The Retail FX Trader: Random Trading and the Negative Sum Game.

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Abstract

With the internet boom of early 2000 making access to trading the Foreign Exchange (FX) market far simpler for members of the general public, the growth of 'retail' FX trading continues, with daily transaction volumes as high as $200 billion. Potential new entrants to the retail FX trading world may come from the recent UK pension deregulations, further increasing the volumes. The attraction of FX trading is that it offers high returns and whilst it has been understood that it is high-risk in nature, the rewards are seen as being commensurately high for the 'skilled and knowledgeable' trader who has an edge over other market participants. This paper analyses a number of independent sources of data and previous research, to examine the profitability of the Retail FX trader and compares the results with that of a simulated random trading models. This paper finds evidence to suggest that whilst approximately 20% of traders can expect to end up with a profitable account, around 40% might expect their account to be subject to a margin call. This paper finds a strong correlation between the overall profitability of traders and impact of the cost of the bid-ask spread, whilst finding little if any evidence that retail FX traders, when viewed as a group, are achieving results better than that from random trading.

The Retail FX Trader – an Introduction

Foreign Exchange (FX) trading is at its simplest, the use of one currency to buy another. A US tourist wishing to visit Great Britain would go to their local bank and sell their 'United States Dollars' (USD), to buy 'Great British Pounds' (GBP), which in the FX world would be a 'buy GBP/USD' transaction. In the case of this tourist, the transaction allows purchases of goods and services to be made more convenient once on British soil, however if the FX trading world, such a transaction would be made to attempt to profit from a belief that the Pound (GBP) is likely to strengthen in value relative to that of the Dollar (USD). The scale of the market for such transactions is huge. According to the Bank for International Settlement's 2013 Triennial survey (BIS 2013), trading in the foreign exchange markets averaged $5.3 trillion per day in April 2013, up from $4.0 trillion in April 2010 and $3.3 trillion in April 2007.

The FX market is made up of various players (King, Michael R, Carol Osler 2011) who need or want access to such a market. Amongst the list of players, including financial institutions, corporations and high-frequency algorithmic traders is a growing section of private

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individuals who wish to trade the FX market either for trading gain or perhaps to hedge the impact of a currency move against a large foreign purchase, for example a holiday home abroad. These 'non-financial customers' account for between 8-10% of the spot FX market (King & Rime 2010) which in 2010 was estimated to be $125-150 billion per day. The 2013 BIS Triennial survey also suggests a figure of 9% for retail traders, which given the growth in the overall FX market between 2010 and 2013 would suggest a daily figure for 'retail trading' of closer to between $165 - 200 billion per day.

Growth in the retail sector has been fuelled by the advent of on-line platforms, which started around the year 2000 and with it brought lower transaction costs via new type of financial intermediary, the 'retail aggregator'. These aggregators offer significant leverage to the retail trader, allowing trades of up to 500 times that of the underlying deposit, so for example a trader with a modest account containing say a $2,000 deposit ("margin") would have the ability, via leverage, to trade up to $1,000,000 of currency. These aggregators are colloquially known as 'brokers', which implies that a trade (and so risk) is offset in the wider market place, however many of these brokers have a hybrid 'dealing' model where they in effect 'take the other side of the trade', with implication on both potential profitability and risk, especially given the leverage they have provided to the retail client. In 2015, one of the UK's largest brokers 'Alpari UK' went into receivership due to the effects of a significant announcement by the Swiss National Bank (SNB) and the effect that had on the Swiss franc, resulting in a $225m loss of client funds (BBC 2015a).

The attraction to the retail trader of the FX market include ease of access, 24 hour trading 5 days a week, the perceived low transaction costs and access to leveraged accounts. A cursory glance at the advertising used to entice new retail traders into the FX market will undoubtedly build on these factors and try and build a seductive picture around the ability to 'trade your way to financial freedom'. Recent changes to the UK pension rules, allowing over-55's to withdraw money from their pension pot and 'invest' or spend it as they see fit (BBC 2015b) may well serve to increase the number of individuals wishing to trade FX, especially if the see trading as a route to top up their underperforming pension pot. However despite the seeming attraction of this market, what is not clear is the number of retail traders that are profitable, nor the extent to which they are profitable. The heady mix of access to pension capital combined with seductive marketing and a lack of understanding of risk could prove to be another financial time-bomb waiting to explode. This paper attempts to provide answers to those questions and in addition to try and establish if the results obtained by retail traders is any better than that of random trading?

Is the FX Market a Random Walk?

Before we examine the profitability of the retail trader, we should consider the question of whether the FX market has any level of predictability at all? The seminal work, conducted in the early Eighties by Meese and Rogoff (Meese & Rogoff 1983) which looked at forecasting accuracy in exchange rates concluded "We find that a random walk model performs as well as any estimated model at one to twelve month horizons". Subsequently this question of whether exchange rates follow a random walk has been much debated. The conclusions of

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the Meese / Rogoff paper were subsequently challenged (Somanath 1986) stating that "while the random walk is the dominant model during the period and for the structural models examined by Meese and Rogoff, it is subordinate to some of those models during the post Meese and Rogoff period". Further work (Hakkio 1986) stated that "some evidence suggest the exchange rate follows a random walk, while other evidence suggests the opposite should be true" before concluding that "although the hypothesis that the exchange rate follows a random walk cannot be rejected, not much weight should be put on that conclusion". Nearly two decades after the original work, Kilian and Taylor (Kilian & Taylor 2003) developed a test to investigate the random walk hypothesis and found "strong evidence of predictability at horizons of 2 to 3 years, but not at shorter horizons".

Whilst these studies of exchange rate forecasting efficacy do provide evidence to support the non-random nature of the currency exchange rate market, there is a striking difference between the time frame of the predictability in Kilian and Taylor's research ("2 to 3 years") and the time horizons of the retail trader as recorded by Heimer and Simon "Roughly half of all positions were closed within an hour and only around ten percent lasted longer than a day". Research into forecasting of shorter term exchange rates using 'Technical Analysis' and 'Artificial Intelligence' tools (Dempster et al. 2001) concluded that their results 'imply that there is useful information in technical indicators that can be exploited' whilst at the same time commenting that 'none of the methods produce significant profits at realistic transaction costs'. However there is potential 'good news' for the retail trader, a study looking at the combination of forecasting techniques (Yu et al. 2005) appears to have some hope for profitable trading. By combining an 'expert system' focusing on eleven basic factors related to forex price fluctuation and a 'neural network' focusing on price trend analysis they created a system that produced one of 3 decisions; buy, sell or deposit across 3 different currencies, with headline results being an annual return of between 13.52% and 15.13% based on testing of out-of-sample data. It appears that there is some evidence to support the non-random nature of the FX market although the question of the timescales over which this non-random behaviour exists still remains and the repeatability of the results.

How successful are Retail Traders?

The question of just how many retail FX traders are profitable has been the subject of much speculation for some time. The common meme, often cited on trading related social media, is that "95% of traders lose money" however, despites its frequent use to support the sales of 'how to trade profitably' courses, there is little evidence to support this specific number. Research into the day trading of stocks in the US (Jordan & Diltz 2003) concluded that from a sample of 324 traders, 35.8% were profitable after 20 months with 64.2% having lost money. A more recent and larger study into the use of social media by 5,693 retail FX traders (Heimer & Simon 2012) tracked the online trading results across a 2 year period, from January 2009 to December 2010 and concluded that only 21% of traders were profitable at the end of the period. This data, taken from the real time tracking of trades posted on the on-line trader portal "MyFXBook" (MyFXBook 2015) also showed that despite the low profitability at the end of the period, individual trades were actually profitable 63.4% of the time! We will examine more of the findings from this study later in this paper.

Although no complete picture exists, there are other insights into how profitable retail traders might be. In America, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd Frank 2010) required retail FX brokers to report each quarter the number of accounts which were profitable or non-profitable. This quarterly data has been collected from each broker and aggregated by the on-line website Finance Magnates (Finance Magnates 2015). Analysis of this data from 19 US brokers, between Q4 2010 and Q1 2014 shows that across a mean quarterly total of 103,437 accounts, the mean number of profitable accounts was 33.4%, with the highest quarter for any individual broker being 46.5%, or to put in another way, at no point during 14 quarters did any of the 19 brokers have more profitable client accounts than unprofitable ones!

Broker Profitability data

	Q1 2014	Q4 2013	Q3 2012	Q2 2013	Q1 2013	Q4 2012	Q3 2012	Q2 2012	Q1 2012	Q4 2011	Q3 2011	Q2 2011	Q1 2011	Q4 2010
Broker	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**	**% profit**
Interactive Brokers	43.1%	45.3%	44.0%	46.5%	43.30%	46.5%	44.6%	42.3%						
CitiFX Pro	38.0%	42.0%		42.0%	41%	43.0%	45.0%	39.0%	41.0%					
OANDA	42.2%	32.5%	35.1%	35.1%	38.10%	40.5%	38.1%	36.2%	39.8%	39.1%	35.5%	31.0%	38.1%	43.5%
Gain Capital	33.4%	27.0%	31.0%	33.0%	33%	36.0%	28.0%	29.0%	32.0%	34.0%	30.0%	26.0%	29.0%	28.0%
FX Solutions						36.0%	28.0%	32.0%	29.0%	32.0%	27.0%	25.0%	26.0%	27.0%
IBFX / TradeStation	34.6%	30.2%	32.0%	30.9%	33%	33.0%	30.0%	32.0%	30.9%	38.0%				
FXCM	33.0%	28.0%	28.0%	28.0%	29%	31.0%	26.0%	29.0%	28.0%	30.0%	30.0%	22.0%	27.0%	23.0%
MB Trading	27.4%	26.8%	27.2%	32.0%	26.90%	31.0%	25.8%	32.1%	28.1%	31.8%	23.9%	24.8%	26.1%	26.0%
FXDD	34.4%	29.9%	29.1%	31.5%	36.20%	30.1%	30.3%	32.2%	32.9%	33.7%	27.4%	24.8%	30.0%	32.0%
Alpari				30.6%	29.90%	27.6%	30.3%	27.4%	28.5%	32.5%	30.8%	27.0%	30.0%	30.0%
ILQ	32.6%	23.1%	22.3%	32.6%	30.30%	22.7%	43.0%	33.4%						
GFT							29.8%	31.6%	40.6%	39.0%	25.3%	30.4%	39.9%	32.0%
PFG									28.0%	36.7%	22.1%	26.6%	29.5%	21.3%
FX Club								30.7%	27.3%	29.5%	20.6%	21.0%	23.5%	19.0%
Institutional Liquidity									30.4%					
Advanced Markets								34.8%	38.6%		42.2%	18.4%	16.0%	22.4%
Interbank FX										38.0%	28.0%	26.0%	30.0%	28.0%
Trade Station										28.0%	27.0%			
IG Markets														26.0%

More evidence comes from the analysis of 23 forex trading competitions which ran between May 2010 and November 2014. The competitions, also hosted by the retail FX trader portal MyFXBook, allow traders of all levels to compete against each other, usually for the duration of a month, using 'demo' trading accounts provided by the sponsoring broker. These demo accounts allow a trader to trade using virtual money, rather than risking real funds. Over the 23 competitions we analysed, 41,529 active traders took part, with on average only 21.9% finishing in profit at the end of the month, despite 66.8% of all individual trades being profitable. Overall 50% of all accounts dropped to below 20% of the opening funding level during the competition, which if trading real funds would have resulted in a request for more funds to be added (known as a "margin call") or in the account being closed due to insufficient funds.

Competition Profitability data

Broker	Date	Active Traders	Margin called Accounts %	Positive Accounts %	Positive Trades %
FXCM	Nov-14	2,444	45.0%	19.7%	69.5%
Squared Financial	Aug-14	2,394	48.0%	17.7%	69.0%
Octa FX	Jun-14	2,247	35.0%	12.6%	70.5%
24 FX	May-14	1,760	45.0%	13.1%	63.5%
Forex Broker	May-14	164	56.0%	11.6%	59.5%
Tenko FX	Mar-14	2,804	44.0%	17.2%	67.0%
Price Markets	Dec-13	1,879	55.0%	16.1%	64.0%
Excel Markets	Sep-13	2,812	39.0%	13.9%	66.5%
Andromex	Jun-13	2,607	49.0%	16.5%	65.0%
FxPro	May-13	2,986	43.0%	17.1%	70.0%
OANDA	Mar-13	1,583	78.0%	56.1%	69.0%
FIBO	Feb-13	2,330	47.0%	20.1%	70.0%
FXCM	Nov-12	2,175	52.0%	21.8%	64.5%
I am FX	Sep-12	1,824	54.0%	19.6%	62.5%
OANDA	Jun-12	1,067	85.0%	61.8%	68.0%
FXCM	May-12	1,708	44.0%	12.3%	63.5%
DF Markets	Mar-12	1,828	59.0%	31.0%	72.5%
Vantage FX	Feb-12	1,914	58.0%	34.8%	74.0%
Go Markets	Sep-11	1,299	44.0%	17.2%	65.5%
FXCM	Jul-11	1,021	56.0%	27.0%	64.5%
FX Open	Mar-11	891	43.0%	11.2%	66.0%
FX Open	Oct-10	371	40.0%	17.9%	68.5%
FXDD	May-10	1,419	32.0%	17.7%	63.5%
Total		**41,529**	**50.0%**	**21.9%**	**66.8%**

Whilst it can be argued that trading with virtual money may result in more aggressive risk taking, it is interesting to observe the parallels between these results and those of the Heimer, Simon 2011 study, both in terms of profitable traders (21.9%, 21.0%) and profitable individual trades (66.8%, 63.4%). It should be noted that both of these sets of data include traders that may have stopped trading during the relevant period, for example because they have lost too much money or been margin called and had their account closed. The quarterly US broker data, on the other hand, will not show data for account that were closed in previous quarters (because the accounts are no longer in existence), which might help explain the seemingly higher profitability level of 33.4%?

It is difficult and dangerous to put a precise number as to the success of retail FX traders. The analysis above suggests that between 20% and 33% of traders are profitable, or rather that between 20% and 33% of trading accounts were in profit at the time their measurement took place. It is interesting to consider why this figure is so low given that a) a given currency pair can only go one of two ways, higher or lower, seemingly a 50/50 bet and b) why traders get the buy-or-sell decision right nearly two-thirds of the time, yet still lose money?

The Negative Sum Game

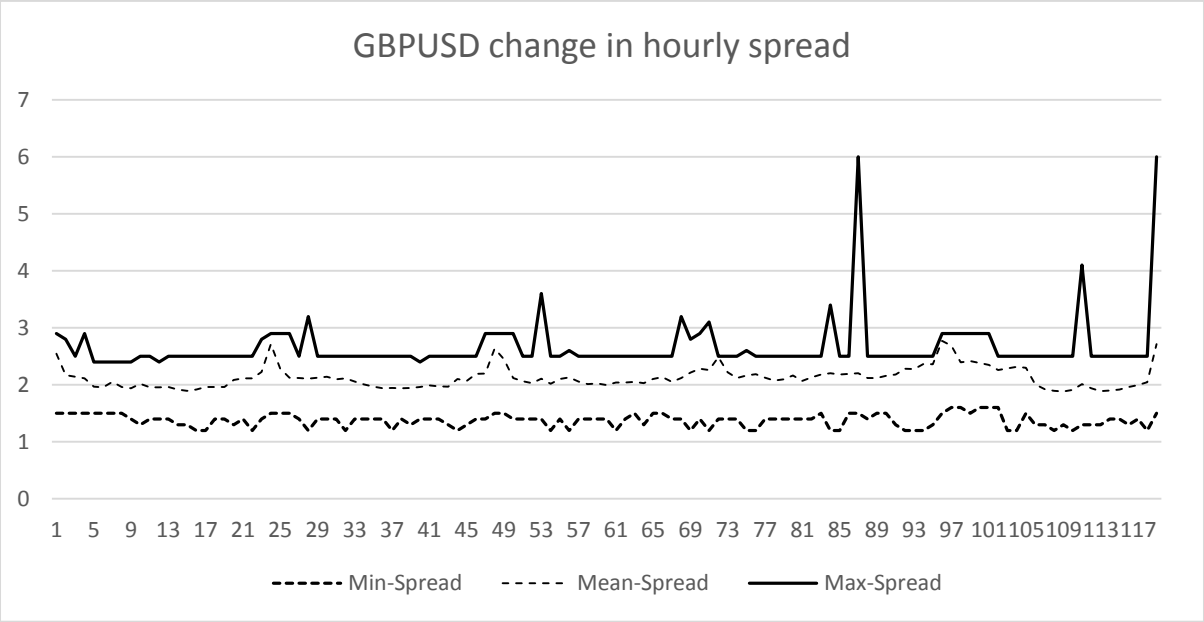
To establish what might be behind these profitability figures, let us look at the mechanics of an FX trade. Foreign Exchange prices are based around a pair of currencies, the currency being sold and the currency being bought. For example the EUR/USD "Euro Dollar" might be quoted at 1.1500, meaning that for every dollar you have (the 'USD' base currency) you will receive 1.1500 Euros ('EUR'). For this transaction to take place, two parties are required, someone that can provide Euros and someone that has Dollars and importantly, these two parties must agree on a value at which they are happy to buy and sell. The size of the FX market means that there are likely to always be many parties who wish to buy and sell at any time ("high liquidity") and it is the job of the brokers and the functioning of the market to bring these parties together. FX price quotations actually consist of two prices, the 'Bid' and the 'Ask'. The Ask price is the price at which a party who wishes to buy a currency can do so, for example Euros were available at 1.1500. The Bid price is the level at which a party can sell the Euros they have, and this is normally lower that the Ask price, for example 1.1498. The difference between these two levels is known as the 'Bid-Ask spread'. Each unit of price movement is known as a 'pip' (Price Interest Point) and the bid-ask spread, simply referred to as the 'spread' , is quoted in pips, in the example above 2 pips. The monetary value of a pip will depend on the size of the trade placed, or 'lot size' and the base currency, with a lot size of 1 being equivalent to $10 per pip movement for USD denominated currency pairs. This 'spread' flows to the broker who is providing the service of bringing the parties together and as such providing liquidity. In most cases brokers do not charge any other fees for trades not held overnight.

Let us consider a buy trade on the EURUSD has taken place and the Euro proceeds to strengthen 10 pips in relationship to the Dollar. The trader who bought the Euros in the EURUSD transaction will be seeing the value of their trade increasing, whilst the selling party will be seeing an equivalent loss in value. This would seem like a zero-sum game, with one party gaining at the others expense, however when the trades are closed, the buyer, who bought at the Asking price, now has to sell at the Bid price, thus incurring a drop in the profit equivalent to the spread. The trader on the losing side will also experience such a loss, as they have to buy at the Ask to close out their 'sell at the bid' transaction. The net of this is that every trade will carry a transactional cost equivalent to the spread, which is paid to the broker for their service. In Heimer and Simon's 2011 study of over 2,149,038 trades from 5,693 traders, split into two groups, they noted that "Despite clear differences in their commitment to trading, both groups are unprofitable losing on average $6.20 per trade." These figures suggest that over $13 million flowed out of the game, but how much of this can be accounted for simply by spreads?

The Anatomy of the Bid-Ask Spread

The size of the gap between the Bid and Ask price varies from broker to broker, currency pair to currency pair and from price quotation to price quotation. For very highly traded currencies, the spread is likely to be lower, reflecting the reduced risk of the broker being unable to find a trader to take the other side of the trade. During times of high volatility, such

as the release of governmental economic data which can severely impact currency price, the spread is likely to be much higher, to reflect the broker risk from very rapid price movements. In order to obtain accurate spread data, a monitoring application was written which recorded the spread level for every price change (known as a 'tick'). This software monitored the changes in spread levels being provided across four currency pairs by three retail FX brokers during a five day period in March 2015. Below is the graph of a typical week of spreads offered by one broker, with the lower line representing the lowest spread seen during a given hour, the top line being the highest spread and the middle line being the mean spread of all the tick data gathered during that hour.



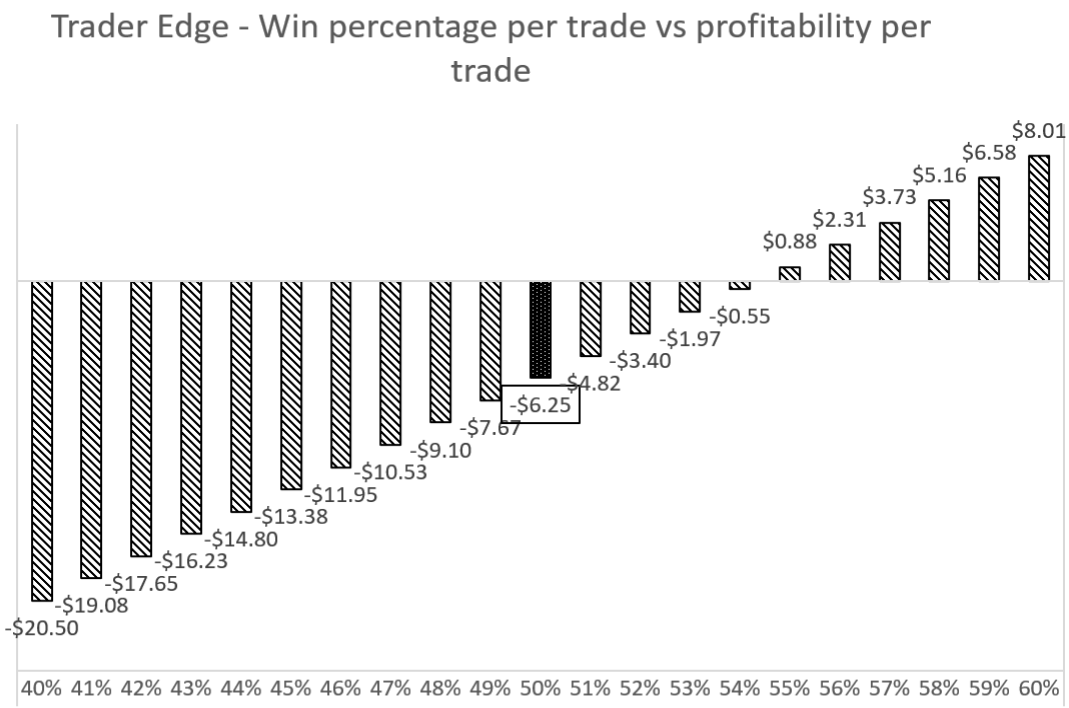
In this example, the lowest spread seen was 1.2 pips, the highest 6.0 pips and the mean value 2.1 pips. A trader trading 1 Lot ($100,000 of currency) would have therefore have paid between $12 and $60 as the spread, depending on the time at which they bought or sold the currency.

To try and establish how much of Heimer and Simon's $6.20 loss per trade was due to the spread we need to know both the mean spread in pips paid by the traders during the study and the mean Lot size of each transaction. The latter figure is given, being a mean trade size of $34,580, or 0.3458 lots. No spread data is given, and indeed given the size of the study it is likely that many tens of brokers and currency pairs would need to be taken into consideration. To try and estimate what a typical spread might have been, the collected spread data from the three monitored broker accounts has been used. This represents the 4 major currency pairs (EURUSD, USDJPY, GBPUSD, USDCHF) that accounted for 55% of all currency transactions in 2010 (2013 BIS Triennial survey).

Currency Pair	BIS share	Weighted	Spread Broker 1	Spread Broker 2	Spread Broker 3	(Mean Spread)	*Spread Cost ($)*
EUR/USD	27.70%	50.09%	1.609	1.13	1.671	1.470	*$5.083*
USD/JPY	14.30%	25.86%	1.6493	1.496	1.598	1.581	*$6.370*
GBP/USD	9.10%	16.46%	2.295	1.79	2.12	2.068	*$7.151*
USD/CHF	4.20%	7.59%	3.6	3.63	3.35	3.527	*$12.509*
Total	***55.30%***	***100.00%***					***$6.248***

By using the mean, monitored spread for each currency pair and working out the implied dollar value from the lots sized used in the Heimer – Simon study and the mean dollar exchange rate during the two year period, we can calculate a range of spread costs for the typical trade ranging from $5.08 to $12.51, depending on the currency pair being traded. If we now weight these spreads by the popularity of these four currencies in 2010, we obtain a weighted mean spread cost of $6.25 per trade, compared to the observed loss of $6.20 loss per trade seen in the original study.

To help judge the significance (or otherwise) of the delta between the observed $6.20 loss in the study and the calculated $6.25 loss, the graph below plots the profitability per trade that would have been seen if the traders had demonstrated a net 'edge' over a 50% 'random' outcome. Based on a representative 20 pip target, to close either a winning or losing trade, a shift in the percentage of profitable trades from 50% to 51% would have seen the calculated mean profit per trade changes from -$6.45 to -$4.82, with a 49% win rate increasing the net loss to -$7.67. The study observed an overall net profitability of -$6.20, comfortably between the effects of a 1% shift from purely random results.



The existence of systematic trading costs, such as the spread, demonstrate the 'negative sum' nature of the market that the retail trader is engaged with. The findings that the group of

traders in the study appeared not to be able to beat the effect of the spread costs may suggest that there is very little non-random behaviour in the timeframes being traded? There is also no evidence from the data to show a net beneficial effect across multiple traders in the way you might expect to see if say a group of share traders benefited from the rise of the global economy being reflected in share prices. It is also worth noting that the group of traders in the study was not a closed group, competing against each other for the same funds, where a net-zero outcome (excluding spread) would be expected. The group was selected simply because they had chosen to post their trades publically during the time of the study. They represented as a group a very small proportion of all the traders trading FX at that time, yet their results still represented a net profit (loss) very close to the calculated value for random '50% probability' trading.

A Theoretical Trading Model

If netting out the spread costs shows that FX trading is a zero sum game, with winners on one side and losers on the other, is there any evidence to show that the winners are winning as a result of increased skill or knowledge and that losers could alter their fate by acquiring similar ability? How would the results seen in the Heimer – Simon study compare if purely random trading during that time was assumed, with no increased skill or knowledge being applied?

It is useful to build a mathematical model to help examine the effect that different parameters have on overall profitability. Assuming that any individual trade has one of two outcomes, it closes as a winning trade or as a losing trade, with the magnitude of that win (or loss) being controlled by the point at which the trade is closed, either in real-time by the trader or using pre-set 'take profit' or 'stop out for a loss' (stop loss) targets. If the trade is a winner, the amount won is a function of the number of pips gained (how much the currency price moved in your favour), how much each pip was worth in absolute currency terms (the Lot size) and the cost of the trade in terms of the spread and any other transaction costs. The same calculation is carried out for the scenario where the trade is a loser, recognising that the number of pips targeted for a win (the take profit target) does not have to be the same as the cut-off point for a losing trade (the stop loss target). For each trade you factor in the probability of any trade being a winner. By summing this equation across all trades taken you get the following formula for monetary gain from a set of trades;

$$\sum_{1}^{NoTrades} (ProbWin \times WinPips - (1 - ProbWin) \times LosePips - SpreadPips) \times TSize \times PipVal$$

Where;

ProbWin is the probability of a given trade being a winner

WinPips is the number of pips won if the trade is a winner)

LosePips is the number of pips lost if the trade is a loser)

SpreadPips is the pip value of the Bid-Ask spread (*)

TSize is the amount of currency units risked for a given transaction

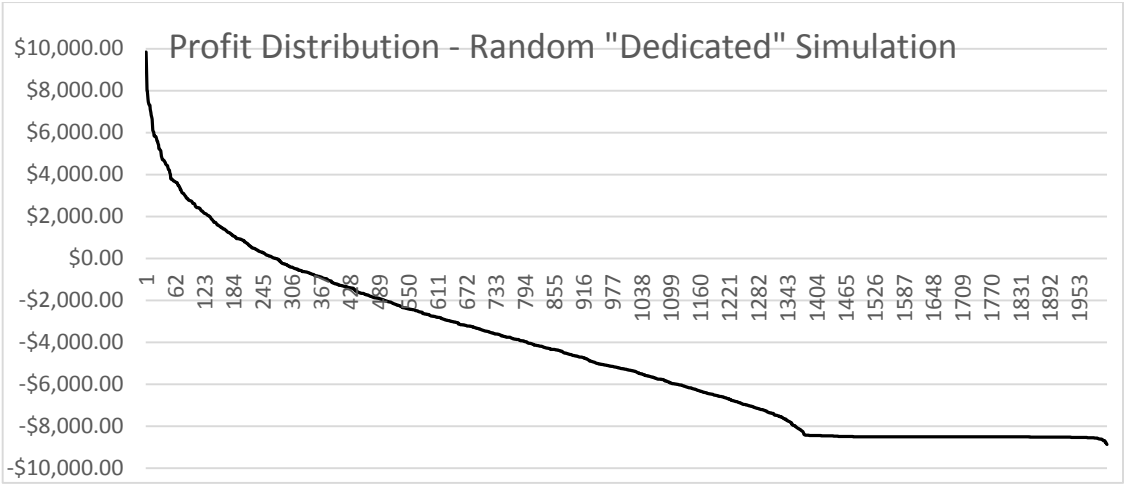
PipVal is value in monetary terms of a single pip of currency movement

(*) This model assumes all transaction costs are included in the spread. Overnight interest rate swaps have been ignored as a day-trading model has been assumed.

This model helps answer the question as to how it is possible that in both the competition data and the Heimer – Simon study, that over 63% of trades were profitable, but traders still lost money overall. If traders are risking more money for each losing trade, than they stand to gain for a winning trade, then the possibility exists for them to lose overall despite being right more than 50% of the time. For example, risking 35 pips for a losing trade whilst only standing to gain 20 pips for a winning trade would be a valid scenario given the spread assumptions, a mean trade size of $34,580 and win-rate probability of around 63% would also give an overall profitably of -$6.20. Data about actual stop loss and take profit levels used by the traders is not available in the Heimer – Simon study.

Random Trading?

The received wisdom in the Forex trading world is that skilled and knowledgeable traders take money from less skilled and less knowledgeable traders and the brokers (via the spread) take money from everyone. But what would the results be if rather than a 'more skilled – less skilled' model was used, an entirely random model was assumed? To test this a random trading simulator 'Dom' was created, designed to recreate as much of the Heimer – Simon study as practicable but using random buying and selling decisions. Based on the MetaTrader 4 automated trading platform, Dom aimed to simulate effect of random trading on the larger set of 2,012 'Dedicated' traders identified in the study. This Heimer – Simon study defined the 'Dedicated' group as traders where "total trades by an individual must exceed the median [of the combined groups] 128 and the frequency with which they trade during a given week must also exceed the median 32.1. The resulting partition of the sample involves 2,012 'Dedicated' individuals who made 1,642,262 trades and 3,681 'Dabblers' who made 506,821". The simulation used actual currency price data for the four major currency pairs from between January 2009 and December 2010, combined with other reported data such as the mean starting account balance ($8,512) , the mean number of trades per trader (816) and mean trade size ($34,580 – or 0.3458 Lots). Random trades were simulated over the given 2-year period in a ratio based on the popularity of the four major currency pairs, in the ratio reported in the Triennial Central Bank Survey. Each run simulated one trader and trades were opened randomly in direction (buy or sell) and time of day. Trades were closed after a random period of time, chosen to replicate the reported time trades remained open in the study ("Roughly half of all positions are closed within an hour and only around ten percent last longer than a day"). The results of the random simulation are shown below, with the simulated overall profitability from the 2,012 traders sorted into descending order.



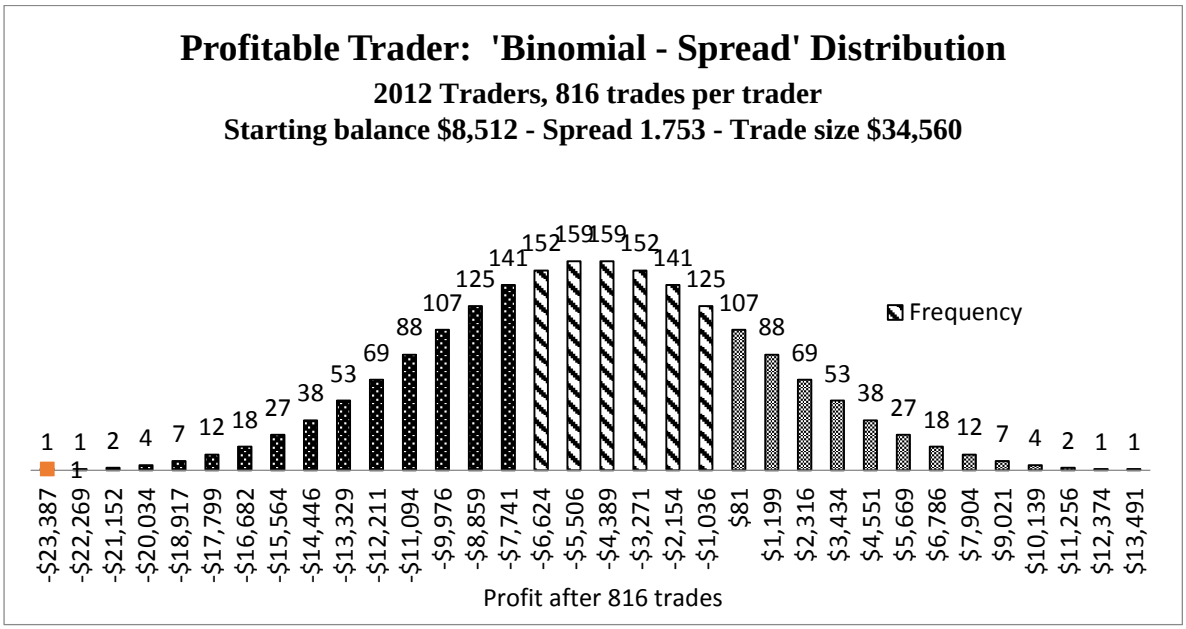
	"Dedicated"	"Dedicated"
Data	Observed – from study	Random - By simulation
Profitable at end of period	17.80%	13.47%
Mean Profit per trade	-$5.49	-$5.79
Mean profit per trader	-$4,776	-$4,629
Trader who lost all money	-	31.50%
No of traders	2,012	2,012
No of trades	1,642,282	1,609,667
Mean trades per trader	816.2	800
Mean trade size	$34,580	$34,580
Mean starting balance	$8,512	$8,512

Whilst the mean losses per trader and mean profit show striking similarity (and demonstrate very close to the calculated results of 50% probability trading discussed earlier), there is a much lower level of profitable traders (13.47% vs 17.8%). This may be attributed to the simplified use of a single mean starting balance ($8,512), trade size (0.3458 lots) and number of trades (800), verse the much wider variance suggested in the original data? This modelling simplification certainly has the effect of narrowing the variance between maximum and minimum profitability per trader.

The results can be split further into three broad sets of trading results, seen clearly on the graph; traders who were profitable (left), traders who lost some of their money (middle) and traders who lost all of their money (flat area on the right). Whilst no data is available from the study as to how many traders lost all of their money, it was noted that “75 percent of all participants in our sample quit trading”.

Binomial Distribution Model

A second way to test for the similarity to random trading is to consider the results is binomial distribution model is used, into which the effect of a spread is added. Each random 'trade' has the probability of 0.5, with an equal amount of money being risked on each trade, whether a winning or a losing trade. The result of each trade is debited or credited to a nominal account, the starting level of which is equal to that seen in the Heimer – Simon study. Each trade additionally results in a fixed amount, equivalent to the 'spread' being removed from the resulting balances. The binomial model used simulates a number of trades from the study and shows a normal distribution curve, shifted away from a midpoint of zero, reflecting the negative sum effect of the spread. Using the Heimer – Simon data we get the following;



The results can again be split into three categories; profitable, lost-some and lost-all. In this model 21.3% of traders finished with a gain and 27.5% of traders finishing with a loss greater than their starting balance, in effect losing everything in their account. Mean profit per trade and mean losses at the end are again very similar to those seen both in the random trading simulation and more importantly the study.

	"Dedicated"	**"Dedicated"**	**"Dedicated"**
Data	**Actual**	**Random - By simulation**	**Random - Binomial**
Profitable at end of period	17.80%	13.47%	21.30%
Mean Profit per trade	-$5.49	-$5.79	-$6.08
Mean profit at end	-$4,776	-$4,629	-$4,957
Margin called accounts	-	38.10%	34.50%

No of traders	2,012	2,012	2,012
No of trades	1,642,282	1,609,667	1,638,528
Mean trades per trader	816.2	800	816
Mean trade size	$34,580	$34,580	$34,580
Mean starting balance	$8,512	$8,512	$8,512

Conclusion

The question "what are the realistic expectations for a retail FX trader to become profitable" can be split into two sub questions; 'how many traders are in profit at any one time' and 'are these profits due to advantages in skill and knowledge '? The answer to this first question can be derived from studying the results of the trading competitions, broker collected data in the US and from the Heimer – Simon study. Whilst it is very difficult to propose a single number to answer this question, it would be easy to conclude from this data that between a fifth and a third (20% and 33%) of retail FX traders are in profit at any time. The higher end of this range however represents the status of the broker supplied data for open accounts, which by definition does not include accounts that were closed in the previous quarter, either via traders or via a margin call, due to losses. It is interesting to note that if a closure rate of 40.9% was assumed, in line with the mean margin call figure, the 'positive' broker accounts would drop from 33.4% to just under 20%, far closer to the results seen elsewhere.

	Traders	**Profitable**	**Unprofitable**	**Margin called**
Dedicated and Dabblers overall	5,693	21.0%	79.0%	n/a (1)
Dedicated only	2,012	17.8%	82.2%	n/a
Computer simulation 'Dedicated'	2,012	13.5%	86.5%	38.1%
Binomial simulation 'Dedicated'	2,018	21.3%	78.7%	34.5%
Competition data	41,529	21.9%	78.1%	50.0%
Broker data (2)	103,437	33.4%	66.6%	n/a
Mean		21.5%	78.5%	40.9%
(1) "75 percent of all participants in our sample quit trading" [during two years of the study]				
(2) By definition data only shows open accounts. Accounts closed (by losing traders) will not be included				

Germane to the profitability data is the fact that the retail FX market is a 'negative-sum game', that is to say that the transactional costs of each trade taken, primarily via the spread, will inevitably reduce the size of the trading funds available. The implication of this is that a

trader who is making trading decisions with an average of only a 50% chance of a positive contribution to their account, will simply drain their funds over time. Additionally the trade win percentage data from the Heimer – Simon study and the FX competition data shows that traders should not confuse a higher than 50% win rate per trade with success either, as winning 65% of the time but losing twice as much as you win on each trade, will not result in a positive outcome over multiple trades.

The second question to consider is 'are profits due to the knowledge and skills edge that some traders have'? If you were to hypothesise the premise that circa 20% of traders have the requisite edge in skills, then the profile of results you would see should include a small group of profitable 'knowledgeable winners', a larger group of unprofitable 'less skilled' traders and a final group, so poorly skilled, that have lost all of their trading funds. Whilst we do see this three way split when analysing the trader profitability data, we also see a similar profile when looking the random trading scenarios. The striking similarity in average trade profitability between the results in the two year Heimer – Simon study and those from the random simulation and mathematical modelling may suggest that the concept of a significant group of skilled and knowledgeable traders having an edge is illusionary and the profile is merely a result of a normal distribution of random results?

It cannot be concluded that the FX market is a random walk and there is no edge to be found, only that, for the retail trader, the market is a negative sum game and that random trading or the trading of a random market would produce similar results to those observed. The Heimer – Simon study showed that the more successful of the two groups studied, the 'Dedicated', could only achieve a mean loss per trade of $5.49, a result which correlates to only a 50.5% success rate in our 'edge' model. Overall the results are consistent with a random trading model, within which might be hidden a small element of 'skilled – knowledgeable' trading, however the models suggest that random distribution effect is far greater than this 'skilled – knowledgeable' impact. Whether the 'random' effect is due to the nature of the FX market (the random-walk theory) or the net effectiveness of the retail trader would require further research to establish.

Finally let us consider what the realistic expectations for a retail FX trader are? To become a constantly profitable the trader would need an edge, sufficient in magnitude to overcome the effect of the negative-sum game. This paper concludes that from the data reviewed, there is little evidence to suggest that a benefit from such a 'knowledge edge' exists in any widely discernible form. This research also highlights the risk of a significant (greater than 80%) overall account loss is around double that of achieving profitability. A new trader should therefor ask themselves where they are going to acquire this edge from given that demonstrably the vast majority of retail market participants would appear not to be able to benefit from it. Perhaps the final conclusions of this paper are to approach FX trading with your eyes open and seek independent financial advice before withdrawing your pension.

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