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Overlay Currency Risk Management: Adding dynamic hedging to the World Patent Index 20

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Overlay Currency Risk Management:

Adding dynamic hedging to the World Patent Index 20

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SUMMARY: The objective of this showcase is to demonstrate that the JRC Overlay strategy can neutralize the existing currency risk in the IP portfolio constructed within this project. Currency risk always arises, when a portfolio consists of assets denominated in different foreign currencies. The pairwise fluctuation of these currencies may lead to losses, totally independent from the value development of the underlying portfolio constituents. We describe our dynamic hedging strategy and the results that outperform against a static hedging position as a benchmark.

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1. Introduction

Investors diversify their portfolio by investing into different asset classes, in order to reduce the risk. For further diversification investors also invest in different currencies since the economic context differs and interest rates and value development of assets is also distinct from country to country.

By diversifying the portfolio through investments in other countries, investors expose themselves to exchange rate risk. An appreciation of the domestic currency will diminish returns in foreign investments. On the other hand, a depreciation of the domestic currency will result into higher returns for the investors. Those fluctuations can have positive and negative results. However, they are an uncertainty, that investors usually underestimate, but most certainly do not want to bear.

In this study we consider the IP (Intellectual Property) value Portfolio constructed by our project partner Privé Services Europe, consisting of a subset of particularly IP biased subset of MSCI World stocks. We apply JRC's Currency Risk Hedging Overlay Strategy and demonstrate that currency risk can not only eliminated, but our strategy is capable to even outperform the static Hedging position that we take as benchmark.

2. Methodology

The basic IP portfolio created by our project partner Privé Services and Matrix consists of a basket of 20 MSCI World stocks which derive their value mainly from IP patents. The resulting portfolio was called “World Patent Index 20”. Figure 1 below shows the regional breakdown of this basket.

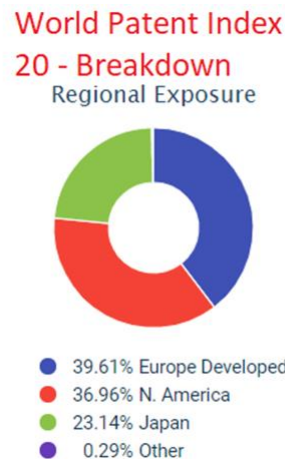


Figure 1: Regional Breakdown of World Patent Index 20

These 20 securities, are nominated in different currencies due to their different markets, i.e. in US Dollar (USD) and Japanese Yen (JPY). Part of it is also denominated in Euro, thus not underlying any currency risk. The remaining stocks were converted into Euro and Dollar currency respectively. The small rest of 0.29% other currencies is split again into several currencies like e.g. Swiss Francs or Swedish Crowns with relatively small amounts and was therefore neglected with respect to currency risk.

In order to reduce currency risks investors often choose to hedge their investment. Two ways of hedging are possible : Active and Passive Hedging strategies.

- A static hedge of the total or part of the exposure. This solution eliminates the exchange rate risk, but also eliminates possible gains based on favorable exchange rate fluctuations.
- A dynamic hedging solution minimizes risk and provides investors with possible returns by participating in trends.

The classical solution for hedging against currency fluctuations consists of a complete static (passive) hedge position. Position size and holding period of the hedge are based on the portfolio size and regularly adapted to the changes of the foreign currency exposure. In contrast to this, our adopted approach, the active hedging solution, uses trend movements of the currency markets for an effective control of position sizes (i.e. the hedge ratio) in order to allow for additional chances of profit. On the basis of JRC’s existing FX Core Portfolio of quantitative algorithmic trading strategies, a number of appropriate strategies has been selected. The resulting buy and sell signals are used for increasing and decreasing the hedge position, thus strengthening the hedging, when needed and lowering it, in case of a positive value development of the counter currency.

Since the selected trading strategies all have to trade the Euro as basic currency, a hedge position always consists of a long position (i.e. buying the currency pair in expectation of rising prices). If we consider a USD exposure, for example, the hedge position shall take the opposite value development than the USD nominated share of the portfolio. If EURUSD prices decrease, the USD exposure will gain in value. Thus, no hedging is needed. On the other hand, if EURUSD shows a longer term uptrend, like e.g. during the year 2017, the exposure loses value, measured in EUR. In order to counter steer, the hedging strategy will enter a buy-position in the amount of the total foreign currency exposure that will develop profitably along with the rise of the EURUSD prices. Depending on the size of the hedge position, these profits can then equalize the losses of the underlying exposure and even more contribute additional profits, if the size of the hedge position is even larger than the exposure.

The size of the hedge ration can vary dynamically. In our example, we have fixed a maximum hedge ratio of 150% and a minimum of 0% (meaning a complete reduction of hedging in order to optimally participate in the positive value development of the exposure. The maximum of 150% is often used by large investors in order to exploit the chances of profit, in excess of the neutralisation of negative value developments by a 100% hedging.

For each currency pair contained in the portfolio, in our case EURUSD and EURJPY, the strategy starts with opening a basic hedge position in size of 75% of the respective foreign currency exposure (the mean of the range 0% - 150%). In case of an uptrend, the respective model from the JRC portfolio will generate a buy-signal that will then be used to increase the hedge position. We categorise our trading models into short-term, medium-term and long-term and assign a specific proportion of the exposure to each of the categories. Depending on the number of active models and their classification, the size of the hedge position can vary, as can be seen in figure 2.

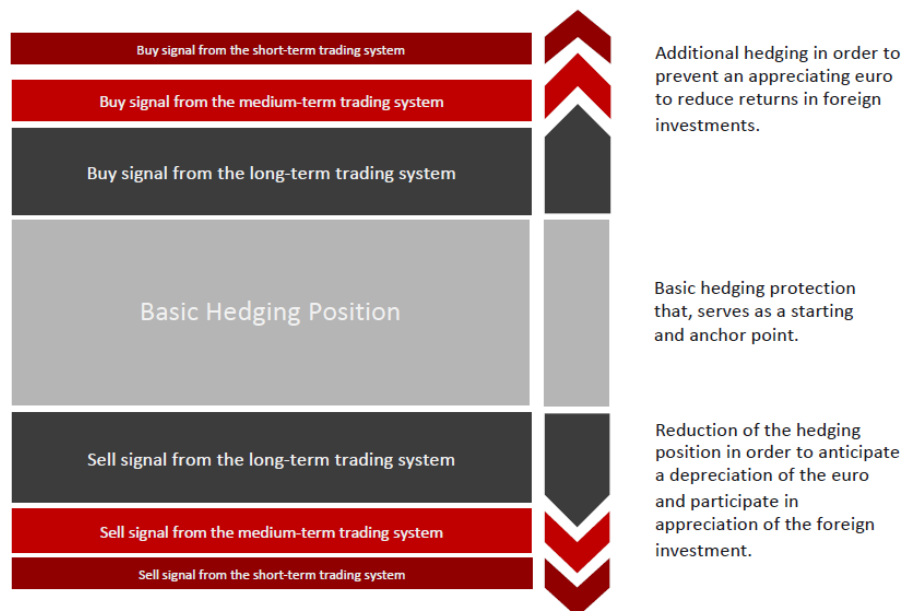


Figure 2: dynamic increase and decrease of hedge positions

For our study, the static hedge will serve as a benchmark used to measure the performance of the JRC overlay strategy on the MSCI. Results showed that the dynamic hedging strategy can be used to hedge the currency risk exposure in the World Patent Index 20, but sometimes even be able to add some outperformance to it.

3. Results

Before we start reporting the performance results of the overlay hedging strategy, we would like to illustrate the just mentioned effect of the dynamic increase and decrease of hedge positions.

Figure 3 displays the hedge ratio (relative size of the hedge position) and shows how the height of the hedge ratio in the lower part varies with the trends in the price chart (orange line) just for the Euro against the US Dollar. During phases, in which the Euro increases against the US Dollar, the hedge ratio is being built up until 150% in order to not only compensate for the losses in the USD, but participate in the gains of the EUR. On the other hand, during phases in which the Euro loses against the US Dollar, the ration can be decreased down to a minimum of 0%. These phases, however, are very rare and of very short duration so that almost continuously a basic hedge is given. During spring 2017 until summer 2018 we can observe an uptrend in EURUSD. Accordingly, hedge ratios above 10% dominate during this period.

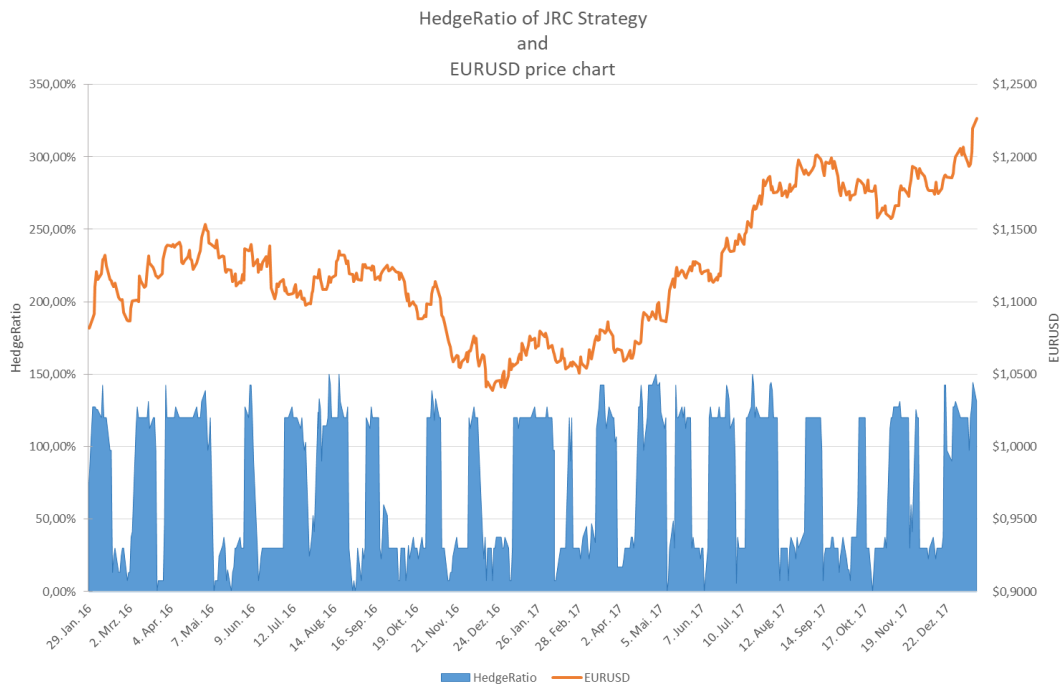


Figure 3: dynamic hedge ratio for EURUSD exposure

In the following, we describe the data processing that we carried out in order to evaluate the effect of applying the dynamic hedging strategy on the performance of the World Patent Index 20.

In a first step, the (weekly) price time series of USD and JPY nominated stocks in this basket were uniformly converted Euros and US dollars in order to display the value gains and losses.

In this showcase we use data from 02.02.2016 to 30.08.2019. During this time period, the impact of the hedge strategy, which is calculated on an intraday basis, had to be aligned to the data available from the IP portfolio, which was given on a weekly basis.

All time series were then normalised, building an index starting with value 100 and accumulating the relative price developments over the entire period.

We compare three time series with each other:

- the summed up 20 IP stocks in USD
- the summed up 20 IP stocks in Euro (showing the weekly value fluctuation due to the currency flows)
- the performance of the hedging strategy

We have layered these three graphs in a chart in order to have a direct comparison of the performance and thus to show whether hedging of the USD exposure using the JRC overlays is possible.

The chart in figure 4 takes the World Patent Index 20 (WPI20) as the basic a portfolio. The grey line illustrates the performance of the index valuated in USD. The orange line shows how the WPI20 would have performed on Euro basis. While stocks performed reasonably good in 2017, returns for euro based investors were quite disappointing due to an appreciating euro.

The red line shows how the JRC Overlay Strategy would have performed. With a dynamic hedge ratio optimization the strategy can take advantage of favorable trends in currency markets to protect the investor from losses and additionally provide capital gain opportunities.

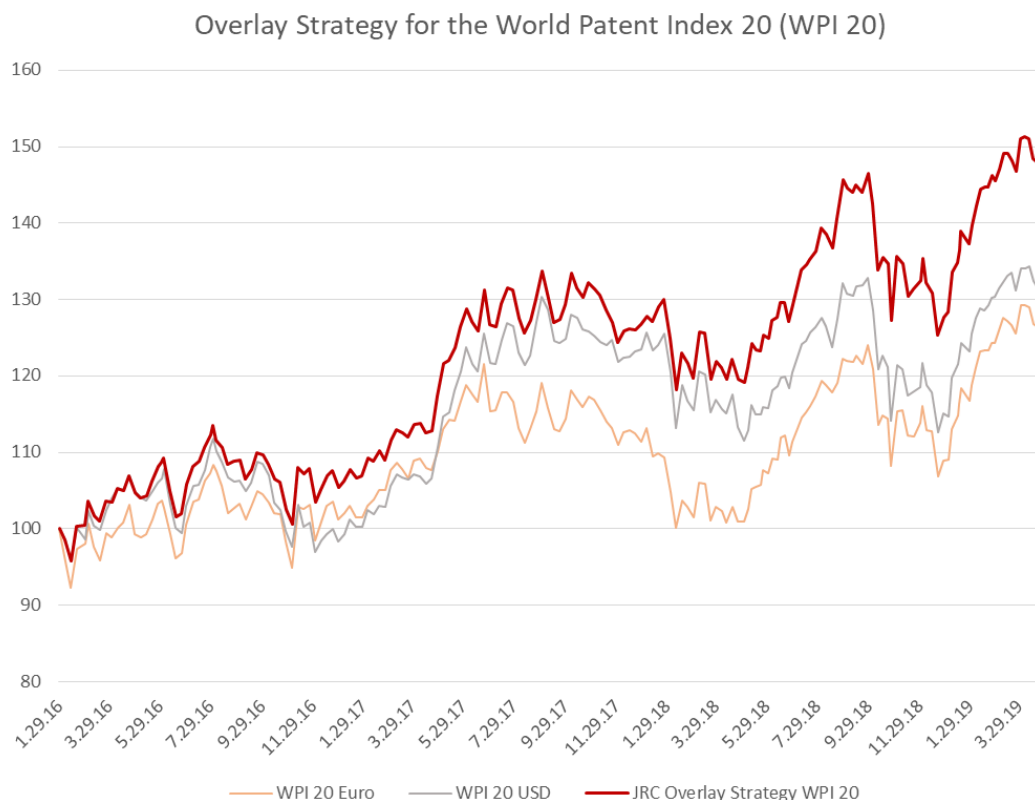


Figure 4: comparison WPI 20 – Overlay Strategy

We conclude this study by indicating and comparing a set of the most relevant performance measures: total return, annualized volatility and sharp ratio.

While the outperformance of the JRC Overlay Strategy compared to both, the US valued and the Euro valued WPI 20 is significant, it even contributes to reduce the annualized volatility slightly, which is a very appreciated effect by all investors.

	World Patent Index 20 EUR	World Patent Index 20 USD	JRC Overlay
total Return	27.01%	31.50%	53.60%
Annualised Volatility	35.06%	33.40%	33.31%
Sharpe Ratio	1.34	1.53	2.41

4. Conclusions

This study has shown the importance of dealing with currency risks when considering portfolios consisting of stocks denominated in foreign currencies in general and of the World Patent Index 20 basket in particular.

The results of this study can be used to improve several of the target products of the CoraPatents project.

In the case of funds or other financial products based on the World Patent Index 20 the performance of the fund may be improved by applying the dynamic hedging strategy to the foreign currency exposures.

Also in the case of (IP value) trading signals as a resulting product, the trading signals from the hedging strategy can easily be integrated and improve the performance of the IP signals.