FX Momentum Trading

In this project I discuss a backtest for a cross-sectional momentum strategy applied to the foreign exchange market using monthly data for the period from 2013 to 2018. Momentum is a well-documented anomaly that spans both equity and FX markets, but is particularly well documented in equity markets. In foreign exchange until recently there has been little evidence on momentum in the cross-section of currencies. Hence, the analysis of foreign exchange momentum using more recent data is of particular interest. You can find the code for this project here: https://github.com/valmal/momentum/blob/master/mom-mecklai.ipynb (https://github.com/valmal/momentum/blob/master/mom-mecklai.ipynb)

Literature

The profitability of momentum-based trading strategies was first documented by Jegadeesh and Titman (1993) using data for stock markets. In their study, a simple momentum strategy generated returns in order of about 12 % p.a. This analysis has since been extended into new domains and other countries. In FX markets, currency momentum studies have generally analysed momentum in the time-series of single exchange rates. As more data became available more studies of cross-sectional currency momentum emerged. Okunev and White (2003) analyse a universe of eight currencies over 20 years, from January 1980 to June 2000. They find that across all base currencies of reference, momentum strategy generated a return of about 6% p.a., which is independent of the specific trading rule chosen. Asness, Moskowitz, and Pedersen (2009) take a broader approach and examine eight diverse markets and asset classes. For FX, they look at ten currency pairs with data covering the period January 1979 to July 2011. To measure momentum, the use the past 12-month cumulative raw return on the asset skipping the most recent month. Not only do they find a mean average excess return of 3.3% for the high minus low currency portfolio, but they also uncover a marked comovement pattern across asset classes highlighting the importance of global factors related to momentum. The richest and most recent paper on momentum is written by Menkhoff, Sarno, Scheling and Schrimpf (2011). Using a rich data source from BBI and Reuters (via Datastream) containing up to 48 currency pairs at a given time, they use the end-of-month spot and forward rates data and find that for the period from January 1976 to January 2010, the momentum strategy yielded the average of 6-10% for short term holding periods of one month. In this article I replicate their analysis and test whether FX momentum continued to be a profitable strategy in the period from 2014 to 2018.

Data

I conducted analysis using the daily spot and forward data freely available on Mecklai Finance (http://www.mecklai.com/digital/home/index (http://www.mecklai.com/digital/home/index)). While the sources of the data is not clear, I thought it would be interesting to compare how the study results differ when using different data sources. A number of data transformations was conducted. I converted all rates to be against the dollar. I also excluded currency pairs, where significant number of data points was missing (i.e., USDBHD and USDKRW). In addition, I have also detected some duplicate data and decided to use the first daily entry and discarded all other entries. Also, I have converted daily data into monthly. Since it is important to incorporate transaction costs to uncover the true profitability of a strategies, ideally, I would also want to incorporate bid and ask spread into my analysis. Consequently, I ended up with monthly data for 19 currency pairs spanning the period from January 2011 to December 2018.

Strategy and Portfolio Construction

I calculate excess returns to a U.S. investor for holding foreign currency k as follows

$$rx_{t+1}^k \equiv i_t^k - i_t - \Delta s_{t+1}^k \approx f_t^k - s_{t+1}^k$$

where s and f denote the (log) spot and 1-month forward rate (forward currency units per USD) and Δs denotes the log spot rate change or return.

At the end of each month, I form three portfolios based on lagged returns over the previous f = 1, 3, 6, 9, 12 months and these portfolios are held for h=1, 3, 6, 9, 12 months. The one third of all available currencies in a given month with the lowest lagged returns are allocated to the first portfolio ("Losers"), the next third is allocated to the medium portfolio and the one third of all available currencies with the highest lagged returns are allocated to the third portfolio ("Winners"). I also form a portfolio which is long in the winner currencies and short in the loser currencies. This "high minus low" portfolio is of the most interest. Note that this long-short portfolio is USD netural.

Results

Table 1 shows average annualized excess returns for a number of high minus low momentum potfolios with formation and holding periods each varing between one and twelve months: f, h = 1, 3, 6, 9, 12. We find that momentum strategies yield excess returns of about 2 - 5%, with most profitable strategies being those with 3 - 6 months formation periods. Whilst there is a monotonous decline in returns in average excess returns when moving from formation periods of 6 months to 12 months for a given holding period, this finding is not consistent across all formation periods. Contrary to the findings by Menkhoff et al. (2011), the short term strategy based on formation and holding periods of one month is unprofitable, according to this backtest.

Looking at the Sharpe Ratio, we find that the annualised Sharpe Ratio is the highest for the strategy with the formation period of one month and the holding period of twelve months. Strategies with formation periods between one and three months and holding periods between six and twelve months seem the most profitable.

Figure 1 shows cumulative excess returns for all the momentum strategies over the full sample period. There is some co-movement between the momentum strategies they are not perfectly correlated. Moreover, from Figure 1 it is clear that momentum profits are highly time-varying and that momentum is most profitable at longer time horizons.

Out[66]:

Table 1. Momentum Returns and Sharpe Ratios

	Excess Return					Sharpe Ratio					T-Statistic				
h	1	3	6	9	12	1	3	6	9	12	1	3	6	9	12
f															
1	-0.27%	2.29%	2.41%	2.13%	1.82%	-0.031	0.73	0.96	1.0	1.1	-0.062	1.8	2.3	2.5	2.6
3	3.37%	3.31%	3.73%	3.02%	2.56%	0.6	0.65	0.95	0.97	0.95	1.2	1.6	2.3	2.4	2.3
6	5.35%	4.16%	3.64%	2.77%	2.20%	0.87	0.84	0.86	0.75	0.67	1.7	2.1	2.1	1.8	1.6
9	1.83%	2.61%	2.53%	2.10%	1.34%	0.34	0.56	0.6	0.55	0.4	0.69	1.4	1.5	1.4	0.98
12	-0.22%	1.26%	1.36%	0.88%	0.63%	-0.017	0.28	0.33	0.23	0.19	-0.031	0.64	0.73	0.52	0.42

Figure 1. Cumulative Excess returns of momentum strategies
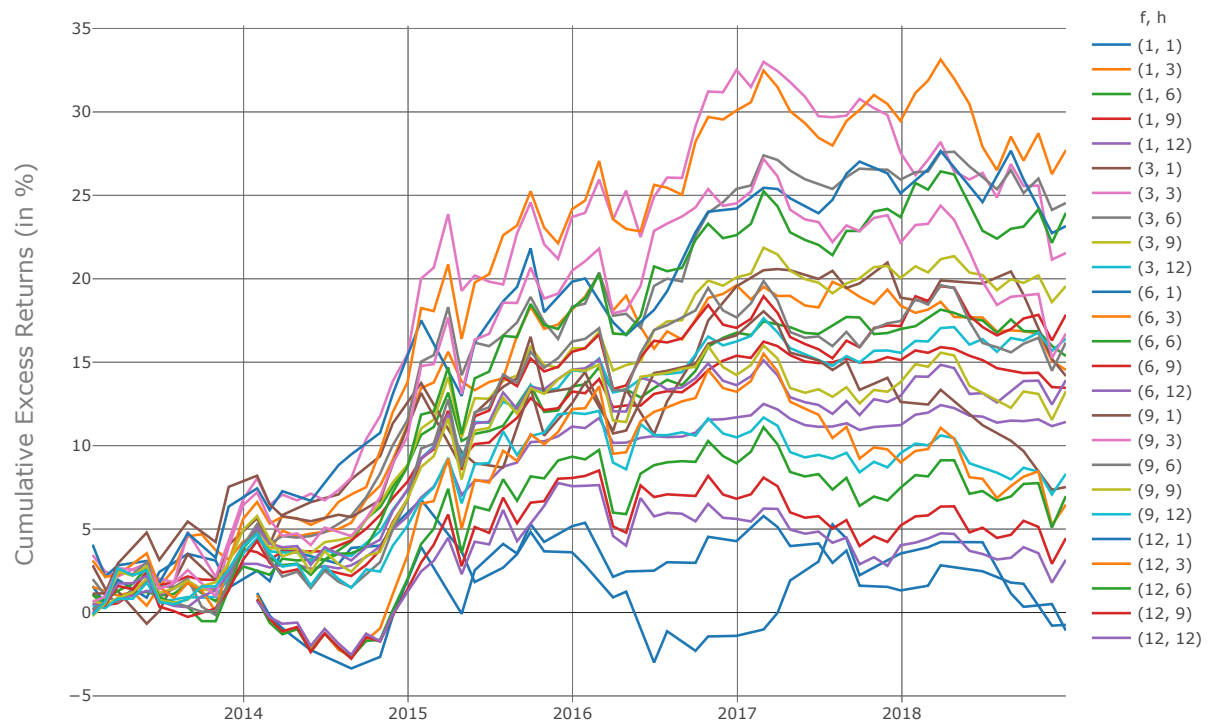
Conclusion

In this project I investigate momentum strategies in FX markets, which rely on return continuation among winenr and loser currencies. I use monthly data on spot exchange rates and forward exchange rates for 19 currency pairs spanning the period from January 2011 to December 2018. I find that momentum strategies yield excess returns of about 2 - 5% per year. This analysis could be developed further by incorporating transaction costs and assessing the contribution of individual currency pairs to portfolio returns. Moreover, it would be interseting to assess this strategy using higher-frequency data.

References

Menkhoff, Lukas, Sarno, Lucio, Schmeling, Maik and Schrimpf, Andreas, (2012), Currency momentum strategies, Journal of Financial Economics, 106, issue 3, p. 660-684.

Asness, Clifford S., Moskowitz, Tobias J. and Pedersen, Lasse, (2013), Value and Momentum Everywhere, Journal of Finance, 68, issue 3, p. 929-985.

Okunev, J., D. White, 2003. Do Momentum-Based Strategies Still Work in Foreign Currency Markets?. Journal of Financial and Quantitative Analysis 38, 425–447.

Jegadeesh, Narasimhan and Titman, Sheridan, (1993), Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency, Journal of Finance, 48, issue 1, p. 65-91.