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Another look at trading costs and short-term reversal profits ☆

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ABSTRACT

Several studies report that abnormal returns associated with short-term reversal investment strategies diminish once trading costs are taken into account. We show that the impact of trading costs on the strategies' profitability can largely be attributed to excessively trading in small cap stocks. Limiting the stock universe to large cap stocks significantly reduces trading costs. Applying a more sophisticated portfolio construction algorithm to lower turnover reduces trading costs even further. Our finding that reversal strategies generate 30–50 basis points per week net of trading costs poses a serious challenge to standard rational asset pricing models. Our findings also have important implications for the understanding and practical implementation of reversal strategies.

1. Introduction

A growing body of literature argues that the short-term reversal anomaly (i.e., the phenomenon that stocks with relatively low (high) returns over the past month or week earn positive (negative) abnormal returns in the following month or week) documented by Rosenberg et al. (1985), Jegadeesh (1990), and Lehmann (1990) can be attributed to trading frictions in securities markets that weaken the arbitrage mechanism. Kaul and Nimalendran (1990), Ball et al. (1995) and Conrad et al. (1997) report that most of short-term reversal profits fall within bid-ask bounds. And more recently, Avramov et al. (2006) evaluate the profitability of reversal investment strategies net of trading costs using the model of Keim and Madhavan (1997). They find that reversal strategies require frequent trading in disproportionately high-cost securities such that trading costs prevent profitable strategy execution. Based on these results one might conclude that the abnormal returns associated with reversal investment strategies that are documented in earlier studies create an illusion of profitable investment strategies when, in fact, none exist. The seemingly lack of profitability of reversal investment strategies is consistent with market efficiency.

In this study we show that this argument is not necessarily true. We argue that the reported impact of trading costs on reversal profits can largely be attributed to excessively trading in small cap stocks. When stocks are ranked on past returns, stocks with the highest volatility have the greatest probability to end up in the extreme quantiles. These stocks are typically the stocks with the smallest market capitalizations. Therefore a portfolio that is long-short in the extreme quantiles is typically invested in the smallest stocks. However, these stocks are also the most expensive to trade and reversal profits may be fully diminished by the disproportionally higher trading costs.

At the same time, the turnover of standard reversal strategies is excessively high. Reversal portfolios are typically constructed by taking a long position in loser stocks and short position in winner stocks based on past returns. Then, at a pre-specified interval the portfolios are rebalanced and stocks that are no longer losers are

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sold and replaced by newly bottom-ranked stocks. Vice versa, stocks that are no longer winners are bought back and replaced by newly top-ranked stocks. While this approach is standard in the stream of literature on empirical asset pricing to investigate stock market anomalies, it is suboptimal when the profitability of an investment strategy is evaluated and trading costs are incorporated.

To investigate the impact of small cap stocks and rebalancing rules on the profitability of reversal strategies, we design and test three hypotheses: first, we gauge the profitability of reversal strategies applied to various market cap segments of the US stock market. Our hypothesis is that the reported impact of trading costs on reversal profits can largely be attributed to excessively trading in small cap stocks and that limiting the stock universe to large cap stocks significantly reduces trading costs. Our second hypothesis is that trading costs can be reduced even further without giving up too much of the gross reversal profits when a slightly more sophisticated portfolio construction algorithm is applied. Third, we extend our analyses of reversal profits within different segments of the US market with an analysis across different markets and evaluate the profitability of reversal strategies in European stocks markets. Our hypothesis is that trading costs have a larger impact on reversal profits in European markets since these markets are less liquid. For robustness, we also evaluate reversal profits across various market cap segments of the European stock markets.

Throughout our study we use trading cost estimates resulting from the Keim and Madhavan (1997) model and estimates that were provided to us by Nomura Securities, one of world's largest stock brokers. Consistent with Avramov et al. (2006) we find that the profits of a standard reversal strategy are smaller than the likely trading costs for a broad universe that includes small cap stocks. At the same time we find that the impact of trading costs on short-term reversal profits becomes substantially lower once we exclude small cap stocks that are the most expensive to trade. In fact, when we focus on the largest US stocks we document significant reversal profits up to 30 basis points per week.

When we also apply a slightly more sophisticated portfolio construction algorithm and do not directly sell (buy back) stocks that are no longer losers (winners) but wait until these stocks are ranked among the top (bottom) 50% of stocks based on past returns, the turnover and trading costs of the strategy more than halve and we find even larger reversal profits up to 50 basis points per week. This number is highly significant from both a statistical and an economical point of view.

Additionally, we find that trading costs have a larger impact on reversal profits in European markets. While standard reversal strategies based on a broad universe of European stocks yield gross returns of 50 basis points per week, their returns net of trading costs are highly negative. Once we exclusively focus on the largest stocks and apply the "smart" portfolio construction rules, we document significantly positive net reversal profits up to 20 basis points per week.

In addition, we look at various other aspects of the reversal strategy to evaluate if the strategy can be applied in practice. Amongst others, we document that the reversal effect can be exploited by a sizable strategy with a trade size of one million USD per stock, and that the strategy also earned large positive net returns over the post-decimalization era of US stock markets.

We deem that our study contributes to the existing literature in at least two important ways. First of all, our finding that reversal strategies yield significant returns net of trading costs presents a serious challenge to standard rational asset pricing models. Our findings also have important implications for the practical implementation of reversal strategies. The key lesson is that investors striving to earn superior returns by engaging in reversal trading are more likely to realize their objectives by using portfolio construction rules that limit turnover and by trading in liquid stocks with relatively low trading costs. Our study adds to the vast amount of literature on short-term reversal or contrarian strategies [see, e.g., Fama (1965), Jegadeesh (1990), Lehmann (1990), Lo and MacKinlay (1990), Jegadeesh and Titman (1995a,b), Chan (2003), Subrahmanyam (2005) and Gutierrez and Kelley (2008)]. Our work is also related and contributes to a recent strand in the literature that re-examines market anomalies after incorporating transaction costs [see, e.g., Lesmond et al. (2004), Korajczyk and Sadka (2004), Avramov et al. (2006) and Chordia et al. (2009)].

Our results also have important implications for several explanations that have been put forward in the literature to explain the reversal anomaly. In particular, our finding that net reversal profits are large and positive among large cap stocks over the most recent decade in our sample, during which market liquidity dramatically increased, rules out the explanation that reversals are induced by inventory imbalances by market makers and that the contrarian profits are a compensation for bearing inventory risks [see, e.g., Jegadeesh and Titman (1995b)]. Also, our finding that reversal profits are not convincingly larger for the 1500 largest US stocks than for the 500 and even 100 largest stocks is inconsistent with the notion that nonsynchronous trading contributes to contrarian profits [see, e.g., Lo and MacKinlay (1990) and Boudoukh et al. (1994)] as this explanation predicts a size-related lead-lag-effect in stock returns and higher reversal profits among small cap stocks.

Our second main contribution is that we not only employ the trading costs estimates from the Keim and Madhavan (1997) model that are typically used in this stream of literature, but that we also use estimates that were provided to us by Nomura Securities. Despite the fact that most researchers now seem to acknowledge the importance of taking trading costs into account when evaluating the profitability of investment strategies, only very little is documented in the academic literature on how these costs should be modelled. Perhaps the most authoritative research in this field is the work of Keim and Madhavan who modelled market impact as well as commission costs for trading NYSE-AMEX stocks during 1991–1993. However, since markets have undergone important changes over time one may wonder if the parameter estimates of Keim and Madhavan can be used to estimate trading costs accurately also over more recent periods. Another concern with the Keim and Madhavan model relates to the functional form that is imposed on the relation between market capitalization and trading costs. Later in the paper we provide some detailed examples which indicate that trading costs estimates resulting from the Keim and Madhavan model should be interpreted with caution in some cases because of these issues. For example, the model systematically yields negative cost estimates for a large group of stocks over the most recent period. We believe that our study makes a significant contribution to the literature on evaluating the profitability of investment strategies by providing a comprehensive overview of trading costs estimates from Nomura Securities for S&P1500 and S&P500 stocks during the period 1990–2009. Moreover, the trading cost schemes we publish in this study are set up in such a way that other researchers can employ them in their studies as the schemes merely require readily-available volume data for their usage.

An additional attractive feature of the trading cost model used by Nomura Securities is that it has also been calibrated using European trade data. This enables us to investigate trading costs and reversal profits in European equity markets as well. To our best knowledge, this study is the first to provide a comprehensive overview of trading costs and to investigate trading cost impact on reversal profits in European equity markets.