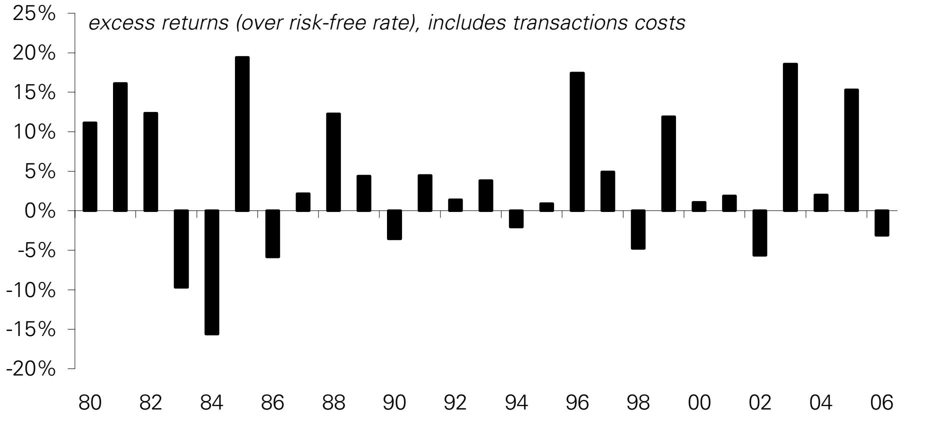
Deutsche Bank

29 March, 2007

Currencies: Value Investing

- In this paper, we outline our preferred systematic approach to valuation-based investment in currencies. In earlier research, we had shown that valuation strategies are one of the central sources of returns in currency markets.
- Fundamentals have tended to be poor predictors of currency movements, especially over the short- to medium-term. Recent research does show that some fundamentals do appear to work over the long-run (3 years+). It appears that Purchasing Power Parity (PPP) – one of the oldest valuation approaches to currencies – is one of the best fundamentals-based models to forecasting currencies.
- Large currency deviations from PPP, show fairly rapid reversions to PPP, while the rest of the time, currencies appear not be driven by fundamentals as trade and information costs are too high for arbitrage back to PPP to occur.
- Our valuation strategy ranks G10 currencies by how under- or over-valued they are relative to the OECD's PPP values. We buy the 3 most undervalued currencies ands sell the 3 most overvalued. Annual excess returns since 1980 have been 4.1% with a Sharpe ratio of 0.54.

Annual Excess Returns of Our Valuation Strategy



Source: Deutsche Bank

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Do Fundamentals Matter?

In a seminal paper[1], written almost 25 years ago, it was shown that using fundamentals-based models to forecast currencies could not outperform tossing a coin. Matters were made worse by the fact that even if one knew the fundamental data in advance, the result still held. Put another way, if one was told next year's values for inflation, growth, money supply and interest rates, then one could still not forecast currencies better than tossing a coin!

Every few years or so, the work has been updated to include more models and currencies. The most recent comprehensive update[2] showed that depending on what criteria one used to assess the success of a model, some fundamentals-based models do show some promise. Though, it appears that what works for one currency may not work for another. The chart on the right shows the accuracy of a range of models featured in the recent update. The models cover factors including purchasing power parity (PPP), money supply (sticky prices), debt and net foreign asset positions (composite). The upshot is that on the criteria of accuracy of "direction-of-change", PPP tends to out-perform the random walk (over long time horizons). Interestingly, it also appears to out-perform more recently popularised models such as ones that include productivity and net foreign asset positions. It would therefore appear that the best fundamental model to use, would be the simplest, PPP.

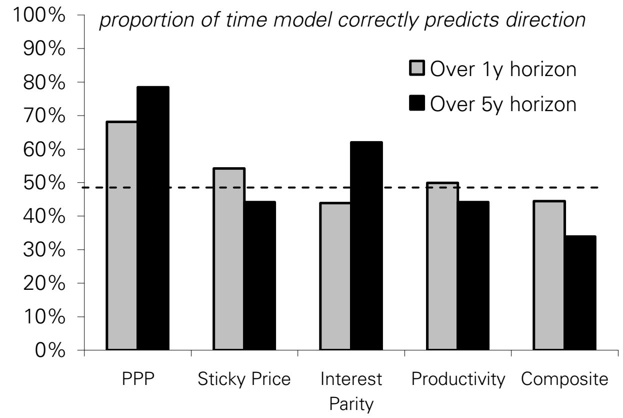
The Resurrection of PPP

The earliest versions of PPP theory have been traced to the Salamanca School of 16th-centrury Spain. Its continued use to this day, attests to its allure (to economists, at least). The idea behind PPP is that a unit of currency should buy the same basket of goods in one country as the equivalent amount of foreign currency, at the going exchange rate, can buy in a foreign country. If that was not the case, then there would be the possibility of arbitrage. The Economist newspaper's "Big Mac Index" is an example of the theory in popular form, where the price of Big Macs from around the world are compared in a common currency to see which currencies are over- or under-valued.

When testing PPP, economists have tended to stick to goods that are tradeable, as that should be where PPP is most likely to hold. Of course, transportation and information costs may make arbitrage difficult, and so it may not be expected that PPP holds at all times. Moreover, productivity difference between countries may also lead to departures from PPP. Notwithstanding these issues, empirical studies show some evidence that PPP holds in the long-run. That is, it takes between 3-5 years for half of the deviation from PPP to be corrected[3]. The length of the deviations has proven to be a puzzle to economists.

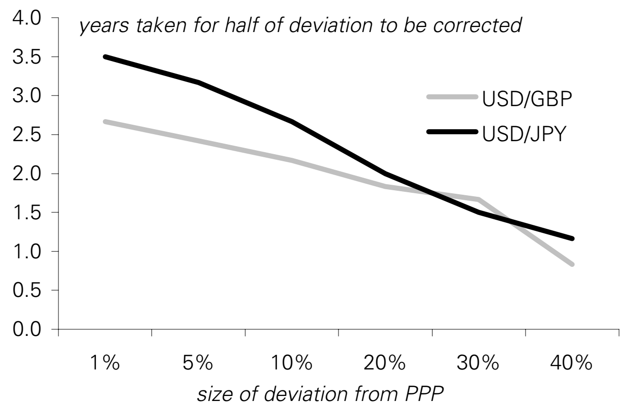
Part of it may be explained by a more technical point of how individual goods prices are aggregated up to price indices – that is, when PPP is tested the price indices between countries may contain different goods or different weights between goods. A bigger picture explanation is that currencies may adjust in a non-linear fashion. That is, when currencies are not too far from PPP levels, the scope for arbitrage may be limited as the transport and other costs may offset any potential arbitrage gains. However, if currencies were to deviate significantly from PPP, then arbitrage forces come into play, and may induce a more rapid reversion to PPP. Studies appear to support this dynamic[4] and suggest

Which Fundamental Model Works Best?



Results for 1983Q1-200Q4 using GBP, CAD, DEM, CHF, JPY – vs USD.
Source: Chheung, Chinn and Pascual (2003)

Faster Reversion To PPP at Extremes



Source: New Palgrave Dictionary, "Purchasing Power Parity

[1] Meese and Rogoff (1983), "Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?"
[2] Cheung, Chinn, Pascual (2003), "Empirical Exchange Rate Models of the Nineties: Are Any Fit to Survive?"
[3] Rogoff (1996), "The Purchasing Power Parity Puzzle"
[4] New Palgrave Dictionary of Economics, "Purchasing Power Pairty), See also Taylor, Peel, Sarno (2001), "Non-Linear Mean-Reversion in Real Effective Exchange Rates: Towards a Solution to the Purchasing Power Parity Puzzles"

that when currencies are close to their PPP level, their behaviour is close to a random walk, while when they deviate significantly from PPP, they tend to mean-revert (see second chart on previous page).

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Turning PPP Into an Investment Strategy

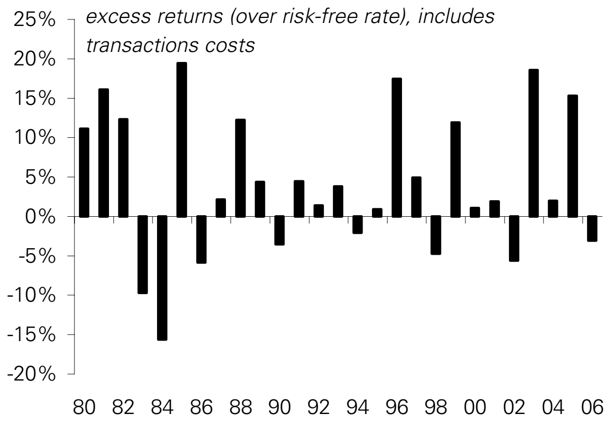
One of the dilemmas of using PPP in any investment strategy is which PPP measure to use. A direct approach would use the actual price levels of some combination of goods and services and compare these across countries to arrive at an actual level of PPP (such as the Big Mac Index). Alternatively, price indices, such as the consumer price index, could be used, but then PPP levels would have to be derived by assuming some earlier base period represents equilibrium[5]. While this approach allows one to pick a price index that contains more tradeable goods, there is scope for data-mining by choosing the base period that results in PPP working best. For this reason, we prefer to use the direct approach, and opt to use the OECD's PPP values[6]. The OECD calculates direct PPP values in order to make international GDP comparisons, rather than as a tool to forecast currencies. Therefore, it is more robust and comprehensive than other direct PPP measures.

As we showed earlier, PPP tends to work best when currencies are at valuation extremes. However, looking back for each currency to see which extremes tend to see the quickest mean-reversion may not fare so well out-of-sample. Therefore, we take a ranking approach of G10 currencies[7] to avoid having to pick discrete thresholds. We do this by calculating each currencies deviation from PPP, and then rank the currencies by how under- or over-valued they are. We then buy the 3 most undervalued currencies and sell the 3 most overvalued currencies. This is assessed every 3 months.

How Does It Perform?

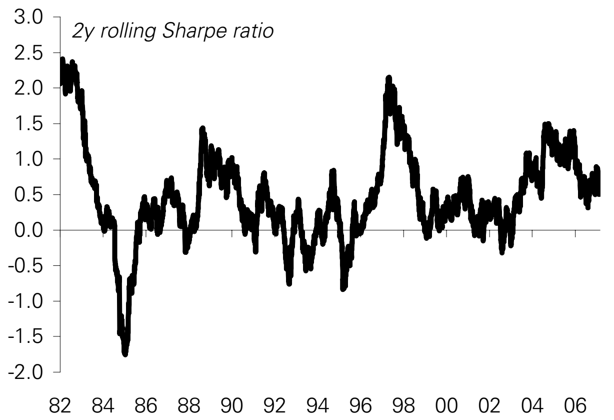
The strategy delivers an annual excess return of 4.1% from 1980-2006 with a Sharpe ratio of 0.46 and a maximum peak-to-trough drawdown of 26% (see table). There also appears to be a higher sensitivity to whether legacy euro currencies are included or not. If we had included ITL, FRF and ESP, then the Sharpe ratio would have increased to close to 0.65, and importantly, the drawdown would have been reduced sharply to around 15%. The overall strategy appears to be characterised by generally low returns interrupted by occasional large positive gains (see first two charts on this page).

Excess Returns of Valuation Strategy



Source: DB Global Markets Research

Rolling 2-Year Risk-Adjusted Returns



Source: DB Global Markets Research, Valuation Strategy

Summary Statistics of Valuation Strategy

	1980-2006	1990-2006	2000-2006
Excess Returns*	4.1%	3.8%	4.3%
Volatility	9.0%	9.2%	7.9%
Sharpe ratio	0.46	0.41	0.54
Max. Drawdown	-26%		

** Includes transaction costs and carry, and excludes legacy Euro currencies, save DEM. Including them, would have increased 1980-2006 returns by 0.9%*

Source: DB Global Markets Research

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5 Research on comparisons between the "Big Mac Index" and CPI-based PPP show a high correlation between the two series. See Parsley and Wei (2003), "A Prism Into the PPP Puzzles: The Micro-foundations of Big Mac Real Exchange Rates"

6 See www.oecd.org

7 USD, EUR (DEM pre-99), JPY, CHF, GBP, NOK, SEK, AUD, NZD, CAD. For the pre-1999 period, we exclude legacy euro currencies, except the DEM. If we include them, returns are higher.

Appendix 1

Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report. [Bilal Hafeez]

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