Decision Support for Foreign Exchange Investments Considering Risk Indicators

Bachelorarbeit

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Table of Content

1. Introduction

The purpose of this work is to evaluate the performance of a currency trading model describing a carry foreign exchange trading strategy considering risk indicators. The basic idea of carry strategies is to borrow money in a currency that has low interest rates and to invest it in a different currency with higher interest. This creates a profit as long as the foreign exchange rate stays constant or the currency with the lower interest rate depreciates in relation to the one with the higher interest. If there is an exchange rate depreciation of the currency with the higher interest rate the carry trader loses money because the profits from interest rate arbitrage are outperformed by the exchange rate change. A trader can suffer significant losses from such developments.

To avoid that risk traders can consider financial indicators to be warned of upcoming crashes. A model developed in this context is the one presented by Çağlayan & Pintér (CP). According to their paper (cf. Çağlayan & Pintér 2013) the model is able to create significant, constant profits and a comparably high information ratio (IR) in all years included in the analysis (1998-2009). The IR reached by the CP model is presented in Figure 1. It reaches an average annual IR in the out-of-sample period of 2.3 which is very high. Risk is quantified by a metric containing six financial indicators, each representing different risk factors. If the risk metric reaches a certain threshold, the long carry position will change to a short carry position. In other words, if the risk is high, the currency with the higher interest rate will be borrowed and invested in the currency with the lower interest. This is based on the expectation of high changes in foreign exchange rates that compensate the cost of holding reverse pairs.

The goal is to build a trading model based on the work of CP and check if that kind of strategy is increasing the performance of a portfolio in comparison to a trading strategy considering no risk indication or just one indicator. Moreover, the weights and other decision variables of CPs optimum solution will be checked for their performance if used in the new model. Performance will be measured by IR in the period from 2000 to 2014, of which 2000 to 2007 are used as in-sample and 2008 to 2014 as out-of-sample period. The results will be compared to those of CP.

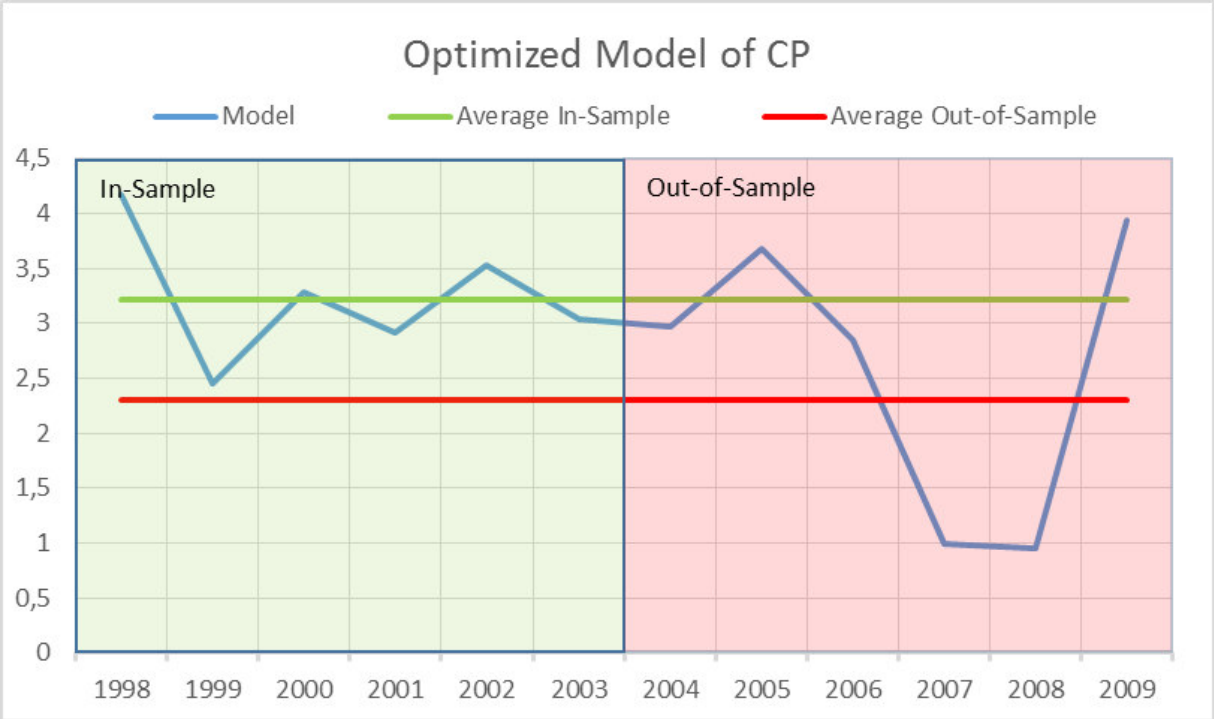

Figure 1: IR of the CP Model

In the following, a look will be taken at carry trades in general and the theoretical background of the strategy. Secondly, the model used in this work will be presented together with its practical implementation in Excel. Thirdly, the performance of the model will be analyzed and compared. Finally, the results will be interpreted and a conclusion will be drawn.

2. The Carry Trade

The idea behind the carry trade is to use periods when the uncovered interest parity (UIP) does not hold as an opportunity for arbitrage. The UIP theorem as described by Stein (1962) implies that market efficiency leads to a compensation of profits from exploiting interest rate differences by changes in the exchange rate (cf. Taylor 1987). Empirical research found that UIP is not the case or at least not consistent over long periods of time, with arbitrage possibilities occurring as a result (cf. Fama 1984, Engel 1996, Chaboud & Wright 2005). Moreover, it is observed that carry trading strategies are averagely profitable and that it is difficult to explain their returns with models of risk as a risk compensation (cf. Burnside 2011). Other findings show that times of high volatility in foreign exchange rate returns decrease the returns of a carry trading strategy (cf. Cenedese et al. 2014). Meanwhile, a high activity of carry trade strategies in specific currencies, as well as increasing global risk aversion,

Looking at the results of the t-tests the only two tests that showed significance at a level of 10% are the one-tailed tests with the fully optimized model and the model using equal weights. At a level of significance of 5% or higher no combination of basket returns with the basket returns of the model without risk indication showed significant differences.

6. Conclusions

Considering the results of the t-test it was not possible to show significant differences in the returns of the models having one risk indicator in comparison to the model without risk indication. For the fully optimized model and the model with equal weights the difference was only significant at 10% for a one-tailed test. This shows that according to the t-test the difference in returns is not that high. One reason for the result can be the small samples used in the t-test containing between 37 and 193 basket returns. If expectation differences in basket returns are very small it is difficult to detect them with a t-test using samples of that size. However, the existence of significant differences at 10% of the one-tailed tests with the fully optimized model and the model using equal weights indicates that the use of risk indicators can bring a performance increase in terms of basket returns.

Looking at the IR achieved by the different models in the out-of-sample period there is a better performance of models with all six risk indicators in comparison to models with one or none risk indicator. One indicator models have a higher out-of-sample IR on average than the model using no risk indication. These results indicate that there is a possible increase in performance if a trader or trading model is using risk indication. The results imply that this increase can be higher if multiple risk indicators are considered. Nevertheless, these results can only be confirmed in the context of the trading model presented.

The out-of-sample performance of the fully optimized model is lower than the one reached by the model with equal weights. This illustrates that a model optimized on an in-sample period is not necessarily performing better than other models based on the same risk indication without weight optimization if used out-of-sample. There are big limitations on the forecasting power of the optimized RM.

Looking at the performance of the model optimized on the CP weights there is a big performance difference in terms of returns and IR to the performance in the preparatory study. Possible explanations are differences in the model construction and data set used. It was not possible to reproduce the high levels of out-of-sample returns and IR achieved by CP. However, the result of CP that a risk considering carry trade strategy is increasing the IR in comparison to a strategy without risk indication and that using multiple risk indicators brings superior performance is confirmed.

To finally confirm the effect of the use of risk indication in the context of the presented carry trading model with a statistic test, longer timeframes with more basket returns have to be considered. An important question in the context of the presented model is how long an optimized solution is keeping its performance and at which point a re-optimization is necessary. The construction of better risk measurement models is also relevant in the context of the presented model.

Finally it can be concluded that the presented model is designed in a very practice orientated way and reaching a considerable return and IR.