Hot and Cold Strategies: Australian Evidence

Vikash Ramiah, Tafadzwa Mugwagwa, and Tony Naughton

School of Economics, Finance and Marketing, RMIT, GPO Box 2476V, Melbourne, 3001, Australia.

Abstract

This study explores a high-frequency tactical asset allocation strategy. In particular, we investigate the profitability of momentum trading strategies and contrarian investment strategies for equities listed on the Australian Stock Exchange (ASX). This paper takes into consideration the short-selling restrictions imposed by the ASX on the stocks used in these two strategies. We look at the relationship between stock returns and past trading volume for these equities within our sample portfolios. This research also investigates the seasonal aspects of contrarian portfolios and observes an April effect. We report significant contrarian profits for the period investigated and show that contrarian profit is a persistent feature for the strategies examined. We also document that contrarian portfolios earn returns as high as 6.54% per day for portfolios with no short-selling restrictions, and 4.71% on the restricted model. The results also support the view that volume traded affects stock returns and shows that market imperfections such as short-selling restrictions affect investors' return.

JEL Classification: G11, G12, G15
EFM Classification: 320, 330, 350, 370, 720

Keywords: Contrarian, Momentum, Turnover Ratio, Past Returns, Short-Selling, Seasonality, Market Imperfections

The authors wish to acknowledge the invaluable research assistance of Anh Minh Le, Dharshini Jayaraj, Jin Li, Phuong Nguyen, Hoa Nguyen, Ashwin Madhou, Binesh Seetanah and Stuart Thomas in data gathering, computation, programming, graphing and proofreading. Any remaining errors are the responsibility of the authors.

I. Introduction

Asset allocation decisions are challenging tasks for investors. Brinson, Hood and Beebower (1986) and Vora and Ginnis (2000) emphasise the complexity of the challenge at the individual level. Even at the most basic level of choosing between stocks and bonds there are no simple solutions for investors. The traditional assumption that investors have a long term horizon is part of this challenge [(see Merton (1981) and O'Brien (2006)]. Such an assumption in asset allocation usually results in fixed weight asset allocation and clearly such strategies are not appropriate for investors with short-term horizons. Our study focuses on investors with short-term horizons and thus advocates a dynamic asset weight allocation. We propose a zero-cost investment strategy in the form of a contrarian high-frequency tactical asset allocation strategy whereby investors select only stocks; buying extreme losers and short-selling extreme winners on a daily basis.

Empirical evidence supports that past stock returns can predict return reversals and return continuations for different horizons. Jegadeesh and Titman (1993) look at return continuations and refer to this phenomenon as momentum strategy. Arbitrageurs can potentially take advantage of this by buying well-performing stocks and selling poor-performing stocks. DeBondt and Thaler (1985) on the other hand demonstrate that investors can buy the losers and short sell the winners to earn abnormal profit. They argue that prior losers generally outperform the market and generally prior winners underperform, that is returns reversal. Abnormal profits of momentum [1] strategies and contrarian [2] strategies have been documented in numerous markets in the world.

[1] See, Rouwenhorst (1998), Rouwenhorst (1999), Schiereck, DeBondt and Weber (1999), Chan, Hameed, and Tong (2000), Lee and Swaminathan (2000), Liu and Lee (2001), Hameed and Kusnadi (2002), Hogan et al (2004), Ellis and Thomas (2004), Menkhoff, and Schmidt (2005), Naughton, Ramiah and Veeraraghavan (2006) and many others.

Most of these studies face a problem of lack of practicability. First of all most studies do not take into consideration market imperfections such as the short-selling restrictions imposed by many stock exchanges. Studies conducted on monthly holding periods can be unrealistic in some markets in the sense that short-selling positions must be closed in a much shorter period after the transaction has occurred. In addition many stock exchanges restrict short-selling to a small sample of highly liquid stocks or those with options available. In other markets short-selling is not permitted on any stock. Many studies deal with extreme winners and extreme losers with extreme stocks defined as either the top decile or the bottom decile of returns. In any particular exchange, the investment and transaction costs involved in executing any of these strategies can be very expensive and very often out of reach to small retail investors. The first objective of this paper is to test whether practical and affordable momentum-contrarian strategies work on the Australian Stock Exchange (ASX). The profitability of these trading strategies is not unknown in the chosen market. For instance Lee, Chan, Faff and Kalev (2003), Lo and Coggins (2006), Durand, Limkriangkrai and Smith (2006) and Monagle, Ramiah, Jing, Hallahan and Naughton (2006) demonstrated the profitability of short-term contrarian profits on the Australian market, while Hurn and Pavlov (2003), Gaunt and Gray (2003), Hodgson, Masih and Masih (2004), Drew, Veeraraghavan and Ye (2004), Demir, Muthuswamy and Walter (2004) and Benson, Gallagher and Teodorowski (2005) reported the profitability of momentum investment strategies in the same market.

[2] See, Ball, Kothari and Shanken (1995), Brouwer, Van Der Put and Veld (1997), Bacmann and Dubois (1998), Fung (1999), Fung, Leung and Patterson (1999), Mun, Vasconcellos and Kish (1999), Hameed and Ting (2000), Kang, Liu and Ni (2002), Lihara, Kato and Tokunaga (2004), Otchere and Chan (2003), Drehmann , Forner and Marhuenda (2005), Assoe and Sy (2004), Novak and Hamberg (2005), Antoniou, Galariotis and Spyrou (2005), Diether, Lee and Werner (2005), Ramiah, Naughton, Hallahan, Cheng, and Orriols (2006) and many others.

Lee et al. (2003), Lo and Coggins (2006), Durand et al. (2006) and Monagle et al. (2006) studied the Lo and MacKinlay (1990), Jegadeesh and Titman (1993) version of the contrarian strategy and found that arbitrageurs could earn excess profits from overreaction in Australia prior to transaction costs. Using weekly data, Lee et al. (2003) attempt to explain contrarian profits with factors like measurement errors, seasonality, volume, firm size and transaction cost. They argue that these profits are primarily driven by firm size with overreaction to firm specific information. Following Dreman and Lufkin (1997), Monagle et al. (2006) employed monthly data, to test if these trends and fashions persist within specific industries of the Australian market. Durand et al. (2006) formed monthly momentum portfolios and reported effects contrary to momentum portfolios, that is contrarian profit. Lo and Coggins (2006), on the other hand, used daily and intra-day returns and applied the same strategy to the top 200 stocks on the Australian Stock Exchange. They showed that the hourly estimated profits are positive at short lags and that the profits quickly diminished. Consistent with Lee et al. (2003), Lo and Coggins (2006) argue that contrarian profits disappear after allowing for transaction costs.

Given the success of these trading strategies, many researchers studied the factors that drive these momentum and contrarian returns. One well established factor is trading volume. In the area of contrarian strategies, Conrad, Hameed and Niden (1994), Chordia and Swaminathan (1999), Bremer and Hiraki (1999), Hameed and Ting (2000) find that returns of portfolios containing high trading volume leads returns of portfolios comprised of low trading volume stocks while Yoshio, Hideaki-Kiyoshi and Toshifumi (2002), Lee et al. (2003), Monagle et al. (2006) and Ramiah et al. (2006) showed otherwise, that is, low volume determines contrarian profits. Lee and Swaminathan (2000), Connolly and Stivers (2003) and Wongchoti and Pyun (2005) show that past trading volume can provide an important link between momentum and value strategies as past trading volume can predict the magnitude and persistence of

price momentum. Lee et al. (2003) and Monagle et al. (2006) using monthly data found that portfolios of heavily and frequently Australian traded securities tended to earn substantially lower contrarian profits than low trading activity portfolios. Hence the second objective of this paper is to use daily data to test whether contrarian return from Australia are driven by low volume traded stocks, as pinpointed by earlier researchers.

Heston and Sadka (2004) examined the seasonal structure of momentum returns and observed January, October and December effects in these returns. Grinblatt and Moskowitz (2004) argued that the profitability of the three-year reversal strategy was largely confined to January in the United States. They also found that contrarian returns were strongly negative in December for losing firms pointing to tax-loss trading as a driver of the good portion of the profitability of momentum strategies. Yalcin (2003) showed robust January seasonality effects in contrarian returns. Spyrou, Kassimatis and Galariotis (2005) detected a manifestation of the January-effect in underreaction scenarios and showed that market shocks predominantly occur on either Mondays or Fridays. In Australia, there are however mixed results. Lee et al. (2003) controlled for January and July calendar effects and reported no seasonality for these two periods while Durand et al. (2006) documented a July effect. To our best knowledge, there is no current study on the daily seasonal aspects of contrarian profit in Australia, and our final objective will be to test if there are significant day of the week effect, and to also shed some lights on the existing debate about monthly effects in Australian contrarian profits. We further test for a yearly effect to examine the issue of persistence.

On a daily basis the Australian Stock Exchange (ASX) reports the top performing stocks (hot stocks) and worst performing stocks (cold stocks). With this in mind, we develop and test zero-cost trading strategies. The first approach is an unrestricted

model where no short-selling restrictions are imposed on the extreme portfolios. Where extreme losers subsequently outperform (underperform) the extreme winners, the state is referred to as the unrestricted contrarian (momentum). Next we impose the short-selling restriction enforced by the ASX, and hence have the restricted momentum and restricted contrarian strategies. A unique characteristic of this paper is the use of daily formation of momentum and contrarian portfolios. The contribution of this paper is that it shows a very simple, inexpensive, realistic and practical way of taking advantage of zero-cost trading strategies.

We find that most of the strategies tested exhibit a very strong contrarian effect, suggesting that returns are driven by the contrarian phenomenon. On average, a zero-cost portfolio that invests in yesterday's losers and sells yesterday's winners earns returns as high as 6.54% per day. Not surprisingly this return was recorded in the unrestricted model. The returns in the unrestricted model were consistently higher than the restricted one, illustrating a clear short-selling effect on contrarian portfolios. Interestingly, when replicating the trading volume sort we find that trading volume clearly plays a role in predicting future returns of stocks. In other words, trading volume can help predict the persistence and the reversal of contrarian pattern in the short-run. Our results support the findings of Lee et al. (2003) and Monagle et al. (2006), in that low volume stocks drive Australian contrarian profits. We also document an unexplained April effect in the contrarian profits. The rest of the paper is organised as follows: In Section II we present the data and methods used in this paper. Section III presents the empirical findings while Section IV concludes the paper.

II. Data and Methods

Data

Daily stock return index, trading volume and the number of outstanding shares for the period 27.07.2001 to 27.03.2006 are obtained from Datastream. We have a total of 1582 stocks in our study. The ASX reports the hot and cold stocks on their website on a daily basis, and in this study we use the 1582 to replicate their hot and cold stocks. The daily average of the variables for the entire period is calculated and Table 1 shows the descriptive statistics for the above variables. On average the daily return in Australia is statistically different from zero, positively skewed and leptokurtic. Jarque-Bera (JB) statistics show that the daily returns are not normally distributed, and this is consistent with Fama (1976).

The ASX uses the following guidelines to approve stocks for short-selling. The stock must be a liquid one with at least 50 million shares on offer. Not more than 10 percent of the securities on issue may be short sold and investors are required to report their net short sold positions to the exchange each day. Short-selling is also not permitted if the security is under an offer of takeover or if the short sell order price is lower than the last sale price. At the end of each trading day, the exchange releases an “approved list” which consists of stocks that are eligible for short-selling the following day. The approved lists for the period studied were supplied by the ASX for the period 02.07.2001 to 27.03.2006.

Methodology

Our unrestricted momentum and contrarian portfolio construction follows the methodologies used by Lo and MacKinlay (1990), Jegadeesh and Titman (1993), Lee and Swaminathan (2000), Kang, Liu and Ni (2002), and Ramiah et al. (2006).

First, we define the absolute daily return as follows:

$$DR_{it} = \frac{(SRI_{it} - SRI_{it-1})}{SRI_{it-1}} \quad (1)$$

Where

DR_{it} is the daily return on the stock *i* over the period from *t-1* to *t*.

SRI_{it} is the stock total return index (includes adjustment for capitalisation changes and dividends) for the share *i* at time *t*.

Consistent with most contrarian studies, we use a discrete returns specification in preference to log returns as a log returns specification will dampen the extreme effects we are attempting to capture. Similar to some of the above cited studies, we use actual returns instead of abnormal returns.

Portfolios are then formed on a daily basis. At the beginning of each day from 27.03.2001 to 27.03.2006, we rank all eligible stocks independently on the basis of past returns. We focus on the top ten winners and top ten losers. Next the portfolios are held for *K* days (where *K* = 1, 5, 20, 60, 90 and 260 days). Returns for *K*-day holding period are based on equally weighted average returns of every stock in the portfolios. For example, the daily return for a three-day holding portfolio is the average of the portfolio return from today's strategy, yesterday's strategy and strategy from two days ago. We focus on the extreme winner and loser over the next *K* days. The unrestricted contrarian (momentum) strategies are to sell (buy) the winner portfolio and buy (sell) the loser portfolio for different holding and formation periods. The return on the zero-cost unrestricted contrarian portfolio is equal to the return on the cold stocks, RC, minus the return on the hot stocks, RH. On the other hand, the return on the zero-cost unrestricted momentum portfolio is equal to the return on the hot stocks, RH, minus the return on the cold stocks, RC. As for the

restricted models, we only include the stocks on the approved list in the short-selling portfolios.

The hot and cold portfolios are then classified into high volume portfolios (H), medium volume portfolios (M) and low volume portfolios (L), based on average daily trading volume. We adapted and adjusted the definition of trading volume from Campbell, Grossman, and Wang (1993) and Lee and Swaminathan (2000).Trading volume is defined as the average daily turnover ratio where the daily turnover ratio is obtained by dividing the daily trading volume of a stock by the number of shares of the same stock at the end of the day. The low, medium and high portfolios refer to stocks with smallest to largest trading volume. The strategy is to take a long position in the high volume traded portfolios and sell the low volume traded in each extreme portfolio. Therefore, H-L return can be calculated for both the hot and cold portfolios. When these returns are positive (negative) we can conclude that, conditional on past returns, high volume stocks generally perform better (worse) than low volume stocks.

Given the gap in the literature on the seasonal aspect of zero-cost strategies, this section discusses the methodology used to test for seasonalities. We develop an OLS regression model to capture seasonal effects, in which the dependent variable is return on the zero-cost trading strategies and the independent variables are dummy variables representing day of the week, month of the year and the calendar year, as specified in equation (2):

$$RET_{S,t} = \alpha_0 + \sum_{i=1}^{1} \beta_{1,i} RET_{S,t-i} + \sum_{j=1,\neq 3}^{5} \beta_{2,j} DAY_j + \sum_{k=1,\neq 9}^{12} \beta_{3,k} MTH_k + \sum_{l=2002}^{2006} \beta_{4,l} YR_l + \varepsilon_t \quad (2)$$

Where:

$RET_{S,t}$ represents the return for zero-cost strategy S at time t;

α_0 represents the constant term;

DAY_j represents the dummy variable for each day of the week (j=1 for Monday, 2 for Tuesday, ..., 5 for Friday). The dummy variable for Wednesday is dropped;

MTH_k represents the dummy variable for each month (K=1 for January, 2 for February, ..., 12 for December). The dummy variable for September is dropped;

YR_l represents the dummy variable for each year included in the sample period (l=2002, …, 2006). The dummy variable for 2001 is dropped;

To avoid the dummy variable trap, observations at Wednesday, September and the year 2001 were incorporated into the constant term α in the model as the base case for each dummy series. These base cases were selected as the trading interval, day, month and year in which returns activity was the lowest. Standard tests and residual diagnostics (that is normality test, autocorrelation, and heteroscedasticity and ARCH effects) revealed no misspecification of the above model.

III. Empirical Findings

This section reports the returns for different contrarian-momentum, volume-based contrarian-momentum strategies and the seasonal aspects of these strategies. We confirm strong contrarian behaviour in that contrarian effects are present in both the restricted and unrestricted model. Momentum effects on the other hand are documented in the momentum-restricted model to a lesser degree. The contrarian phenomenon was the strongest effect for these equities, most notably in the unrestricted contrarian portfolios. We find evidence of a relationship between stock returns and trading volume over the short-term holding period. The results show that contrarian returns are generally higher in April, implying an April effect.

Simple Strategies

Table 2 summarises the empirical results from several trading strategies in the different states. We report the mean return from a dollar-neutral strategy of selling (buying) extreme winners and buying (selling) extreme losers, RC-RH (RH-RC) without imposing any restriction. After imposing the short-selling restriction on the short-selling portfolios, we report the restricted contrarian profits and the restricted momentum profits. At the beginning of each day, stocks are ranked and grouped into two groups on the basis of their yesterday's returns. Thus, there are two portfolios with the ten top winners (hot stocks) and the bottom ten worst losers (cold stocks) every day from 27.03.2001 to 27.03.2006.

We report results for the extreme losers (RC) and the winner (RH). On each day, we also take a long position in the loser portfolio and short the winner portfolio. The return from this zero-cost portfolio is shown as RC-RH. The results in Table 2 suggest a clear and consistent contrarian effect for the hot and cold stocks listed in the Australian Stock Exchange. Returns for cold portfolios are significantly larger than those of stocks in the hot portfolios. These results are consistent in both the unrestricted and restricted contrarian models.

Rows 4 to 10 report the equal-weighted average daily returns over the next *K* days (*K*=1, 5, 20, 60, 120, 180, and 260). For example in the unrestricted contrarian model (see Table 2), when *K*=5, past losers on average win 2.16 % over the next five days while past winners on average lose 0.42% over the same period. The zero-cost portfolio which shorts the hot and buys the cold earns 2.58% over five days. In this short-run study, we observe that the differences in daily returns between cold and hot portfolios are positive and significant for every value of *K*, implying a clear contrarian effect.

This result is persistent in the restricted contrarian model. On average, these differences are very high. For example in the restricted model, the zero-cost portfolio earns on average per day 2.19% when *K*=5. Note that the strategy is to buy the cold stocks and to short sell the hot stocks. As a result, the returns of the losers (RC) do not change. However when we apply the short-selling restrictions to the hot portfolios, it reduces the loss from –0.42% to –0.02% when *K*=5 (see Table 2). This change in returns occurs in every other holding period, implying that short-selling restrictions do affect portfolio return. The net results of applying short-selling restrictions on contrarian portfolios, is that it reduces the contrarian profits for holding periods of 1 day and 5 days while it moderately increases contrarian profit for longer holding periods. The remaining rows of Table 2 report the daily returns for each portfolio for up to 260 days following the portfolio formation. We find that the contrarian effects are larger for holding periods of less than 60 days for both the restricted and unrestricted model. From 60 days onwards, a reversal pattern is observed for these portfolios and both models revert at the same rate.

We now analyse the momentum-restricted model. The momentum-restricted returns based on our range of holding periods are shown in Table 2 and then illustrated in Exhibit 1A. The strategy is to buy the hot stocks and short sell the cold stock, and in this analysis we apply the short-selling restrictions to the cold stocks. Instead of reporting RC-RH, we report the RH-RC in the last column of Table 2. With the exception of the one-day and five-day formation periods (*K*=1 and *K*=5), all other formation periods show moderate momentum. The results show a 0.29% momentum return for a holding period of 260 days. For holding periods of less than 5 days, the momentum-restricted models show a negative profit, and this can be interpreted as contrarian profits. This contrarian profit observed in this momentum-restricted model is consistent with the contrarian strategies discussed earlier. The profit is larger for shorter holding periods. The results imply that investors investing in hot and cold

stocks should adopt a contrarian investment strategy where they short sell the hot stocks and buy the cold portfolio. Further, short-selling restrictions imposed by the Australian Stock Exchange have a negative impact on contrarian profits.

The contrarian returns for the restricted and unrestricted model and the momentum return are graphically shown in Exhibit IA. The three strategies show the highest returns in the first day of holding followed by a quick decline. For holding periods less than 5 days, the mean reversal process is quicker than for the longer formation periods. Note that the momentum return is negative, thus exhibiting contrarian profits. The same reversal pattern is observed as before. All formation periods converge to about 0.2% return after K=60 days and remain around this level for longer formation periods (see Exhibit 1A). Exhibit 1B shows the returns for the cold stocks and the returns on the restricted cold portfolios is zero regardless of the holding period. Note that the returns for the cold stocks are the same for the restricted and unrestricted contrarian portfolios. The returns are at their highest when the holding period is one day and steadily decreases over time, suggesting that the contrarian profits from the restricted and unrestricted contrarian model is driven by the cold stocks. This is confirmed in Exhibit 1C where the returns of the hot portfolios are zero. Another important conclusion that can be drawn from these graphs is that whenever the short-selling restriction (that is the approved list is taken into consideration) is enforced, the returns of these portfolios are decreased to zero. The benefit of short-selling under these scenarios is to generate a cash flow, which will help to finance the acquisition of the long portfolio, thus creating a notional zero-cost portfolio.

We can conclude that the optimal hot and cold strategy in Australia is to short sell the hot portfolios and to buy the cold portfolios. To maximise returns, a one-day holding period is preferred. This strategy generates the highest return irrespective of the short-selling restrictions. The inefficiency of market restrictions is suggested by the

reduced investors' returns under short-selling restrictions. We find that investors with short-term horizons should invest in contrarian portfolios rather than momentum strategies, consistent with Lee et al. (2003), Lo and Coggins (2006), Durand et al. (2006) and Monagle et al. (2006). Using weekly data over the period of 1994 to 2001 and limiting the sample to the stocks included in the All Ordinaries Index (AOI), Lee et al. (2003) showed an excess return of 0.017% per week. Monagle et al. (2006) find that on average, a zero-cost portfolio that invests in past losers and sells past winners earns returns as high as 11.74% per month in the Health Sector for period of 2001 and 2006. In addition Lo and Coggins (2006) reported that the daily returns were higher than the hourly returns for the period 2000 and 2002. We can thus argue that contrarian profits are not data irregularities but instead a persistent feature of the Australian equity market over the period of 1994-2006.

Stock Returns and Past Trading Volume

In this section we examine whether there is any relationship between stock returns and past trading volume for the hot and cold stocks. Table 3 reports returns for portfolios formed on the basis of a two-way sort between past returns and past trading volume for the unrestricted contrarian strategy[3]. Our results support the theory that trading volume helps predicting stock returns. In this respect our findings support prior research in the informational content of trading volume.

Several interesting results are evident in Table 3. Conditional on past returns, when lower volume stocks perform better than high volume stocks, the H (high volume) - L (low volume) portfolios results in a negative return. Our results show negative returns for H-L for both the loser and contrarian portfolios. From this we conclude that conditional on past returns, there is evidence that low volume stocks outperform high

[3] Note that we report the results for the unrestricted contrarian model only, as this strategy yields the highest profit.

volume stocks for both portfolios over the subsequent 260 days. We also observe that the medium (M-L) strategy generates significant[4] negative returns on the losing portfolios (RC), hot portfolios (RH) and the contrarian portfolios (RC-RH). Our findings on the influence of trading volume on Australian contrarian profits are consistent with Lee et al. (2003) and Monagle et al. (2006). Furthermore this result is consistent with Yoshio, Hideaki-Kiyoshi and Toshifumi (2002) and Ramiah et al. (2006) but inconsistent with Conrad et al. (1994), Bremer and Hiraki (1999), and Hameed and Ting (2000) who reported that contrarian profits are driven by high volume traded portfolios.

In Table 3 we also report returns of RC-RH. For example, when *K*=1, the high volume cold portfolio earns 3.43% while the low volume cold portfolio earns a higher return (4.77%). A zero-cost portfolio which buys the high volume traded in the cold portfolios and short sell the low volume traded in the cold portfolios loses 1.34%. If we apply the same trading strategy to the contrarian profits, the portfolio will lose 1.81%.This is consistent across the different holding periods implying that cold and contrarian returns are dominated by low volume traded. This may also reflect the illiquidity premium of the cold stocks. It is worth noting that as the holding period increases the return decreases. However when the strategy is applied to the hot stocks, we observe a positive return of 0.47% but this pattern is not consistent across the different holding periods. In other words, low trading volume can help predict the persistence and the reversal of contrarian profits and cold stocks pattern in the Australian market.

Seasonal Aspects of Contrarian, Hot and Cold Returns

Results of the regression analysis of equation 2 are presented in Table 4. We report the coefficients and t-statistics for each seasonal dummy variable and for the lagged

[4] Note that we do not report these t-statistics.

returns. We find that day-of-week effects are negative on Monday and Tuesday and are positive on Thursday and Friday for the three portfolios, namely contrarian profit, hot and cold portfolios. It implies that relative to Wednesday, returns of the three portfolios are lower for Monday and Tuesday and higher for Thursday and Friday. From these regression outputs, we observe that the results of the contrarian profits are similar to the cold portfolios. An interesting observation is that the return for the hot stock is at its worst on Monday and improves through the week. However none of them are statistically significant, that is we find no statistical evidence of day of the week effect in contrarian profits.

When the returns of the hot, cold and contrarian portfolios are grouped by month, we observe that returns for the cold and contrarian portfolios are significantly higher in April. The results of the regression analysis of Table 4 illustrate these findings and imply an April effect in cold and contrarian profits. The regression output indicates that relative to September, the returns of cold portfolios and contrarian portfolios for April are significantly higher. This apparent April effect is unexpected and unfortunately we do not have a clear explanation as to why it occurs. At best, we could speculate that preliminary financial reports are available around that time. Secondly we find no evidence of July effect in contrarian profits and thus, our results support Lee at al. (2003) but are inconsistent with Durand et al. (2006).

Results presented in Table 4 also show that contrarian returns are negative in January, August, October and December but are not statistically significant. Returns for cold portfolios are negative and insignificant for all months except April. As for the hot portfolios, the returns are negative in all the months and significant in February, May and June. It should be noted that Lee et al. (2003) looked at the January and July effect on contrarian profits and failed to establish any clear effect. In that sense, our results are consistent with the prior literature.

Relative to the year 2001, returns of contrarian and cold portfolios were consistently higher in the later years in the sample, however only year 2002 was statistically significant. The winners' portfolios returns decreased relative to 2001 for all other periods, with significant results for 2002, 2005 and 2006 (see Table 4).

In summary, we observe contrarian profits in the Australian Equity markets, and we partially explain this irregularity with volume information and an unexplained April effect. Low volume traded stocks appear to drive the contrarian profits and perhaps this is simply reflecting an illiquidity premium in the market. Monagle et al. (2006) explain this phenomenon with industry effects and observed that market return, size, and book-to-market factors cannot account for these profits. Lee et al. (2003) argue that this trend may be driven by firm specific factors, measurement errors, seasonal factors, volume, and firm size while behavioural finance theorists attempt to explain this with an overreaction hypothesis. Given that the contrarian profits originate primarily from the loser portfolios, one can argue that the Australian market tends to have a propensity to overreact to bad news. We conducted a preliminary investigation of the announcements made of the cold stocks through the Signal G dataset and this lead us to suspect that bad news are not limited to earnings warnings but may originate from sources such as: issue of debt or equity; industry and macroeconomic factors; change in management; and market share or turnover announcements. Lee et al. (2003) and Lo and Coggins (2006) showed that contrarian profits for shorter interval rebalancing periods disappear after transaction costs are included. Chan (2003) argued that asymmetry exists between responses to good news versus bad news; while Gaunt, Gray and McIvor (2000) show a size effect in Australian equity returns. These factors are outside the scope of this paper, and further study is warranted on how these factors affect the hot and cold strategies.

IV. Conclusions

In this paper, we investigate various contrarian-trading strategies for equities listed on the Australian Stock Exchange. We test whether a retail investor can use information provided by the exchange to construct simple zero-cost trading strategies. We find evidence of substantial contrarian profits during the period 2001 to 2006. A contrarian strategy that goes long in past bottom ten losers and short in past top ten winners on average can earn up to 6.54% per day. When more practical portfolios are formed, that is by imposing short-selling restrictions, we find that contrarian strategies continue to work but to a moderately lower magnitude. We also consider the role of trading volume in explaining contrarian profits. Our results support the existing literature, in that we find past trading volume to be influential in predicting future returns of stocks in shorter-term horizons. Our analysis show that contrarian portfolios and extreme losers' portfolios are mostly made up of low volume traded stocks. We also investigate the seasonal effects of these strategies. We do not observe any significant day of the week effect and we find an unexpected April effect in the contrarian and cold returns. This study does not take transaction costs into account and we believe that this would be an interesting area for future research.

Reference

Antoniou, Antonios, Emilios C. Galariotis and Spyros I. Spyrou, 2005, Contrarian Profits and the Overreaction Hypothesis: the Case of the Athens Stock Exchange, European Financial Management 11, 71-98.

Assoe, Kodjovi, and Oumar Sy, 2004, Profitability of the short-run contrarian strategy in Canadian Stock markets, Canadian Journal of Administrative Sciences 20, 311-320.

Bacmann, Jean Francois, and Michel Dubois, 1998, Contrarian strategies and cross-autocorrelations in stock returns: Evidence from France, Social Science Research Network, working paper series.

Ball, Ray, S.P. Kothari, and Charles Wasley, 1995, Can we implement research on stock trading rules: the case of short-term contrarian strategies, Journal of Portfolio Management 21, 54-63.

Benson, Karen L., David R. Gallagher, and Patrick Teodorowski, 2005, Momentum investing and the asset allocation decision, Social Science Research Network, working paper series.

Bremer, Marc, and Takato Hiraki, 1999, Volume and individual security returns on the Tokyo Stock Exchange, Pacific-Basin Finance Journal 7, 351-370.

Brinson, Gary P., Randolph L. Hood and Gilbert L. Beebower, 1986, Determinants of Portfolio Performance, Financial Analysts Journal, 42 (4), 39-44.

Brouwer, Iwan, Jeroen Van Der Put, and Chris Veld, 1997, Contrarian Investment Strategies in a European Context, Journal of Business Finance and Accounting 24, 1353-1366.

Chan, Ka, Allaudeen Hameed, and Wilson Tong, 2000, Profitability of momentum strategies in the international equity markets, Journal of Financial and Quantitative Analysis 35, 153-172.

Chan, Wesley S., 2003, Stock price reaction to news and no-news: drift and reversal after headlines, Journal of Financial Economics 70, 223-260.

Chordia, Tarun, and Bhaskaran Swaminathan, 1999, Trading Volume and Cross-Autocorrelations in Stock Returns, Journal of Finance 55, 913-935.

Connolly, Robert, and Christopher Stivers, 2003, Momentum and reversals in equity-index returns during periods of abnormal turnover and return dispersion, Journal of Finance 58, 1521-1555.

Conrad, Jennifer S., Allaudeen Hameed, and Cathy Niden, 1994, Volume and Autocovariances in Short-Horizon Individual Security Returns, The Journal of Finance 49, 1305-1359.

De Bondt, Werner F.M., and Richard Thaler, 1985, Does the Stock Markey Overreact?, The Journal of Finance 40, 793-805.

Demir, Isabelle, Jay Muthuswamy, Terry Walter, 2004, Momentum returns in Australian Equities: The influences of size, risk, liquidity and return computation, Pacific-Basin Finance Journal 12, 143-158.

Diether, Karl B., Kuan Hui Lee, and Ingrid M. Werner, 2005, Can short-sellers predict returns? Daily evidence, Journal of Financial Economics 61, 77-106.

Dreman, D.N., and Lufkin E.A., 1997, Do contrarian strategies work within industries?, Journal of Investing 6, 7-29.

Drehmann, Mathias, Joerg Oechssler, and Andreas Roider, 2005, Herding and contrarian behaviour in financial markets: An Internet Experiment, The American Economic Review 95, 1403-1427.

Drew, Michael, Madhu Veeraraghavan, and Min Ye, 2006, Do Momentum Strategies Work? Australian Evidence, forthcoming in Managerial Finance.

Durand Robert B., Limkriangkrai Manapon, Smith Gary, 2006, Momentum in Australia—A Note, Australian Journal of Management 31 No.2, 355-364.

Ellis, Mark, and Dyaln C. Thomas, 2004, Momentum and the FTSE 350, Journal of Asset Management 5, 25-36.

Fama, Eugene F., 1976, Foundations of Finance, Basic Book, New York, Inc.

Fung, Alexander K.W., 1999, Overreaction in the Hong Kong Stock Market, Global Finance Journal 10, 223-230.

Fung, Hung Gay , Wai K. Leung, and Gary A. Patterson, 1999, Do trading rules based upon winners and losers work across markets? Evidence from the Pacific Basin and U.S Markets, Multinational Finance Journal 3, 41-70.

Gaunt, Clive, Gray, Philip, 2003, Short-Term Autocorrelation in Australian Equities, Australian Journal of Management 28, 97-117.

Gaunt, Clive, Gray, Philip, McIvor, Julie, 2000, The impact of share price on seasonality and size anomalies in Australian equity returns, Accounting and Finance 40, 33-50.

Grinblatt, Mark, and Tobias J. Moskowitz, 2003, Predicting stock price movements from past returns: the role of consistency and tax-loss selling, Journal of Financial Economics 71, 541-579.

Hameed, Allaudeen, and Yuanto Kusnadi, 2002, Momentum strategies: Evidence from the Pacific Basin Stock Markets, Journal of Financial Research 25, 383-397.

Hameed, Allaudeen, and Serena Ting, 2000, Trading Volume and short-horizon in contrarian profits: Evidence from the Malaysian market, Pacific-Basin Finance Journal 8, 67-84.

Heston, Steven L., and Ronnie Sadka, 2004, Seasonality in the Cross-section of Expected Stock Returns, Journal of Finance 42, 557-581.

Hodgson, Allan, Mansur M.A. Masih, and Runi Masih, 2004, Futures trading volume as a determinant of prices in different in different momentum phases, International Review of Financial Analysis 15, 68-85.

Hurn, Stan, and Vlad Pavlov, 2003, Momentum in Australian Stock Returns, Australian Journal of Management 28, 141-157

Jegadeesh, Naramsimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: implications for stock market efficiency, Journal of Finance 48, 65-91.

Kang, Joseph, Ming-Hua Liu, and Sophie Xiayoan Ni, 2002, Contrarian and momentum strategies in the China stock market: 1993-2000, Pacific-Basin Finance Journal 10, 243-265.

Lee, Charles M.C, and Bhaskaram Swaminathan, 2000, Price momentum and trading volume, Journal of Finance 55, 2017-69.

Lee, Daren D., Howard Chan, Robert W. Faff, and Petko S. Kalev, 2003, Short-term contrarian investing is it profitable? Yes and No, Journal of Multinational Financial Management 13, 385-404

Lihara, Yoshio, Hideaki-Kiyoshi Kato and Toshifumi Tokunga, 2004, The Winner-Loser effect in Japanese Stock Returns, Japan and the World Economy 16(4), 471-485.

Lo, Andrew, and Craig MacKinlay, 1990, When are contrarian profits due to stock market overreaction?, Review of Financial Studies 3,175-250.

Lo, Kevin, and Richard Coggins, 2006, Effects of Order Flow Imbalance on Short-horizon Contrarian Strategies in the Australian Equity Market, Pacific-Basin Finance Journal 14, 291–310.

Menkhoff, Lukas, and Ulrich Schmidt, 2005, The use of trading strategies by fund managers: some first survey evidence, Applied Economics 37, 1719-1730.

Merton Robert C., 1981, On Market Timing and Investment Performance. An Equilibrium Theory of Value for Market Forecasts, The Journal of Business 54 (3), 363-407.

Monagle, Shannon, Vikash Ramiah, Wei Jing, Terry Hallahan, and Tony Naughton, 2006, Decomposing Contrarian Strategies by the Global Industry Classification Standard: Australian Evidence, RMIT, School of Economics, Finance and Marketing, Working Paper.

Mun, Jonathan C., Geraldo M. Vasconcellos, and Richard Kish, 1999, Tests of the Contrarian Investment Strategy Evidence from the French and German stock markets, International Review of Financial-Analysis 8, 215-234.

Naughton, Tony, Vikash Ramiah, and Madhu Veeraraghavan, 2006, First and Second Board Momentum Strategies in Singapore, RMIT, School of Economics, Finance and Marketing, Working Paper.

Novak, Jiri, and Mattias Hamberg, 2005, Contrarian investment, Accounting conservatism and Transitory earnings, Journal of Financial Economics 43, 3-27.

O'Brien John, 2006, Rebalancing: A Tool for Managing Portfolio Risk, Journal of Financial Service Professionals 60 (3), 62-68.

Otchere, Isaac, and Jonathan Chan, 2003, Short-term Overreaction in the Hong Kong Stock Market: Can a Contrarian Trading Strategy Beat the Market, Journal of Behavioral Finance 4, 157-171.

Ramiah, Vikash, Tony Naughton, Terry Hallahan, Ka Y. Cheng, and Julien Orriols, 2006, Contrarian investment strategies work better for dual listed companies: Hong Kong evidence, RMIT, School of Economics, Finance and Marketing, Working Paper.

Rouwenhorst, Geert K., 1998, International momentum strategies, Journal of Finance 53, 276-284.

Rouwenhorst, Geert K., Steven L. Heston, and Roberto E. Wessels, 1999, The role of beta and size in the cross-section of European stock returns, European Financial Management 5, 9–28.

Schiereck, Dirk, Werner DeBondt, and Martin Weber, 1999, Contrarian and momentum strategies in Germany, Financial Analysts Journal 55, 104-116.

Spyrou, Spyros, Kostantinos Kassimatis, and Emilios Galariotis, 2005, Short-term Overeaction, Undereaction and Efficient Reaction: Evidence from the London Stock exchange, Journal of Finance 54, 2143-2184.

Vora, Premal P. and John D. McGinnis, 2000, The Asset Allocation Decision in Retirement: Lessons from Dollar-Cost Averaging, Journal of Financial Services Review 9, 47-63.

Wongchoti, Udomsak, and Chong Soo Pyun, 2005, Risk-adjusted long-term contrarian profits: Evidence from Non-S&P 500 high-volume stocks, The financial Review 40, 335-359.

Yalcin, Atakan, 2003, Gradual information Diffusion and Contrarian Strategies, Journal of Financial Economics 38, 361-381.

Table 1: Descriptive Statistics of Daily Return, Volume, Number of Shares (NOSH) and Turnover Ratio from 2nd July 2001 to 27th March 2006

	Mean Return	Volume (000's)	NOSH (000's)	Turnover Ratio
Mean	0.20%	539	172912	0.0032
Standard error	0.0004	34	10403	0.0001
Median	0.0011	146	81017	0.0021
Standard Deviation	0.0148	1353	12000	0.0023
Excess Kurtosis	633.46	89	563	437.40
Skewness	23.060	8	19	17.815
Range	0.5485	23976	12855262	0.1688
Minimum	-10.95%	0	15	0.0000
Maximum	43.90%	23977	12855277	0.1688
Count	1582	1582	1582	1582
JB-Statistic	26590618	532279	21019260	12694912

Table 2: Contrarian Portfolios, Momentum Portfolios and Stock Returns for Hot and Cold Stocks

This table presents average daily returns for the time period July 2001 to March 2006. RC represents the loser portfolio (Cold) and RH the winner portfolio (Hot). K represents daily holding periods where K=1, 5, 20, 60, 120, 180 or 260 days. Returns are average daily returns over the portfolio formation period. The numbers in italics are t-values.

		Unrestricted Contrarian	Restricted Contrarian	Restricted * Momentum
K=1	**RC**	4.57%	4.57%	0.02%
	t-Stat	*10.76*	*10.76*	*12.44*
	RH	-1.97%	-0.13%	-1.97%
	t-Stat	*-17.15*	*-4.96*	*-17.15*
	RC - RH	6.54%	4.71%	-1.99%
	t-Stats	*14.75*	*11.08*	*-17.20*
K = 5	**RC**	2.16%	2.16%	0.08%
	t-Stat	*24.66*	*24.66*	*10.78*
	RH	-0.42%	-0.02%	-0.42%
	t-Stats	*-11.60*	*-3.68*	*-11.60*
	RC - RH	2.58%	2.19%	-0.50%
	t-Stat	*28.63*	*26.23*	*-13.51*
K = 20	**RC**	0.91%	0.91%	0.04%
	t-Stat	*18.10*	*18.10*	*10.56*
	RH	0.12%	0.01%	0.12%
	t-Stat	*3.21*	*1.32*	*3.21*
	RC - RH	0.79%	0.90%	0.08%
	t-Stat	*12.68*	*18.05*	*2.17*
K = 60	**RC**	0.61%	0.61%	0.03%
	t-Stat	*24.11*	*24.11*	*12.30*
	RH	0.28%	0.01%	0.28%
	t-Stat	*13.07*	*5.64*	*13.07*
	RC - RH	0.33%	0.59%	0.25%
	t-Stat	*10.26*	*23.70*	*11.78*
K =120	**RC**	0.51%	0.51%	0.02%
	t-Stat	*27.33*	*27.33*	*11.85*
	RH	0.30%	0.01%	0.30%
	t-Stat	*21.22*	*8.65*	*21.22*
	RC - RH	0.20%	0.49%	0.28%
	t-Stat	*8.69*	*26.64*	*19.75*
K =180	**RC**	0.47%	0.47%	0.02%
	t-Stat	*27.59*	*27.59*	*12.44*
	RH	0.31%	0.01%	0.31%
	t-Stat	*24.59*	*10.43*	*24.59*
	RC - RH	0.17%	0.46%	0.29%
	t-Stat	*7.74*	*26.82*	*23.18*
K = 260	**RC**	0.44%	0.44%	0.02%
	t-Stat	*28.19*	*28.19*	*12.89*
	RH	0.30%	0.01%	0.30%
	t-Stat	*28.43*	*11.87*	*28.43*
	RC - RH	0.14%	0.43%	0.29%
	t-Stat	*7.23*	*27.41*	*26.99*

* This strategy buys winners and sells losers. We impose short-selling restrictions on the cold portfolios. Instead of reporting (RC – RH), we show the results for (RH – RC).

Table 3: Returns for Portfolios Sorted on Past Returns and Volume for Hot, Cold and Unrestricted Contrarian

This table represents average daily returns for unrestricted contrarian portfolios sorted on past return and past average daily turnover for the period July 2001 to March 2006. K represents the daily holding periods where K=1, 5, 20, 60, 120, 180, 260 days. RC represents the loser portfolio (Cold) and RH represents the winner portfolio (Hot). L represents the lowest trading volume portfolio, M represents the medium trading volume portfolio and H represents the highest trading volume portfolio. The numbers in parentheses are t-values.

		L	M	H	H-L
K =1	**RC**	4.77%	3.24%	3.43%	-1.34%
	T-Stat	*7.95*	*11.2*	*13.54*	*-2.06*
	RH	-2.13%	-1.41%	-1.66%	0.47%
	T-Stat	*-15.17*	*-5.63*	*-7.38*	*1.78*
	RC - RH	6.90%	4.65%	5.08%	-1.81%
	T-Stat	*11.16*	*12.18*	*14.85*	*-2.57*
K =5	**RC**	1.41%	1.01%	1.01%	-0.40%
	T-Stat	*26.98*	*12.31*	*10.97*	*-3.80*
	RH	-0.28%	-0.23%	-0.26%	0.01%
	T-Stat	*-6.58*	*-3.48*	*-3.68*	*0.17*
	RC - RH	1.68%	1.24%	1.27%	-0.42%
	T-Stat	*25.02*	*11.73*	*10.69*	*-3.04*
K =20	**RC**	0.75%	0.47%	0.51%	-0.24%
	T-Stat	*19.96*	*14.37*	*12.85*	*-4.34*
	RH	0.09%	0.06%	0.07%	-0.02%
	T-Stat	*4.42*	*2.05*	*1.67*	*-0.35*
	RC - RH	0.66%	0.42%	0.44%	-0.22%
	T-Stat	*16.06*	*9.20*	*7.22*	*-3.00*
K =60	**RC**	0.66%	0.36%	0.38%	-0.29%
	T-Stat	*18.43*	*17.36*	*16.7*	*-6.76*
	RH	0.29%	0.21%	0.21%	-0.08%
	T-Stat	*8.66*	*5.42*	*5.62*	*-1.63*
	RC - RH	0.37%	0.15%	0.17%	-0.20%
	T-Stat	*7.64*	*3.34*	*3.47*	*-3.00*
K =120	**RC**	0.55%	0.32%	0.34%	-0.21%
	T-Stat	*22.82*	*13.39*	*17.75*	*-6.94*
	RH	0.32%	0.20%	0.24%	-0.08%
	T-Stat	*12.61*	*9.03*	*6.68*	*-1.80*
	RC - RH	0.23%	0.12%	0.10%	-0.13%
	T-Stat	*6.75*	*3.44*	*2.17*	*-2.37*
K =180	**RH**	0.52%	0.29%	0.31%	-0.20%
	T-Stat	*23.31*	*15.3*	*17.67*	*-7.17*
	RC	0.31%	0.22%	0.26%	-0.05%
	T-Stat	*16.16*	*9.83*	*7.4*	*-1.05*
	RC – RH	0.21%	0.07%	0.05%	-0.16%
	T-Stat	*7.07*	*2.32*	*1.02*	*-2.98*
K =260	**RH**	0.48%	0.27%	0.30%	-0.18%
	T-Stat	*24.33*	*16.19*	*17.75*	*-6.76*
	RC	0.31%	0.22%	0.26%	-0.04%
	T-Stat	*18.04*	*11.21*	*7.4*	*-1.12*
	RC – RH	0.18%	0.05%	0.04%	-0.13%
	T-Stat	*6.74*	*1.73*	*0.96*	*-2.58*

Table 4: Results Of Regression Analysis For Unrestricted Contrarian Returns Against Seasonal Dummy Variables For Day, Month, Year And Lagged Return

	Unrestricted Contrarian		Hot		Cold	
	Coeff	***T-Stat***	**Coeff**	***T-Stat***	**Coeff**	***T-Stat***
Constant	0.02915	1.361594	-0.004949	-0.894822	0.024528	1.193778
Monday	-0.004488	-0.320369	-0.001252	-0.345991	-0.005478	-0.407255
Tuesday	-0.006198	-0.443105	-0.000972	-0.268985	-0.007154	-0.532833
Thursday	0.001223	0.087437	0.001858	0.514163	0.003173	0.236275
Friday	0.010696	0.764575	0.001754	0.48517	0.01256	0.935231
January	-0.007138	-0.328835	-0.006291	-1.121133	-0.013591	-0.652192
February	0.003824	0.171805	-0.012201	-2.116923*	-0.008294	-0.388218
March	0.001142	0.052337	-0.006673	-1.182579	-0.005522	-0.263634
April	0.053528	2.360751*	-0.00864	-1.477169	0.045707	2.101192*
May	0.013276	0.588666	-0.011871	-2.033391*	0.001588	0.073367
June	0.019446	0.854011	-0.013211	-2.238953*	0.006522	0.298482
July	0.001509	0.071478	-0.006077	-1.113699	-0.004568	-0.225446
August	-0.001502	-0.071328	-0.004134	-0.759286	-0.005595	-0.276788
October	-0.002403	-0.114083	-0.002166	-0.397949	-0.004602	-0.227622
November	0.000259	0.012165	-0.003439	-0.626158	-0.003196	-0.156649
December	-0.004622	-0.219503	-0.006112	-1.121864	-0.010748	-0.5317
2002	0.0471	2.705238**	-0.009197	-2.047351*	0.038637	2.314196*
2003	0.025955	1.493966	-0.004177	-0.931155	0.022191	1.331078
2004	0.027123	1.561623	-0.012022	-2.673526**	0.015526	0.931949
2005	0.02965	1.704811	-0.012487	-2.773312**	0.017624	1.056598
2006	0.040359	1.493131	-0.008867	-1.269973	0.032138	1.239163
RET(-1)	0.021721	0.756408	0.00763	0.265297	0.006672	0.232239
R^2	0.020338		0.024855		0.017295	
Adj R^2	0.003364		0.007959		0.000268	
F-statistic	1.214433		1.491492		1.020422	

* and ** indicate a (two-sided) significant difference from Zero at the 5% and 1% levels, respectively.

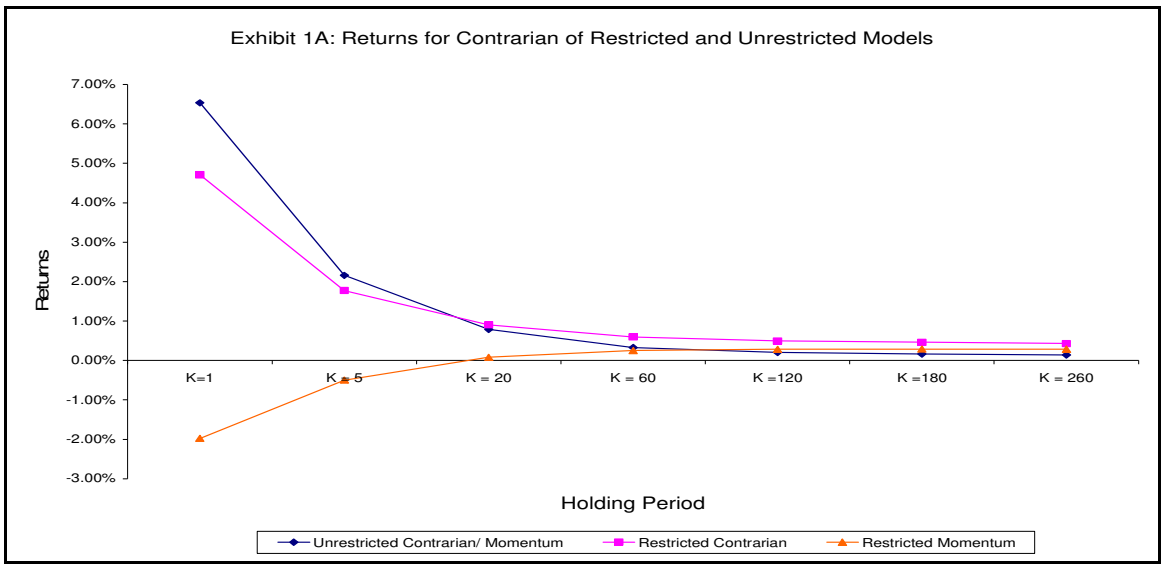
Exhibit 1A: Returns for Contrarian of Restricted and Unrestricted Models
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
-1.00%
-2.00%
-3.00%
Returns
K=1
K = 5
K = 20
K = 60
K =120
K =180
K = 260
Holding Period
Unrestricted Contrarian/ Momentum
Restricted Contrarian
Restricted Momentum

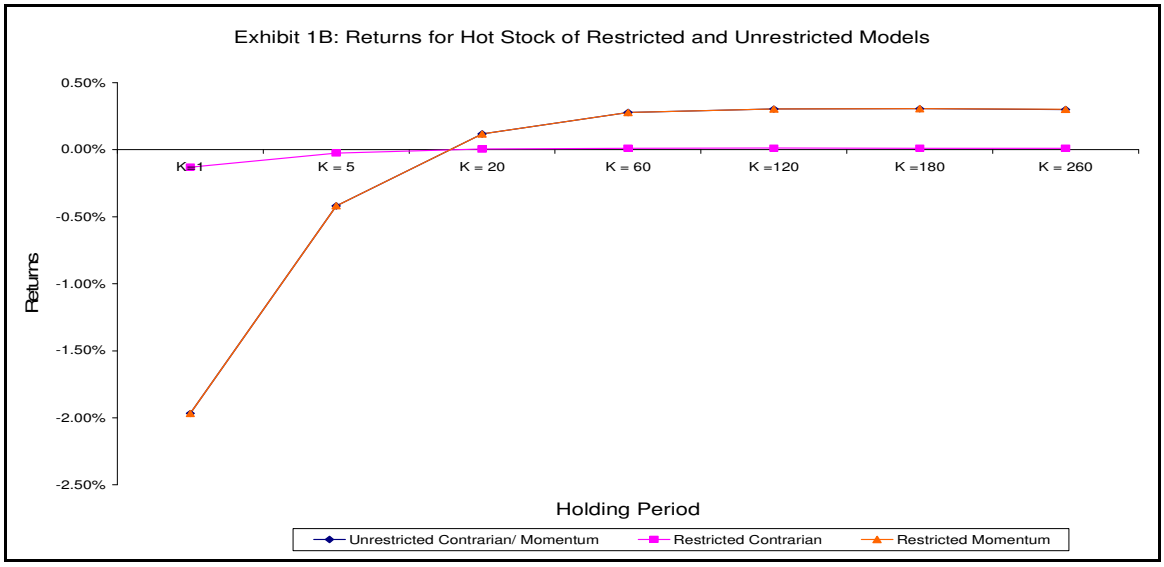
Exhibit 1B: Returns for Hot Stock of Restricted and Unrestricted Models
0.50%
0.00%
-0.50%
-1.00%
-1.50%
-2.00%
-2.50%
Returns
K=1
K = 5
K = 20
K = 60
K =120
K =180
K = 260
Holding Period
Unrestricted Contrarian/ Momentum
Restricted Contrarian
Restricted Momentum

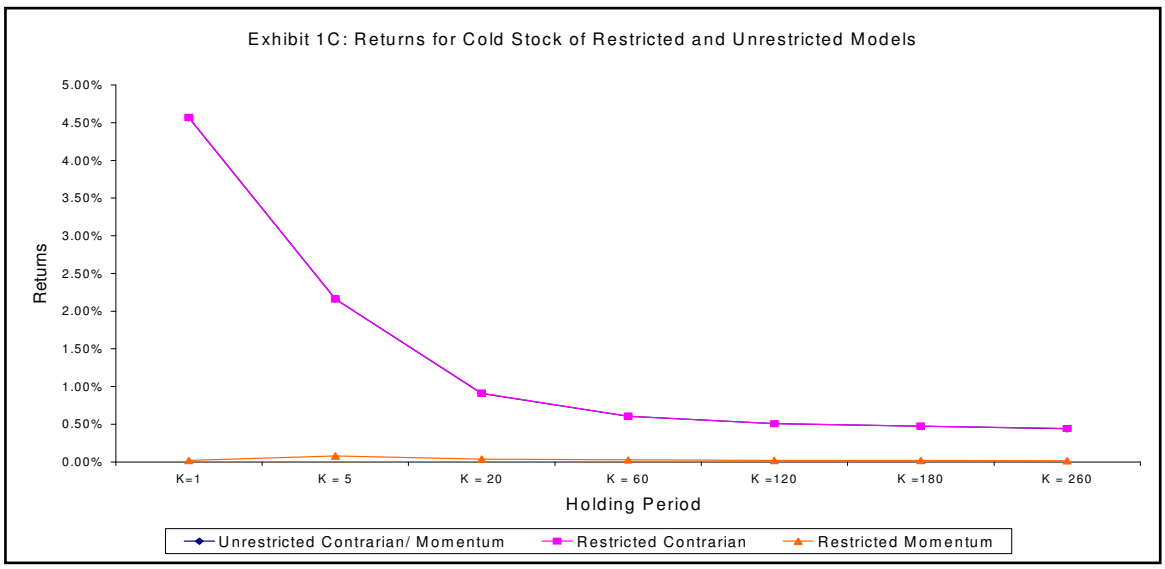
Exhibit 1C: Returns for Cold Stock of Restricted and Unrestricted Models
5.00%
4.50%
4.00%
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
Returns
K=1
K = 5
K = 20
K = 60
K =120
K =180
K = 260
Holding Period
Unrestricted Contrarian/ Momentum
Restricted Contrarian
Restricted Momentum