

Dynamic Rebalancing Based Hedging of Exchange Rate Risk Using Currency ETFs

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ABSTRACT

The emergence of currency exchange traded funds (ETFs) has provided an alternative vehicle for both speculation and hedging in the currency markets. Because currency ETFs trade like equities and have no relevant expiration data, they represent an intriguing alternative for managing certain types of foreign exchange risk.

This paper reviews the particular advantages and disadvantages to currency ETFs as hedging instruments. Next, a discussion is provided of the potential divergence from initial intended ETF hedging results based on the particular characteristics of certain currency ETFs. The technique of dynamic rebalancing is introduced. A test of ETF hedging using the technique is then outlined for a dataset of historical currency ETF prices and exchange rates. Finally, recommendations are made concerning how market participants might assess the utility of currency ETFs in their specific foreign currency risk hedging application based on the expected results.

OVERVIEW

The trade press has presented various practitioner oriented articles concerning the usefulness of currency ETFs in hedging foreign currency risk. However, such discussions typically do not approach the topic systematically. Generally, such treatments fail to recognize the similarities and differences between ETF based hedges and other hedging techniques using futures contracts, options contracts, or money market transactions. Most notably, many of the practitioner oriented articles discount the use of currency ETFs in hedging applications because of the necessity of tying up capital during the hedge. This criticism lacks merit since other well established techniques for dealing with foreign exchange risk also tie up capital during the hedging period. In the following sections this paper reviews the issues which arise in using currency ETFs in managing foreign exchange risk. Transaction details specific to currency ETFs are then discussed. Examples are given contrasting various hedging techniques, with special emphasis on how currency ETF investment objectives can impact the effectiveness of a hedge.

MANAGEMENT ISSUE

The basic issue at hand is the management of foreign currency risk for those market participants who face only very small or occasional foreign currency exposures and those who face extremely long-term foreign currency exposures. For such market participants, existing liquid market derivative securities simply do not match the transaction scale or maturity. Table One summarizes this situation for the dominant U.S. market derivatives for the euro. In this case, the smallest notional principal amount involves 10,000 euros. A smaller size transaction would force the market participant to, in effect; take on a residual exposure of opposite nature to the initial exposure.

While services for small scale market participants do exist among the retail foreign exchange dealers, these arrangements have a reputation of being of a disadvantageous cost structure with account details

which may create more difficulties for the potential hedger (full margin calls, etc.). Also, the smaller FX dealer based derivative contracts or minor electronic exchanges suffer from illiquidity which may negatively impact pricing.

Table One: Example Derivative Contract Sizes

PHLX:

| | |
|--------------|--------------|
| Euro Options | 10,000 euros |
|--------------|--------------|

CME:

| | |
|---------------|---------------|
| Euro Futures* | 125,000 euros |
|---------------|---------------|

| | |
|----------------|---------------|
| E-mini Futures | 62,5000 euros |
|----------------|---------------|

| | |
|-----------------|---------------|
| E-micro Futures | 12,5000 euros |
|-----------------|---------------|

*CME Options are limited to larger contracts.

With respect to maturity, the available exchange traded contracts tend to have relatively short maturities when compared to certain long-term foreign exchange exposures. Some OTC derivatives do have longer maturities, but these would be expected to have low liquidity.

CURRENCY ETFS

In recent years numerous currency ETFs (CETFs) have been introduced. These include ETFs which cover most of the major currencies and an increasing number of second tier currencies. Variations include both long and short position ETFs, and more recently, double and triple long and short varieties. Table Two presents a sample listing of available CETFs as presented on the *Artremis.com* website. For the majority of these CETFs, there is no relevant maturity.

Table Two: Examples of Currency ETFs *

| Symbol | Name | Fund Family | Currency |
|--------|--|----------------|--|
| FXE | CurrencyShares Euro Trust | Rydex | Euro |
| EU | WisdomTree Dreyfus Euro | WisdomTree | Euro |
| ERO | iPath EUR/USD Exchange Rate ETN | iPath | Euro/U.S. dollar exchange rate |
| ULE | Ultra Euro ProShares | ProShares | 2x EUR/USD daily price change |
| EUO | UltraShort Euro ProShares | ProShares | 2x inverse EUR/USD daily change |
| URR | Market Vectors Double Long Euro | Market Vectors | 2x long euro |
| DRR | Market Vectors Double Short Euro | Market Vectors | 2x short euro |
| UUP | PowerShares DB US Dollar Index Bullish | PowerShares | US Dollar |
| UDN | PowerShares DB US Dollar Index Bearish | PowerShares | short US Dollar |
| FXJ | CurrencyShares Japanese Yen Trust | Rydex | Japanese Yen |
| JYF | WisdomTree Dreyfus Japanese Yen | WisdomTree | Japanese Yen |
| JYN | iPath JPY/USD Exchange Rate ETN | iPath | Japanese Yen/U.S. dollar exchange rate |
| YCL | Ultra Yen ProShares | ProShares | 2x JPY/USD daily price change |
| YCS | UltraShort Yen | ProShares | 2x short , JPY/USD daily change |
| FXC | CurrencyShares Canadian Dollar Trust | Rydex | Canadian Dollar |

* Source: Artimis.com

CETF managers strive to match the change of the target currency in the specified proportion on a day-to-day basis. Essentially, the CETF substitutes for a long or short position in the target currency. Because the CETFs are traded on a share basis, an investor can take any conceivable position depending on the number of shares purchased. Based on varying notional amounts, most attempt to capture the daily percentage change of the target currency. While most applications of both speculation and hedging in foreign currencies can be accomplished with outright currency trades and traditional derivatives, the ease of trading CETFs is attractive to the new or occasionally foreign currency impacted investor. Also, there is no set denomination per share of such CETFs. Some CETFs are quoted in multiples of the underlying currency, while others are based on an arbitrary notional principal. Recent per share values range from \$15.87 to \$132.72 for the CETFs presented in Table One.

The minimum number of shares which an individual investor could trade depends on the individual brokerage housing the account. This conceivably could be as few as one share, and should not be confused with the inter-institutional “creation units” of much larger magnitude [1]). Commissions on CETF trades are also subject to wide variation, with typical commissions at discount brokerages below \$10 per trade. Some brokerages also offer commission-free trading on select ETFs. The basic CETFs involve foreign currency denominated bank accounts. The inverse or leveraged CETFs also use derivatives to attempt to meet their objectives. [11]

CETF INVESTMENT OBJECTIVES AND RESULTING RETURN DYNAMICS

CETFs are available in both long and short varieties, and in leveraged long and short varieties. Naturally, the capability to easily take either short or long positions using these financial instruments would be of interest to those engaged in hedging applications. The potential utility of using CETFs in hedging foreign exchange risk would appear at first glance be highest for those who only occasionally face foreign exchange risk or those who face foreign exchange risk in magnitudes smaller than the sizes of the existing exchange traded currency derivatives. While foreign currency dealers have in recent years introduced smaller trading lots, the trading startup learning curve for trading forward currency contracts probably serves as a deterrent for the market participants in question.

However, existing CETFs operate under investment objectives which are defined relative to the daily returns on the underlying currency. The nature of the fund’s investment objective is crucially important to the potential use of CETFs in constructing hedging portfolios. The essence of any hedging approach is to create an offsetting position which is negatively correlated to the position originally at risk. However, this inverse relationship must be defined relative to the entire holding period. It is here that the CETF investment objective is crucial. While the typical CETF does a good job of tracking the daily changes in the reference currency, the effect is to create a compound return which can differ significantly from a continuous holding period return [4]. Thus, constructing hedge portfolios using CETFs can be problematic.

Given the existing CETFs one day return defined investment objective, the value of the CETF is driven by its own value change during the previous trading day. This differs significantly from other hedging instruments such as futures and forward contracts in which the value of the contract is always defined relative to the current value of the underlying. The overall effect is that CETF based hedges will drift away from the “perfect hedge” over time while derivatives based hedges will not deviate from the perfect hedge state during the contract period.

The drift effect is more pronounced for larger daily changes in the price of the underlying currency, and for longer periods of time [2]. For lower volatility markets and for shorter periods of time, the drift effect is negligible. However, for longer periods of time or high volatility markets, the effect can be substantial.

Thus, to ensure a CETF based hedge remains effective, ongoing rebalancing of the CETF position is required. This rebalancing, though theoretically relatively easy to accomplish due to the CETF trading format, significantly offsets the apparent appeal of CETFs as a hedging instrument for the occasional or small scale foreign currency market participant. In addition, the ongoing effort and expense of the rebalancing program would impact the overall effectiveness of the hedge.

REAL WORLD RELEVANCE OF CETF HEDGE DIVERGENCE

From the literature it is clear that the divergence of a CETF based foreign currency hedge arises from the shape of the underlying position value functions [2]. Because the CETF has a return dependent on its own past return, its relationship to the underlying currency can be curvilinear [13]. Meanwhile, the futures contract value remains in a linear relationship to the underlying currency since its value is always $X-S$, which is the contract price minus the spot price on the value date.

The issue of CETF hedge divergence is thus dependent on the size of the daily returns in the underlying currency and the length of time over which the hedge position is held. In examples in the literature, the absolute magnitude of the daily return (i.e. change in price) of the underlying currency has been set as high as 5%. Clearly this is an unusually high level of change being only matched occasionally for any currency in the historical record. As a benchmark, from its high of around \$1.45/€1.00 in June 2011, to its level in June 2012 of \$1.25/€1.00, the euro experienced only an aggregate percentage return (price change) of negative 13.79%. This one year change implies daily average price changes of .04% over the period. If this period is seen as a relatively volatile period against the backdrop of the ongoing Eurozone financial crisis, the example volatilities from certain published hypothetical cases are clearly extraordinarily large.

For smaller daily returns (volatility) in the currency whose value is to be hedged, the divergence of the CETF based currency hedge can be negligible. However, high volatility environments are the essential motivation to most hedgers.

DYNAMIC REBALANCING AS A CETF HEDGING STRATEGY

The discussion above has outlined the potential problem of divergence of CETF based hedges of foreign currency cash flows. The literature shows that the divergence can be extreme under certain daily return scenarios involving exceptional levels of volatility or exceptional levels of daily returns. However, under assumptions more in keeping with the historical record, it is likely that the divergence of the CETF based hedge from the benchmark futures based hedge is rather small.

It has been noted in the literature that the divergence of an ETF hedge can be eliminated by periodic rebalancing of the hedge [7]. In essence, this requires selling or purchasing the “excess” or “deficit” amount in the ETF resulting from the divergent returns on the ETF relative to the underlying asset. This would significantly reduce the suitability of hedging currency risk by less sophisticated market participants, since such rebalancing would require a complex and disciplined maintenance.

However, for reasonably sophisticated market participants, a rebalancing strategy could prove viable. The approach would provide an alternative to other available hedging techniques. One potential advantage of such a CETF hedging strategy would be the potential to keep a hedge position in place for an unlimited amount of time. It may well be that the relative efficiency of this type of CETF hedge would compare favorably to the longer term derivative contracts with respect to total cost.

What is needed is an empirical test of the hedging strategy. Since historical price data for CETFs is now available, it is possible to assess the technique for multiple currencies and for multiple historical market

periods and sub-periods. Such an investigation should be designed to include sub-periods of high volatility so as to provide meaningful evidence concerning the real-world likelihood of the theoretically possible extreme divergence discussed above.

SUMMARY

While the basic construct seems robust, justification for use of CETFs for foreign exchange risk hedging depends on some operational details. First, while the CETF management objectives are clearly stated (ex. track double the inverse of the change in the underlying currency), the effectiveness of the CETF managers should be tested. For example, a double long CETF should correlate highly to 200% of the underlying currency's value change. If not, the utility of using double or triple long or short CETFs to reduce the amount of capital that is tied up is diminished.

Second, while many widely used currency risk hedging techniques (money market hedges, back-to-back loans) also do tie up capital during the duration of the hedge, the proper opportunity cost treatment for funds tied up in CETF based hedging must be more completely developed. Surely, those who dismiss CETF based hedging due to this factor overstate the severity of the issue. Nonetheless, a systematic incorporation of capital availability and costs must be established.

Finally, due to the return dynamics of CETFs, it is clear that a CETF hedge would require monitoring and potentially rebalancing to ensure the hedge objectives were met. However, this dynamic rebalancing approach must be assessed relative to the potential adjustments necessary for other types of hedges (ex. rolling between futures contracts) for longer hedging periods. That is, through ongoing rebalancing, a CETF hedge could be held open indefinitely. While studies of the effectiveness of such rebalancing approaches have been conducted for index and commodity ETFs, the author is unaware of similar studies specifically addressing CETFs [6].

REFERENCES

- [1] Abner, David (2010). *The ETF Handbook*, John Wiley & Sons, Hoboken, New Jersey.
- [2] Burney, Robert B. (2012). "Hedging with Currency ETFs: The Implications of Return Dynamics." *Journal of Accounting and Business*, Vol. 5, No.1, 25-35.
- [3] Cain, Alexandra (2011). "Small Exporters Getting Savvy About Currency Risk." *Sydney Morning News*, July 27.
- [4] Cheng, Minder and Ananth Madhavan (2009). "Dynamics of Leveraged and Inverse ETFs." Barclays Global Investors, October.
- [5] (2011). "Currency Exchange Traded Funds (ETFs)". *Artremis.com*, September 14.
- [6] Hill, Joanne and George Foster (2009). "Understanding Returns of Leveraged and Inverse Funds." *Journal of Indexes*, September/October.
- [7] Hill, Joanne and Solomon Teller (2010). "Hedging with Inverse ETFs: A Primer." *Journal of Indexes*, November/December, 18-24.
- [8] Goodboy, David (2008). "FOREX spot trades vs. Currency Futures." *TradingMarkets.com*, May 21.

- [9] (2009). "Hedge Against Exchange Rate Risk With Currency ETFs." *Investopedia*, August 12.
- [10] Hudacheck, Dennis (2011). "Currency-Hedged ETFs Lower Volatility." *Index Universe*, November 16.
- [11] Lachini, Michael (2011). "Leveraged and Inverse ETFs: Not Right for Everyone." *Schwab.com*, October 20.
- [12] Lachini, Michael and Tatjana Michel (2011). "Currency ETFs: The Facts and Current Dollar Outlook." *Schwab.com*, October 31.
- [13] Schubert, Leo (2011). "Hedge Ratios for Short and Leveraged ETFs." *Revista Atlántica de Economía*, Volumen 1, 1-33.
- [14] Yates, Tristan (2007). "The Case Against Leveraged ETFs." *Seeking Alpha.com*, May 17.
- [15] Zweig, Jason (2009). "How Managing Risk with EFTs Can Backfire." *Wall Street Journal*, February 26.