The equity markets and the flows generated by currency carry trades

ALEXANDRU CONSTANTINESCU[1], DARIE MOLDOVAN[2], MIRCEA MOCA[2]
[1]Department of International Business and Economics
The Bucharest Academy of Economic Studies
6, Romana Square, District 1, Bucharest
[2]Business Information Systems Department
Babe□-Bolyai University of Cluj-Napoca
58-60, Teodor Mihali Street
ROMANIA
alexandru.constantinescu@swisscapital.ro, {darie.moldovan; mircea.moca}@econ.ubbcluj.ro

Abstract: Carry trade strategies based on major currency pairs gained momentum between 1995 and 2008, a period when financing for investments on the capital markets was difficult in developed countries that held high key interest rates. Japan was the first economic power that lowered the interest rate below 1% in 1995 and generated an important circuit on the USDJPY exchange rate. We plan to empirically test the influence of the largest currency carry trade channel, the USDJPY, on the US equity market and to highlight the importance of major carry trade circuits for anticipating movements in equity markets.

Key-Words: equity markets, currency pairs, carry trades, correlation, regression analysis

1 Introduction

The concept of carry trade refers to a strategy where an investor sells a certain currency that offers a relatively low interest and uses the funds to buy or invest in another currency that offers higher yields [2].

Such strategies have gained a major importance in the second part of the last decade and the available statistics on off balance sheet positions in derivatives show that the highest positions are related to the yen. This happened mainly because the Central Bank of Japan has been maintaining the lowest interest rate in the world for the past fifteen years. The market size of carry trade strategies involving the yen was estimated in 2007 to 1 trillion USD [11]. Theoretically, we should observe an increase in investment activity during expansion periods and we can imagine that large hedge funds could access loans in a weak currency that has a low key interest rate. These investments could be directed to equity markets.

So during the expansion period, investors should borrow and sell weak currency like the yen and this should lead to a depreciation of the weak currency. In periods of risk aversion investors will withdraw their investments to buy back the yen and we should observe an appreciation of the weak currency.

The study conducted by Menkhoff, Sarno, Schmeling and Schrimpf on volatility indicates a significant negative relationship between yield strategies of carry trade and volatility in the Forex market. In other words, in periods of low volatility such strategies are significantly profitable and in turbulent times, the margin of profitability of strategies decreases [9].

Jylha and Suominen showed that the hedge fund investment strategy predicted by their model, which they call the risk-adjusted carry trade strategy, explains more than 16% of the overall hedge fund index returns and more than 33% of the fixed income arbitrage sub-index returns [6]. According to Barroso and Santa-Clara, a well-diversified equal-weighted carry trade portfolio has shown puzzling investment performance in the floating exchange rate era, producing a Sharpe ratio of 0.9 that is more than double the 0.4 of the US stock market. So far there is no consensus risk-based explanation for this result [1].

2 The mechanism of the carry trade channel

According to the theory of uncovered interest rate parity (UIS), the profit that was generated by the interest differential should be canceled by the exchange rate changes between the two countries but the reality of the statistics provided by different studies shows that this does not happen all the times [4]. Moreover, countries that maintain long-term low interest suffer currency depreciation and the ones that maintain high interest rates achieve a

greater appreciation, which could increase the profitability of such strategies. According to Jakub Jurek Currency carry trades exploiting violations of uncovered interest rate parity in G10 currencies have historically delivered signicant excess returns with annualized Sharpe ratios nearly twice that of the U.S. equity market (1990-2008) [5].

Christian Wagner derived a speculative pendant to the standard UIP condition and showed that exchange rate returns comprise a time-varying risk-premium, how carry-traders are able to collect this risk-premium, thereby providing a direct rationale for the strategy, and that the forward bias puzzle originates from the omission of the risk-premium in standard UIP tests. Disregarding the interecept in the Fama-regression leads to overestimating excess returns and consequently to overstating the economic value of currency speculation [10].

Clarida, Davis and Pedersen show that yield curve level factors are positively correlated with carry trade excess returns while yield curve slope factors are negatively correlated with carry trade excess returns. Importantly, we show that this correlation is robust to the current crisis and to the inclusion of equity volatility in the model. What distinguishes carry trade returns in the current crisis from non crisis periods is not changed loading on yield curve factors but a much larger loading on the equity factor [3].

These results should indicate that the carry trade strategies are successful.

Usually in periods of high volatility low interest currencies tend to appreciate, because risk appetite declines and investors are repatriating their funds. In these periods low interest currencies tend to appreciate.

We can test the theory of uncovered interest rate parity and the profitability of a carry trade strategy by handpicking the EUR/RON pair.

We could have accessed a loan in EUR in May 2009, the month when the European Central Bank lowered the interest rate down to 1%, the minimum key rate for the past years, sold EUR to buy RON at 4.17 and invested for a one year maturity in treasury bills in Romania where the official interest rate was at that time around 9.5%. After a year if one were to withdraw money from this strategy at a EURRON rate of 4.175 and taking into account transaction costs, one would have obtained a yield of approximately 8%. This annual performance is high for a fixed income investment made in the European area.

We presume that the initial flow generated by carry trade currency strategies, selling the weak currency or low interest currency for exposing on a currency that offers high interest rates should generate a flow that could reflect on the stock market. We can assume that the opening of positions on a currency carry trade should lead to a negative correlation between the trend of the weak currency and the equity market from the country with a higher interest rate.

For this reason a manager that has under administration a portfolio with a global exposure should take into account the possible effects that can run into action when we face a change in the circuit of a very important carry trade currency pair, similar to the carry trade circuit that was active on the USD/JPY during 1995 -2008 [8]. These changes could have impact on equity market returns in regions where speculative money generated by such strategies is directed. The sudden change of the variables that sustain a carry trade strategy, like the interest rates from the two countries that are involved can lead to a massive selloff and could affect the short-term return on equities.

We propose to test the correlation between the most famous carry trade pair USD/JPY (and generates the highest flows) and the most representative stock market index from the U.S., the Standard & Poor's 500 (S&P500). We expect that the widening of the interest rate differential and hence the carry trade channel after important monetary policy decisions should increase the amount of speculative money that come from Japan and head to the U.S. equity market.

3 Analyzing the correlation with the equity market

The data used for empirical testing was taken from the Bloomberg database [12]. For the study we chose initially a period of 16 years (March 1995 - March 2011) using monthly data series. This period includes two powerful cycles of economic expansion and two periods of contraction. We chose this period because the financial industry in the mid-90s (which focused on the carry trade between the dollar and the yen) has developed aggressively and gained dimension and there is more likely to find results during this period.

The data was grouped according to the moment when the central banks of both countries changed their monetary policy and made it possible to increase the carry trade phenomenon by widening the interest rate differential and the range of this interval. The S&P500 index is used as a proxy for the U.S. stock market. The values of the S&P index

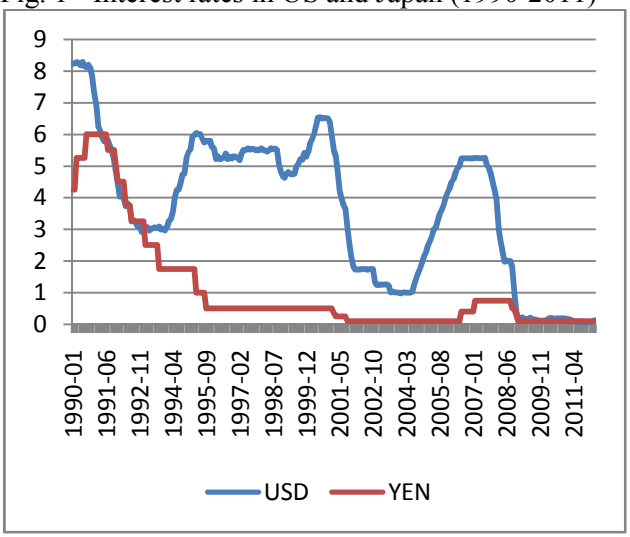
ISBN: 978-1-61804-102-9

and the USD/JPY pair were log-sized in order to stabilize the series.

In 1991 Japan had the key interest rate at 6%. From 1991 to mid-1995, due to economic problems, Japan has accelerated and reduced the interest rate down to 0.5%, and maintained it around this value until now. During this period U.S. maintained the reference interest rate significantly above the 0,5% level and with one exception during 2002-2003, the federal rate was always above 2% until 2008. The FED adopted a lax monetary policy and reduced the key interest rate to a historically low in order to offset the contraction from 2008-2009 when they made the most aggressive interest cuts and we can mark the closing of a major carry trade channel that lasted for almost 13 years between U.S. and Japan. As seen in Figure 1, the interest differential increases between 1994 and 1995, closes in 2001-2002 and reopens again in 2005.

We test the level of correlation on the entire interval (March 1995 - March 2011) and we compare these results with the results obtained by restricting the range of the data by excluding the moments in which the monetary policy changes of the two countries have reduced the interest rate differential, making very hard to initiate carry trade strategies. After adjusting the time range we should obtain a higher degree of positive correlation between S&P500 and USDJPY and we could assume that this increase in correlation would be due to the speculative funds that are active through the carry trade channel in such periods.

Fig. 1 - Interest rates in US and Japan (1990-2011)



For the first adjustment on the interval, we exclude the period from the end of the interval, when the U.S. Federal Bank aggressively reduced the interest rate in November 2008 and led to an interest differential of less than 2%. We estimate the following two regressions:

(1) SPX_95-11 = C(1)* USDJPY_95-11 + C(2)
(2) SPX_95-08 = C(1)* USDJPY_95-08 + C(2)

We note SPX as the log-sized monthly returns of the S&P500 equity index and the USD/JPY as the log-size values of the monthly USD/JPY fluctuations. The first regression provides the results for the entire interval (1995 – 2011) and the second regression provides the results for the first adjustment.

For the first regression we obtain a positive beta indicator of 0.38, a coefficient of determination of 3.4% and a rather small F-statistic value of 6.67 as presented in table 1.

Table1. Results for S&P Index and USDJPY'95-'11

Dependent variable: SPXmar95-mar11 Method: Least Squares Included observations: 193		
Variable	Coefficient	Std. Error
USDJPY_95-11	0.385415	0.149128
t-Statistic	Prob.	Corr. Coeff.
2.584459	0.0105	0.02223
R-squared		0.033789
Adjusted R-squared		0.028730
S.E of regression		0.254210
Durbin-Watson stat		0.036468
S.D. dependent var		0.25794
Akaike info criterion		0.10900
Schwarz criterion		0.14281
F-statistic		6.67942
Prob(F-statistic)		0.01049

With these figures we cannot highlight many things regarding the relationship between S&P500 stock index and the currency pair USD/JPY except that the two variables have a slight measure of positive correlation.

As we predicted, with the first tightening of the interval, we obtain a higher beta (0.73), almost double the coefficient of determination (6.1%), a higher F-statistic test and a correlation coefficient 2.3 higher as seen in Table 2.

These figures represent a much stronger result compared to the one from the first regression, our presumption gaining a degree of significance.

In the case of the second adjustment, we optimized the interval by eliminating also the period between December 2001 and January 2005, a period in which in order to counter the negative effects of the recession from 2001, the FED kept interest rates below 2%.

ISBN: 978-1-61804-102-9

Table 2 – Results for the S&P Index and USDJPY between 1995 and 2008

Dependent variable: SPXapr95-nov08 Method: Least Squares Included observations: 163		
Variable	Coefficient	Std. Error
USDJPY_95-08	0.737010	0.227847
t-Statistic	Prob.	Corr. Coeff.
3.234666	0.0105	0.05191
R-squared		0.061022
Adjusted R-squared		0.055190
S.E of regression		0.259384
Durbin-Watson stat		0.036997
S.D. dependent var		0.266853
Akaike info criterion		0.151182
Schwarz criterion		0.189142
F-statistic		10.46306
Prob(F-statistic)		0.001478

We introduce the following regression:

(3) SPXadjusted = C(1)* USDJPYadjusted + C(2).

The second adjustment brings much more representative results even compared to the first adjustment for all statistical indicators as shown in Table 3. We obtain a beta indicator slightly higher than 1, which indicates that during this last interval that was adjusted twice, the US stock market and the USD/JPY moved exactly at the same pace. The correlation coefficient is three times higher compared to the initial figures.

Gradually adjusting the series according to the criteria in which the carry trade strategy should function properly we managed to obtain significant results for a model that compares the evolution between the S&P500 stock index and the USD/JPY currency pair.

Table 3 – Results for the S&P Index and USDJPY for the final adjusted interval

Dependent variable: SPX_adjusted Method: Least Squares Included observations: 128		
Variable	Coefficient	Std. Error
USDJPY_adjusted	1.006217	0.263000
t-Statistic	Prob.	Corr. Coeff.
3.825917	0.0002	0.06916
R-squared		0.104081
Adjusted R-squared		0.096970
S.E of regression		0.279824
Durbin-Watson stat		0.046722
S.D. dependent var		0.294466
Akaike info criterion		0.306192
Schwarz criterion		0.350755
F-statistic		14.63764
Prob(F-statistic)		0.000204

We can presume that the size of carry trade strategies, the funds that were financed and moved from Japan to the U.S. capital market, towards treasury bonds or equities, influence the foreign exchange rate between the two countries and the return of stock indexes.

4 Conclusion

This study shows that during the periods in which the monetary policy facilitated carry trade strategies, the correlation between the S&P500 stock index and the USDJPY currency pair has grown significantly and we can assume that the amount of funds that were financed at very low costs in Japan and headed to the U.S. capital market, towards treasury bonds or equity markets, had a major impact in the last fifteen years and influenced the returns of the stock market indexes and the evolution of the USD/JPY.

If in the case of the first interval restriction, when we have eliminated the period starting from the moment when the FED reduced the key interest rate below 2% in late 2008, we can argue that the higher degree of correlation is generated by market conditions, in a period of a major global economic contraction equity markets fall and weaker currencies are stronger, in the case of the second adjustments we are not dealing with a severe global crisis, Japan lost around 1.5% of GDP (Gross Domestic Product) in the three quarters of decline from 2001 and in U.S. the recession was merely technically in 2001, not having two consecutive quarters of GDP decline [7]. We can conclude that we have obtained better results in the level of correlation mostly because of the adjustments based on the interest differential needed for carry trade strategies.

A fund manager that oversees a portfolio with a global exposure should take into account any changes in monetary policy that can affect large currency carry trades and hence the large flows that might enter or be withdrawn through this circuit and could affect major stock market indices and foreign exchange rates.

Acknowledgments

This work was partly supported by POSDRU 88/1.5/S/55287 Grant and CNCSIS TE_316 Grant and POSDRU/89/1.5/S/63663 Grant.

References:

[1] Pedro BARROSO, Pedro SANTA-CLARA – "Beyond the Carry Trade: Optimal Currency

Portfolios", Working Paper SeriesNova SBE and Universidade Nova de Lisboa, 2011;
[2] Markus BRUNNERMEIER, Stefan NAGEL, Lasse PEDERSEN – "Carry Trades and Currency Crashes", NBER Macroeconomics Annual 2008, Volume 23, publication 2009;
[3] Richard CLARIDA, Josh DAVIS, Niels PEDERSEN – "Currency Carry Trade Regimes: Beyond the Fama Regression", NBER Working Paper No. w15523, 2009;
[4] Joseph GANGON, Alain CHABOUD – "What Can the Data Tell Us about Carry Trades in Japanese Yen?", FRB International Finance Discussion Paper No. 899, 2007;
[5] Jakub JUREK - „Crash-Neutral Currency Carry Trades", National Bureau of Economic Research (NBER), AFA 2010 Atlanta Meetings Paper, 2007;
[6] Petri JYLHA, Matti SUOMINEN, Paul SODERLIND – "Speculative Capital and Currency Carry Trades", Forthcoming in The Journal of Financial Economics, 2010;
[7] Kevin L. KLIESEN – "The 2001 Recession: How Was It Different and What Developments May Have Caused It?", Federal Reserve Bank of St. Louis Review, 2003;
[8] Michael LIM – "The 'Carry Trade' and the Current Financial Turmoil", Third World Resurgence #203/204, July/August 2007;
[9] Lukas MENKHOFF, Lucio SARNO, Maik SCHMELING, Andreas SCHRIMPF - "Carry Trades and Global Foreign Exchange, Volatility", Journal of Finance, Forthcoming, EFA 2009 Bergen Meetings Paper;
[10] Christian WAGNER - „Risk-Premia, Carry-Trade Dynamics, and Economic Value of Currency Speculation", EFA Athens Meetings Paper, 2008;
[11] http://www.economist.com/node/8633485?story_id=8633485
[12] http://www.bloomberg.com/quote/SPX:IND