FX Strategy

Global Markets Research

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Currency Markets: Is Money Left On the Table?

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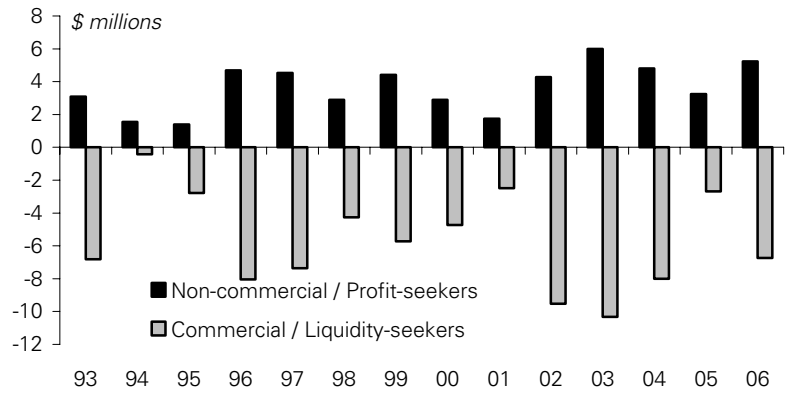
- In earlier research, we showed that currency markets do offer consistent excess returns over time, which on some metrics were stronger than equities and bonds
- Yet, where do these returns come from if currency markets are a zero-sum game? Who are the players that lose money? Are these players declining as share of the market? In this paper, we attempt to answer these questions
- We first show how the efficient markets hypothesis is not appropriate for currency markets, and instead find that the more relevant theories suggest that if market participants exhibit differences in beliefs and objectives, currency markets can offer excess returns
- We categorise market participants as either "profit-seekers" or "liquidity-seekers" and find that "profit-seekers" represent at most between 25% and 50% of the currency market, with the rest being made up of "liquidity-seekers". More realistically, the share is likely to be between 5% and 25%.
- Controversially, we also find evidence that the share of "profit-seekers" has actually been declining over time, as the increase in volume of cross-border trade in goods, services and securities has been more rapid than the volume of currency turnover.
- Finally, using actual positioning data, we find that "profit-seekers" do actually make consistent profits at the expense of "liquidity-seekers"

"Profit-Seekers" Make Profits at the Expense of "Liquidity-Seekers"



Source: Deutsche Bank, CFTC

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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.

Section A: The Technical Part

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 the markets 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 predication 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 thus not efficient using the classical definition[6]. Academic work has also shown that trend-following 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

[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

[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".

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.

Section B: The Tribes of Currency Markets

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, 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.

Dealing With Dealers

In reality, dealers are the intermediaries between the two other tribes, and so are in many ways are 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 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].

[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

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

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.

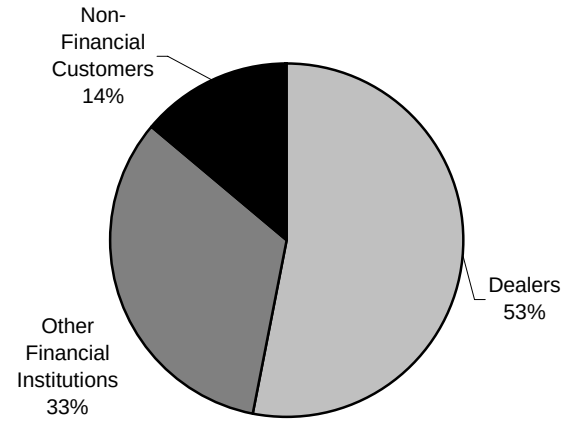
The starting point would be the tri-annual BIS survey[13], which is the most comprehensive survey of currency market turnover. The latest, which was taken in 2004, shows that total currency market turnover is $1.9 trillion. "Dealers" make up just over 50% of the market, "other financial institutions" 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 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.

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.

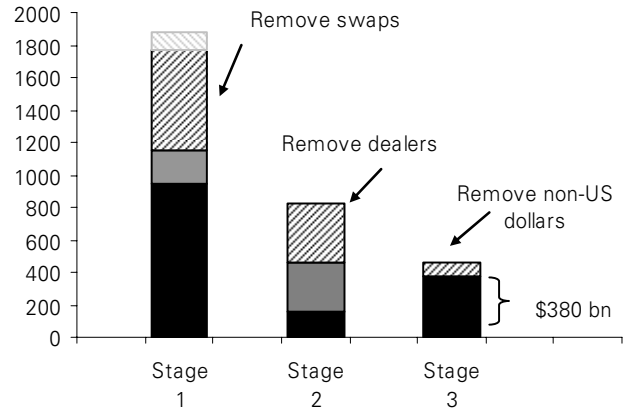
So first, the headline BIS turnover of $1.9 trillion needs to be reduced to the US dollar amount that would consist of liquidity and profit-seekers (ie the originators of net FX demand). The headline turnover data includes spot, forwards and swaps. The latter should be excluded as it does not result 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).

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



Source: BIS. Survey taken on April 2004.

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



Source: BIS. Survey taken on April 2004.

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

[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.

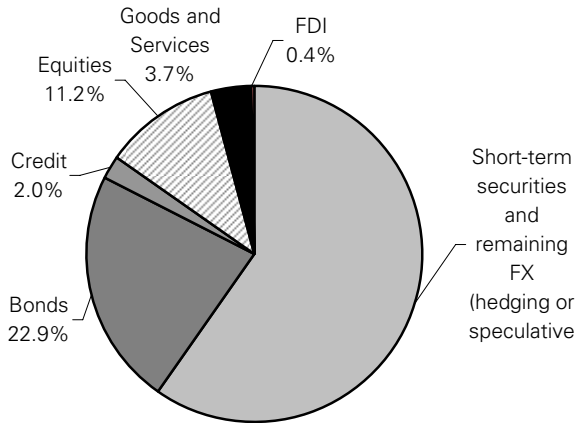
Second, the total cross-border volumes in non-US resident activity in US assets, goods and services and US resident activity in non-US asset, goods and services need to be calculated. Official US data sources provide gross data that allows one to calculate the breakdowns for long-term securities, direct 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 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 could be attributed to cross-border investment in short-term securities and loans[16], currency hedging of an underlying exposure or currency trading for speculative purposes (see first chart below). The investments in short-term securities and loans, and hedging would be categorised as liquidity-seeking, while the speculative would be profit-seeking. So the uncertainty would be how much of the 60% is devoted to the remaining liquidity-seeking volumes.

A conservative approach would be to leave the short-term securities and loans out, which would overstate the size of profit-seekers, and arrive at some estimate 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 (in reality, it is likely to be a much higher proportion) 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 and loans would likely make up as much of the overall FX volumes as bond flows (which was 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".

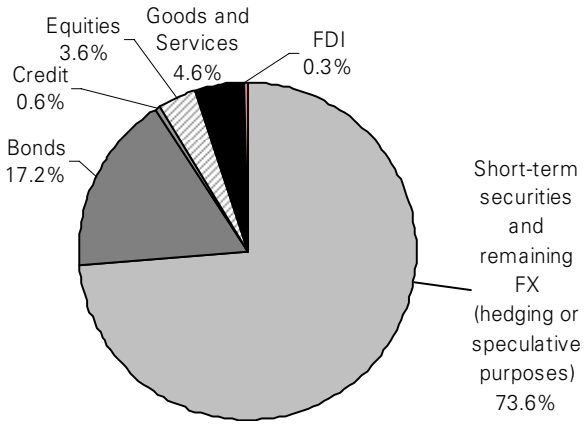
Interestingly, if we look at data from 1995, we find that using the conservative approach, 73% of currency volumes were not related to purchasing an underlying asset, good or service (versus 60% in 2004) and using the same assumptions on hedging, it would leave 65% of the market as profit-seeking versus 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 the broader growth in cross-border flows in other asset and goods markets.

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

[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.

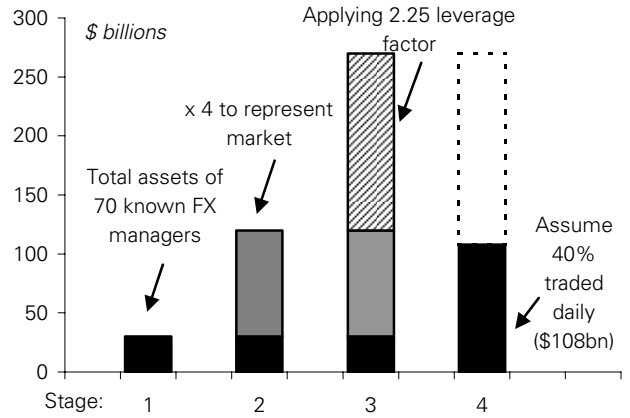
[16] More specifically, this category would likely be dominated by changes in claims in and liabilities of banks

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

From DB FXSelect Data to Profit-Seeking Volumes



Source: Deutsche Bank

The difficulty now is to estimate what proportion of this is traded each day. Unfortunately, we do not directly have that number, so we will have to arrive at some reasonable estimate. The one data point that may help is the median number of trades, done each day on the FXSelect platform, which are 4. Using this we could perhaps come up with an absolute upper bound of any likely turnover number.

We can do this by making several assumptions. First, we will assume that the funds only trade the G10 currencies, second, that each trade is in a different currency and finally, that each trade will equate to 10% of the levered size of the funds (so that if ten trades are done, the entire levered size of the fund is executed). Of course, these are quite extreme assumptions and are very likely to upwardly bias any estimate of the size of the profit-seekers. Nevertheless, using these assumptions and the frequency of 4, we would arrive at 40% as the proportion of total assets that are traded each day (4 trades divided by 10 currencies). 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, see chart below). Using the more reasonable 5%-10%, the volume would be between $14bn and $27bn.

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. 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.

Section D: The Profitability Of the Tribes

Proving Non-Profit Seekers May Systematically Lose Money

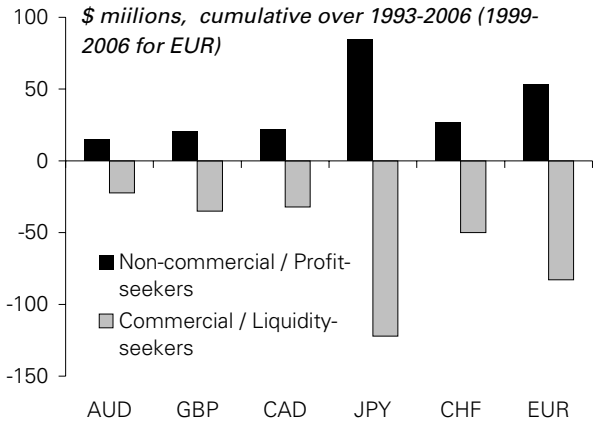
Armed with a sense of how the currency markets are segmented, the question is whether profit-seekers do indeed make profits at the expense of liquidity-seekers. Ironically, this may end up being easier to test, than estimating their relative sizes. The CFTC publishes weekly data on the futures positions 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 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. 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. 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.

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 underlying 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.

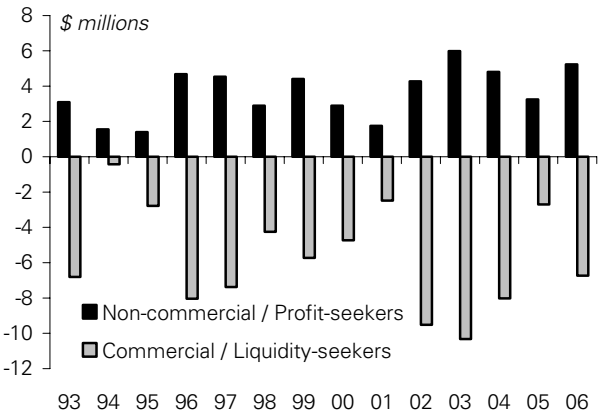
[17] See Kearns and Manners (2004), "The profitability of Speculators in Currency Futures Markets", Reserve Bank of Australia.

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



Source: DB Global Markets Research, CFTC

Absolute P&L Across Time Trading the G5 FX (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.

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Appendix 1

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