Finding Equilibrium

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G10 FX Strategy
Global

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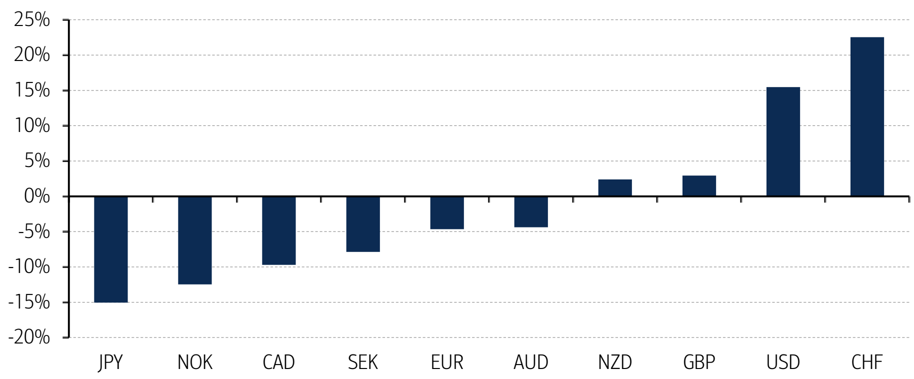
Key takeaways

- Our suite of equilibrium models show CHF/JPY to be the most overvalued G10 cross. NOK also looks cheap.
- USD overvaluation is understandable given impending Fed tightening and poses no risk to further upside.
- Conversely, EUR appears close to equilibrium; expecting QE2 from the ECB, we argue for further downside.

Chart 1: G10 Trade-Weighted Currency Misalignment



Source: BofA Merrill Lynch Global Research

Long-term factors gain importance as markets normalize

Normalizing markets slowly out of crisis mode means long-term factors become more important. We update our set of equilibrium models, showing the most extreme misalignments to be in CHF and JPY, and suggesting value in being short CHF/JPY.

USD overvaluation - large at 15% - is understandable given market expectations of Fed tightening and in fact should probably be bigger. We expect USD has scope to strengthen further. Conversely EUR is arguably not undervalued enough. EUR is close to equilibrium, as is EUR/USD; a surprising result given monetary policy divergence which we expect will continue to be a powerful driver, and underpins our call for EUR/USD to move towards parity by the end of 2015.

AUD and NZD results are also surprising, with valuation suggesting both are close to equilibrium. We remain bearish on both – NZD more than AUD – as commodity weakness continues to bite.

The G-10 ‘petro-currencies’ – NOK and CAD – have understandably suffered the effects of plunging oil prices, bolstered by dovish Central Banks. NOK in particular appears to have over-shot however.

Value in equilibrium

In theory, exchange rates should converge to their long-term equilibrium. In practice exchange rates are volatile, misalignments can persist for long periods of time, and the equilibrium level itself can often prove to be an elusive target. Nevertheless, a measure of equilibrium exchange rates is useful in providing "long-term" guidance. Valuation gives us a framework in which to think about exchange rates and aids to differentiate structural moves from temporary (cyclical) swings and noise.

USD has appreciated sharply since mid-2014, and equivalently JPY has depreciated steadily since 2013, indeed reaching levels which prompted BOJ Governor Kuroda to say that further JPY weakness is unlikely, at least on a REER basis. Equilibrium estimates can help answer the question whether such behaviour represents movements in the underlying equilibria, and therefore the currencies are correctly priced, or whether it represents misalignments that will gradually correct.

Estimating the extent and duration of over/undershooting from equilibrium remains a mixture of art and science, and it is important to interpret all such model results as one input for trading decisions, to be augmented with judgment informed by the macro picture, as well as inputs from other sources such as flows (LCBF) and price action (FXQT).

Methodology redux

We estimate a set of 12 models, in five categories – PPP, Balance of Payments, Monetary Models, Real Interest Differentials and Behavioural Equilibrium Exchange Rate models. As with any pricing exercise, the methodology itself introduces uncertainty, and we address this uncertainty by using a range of methodologies and further by estimating variants of each model with different choices of inputs, (See Appendix for more details).

G10 not broadly misaligned on a trade weighted basis

Our results show significant overvaluation in CHF and USD, while JPY and NOK look markedly undervalued. The rest of the G10, while predominantly undervalued, remain within the margin of error for such models.

Going to Extremes – sell CHF/JPY

CHF and JPY show the largest misalignment in our models, and furthermore individual models are internally consistent. The RID model is the notable exception for JPY, though estimates appear to be affected by the consumption tax impact on inflation data (Chart 1, Table 1). Large deviations from equilibrium are more likely to signal that a currency is becoming unsustainably detached from fundamentals and is due for correction, and make longer-term valuation more relevant for medium term movements. We have argued in recent reports that there is value in selling CHF/JPY, and our model estimates further support this view.

Table 1: G10 Equilibrium estimates

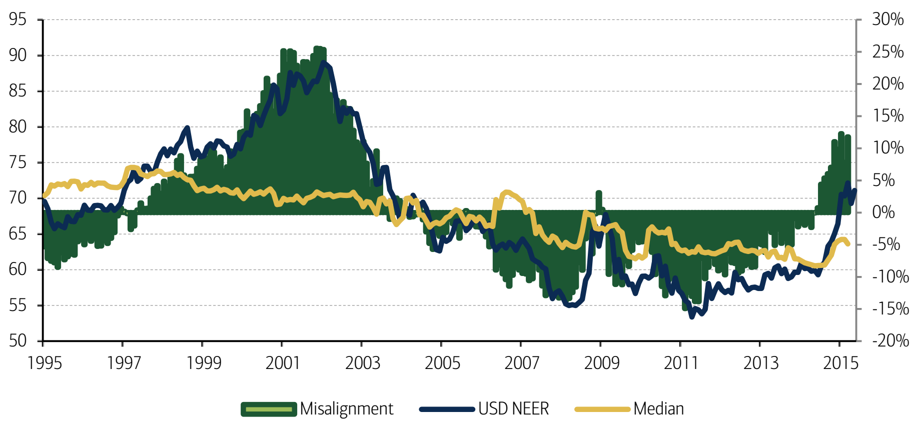
	Equilibrium Estimates G10 TWI									
	USD	EUR	JPY	GBP	CHF	NOK	SEK	CAD	AUD	NZD
Spot	73	120	171	98	194	83	74	93	65	120
PPP	59	137	211	89	172	89	80	110	66	118
BOP	63	128	201	94	156	94	80	102	63	120
MM	62	126	206	95	166	96	81	103	73	114
RID	75	126	144	107	136	98	77	96	71	115
BEER	67	126	185	100	158	95	79	105	68	136
Median	63	126	201	95	158	95	80	103	68	118
Misalignment	15%	-5%	-15%	3%	23%	-12%	-8%	-10%	-4%	2%
St. Deviation	5.49	4.44	24.44	6.08	12.03	3.01	1.36	4.61	3.78	8.05

Source: BofA Merrill Lynch Global Research

USD has room to strengthen despite valuation

USD overvaluation appears large at 15%, raising some question on how much upside is left for USD. We argue that USD has room to strengthen further as the Fed enters a hiking cycle and considering that a decomposition of USD strength over the past year suggests only a small portion was due to Fed expectations. Even in the longer term, structural developments suggest that the USD equilibrium can shift somewhat higher. Energy discoveries imply both stronger domestic growth and lower trade deficit, and the US has had substantially improved external imbalances post-crisis. In all, fundamentals in fact support secular USD strength, suggesting that, following over a decade of undervaluation in USD, we may be at the beginning of a sustained period of USD strength. Indeed the USD was overvalued by as much as 25% in the early 2000's (Chart 2).

Chart 2: USD



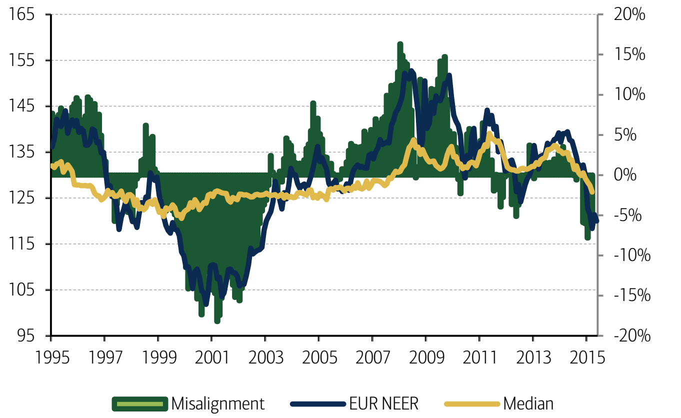
Source: BofA Merrill Lynch Global Research, Bloomberg

EUR close to equilibrium but mind the ECB

Surprisingly, EUR is close to its equilibrium level on a trade weighted basis, and EUR/USD is also close to fair value of 1.16. Indeed the equilibrium estimate for EUR/USD at 1.16 is below the long-term average level of the exchange rate of around 1.20, suggesting that equilibrium has shifted lower. In the short-to medium term, policy divergence will continue to be a powerful driver of EUR. The depreciation of the currency has so far been one of the most tangible benefits of QE. As such, we expect that the ECB will act, continuing QE beyond September 2016, and signalling as much potentially as soon as next month, keeping pressure on EUR. The Eurozone and the US are at different stages in the business cycle and the Fed will begin hiking rates, whether in September (our base case) or soon after. This brings the short-term 'equilibrium' lower and forms the basis of our call for parity in EUR/USD by the end of 2015. In the longer-term however, the exchange rate will shift higher to reflect external equilibrium.

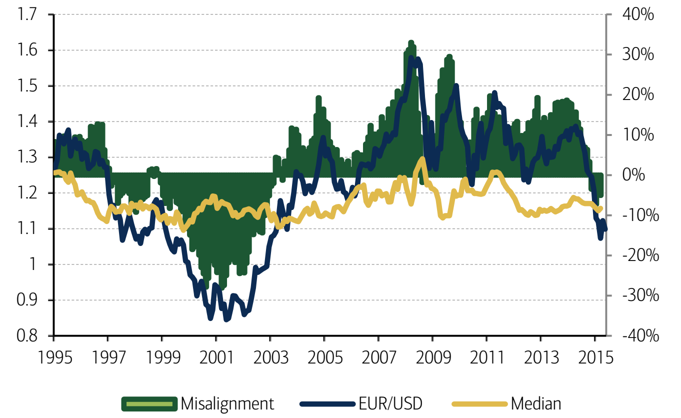
EUR also has scope to weaken vs both SEK and GBP for a number of reasons. On a pure valuation basis, SEK is more undervalued than EUR so we could see some correction there. In addition, while the Riksbank has been aggressive in its easing and has kept up with the ECB, we believe that the ECB has more scope to ease for longer, implying gradual SEK strength vs EUR in the medium term. GBP itself is close to equilibrium. Nevertheless, for arguments similar to those mentioned for USD, monetary policy divergence between the ECB and the BOE implies EUR/GBP downside.

Chart 3: EUR



Source: BofA Merrill Lynch Global Research, Bloomberg

Chart 4: EUR/USD



Source: BofA Merrill Lynch Global Research, Bloomberg

AUD and NZD close to equilibrium but still vulnerable

Valuation for AUD and NZD was somewhat surprising, suggests that both currencies are broadly at equilibrium. Yet we remain bearish and feel that both currencies are vulnerable to further weakness as commodities remain under pressure, and as we expect terms of trade for both countries will continue to deteriorate. Furthermore, both the RBA and the RBNZ maintain an easing bias, and both countries are particularly sensitive to developments in China (China and the Fed face off).

G10 'petro-currencies' feeling the pain; NOK overshoot

NOK and CAD have understandably suffered the effects of plunging oil prices, with currencies weighed down further by dovish Central Banks. NOK in particular appears to have over-shot however, although we would expect the NOK equilibrium rate to adjust lower than historical averages as Norway adjusts to a new oil reality. In the short-term the pressure from still very low oil prices and a likely further cut from Norges Bank pose downside risks, but NOK has room to correct higher in the medium term, though less so vs USD where monetary policy divergence works against it.

Bilateral deviations

Looking at bilateral misalignments the message is similar (Table 2, Table 3), showing EUR/CHF (Chart 5) and USD/JPY (Chart 6) significantly misaligned, while also indicating marked deviation in NOK pairs. CHF looks less overvalued relative to USD than to EUR, in line with commentary from the SNB, who have argued that the overvaluation relative to USD has diminished while nevertheless emphasizing the continued and striking overvaluation in CHF overall.

Table 2: Equilibrium Estimates USD pairs

	Equilibrium Estimates USD pairs								
	EUR/USD	USD/JPY	GBP/USD	USD/CHF	USD/NOK	USD/SEK	USD/CAD	AUD/USD	NZD/USD
Spot	1.1191	120	1.5379	0.9782	8.2631	8.4252	1.3256	0.7001	0.6316
PPP	1.16	89	1.53	1.05	6.79	6.34	1.21	0.69	0.56
BOP	1.21	94	1.60	1.02	6.56	7.40	1.11	0.89	0.76
MM	1.11	97	1.65	1.06	6.16	7.61	1.03	0.88	0.64
RID	1.10	-	1.64	-	6.92	8.06	1.27	0.76	0.62
BEER	1.20	93	1.57	1.05	6.46	7.81	1.17	0.78	0.84
Median	1.16	94	1.60	1.05	6.56	7.61	1.17	0.78	0.64
Misalignment	-3%	28%	-4%	-7%	26%	11%	13%	-11%	-2%
St. Deviation	0.05	3.13	0.04	0.02	0.27	0.60	0.08	0.07	0.10

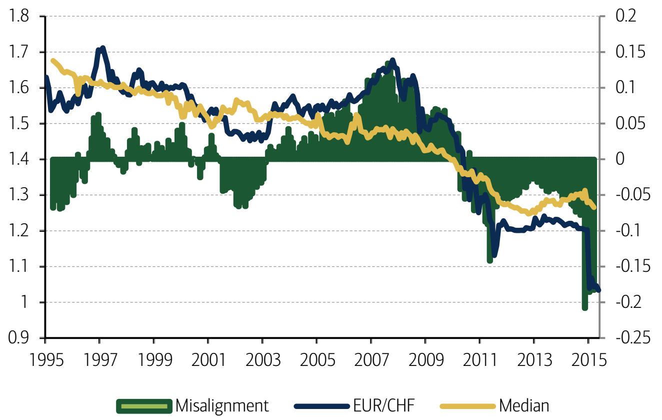
Source: BofA Merrill Lynch Global Research, Bloomberg

Table 3: Equilibrium Estimates EUR pairs

Equilibrium Estimates EUR Pairs									
	EUR/USD	EUR/JPY	EUR/GBP	EUR/CHF	EUR/NOK	EUR/SEK	EUR/CAD	EUR/AUD	EUR/NZD
Spot	1.1191	134	0.7277	1.0948	9.2473	9.4296	1.4832	1.5984	1.7709
PPP	1.16	103	0.76	1.21	7.63	7.34	1.39	1.67	1.93
BOP	1.21	133	0.74	1.27	8.17	9.09	1.45	1.52	1.72
MM	1.11	127	0.76	1.30	8.01	8.68	1.33	1.46	1.68
RID	1.10	149	0.66	-	8.03	9.28	1.50	1.42	1.79
BEER	1.20	145	0.65	1.24	7.86	9.17	1.39	1.39	1.58
Median	1.16	133	0.74	1.26	8.01	9.09	1.39	1.46	1.72
Misalignment	-3%	1%	-1%	-13%	15%	4%	6%	10%	3%
St. Deviation	0.05	16.42	0.05	0.03	0.18	0.72	0.06	0.10	0.12

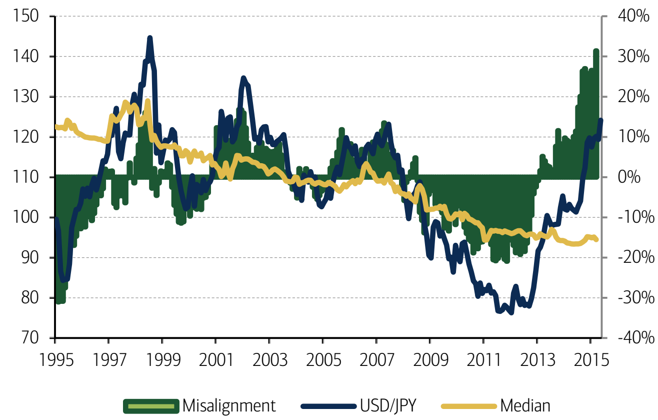
Source: BofA Merrill Lynch Global Research, Bloomberg

Chart 5: EUR/CHF



Source: BofA Merrill Lynch Global Research, Bloomberg

Chart 6: USD/JPY



Source: BofA Merrill Lynch Global Research, Bloomberg

Appendix

We estimate 12 models to determine the long-term equilibrium of the G10 currencies.

As with any pricing exercise, the methodology itself introduces uncertainty, and we address this uncertainty by using a range of methodologies and further by being relatively agnostic about the choice of variables within models. As an example, we estimate our models separately using both CPI and PPI, and using both short-term and long-term interest rates, recognizing that there is no 'correct' choice of variables and no 'correct' choice of model.

Each individual model has its own drawbacks, for example the PPP and BoP approaches are simple and intuitive, but ignore real economic shocks and variables that can move the currency in the longer term. RID models can capture medium-term moves through inflation and yield components, but can miss significant real exchange rate trends that might be caused by events such as persistent productivity and terms of trade shocks. The BEER models encompass most of the other four models, capturing shifts in the long term expected real exchange rate using productivity, terms of trade and fiscal shocks, as well as real rate differentials. Taken as a whole, the set of models allows us to create a more complete view of valuation and address concerns about individual model selection.

The estimation period is 1985 – 2015 for all methodologies with the exception of the BEER models where the estimation period starts in 1995.

Data is seasonally adjusted and appropriately transformed.

Estimation is done using single-equation cointegration, specifically the Stock-Watson Dynamic OLS approach.

Our models fall into 5 main methodologies:

- Purchasing Power Parity (PPP)
    - PPP CPI: The equilibrium exchange rate is consistent with equilibrium in goods markets in domestic and foreign economies. In theory, higher prices lead to a weaker currency and any deviations from the PPP should disappear due to good's market arbitrage.
    - PPP PPI: PPI embeds more tradable goods prices than CPI.
- Balance of Payments Approach (BoP)
    - This approach encompasses the PPP model and UIP (Uncovered Interest Parity) assumptions. It also assumes that the long-term BoP equilibrium is equal to zero. Higher domestic prices lead to a weaker currency, while higher yields support the currency through capital inflows.
    - We employ four different versions of this model, using CPI, PPI, 3M interest rates and 10Y bond yields.
- Monetary Models (MM).
    - These models encompass PPP and Interest Rate Parity assumptions to estimate the equilibrium exchange rate that should equate the relative money demand and supply between two economies.
    - Excess relative monetary easing, assuming it spills over to prices, requires a weaker exchange rate. On the other hand, all else being equal, higher income requires a stronger currency through money demand conditions.
    - The flexible version of the MM assumes that equilibrium in goods and asset markets clear at the same pace. However, in practice, due to the dynamic nature of capital flows and price stickiness in goods prices, asset markets clear faster, leading to currency overshooting.
    - We estimate two models, one with flexible and one with sticky prices.
- Real Interest Differentials (RID).
    - The real equilibrium exchange rate is determined by real interest rate differentials through capital markets arbitrage.
    - We employ RID models both with 3M real interest rate differentials (RID-3M), and with 10Y real yield differentials (RID-10Y).
    - Holding the expected exchange rate constant, higher yields should result in a stronger currency because of capital inflows.
- Behavioural Equilibrium Exchange Rate Models (BEER).
    - BEER models assume that real exchange rate swings are driven by relative productivity, relative terms of trade shocks and relative fiscal shocks. While positive productivity and terms of trade shocks strengthen the currency, fiscal expansion (and higher external indebtedness) weakens the currency.

- BEER-I model captures shifts in the long term expected real exchange rate using productivity, terms of trade and fiscal shocks.

- BEER-II model incorporates the RID model into the BEER-I model.

In each case we present the median estimate for each type of model.

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