



Profitability of pairs trading strategy in an illiquid market with multiple share classes ☆

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Abstract

We investigate the practical issues of implementing the self-financing pairs portfolio trading strategy presented by [Gatev et al. \(2006\)](#). We also provide new evidence on the profitability of pairs trading under different weighting structures and trade initiation conditions. Using data from the Finnish stock market over the period 1987–2008, we find pairs trading to be profitable even after allowing for a one day delay in the trade initiation after the signal. On average, the annualized return can be as high as 12.5%, though requiring trading on days a pair is traded lowers the return approximately by three percentage points. On the other hand, lowering the threshold for opening a pair is found to increase returns even after accounting for trading costs, indicating that there might be a more optimal trade initiation threshold available than that presented in earlier literature. The profits are not related to market risk. Pairs trading strategy is found to produce positive alpha during the sample period.

Introduction

One of the popular trading strategies found in a statistical arbitrageur's toolbox is pairs trading. Not only is pairs trading a popular trading strategy, it is simple to implement. An arbitrageur finds two stocks whose prices move together over an indicated historical time period. If the pair prices deviate wide enough, the strategy calls for shorting the increasing-price security, while simultaneously buying the declining-price security. The idea behind the pair trade is to profit from convergence forces that eliminate short-term price deviations in favor of long-term historical pricing relationships. In a pricing world that is relatively efficient, simple strategies based on mean-reversion concepts should not generate consistent profits. [Gatev et al. \(2006\)](#), however, document pairs trading generates consistent arbitrage profits in the U.S. equity market, which is considered the most efficient and liquid in the world. [Do and Faff \(2010\)](#) extend [Gatev et al. \(2006\)](#) and show that although profitability of pairs trading has declined generally, the strategy generates substantial performance during turbulent market horizons, including the recent financial crisis.

Since the publication Gatev et al. (2006) surprisingly few studies have investigated pairs trading in markets other than that of the USA. A couple of exceptions are Perlin (2009) who evaluate pairs trading in Brazil, and Andrade et al. (2005), who evaluate pairs trading profitability in Taiwan. This could be due to the computational complexity of estimating profits from the pairs trading despite the *prima facie* simplicity of the strategy. In this paper we discuss some of issues in the practical implementation of the strategy not mentioned in Gatev et al. (2006), as well as we analyze the role of the pairs trade initiation criteria and the effect on returns of requiring trading in stocks selected for pairs on days when a pair is opened. Furthermore, we provide computer code for the implementation. Finally, we provide evidence on the profitability of the pairs trading strategy in Finland, a stock market with much less liquidity than that found in the United States. Since the pairs trading strategy requires implementing two trades instead of one, evaluating performance in a less liquid market provides additional evidence regarding the strategy's global implementable efficacy.

There are two additional reasons why evaluating the pairs trading strategy in Finland is interesting. First, the time period evaluated, 1987–2008, covers not only the global boom and bust in the technology sector, but also the financial institution crisis of 1990 and 2008 that impacted investors in Finnish equities. Evaluating the pairs trading strategy in such stressed market environments provides information to those evaluating the strategy's potential to act as a risk management alternative to traditional purely directional trading strategies. Secondly, a unique institutional characteristic regarding common and preferred shares in Finland allows a closer examination of potential causes for price deviation offered not only by similar securities, but by securities that have access to the same cash flow source.

The results of this effort show the pairs trading strategy is persistently profitable even in a market with reduced liquidity. Significant profits also seem to be generated by taking advantage of price deviations between common and preferred shares of the same firm. The contribution to the literature of the latter result is important because one of the reasons suggested for profitable trading opportunities due to pair price deviation is trader risk aversion regarding fundamental value calculation uncertainty. If the trader's assessment of fundamental value is highly uncertain, then prices may deviate persistently because trades made to take advantage of mispricing are not undertaken. Trader's risk aversion, therefore, potentially reduces the profit potential of the pairs trading strategy because lack of trading activity may allow non-convergence of disequilibrium asset prices. The finding that profits can be made from price deviation between assets with claims on the same cash flow source provides additional support for this naïve investment trading strategy.¹

The remainder of this paper is organized as follows. Section 2 provides a brief introduction to the pairs trading strategy as well as the estimation strategy employed in this paper. Section 3 presents the data and Finnish institutional characteristics. Section 4 shows the empirical results. Section 5 concludes and offers some suggestions for future research.

Section snippets

Pairs methodology

Similar to Gatev et al. (2006), our implementation of the pairs trading strategy proceeds in two stages. First, pairs of stocks are selected for trading using a twelve month period of data, termed the formation period. Second, trades are made on the pairs during the six months following the formation period if trading

conditions are met. The six month trading horizon is called the trading period. Only stocks that are listed throughout the 18 month period are included in the analysis.²...

Data

We use daily data for Finland from the beginning of 1987 to the end of 2008. All stocks listed in the Official List (later Main List) of the Nasdaq OMX Helsinki Stock Exchange (OMXH) during the sample period are used in the analysis.¹³...

Main results

Table 1 shows descriptive statistics for the monthly percentage (net) returns for the TOP 5 pairs trading strategies under two different weighting schemes. Monthly returns are calculated using daily cumulative return indices. The TOP 5 pairs are chosen to be those with the smallest distance measure. Panel A lists the results for the investment scenario allowing same-day investment of the pair as indicated by the distance measure. Panel B lists the results for the investment scenario that allows ...

Conclusions

In this paper, we reviewed the pairs trading strategy approach in Gatev et al. (2006) and discussed its implementation in detail on the Finnish stock market. Combined with the fact that the Finnish stock market is more inefficient and many companies listed in Finland have multiple stock series offering potential for pairs trading, one may expect ex ante to observe potentially high returns from the strategy.

The pairs trading strategy was tested using a sample period of 21 years from 1987 to...

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...However, it became popular through the study carried out by Gatev et al. (2006), who proposed the distance method as the main operational strategy for pairs trading. The traditional distance method has been widely studied and tested throughout the pairs trading literature (Broussard & Vaihekoski, 2012; Caldeira & Moura, 2013; Do & Faff, 2010,2012; Gatev et al., 2006; Krauss, 2017b; Rad et al., 2016). The approach can be seen as a distribution-free method and thus does not subject the stock prices to be generated by any particular distribution....

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...Gatev et al. (2006) investigate the empirical performance of a pairs trading strategy, which is based on the historical standard deviation of the spread, in the U.S. equity market. Andrade et al. (2005), Perlin (2009), Bolgün et al. (2010), and Broussard and Vaihekoski (2012), conduct similar empirical tests in Taiwan, Brazilian, Istanbul and Finland markets, respectively. Mori and Ziobrowski (2011) test the same strategy in the U.S. real estate market....

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