, margin requirements mean investors are only required to put up at most 20 percent of the position as margin.[11] This means at most $4,454 is required as margin for the mean CFDs trade of $22,269 as we report in Table 1 Panel A. The lower margin and minimum brokerage therefore creates incentive for the investors to make larger trades where possible. Further evidence of CFDs trades being larger than in the underlying stock is shown in Table 1 Panel B, where we show the percentage distribution of all CFDs and underlying stock trades in five trade size groups. The trade size cut-offs are nominal amounts. By count, the majority of CFDs trades are $20,000 or less while in the underlying stock, about 60 percent of trades are less than $5,000. However by trade value, about 56 percent of CFDs trades are in trade sizes between $10,000 to $50,000 while in the underlying stocks over 57 percent of trade value are in trade sizes greater than $50,000. This suggests that trading in CFDs is mainly focused in mid-sized trades while underlying stock trades are either handled in small trades or completed using very large trades.

As further evidence that the CFDs market has less algorithmic trading than the underlying, for every trading day and every CFD/underlying stock, we report the difference in the daily average

[10] For example discount retail broker Commonwealth Securities advertises CFDs brokerage of the maximum of $14.95 or 0.11% of trade value as of time of writing.
[11] In practice, ASX-listed CFDs margin requirements are calculated in dollars per contract rather than in percentage terms as with OTC CFDs.

mean and median time for a quote change and the daily number of quote changes. A quote change is when the best bid or ask price differs from the prior bid and ask on a day. If algorithmic trading is prevalent in CFDs, then we should find that the quote change time and number of quotes to be statistically quicker and more frequent than the underlying. This is because CFDs are a derivative of the underlying and so it is potentially possible for algorithms to arbitrage between the two using limit order management. Indeed Foster and Liu (2011) Table 1 shows that there is vastly more order activity (and also vastly less trading) in National Australia Bank warrants than in the underlying stock for periods from 2001 to 2010 which they put down to algorithmic trading. In addition, the reported wider spreads in CFDs than underlying stocks by Brown *et al.* (2010) would also allow for more movement of the bid-ask spread on CFDs by algorithmic traders. We report our findings in Appendix 1 for all 71 CFDs as well as daily average measures across all stocks. We find that across all stocks, the mean and median average daily quote change in CFDs is 30.15 and 12.16 seconds slower than the underlying, respectively, and statistically significant at the one percent level. There are also on average 374.72 less quote changes by CFDs per day. Across individual stocks we find no stock that has statistically significant faster quote changes or more quote changes per day than the underlying. Combined with our evidence in Table 1 of the larger trade sizes and lower volume in CFDs than in the underlying stock, this suggests that there is less evidence of investors using algorithmic trading in CFDs than in the underlying.

3.3. The Market Orders of Investor Trades

In order to analyse investor performance, we must first infer which trades are made by investors and whether they are on the buy or sell side of the trade. This is because our data does not identify the trader. Our strategy is to analyse buyer and seller initiated trades (market orders) as investor trades due to institutional features of the CFDs market and prior literature on limit order book markets.

Our first basis for using market orders is the presence of the designated price maker (DPM)

approved by the ASX in the CFDs market. As mentioned in Section 2.1, the ASX states that the role of the DPM is to 'provide liquidity in the ASX Listed CFD market.' DPMs also 'receive incentives from the Exchange based on their success in trading ASX Listed CFDs.' Brown *et al.* (2010) p. 1115 also note that DPMs are 'rebated the Open Interest Charge (OIC) as part of incentive arrangements with the ASX, face very low transaction fees, and as financial institutions should be able to access short-term interest rates close to the RBA target cash rate'. The specific role and numerous advantages of the DPMs over other investors suggest that DPMs are a major limit order/liquidity provider in the CFDs market.[12] While it is possible that the DPM may use buyer or seller initiated trades to correct mispricing between the CFDs and its underlying asset, Brown *et al.* (2010) find that mispricing within reasonable transaction cost bounds is rare in ASX-listed CFDs and only occurs in illiquid CFDs. For this reason, focusing on market orders is a cleaner measure of investor performance as limit orders will contain both DPM and other investor trades.

A second institutional feature is that the CFDs market during our sample period used SYCOM (Sydney Computerised Overnight Market, now ASX Trade24) while the underlying stock market used the separate ITS (Integrated Trading System, now ASX Trade). Brown *et al.* (2010) suggests that the lack of integration between the two systems makes it difficult to instantaneously arbitrage between platforms due to latency issues. The result is that other algorithmic traders are deterred from entering the CFDs market. Our results on the slower quote changes in the CFDs market in Appendix 1 also supports the lack of algorithmic trading.[13] As such, market orders appear to be exclusively used by investors without the same algorithmic trading capabilities as participants in the underlying.

While the above makes it clear that market orders are used by investors, the use of limit orders also by investors may make it difficult to draw inferences about performance given that investors are on both sides of the trade. Indeed Brown *et al.* (2010) Table 2 show that during their

[12] It is also worth noting that in OTC CFDs using a 'market-maker' platform that the investor is unable to provide limit orders and instead must trade against the CFDs provider's bid and ask quotes.
[13] ASIC (2010a) also find little evidence that institutional investors make use of CFDs in Australia.

sample period that 19.31 percent of CFDs trades are immediately followed by a trade in the underlying of the same size suggesting DPM hedging. As Brown *et al.* (2010) note, 19.31 percent is a conservative estimate of DPM trading as it does not take into account for split trades in the CFDs or the underlying market. As such there may be a portion of limit orders that are executed by investors and not the DPM. We thus rely on prior literature on limit order books to show that looking at market orders is a reasonable proxy for investor performance.

Market orders are used for either trade urgency (e.g. Goettler *et al.*, 2009, Roşu, 2009) or informed trading (e.g. Menkhoff *et al.*, 2010). The use of market orders is therefore a conscious and realised trading decision by the investor to pay the bid-ask spread for immediate execution. Whether they are able to recuperate such costs from trading performance is an empirical issue. Also as the spread is wider on CFDs than the underlying as Brown, Dark and Davis (2010) show, investor face an even larger hurdle in choosing to trade the CFD rather than the underlying when using market orders.

In contrast, the trade performance of limit order trades only partially measures skill, and this is even more apparent in CFDs due to the wider spread. Firstly investors may use limit orders to provide liquidity, with the cost of such trading being that they bear non-execution risk and monitoring costs (e.g. Hollifield *et al.*, 2006). In other words, whether a market order hits them is not determined by their trading skill. Secondly even if limit orders are hit by an informed market order, the wider spread in the CFDs allows one to earn part of the spread by taking a market order in the underlying (e.g. limit buy executes and immediately conduct a market sell in the underlying at a higher price). This hedging ability means a CFDs limit order trade is not necessarily the mirror image of a CFDs market order. The performance of CFDs market order trades however is much clearer as there is no hedging opportunity available to these investors.

The literature also finds that individual investors, who are purported to be unsophisticated and users of CFDs, using market or aggressive orders have poor short-term trading performance. (e.g. Barber *et al.*, 2009a; Linnainmaa, 2010; Fong *et al.*, 2012). Linnainmaa (2010) shows that the

market orders of individual investors earn negative returns to the closing price on the day regardless if the trade is against individuals or institutions and show that they are particularly more negative against institutions. Fong *et al.* (2012) provides further evidence that the market orders of individual investors earn negative returns on the trading day and beyond suggesting that the spread is a considerable trading cost to them. In particular, for trades of discount retail brokers they find negative and statistically significant returns extending to 20 days. We therefore expect to find negative short term returns for our sample of market orders if investors are unsophisticated.

3.4. Determining Market Orders

To determine whether the trades are buyer or seller initiated, we first match every trade to the prevailing bid and ask quotes using the methodology of Ellis *et al.* (2000) and using a zero-second time delay for trades as Henker and Wang (2006) suggest.

Our use of small signed trades to identify investor trades bears similarities to the methodology (but not the exact same rationale) that Hvidkjaer (2008) and Barber *et al.* (2009b). While Barber *et al.* (2009b) cite algorithmic trading and the breaking up of institutional trades for ending their analysis at 2000, our CFDs sample should not suffer such a problem given the lack of algorithmic trading of the CFDs market as aforementioned.

3.5. Measuring Investor Performance

To measure investor performance using the signed trades, we follow a methodology similar to Barber *et al.* (2009a) in using buys minus sells portfolios except that we do not net off buy and sell trades and instead measure returns from the traded price rather than from the day's close.[14] This allows us to calculate a mark-to-market return from the traded price. The methodology we use is as follows:

[14] Chen *et al.* (2000) also use a similar methodology in investigating buys minus sells trade performance though they look at U.S. mutual fund trades as inferred by their quarterly change in stock holdings.

1. Every day, buy (seller) initiated trades are placed into the buys (sells) portfolio.

2. For all buy trades, the abnormal daily return for the buy portfolio on day *t* over holding period *h* is calculated as:

$$AR_{b,t}^{h} = \sum_{i=1}^{n} \frac{Vol_{i,x,t} \times P_{i,x,t} \times R_{i,x,t}^{h}}{\sum_{i=1}^{n} Vol_{i,x,t} \times P_{i,x,t}} - R_{m,t}^{h} \quad (1)$$

Where $Vol_{i,x,t}$ is the number of CFDs buy contracts opened for trade *x* for CFDs *i*. $P_{i,x,t}$ is the actual traded price of the CFDs. $R_{i,x,t}^{h}$ is the next *h* day's return of the CFDs' underlying stock from the traded price where *h* = 0, 1, 5, 20, 127 or 254 days. These intervals correspond with the return to the day's closing settlement price, next day, weekly, monthly, half-yearly and yearly returns. Using different holding periods of buys minus sells portfolios when the actual holding period of investors is unknown is commonly used in the literature as a way to measure whether short or long term trading performance exists (e.g. Chen *et al.*, 2000; Barber *et al.*, 2009a; Fong *et al.*, 2012). $R_{m,t}^{h}$ is the return of the S&P/ASX 200 accumulation index over the next *h* days for holding periods of 1 day or more.[15] An analogous measure is made for sell trades in the sell portfolio, $AR_{s,t}^{h}$. We also use the market capitalisation value weighted return of only the underlying stocks of CFDs as an alternative benchmark.

3. The buy portfolio is subtracted from the sell portfolio to form the daily buys minus sells portfolio return, BS_{t}^{h} as:

$$BS_{t}^{h} = AR_{b,t}^{h} - AR_{s,t}^{h} \quad (2)$$

We then calculate the daily average $AR_{b,t}^{h}$, $AR_{s,t}^{h}$ and BS_{t}^{h} measures to estimate investor trade performance. As such a positive and statistically significant average BS_{t}^{h} return means that

[15] For trade to the settlement price we do not adjust for the market index as this introduces noise into the return measure.

investor buy trades outperform their sells, inferring superior trading performance over a given holding period. In addition, a positive (negative) and statistically significant $AR_{b,t}^{h}$ ($AR_{s,t}^{h}$) measure would suggest investors are better at buying (selling) CFDs compared with holding the market portfolio. For robustness, we also use characteristic-based benchmark alphas following Pinnuck, 2003.

3.6. Incorporating Bid-Ask Spreads and Financing Costs

We take into account the transaction costs of trading CFDs through measuring the bid-ask spread and financing costs. As we use the traded price of buyer or seller initiated trades for our holding period return measures above, we already implicitly incorporate the bid-ask spread. However we also separately measure the bid-ask spreads of CFDs to estimate the magnitude of CFDs trading cost. For example Brown *et al.* (2010) find that the average time-weighted spreads on share CFDs to be about 0.50 percent higher than the underlying stock and therefore are not trivial.

To estimate the daily value-weighted bid-ask spread, we use the effective percentage half spread calculated as:

$$Spread_{i,t} = \sum_{x=1}^{n} \frac{Vol_{i,x,t} \times p_{i,x,t} \frac{\left|p_{i,x,t} - m_{i,x,t}\right|}{m_{i,x,t}}}{\sum_{x=1}^{n} Vol_{i,x,t} \times p_{i,x,t}} \quad (3)$$

Where $Vol_{i,x,t}$ is the number of CFDs positions opened in trade x, $p_{i,x,t}$ is the traded price and $m_{i,x,t}$ is the prevailing midpoint quote as used to sign trades. A similar daily spread measure is also made for the underlying stocks. The daily spread on the buy or sell portfolios is estimated as the CFDs trade value weighted daily spread of the individual CFDs. An estimate of the spread if instead the CFDs trades were made on the underlying stock is calculated as the CFDs trade value weighted daily spread on the underlying individual stocks. This allows us to compare the trading costs on the CFDs to the underlying stocks.

Financing costs are in the form of a benchmark contract interest rate charge and the Open

Interest Charge (OIC). Financing costs are charged or earned daily on the value of the open CFDs position at the market's close. Contract interest plus OIC are paid if an investor holds a CFDs long position while contract interest less OIC is earned if an investor holds a short position in the CFDs overnight. The OIC is fixed at 1.5% p.a. for both long and short positions throughout the sample period. The benchmark contract interest rate is the Reserve Bank of Australia target overnight cash rate. As such, the OIC makes the calculated buys minus sells portfolio costly as in essence investors will lose three percent per annum (1.5% on each side) when holding similarly sized buy and sell positions. While the inclusion of financing costs do not lend CFDs to the formation of zero investment arbitrage portfolios, pairs trading is often touted as a strategy for CFDs investors (e.g. Dunn, 2009). As such it is important to take into account financing costs for the buys minus sells portfolio. Note also that by estimating the after financing cost performance for buys and sells portfolios separately, we may be overestimating financing costs as some buy and sell trades may be made by the same investor on the same day which will net off.

An interesting feature of CFDs financing costs is that it is 'prepaid' if the position remains open at the market's close, rather than on the next trading day. As such if an investor holds a long position at Friday's close and the next trading day is Monday, then he will pay three days' worth of financing costs at Friday's close. Thus we calculate the CFDs financing charge, $F_{\delta,t}$, as:

$$\boldsymbol{F_{\delta,t} = \sum_{t=0}^{h} \frac{(R_{f,t} + \delta \times 0.015)d}{days\ in\ year}} \quad (4)$$

where $R_{f,t}$ is the RBA overnight cash rate, δ takes the value of 1 for the buy portfolio and -1 for sell portfolio and d is the number of days between the current trading day and the next trading day. $F_{\delta,t}$ calculated separately and subtracted from the buy and sell portfolios.

4. Results

4.1. Bid-ask Spread of CFDs Trades Compared with Underlying Stocks

As we identify investors trades as those using buyer or seller initiated trades, they must

always incur the bid-ask spread cost. The bid-ask spread is implicitly captured in our holding period return measures as we measure returns from the initiated trade, rather than the settlement price. As such we first explicitly measure the bid-ask spread of CFDs trades to investigate the magnitude of trading costs. Table 2 Panel A reports the average daily effective percentage spread of the investor buy, sell and buys minus sells portfolios for CFDs or for if the underlying stocks were traded instead. Buys and sells incur only the effective half-spread while the 'Buys–Sells' portfolio adds both spreads together as if the buy and sell portfolios were traded concurrently.

[Insert Table 2 Here]

CFDs buys (sells) incur half-spread costs of 0.0964% (0.0973%), while the underlying stocks on average incur lower spreads of 0.0796% (0.0799%). The spread difference between the CFDs and underlying stocks 'CFDs is statistically significant at the one percent level. The total CFDs spread of 0.1936% is also much lower than the average 0.7293% that Brown *et al.* (2010) report. One reason for our lower spread is that Brown *et al.* (2010) use time-weighted spreads where spreads may be wider due to a lack of liquidity over the day. Another reason is that their sample ends in December 2008 when CFDs spreads were unusually high. As such it appears that investors do attempt to trade CFDs when spreads are narrower.

4.2. Investor Market Order Trade Performance before Financing Costs

For individuals to show stock picking ability in CFDs, the CFDs that they buy must outperform the market while the stocks that they sell underperform the market. In addition, the stocks that they buy must also outperform the stocks that they sell in a statistical manner.

Table 2 Panel B reports daily average returns of investor buy and sell trade portfolios for holding periods to the day's settlement price, next day, week, month, half year and year, inclusive of the bid-ask spread but before financing costs.

We find evidence that investor buys minus sells trades outperform after one day, though no statistically different performance from zero for all other holding periods. For trades to the

settlement price, we find that buys outperform sells by 2.16 basis points per day, though only weakly statistically significant with a *t*-statistic of 1.54. After the next day, buy trades outperform sell trades by 5.85 basis points per day, statistically significant at the five percent level, suggesting that investors have some intraday and daily stock picking ability. The stock picking ability appears to be concentrated in buy trades, with the buy trades portfolio after one day earning 10.12 basis points above the market return per day, statistically significant at the five percent level. Note that while 5.85 basis points per day may seem small, it amounts to an annualised return 16.01 percent[16]. If we further assume a 20 percent margin on opening CFDs positions separately for buy and sell positions (and therefore 20 percent margin on each side), this amounts to a 40.02 percent gain per year. These estimates however are before financing costs and brokerage which we will consider in the next section.

For intervals beyond one day however buy returns are not statistically different to sell returns. In particular for monthly intervals and above, buys actually underperform sells though the return is statistically insignificant. It is also interesting to note that buy portfolios held at half-year and yearly holding period buys earn 2.51 and 3.67 percent respectively above the S&P/ASX 200 market return, statistically significant at the one percent level, which suggests stock picking ability for buys. However their respective sell portfolios earn even higher, and statistically significant returns, of 2.62 and 3.70 percent above the market suggesting that CFDs sold earn above market returns and therefore have poor selling ability.

4.3. Investor Market Order Trade Performance after Financing Costs

A further consideration in trading CFDs are financing costs, which will make buy trades perform worse and the sell trades perform better. Financing costs will also negatively (positively) affect the buy (sell) portfolio more for longer holding periods as the financing costs are on a daily basis. As such, while we show poor stock picking ability in sell trades over half-year and yearly

[16] $(1.000585)^{254}-1= 0.1601$

holding periods, financing costs earned on sells may reduce it. Table 2 Panel C reports the performance of investors after incorporating financing costs. The settlement price holding period results are the same as in Table 2 Panel B as financing costs are not incurred intraday and are reported for completeness.

We find that the buys minus sells portfolios across all holding periods are weaker to our before cost results, with the outperformance at the day holding period no longer being statistically significant. At the month, half year and year holding period the buys minus sells portfolio are negative and statistically significant when accounting for financing costs. The reason is due to the 1.5% open interest charge that both buys and sells incur which increases the month, half year and year holding period losses by 0.25%, 1.5% and 3% respectively.

Separately looking at the buy and sell portfolios, we find that the financing costs that the buy portfolio incurs make holding period returns one month or more negative and statistically significant for the month and yearly holding periods. At the daily holding period the buy outperformance remains positive though is statistically weaker than in the before financing cost results. For the sell portfolio, the financing costs that are received are not enough to make the portfolios statistically outperform the market (i.e. negative excess market returns). For example at the half yearly holding period, the return is 1.02 percent above the market statistically significant at the one percent level while the yearly holding period return is 0.72 percent above the market and statistically insignificant. Returns for the monthly holding period and below are also statistically insignificant.

For further robustness, we also document the after financing cost performance using alternative benchmarks in Appendix 2. Appendix 2 Panel A uses the value weighted returns of the underlying stocks and using characteristic-based alphas following Pinnuck (2003) in Appendix 2 Panel B. The buys minus sells portfolio results are consistent with Table 2 Panel C, except using the Pinnuck alpha the week holding period return is also negative and statistically significant at the one percent level. The benchmarks however differ in the attribution of the losses with the Pinnuck alpha

attributing the losses to the positive and statistically significant alpha of the sells portfolios for the half year and year holding period whereas the underlying stock benchmark attributes it to the underperforming buy portfolio.

While the positive and statistically insignificant short term performance after financing costs appears unremarkable, it compares favourably to the negative and statistically significant returns of individual investor market orders in prior literature. For example Linnainmaa (2010) finds Helsinki Stock Exchange individual investor market order returns from transaction price to the closing price of -0.361 percent (statistically significant at the one percent level) while Fong *et al.* (2012) report market order discount retail broker trades on the ASX earning -0.307 percent (statistically significant at the one percent level) using the same holding period.

Overall, we find that after financing costs and across holding periods of over a month negative abnormal trading performance with sell portfolio financing costs being not enough to allow the trades to outperform the market.

4.4. Small vs. Large Market Order Trades Performance

In this section we investigate whether smaller trades have worse trading performance than larger trades. In the absence of algorithmic trading to break up trades in the CFDs market, we expect that if investors are less sophisticated, they would tend to place smaller trades in hopes of larger returns, akin to lotteries (e.g. Kumar, 2009). Consequently we expect to see that small trades have worse performance than large trades.

In order to investigate whether small trades perform worse, we first separate individual trades into three trade size groups and then measure performance using the buys minus sells portfolio methodology. The trade size groups are in three broader groups than those we use in Table 1 Panel B: less than $10,000 (group 1), greater than $10,000 and less than or equal $20,000 (group 2) and greater than $20,000 (group 3). We decide to use the broader sorts to ensure enough trades are in all groups daily and in recognition that margins in CFDs means the investor capital

requirement is less than when trading shares. For example a trade size group 1 trade of $15,000 would require at most 20% or $3,000 up-front in margins.

Table 3 reports investor performance after financing costs for the trade size groups. We find that for small trades (group 1) buys minus sells portfolio incur positive and statistically significant returns after one day, at the ten percent level. Mid-sized trades are the worst performing group with negative and statistically negative and statistically significant buys minus sells portfolio after one week, at the ten percent level. In contrast, large trade groups show positive and statistically significant (at the ten percent level) buys minus sells returns at settlement and after one week. Across all groups buys minus sells are negative and statistically significant at the half year and year holding period suggesting financing costs are a significant factor in trading in the medium term. In unreported results, we also find that the return difference of buys minus sells portfolios between small and large trades are not statistically significant across all holding periods. This suggests that the superior performance at the settlement day and daily holding period in Table 2 Panel B is mainly driven by small and large trades. Our results are therefore inconsistent with small trades being used by unsophisticated investors though consistent with large trades being made by more sophisticated investors.

[Insert Table 3 Here]

4.5. CFDs vs. Underlying Stock Market Order Trade Performance

Another method of determining the performance of market order CFDs trades is to compare their buys minus sells market order trade performance with that of market order trades on the underlying stock. It should be noted that the underlying stock is predominantly made up of institutional trading as ASX CFDs are derivatives of the largest stocks on the ASX. Indeed, Fong *et al.* (2012) in Table 3 show that purely institutional brokers on the ASX dominate trading in the top 50 stocks and 51st to 300th largest stocks with a turnover market share of 63.7 and 54.2 percent

respectively.[17] In addition and as noted prior, the underlying stocks also have lower spreads further reducing trading costs compared with CFDs. These factors may allow market orders on the underlying to perform better than trades on CFDs.

Table 4 reports the buys minus sells portfolio market order trade performance before financing costs of CFDs compared with the underlying stocks. Panel A reports raw returns[18] while Panel B reports Pinnuck alphas. We only compare before financing costs (but after bid-ask spread) performance as we do not know the financing costs of investors in the underlying stocks. Our buys minus sells results in Table 4 Panel A for CFDs are the same numbers reported in Table 2 Panel B column 4.

In comparison to CFDs trades, underlying market order trades perform worse and statistically so for up to a one week holding period for both benchmarks. As can be seen, in Table 4 Panel A, the market order trades for the underlying stock earns -19.98 basis points from the trade to settlement price and the losses slightly lower to -26.32 basis points at the year holding period, both statistically significant at the one percent level. Using Pinnuck alphas in Panel B, the losses are nearly monotonically declining with increasing holding period and statistically significant except for the year holding period where the alpha of -6.07 basis points is statistically insignificant. The results indicate that market order trades in the underlying lose due to the spread on the trading day and this loss is not recovered for up to at least a year holding period using raw returns and are recovered at the one year holding period based on the Pinnuck alpha.

When we compare the return difference between CFDs and the underlying in the 'CFDs–Underlying' column, we find that CFDs trades outperform the underlying by 22.14 basis points, statistically significant at the one percent level. This outperformance persists for at least one week and becomes statistically insignificant using longer holding periods for both return measures. Our findings suggest that CFDs investors have better trading performance than their counterparts in the

[17] If we mixed brokers (those that service retail and institutions) the shares increase to 91.4 and 87.8 percent, respectively.
[18] There is no need to use a market benchmark as the buys minus sells portfolio cancels out the market return.

underlying stock despite wider spreads and seemingly a lack of institutional investor participation. Also, the main driver of the underlying stock investor underperformance is the spread, which CFDs investors are able to recuperate through better performance. These results therefore provide further evidence that the average investors in CFDs are actually better than the average investor in the same stocks.

[Insert Table 4 Here]

4.6. Market Timing

While the above results show that investors have no positive trading performance after financing costs except at the intraday or daily holding period, this section investigates whether investors are instead market timing trades by buying (selling) prior to market upturns or downturns. For example, on a given day, CFDs investors may be bullish by net buying high beta stocks while on another day be bearish by selling high beta stocks and/or buying low beta stocks.

In order to measure market timing returns, every day, we calculate the past year's market capital asset pricing model (CAPM) beta as a proxy of the individual CFDs' underlying stock's market loading. Buy trades have a positive beta exposure while sell trades have a negative beta exposure. We then calculate the daily aggregate beta as the trade value-weighted beta of all trades. The daily aggregate beta is then multiplied with the market (S&P/ASX 200 Accumulation Index) return over the subsequent day, week, month, half-year or yearly holding periods to calculate the market timing return. We then calculate the excess market timing return as the market timing return less the risk-free rate using the RBA overnight cash rate as the proxy.

Formally, the daily excess market timing return at a given holding period *h* as:

$$EMT_t^h = \sum_{i=1}^{n} \frac{NetVol_{i,t} \times P_{i,t} \times \beta_{i,t}}{\sum_{i=1}^{n} |NetVol_{i,t}| \times P_{i,t}} R_{m,t}^h - R_{f,t}^h \quad (5)$$

where $\beta_{i,t}$ is stock *i*'s market beta estimated using the past year's stock and market return (using the S&P/ASX 200 accumulation index return). $R_{f,t}^h$ is the risk-free rate return over holding period *h* using the RBA overnight cash rate.

Table 5 reports our excess market timing results before and after financing costs across the different holding periods. In unreported results, we find an average daily CFDs trade-weighted beta of investors over the sample period of -0.067 (*t*-stat of -3.88) suggesting that on average investor market order trades were slightly short the market. Before costs, returns across all holding periods earn below the risk-free rate however this is only statistically significant at the half year and year holding periods at the one percent level. Incorporating financing costs, holding period returns are more negative and have stronger statistical significance from the monthly period onwards. For example investors earn a monthly holding period return after financing costs of 0.29 percent below the risk-free rate (statistically significant at the five percent level) and yearly holding period return after financing costs of 4.92 percent below the risk-free rate per year (statistically significant at the one percent level). The results suggest that investors are poor market timers in the medium term, even before financing costs but no statistically significant market timing performance at shorter intervals.

[Insert Table 5 Here]

4.7. Investor Dollar Profits

This section investigates the dollar profits earned by investors. Our prior results using returns based measures found that individuals had some evidence of stock picking ability at the intraday and daily holding periods. There are however some shortcomings in using trade based buys minus sells percentage return measures. Firstly, the returns measure does not take into account the net positions held overnight but instead assumes that trades are closed within plausible holding periods that a CFDs investor would use as we do not have information on when a particular investor closes their position.

Secondly, percentage return measures mask the fact that each day will have different trading volumes. For example if investors earn large negative returns on high trading volume days and earn large positive returns on low trading volume days, the daily average return would be close to zero

despite there being an average daily loss in dollar terms.[19] A similar argument may be made with the buy and sell trade portfolios not being of equal size every day and therefore the buys minus sells percentage portfolio return may not be an accurate reflection of the actual gains and losses to investors.

To overcome these two problems we measure trading dollar profits, dollar profits of overnight positions held and their related dollar financing costs. We are able to do this as our sample period begins when share CFDs are introduced, and therefore we can estimate the net positions which remain open daily. While investors may be able to close positions using the exchange for physical facility, we look at the exchange for physical (EFP) volumes traded during our sample period from the ASX EFP website[20] and find no exchange for physical trades on share CFDs occurred during our sample period.

We calculate the dollar trading profits in three parts: the mark-to-market profits of trades on the day to the day's close, the mark-to-market profits of positions held overnight to the day's close and financing costs of positions held overnight. As per the returns based measures, investor trades are identified as those that are buyer or seller initiated. Formally, the total daily profits are calculated as:

$$Total\ Dollar\ Profit_t = \sum_{x=1}^{z} TVol_{i,x,t}\left(P_{i,t} - P_{i,x,t}\right) + \sum_{n=1}^{i} OVol_{i,t-1}\left(P_{i,t} - P_{i,t-1}\right) - \sum_{n=1}^{i} OVol_{i,t} \times P_{i,t}\left(R_{f,t} + \delta \times 0.015\right)d_t/days\ in\ year_t \quad (6)$$

where $TVol_{i,x,t}$ is the signed volume in trade x for stock i and $OVol_{i,t-1}$ is the overnight signed volume of positions held in stock i on the prior trading day (adjusted for capitalisation adjustments on day t). The first right hand side term in equation 6 measures the mark-to-market profits of the daily trades; the second term measures the mark-to-market profits of overnight positions and the third term measures financing costs of overnight positions as we use in equation 4.

[19] Moeller *et al.* (2005) make a similar point with the very large dollar losses of bidder company stock returns following acquisitions in 2000-2001 despite the abnormal percentage returns being relatively small to other years.
[20] http://www.asx.com.au/products/exchange-for-physicals.htm.

We report the daily dollar profits of investors in Table 6, as well as the average daily value traded and total overnight positions held, separately for buys and sells (trades or net overnight positions). We find positive and statistically significant mark-to-market profits for the daily trades and financing costs, however profit from overnight positions and total profit is not statistically different to zero. The average daily trade value is slightly larger for sells of $3.31 million compared with buys of $3.09 million. The higher sell trades daily contributes to the much larger daily average net sell positions held by investors of -$120.88 million compared with net buy positions of $11.70 million. The large net sell positions naturally contributes to the positive total financing costs earned of $12,664 per day.

[Insert Table 6 Here]

In comparison, total mark-to-market trade profits are modest with sell trades earning $1,816 per day (statistically significant at the five percent level) and buy trades of $1,497 per day (statistically significant at the ten percent level). The statistical significance suggests that investors are able to consistently make positive mark-to-market dollar profits daily in both buys and sells in contrast to the statistically insignificant trade to settlement price holding period returns of buys and sells in Table 2 Panel B. The total mark-to-market trade dollar profits of $3,312, while also statistically significant, however is not economically significant. If we consider that on average $6.41 million of trade value per day is used to generate the profit, this equates to a return of 5.17 basis points which is about half of conservative brokerage rates of 10 basis points. This suggests that investors are unable to profit from intraday trading alone.

Mark-to-market positions however comprise the bulk of profits with total profits of $14,996 per day. The amount however is not statistically significant despite being economically more substantial than the trade profits. We investigate the reason for the lack of statistical significance by calculating the cumulative profits of the three sources daily as shown in Figure 1. As can be seen, mark-to-market trade profits and financing costs accumulate smoothly over time, with financing costs earning more than mark-to-market daily trade profits. Cumulative mark-to-market profits of

overnight positions however peak in November 2008 at about $50.5 million and return to nearly zero at the sample period's end. The large profit and subsequent disappearance is due to the net sell dollar positions held overnight as shown in Figure 2. Here, we plot the net daily positions held by individual against the cumulative S&P/ASX 200 accumulation index return. Net sell positions accumulate immediately from the introduction of CFDs and proceed to accumulate until September 2008. The net sell positions combined with a sharp fall in stock returns due to the global financial crisis during this period contributes to the large cumulative profits of overnight positions as seen in Figure 1. The reduction in net sell positions after September 2008 is explained by the short sales ban from 22nd September 2008 to 19th November 2008 for all stocks and from 22nd September 2008 to 22nd May 2009 for select financial stocks (see Do *et al.*, 2012). After the short sale ban is lifted, investors continue to accumulate short positions, with the rising market subsequently driving cumulative overnight position profits to zero.[21] In summary, investors appear to be using CFDs as a way to short stocks, as evident by the consistently large net positions, positive trading profits and financing costs earned.

5. Conclusion

CFDs have become increasingly popular with individual investors; a group which regulators and the academic literature identify as being susceptible to trading losses in financial markets due to a lack of investor sophistication. With the leverage and complexity of derivatives such as CFDs, these losses may be magnified.

We find that investor ASX-listed CFDs market order buy trades outperform their sells trades over a one day holding period, inclusive of the bid-ask spread. This short term outperformance is contained in both small and large trades, even after financing costs. CFDs market trades also statistically outperform the market trades on underlying stocks of up to a week holding period

[21] In unreported results, we also look at the net positions held overnight in S&P/ASX 200 CFDs (ASX ticker 'IQ') and find consistent but more gradual net sell positions held over the same sample period except for no reduction in net sell positions during the short sale ban and having net buy positions on the last few days of the sample period.

suggesting that CFDs investors have better trade performance than the average market order trade. The short term outperformance however is not economically significant and would not cover conservative brokerage estimates of ten basis points. At longer holding periods from one month to one year, investors lose due to financing costs rather than poor stock selection ability. In analysis of the market timing ability of their trades we find that they cannot beat the risk-free rate before and before after financing costs. Also their consistent holding of large net sell positions suggests that investors use CFDs for their shorting ability which would be difficult for individual investors to do in the underlying market. We conclude that investors using market orders on ASX-listed share CFDs display some short term trading performance, inconsistent with the poor performance of individual investors found in prior literature.

A caveat should be made on our use of the ASX CFDs sample and whether we may generalise our findings to OTC markets, where regulators are showing greater concerns for investor welfare. It is possible that as ASX CFDs are quite recent, only more sophisticated investors are currently using it. As such, as the ASX CFDs market matures, we may find the performance of trades being similar to that found of investors trading ASX shares and in other stock markets across the world. Using the CFDs trades from an OTC provider is naturally the most direct method to study the performance of individuals trading OTC CFDs and is left for future research.

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Table 1
Descriptive Statistics

The table reports descriptive statistics of the daily dollar trade volume and the average daily dollar trade size for all ASX-listed CFDs and their underlying stocks from 5 November 2007 to 30 June 2010. Statistics for a selection of individual share CFDs and their underlying stock are also reported. Only underlying stock trades that are made during continuous trading hours are included in order to match CFDs trading hours. Panel A reports statistics for trade volume and trade size. Panel B reports the percentage distribution of trades by trade count and trade size in dollar valued trade size groups separately for all CFDs and for all underlying stocks.

Panel A. Daily Trade Volume and Average Daily Dollar Trade Size Statistics

	Daily Dollar Trade Volume ($'000s)			Average Daily Dollar Trade Size		
	Mean	Median	Std	Mean	Median	Std
All CFDs	7,798	7,351	3,590	22,269	21,734	6,464
All Underlying Stocks	2,983,671	2,999,642	1,028,553	15,068	13,277	6,378
ANZ Bank (CFDs)	321	225	335	20,972	18,659	12,106
ANZ Bank (Stock)	157,237	148,058	74,706	17,854	15,744	7,311
BHP Billiton (CFDs)	1,259	980	968	36,016	33,331	15,375
BHP Billiton (Stock)	440,872	403,018	188,006	34,719	31,543	13,343
Cochlear (CFDs)	129	85	127	23,514	17,979	19,354
Cochlear (Stock)	13,943	12,392	7,290	3,482	3,222	1,218
Commonwealth Bank (CFDs)	1,154	810	1,085	33,848	28,565	20,003
Commonwealth Bank (Stock)	178,935	165,544	83,225	19,983	17,142	9,516
Foster's Group (CFDs)	85	43	146	18,941	13,044	18,855
Foster's Group (Stock)	41,853	36,036	27,845	14,828	13,269	8,117
Nufarm (CFDs)	20	12	22	4,848	4,100	2,941
Nufarm (Stock)	8,297	6,502	6,998	3,764	3,468	1,608
Rio Tinto (CFDs)	677	463	640	24,629	22,668	14,717
Rio Tinto (Stock)	187,727	163,193	106,929	22,154	17,969	12,489
Westpac (CFDs)	258	171	268	22,458	19,681	12,869
Westpac (Stock)	161,782	149,312	72,719	18,929	16,607	8,451

Panel B. Percentage Distribution of Trades by Trade Count and Trade Value in Trade Size Groups

	Trade Size Groups (Dollars)				
	$0 \leq T \leq 5{,}000$	$5{,}000 < T \leq 10{,}000$	$10{,}000 < T \leq 20{,}000$	$20{,}000 < T \leq 50{,}000$	$T > 50{,}000$
All CFDs (Trade Count %)	20.93	17.04	25.54	27.51	8.98
All Underlying Stocks (Trade Count %)	60.19	14.12	11.58	9.07	5.04
All CFDs (Trade Value %)	2.25	5.74	16.97	38.73	36.30
All Underlying Stocks (Trade Value %)	5.87	6.93	11.15	19.06	56.99

Table 2

Investor Market Order Performance Before and After Costs

The table reports the effective half spread and investor performance after financing in ASX-listed share CFDs across various holding periods from 5 November 2007 to 30 June 2010. Investor trades are identified as those trades which are buyer or seller initiated. We estimate the spread as the effective percentage half-spread calculated as the absolute difference between the trade price less the midpoint of the prevailing bid and ask price over the midpoint bid-ask price. Buy and sell portfolios are then calculated based on the buy or sell trade value weighted return from the traded price to the settlement price, next day, month, half year or year. Buy and sell portfolios are adjusted by the S&P/ASX 200 accumulation index return. Financing costs are the RBA overnight cash rate plus 1.5% for buys and the RBA rate less 1.5% for sells. The financing costs are paid daily for buys and received daily for sells. Panel A reports the average trade-value weighted daily effective half-spread of CFDs and their underlying stocks for individual buy and sell portfolios. The 'Buys–Sells' column reports the combined spreads of the buys and sells portfolio. Panel B reports the average daily investors' trade performance. Panel C reports the average daily investors' trade performance after financing costs. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

Panel A. Average Effective-Half Spread of Buy and Sell Portfolios

	Average Daily Effective Half Spread (%)		
	Buys	Sells	Buys–Sells
CFDs	0.0964	0.0973	0.1936
Underlying Stocks	0.0796	0.0799	0.1595
CFDs–Underlying	0.0167***	0.0174***	0.0342***
t-statistic	3.16	3.70	3.46

Panel B. Investor Holding Period Returns

	Market Adjusted Holding Period Return (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Settlement Price	0.0301	0.0085	0.0216	1.05	0.33	1.54
Day	0.1012**	0.0427	0.0585**	2.31	1.05	2.00
Week	0.1580*	0.1457	0.0123	1.68	1.62	0.23
Month	0.0774	0.1255	-0.0482	0.45	0.78	-0.56
Half Year	2.5106***	2.6227***	-0.1122	6.19	6.92	-0.53
Year	3.6720***	3.6924***	-0.0204	5.73	6.38	-0.09

Panel C. Investor Holding Period Returns after Financing Costs

	Market Adjusted Holding Period Return (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Settlement Price	0.0301	0.0085	0.0216	1.05	0.33	1.54
Day	0.0758*	0.0292	0.0466	1.73	0.72	1.59
Week	0.0310	0.0781	-0.0471	0.33	0.86	-0.87
Month	-0.4288**	-0.1428	-0.2860***	-2.51	-0.88	-3.35
Half Year	-0.5944	1.0208***	-1.6152***	-1.49	2.77	-7.65
Year	-2.3128***	0.7170	-3.0298***	-3.56	1.23	-13.09

Table 3

Investor Market Order Performance after Financing Costs by Trade Size Groups

The table reports the investor average daily holding period return after financing costs in ASX-listed share CFDs across various holding periods from 5 November 2007 to 30 June 2010. Investor trades are identified as those trades which are buyer or seller initiated. Trades are separated into three trade size groups: less than $10,000 (group 1), between $10,000 and $20,000 (group 2) and greater than $20,000 (group 3). The size groups are nominal amounts. Buy and sell portfolios are then calculated based on the buy or sell trade value weighted return from the traded price to the settlement price, next day, month, half year or year. Buy and sell portfolios are adjusted by the S&P/ASX 200 accumulation index return. Financing costs are the RBA overnight cash rate plus 1.5% for buys and the RBA rate less 1.5% for sells. The financing costs are paid daily for buys and received daily for sells. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

		Market Adjusted Holding Period Return (%)			*t*-statistic		
Trade Size Groups	Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
1 (small trades)	Settlement Price	0.0276	-0.0387	0.0663	0.62	-1.05	1.40
	Day	0.2906**	0.1052	0.1854*	2.54	0.85	1.76
	Week	0.6525**	0.4237	0.2287	2.10	1.28	0.95
	Month	1.615**	1.8136***	-0.1987	2.49	3.00	-0.50
	Half Year	5.5311**	8.5185***	-2.9874***	2.39	3.73	-2.62
	Year	-0.1597	2.9195	-3.0792**	-0.06	1.04	-2.26
2	Settlement Price	0.014	0.0174	-0.0034	0.28	0.35	-0.07
	Day	-0.2423*	-0.0307	-0.2116	-1.69	-0.23	-1.55
	Week	-0.2322	0.2107	-0.4429*	-0.68	0.63	-1.84
	Month	0.0614	0.77	-0.7086	0.09	1.24	-1.59
	Half Year	-0.9246	2.1251	-3.0497***	-0.38	0.87	-3.51
	Year	-7.6754**	-4.0773	-3.5981***	-2.50	-1.35	-2.98
3 (large trades)	Settlement Price	0.0806**	0.013	0.0677*	2.37	0.40	1.72
	Day	0.0317	-0.0707	0.1024	0.32	-0.69	1.16
	Week	-0.0291	-0.3634	0.3344*	-0.10	-1.19	1.76
	Month	-0.4791	-0.2647	-0.2143	-0.70	-0.35	-0.60
	Half Year	-3.8011*	-2.3884	-1.4127	-1.96	-1.03	-1.56
	Year	-12.245***	-8.1503***	-4.0947***	-4.99	-2.97	-3.90

Table 4

Investor Market Order Performance in CFDs vs. Underlying Stocks

The table reports the buys minus sells return of the market trades of investors in CFDs compared with underlying stocks across various holding periods from 5 November 2007 to 30 June 2010. Investor market trades are identified as those trades which are buyer or seller initiated. Buys minus sells portfolios are then calculated based on the buy less sell trade value weighted return from the traded price to the settlement price, next day, month, half year or year. Daily average buys minus sells portfolios are reported using raw returns in Panel A, and characteristic-based alphas using the methodology of Pinnuck, 2003 in Panel B. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

Panel A. Raw Returns

	Buys–Sells Holding Period Raw Return (%)			*t*-statistic		
Holding Period	CFDs	Underlying	CFDs–Underlying	CFDs	Underlying	CFDs–Underlying
Settlement Price	0.0216	-0.1998***	0.2214***	1.54	-9.91	8.59
Day	0.0585**	-0.2028***	0.2613***	2.00	-9.41	6.56
Week	0.0123	-0.1918***	0.2041***	0.23	-7.57	3.41
Month	-0.0482	-0.1983***	0.1501	-0.56	-6.07	1.63
Half Year	-0.1122	-0.2781***	0.1660	-0.53	-4.62	0.75
Year	-0.0204	-0.2632***	0.2427	-0.09	-4.09	1.00

Panel B. Characteristic-Based Alpha following Pinnuck (2003)

	Buys–Sells Holding Period Alpha (%)			*t*-statistic		
Holding Period	CFDs	Underlying	CFDs–Underlying	CFDs	Underlying	CFDs–Underlying
Settlement Price	0.0216	-0.1998***	0.2214***	0.84	-9.52	6.41
Day	0.0200	-0.1971***	0.2170***	-1.28	-8.58	2.76
Week	-0.0536	-0.1905***	0.1369***	-2.79	-6.84	0.44
Month	-0.1655***	-0.1948***	0.0293	-0.76	-2.44	0.32
Half Year	-0.1223	-0.1743**	0.0520	-0.55	-0.95	-0.24
Year	-0.1366	-0.0759	-0.0607	0.84	-9.52	6.41

Table 5

Excess Market Timing Returns of Investor Market Orders in CFDs

The sample is ASX-listed share CFDs trades from 5 November 2007 to 30 June 2010. Investor trades are identified as those trades which are buyer or seller initiated. Every day, we first calculate the net volume bought or sold in a stock CFD. We then measure the past year's market (CAPM) beta as a proxy of the stock's market loading. Stocks bought have a positive beta exposure while stocks sold have a negative beta exposure. We then calculate the daily aggregate beta as the net trade value-weighted beta of all stocks. The daily aggregate beta is then multiplied with the market (S&P/ASX 200 Accumulation Index) return over the subsequent day, week, month, half-year or yearly holding periods to calculate the market timing return. We then calculate the excess market timing return as the market timing return less the risk-free rate. The table reports the average daily excess market timing return and excess market timing return after financing costs over the various holding periods. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

Holding Period	Excess Market Timing Holding Period Return	*t*-statistic	Excess less Financing Costs	*t*-statistic
Day	-0.0202	-0.77	-0.0247	-0.94
Week	-0.0212	-0.33	-0.0412	-0.64
Month	-0.2116	-1.52	-0.2936**	-2.04
Half Year	-1.4462***	-4.21	-1.9948***	-5.18
Year	-3.6165***	-7.07	-4.9266***	-7.97

Table 6

Investor Daily Dollar Profits from Trades and Overnight Positions Held

The table reports the average daily total dollar profits of investors, average daily traded value and average daily overnight positions held in ASX-listed share CFDs from 5 November 2007 to 30 June 2010. Investor trades are identified as those trades that are buyer or seller initiated. Total dollar profits are further split into mark-to-market trade profits, mark-to-market overnight position profits and financing costs as per equation 6. Profits are also reported separately for buy or sell trade and buy or sell overnight positions. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

	Mark-to-market Trade Profits ($)	*t*	Mark-to-market Position Profits ($)	*t*	Financing Costs ($)	*t*	Total Profit ($)	*t*	Trade Value ($m)	Overnight Positions ($m)
Buy Trades/ Positions	1,497 *	1.80	-4,743	-0.71	-2,702 ***	-17.13	-5,948	-0.85	3.09	11.71
Sell Trades/ Positions	1,816 **	2.05	19,738	0.25	15,366 ***	19.19	36,920	0.46	3.31	-120.88
Total	3,312 ***	5.77	14,996	0.20	12,664 ***	16.32	30,971	0.41	6.41	-109.18

Figure 1
Cumulative Profits of Investor Market Orders (5th November 2007 to 30th June 2012)

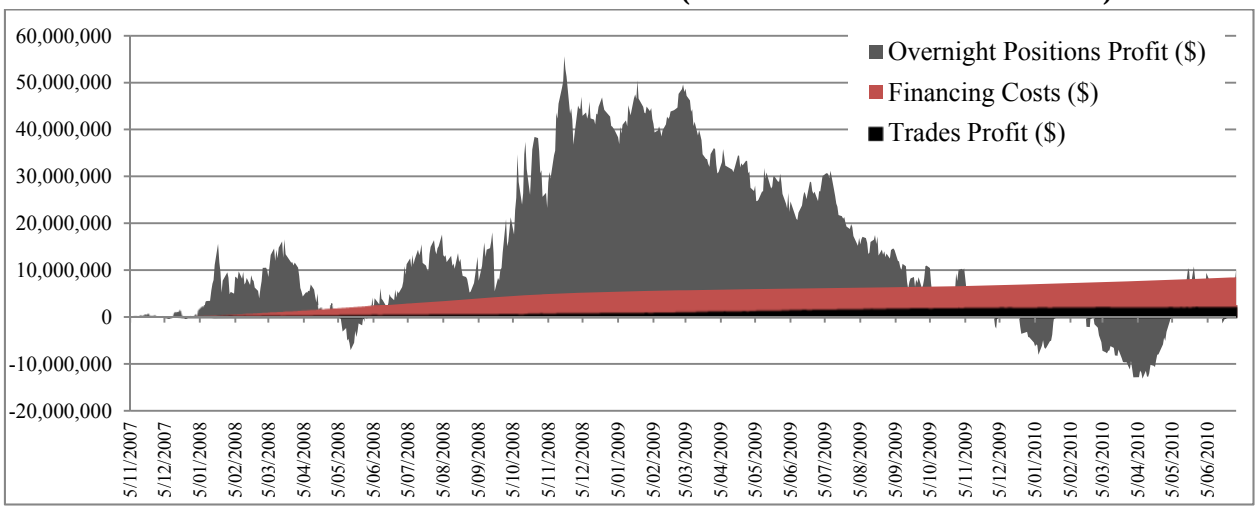
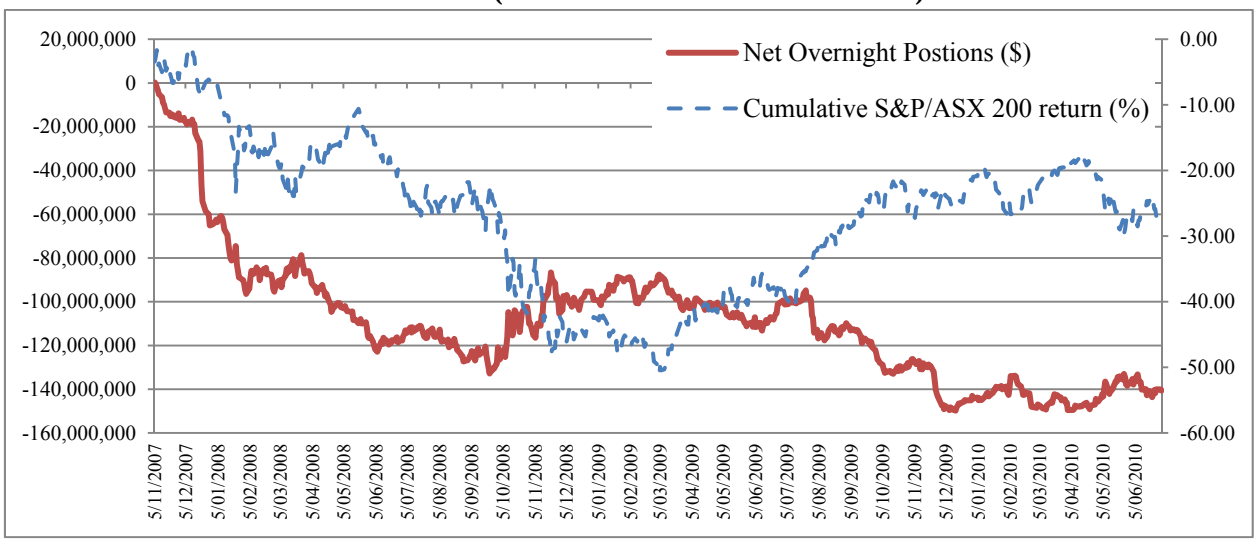


Figure 2
Net Dollar Positions Held Overnight by Investor Market Orders vs. Cumulative S&P/ASX 200 Accumulation Index Return (5th November 2007 to 30th June 2012)



Appendix 1

Quote Updating on CFDs versus Underlying Stock

Every day from 5 November 2007 to 30 June 2010 for each ASX-listed share CFDs and their underlying stock we calculate the mean midpoint quote change in seconds, median midpoint quote change in seconds and the number of midpoint quote changes. The midpoint quote is the average of the best prevailing bid and ask quote at a given time. We then calculate the difference between the CFDs and underlying stock for each of the three daily measures and report in the table the daily time series average as Δmean, Δmedian and Δnquotes respectively. The 'All Stocks' group is the time series average of the equally weighted average measures across all stocks each day. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using *t*-statistics for Δmean and Δnquotes, while using the Wilcoxon signed-rank test statistic for Δmedian.

	CFDs less Underlying Stock Quotes			*p*-values		
Stocks	Δmean (sec)	Δmedian (sec)	Δnquotes	Δmean	Δmedian	Δnquotes
All Stocks	30.15 ***	12.16 ***	-374.72 ***	0.00	0.00	0.00
AGL Energy	5.34 ***	1.68 ***	-220.26 ***	0.00	0.00	0.00
Alumina	26.28 ***	7.69 ***	-340.31 ***	0.00	0.00	0.00
Amcor	6.31 ***	2.59 ***	-59.66 ***	0.00	0.00	0.00
AMP	39.99 ***	4.72 ***	-163.98 ***	0.00	0.00	0.00
ANZ Bank	11.69 ***	3.64 ***	-155.39 ***	0.00	0.00	0.00
Asciano Group	150.35	26.77	-78.50	0.34	0.50	0.34
AXA Asia Pacific	3.64 **	1.62 ***	-802.06 ***	0.02	0.00	0.00
BHP Billiton	2.10 ***	0.73 ***	-1342.56 ***	0.00	0.00	0.00
Bluescope Steel	18.55 ***	9.27 ***	-107.62 ***	0.00	0.00	0.00
Boral	10.22 ***	3.09 ***	-79.12 ***	0.00	0.00	0.00
Brambles Industries	9.68 ***	2.42 ***	-267.50 ***	0.00	0.00	0.00
CFD Retail Property	119.02 ***	20.82	-30.00	0.00	0.50	0.33
Coca-Cola Amatil	1.07 ***	0.63 ***	-173.48 ***	0.00	0.00	0.00
Cochlear	103.43 ***	24.93 ***	-153.68 ***	0.00	0.00	0.00
Commonwealth Bank	3.93 ***	1.30 ***	-124.08 ***	0.00	0.00	0.00
Computershare	2.56	0.54	-1091.50	0.17	0.50	0.10
Crown	10.67	9.59 ***	-1490.11 ***	0.23	0.00	0.00
CSL	6.37	1.69	-284.50 **	0.15	0.50	0.02
CSR	23.00	3.87	-96.50	0.41	0.50	0.19
Dexus Property	442.48	62.18	-17.00	0.25	0.50	0.15
Fairfax Holdings	75.22 ***	17.77 ***	-142.71 ***	0.00	0.00	0.00
Fortescue Metals	12.74	3.21	-87.00	0.31	0.50	0.15
Foster's Group	29.07 ***	6.55 ***	-148.74 ***	0.00	0.00	0.00
GPT	272.66 ***	178.72 ***	-98.51 ***	0.00	0.00	0.00
Harvey Norman	16.07	5.45	-8.50	0.55	0.50	0.68
Incitec Pivot	25.31	7.74	-13.00	0.48	0.50	0.10
Insurance Australia Group	21.11 ***	5.86 ***	-100.34 ***	0.00	0.00	0.00
James Hardie	4.30 *	0.45	-930.50	0.07	0.50	0.14
JB Hi-Fi	17.02	1.36	-474.50	0.38	0.50	0.16
Leighton Holdings	0.88 ***	0.33 ***	-404.13 ***	0.00	0.00	0.00
Lend Lease	7.19 ***	1.73 ***	-187.34 ***	0.00	0.00	0.00
Lihir Gold	29.22 ***	16.25 ***	-38.01 ***	0.00	0.00	0.00
Macarthur Coal	7.09	1.57	-239.50	0.33	0.50	0.18
Macquarie Bank	1.59 ***	0.40 ***	-707.78 ***	0.00	0.00	0.00

Appendix 1 continued

Macquarie Goodman	85.77	***	23.68	***	-121.14	***	0.00	0.00	0.00
Macquarie Infrastructure	-16.15		8.24		9.00		0.58	0.50	0.53
Metcash	306.01	**	20.32		-103.50		0.05	0.50	0.10
Mirvac Group	-7.80		13.60		19.50		0.71	0.50	0.62
Myer Holdings Ltd	2.28	***	0.48	***	-912.62	***	0.00	0.00	0.00
National Australia Bank	1.82	***	0.46	***	-645.15	***	0.00	0.00	0.00
Newcrest Mining	2.20	***	0.96	***	-153.65	***	0.00	0.00	0.00
News Corporation	24.48		0.96		-212.50		0.43	0.50	0.44
Nufarm	229.86	***	66.66	***	-131.67	***	0.00	0.00	0.00
Oil Search	8.99	***	2.73	***	-143.11	***	0.00	0.00	0.00
Onesteel	11.91	***	8.39	***	-149.62	***	0.00	0.00	0.00
Orica	3.07	***	1.12	***	-481.91	***	0.00	0.00	0.00
Origin Energy	2.96	***	0.55	***	-196.00	***	0.00	0.00	0.00
OZ Minerals	17.94	***	7.59	***	-121.33	***	0.00	0.00	0.00
Paladin Resources	4.88	***	2.16	***	-976.97	***	0.00	0.00	0.00
Qantas Airways	24.57	*	20.96	***	-43.55	***	0.07	0.00	0.00
QBE Insurance	1.15	***	0.27	***	-1554.75	***	0.00	0.00	0.00
Rio Tinto	3.87	***	0.84	***	-401.46	***	0.00	0.00	0.00
Santos	6.16		0.63		-763.50		0.27	0.50	0.19
Sims Metal	8.69		2.13		-306.50		0.22	0.50	0.34
Sonic Healthcare	4.57	***	0.71	***	-964.29	***	0.00	0.00	0.00
St George Bank	7.42	***	3.67	***	-37.00	***	0.00	0.00	0.00
Stockland	7.00	***	2.57	***	-337.48	***	0.00	0.00	0.00
Suncorp Group	11.18	***	3.99	***	-111.07	***	0.00	0.00	0.00
Tabcorp Holdings	19.76		36.62	***	-25.68	***	0.12	0.00	0.00
Tattersall's	96.61	***	21.24	***	-70.49	***	0.00	0.00	0.00
Telecom Corp of NZ	62.93	***	24.64	***	-74.66	***	0.00	0.00	0.00
Telstra	11.79	***	3.77	***	-278.10	***	0.00	0.00	0.00
Toll Holdings	11.63	***	3.94	***	-118.18	***	0.00	0.00	0.00
Transurban Group	1.57	***	0.53	***	-546.03	***	0.00	0.00	0.00
Wesfarmers	3.13	***	1.17	***	-457.89	***	0.00	0.00	0.00
Westfield Group	1.98	***	0.86	***	-677.58	***	0.00	0.00	0.00
Westpac	2.74	***	1.06	***	-1189.92	***	0.00	0.00	0.00
Woodside Petroleum	5.52	***	2.20	***	-814.26	***	0.00	0.00	0.00
Woolworths	2.93	***	0.38		-1476.50		0.01	0.50	0.11
Worley Parsons	9.26	***	2.20	***	-394.72	***	0.00	0.00	0.00
Zinifex	85.77	***	23.68	***	-121.14	***	0.00	0.00	0.00

Appendix 2

Investor Performance after Financing Costs Using Alternative Benchmarking Specifications

The table reports investor performance after financing in ASX-listed share CFDs across various holding periods from 5 November 2007 to 30 June 2010 using alternative benchmarks. Investor trades are identified as those trades which are buyer or seller initiated. Buy and sell portfolios are calculated based on the buy or sell trade value weighted return from the traded price to the settlement price, next day, month, half year or year. Panel A reports buy and sell portfolios are adjusted by the value weighted return of all underlying stocks of the CFDs while Panel B reports characteristic-based alphas using the methodology of Pinnuck, 2003. Financing costs are the RBA overnight cash rate plus 1.5% for buys and the RBA rate less 1.5% for sells. The financing costs are paid daily for buys and received daily for sells. The 'Buys–Sells' column reports the combined spreads of the buys and sells portfolio. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics using six lags.

Panel A. Excess Value-Weighted CFDs Underlying Stock Return

	Adjusted Holding Period Return (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Settlement Price	0.0301	0.0085	0.0216	1.05	0.33	1.54
Day	0.0619	0.0153	0.0466	1.45	0.38	1.59
Week	-0.0223	0.0248	-0.0471	-0.26	0.29	-0.87
Month	-0.6195***	-0.3336**	-0.2860***	-3.70	-2.08	-3.35
Half Year	-1.2712***	0.3440	-1.6152***	-3.17	0.96	-7.65
Year	-3.3964***	-0.3666	-3.0298***	-5.66	-0.69	-13.09

Panel B. Characteristic-Based Alpha following Pinnuck (2003)

	Holding Period Alpha (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Settlement Price	0.0301	0.0085	0.0216	1.05	0.33	1.54
Day	0.0694	0.0613	0.0081	1.45	1.32	0.34
Week	0.0708	0.1839	-0.1131***	0.64	1.61	-2.69
Month	-0.1863	0.2170	-0.4033***	-0.83	0.99	-6.82
Half Year	-0.1219	1.5035***	-1.6254***	-0.28	3.92	-10.17
Year	-0.2038	2.9422***	-3.1460***	-0.27	4.00	-12.70