Active Currency Management in Portfolio Construction

Risk-Sentiment as Diversifier and Source of Alpha

Central banks have compressed risk premiums.

More volatile markets may lie ahead.

Active currencies as alternative asset class.
High asset valuations, growing geopolitical risks, and the effects of distressed commodities markets are just a few of the current concerns that investors have. Portfolio managers are faced with increased risk management needs amid more closely integrated global markets, making the search for truly uncorrelated assets to diversify client portfolios a bigger challenge. A multi-year bull market run in equities, meanwhile, has raised return expectations for portfolio managers, who run the risk of losing diversification by chasing higher yielding assets, as alternative asset classes that offer attractive returns may be too correlated with stocks and bonds. Despite their potential portfolio enhancing benefits, currencies as possible alternative are thereby often overlooked.

This paper makes the case for currency strategies in multi-asset portfolios, and primarily intends to bring more attention to the value proposition of actively managed currencies in the portfolio design context. We present arguments why investors should consider currencies in asset allocation decisions, how we differentiate active currency management from passive, and provide economic intuition why the often misunderstood microstructure of the foreign exchange market offers alpha opportunities. As part of an active approach to currency investing, the paper proposes a way to exploit structural inefficiencies in currency markets using measures of risk sentiment. To illustrate the benefits of currencies in portfolio construction, we simulate portfolios that are enhanced with various alternative asset classes along with active and passive currency strategies. Our findings suggest that actively managed currency strategies can significantly reduce volatility and minimize drawdowns in portfolios, and that viewing risk dynamics as a trading signal can generate consistent alpha over time.

Currencies as Asset Class

Whereas alternative assets such as commodities, real estate investments or hedge funds have seen growing popularity in strategic portfolio construction, currencies as an alternative asset class have still not found widespread acceptance in asset allocation. One possible explanation for this is that investors have difficulty perceiving currencies as an asset class, especially when compared to more conventional assets like stocks and bonds.

 Principally, the definition of an asset class is not necessarily objective. Traditionalists might argue that an asset class is fundamentally characterized by generating an expected economic return for the holder that is positive absent of any trading activity. Investing in stocks and bonds means deploying real capital into equity and fixed income markets, generating a positive expected return through capital appreciation, dividends or coupons. This positive holding period return however does not exist in currencies, because buying one currency means selling another currency at the same time. Holding an unmanaged basket of currencies means being long one asset while shorting another, and without any underlying trading strategy this is regarded as merely speculative and hence is a zero-sum game. Such a basket would yield an expected return of zero, and therefore would disqualify currencies as an asset class in the traditional sense.

While there is some merit to this argument, it should not be overlooked that the same point can be made for other acknowledged alternative asset classes as well. Commodities for example, do not necessarily fulfill this condition either. However, for the sake of this paper it can be accepted that an unmanaged currency investment without fundamental strategy does not constitute an asset class. This will be important again in the following discussion on benchmarks in currencies.

A more relevant definition of an asset class, especially in reference to portfolio allocation is often associated with correlation. The common perception is that if an asset produces returns independent of any other asset class, i.e.
returns are uncorrelated, then it can be contended that it is an asset class of its own. From this perspective, the argument for currencies is quite compelling, as currencies have exhibited low correlation with other major asset classes over the medium to long-term. More importantly, the correlation of currencies while low has also been comparatively stable, as shown in Figure 1, comparing 1-year rolling correlations of alternative asset classes with equities. The same cannot be said for other popular alternative assets, such as real estate, which shows a relatively stable but high correlation with equities, or commodities that have a low correlation but especially in times of higher financial turmoil appears to be unstable.¹

![Figure 1: Correlation of Alternative Assets with Equities*](image)

Even though there is no unequivocal definition of the term asset class, there are valid reasons why currencies should be considered at least a sub-set of the alternative asset class space. The low correlation to traditional asset classes make it particularly qualified from a portfolio design perspective, and especially if we refer to a managed basket of currencies that follows a specific strategy with a non-zero expected return (such as well-known systematic strategies like carry, momentum or valuation), the inclusion of currencies as asset class is justifiable.

**Active vs. Passive Management in Currencies**

Just as the discussion of currency as an asset class is not straightforward, the distinction of active versus passive investing in currencies also requires some deliberation. Whereas for equities, many specific indices exist that are widely accepted as a market benchmark, allowing a clear separation of general market exposure (beta) and active or excess return (alpha), there is no such agreement on a generic benchmark for currency markets.

A very simple approach that is often used in academic studies is to look at currency returns as absolute returns and adopt either zero or the risk-free return as the appropriate benchmark. The former approach is consistent with the argument that currencies are not an asset class, because of the long-short nature of investing in an unmanaged currency basket with an expected return of zero. The latter is slightly more ambitious, essentially assuming that a

---

¹ The following indices are used as proxies for the respective asset classes: equities - S&P 500 Total Return Index; currencies - Deutsche Bank Currency Return Index; commodities - Deutsche Bank Liquid Commodities Index; real estate – FTSE NAREIT All Equity REITS Total Return Index; hedge funds – HFRX Global Hedge Fund Index; managed futures – Morningstar Diversified Futures Total Return Index; private equity – LPX50 Listed Private Equity Total Return Index.

© 2015 Merk Investments LLC® | (866) 637 5386 | www.merkinvestments.com | Page 3
passive currency manager holds managed funds in cash accounts, and any return above the cash rate is an active return. Both approaches however imply that in absence of a more defined benchmark, real beta is assumed away, and all currency returns are considered excess returns, or alpha. The question then arises: can active management in currencies really be justified if there is no sensible benchmark other than the risk-free return? Is the supposed alpha of a currency manager in reality a hidden beta in the form of exposure to systematic risk in currency markets, which is just difficult to define?

Melvin and Shand (2010) address this in their paper Active Currency Investment and Performance, agreeing that since “there is no such thing as a ‘buy-and-hold’ in the currency market”, a truly passive approach in currency investing simply does not exist. They propose however that measuring an active return is still possible, by evaluating currency strategies in terms of common risk factors that currency managers face. As risk factors, they reference known rule-based trading styles in currency markets, namely carry, momentum and valuation. Although all of these trading strategies are implemented in the industry in various ways and do not cover the entirety of applied currency strategies (therefore not common style factors in the closer sense), Melvin and Shand provide empirical evidence that a large number of managers incorporate elements of these styles in their currency management to some degree. Using any single or a composite of these styles as the benchmark, allows differentiating between managers who simply load up on a commonly available currency style and those who seek to generate excess returns beyond that.

This methodology seems plausible to us, given the increasing availability of these common currency strategies in the form of exchange-traded funds and mutual funds. Any portfolio manager who wants to be invested in currencies, can buy an available index at lower cost with which he or she receives an average (or market) currency return. The active manager who believes to be able to add alpha should focus on beating the widely available currency index, by providing returns that cannot be explained by any of the commonly applied systematic strategies.

**Beta**

The above discussion on benchmarks is important because we want to show the difference of actively and passively managed currency strategies that are incorporated as an alternative asset class in multi-asset portfolios. As a benchmark for our study, we select Deutsche Bank’s Currency Return Index (DBCR), which is an equally weighted index of three common rule-based currency styles: carry, momentum and valuation. This index is an often cited benchmark in foreign exchange studies and largely accepted in the industry as a proxy for systematic currency returns. DBCR is not the only benchmark used in studies, but it is a major one. Additionally, it is investable and equally incorporates exposure to arguably the most widely employed currency strategies. While we recognize that DBCR is still considered to be an “active” currency management in the broader sense, based on the above definition of currencies as asset class and using the narrower benchmark concept, it serves as our “passive” strategy in this study. We should also point out that the underlying strategies of DBCR are rebalanced once a month at the most, while the active strategy that we suggest is more tactically oriented and requires a daily rebalancing. This might present another point of differentiation between active and passive approaches, although less academic, as it requires more hands-on operational effort.

---

4 Deutsche Bank Currency Carry Index and Deutsche Bank Currency Valuation Index is rebalanced every three months. Deutsche Bank Currency Momentum Index is rebalanced every month.
Alpha

If alpha in currencies can be measured, what possible explanations are there then for its actual existence and how can one capture it? Since the foreign exchange market is by far the most liquid market in the world, with more than $5.3 trillion in daily turnover worldwide, there is an overwhelming notion that due to its size and depth, it is also the most efficient. So how can alpha exist in a perfectly efficient market?

As studies show, the particular microstructure of the FX market actually suggests that currency markets are not efficient in the classical sense. Sarno and Taylor (2002) and Sanger and Taylor (2005) point out in their research, that the foreign exchange market is in reality characterized by heterogeneous rather than homogenous market participants, which act on information asymmetries and differing risk tolerances (instead of common rationality and risk-neutral investor behavior). Thus, the assumptions underlying the Efficient Market Hypothesis are directly violated for the currency market, and suggest the existence of market imperfections that can be exploited. Moreover, according to the study, market participants can be grouped into active and passive investors. Passive investors are those seeking liquidity and use currencies to manage their risk exposure, and not to maximize currency returns. Active investors on the other hand provide liquidity and actively pursue profit-maximizing opportunities. The passive investors can be large multinational corporations, central banks and government institutions, who enter the market for such reasons as cash management purposes or currency hedging, and in fact make up the majority of currency trading volume with often large transactions. Their pure existence, non profit-seeking nature, and relative impact on the market differentiates foreign exchange from other markets, and can provide a source of alpha for the active participant.

In conclusion, a profit-seeking active investor who pursues a strategic approach to currencies and also has the needed sophistication and infrastructure to participate in foreign exchange, is given the potential to exploit these short to medium-term market inefficiencies. Heightened geopolitical risks and the increasing influence of central bank policy makers on financial markets further add to the potential to generate returns from emerging disruptions and structural deficiencies in the currency market. Specifically periods of market distress and higher asset volatility can trigger the need for liquidity for passive participants (e.g. more frequent rebalancing, currency hedging, exit of longer-term interest rate strategies like carry trades), as the passive participant is mostly concerned with risk exposure and less with execution efficiency, coincidentally giving up alpha to the active investor. At the same time, these periods are also associated with higher correlation among traditional asset classes, which warrants the need for portfolio diversification through uncorrelated alternative returns even more.

As a result, we hypothesize that by developing a systematic framework that is sensitive to the more risk-averse behavior of liquidity seekers, the active currency investor can capitalize on these shorter-term profit opportunities and extract alpha on a consistent basis in the long run, while mitigating overall portfolio risk. In the following, we present an approach that seeks to generate excess returns from currencies by targeting dynamics in risk sentiment in the FX market.

---

Risk Sentiment as Alpha Signal

The strategy that we are discussing is designed to capture shifts in investor risk perception that materialize due to changes in market conditions. We believe that this sentiment is reflected in dynamics of volatility risk premiums for currencies. As a proxy for risk premium, we use option-implied volatility in currencies, which we view as a biased estimate of future realized volatility. Market makers of currency options price their value through implied volatility, adjusting their risk premium according to their own estimates and supply and demand in the market. Any risk event that the passive market participant is trying to avoid or hedge is directly compensated through the quoted implied volatility, and the “fair value” assuming such a risk as the seller of the option is determined through the dealings in the interbank market. We further posit that due to the fact that underlying market risk in options is more complex to manage than it is for outright transactions, there is greater sophistication in option pricing than in spot, which means that the implied volatility is very sensitive to risk sentiment changes and adjusts rather quickly. Flows in spot and derivatives markets directly affect each other. Large supply and demand shifts in the spot market, e.g. through repositioning by the larger passive market participant, might be preceded by a change in risk premium in the derivatives market, as the interbank market mitigates its own risk when providing liquidity. In our assessment, this especially makes sense during periods of greater market stress, when there is larger demand for liquidity from passive participants and risk premiums express this change of market risk perception even more.

Ultimately, we think implied volatilities carry valuable information about future risk events that the passive participant is sensitive of, and believe that the emergence and abatement of risk in currencies can create alpha opportunities in the medium to long-term. With this in mind, we use the more reactive short end of the implied volatility term structure in G10 currencies to devise a systematic strategy that identifies relative changes in risk sentiment. To detect dynamics, we incorporate both relative value and momentum elements in our system, and devise a ranking strategy that positions us 100% long/short in G10 currencies at any given time – meaning it is neutral on the US dollar. It should be noted though, that while the signal is using options data, the actual currency exposure is achieved through trading forward contracts. In the following text, this currency strategy is referred to as “Active Currency” whereas the index investment using DBCR is referred to as “Passive Currency”.

Portfolio Simulation

For the time frame of our data set, we picked the period of January 2005 until December 2014, in order to allow for various market conditions in the different asset classes, and also to examine what happens to differently diversified portfolios during a more severe market downturn such as the Global Financial Crisis of 2008-09. We are restricted to this 10-year period due to limited and less reliable data on the option-implied volatility term structures prior to our selected time frame. For both, the signal generation in the Active Currency model and the composition of the asset class weights in the portfolios, we assume daily portfolio rebalancing.\(^9\)

As a base portfolio in our comparison, we use an equal allocation of 50% stocks and 50% bonds (“50/50 Base”). To examine the potential return enhancing and diversifying effect of alternative investments, we incorporate a 20% allocation to various alternative asset classes in the portfolio, while keeping an equal weighting of 40% in each stocks and bonds (“40/40 +”). Besides Active Currency and Passive Currency, we study commonly referenced

---

\(^9\) The results of the Active Currency model and the model portfolios are based on hypothetical analysis (back testing) and presented gross of fees and transaction costs. Returns herein are hypothetically achieved and are for illustrative purposes only. Past performance whether illustrative or actual is not a guarantee of future results.
alternative investments in the analysis, including commodities, real estate, hedge funds, managed futures and real estate, all of which are represented by investable and widely accepted benchmarks.\textsuperscript{10}

Before analyzing the performance of the constructed portfolios, we can get an indication of the diversification potential by looking at the correlation of the base portfolio with the respective alternative assets (Table 1). We notice that over the 10-year span, both Passive Currency and Active Currency as well as managed futures appear to be on average largely uncorrelated with the 50/50 Base portfolio, thereby offering diversifying benefits to traditional portfolios. Real estate, hedge funds, private equity and to some degree commodities however show higher average correlations.

\begin{table}[h]
\centering
\caption{10-year Average Correlations}
\begin{tabular}{|l|c|}
\hline
 & 50/50 BASE \\
\hline
ACTIVE CURRENCY & -0.11 \\
PASSIVE CURRENCY & 0.13 \\
COMMODITIES & 0.31 \\
REAL ESTATE & 0.80 \\
HEDGE FUNDS & 0.57 \\
MANAGED FUTURES & -0.18 \\
PRIVATE EQUITY & 0.70 \\
\hline
\end{tabular}
\end{table}

Back testing the systematic currency model and simulating the various portfolio compositions over the past ten years indicates that only Active Currency and real estate as partial allocation were able to enhance returns of the portfolio. From Figure 2, it is evident though that some of the modeled portfolios achieve diversification as they decrease the variability of the overall return, especially during the unfolding of the Global Financial Crisis.

\textsuperscript{10} The following indices are used as proxies for the respective asset classes: equities - S&P 500 Total Return Index; fixed income – JPM U.S. Aggregate Bond Total Return Index; passive currency - Deutsche Bank Currency Return Index; commodities - Deutsche Bank Liquid Commodities Index; real estate – FTSE NAREIT All Equity REITS Total Return Index; hedge funds – HFRX Global Hedge Fund Index; managed futures – Morningstar Diversified Futures Total Return Index; private equity – LPX50 Listed Private Equity Total Return Index.
As it turns out, the only alternative asset class allocations that were able to reduce the annualized volatility of the constructed portfolio were currencies (both Active and Passive), hedge funds and managed futures. Only Active Currency and managed futures though lead to a meaningful increase in the risk-adjusted return of the portfolio. While a Passive Currency allocation did result in a reduction of the portfolio standard deviation, it did so at the expense of a reduced return, as the unchanged Sharpe Ratio shows. This makes the obvious case for active versus passive currency management in multi-asset allocations, i.e. the ability to provide an uncorrelated return stream to the portfolio that harvests alpha in the long run.

Table 2: Performance Results for Simulated Portfolios (Jan 2005 - Dec 2014)

<table>
<thead>
<tr>
<th></th>
<th>50/50 Base</th>
<th>40/40 + Active Currency</th>
<th>40/40 + Passive Currency</th>
<th>40/40 + Commodities</th>
<th>40/40 + Real Estate</th>
<th>40/40 + Hedge Funds</th>
<th>40/40 + Managed Futures</th>
<th>40/40 + Private Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CUMULATIVE RETURN</strong></td>
<td>95.87%</td>
<td>117.75%</td>
<td>78.91%</td>
<td>73.81%</td>
<td>115.42%</td>
<td>74.56%</td>
<td>87.02%</td>
<td>92.74%</td>
</tr>
<tr>
<td><strong>ANNUALIZED RETURN</strong></td>
<td>6.95%</td>
<td>8.09%</td>
<td>5.99%</td>
<td>5.68%</td>
<td>7.97%</td>
<td>5.73%</td>
<td>6.46%</td>
<td>6.78%</td>
</tr>
<tr>
<td><strong>ANNUALIZED VOLATILITY</strong></td>
<td>9.80%</td>
<td>7.84%</td>
<td>8.02%</td>
<td>10.11%</td>
<td>14.41%</td>
<td>8.32%</td>
<td>7.73%</td>
<td>11.18%</td>
</tr>
<tr>
<td><strong>SHARPE RATIO</strong></td>
<td>0.56</td>
<td>0.84</td>
<td>0.56</td>
<td>0.42</td>
<td>0.45</td>
<td>0.51</td>
<td>0.65</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>SORTINO RATIO</strong></td>
<td>0.77</td>
<td>1.17</td>
<td>0.78</td>
<td>0.58</td>
<td>0.62</td>
<td>0.71</td>
<td>0.89</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>BEST MONTH</strong></td>
<td>5.53%</td>
<td>4.99%</td>
<td>4.71%</td>
<td>6.51%</td>
<td>10.20%</td>
<td>4.58%</td>
<td>4.02%</td>
<td>10.02%</td>
</tr>
<tr>
<td><strong>WORST MONTH</strong></td>
<td>-9.04%</td>
<td>-4.56%</td>
<td>-6.69%</td>
<td>-12.39%</td>
<td>-13.61%</td>
<td>-9.03%</td>
<td>-5.19%</td>
<td>-12.64%</td>
</tr>
<tr>
<td><strong>AVERAGE MONTH</strong></td>
<td>0.57%</td>
<td>0.66%</td>
<td>0.49%</td>
<td>0.47%</td>
<td>0.68%</td>
<td>0.47%</td>
<td>0.53%</td>
<td>0.59%</td>
</tr>
<tr>
<td><strong>AVG. MONTHLY GAIN</strong></td>
<td>1.65%</td>
<td>1.48%</td>
<td>1.46%</td>
<td>1.72%</td>
<td>2.21%</td>
<td>1.52%</td>
<td>1.38%</td>
<td>2.00%</td>
</tr>
<tr>
<td><strong>AVG. MONTHLY LOSS</strong></td>
<td>-1.65%</td>
<td>-1.21%</td>
<td>-1.31%</td>
<td>-2.17%</td>
<td>-2.43%</td>
<td>-1.52%</td>
<td>-1.42%</td>
<td>-2.41%</td>
</tr>
<tr>
<td><strong>% OF POSITIVE MONTHS</strong></td>
<td>67.21%</td>
<td>69.67%</td>
<td>64.75%</td>
<td>68.03%</td>
<td>67.21%</td>
<td>65.57%</td>
<td>69.67%</td>
<td>68.03%</td>
</tr>
<tr>
<td><strong>95% MONTHLY VAR (HIST.)</strong></td>
<td>-3.47%</td>
<td>-2.06%</td>
<td>-3.08%</td>
<td>-5.03%</td>
<td>-4.74%</td>
<td>-3.30%</td>
<td>-2.91%</td>
<td>-5.74%</td>
</tr>
<tr>
<td><strong>MAXIMUM DRAWDOWN</strong></td>
<td>-27.92%</td>
<td>-16.43%</td>
<td>-22.83%</td>
<td>-34.37%</td>
<td>-37.00%</td>
<td>-27.11%</td>
<td>-18.87%</td>
<td>-44.50%</td>
</tr>
</tbody>
</table>

The difference becomes more apparent when looking at the Sortino ratio of both, or the excess return over the downside standard deviation (volatility of negative returns). In the simulation, Active Currency was able to produce consistent excess returns over the base portfolio, while at the same time decreasing negative volatility, maximum drawdown and value at risk (VaR). Managed Futures show similar risk reduction potential, but fail to add consistent alpha over the 10-year horizon. In addition, the unstable correlation with equities as shown in Figure 1, makes it a less reliable choice as a diversification tool. We also repeated this study using global stock and bond indices for the base portfolio, that lead to very similar results.

The year-on-year analysis on the performance metrics of the Active Currency enhancement to the portfolio demonstrates the consistency of the above results. With the exception of 2007, both Sharpe ratio and Sortino ratio were increased in every year of the simulation, and the strategy systematically reduced the downside risk of the portfolio (Figure 5).

---

11 Value at risk (VaR) is measured using historical monthly returns.
12 The following indices are used as proxies for the respective asset classes: international equities – MSCI All Country World Daily Total Return Index Net Ex USA; international fixed income – JPM Global Aggregate Bond Total Return Index.
13 We should mention at this point, that the data quality of the signal input, i.e. the term structure of option-implied volatilities of the G10 currencies, improved greatly as we move through the years of the data set.
Table 3: Yearly Results for Simulated Portfolios (Jan 2005 - Dec 2014)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHARPE RATIO</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50/50 BASE</td>
<td>0.23</td>
<td>1.00</td>
<td>0.21</td>
<td>-0.89</td>
<td>1.24</td>
<td>1.32</td>
<td>0.56</td>
<td>1.79</td>
<td>2.39</td>
<td>1.94</td>
</tr>
<tr>
<td>40/40 + 20 ACTIVE CURRENCY</td>
<td>0.27</td>
<td>1.10</td>
<td>0.19</td>
<td>-0.55</td>
<td>1.65</td>
<td>1.72</td>
<td>0.79</td>
<td>2.27</td>
<td>2.72</td>
<td>2.25</td>
</tr>
<tr>
<td>EXCESS SHARPE RATIO</td>
<td>0.04</td>
<td>0.11</td>
<td>-0.02</td>
<td>0.33</td>
<td>0.42</td>
<td>0.40</td>
<td>0.23</td>
<td>0.48</td>
<td>0.33</td>
<td>0.32</td>
</tr>
<tr>
<td><strong>SORTINO RATIO</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50/50 BASE</td>
<td>0.37</td>
<td>1.54</td>
<td>0.28</td>
<td>-1.17</td>
<td>1.73</td>
<td>1.81</td>
<td>0.72</td>
<td>2.72</td>
<td>3.25</td>
<td>2.64</td>
</tr>
<tr>
<td>40/40 + 20 ACTIVE CURRENCY</td>
<td>0.46</td>
<td>1.79</td>
<td>0.26</td>
<td>-0.77</td>
<td>2.35</td>
<td>2.41</td>
<td>0.98</td>
<td>3.39</td>
<td>3.77</td>
<td>3.04</td>
</tr>
<tr>
<td>EXCESS SORTINO RATIO</td>
<td>0.08</td>
<td>0.25</td>
<td>-0.02</td>
<td>0.40</td>
<td>0.61</td>
<td>0.60</td>
<td>0.26</td>
<td>0.66</td>
<td>0.51</td>
<td>0.40</td>
</tr>
</tbody>
</table>

To further differentiate the Active Currency approach from Passive Currency, we perform a style factor regression with weekly returns using the three sub-components of DBCR as explanatory variables. This gives an indication
of how much of the returns are derived from having systematic exposure to these generic currency strategies, and how much excess return can be separated from that. As a fourth style factor, we use weekly changes in the Deutsche Bank Currency Volatility Index (CIVX), which measures implied volatility in currency markets. This fourth factor is essential given that our strategy derives alpha signals specifically from dynamics in short-term implied volatilities. The estimation is expressed with the following multivariate linear regression model:

\[ r_t = \alpha + \beta_1 F_{1,t} + \beta_2 F_{2,t} + \beta_3 F_{3,t} + \beta_4 F_{4,t} + \epsilon_t \]

where

- \( r_t \): return of the Active Currency strategy at time \( t \)
- \( \alpha \): excess return (alpha)
- \( \beta_i \): factor exposure associated with style factor \( i \) (beta coefficient)
- \( F_{i,t} \): return of the style factor \( i \) at time \( t \), with \( i = 1-4 \) being carry, momentum, valuation and volatility respectively
- \( \epsilon_t \): random error term

The regression results suggest that the Active Currency strategy exhibits statistically significant exposure with three of the four style factors, carry being the only one showing no valid factor loading. This is not necessarily surprising since we incorporate elements of both momentum and relative value into the strategy in order to detect relative dynamics in risk appetite. Ultimately, this can have similarities to the underlying methodologies of the Deutsche Bank indices. Also, since our strategy uses short-end currency volatility, it is natural that there is some sensitivity to changes in volatility represented by an aggregate index. More importantly, the regression also identifies positive alpha that is statistically different from zero. Thus, while some of the returns can be explained through factor loading, the Active Currency strategy does produce excess return beyond the four common risk factors.

The model as a whole is statistically reliable, but at the same time adjusted R-square of 0.0352 is low, which implies that not much of the variation of the Active Currency strategy is explained by the variation of the chosen factors in the style regression model. Again, we emphasize that these particular currency styles can come in many different variations, Deutsche Bank indices just being one of them. This is directly related to the discussion on the difficulty in defining active management in currencies and choosing appropriate benchmarks.

---

14 CVIX is calculated based on the three month implied volatilities of nine major currency pairs.

15 This analysis is analogous to empirical studies done by Pojarliev and Levich (2008) and Melvin and Shand (2010). Pojarliev and Levich use different proxies for currency style factors and include a custom index for currency volatility, whereas Melvin and Shand use DBCR indices but omit the volatility factor.

16 F-test of 5.51 (p-value 0.000242).
We could at this point dig even deeper into statistical analysis, selecting various different currency indices as explanatory variables, different compositions or higher order moments of the volatility component, using better fitting models or analyzing timing ability of factor exposure. This however goes beyond the scope of this analysis. The main point we want to make here is that currencies have attractive characteristics in the portfolio design context, and that there is potential value, both conceptually and empirically, in considering actively managed currencies as opposed to prevalent market indices.

**Critical Evaluation**

As indicated, this study is by no means exhaustive and should serve primarily to broaden the discussion on alternative investments and illustrate the potential benefits of currencies in multi-asset portfolio management. We selected the given data set due to the restricted availability of options data, but it is also certainly possible that longer periods could have produced different results. Any ex-post analysis naturally has hindsight bias, and we do not promise that past results guarantee future performance.

That being said, as the quality of the options data as signal input has improved throughout the sample period, we observed more stable results. The back testing methodology was also carefully assessed in terms of prudent timing lag between signal generation and trade implementation (look-ahead bias), robustness of the variables and techniques used in the model. In the construction of the trading signal, we also did not data mine our results to fit the hypothesis. In fact, we have been incorporating the same particular signal that we presented here in our own tactical model framework for a considerable time. Another critical point to consider is that since this is a simplified study based on hypothetical returns, it does not include any transaction costs or fees, irrespective of the asset class. Admittedly, excess returns will be lower once more realistic assumptions are applied, but we regard this also as secondary in this study. First, transaction costs have been ignored equally for all the asset classes in the model portfolios, and secondly currencies have some of the lowest costs of all tradable assets, especially considering more illiquid alternative asset choices.

One of the advantages of foreign exchange is the incredible depth of the market, incurring not only comparatively low trading costs but also allowing highly scalable strategies. This is particularly relevant during periods of extreme market conditions, when execution generally becomes less efficient. Due to the size of the market, execution risk in the FX market remains relatively low in these conditions, particularly for G10 currency forward transactions. As mentioned before, these periods also coincide with correlations moving closer to one among many asset classes, whereas currencies tend to remain relatively uncorrelated. Additionally, potential alpha opportunities further the argument for active currency management as a portfolio diversifier. Besides, the Active Currency strategy that we illustrated is designed in a way to reduce turnover and the effect of noisy data, resulting in weight changes in the currency allocations that play out gradually over the course of several days or weeks.

**Conclusion**

This paper is intended to make investors aware of the opportunities that lie within currency investing. While our study is only an illustration of one particular investing methodology, the underlying message that currency markets have attractive characteristics leading to potentially lower portfolio risk and enhanced returns should not be missed. We want to leave the reader with a few key takeaways.

---

17 For a more thorough academic discussion on measuring performance in active currency management we refer to the studies mentioned in this text.
First, managed currencies should be considered an asset class for the same reason that other popular alternative assets are. From the portfolio construction perspective, many commonly chosen alternatives exhibit less beneficial attributes with respect to risk management. In fact, correlations of currencies with traditional investments are more favorable, showing lower and more stable correlations with equities. As our research suggests, partial allocation to managed currencies in multi-asset portfolios is especially effective in mitigating downside volatility and maximum drawdown. Investors who care about protecting their portfolio should broaden their horizon and be mindful of the powerful diversifying effect that currencies can have.

Secondly, despite its size and scope, the foreign exchange market is not necessarily an efficient market in the classical sense. There are many different types of market participants with different intentions of entering currency transactions, the majority of which do not expect to maximize returns. These inefficiencies provide active market participants with prospects of generating excess returns from providing liquidity, oftentimes more pronounced during turbulent markets, when multi-asset portfolios are especially at risk of losing diversification. Meanwhile, unlike many other markets, FX markets are well functioning during these distressed periods, and enable long-short currency managers to implement their alpha generating strategies at relatively low cost without major disruptions.

Lastly, there is no uniform benchmark for currencies and no currency strategy is the same, even if it shares the same label. The distinction of active versus passive is not simple, but investors should nevertheless be able to differentiate between paying for an actual active currency management mandate, or choosing the cheaper alternative of buying securities that track “average” currency strategies. Prior research on this topic shows that active currency managers can generate consistent alpha independent of most available strategies. Our simulation, while simplified in its assumptions, indicates that an alpha targeting currency strategy, which exploits the microstructure of the FX market and behavior of dominant market participants, can provide beneficial portfolio diversification while generating excess returns. More importantly, globally diverging monetary policy that increasingly drives markets as a whole, does not only substantially impact asset volatility, but simultaneously creates alpha opportunities for the active investor.

About the Authors

Axel Merk is the President and CIO of Merk Investments, manager of the Merk Funds. An authority on currencies, he is a pioneer in the use of strategic currency investing to seek diversification. Axel Merk is a sought after speaker and author on topics ranging from the economy, gold and currencies to sustainable wealth and personal finance, as well as a regular guest and contributor to the business media around the world.

Daniel Lucas is the Vice President of Quantitative Research & Trading at Merk Investments and a member of the portfolio management group. Mr. Lucas focuses on quantitative research and analytics, portfolio optimization and currencies trading. He holds a M.Sc. in Financial Engineering (MFE) from the Haas School of Business at UC Berkeley as well as a Master’s Degree in Finance and Economics from the University of Stuttgart.
S&P 500 Total Return Index: a benchmark for broad-based measurement of changes in stock market conditions based on the average performance of 500 widely held common stocks; assumes that any distributions are reinvested.

MSCI All Country World Daily Total Return Index Net Ex USA: a benchmark for large, mid and small cap stock investments covering approximately 99% of the global equity opportunity excluding U.S. markets; assumes any distributions are reinvested.

JPM U.S. Aggregate Bond Total Return Index: a benchmark for U.S. dollar denominated investment-grade fixed income investments; assumes that any distributions are reinvested.

JPM Global Aggregate Bond Total Return Index: a benchmark for multi-currency denominated global investment-grade fixed income investments; assumes that any distributions are reinvested.

Deutsche Bank Total Return Index: a benchmark for systematic currency investments that equally weights three widely employed strategies, carry trade, momentum and valuation.

Deutsche Bank Liquid Commodities Index: a liquid and diversified benchmark for the commodities’ asset class.

FTSE NAREIT All Equity REITS Total Return Index: a benchmark for exposure to the real estate space across the U.S. economy through investments in tax qualified exchange listed real estate investment trusts; assumes that any distributions are reinvested.

HFRX Global Hedge Fund Index: a benchmark for performance measurement across all aspects of the hedge fund industry globally.

Morningstar Diversified Futures Total Return Index: benchmark for exposure to global markets through exchange listed futures contracts in commodities, currencies and equities.

LPX50 Listed Private Equity Total Return Index: a benchmark for investments in global exchange-listed private equity companies benchmark for systematic currency investments diversified across equity categories, styles, regions and vintage years; assumes that any distributions are reinvested.

Deutsche Bank Currency Carry Index: a benchmark for systematic currency investments generated with carry trade strategies.


Deutsche Bank Currency Momentum Index: a benchmark for systematic currency investments generated with momentum strategies.

Deutsche Bank Currency Volatility Index: a benchmark for implied volatility of currency markets based on 3-month implied volatilities of nine major currency pairs.

Correlation: a statistical measure of how two securities move in relation to each other.

Sharpe ratio: a measure of the excess return per unit of risk in an investment asset or a trading strategy.

Sortino ratio: a measure of the excess return per unit of downside risk in an investment asset or trading strategy.

Value at risk (VaR): a measure of the maximum loss not exceeded with a given probability defined as the confidence level over a specified period of time.

* * *

This report was prepared by Merk Investments LLC and reflects the current opinion of the authors. It is based upon sources and data believed to be accurate and reliable. Merk Investments LLC makes no representation regarding the advisability of investing in the products herein. Opinions and forward-looking statements expressed are subject to change without notice. This information does not constitute investment advice.

Explicit permission must be obtained from Merk Investments LLC in order to replicate, copy, distribute or quote from this document or any portion thereof.

Published by Merk Investments LLC

© 2015 Merk Investments LLC