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

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Abstract

Individual investors now widely use contracts for difference (CFDs) to gain leverage and short sell underlying financial assets such as shares. We investigate the after cost performance of individual investors in Australian Securities Exchange listed share CFDs. We find that individual CFDs trades earn small positive and statistically significant returns at the daily horizon and lose for trading horizons from one week to one year due to financing costs, rather than stock picking ability. Individuals also do not display market timing ability and consistently hold net sell positions suggesting hedging motives for trading CFDs.

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

JEL classification: G14

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1. Introduction

We investigate the after-cost performance of individual 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 individual 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 including the Australian Securities and Investment Commission (ASIC) and European Securities and Markets Authority (ESMA). 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 individuals in CFDs.[1] The lack of research on individual investors 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

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

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 individual investors in an usually opaque market.

Our study also contributes to the literature of individual 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, Cosemans and Eichholtz (2009) who study options trading on the Euronext Amsterdam by individual investors of a discount brokerage firm. Much like 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, individual investor buys statistically outperform their sell CFDs trades mark-to-market to the close by 2.47 basis points per day and by 6.10 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 3.42 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 period still remain with reduced statistical significance but 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 individual investor trades into small and large trades groups, we find the short-term performance is contained in the largest trades ($20,000 or more in 1991 dollars) while small and medium size trades have statistically insignificant buy minus sell returns after financing costs. This suggests that it is individuals trading larger size trades that are sophisticated. We also find that individual investors show no market timing ability and that they consistently hold large net

[22] See for example Barber and Odean (2000) and Griffin, Harris and Topaloglu (2003) for the US, Oh, Parwada and Walter (2008) for Korea, Barber *et al.* (2009a) for Taiwan and Fong, Gallagher and Lee (2010) for Australia.

sell overnight positions with statistically insignificant mark-to-market close profits suggesting that individual investors use CFDs for hedging purposes rather than for leveraged speculation.

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.

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 closing 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.

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

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

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 trading horizons of less than one year. We therefore focus our analysis of CFDs trade performance to trading holding periods of one year or less.

2.1. ASX-Listed CFDs

Our study investigates the performance of ASX exchange-traded share 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 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.

[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 3-4% p.a. 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.

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 individual 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, 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 the performance of investors in ASX-listed CFDs trades should be representative of the performance of the average CFDs investor.

3. Data and Methodology

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 closing prices and returns of the underlying stocks and index returns are obtained from the SIRCA Core Research Database (CRD) and TRTH respectively.

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

We use the trade and quote data of all 72 listed share CFDs are from when exchange-traded CFDs were first listed on the ASX from 5 November 2007 to 30 June 2010. The choice of underlying shares for CFDs was made by the ASX and represent the most liquid ASX stocks.

3.2. Summary Statistics

Table 1 presents descriptive statistics for our final sample of 270,584 signed 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 individual CFDs and their underlying stocks. 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 the first three columns 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 with for example BHP stock having 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 in comparison to its OTC counterparts.

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 $22,679 for CFDs and 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 COH (Cochlear Limited) 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 sizes 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, individual investors incur minimum brokerage costs[7] and therefore cannot cheaply break up trades as easily as institutional investors. Secondly, margin requirements mean individual investors are only required to put up at most 20 percent of the position as margin.[8] This means that 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 individual investor 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 as Barber, Odean and Zhu (2009b) use. The trade size cut-offs are in 1991 dollars and inflation adjusted by the Consumer Price Index (CPI). By count, the majority of CFDs trades are $20,000 or less while in the underlying stock, about 70 percent of trades are less than $5,000. However by trade value, about 50 percent CFDs trades are in trade sizes between $10,000 and $50,000 while in the underlying stocks almost 50 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 stocks trades are either handled in small trades or completed using very large trades. In summary, the larger trade sizes and lower volume in CFDs than in the underlying stock is consistent with trades being made by individual investors.

3.3. Inferring Individual Investor Trades

In order to analyse individual investor performance, we must first infer which trades are made by individual investors and whether they are on the buy or sell side of the trade. This is because our trade data does not identify the trader. As we find low daily trading volume and mainly mid-sized trades in Table 1, we assume that all CFDs trades are made predominantly by individual

[7] 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.
[8] In practice, ASX-listed CFDs margin requirements are calculated dollars per contract rather than in percentage terms as in OTC CFDs.

investors trading against other individual investors or the designated price maker (DPM). ASIC (2010a) also find little evidence that institutional investors make use of CFDs in Australia. Cacciotti and Michayluk (2012) provide evidence supporting ASIC's claim finding that with the introduction of CFDs, the underlying stocks exhibited increased bid-ask spreads and volatility which suggests that CFDs trading is noisy rather than informative. They however do not look directly at trading in CFDs. It is possible that the DPM may use buyer or seller initiated trades to correct mispricing between the CFDs and its underlying asset however Brown *et al.* (2010) show that mispricing within reasonable transaction cost bounds is rare in ASX-listed CFDs and only occurs in illiquid CFDs. It is therefore more likely that the DPM is providing liquidity and on the passive side of trades (i.e. placing limit bid and ask quotes).[9] We therefore identify individual investor trades as those that are buyer or seller initiated (i.e. buying at the ask price or selling at the bid price).

To determine whether the trades are buyer or seller initiated (and thus whether the individual investor is buying or selling CFDs respectively) we first match every trade to the prevailing bid and ask quotes using the Ellis, Michaely and O'Hara (2000) and using a zero-second time delay for trades as Henker and Wang (2006) suggest.

Our use of small signed trades to identify individual investor trades is similar to the methodology that Barber *et al.* (2009b) and Hvidkjaer (2008) employ. 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 retail nature of the CFDs market as aforementioned. As such our analysis is able to investigate the performance of individual investors against the DPM.

3.4. Measuring Individual Investor Performance

To measure individual investor performance using the signed trades, we follow a

[9] 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.

methodology similar to Barber *et al.* (2009a) in using buy minus sell 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.[10] This allows us to calculate a mark-to-market return from the traded price. The methodology we use is as follows:

1. Every day, buy (seller) initiated trades are placed into the buy (sell) 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. $R_{m,t}^{h}$ is the return of the S&P/ASX 200 accumulation index over the next *h* days for horizons of 1 day or more.[11] An analogous measure is made for sell trades in the sell portfolio, $AR_{s,t}^{h}$.

3. The buy portfolio is subtracted from the sell portfolio to form the daily buy minus sell 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 individual investor trade performance. As such a positive and statistically significant average BS_{t}^{h} return

[10] Chen, Jegadeesh and Wermers (2000) also use a similar methodology in investigating buy minus sell trade performance though they look at U.S. mutual fund trades as inferred by their quarterly change in stock holdings.
[11] For trade to the settlement price we do not adjust for the market index as this introduces noise into the return measure.

means that individual investor buy trades outperform their sells, inferring superior trading performance over a given trading holding period. In addition, a positive (negative) and statistically significant $AR^h_{b,t}$ ($AR^h_{s,t}$) measure would suggest individual investors are better at buying (selling) CFDs compared with holding the market portfolio.

3.5. 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 for our holding period return measures above, we already implicitly incorporate the bid-ask spreads. However we 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% 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 buy-minus sell portfolio costly as in essence individual investors will lose three percent daily (1.5% on each side) when holding similarly sized buy and sell positions.

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 individual 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 at the closing 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 individual investor buys, sell and buy minus sell portfolios for CFDs or if the underlying stocks were traded instead. Buys and sells incur only the effective half-spread while the 'buy-sell' portfolio

adds both spreads together as if the buy and sell portfolios were traded concurrently.

[Insert Table 2 Here]

CFDs buys (sells) incur spread costs of 0.0963% (0.0973%), while the underlying stocks on average incur lower spreads of 0.0796% (0.0798%). The spread difference between the CFDs and underlying stocks 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.* use a 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 individual investors do attempt to trade CFDs when spreads narrow.

4.2. Individual Investor 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 individual 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 individual investor buy trades outperform to the day's close and after one day, though no statistically different performance to zero for all other horizons. For trades to the closing price, we find that buys outperform sells by 2.47 basis points per day, statistically significant at the ten percent level. After the next day, buy trades outperform sell trades by 6.10 basis points per day, statistically significant at the five percent level, suggesting that individual 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 10.87 basis points above the market return per day, statistically significant at the five percent level. Note that while

6.10 basis points per day may seem small, it amounts to an annualised return 15.50 percent. If we further assume a 20% margin on opening CFDs positions separately for buy and sell positions, this amounts to a 37.5 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 buys 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 horizons buys earn 2.42 and 3.66 percent respectively above the market return, statistically significant at the five percent level, which suggests stock picking ability. However their respective sell portfolios earn even higher and statistically significant returns at 2.52 and 3.70 percent above the market suggesting that CFDs sold have returns above the market and therefore poor stock picking ability.

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

We find that the buy minus sell portfolios across all holding periods are weaker or similar to before costs, with the half year and yearly holding period losses negative and statistically significant when accounting for the financing costs. The reason is due to the 1.5% open interest charge that both buys and sells incur which increases the half year holding period buy minus sell losses by

1.5% and yearly holding period losses by 3%.

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. At the day 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. For example at the half year holding period, the return is 0.92 percent above the market statistically significant at the five 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. Overall, the findings show that after financing costs, all portfolios across holding periods of over a month show negative abnormal performance with sell portfolio financing costs being not enough to allow the trades to outperform the market.

4.4.Small vs. Large 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 less sophisticated investors would tend to place smaller trades in hopes of larger returns, much like in 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 buy minus sell 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). The size groups are in 1991 real dollars and adjusted for inflation using the CPI. 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

buying shares. For example a group 1 trade of $15,000 in 2008 dollars would require at most 20% or $3,000 up-front in margins.

Table 3 reports the individual investor performance after financing costs for the trade size groups. We find that the small trade group buy minus sell portfolio incurs negative and statistically significant returns for trading horizons one week or greater. Meanwhile mid-sized and large trade groups have negative and statistically significant returns only from one month or greater. In particular, the buy minus sell portfolio for large trades at the one day trading horizon earns 9.32 basis points, statistically significant at the ten percent level, while there is no outperformance for mid-sized and small-sized trades in the same trading horizon. In unreported results, we also find that the large trades buy minus sell portfolio outperforms the small trades buy minus sell portfolio for a one day holding period, statistically significant at the ten percent level (*t*-stat of 1.95). For all other holding periods, there is no statistical difference in performance between small and large trades. This suggests that the superior performance at the intraday and daily horizon in Table 2 Panel B is mainly driven by large trades. The results are consistent with large trades being made by more sophisticated individual investors.

[Insert Table 3 Here]

4.5. Market Timing

While the above results show that individual investors show no stock picking ability after financing costs except at the intraday or daily holding period for large size trades, 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 measure the past year's market (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 trading 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 excess market timing return at a given trading 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 trading holding period *h* using the RBA overnight cash rate.

Table 4 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 individual investors over the sample period of -0.028 (*t*-stat of -2.64) suggesting that on average individual investor trades were slightly short the market. Before costs, returns across all horizons earn below the risk-free rate with the one day holding period being statistically significant at the ten percent and at the weekly holding period not being statistically significant. For holding periods greater than one month, returns are negative and statistically significant at the one percent level. Incorporating financing costs, holding period returns are more negative and have stronger statistical significance. For example investors earn a daily holding period return after financing costs of 0.03 percent below the risk free rate (statistically significant at the five percent level) and yearly holding period return after financing costs of 4.71 percent below the risk-free rate per year(statistically significant at the one percent level). The results suggest that individual investors are poor market timers across all holding periods, even before considering financing costs. Again, if we take into account a 20 percent margin requirement, these losses would be magnified five times.

[Insert Table 4 Here]

4.6. Individual Investor Dollar Profits from Trades and Overnight Positions Held

This section investigates the dollar profits earned by individual 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 buy minus sell 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.[12] A similar argument may be made with the buy and sell trade portfolios not being of equal size every day and therefore the buy minus sell 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 individual investors may be able to close positions using the exchange for physical facility to close positions, we look at the exchange for physical volumes traded during our sample period from the ASX EFP website[13] and find no exchange for physical trades on share CFDs occurred at all 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

[12] Moeller, Schlingemann and Stulz (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.

[13] http://www.asx.com.au/products/exchange-for-physicals.htm.

and financing costs of positions held overnight. As per the returns based measures, individual investor trades are identified as those that are buyer or seller initiated. Formally, the total daily profits is calculated as:

$$Total\ Dollar\ Profit_t = \sum_{x=1}^{z} TVol_{i,x,t}\left(P_{i,t} - P_{i,x,t}\right) + \sum_{n=1}^{i} OVol_{i,t-1}\left(P_{i,t} - P_{i,t-1}\right) - n{=}1iOVoli{,}t{-}1Pi{,}t{-}1Rf{,}t{+}\delta{\times}0.015ddays \quad in \quad year \tag{6}$$

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 (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.

We report the daily dollar profits of individual investors in Table 5, 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 net sell positions held by individual investors of -$121.04 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 $12,678 per day.

[Insert Table 5 Here]

In comparison, total mark-to-market trade profits are modest with sell trades earning $1,816 per day (statistically significant at 5 percent level) and buy trades of $1,495 per day (statistically significant at 10 percent level). The statistical significance suggests that individual 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 closing price holding period returns of buys and sells in Table 2 Panel B. The total mark-to-market trade dollar profits of $3,311 however is not economically significant. If we consider that on average $6.40 million of trades is used to generate the profit, this equates to a return of 5.17 basis points which is about half of reasonable brokerage rates of 10 basis points. This suggests that individual investors are unable to profit from intraday trading alone.

Mark-to-market positions however comprise the bulk of profits with total profits of $14,781 per day. The amount however is not statistically significant. 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 periods 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 sharp fall of stocks 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, Do and Chai (2012)). After the short sale ban is lifted, individual investors continue to accumulate short positions, with the rising market subsequently driving cumulative overnight position profits to

zero.[14] In summary, individual investors appear to be using CFDs as a hedging tool, as evident by the consistently large net positions held and lack of market timing.

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 individual investor ASX-listed CFDs buy trades outperform their sells trades mark-to-market to the close and over a one day holding period, inclusive of the bid-ask spread and financing costs. This short term outperformance is contained in large trades in which arguably more sophisticated individuals would use to trade with, while small and medium trades having no statistical outperformance over the short trading horizons. The short term outperformance however is not economically significant and would not cover reasonable brokerage estimates. At longer trading horizons from one month to one year, individual 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. Their lack of market timing ability and consistent holding of large net sell positions suggests that they use CFDs for hedging purposes rather than for speculation. We conclude that individual investors trading ASX-listed share CFDs are not as unsophisticated as is commonly thought of in the literature.

[14] 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 net buy positions held on the last few days of the sample period.

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Table 1
Descriptive Statistics

The table reports descriptive statistics of daily dollar trade volume and the average daily dollar trade size for ASX-listed CFDs and their underlying stocks from 5 November 2007 to 30 June 2010. Only underlying stock trades that are during continuous trading hours are included in order to match CFDs trading hours. Panel A reports statistics for trade volume and trade size. Statistics are reported for all CFDs and all underlying stocks and for a selection of CFDs and their underlying stock. Panel B reports the percentage distribution of trades by trade count and trade size in inflation adjusted 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 (CFDs)	321	225	335	20,972	18,659	12,106
ANZ (Stock)	157,237	148,058	74,706	17,854	15,744	7,311
BHP (CFDs)	1,259	980	968	36,016	33,331	15,375
BHP (Stock)	440,872	403,018	188,006	34,719	31,543	13,343
COH (CFDs)	129	85	127	23,514	17,979	19,354
COH (Stock)	13,943	12,392	7,290	3,482	3,222	1,218
CBA (CFDs)	1,154	810	1,085	33,848	28,565	20,003
CBA (Stock)	178,935	165,544	83,225	19,983	17,142	9,516
FGL (CFDs)	85	43	146	18,941	13,044	18,855
FGL (Stock)	41,853	36,036	27,845	14,828	13,269	8,117
NUF (CFDs)	20	12	22	4,848	4,100	2,941
NUF (Stock)	8,297	6,502	6,998	3,764	3,468	1,608
RIO (CFDs)	677	463	640	24,629	22,668	14,717
RIO (Stock)	187,727	163,193	106,929	22,154	17,969	12,489
WBC (CFDs)	258	171	268	22,458	19,681	12,869
WBC (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 (1991 Dollars and Inflation Adjusted)				
	$0 \leq T \leq \$5{,}000$	$\$5{,}000 < T \leq \$10{,}000$	$\$10{,}000 < T \leq \$20{,}000$	$\$20{,}000 < T \leq \$50{,}000$	$T > \$50{,}000$
All CFDs (Trade Count %)	31.34	23.32	25.83	16.11	3.40
All Underlying Stocks (Trade Count %)	69.63	12.89	8.80	5.87	2.81
All CFDs (Trade Value %)	5.28	12.50	26.82	34.88	20.52
All Underlying Stocks (Trade Value %)	9.94	9.91	13.37	19.24	47.55

Table 2

Individual Investor Performance Before Costs

The table reports the effective half spread and individual investor performance after financing in ASX-listed share CFDs across various trading holding periods from 5 November 2007 to 30 June 2010 for individual investors. Individual investor trades are identified as those 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 closing 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 individual investors' trade performance. Panel C reports the average daily individual investors' trade performance after financing costs. ***, **, * denote statistical significance at the 1, 5% and 10% level respectively using Newey-West *t*-statistics.

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

	Average Daily Effective Half Spread (%)		
	Buys	Sells	Buys-Sells
CFDs	0.0963	0.0973	0.1936
Underlying Stocks	0.0796	0.0798	0.1594
CFDs - Underlying	0.0167***	0.0175***	0.0342***
t-statistic	3.17	3.71	3.47

Panel B. Individual Investor Holding Period Returns

	Market Adjusted Holding Period Return (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Closing Price	0.0385	0.0138	0.0247*	1.34	0.54	1.71
Day	0.1087**	0.0477	0.0610**	2.47	1.18	2.08
Week	0.1636*	0.1448	0.0188	1.73	1.61	0.34
Month	0.0727	0.1133	-0.0406	0.42	0.70	-0.47
Half Year	2.4236***	2.5242***	-0.1006	5.99	6.71	-0.48
Year	3.6631***	3.6968***	-0.0338	5.93	6.67	-0.14

Panel C. Individual Investor Holding Period Returns after Financing Costs

	Market Adjusted Holding Period Return (%)			*t*-statistic		
Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
Closing Price	0.0385	0.0138	0.0247*	1.34	0.54	1.71
Day	0.0833*	0.0342	0.0491*	1.89	0.84	1.68
Week	0.0366	0.0773	-0.0407	0.39	0.85	-0.75
Month	-0.4334**	-0.1550	-0.2784***	-2.52	-0.95	-3.26
Half Year	-0.6813*	0.9223**	-1.6036***	-1.70	2.51	-7.60
Year	-2.3186***	0.7230	-3.0416***	-3.69	1.29	-12.93

Table 3

Individual Investor Performance after Financing Costs by Trade Size Groups

The table reports the individual investor average daily holding period return after financing costs in ASX-listed share CFDs across various trading holding periods from 5 November 2007 to 30 June 2010. 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 in 1991 real dollars and adjusted for inflation using the Consumer Price Index (CPI). Buy and sell portfolios are then calculated based on the buy or sell trade value weighted return from the traded price to the closing 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.

		Market Adjusted Holding Period Return (%)			*t*-statistic		
Trade Size Groups	Holding Period	Buys	Sells	Buys–Sells	Buys	Sells	Buys–Sells
1 (small trades)	Closing Price	0.0138	0.0089	0.0049	0.47	0.34	0.29
	Day	0.0626	0.0846**	-0.0221	1.24	1.99	-0.69
	Week	0.1288	0.2696**	-0.1408**	1.10	2.35	-2.19
	Month	0.0885	0.3362	-0.2477***	0.41	1.63	-2.61
	Half Year	-0.8698	0.5877	-1.4575***	-1.47	1.04	-6.56
	Year	-3.0318***	0.1065	-3.1384***	-4.28	0.16	-10.24
2	Closing Price	0.0339	0.0223	0.0116	1.36	0.90	0.77
	Day	0.0647	0.0086	0.0561	1.57	0.20	1.60
	Week	-0.0106	-0.0237	0.0131	-0.09	-0.21	0.19
	Month	-0.4556*	-0.1384	-0.3172**	-1.88	-0.61	-2.08
	Half Year	-1.7117***	-0.1947	-1.5170***	-4.29	-0.51	-5.71
	Year	-2.7829***	0.1215	-2.9045***	-4.16	0.18	-8.36
3 (large trades)	Closing Price	0.0612	0.0225	0.0387*	1.63	0.59	1.69
	Day	0.1316*	0.0384	0.0932*	1.94	0.68	1.69
	Week	-0.0186	0.0784	-0.0970	-0.15	0.60	-1.10
	Month	-0.6632***	-0.3365	-0.3267**	-2.91	-1.25	-2.19
	Half Year	-0.1805	1.2779***	-1.4584***	-0.36	2.81	-3.70
	Year	-1.8919***	0.9393	-2.8312***	-2.61	1.55	-5.30

Table 4

Excess Market Timing Returns of CFDs Investors

Every day, we first calculate the net volume bought or sold in a stock as we did when calculating the buy minus sell portfolios returns. Furthermore, we 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 trading 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.

Holding Period	Excess Market Timing Holding Period Return	*t*-statistic	Excess less Financing Costs	*t*-statistic
Day	-0.0257*	-1.87	-0.0297**	-2.15
Week	-0.0531	-1.52	-0.0698*	-1.96
Month	-0.2695***	-3.28	-0.3385***	-3.82
Half Year	-1.8284***	-9.99	-2.2948***	-9.58
Year	-3.6976***	-14.05	-4.7149***	-12.30

Table 5

Individual Investor Daily Dollar Profits from Trades and Overnight Positions Held

The table reports the average daily total dollar profits of individual investors, average daily traded value and average daily overnight positions held in ASX-listed share CFDs from 5 November 2007 to 30 June 2010. Individual investor trades are identified as those 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.

	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	1,495*	1.80	-4,933	-0.74	-2,702***	-17.13	-6,140	-0.87	3.09	11.70
Sell Trades/ Positions	1,816**	2.05	19,714	0.25	15,380***	19.22	36,909	0.46	3.31	-121.04
Total	3,311***	5.76	14,781	0.20	12,678***	16.35	30,769	0.41	6.40	-109.94

Figure 1
Cumulative Profits of Individual Investors

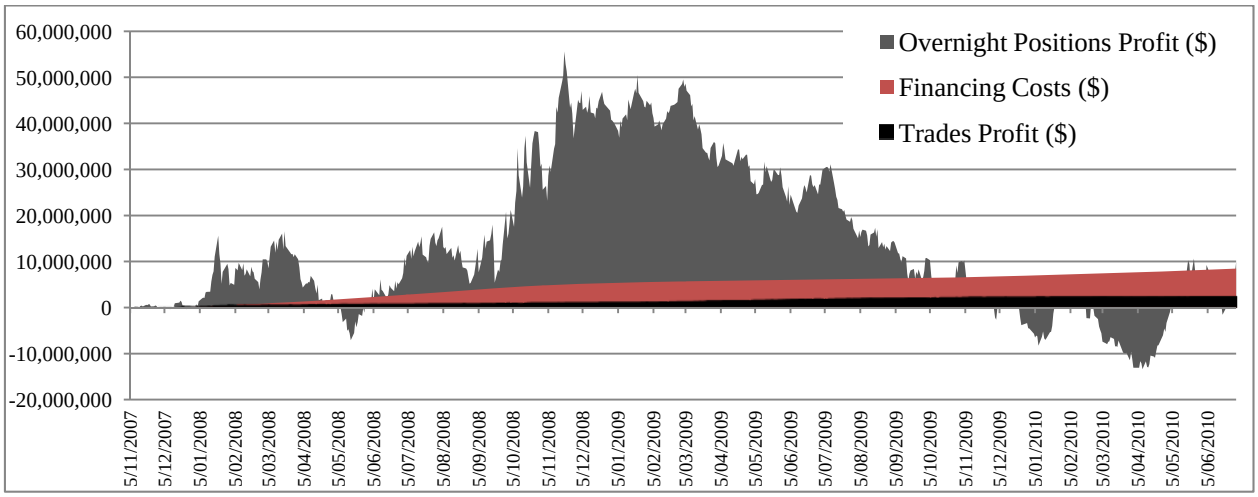

Figure 2
Net Dollar Positions Held Overnight by Individual Investors vs. Cumulative S&P/ASX 200 Accumulation Index Return