Global Foreign Excahnge

Global Markets

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Deutsche Bank Guide To Currency Indices

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Introduction

October 1st, 2007

To Deutsche Bank's Clients:

Currencies represent the largest financial market in the world. Yet they have not traditionally enjoyed Asset Class status in the same way that Equities and Bonds have.

In large part, this reflects the common view that as a zero sum game, currency has no 'inherent' return, and is simply a source of uncompensated risk.

But this view is changing. Institutional Investors, Plan Sponsors and Consultants have come to recognise over the last two decades what many absolute return investors have always believed: that Currency is a significant source of Alpha that is portable, uncorrelated and sustainable, and as such represents a good use of risk budget. We have explored these themes widely in two previous publications: A Guide to Currency Overlay Management (February 2002) and Currency Alpha: An Investor's Guide (October 2005).

Recent research has gone one step further, making the case for Currency actually having a Beta, and demonstrate that if incorporated into many traditional portfolios it can significantly enhance returns.

In this guide, we seek to highlight some of the investable currency index products available in today's market that allow access to Currency Returns. We hope to make both the theoretical and practical case for making an explicit allocation to Currency in every properly diversified investment portfolio.

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Overview

Investors made their first foray in currency markets following the collapse of Bretton Woods in the 1970s. But currency managers were restricted to a handful of global macro funds and managed CTA programmes, while the majority of market participants typically viewed FX as an unavoidable source of secondary risk. These managers initially traded individual currency pairs, later moving on to trade FX options, as well as indices composed of static currency baskets. These provided a more effective way of expressing tactical views on individual currencies.

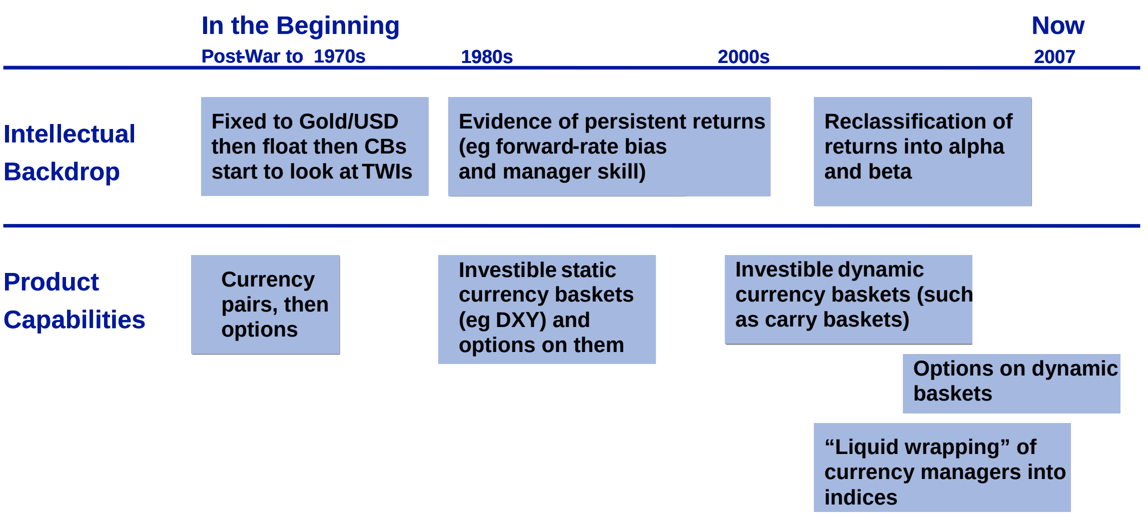
In the ensuing period, the explosive growth in FX turnover has been accompanied by rapid progress in both the perception and management of currency risk. By the late 1990s, it was largely accepted that currencies provide a source of return as well as risk. This led to the development of rules-based indices, whose currency composition changed dynamically over time. These indices aimed to capture returns from widely known investment strategies such as the FX carry trade, which is based on investing in high-yielding currencies through funding in the low-yielders.

Today, it is also possible to wrap the performance of currency managers into investable indices. At the same time, the discussion on currency returns and risk has moved on to the possibility that some indices represent the "beta" of currency markets, while others the "alpha". In this way, currency markets may finally get a returns "benchmark" similar to bond and equity markets.

Clearly, the FX product offering has expanded significantly. The *"Deutsche Bank Guide to Currency Indices"* aims to provide an overview of the full suite of FX index products now available to investors. In the first section, the guide focuses on tactical indices, which typically have fixed weights and can be used to express single-currency or regional views. In the second section, we present strategic indices, where the currency allocation changes over time based on rules-based strategies. In the third section, we present the Deutsche Bank FX Select platform, which provides access to currency manager performance through the creation of custom-based indices. The Deutsche Bank menu of currency indices can therefore be used to access systematic FX returns in the form of both 'beta' and 'alpha'.

The guide opens with an overview of the Deutsche Bank index product suite, where Jason Batt discusses the importance of index design in creating investable currency indices. We then move on to *Currency Markets: Money Left on the Table?,* where Bilal Hafeez argues that theoretically, as long as currency market participants have different motives, understandings of what drives currencies and information sources, currency markets should provide systematic excess returns to those willing to take the risk. Bilal then proceeds with

Evolution of Currency Markets



analyzing the structure of currency markets, and finds that it does conform to one where market participant have different motives. Using a very conservative approach, he argues that at most between 25%-50% of the market is made up of profit-seekers, while the remainder are liquidity-seekers. Employing more realistic assumptions, he argues the range is likely to be 5%-25%. Interestingly, he also finds evidence that the share of profit-seekers is falling, as the rise in cross-border trading in bonds and equities has exceeded the rise in currency turnover. Finally, and perhaps most importantly, he finds that using the actual positioning of liquidity and profit-seekers since 1993, profit-seekers have systematically made profits at the expense of liquidity-seekers. It would therefore appear that liquidity-seekers are paying a premium in the form of profits to profit-seekers in return for the provision of liquidity.

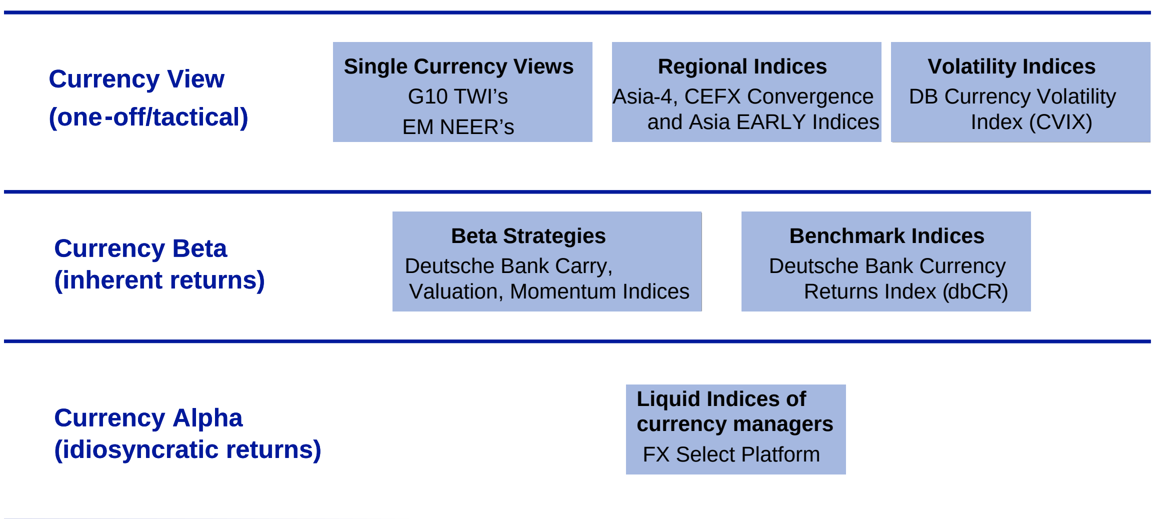
Moving on from theoretical considerations, *DB G10 Trade-Weighted Indices: From Theory to Practice* and *DB EM Asia Policy Baskets* present DB's suite of G10 and EM Asia currency indices. These allow investors to hedge or assume single-currency risk, while avoiding taking a position on any particular currency cross. This is done by using trade-weighted exchange rates (TWI's) for the G10 currencies and nominal effective exchange rate (NEER's) for MYR, CNY and SGD in Asia. The overarching principle for both the G10 and EM currency baskets has been to choose weights that are as close as possible to those used by the respective central banks, which is of particular importance for EM Asia currencies where exchange rate targeting plays a direct role in monetary policy.

Regional currency baskets are a transparent approach to take a view on a whole region rather than a single currency. The Deutsche Bank Asia-4 index takes an equal weighting of the four most liquid currencies in Asia. Alternatively, in *The Emerging Asia Reserves, Liquidity and Yield Index* James Malcolm and Mirza Baig argue that the EARLY index provides a more efficient approach to investing in structurally appreciating EM Asia currencies by accounting for differences in reserve accumulation, liquidity and the cost of carry.

Concluding the section on tactical indices, *The DB Currency Volatility Index (CVIX): A Benchmark for Volatility* presents a benchmark for tracking expected future volatility in currency markets. Aside from using the index to take a directional view on FX volatility, it is argued that the index can be used to hedge exposure to risky assets, as well as to take advantage of relative value opportunities in options markets across asset classes.

The strategic indices section of the guide starts by presenting the Deutsche Bank G10 carry, valuation and momentum indices. In *Carry, Value and Momentum Investing* Bilal Hafeez analyses the academic considerations behind each investment style and presents three investable indices that take advantage of these trading strategies. In *Benchmarking Currencies: The Deutsche Bank Currencies Returns Index* it is argued that these three strategies are evidence of the existence of 'beta' in currency markets, similar to

The Deutsche Bank Menu of Currency Indices



the inherent returns of bonds or equities. The strategies are combined into the dbCR index, which aims to establish itself as a benchmark of currency market returns similar to those used in equity or bond markets.

In *Carry Goes Global: The Global and Balanced Harvest Indices* it is argued that by expanding the universe of currencies used for carry trades to include the more liquid EM crosses, one can improve the prospective returns. For one, the positive carry that can be captured is higher, so even in range-bound markets the returns look more respectable. Second, some high-yielding currencies are less likely to be overvalued than their G10 counterparts, thus providing more scope to capture spot returns.

In the *Currency Manager Indices* section of this guide, Torquil Wheatley argues that currency managers provide an efficient and flexible way to access currency market alpha. He shows how the FXSelect platform allows for the creation of investable indices that track the performance of a completely customisable portfolio of currency managers. He argues that FXSelect provides a cost-effective, transparent and liquid solution to the challenges associated with investing in multiple currency managers.

In the final piece of the guide, Bilal Hafeez looks at currency allocation in an investment portfolio context. He shows that the addition of FX to a portfolio of bonds and equities can significantly enhance the quality of returns by reducing the volatility of returns and duration and magnitude of significant phases of underperformance. The size of the allocation should be comparable to those of bonds and equities (that is 20%+), rather than those of "alternative investments"

Conclusion

The sophistication and range of currency products has expanded rapidly over the last few years. We hope that this guide will provide a useful overview of the Deutsche Bank index product offering, and demonstrate how currency indices can be used to profitably express tactical views or obtain strategic access to long-term currency returns.

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The Deutsche Bank Menu of Currency Indices

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Introduction

Investors use indices to invest in currencies for the same reasons that they use equity, bond or commodity indices to invest in those markets: they provide diverse and cost effective market access, they are a means of outsourcing expertise in a particular market and they are simple to trade. The key feature of any index that we design is that it has to be investable, and in a format that most suits potential users.

Importance of Index Design for Investable Indices

There are some obvious factors that dictate how an investable index is designed: liquidity considerations, availability of reliable market data, fixing sources (particularly relevant for FX which trades on an OTC basis rather than on an exchange where exchange closing levels can reliably be used), and frequency of roll among others. But there are also some more esoteric factors that are a critical part of the intellectual property the non-specialist investor is buying into. Such factors that we pay a great deal of attention to are i.) Roll mechanism – making sure that market front-running of positions that an index has to implement are avoided and that the 'footprint' a large notional index leaves in the market is minimal and ii.) Robustness – making sure that there is a sound economic rationale behind the index rules and that the parameters in the index are not overly optimised to give the best historic performance over a specific back-testing period. This last point is often overlooked but investors should be particularly aware that an over-complicated set of index rules can have parameters optimised in such a way that it is unrealistic to assume historic performance will be repeated (after the index launch date).

Index Type:		Feature:	
Tactical Indices			
	>	*Bid/Offer Spread*	Yes, set according to market
	>	*Index Fee*	No
	>	*Typical Investment Horizon*	1month to 1 year
	>	*Pricing Frequency*	Intra-minute, often 24 hours around the clock
	>	*Client Types*	Typically hedge funds, prop desks but also corporates and retail
Strategic Indices			
	>	*Bid/Offer Spread*	None, executed at mid-market NAV
	>	*Index Fee*	Yes, set according to index to cover costs of rolling positions
	>	*Typical Investment Horizon*	1year and over
	>	*Pricing Frequency*	Daily at index closing level. Daily calculation time typically 4pm London
	>	*Client Types*	Typically real money such as insurance companies, pension funds, asset managers and retail but also corporates
All Indices			
	>	*Investable via single transaction*	
	>	*Single currency pay-off*	
	>	*Transparent index calculation*	
	>	*Non-discretionary trading rules*	
	>	*Liquid underlying*	

Source: DB Global Markets

Investable Products by Index

	Tactical Indices				Strategic Indices	
Wrapper	G 10 TWI's	Asia Policy Baskets	EARLY Index	CVIX	Harvest	DBCR
Delta One	✓	✓	✓	✓	✓	✓
>Format	NDF's traded as contracts that settle each quarterly IMM date				Total Return Swaps (funded or unfunded)	
>Pay Currency	Currency of TWI	Currency of Policy Basket	Can quanto to most Currencies		Can quanto to most Currencies	
>Tick Size	10 units of Pay currency per index 0.01				n/a	
>Notional Invested	Notional is strike dependant and is calculated as No. Contracts X Index Level X 1,000				n/a	
	i.e.: P & L is re-invested					
>Trading Hours	24 hours	00-20 hours GMT			Daily on 4pm GMT Index Closing Level	
Options						
>Vanilla	✓	✓	✓	✗	✓	✓
>Digitals	✓	✓	✓	✗	✓	✓
>Asians	✓	✓	✓	✗	✓	✓
>Barrier	Yes but only with daily discrete observation of barrier against fix			✗	✗	✗
Notes						
>Fixed Maturity	✓	✓	✓	✓	✓	✓
>Path Dependant Maturity	✓	✓	✓	✗	✗	✗
Structured Deposits	✓	✓	✓	✓	✓	✓
Funds	✗	✗	✗	✗	UCITS III EUR Balanced Fund	UCITS III EUR ETF's due Q4 2008
					USD G10 ETF {DBV Index <Go>}	
e-trade capability	✓	✗	✗	✗	✓	✗

Source: DB Global Markets

Currency Markets: Money Left on the Table?

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The Puzzle of Currency Markets.
In previously published research[1], we showed that currency markets delivered consistent excess returns over time, which on some metrics were stronger than equity markets. The systemic returns were evident by the profitability of three widely known and followed strategies: carry, momentum and valuation, and also the actual track records of currency managers. Yet the presence of these returns opens more questions than it answers. As the most liquid market in the world, shouldn't currency markets be efficient, and so not allow consistent profit opportunities? How can a zero-sum game, where for every long position, there is a short position such as in currency markets, offer systematic returns? Who are the systematic losers who supposedly leave "money on the table"? If they exist, what share of the market do they consist of? And is that share declining? In this paper, we attempt to answer all of these questions.

<u>Section A: The Technical Part</u>

What Do We Mean By Efficient Markets, and Does It Work?
The currency markets are the most liquid in the world with a daily turnover of close to $2 trillion, which compares to $500 billion for the US government bond market and $70 billion on the NY Stock Exchange[2]. So of all the financial markets, currency markets should perhaps conform closest to what economists call an "efficient market". That is, a market, where prices reflect all available information and so traders and investors should not be able to earn excess returns over time. Yet, reality has a habit of providing obstacles to many economic theories, and currency markets are one such obstacle.

In order to show why the classical efficient market hypothesis does not hold for currency markets, one simply needs to see what the hypothesis would predict for currency markets, and compare that to the real world. The efficient market hypothesis[3] assumes that market participants are risk neutral and behave rationally. The former means that they care only about the expected return of holding foreign currency and not the risk, and the latter generally means that investors know the true model of the underlying economy and markets, use all publicly available information and stick to the principles of logic[4]. Given these assumptions one of the predictions of the hypothesis would be that uncovered interest parity should hold, or put another way, carry trades should not consistently make money over time[5]. Another would be that momentum or trend-following strategies should not be profitable.

After thirty to forty years of academic work in this area, the overwhelming consensus is that in the real world, uncovered interest parity does not hold, and so currency markets are not efficient using the classical definition[6]. Academic work has also shown that trend-following

[1] Hafeez (Aug 2006), "Currencies: Pension Saviour?", Deutsche Bank.
[2] FX turnover taken from the BIS' "Triennial Central Bank Survey", March 2005 – survey taken in 2004. US bond volumes from Federal Reserve Bank of New York, 22 February, 2007. NYSE volumes taken from NYSE, 22 February, 2007/
[3] Three different forms of efficiency are usually described: i) weak form (current prices incorporate all information contained in past prices), ii) semi-strong form (current prices incorporate all publicly available information, including past prices), iii) strong form (prices reflect all information that can possibly be known).
[4] Or more precisely the Savage axioms, which underlies a theory of expected utility, and includes axioms in addition to those of logic.
[5] A carry trade is where investors borrow in a low interest rate currency and invest in a high interest rate currency. The difference in interest rates is known as "carry" and investors intend to earn the carry, and expect that currency movements should not move to completely offset the carry gain.
[6] For an excellent overview see Sarno and Taylor (2002), "The Economics of Exchange Rate Economics", Cambridge University Press

strategies have been profitable at various points in time[7]. It would appear that for the efficient market hypothesis to work market participants would need to be extremely risk averse[8] or that they are irrational, which does not sit well with most economists. In fact, the fundamental tenet of how market participants are represented in the efficient markets hypothesis appears to be completely ill-suited to apply to currency markets.

New Theories Fight Back

Of course, some avenues of academic research have proven to be more satisfying. Behavioural economics delves into the irrationality of investors, and provides some explanations for observed market dynamics. Other approaches which broadly retain the assumption of rationality and have interesting-sounding names such as rational beliefs and endogenous uncertainty, adaptive market hypothesis and order flow-based models[9] have all proven to conform to market reality. In essence, they are based on a world where market participants have different beliefs[10] of what drives currency markets, different objectives that they may be maximising and often have different information at various times. In such a world, investors can earn systematic returns over time, but not without taking risks, and there is room for "smart" investors to outperform the "average" investor. Therefore, these theories of currency markets suggest that market participants need not be irrational for currency markets to deliver consistent excess returns over time, but instead they need to be shown to have different beliefs of what drives markets and different objectives. If that can be shown, then in theory at least, currency markets may offer systematic returns to those willing to take risk.

<u>Section B: The Tribes of Currency Markets</u>

The Three Tribes of FX Markets: Profit-Seekers, Liquidity-Seekers and Dealers

A useful segmentation of currency markets that is in the spirit of the more successful strands of academic work is to split market participants into two tribes: profit-seekers and liquidity-seekers. The former has the sole objective of entering into currency transactions in order to make a profit from movements in currencies, while the latter has the objective of ensuring they can access the currency markets whenever they need to engage in a cross-border transaction. Examples of profit-seekers would be a hedge fund or currency overlay manager. Examples of liquidity-seekers would be a corporate, which needs to enter into a currency transaction to set up a factory abroad, an international equity investor, who needs to buy a foreign currency in order to invest in a foreign equity market, a bond manager, who always currency hedges their foreign bond exposures or a central bank that needs to buy or sell currencies in order to maintain an exchange rate policy.

In such a world, the liquidity-seekers are willing to pay a premium to induce profit-seekers into currency markets[11]. As a result, this segmentation would lead to profit-seekers generally making profit over time, while liquidity-seekers would not (but would not mind as they are fulfilling other objectives). One obvious question is what the relative sizes of these groups in the currency markets is, and another would be whether we can prove that this profit transfer is occurring between the two segments. But before we go on to answer those questions, a word on a third tribe of FX markets "dealers". Indeed, the most recent BIS survey on FX market turnover, show dealers to be responsible for over 50% of FX turnover.

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[7] Neely, Weller, Ulrich (2006). "The Adaptive Markets Hypothesis: Evidence from the Foreign Exchange Market".

[8] So that for a given level of risk premium, a large excess return in the currency would be expected. This is analogous to the "equity premium puzzle". Aside from this, if consumption (in the economy) is highly correlated with the exchange rate then risk premium could be a plausible explanation of the violation of uncovered interest parity. In reality, exchange rates are much more volatile than consumption, so the correlation is low.

[9] See Kurz (1997), "Endogenous Uncertainty: A Unified View of Market volatility", Lo (2004), "The Adaptive Markets Hypothesis: Market Efficiency From an Evolutionary Perspective" and Carlson and Osler (2005), "Short-Run Exchange Rate Dynamics: Theory and Evidence".

[10] In this context, market participants have no structural knowledge of the market, but have a common empirical knowledge. A rational belief is then a theory of the market that cannot be contradicted by the data. At any given time, several theories could meet this criteria (see Kurtz (1997))

[11] For an overview of this dynamic in markets, see Kolb (1992) "Is normal backwardation normal?", Journal of Futures Market

Dealing With Dealers

In reality, dealers are the intermediaries between the two other tribes, and so are in many ways the reactive segment of the market. That is, were the profit- or liquidity-seekers not to place any orders, the dealer or interbank volumes would dry up. Put another way, dealers are the providers of liquidity in the very short-run, where profit-seekers also become liquidity-seekers in addition to the typical liquidity-seeker, such as a corporate. Dealers therefore have to be induced to provide the liquidity, which in essence is the bid-offer spread.

Indeed, dealers constantly showing bid-offers prices is a form of constantly writing very short-dated put and call options, since the clients of the dealer can hit the bid or lift the offer at any time. Thus, writing options earns premium (in this case the spread between the bid-offer prices). However, dealers would also want to manage the risk by transferring their positions to other banks (at a lower spread), thus generating interbank volume. Ideally by the end of each day, the positions should be closed by the dealers by passing the positions back out to end-users. In this way, the volumes generated by dealers should not fall into either tribe of liquidity-seeker or profit-seeker as described earlier, and thus should be left out as the intermediary flows. Of course, some dealer flow could really be proprietary trading, in which case it should be categorised as profit-seeking, but for the purposes of this paper we will assume proprietary flows are relatively small[12].

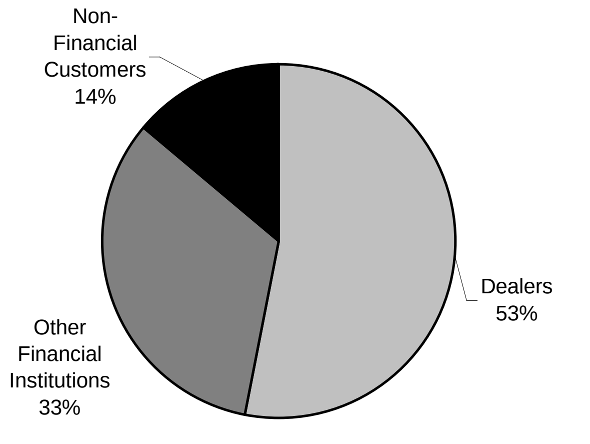
Section C: Quantifying the Sizes Of the Tribes

How Much of the Market Are Profit-Seekers?

There is no definitive way of answering this question since the currency markets are an over-the-counter market, and so there is no centralised source of data on turnover and segmentation of the market. Instead, one needs to make reasonable assumptions using multiple data sources. We will also attempt to estimate the highest proportion of the market that could be profit-seekers – in that way, we will be conservative in our approach.

The starting point would be the tri-annual BIS survey[13], which is the most comprehensive survey of currency market turnover. The latest, which was taken in 2004, shows that total currency market turnover is $1.9 trillion. “Dealers” make up just over 50% of the market, “other financial institutions” make up around 35% and “non-financial customers” make up around 15% (see first chart below). “Other financial institutions” include smaller banks not covered by the dealer category, mutual funds, pension funds, hedge funds, currency funds, money market funds, building societies, leasing companies, insurance companies, financial

BIS Survey of FX Markets: Breakdown by Counterparty of Reporting Dealers



Source: BIS. Survey taken on April 2004.

[12] See Sager and Taylor (2005), “Under the Microscope: The Structure of the Foreign Exchange Market”

[13] See www.bis.org/triennial.htm , or BIS (2005) “Triennial Central Bank Survey”

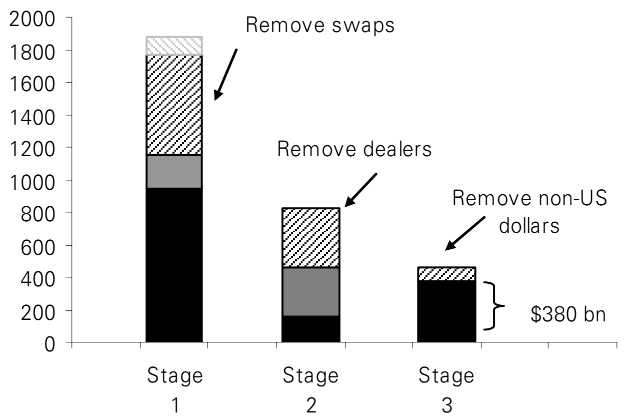
subsidiaries of corporate firms and central banks. "Non-financial customers" would cover all others, and are mainly corporates and governments. Given how broad the "other financial institutions" category is, translating the BIS categories to liquidity-seekers and profit-seekers is meaningless, so the overall BIS data needs to be combined with other data sources. We will do this using two different approaches.

Approach #1: Calculating the Size of Liquidity-Seekers First, and Then Using the Residual as Profit-Seekers

The BIS data can be supplemented by the US balance of payments and capital flow data. This is because between 85% and 90% of currency turnover involves the US dollar. So cross-border volumes in US securities, goods and services (and also US activity in foreign markets) would provide much more colour on the purpose behind certain portions of currency turnover.

So first, the headline BIS turnover of $1.9 trillion needs to be reduced to the US dollar amount that would consist of liquidity and profit-seekers (ie the originators of net FX demand). The headline turnover data includes spot, forwards and swaps. The latter should be excluded as it does not result in net currency demand[14] . Then, dealers should be excluded as they are the "intermediary". And finally only volumes which include the US dollar should be included. Using BIS data for each step, this leaves around $380 billion of currency turnover involving US dollars (see second chart below).

Filtering the BIS Data to the Relevant Volumes ($ billions)



Source: BIS. Survey taken on April 2004.

Second, the total cross-border volumes in non-US resident activity in US assets, goods and services and US resident activity in non-US asset, goods and services need to be calculated. Official US data sources provide gross data that allows one to calculate the breakdowns for long-term securities, direct investment[15], goods and services. The upshot is that these volumes come to around $155bn. That is, 40% of FX turnover can be attributed to buying/selling some asset, good or service (see first chart for full breakdown). So this 40% could safely be categorised as liquidity-seeking. Interestingly, the bulk of this category is made up of investors who are active in a market other than currencies, rather than corporates.

That leaves the remaining 60% of FX turnover which needs to be categorised. These are likely to be attributed to cross-border flows in short-term securities/loans[16], the currency

[14] In a foreign exchange swap, two currencies are exchanged at an agreed rate on completion of the transaction, and a reverse exchange of the same two currencies at date further in the future at an agreed rate.

[15] For FDI volumes, we use the absolute sum of quarterly changes in direct investment. This approaches broadly matches separate data DB holds in cross-border M&A volumes.

[16] More specifically, this category would likely be dominated by changes in claims in and liabilities of banks

hedging of an underlying exposure or currency trading for speculative purposes (see first chart below). The flows in short-term securities/loans, and hedging could be categorised as liquidity-seeking, while the speculative flows would clearly be profit-seeking. So the uncertainty would be how much of the 60% is devoted to pure profit-seeking flows, rather than the other flows.

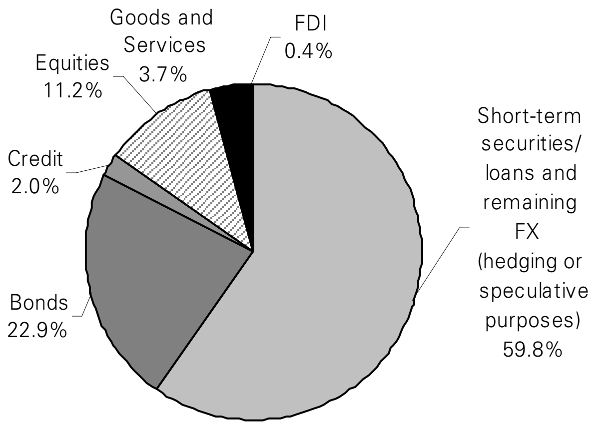
A conservative approach would be to leave the short-term securities/loans out, which would overstate the size of profit-seekers, and only try to estimate the size of currency hedging. We could argue that much of the cross-border activity in bonds (23% of turnover) is likely to be hedged. Assuming conservatively that half of the bond flows are currency hedged, and no other flow is hedged, then that would leave 49% (60% minus 11.5%) as profit-seeking. Hence, using this approach, 49% of the currency markets are made up of profit-seeking flows, while 51% is liquidity-seeking. More realistically, the volumes of cross-border transactions in short-term securities/loans, not related to speculative flows, would likely make up as much of the overall FX volumes as bond flows (23%). So a more reasonable estimate would be to deduct an extra 23% from the 49% we arrived at above. This would leave 26% as the proportion of the market that is "profit-seeking".

Interestingly, if we look at data from 1995, we find that using the conservative approach which overstates the size of profit-seekers, 73% of currency volumes were not related to purchasing an underlying asset, good or service (versus 60% in 2004, see second chart below). Using the same assumptions on hedging as above, it would leave 65% of the market as profit-seeking versus 35% as liquidity-seeking. So it appears that the proportion of profit-seekers has been falling. Another way of looking at this is that cross-border volumes in the trade of goods, services and securities has risen sharply by over 200%, while currency volumes have "only" risen by just over 100%. So the growth in currency investment has not kept pace with the broader growth in cross-border flows in other asset and goods markets.

Approach #2: Calculating the Size of Profit-Seekers First, and Then Using the Residual as Liquidity-Seekers

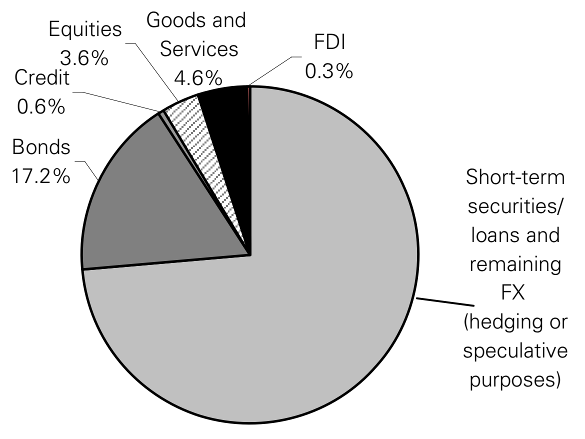
A more direct approach to measure the scale of profit-seekers would be to estimate the size of assets devoted to currency investment, and how much these funds trade. One of the most useful data sources is Deutsche Bank's FX Select platform, which has a broad and detailed array of data on currency managers. It contains funds from over 70 of the leading currency investment managers. Based on data disclosed by these managers, they account for just over $30bn in assets that focus specifically on investing in currencies. We estimate that these assets represent a significant proportion of funds dedicated to currency investments.

Estimated Breakdown of US Dollar FX Turnover By Purpose in 2004



Source: BIS. US Bureau of Economic Analysis, US Treasury Bulletin

Estimated Breakdown of US Dollar FX Turnover By Purpose in 1995



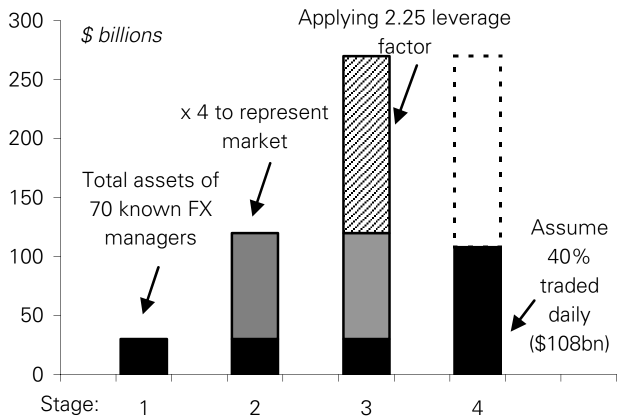
Source: BIS, US Bureau of Economic Analysis, US Treasury Bulletin

However, accounting for other currency managers whose funds are not included on FXSelect, currency overlay managers and the currency component of global macro funds, it would be reasonable to multiply the $30bn by some factor. To stay on the conservative side, we will quadruple the $30bn to $120bn and assume that this should cover any missing assets from our initial estimate.

In order to calculate the currency volumes that these profit-seekers account for, we need to answer several more questions. These include what leverage is used, and what proportion of the funds is traded each day. Fortunately, the FXSelect platform can provide some guidance here. According to data collected by the platform, the average leverage of these funds over the past six months has been 2.25. The leverage factor allows us to estimate the actual "size" of all currency funds to be $270bn (2.25 multiplied by $120bn).

The difficulty is to estimate what proportion of this is traded each day. One data point that may help in estimating this aspect of turnover is the median number of trades done each day on the FXSelect platform. As an absolute upper bound of the likely turnover number, we could assume that if an average portfolio holds the G10 currencies, then the average number of daily trades, which is 4, turns 40% of the portfolio each day (ie 4 divided by 10). This is a very high estimate, and the more likely number is closer to 5%-10%, but it does provide any absolute upper bound. Therefore using the 40%, the daily volume traded by profit-seekers comes to $108bn (ie 40% multiplied by $270bn). The first chart below shows each stage of our calculation in graphical form. Using the more reasonable 5%-10%, the volume would be between $14bn and $27bn.

From DB FXSelect Data to Profit-Seeking Volumes



Source: Deutsche Bank

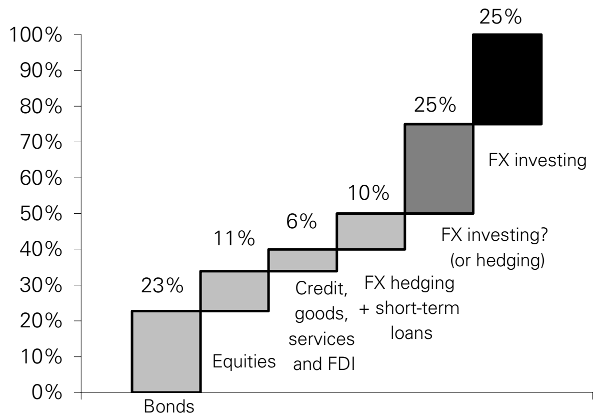
Total BIS daily turnover excluding dealers and swaps, but including all currencies comes to $455biilion. That would imply that 24% of currency market turnover is profit-seeking ($108bn divided by $455bn) using our upper bound estimate, while the rest is liquidity-seeking. The more likely proportion may well be closer to 3%-6%.

And So The Answer Is…

Using the two approaches described above with the conservative assumptions, we arrive at an upper bound range of 24%-49% of the market as profit-seeking (see second chart below). Using more reasonable assumptions, the range would come to 5%-25%. Obviously, very wide ranges, but that is inevitable given the absence of a central source of data for all currency transactions. But whichever way one arrives at these estimates, profit-seekers appear to make up at most 50% of the market, which leaves the rest as non-profit seekers.

Additionally, this share appears to be falling over time. Therefore, there appears to be strong grounds for profit-seekers to have consistent profit opportunities over time at the expense of liquidity-seekers. The question, though, is whether the profit-seekers do actually make these profits. We address this in the next section.

Summary of Currency Market Segmentation (Using "Conservative" Approach)



Source: Deutsche Bank

Section D: The Profitability Of the Tribes

Proving Non-Profit Seekers May Systematically Lose Money

Armed with a sense of how the currency markets are segmented, the question is whether profit-seekers do indeed make profits at the expense of liquidity-seekers. Ironically, this may end up being easier to test, than estimating their relative sizes. The CFTC publishes weekly data on the futures positions of two self-defined groups on the Chicago Mercantile Exchange (CME): non-commercial traders and commercial traders. The former trade for speculative purposes (ie profit-seekers), while the latter for hedging purposes (ie liquidity-seekers). Moreover, the positions of these types are reported on a weekly basis, and by their nature it is a zero-sum game. Therefore, we can use the weekly positioning data to determine the profit (or loss) of both commercial and non-commercial participants. Of course, commercial participants may not view their trades in terms of profit-and-loss as a non-commercial participant would, as they are focusing more on achieving hedging objectives, but nevertheless their positions can be used to calculate a profit-and-loss stream.

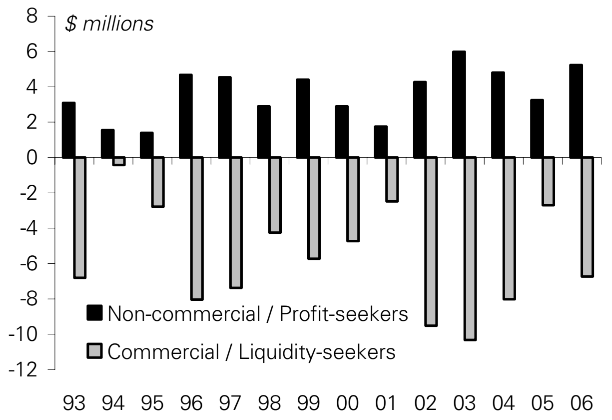
Some assumptions need to be made about what the likely exchange rate was on when the position was taken (we use the previous week's FX average). The upshot is that over the 1993-2006 period across all the currencies we studied, on average, non-commercials traders or profit-seeker made profits, while commercial traders or liquidity-seekers lost money (see first chart). Moreover, across time, it appears that for every year since 1993, non-commercial traders or profit-seekers have made profits in the major currencies at the expense of commercials or liquidity—seekers (see second chart). It should be noted that the charts show absolute profits and losses, so a high number may not necessarily be due to a greater percentage return on capital, but larger volumes being traded. Also, the sum of the two categories is not zero, as there is a third category of positions ("non-reportable"), which was not included in our calculations as they are not explicitly defined as either "commercial" or "non-commercial".

More robust studies[17], which use more precise entry and exit price levels and incorporate transaction costs, also confirm these results (see table). So they are not sensitive to our un-

[17] See Kearns and Manners (2004), "The profitability of Speculators in Currency Futures Markets", Reserve Bank of Australia.

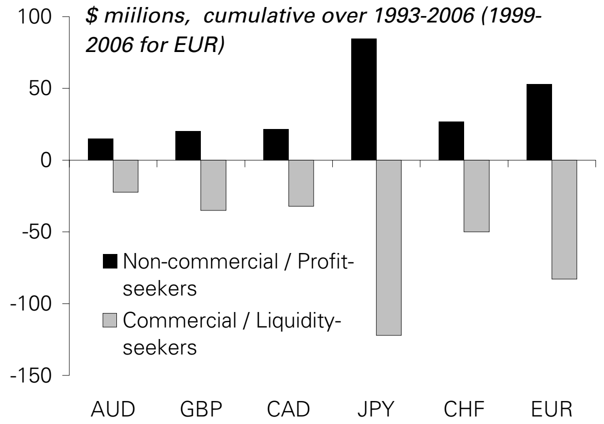
derlying assumptions. Thus, using this approach it does appear that there are segments of the markets such as liquidity-seekers who systematically lose money to profit-seekers.

Absolute P&L Across Time Trading the G5 FX (1993-2006)



Source: DB Global Markets Research, CFTC

Absolute P&L of Profit-Seekers and Liquidity-Seekers Using IMM Data (1993-2006)



Source: DB Global Markets Research, CFTC

Reserve Bank of Australia Study on Profitability of Speculators (1993-2003)

Currency	Non-commercial / Profit-seekers		Commercial / Liquidity-seekers
	Gross profit	Net profit*	Gross profit
	Annualised, US$ millions		
Australian Dollar	23	21	-37
British Pound	3	-11	-30
Canadian dollar	32	24	-33
Euro (99-)	258	235	-401
German mark (pre-99)	189	152	-297
Japanese yen	282	242	-448
Swiss franc	96	74	-183
Total	**661**	**543**	**-1084**

Source: Adapted from Kearns and Manners (2004), "The Profitability of Speculators in Currency Futures Markets", Reserve Bank of Australis

** Net profit calculated using a different methodology to gross profits. Transaction costs of 0.03% used.*

Bottom Line

It appears that theoretically as long as currency market participants have different motives, understandings of what drives currencies and information sources, currency markets can provide systematic excess returns to those willing to take the risk. The structure of currency markets does appear to conform to this. It appears that using a very conservative approach at most between 25%-50% of the market is made up of profit-seekers the remainder are liquidity-seekers. More realistically, the range is likely to be 5%-25%. Interestingly, we also find evidence that the share of profit-seekers is falling, as the rise in cross-border trading in bonds and equities has exceeded the rise in currency turnover. Finally, and perhaps most importantly, we find that using the actual positioning of liquidity and profit-seekers since 1993, we do find that profit-seekers systematically make profits at the expense of liquidity-seekers. It appears that the liquidity-seekers are paying a premium in the form of profits to profit-seekers in return for the provision of liquidity.

Tactical Indices

DB G10 Trade Weighted Indices: From Theory To Practice

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What are trade-weighted exchange rates?

Trade-weighted exchange rates (more broadly known as effective exchange rates) have been used by policy makers and academics for a long time, but were put into broader use by the IMF in the late 1980s as part of its exchange rate surveillance responsibilities.[18] Since then, the move away from fixed pegs or managed floats towards freely-floating currencies in the developed world has seen the majority of central banks adopt effective exchange rates as a crucial indicator of "the" exchange rate value of their currencies.

In its simplest form, a trade-weighted exchange rate can be defined as a weighted average of bilateral exchange rates[19], which distils information on the value of a currency into a single index. The bilateral exchange rates of choice and the relevant weights would typically depend on what the index is intended to analyse, with the emphasis usually placed on the influence of the exchange rate on the real economy and the balance of payments through changes in the relative price of tradable vs non-tradable goods.

How much significance do central banks place on currencies? The overall importance varies significantly between them, but the degree of a country's openness to the world economy is typically a key determinant. The first chart below measures this by looking at the sum of exports and imports as a proportion of GDP, with Switzerland standing out as the most open economy in the G10, and the US the least.

Exhibit 1: Openness of G10 Economies

Source: DB Global Markets Research

The Nuts and Bolts of TWI's

How are exchange rate indices constructed? The first step involves picking the number of currencies to include in the basket. One extreme would be to pick as many currencies as possible, though this is likely to be of marginal added value beyond a certain number of cur-

[18] The earliest IMF indices were based on the multilateral exchange rate model (MERM) first presented in "Measuring Price Competitiveness for Industrial Country Trade in Manufactures", IMF Working Paper, (1987). These were then replaced by indices based on total compositeness weights (TCW), see "New Rates from New Weights", IMF working Paper (2005) for the most recent update

[19] A bilateral exchange rate expresses the value of one currency against another (eg. USD/JPY, EUR/USD)

rencies given that exchange rate movements are often correlated. At the other extreme, only picking a few currencies may not provide a complete picture of how a country's competitiveness is affected by bilateral exchange rate movements. In the G10 world, the number of currencies used by central banks ranges from 6 in the case of Canada to 25 in Norway, with each decision ultimately subject to a trade-off between ease of calculation and completeness.

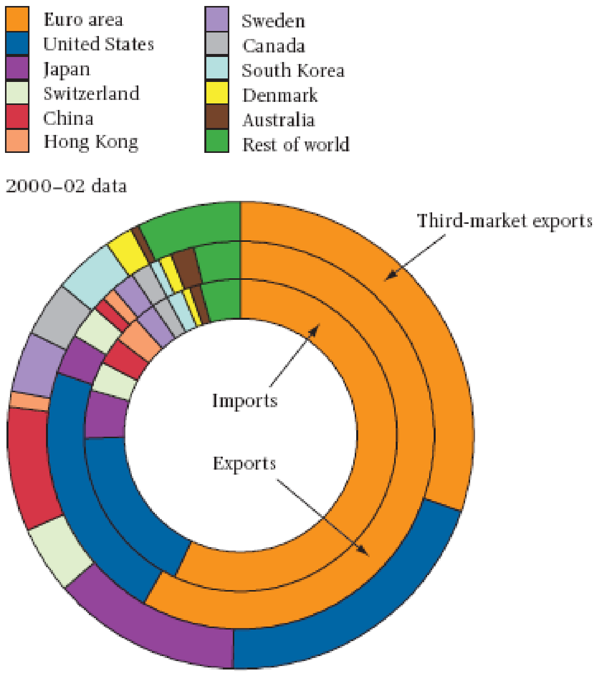
The second step involves choosing weights that are representative of each bilateral exchange rate's importance to a country's global competitiveness. In its simplest form, the weight w attached to a bilateral exchange rate i can be defined as:

$$w_j = \lambda_i^{M} + \lambda_i^{DX} + \lambda_i^{TX}$$

There are three types of competitiveness which this methodology would cover:

- Import competition (λ_i^{M}): this reflects the importance of each trading partner i as an importer of foreign products into the domestic market. A higher import share would mean that any given weakening of a country's exchange rate vis-avis importer i would generate a larger effective exchange rate depreciation
- Direct export competition (λ_i^{DX}): this measures the importance of trading partner i as an export destination of a country's exports
- Third-market competition (λ_i^{TX}): this incorporates the degree of export competition faced between the home country and country i in third-country export destinations. Chart 2 below shows the weights for each competition category attached to the sterling effective exchange rate index as an example. Though the direct share of UK exports to the Japanese market is small, UK and Japanese products compete between them in third markets, so that an appreciation of GBP against the JPY would (which makes UK exports more expensive compared to Japanese exports), would have a larger competitiveness effect on the UK economy than what the bilateral UK-Japan trade flows would imply.

Exhibit 2: Import, Export and Third-Market Competition Weights for the UK Effective Exchange Rate Index



Source: Bank of England

How similar are central banks' approaches to calculating exchange rates? Table 1 below summarises the calculation methodology used by central banks across the G10. While the majority use competitiveness-weighted exchange rates based on the approach outlined above, New Zealand and Australia stand out as following a simpler approach based on the bilateral trade flows that does not incorporate third-country competitiveness effects. The appendix at the end of this piece looks at the construction methodology of trade-weighted indices in more detail.

The Deutsche Bank Trade-Weighted Indices

The Deutsche Bank TWI's are a 'narrow' version of the effective exchange rates presented in exhibit 3. Each basket is constructed by taking the five G10 currencies with the largest weights in each central bank's officially published index, to ensure high levels of liquidity and minimise transaction costs. The weights are changed annually based on any modifications made by the central bank.[20] Exhibit 4 looks at the correlation between the DB TWI's and the central bank 'originals', with the majority of currency baskets tracking the central bank indices with a correlation of more than 90%. The currencies that stand out are the JPY and USD, where the tracking error is larger due to the relatively large allocation of EM Asia currencies in each index.

Exhibit 3: G10 Effective Exchange Rates

Central Bank	Name	Type of Weighting	No. of Currencies	Calculation of Weights
US Federal Reserve	Major Currencies Index	Weighted for competition, time varying	7	Internal
Bank of England	ERI	Weighted for competition, time varying	15	Internal
Norges Bank	TWI	Trade-weighted, time-varying	25	OECD
Bank of Canada	CERI	Weighted for competition, time varying	6	IMF
Reserve Bank of Australia	TWI	Trade-weighted, time-varying	23	Internal
Reserve Bank of New Zealand	TWI	Trade-weighted, time-varying	5	Internal
ECB	EER-23	Weighted for competition, updated every fifth year	23	Internal
Riksbank	TCW	Weighted for competition, constant weights	10	IMF
Bank of Japan	NEER	Weighted for competition, time varying	15	Internal
Swiss National Bank	Export-Weighted ERI	Trade-weighted, time-varying	14	Internal

*Two other indices (broad and other important trading partner are also calculated

Source: DB Global Markets Research,

[20] As of December 2006, the indices have been sponsored by the International Index Company (IIC), under the iBoxxFX TWI brand, providing an independent and transparent source of valuation.

Exhibit 4: Correlation Between Central Bank and DB TWI's

AUD	93%	**JPY**	30%
CAD	94%	**NOK**	99%
CHF	99%	**NZD**	93%
EUR	94%	**SEK**	98%
GBP	94%	**USD**	70%

weekly correlations, 2001-2006

Source: DB Global Markets Research

An alternative approach to the one outlined above would have been to use an identical calculation methodology for all G10 currencies. Though this would have benefited from greater consistency, we felt that it would suffer the drawback of not being representative of the particular monetary policy considerations as reflected in each central bank's choice of weights. In addition, though the IMF does publish a consistent source of TWI indices across the G10, the weights are updated infrequently and with a large time lag, making this approach less effective in incorporating changes in trade patterns over time.

Why trade TWI's?

The main benefit of exchange rate indices over single-currency crosses is that they allow investors to express or hedge a single 'country' view on a particular currency while avoiding taking direct exposure against another. This avoids common pitfalls of single currency trades, which may be vulnerable to overextended positioning on a particular currency cross, or be influenced by exchange rate moves specific to that cross. In addition, TWI's can be a more effective tool to express a macroeconomic view within the context of a multi-asset portfolio, given that they are constructed so as to reflect the true impact of exchange rate moves on the real economy. As a final benefit, currency indices also lead to diversification benefits, as they are typically less volatile than the underlying cross-rates.

Appendix

The Deutsche Bank TWI's are based on geometric (as opposed to arithmetic) averaging based on the formula below:

$$IndexSpot_t^i = \kappa_s^i \times \prod_j^m \left(Spot_t^j\right)^{w(j)_s}$$

where

$i \in \{EU, US\}$ fixings

κ_s^i ....constant factor set for index i at the last re-balancing s

$w(j)_s$ ....weight of currency j at the last re-balancing s

$IndexSpot_t^i$ ....level of index i at time t

Geometric baskets are used as this is the methodology adopted by central banks. The advantage of geometric averaging is that a given percentage change in the spot rate generates an equivalent change of the basket value independently of the base. An arithmetic base, in contrast, would generate a different percent change depending on its starting value.

DB EM Asia Policy Baskets

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The Broad and Narrow SGD NEER Baskets

We launched an index contract based on our full SGD Nominal Effective Exchange Rate (NEER) model nearly three years ago. Recently, we added a narrower proxy, which reduces transaction costs and circumvents the problem of THB (where onshore and offshore rates have diverged by as much as 10% since capital controls were imposed last December).

These indices enable investors to take a view on the Singapore dollar relative to its policy basket. By offering a greater degree of insulation from broad USD moves, one can express a long-term macro view on the Singapore economy – buying SGD against the basket when it is low in the band and the outlook is rosy, and vice versa. It also makes it easier to position and hold out for reversion when the SGD NEER appears to be in overshoot territory and intervention may be imminent.

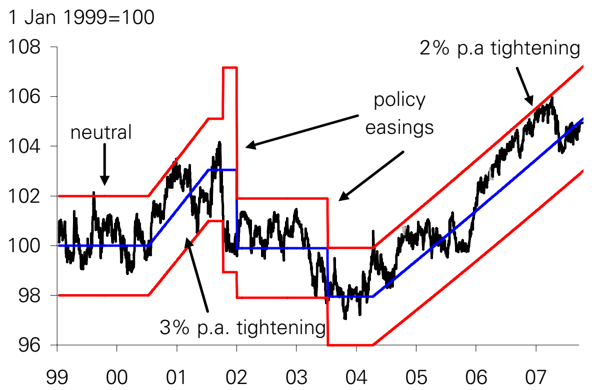
The baskets

Our SGD NEER baskets seek to minimize tracking errors to MAS' official published series (see box). Inputs are the currencies of Singapore's main trading partners. We constrain weights to within a few percentage points of recent trade shares, and solve against the latest two-year rolling window. We also re-run backtests periodically to check whether the incorporation of new currencies significantly improves fit.

Accordingly, we offer two tradable, geometric indices:

- *The full broad basket*, which uses THB onshore and is re-weighted dynamically, approximately four weeks after each policy review to take advantage of all available information.
- *A fixed narrow proxy*, which excludes THB, HKD and peripheral components like AUD. It has eight components; weights rounded to 5% increments; and has tracked stably in- and out-of-sample, albeit with somewhat larger tracking errors and a slightly higher beta to broad USD moves. Naturally, spreads are narrower, the forward curve flatter, and policy risks to the likes of THB smaller. Theoretically, it also reduces unwind risks by allowing for simple entry of an offsetting trade with a different counterparty.

SGD NEER and DB-implied bands



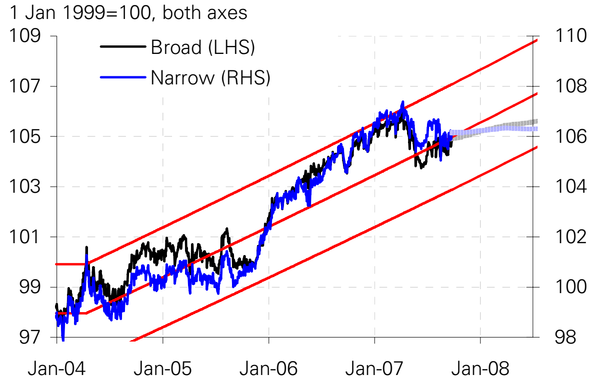
Source: DB Global Markets Research

SGD NEER and DB-implied bands

	Latest broad	Narrow
USD	21.4%	15.0%
EUR	8.6%	15.0%
JPY	8.9%	15.0%
GBP	2.0%	
AUD	4.0%	
KRW	3.8%	5.0%
TWD	6.6%	10.0%
CNY	14.9%	15.0%
HKD	2.0%	
THB	7.0%	
IDR	5.5%	5.0%
MYR	15.3%	20.0%

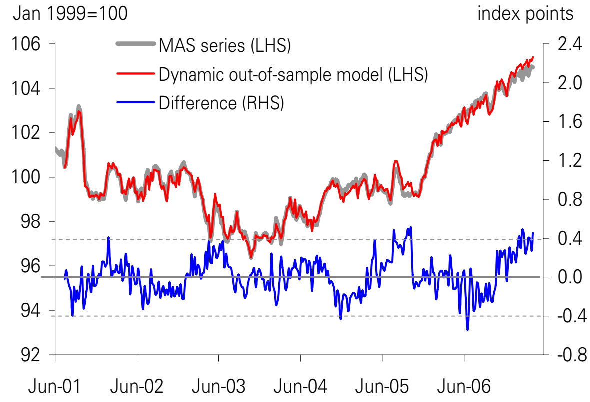
Source: DB Global Markets Research

DB SGD NEERs: broad versus narrow*



*Source: DB Global Markets Research, * Broad shown here uses THB onshore spot but offshore forward*

DB versus MAS model, tracking error



Source: DB Global Markets Research

Monitoring versus execution

The onshore-offshore spot THB basis has complicated SGD NEER monitoring and trade execution. Since the official basket seemingly uses onshore THB (as this is what matters for real economic competitiveness) trade signals need to come from a model which uses onshore THB. But actual trade execution must, if THB is incorporated, use THB offshore – incurring a significant spot basis risk. This is a strong reason for preferring the narrow proxy basket until this basis stabilizes or narrows.

We flag up SGDNEER developments and show charts of our full basket (using THB onshore spot) overlayed against estimated official bands in our regular research publications. Investors who wish to track the basket closely are recommended to set up a custom Bloomberg CIX page and chart or equivalent.

Information on the official SGD NEER

MAS uses the exchange rate as its main tool of monetary policy, announcing a bias for the SGD NEER and intervening (in USD/SGD spot) to keep the currency within bands around a central tendency. With open capital markets, interest rates are thus determined endogenously. .

Monetary policy is reviewed semi-annually, currently in early April and October, as well as in extreme circumstances (e.g., post-9/11).

We know from official publications that policy formulation relies on a formal econometric model which looks at the sensitivity of local growth, inflation and unemployment under various exchange rate scenarios. Critical input variables include foreign growth, inflation and commodity prices.

We also know that MAS' NEER is a geometric series, calculated on the basis of bilateral export weights adjusted for third country effects, and revised periodically to take account of changing trade patterns.

The Authority publishes a weekly chart of the NEER at each policy review, absent bands but with commentary that indicates, roughly, how the currency has traded relative to the band over the past six months. In April 2006, MAS began releasing the underlying data, about three weeks in arrears of each policy review. The data goes back to 1999.

The slope of the band, the NEER constituent currencies and their weights are not officially divulged, though over time can usually be gauged fairly reliably.

Source: DB Global Markets Research, MAS

CNY and MYR: Asia's New Policy Baskets

China and Malaysia staged small revaluations and shifted from hard USD pegs to managed basket floats in July 2005. Two years later, we have a reasonable idea about the operating parameters of their new regimes. And per official commentary, particularly out of China, there are good reasons to believe that the basket framework will play a larger role in guiding day-to-day FX policy over time. That means that NEER analysis could eventually become as important in taking an FX view as it is in SGD.

Second-guessing policy

The methodology for the China basket has been set out pretty clearly by policymakers. PBoC governor Zhou divulged weights are based on the composition of China's trade, inward direct investment and foreign debt. He listed four major partners – the US, Europe, Japan and Korea -- and seven smaller ones – Singapore, the UK, Russia, Malaysia, Thailand, Australia and Canada. He also confirmed that the total USD weight was significantly less than 50%.

Malaysian authorities are more reticent. But Bank Negara's initial depeg statement did spell out their aim of "maintaining the value of the ringgit against a trade-weighted index of major trading partners."

Accordingly, we developed full NEER baskets for both, China per the logic above, Malaysia simply using recent trade weights. We have been tracking these closely for the past 18 months.

For China, we believe authorities are targeting a 3% positive slope and defend +/-3% bands.

For Malaysia, a 2% slope and +/-2% bands initially seemed to explain moves and intervention well, though in recent months BNM seems to have become more comfortable with greater FX strength. This is also evident in broader policymaker comments. Over time, we may be able to confirm suspicions of a one-off 2% upward shift in the band, starting in 2007.

Making it tradable

Using only the four "major" trading partners for China yields a remarkably close fit with the broader NEER. For Malaysia, we make our narrower cut by incorporating only those currencies with weights exceeding 10% in the broad basket. That leaves a basket of 5 currencies and, happily, excludes THB (getting around the onshore-offshore basis problem). In both cases, we round the weights for convenience.

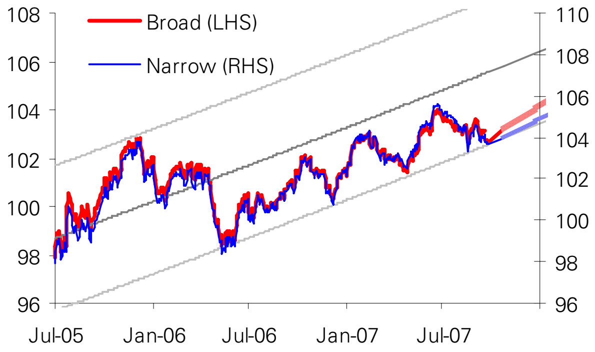
DB narrow proxy policy baskets

	China	Malaysia
USD	35%	25%
JPY	27%	20%
EUR	25%	20%
KRW	13%	--
SGD	--	20%
CNY	--	15%

Source: DB Global Markets Research

CNY NEERs and implied policy band

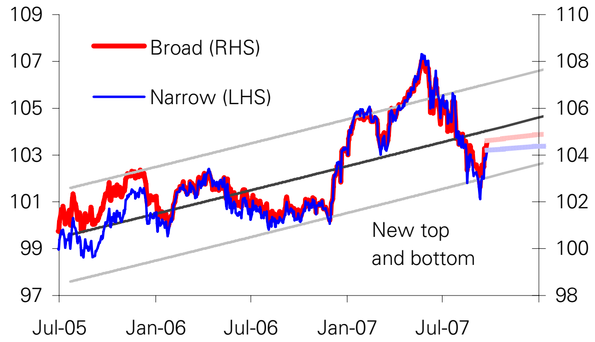
22 July 2005 = 100, both scales



Source: DB Global Markets Research

MYR NEERs and implied policy band

22 July 2005 = 100, both scales



Source: DB Global Markets Research

The Emerging Asia Reserves, Liquidity and Yield (EARLY) Index

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Get in EARLY for Asia

Last year we launched the Emerging Asia Reserves, Liquidity and Yield (EARLY) index to provide a vehicle for simple, transparent and efficient EM Asian FX exposure. While the performance has been impressive, its broader appeal was dented by Thailand's imposition of capital controls. We have now rebalanced, removing THB. The remaining eight currencies are amalgamated into a geometric index with shares based on ordinal rankings across three equally-weighted criteria:

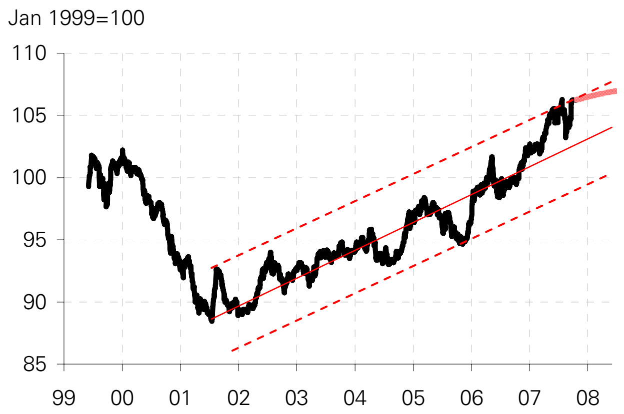
- *Reserve accumulation*: Calculations of currency deviations from "fair value" are numerous, disparate and usually controversial. We prefer a standardized proxy for market pressure that is being offset by central banks: Reserve accumulation as a share of nominal GDP. To avoid distortion from the business cycle and short-term environmental considerations, we average the last three full years' data.

- *Liquidity:* We use estimates of liquidity in the parts of the region's FX markets that are accessible to offshore investors, as published in our annual *Asian Currency Handbook*.

- *Yield:* We take the last one year's average 6-month FX-implied yield (offshore where appropriate) as an indication of the cost of carrying FX exposure in each currency.

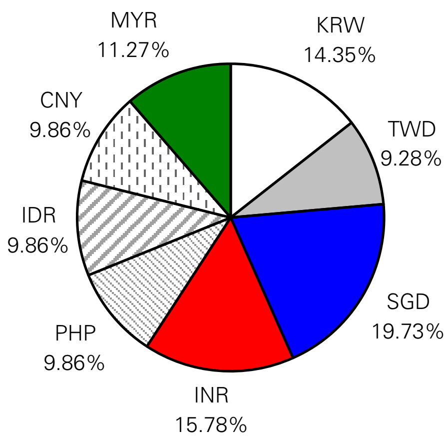
THB is excluded on liquidity grounds, with our latest estimates of offshore FX market liquidity having dropped below USD50 million per day on average. HKD is also excluded, as we do not envisage the peg being broken or discarded in the next year or two (top officials have only recently reiterated their commitment to the institution).

DB EARLY index, trend and forward curve



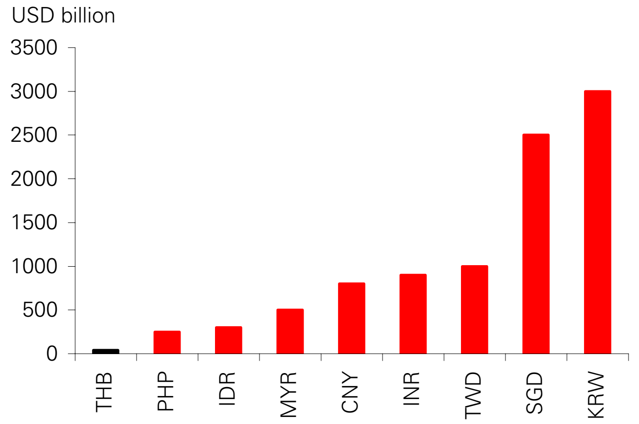
Source: DB Global Markets Research

DB EARLY weights



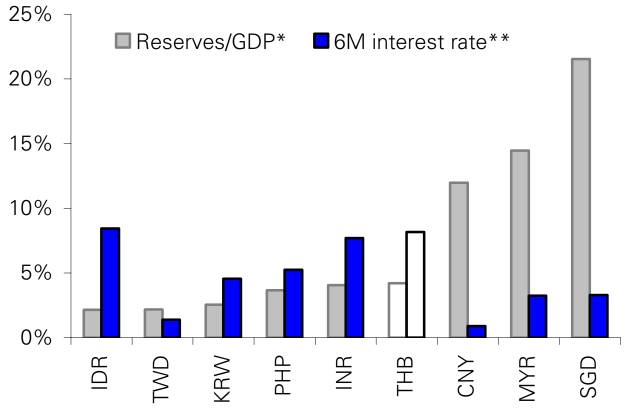
Source: DB Global Markets Research

Liquidity*



*Source: DB Global Markets estimates, * parts of market accessible to off-shore investors*

Reserves and carry



*Source: DB Global Markets Research, * 2004-6 average, includes forward book; ** offshore-implied where applicable, July'06-June '07 average*

The DB Currency Volatility Index (CVIX): A Benchmark For Volatility

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Origins of Currency Option Markets

Currency options first started trading actively in the 1970s and 1980s on listed futures and options markets, but were constrained to a handful of major exchange rates. Following the development of a more liquid OTC interbank market in the 1990s, options trading expanded to the full range of exchange rates. Today, the FX options market is a global, 24-hour market. It is one of the largest option markets by trading volume, with an average daily turnover of more than $200bn based on the most recent BIS survey.[21] Though it remains small relative to the overall size of FX markets, these figures likely underestimate its overall significance, as options traders are particularly active in the spot market as part of their ongoing hedging activity. In addition, the FX options market has been the fastest growing segment of FX markets over the last ten years, and has been the birthplace of some of the most innovative and exotic options structures across the space of financial derivatives.

The Deutsche Bank Currency Volatility Index (CVIX)

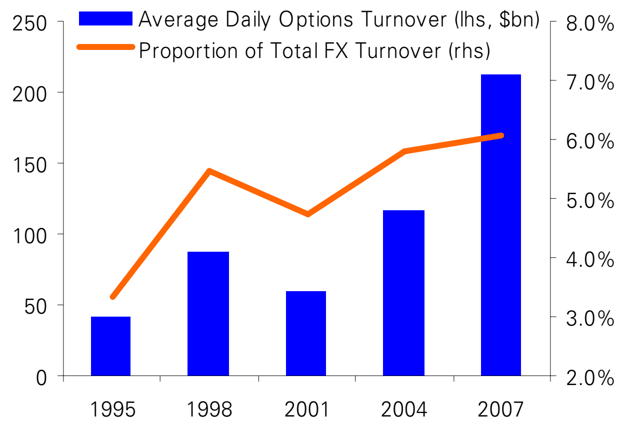
The Chicago Board of Exchange volatility index (VIX) is a well established equity market indicator that measures the implied volatility of a basket of S&P 500 options. The index is a measure of the market's expectation of future equity market volatility, and is widely used as a benchmark of investor sentiment and risk appetite. Though FX dwarfs equities in both size and liquidity, there has so far not been a widely recognizable benchmark of currency market volatility.

The aim of the DB CVIX is to provide such a benchmark for currency market participants. The index is designed to represent investors' expectation of future volatility, and is calculated as the arithmetic average of the 3-month level of implied volatility for all the major currency pairs. The index is defined as:

$$\text{CVIX} = \sum_{i=1}^{9} w_i vol_i$$

where the weights *w* are shown in the table at right below, and *vol* is the implied volatility

Options Market Turnover



Source: DB Global Markets Research, BIS 2004 Survey

Currency Crosses and Weights In CVIX

EURUSD	35.90%
USDJPY	21.79%
GBPUSD	17.95%
USDCHF	5.13%
USDCAD	5.13%
AUDUSD	6.41%
EURJPY	3.85%
EURGBP	2.56%
EURCHF	1.28%

Source: DB Global Markets Research, BIS 2004 Survey

[21] See BIS "Triennial Central Bank Survey", September 2007 and DeRosa "Options on Foreign Exchange", January 2000

of each cross based on a 4pm London BBA fixing. The currency pairs chosen are the ten most liquid crosses as measured by the triannual BIS survey of 2004, with the weights corresponding to the average daily turnover in each cross. Deutsche Bank makes markets in the index, with the trade settling as a contract for difference on the expiration date. Clients can keep track of their positions on Bloomberg on CVIX Index <Go>.

Why Trade the CVIX?

The main advantage of trading a currency volatility index as opposed to individual currency crosses is that an investor can avoid taking single currency risk, with the implied volatility on a particular cross typically dependent on the upcoming event horizon of a particular exchange rate and the economic cycle of a particular economy. Aside from this, one can use the CVIX to express a view based on the following considerations:

(1) Taking a directional view on volatility

Implied volatility is typically a function of realised volatility, so one would also likely be expressing a view on the realised path of volatility. This in turn depends on multiple drivers, ranging from global liquidity to monetary policy, and the microstructure of currency markets. For instance, both the increased transparency of G10 monetary policy combined with the growing number and size of e-platforms in global currency markets are credited by some as reducing the overall level of volatility in currency markets over recent years.

(2) Expressing a view on risk-aversion, event risks or hedging exposure to risky assets

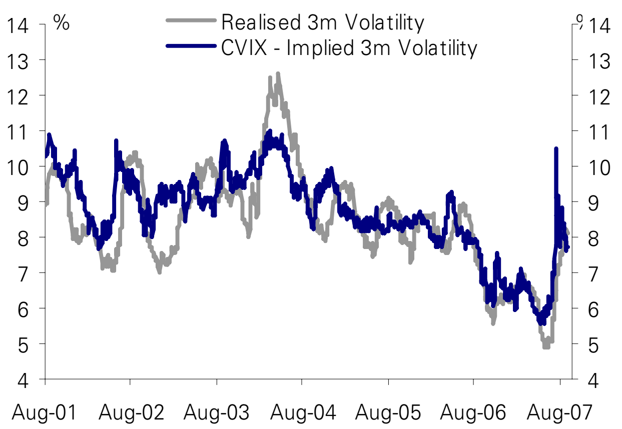
Aside from reflecting the market's view on the outcome of particular event risks (for instance, the CVIX rose significantly over the credit crisis in Augut), implied currency volatility is a broader indicator of investor risk appetite in currency markets. As such, it tends to be negatively correlated to the performance of carry trades and can be used as a hedge that avoids taking a directional and potentially more expensive exposure on a basket of carry crosses.

(3) Tactical asset allocation/Relative Value

The CVIX can be used to express a view on the relative value between options implied volatilities across asset classes. To take one example, equity market and FX market volatility have tended to track each other fairly closely over the last two years, but in some instances have exhibited signs of decoupling (chart at right). This would suggest the opportunity of a spread trade should one believe that FX volatility will 'catch-up' to a heightened perception of risk in equity markets, or vice versa.

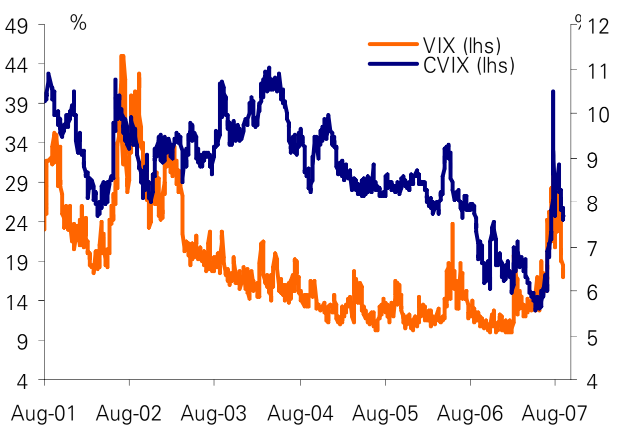
In all, the CVIX offers significant opportunities for investors seeking to express a view on volatility, currency market risk sentiment and the relative value of volatility across asset classes. As such, it has the potential to be an attractive and cheap diversifier in any currency portfolio.

CVIX vs Realised Volatility



Source: DB Global Markets Research, BIS 2004 Survey

FX Market vs Equity Market Volatility



Source: DB Global Markets Research, BIS 2004 Survey

Strategic Indices