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Thesis Review
A Cointegration Trading Strategy for Currency Exchange Rates

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This review critically examines the thesis on 'Cointegration Trading Strategy for Currency Exchange Rates' by Jeroen Goudvis. The author explores the possibility of designing a trading strategy for currency exchange rates based on the concept of cointegration i.e., utilizing the long-term equilibrium relationship between currency pairs to detect profitable trading possibilities. The study analyses the dataset consisting of 27 currency pairs spanning from 2000 to 2019, utilizing the Engle-Granger two-step cointegration test to identify the currency pairs exhibiting mean-reverting characteristics. Trades are initiated when currency values vary greatly from their normal levels, and finalized when they return to equilibrium, maximizing profits from temporary price adjustments. The research shows that this market-neutral approach produces a yearly average gain of 12% and shows minimal connection to big indicators such as the S&P 500, lowering the impact of systemic risk. The pairs that exhibit synchronized movements are used as samples, and USD is used as the base currency. This approach remains effective in different market conditions. This study presents valuable perspectives on utilizing statistical arbitrage in forex markets by providing an attractive option to conventional trading methods. The review evaluates every segment of the paper to craft a detailed review and offer suggestions and avenues for future research.

The study offers a valuable contribution to financial trading with its utilization of a cointegration-based approach in the FOREX market. The thesis questions the traditional market efficiency theory by showing how short-term price differences in currency exchange rates can influence the existence of arbitrage. d. The main aim of the research is to evaluate the effectiveness of utilizing cointegration methods in pairs trading, providing fresh perspectives on currency market behaviour and introducing a different investment approach for FOREX traders. The author tries to identify cointegrated pairs to determine the average returns of the proposed strategy.

Fama (1970) proposed the Efficient Market Hypothesis (EMH) in financial markets, stating that asset prices incorporate all known information, making it difficult to consistently outperform the market using past data analysis. Goudvis disputes this concept by examining the temporary inefficiencies that may arise from delays in absorbing information. The study presents a strategy known as pairs trading, commonly used in stock markets, for trading currency pairs in the FOREX market. The Forex market stands out for its high liquidity, significant

[1]The review is based on the Bachelor Thesis submitted to Erasmus School of Economics, by Jeroen Goudvis under the supervision of L.A.P. Swinkels, dated 2 August 2020

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trading volume, and lower transaction costs in comparison to other financial markets, potentially making it a perfect setting for these strategies.

The thesis is notable for using a familiar trading strategy from the stock market in a different and riskier market. This alteration proves to be innovative and efficient as currency pairs frequently display long-lasting balance connections because of macroeconomic factors like interest rate parity and purchasing power parity (PPP). Goudvis's research centres on pairs trading in currency markets, a subject often overlooked in present studies, filling a significant void in the existing literature.

The literature review is comprehensive, providing a discussion of theoretical foundations and existing literature including noted works by Gatev et al. (1998), Goetzmann, and Rouwenhorst (1998, 2003, 2006). The study conducts a comprehensive exploration of literature in the context of equity markets and also identifies the strength of cointegration as a strategy and its relevance to the FOREX market.

The literature review includes key theories such as Purchasing Power Parity (PPP) and interest rate parity, which uphold the enduring equilibrium of currency pairs. The theory is in a broader economic context by integrating macroeconomic ideas, demonstrating the significance of cointegration in assessing fluctuations in currency values. Despite being thorough, the literature review could have delved deeper into the recent advancements in machine learning and artificial intelligence, which are increasingly important in predicting financial markets and could improve traditional cointegration methods.

The thesis outlines its research objectives and hypotheses in a clear manner. The research hypotheses are clearly stated and offer a solid structure for practical examination. The thesis guarantees a thorough examination of its research question by paying attention to both identifying cointegrated pairs and assessing the profitability of the strategy.

The study makes use of the daily exchange rate of 27 currencies across various continents, covering a period of two decades (2000-2019) divided into 10-year formation years and 10 years of trading. Using USD as the base currency simplifies the analysis by lessening the number of datasets needed for testing cointegration. The Dickey-Fuller test confirms the series are first-order integrated. The Engle-Granger two-step error correction method is adopted in the thesis to detect cointegrated pairs and ensure methodological soundness. However, stability in cointegration relationships may not hold well in volatile markets. Further studies can test the stability and also include transaction costs and spreads to evaluate the profitable scenario.

During the formation period, the Engle-Granger method observed 23 significant cointegrated pairs out of 351 combinations tested. Throughout the trading period, 38 trades were completed, resulting in an average realized gain of 6.5%, deemed statistically significant at the 1% level. The Russian Ruble (RUB) pairs displayed high volatility following geopolitical and economic events after 2014, resulting in varying returns among pairs. Empirical results demonstrate statistical significance at returns significantly different from zero.

Goudvis finds that using a pairs trading strategy based on cointegration in the FOREX market is feasible, with substantial returns backing its effectiveness. Nevertheless, the thesis recognizes several constraints, such as:

1. **Unused Trading Days:** Only 21.8% of potential trading days were utilized, suggesting opportunity costs.
2. **Fixed Formation Period:** A rolling window for pair identification could enhance adaptability.
3. **Lack of Risk Management:** The absence of stop-loss mechanisms increases exposure to extreme market conditions.

4. **Transaction Costs:** Ignoring transaction costs may overestimate net returns.

To enhance the strategy, upcoming studies could investigate:

1. **Dynamic Pair Selection:** It involves the utilization of machine learning algorithms to detect pairs that are cointegrated.
2. **Sophisticated Risk Management:** Integrating stop-loss strategies and adjusting position sizes based on volatility.
3. **Transaction Cost Analysis:** This involves considering bid-ask spreads and trading fees to improve the accuracy of return calculations.

Future research can build on these study findings to create more robust trading strategies. This review emphasizes the academic contribution of the paper.