

ARTICLES

A profile of the NZ dollar foreign exchange market¹

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In this article we review developments in the NZD/USD market between January 2001 and March 2006 using a new and detailed dataset from Reuters. Given the traditionally opaque nature of the global FX market, the dataset provides some insights into the NZD/USD market that have previously been unavailable. We show that trading volumes and other measures of market activity, like the depth of the limit order book, have increased significantly since 2001. We also show that market activity changes at different times of the trading day, with considerably more trading volumes taking place in London and New York.

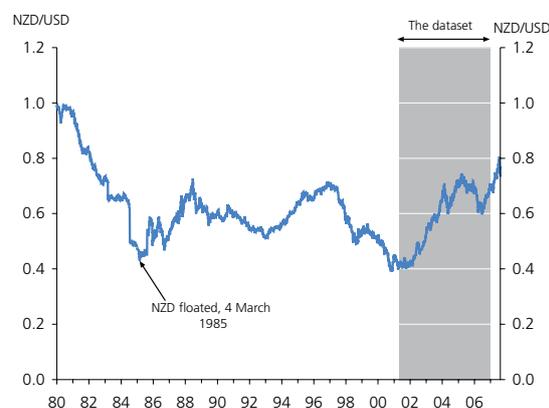
1 Introduction

In recent years the New Zealand dollar (NZD) has attracted unprecedented attention in the global financial markets. There have been a number of reasons for this, including greater trading activity in the global foreign exchange (FX) market, and the relatively high level of New Zealand interest rates compared to some major overseas economies. One well-publicised source of interest in the NZD has come from the 'carry trade', a practice whereby investors borrow in low yielding currencies, like the Japanese yen, and invest in higher yielding ones, such as the NZD.

A wide range of market participants are now increasingly active in the NZD market and follow New Zealand economic developments closely. Of course, there has also been far greater public attention in New Zealand, as earlier this year the Reserve Bank intervened for the first time since the NZD floated back in 1985 (see figure 1 below), and the NZD rose to its highest level against the USD in 25 years.

Despite the level of interest in the NZD over the past few years, it has been difficult for the Reserve Bank to gather precise information on trading activity. Until recently, the Reserve Bank has had to rely on anecdotes from market participants and other central banks, the RBNZ daily FX turnover survey of the New Zealand-based banks, and the

Figure 1
NZD/USD since 1980



Source: Reserve Bank

triennial BIS FX turnover survey, as its major sources of information on trading activity in the NZD.² However, the growth of electronic trading platforms in the FX market in recent years has now allowed us access to a far richer and more comprehensive set of information on the FX market.

High-frequency data from the Reuters Spot Matching service, the main trading platform banks use to trade NZD with one another globally, gives us an opportunity to 'look under the hood' and update our understanding of the NZD market. While the data is historical – meaning the Reserve Bank does not have access to the data in real time – it is still very useful to look back at past episodes and understand how the market dynamics worked at the time.

¹ This article builds on some earlier work undertaken at the Reserve Bank by Wai Kin Choy and Victor Gaiduch. We would like to thank Reuters for access to the data and permission to publish it, and for other assistance.

² A forthcoming *Bulletin* article will discuss the results of the 2007 BIS triennial FX turnover survey, which has detailed statistics on FX trading volumes worldwide.

The article proceeds as follows. In Section 2, we provide an overview of the global foreign exchange market. In Section 3, we discuss the Reuters Spot Matching service – the source of the data – and the main platform that banks use to trade NZD with one another globally. In Section 4, we show how different indicators of trading activity in the NZD market, such as trading volumes, have changed between 2001 and mid-2006. In Section 5, we look at how these indicators vary at different times of the trading day. In Section 6, we look at how the NZD market reacts to new information, using the release of New Zealand retail sales in March 2006 and 'September 11' as examples. Finally, in Section 7 we conclude.

2 The global foreign exchange market

The FX market is very large. Average daily trading volumes in the spot FX market across all currencies were almost USD 1.8 trillion in 2004 (BIS).³ To put this in context, average daily trading volumes on the New York Stock Exchange were 88 billion USD and in US Treasury bonds were 700 billion USD in 2007. A forthcoming article outlining the results to

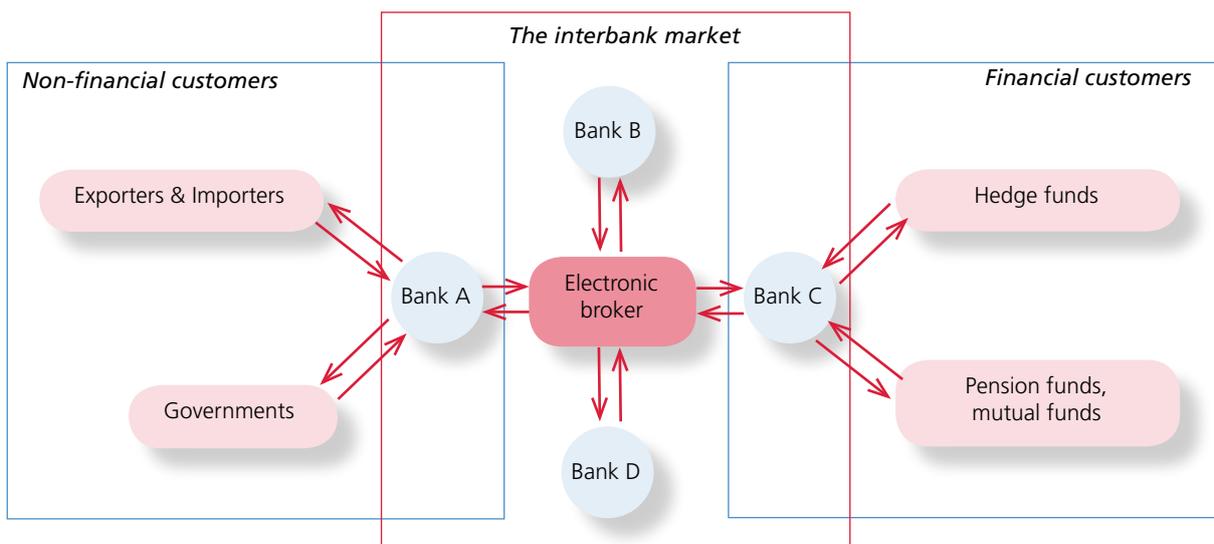
the 2007 Bank of International Settlements (BIS) FX turnover survey will provide a more recent update on global FX trading activity and the reasons for these developments.

The FX market is made up of many different types of participants. These participants can be roughly broken down into:

- financial customers: participants such as hedge funds and pension funds who invest in financial assets, such as bonds and stocks, and speculate on the direction of currencies;
- non-financial customers: participants such as exporters and importers who use the FX market to pay for goods and services;
- dealers: participants, typically working as traders at banks, who intermediate between buyers and sellers, and sometimes trade for themselves.

In 2004, trading by dealers accounted for around 50 percent of global FX turnover, trading by financial customers accounted for around 35 percent, while non-financial customers accounted for the remaining 15 percent (BIS, 2005). Figure 2 below is a stylised view of the structure of the FX market.

Figure 2
Stylised view of the modern FX market



³ The 'spot' FX market is what people usually refer to when they mention the FX market. The 'spot' market is the main driver of movements in the exchange rate. See Smyth (2005) for information on the other FX markets, and Sager and Taylor (2006) for a detailed explanation on the structure of the global spot FX market.

Financial and non-financial customers buy and sell currencies directly with dealers at commercial banks. Traditionally, this has occurred over the phone, but increasingly it now takes place via computer systems. As dealers take the opposite side of customer trades, they accumulate currency positions over the trading day. At some point, dealers 'close out' their positions by on-selling to dealers at other banks (trading between dealers occurs in what is known as the 'interbank market', as shown in figure 2). Over the past few years, electronic broker systems have consolidated their position as the main mechanism by which dealers at banks trade with each other in all the major currencies, including the NZD.

Often, dealers will buy or sell currencies for themselves for short periods, or decide to hold onto the positions for longer than usual, if they have a view on the likely direction of the exchange rate. Dealers are quick to respond to new information, such as the release of economic statistics, which influences the value of currencies. Because dealers are typically the first to react to new information, it is in the interbank market – via the Spot Matching service – where much of the price discovery occurs in the FX market.

3 The Reuters spot-matching system

In the NZD, the Reuters Spot Matching service is the dominant trading platform that banks use to trade with one another globally. Discussions with market participants suggest that a significant proportion – perhaps even greater than 90 percent – of NZD trading between banks takes place over the Reuters system. Since the interbank market is where customer flows are usually cleared, and where much of the price discovery takes place in the FX market, the Reuters dataset should provide a very representative view of global FX trading trends in the NZD.

The Reuters system is an electronic limit order market, just like the trading platforms used to trade in many sharemarkets around the world (the difference being that an exchange rate is quoted in the FX market rather than a stock price in

the sharemarkets).⁴ Like the sharemarket trading systems, dealers can trade in the Reuters system by leaving one of two types of orders – limit orders or market orders.

A limit order is a commitment to buy (a bid) or sell (an offer) a specific quantity of currency at a chosen exchange rate. A collection of limit orders makes up what is known as the limit order book. Figure 3 shows a subset of the limit order book at one point during 16 March 2006. In this instance, one dealer has left a limit order to buy 4 million NZD against the USD at 0.6394. When the dealer entered the order into the electronic broker, it did not result in an immediate trade, because there was no willing seller at this price. The limit order stays in the system until either the dealer cancels the order, another dealer decides to sell to him at 0.6394, or until the order expires.⁵ Limit orders provide liquidity to the market, because they provide firm prices at which other dealers can trade on.

Figure 3
NZD/USD limit order book at one point on 16 March 2006



Source: Reuters

A market order, in contrast, is an order to buy (a take) or sell (a hit) a given quantity immediately at the nearest exchange rate. In figure 3, a dealer could sell 4 million NZD against the USD at 0.6394 immediately using a market order. The advantage of using a market order is that the dealer can be certain he will complete a trade. In contrast, a dealer who

⁴ Here, the aim is to discuss the basic characteristics of the Reuters Spot Matching service, rather than provide a very detailed description. We do simplify some of the aspects of trading using the Reuters Spot Matching service. A detailed description of the way the system works is available on the Reuters website.

⁵ Limit orders automatically expire over the weekend, after 5pm New York time on Friday afternoon.

places a limit order cannot be certain that he will complete a trade because the exchange rate might well move in the opposite direction.⁶

Figure 3 also illustrates the bid-offer spread, which is the difference between the lowest offer rate and the highest bid rate. In this case, the bid-offer spread is 3 points (each 'point' refers to 0.0001 USD). Dealers can always see the lowest offer and the highest bid on their Reuters electronic broker screen, so dealers always know at what exchange rate they can trade immediately. However, dealers (and the Reserve Bank) cannot see what bids and offers lie at other exchange rates. That is, dealers cannot see the entire limit order book.⁷ In figure 3 for instance, dealers would not know that there were 25 million NZD of offers from 0.6398 to 0.6403.

In the NZD/USD, the minimum trade size using the Reuters Spot Matching service is 1 million NZD. Dealers can enter orders for much larger amounts than this, but for all limit orders greater than 10 million NZD, the Reuters system, perhaps counter intuitively, displays an 'R', indicating a 'regular' trade size. The market is able to see the volume attached to the highest bid and lowest offer, so dealers have some idea how much they can trade at the nearest exchange rate.⁸

When a trade between two dealers is completed, the Reuters Spot Matching service screen displays the price at which the transaction took place, and the direction of the aggressive, or incoming, order.⁹ An aggressive sell order

is signalled by a 'G' – which stands for 'given' – while an aggressive buy order is signalled by a 'P' – which stands for 'paid'. No information on the volumes of each transaction or the counterparties involved is made available to the rest of the market.

4 Trends in the NZD market: January 2001 to March 2006

The very detailed and high-frequency nature of data available from the Reuters Spot Matching service allows us to look at a range of indicators of market conditions in the NZD/USD. Some of these indicators, such as the depth of the limit order book, have not been available until now for the global FX market. These indicators provide a view of the liquidity of the market – that is, how easily and cheaply market participants can transact.¹⁰

Transaction volumes

The number of transactions and the volumes traded in the NZD/USD over the Reuters Spot Matching service increased significantly between 2001 and 2006. In 2001, transaction volumes averaged around 500 million NZD each day. In March 2006, transaction volumes had increased to over 5.5 billion NZD on an average day. The forthcoming article on the triennial BIS FX turnover survey results will discuss some of the reasons for the growth in NZD trading.

On some days, particularly large amounts were traded. For example, on one day in January 2006 over 9 billion NZD was traded. These volumes are substantial compared with both the size of the New Zealand economy and the volume of New Zealand exports and imports.

⁶ In actual fact, dealers tend to use limit orders aggressively to complete trades by entering an exchange rate that will guarantee a trade will take place. For instance, in Figure 3, a dealer might leave an offer for 10 million NZD at 0.6394. This would complete a trade for 4 million immediately, while the remaining 6 million NZD would become the best (lowest) offer in the market at 0.6394.

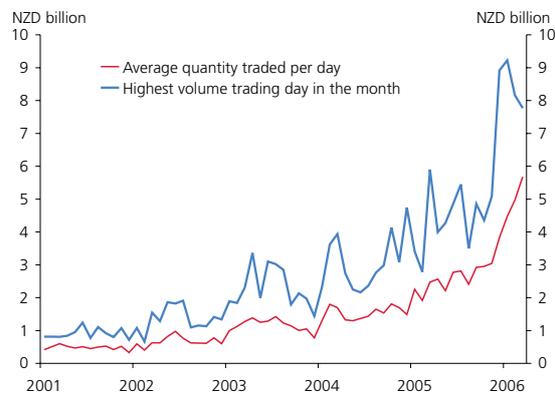
⁷ In contrast, most sharemarkets make information on the entire limit order book available in real time.

⁸ The Reuters electronic broker allows dealers to enter a 'more quantity' option. Dealers can enter a limit order that displays only a portion of the total amount to the market – i.e. a dealer could submit an order to buy 1 million NZD with a 'more quantity' option for 9 million at 0.7000. The market would only see 1 million NZD displayed on the screen, not the 9 million NZD that is also in the limit order book.

⁹ Another way of describing an aggressive order is as an order that is entered into the system that immediately results in a trade – this can be either a market order or a limit order that is entered at the same price as the best opposing order in the limit order book.

¹⁰ The semi-annual *Financial Stability Report* has a Financial Markets section that usually includes the Reserve Bank's assessment of liquidity in the NZD/USD market. The most recent *Report* is available on the Bank's website. A description of the different indicators of liquidity in the NZD/USD market is contained in a 2001 *Bulletin* article by Lauren Rosborough. Readers can refer to a BIS paper on market liquidity in 1999 for a more comprehensive discussion of the various elements of liquidity in a market.

Figure 4
Average and maximum daily trading volumes in NZD/USD



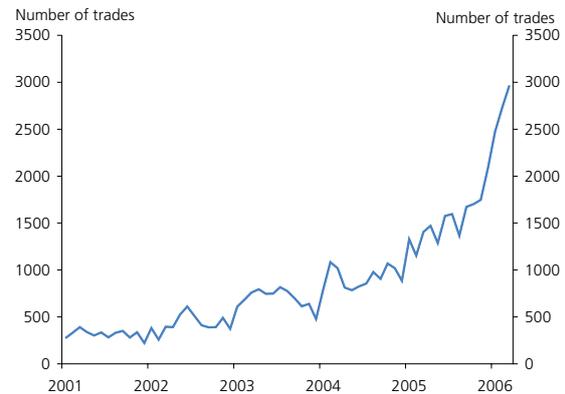
Source: Reuters

It is worth keeping in mind that the large increase in trading volumes in the NZD as captured by our data is partly due to the growth of electronic brokers as trading platforms. In 2001, the Reuters electronic broker was not used by banks to trade NZD with one another to the extent that it is now. However, even accounting for greater use of the Reuters Spot Matching service in the NZD market, NZD volumes globally appear to have increased substantially between 2001 and 2006, reflecting greater interest in the New Zealand economy and New Zealand financial markets.

The depth of the limit order book

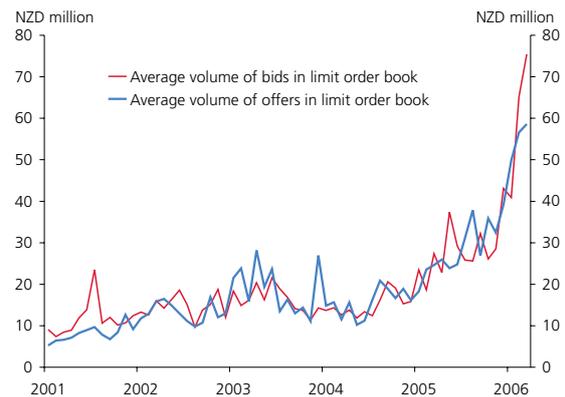
The volume of orders in the limit order book also increased between 2001 and 2006. In March 2006, there were, on average, around 60 million NZD of offers and 75 million NZD of bids in the electronic broker continuously during the day. Dealers prefer when there are substantial limit orders in the market, because it means there are a number of different banks willing to take the opposite side of the trade with them. A deep limit order book gives dealers the ability to buy and sell large amounts immediately if they need to, and is a sign of a well-functioning and liquid market.

Figure 5
Average number of trades per day in NZD/USD



Source: Reuters

Figure 6
Average volumes of bids and offers in the NZD/USD limit order book



Note: Order book 'snapshots' are taken every five minutes and the number and volume of orders are recorded. The averages are then worked out for each month.

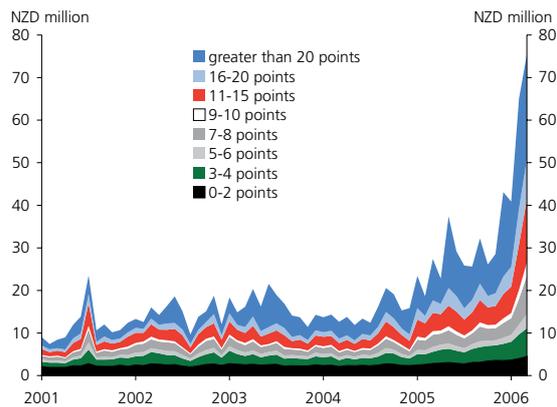
Source: Reuters

Dealers also prefer when limit orders are clustered close to the current market exchange rate, because it means they can trade immediately at a competitive price. For instance, in figure 3 a dealer who wanted to buy 4 million NZD immediately would have had to pay 0.6397 for 1 million, 0.6398 for 1 million, and 0.6399 for 2 million – a dealer would prefer that there was an offer for 4 million (or a larger amount depending on how much he wanted to buy) at 0.6397 because it would make it cheaper for him to buy NZD.

Figure 7 shows the volume of limit buy orders by how close they are to the highest bid rate while figure 8 shows the volume of limit sell orders by how close they are to the

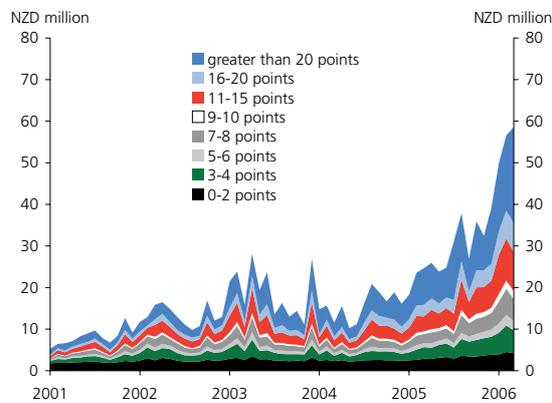
lowest offer rate. The volume of orders close to the best market rates – such as those within 2 points of the best bid or offer – increased between 2001 and 2006, a sign that liquidity in the NZD market has improved and dealers can transact more cheaply. However, the bulk of orders in the limit order book remained concentrated well away from the best bid and offer.

Figure 7
Average volume of bids in the limit order book



Source: Reuters

Figure 8
Average volume of offers in the limit order book



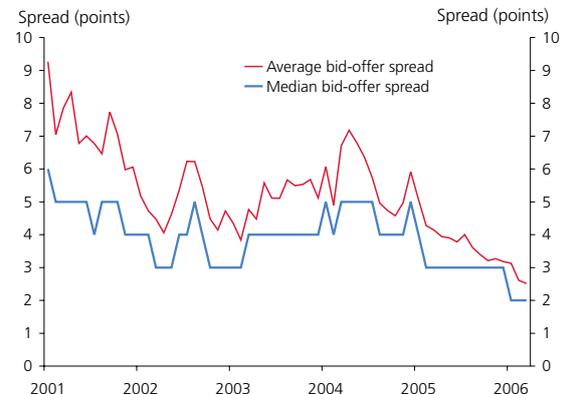
Source: Reuters

The bid-offer spread

The bid-offer spread (or bid-ask spread) is the difference between the highest bid rate and the lowest offer rate. When there is a narrow bid-offer spread, dealers can trade immediately at a rate close to the 'market' exchange rate, effectively making it cheaper for them to transact.¹¹ The

¹¹ In addition, when the bid-offer spread is narrow, there is less confusion about where the market exchange rate lies. During periods when the bid-offer spread is wide, it can be difficult to tell where within the spread the market exchange rate lies. This in turn makes it difficult for dealers to quote customers a fair exchange rate to transact on.

Figure 9
Average and median bid-offer spread in the NZD/USD in the Reuters electronic broker



Source: Reuters

Note: 'Snapshots' of the bid-offer spread are taken every five minutes. The median bid-offer spread is taken as the median observation of all the recordings over the month.

median bid-offer spread in the Reuters electronic broker narrowed between 2001 and 2006, from around 5-6 points towards the start of the period to around 2-3 points in March 2006, another sign that conditions in the NZD market have improved.

5 Trends in the NZD market across the trading day

Transaction volumes

Transaction volumes have two distinct peaks over the trading day – the first after London opens for the day and a second, larger peak towards the London 'fix' (see box 1). There is a dip during the middle of the London trading session, which probably reflects the lunchtime for dealers and other market participants.

Volumes in the NZD/USD tend to be much higher during offshore trading – particularly so in London and New York – where most of the major financial participants are based. Volumes are significantly lower during the New Zealand trading day, particularly in the period after New York closes for the day, and before Singapore and Tokyo open. Nonetheless, trading volumes in the NZD/USD have still increased substantially over the New Zealand trading day. The trading patterns in the NZD/USD over the trading day

Box 1

FX trading in different time-zones

The FX market is a 24-hour global market with trading activity switching from one trading centre to another as the day wears on. The trading week begins at 5am Sydney time on Monday morning and continues uninterrupted until 5pm New York time on Friday evening. Global banks tend to pass their customer orders onto the trading desk at the next time-zone at the completion of their local business day.

The major time-zones are:

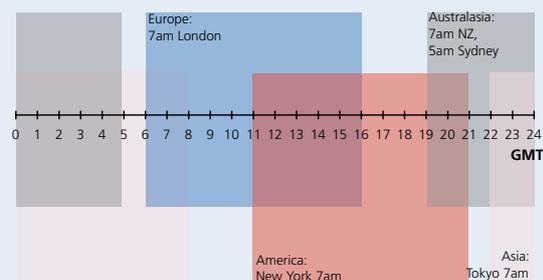
- The Asian time-zone: the major trading centre is Tokyo, but other important regional trading centres include Singapore, Sydney and Hong Kong.
- The European time-zone: the major trading centre is London, with other regional trading centres including Frankfurt, Zurich and Paris.
- The American time-zone: the major trading centre is New York, with Toronto being the other significant regional trading centre.

Figure 10 shows when the major trading centres are open over the trading day during the New Zealand winter months (the opening and closing hours for different trading centres in GMT change slightly during the New

Zealand summer months). The largest trading centre for FX has been London for some time, followed by New York, and then Tokyo. There is often overlap when two major trading centres are open for operation at the same time.

The busiest period in the trading day occurs around the London 'fix' – at 4pm London time – when the London and New York markets are both open. The exchange rates at the time of the London 'fix' are often used as the reference rates for global fund managers and for some financial contracts. Market participants, knowing there will usually be heavy trading activity over this period, often choose this time of the day if they need to trade large amounts.

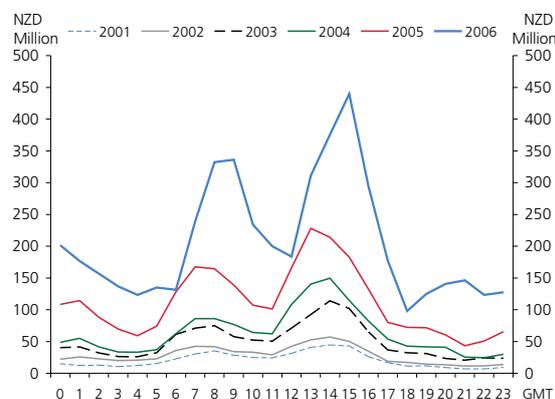
Figure 10
Different time-zones during New Zealand winter months



are very similar to those for most major currencies that are traded globally, including the Australian dollar (AUD/USD).

The average number of transactions has an almost identical pattern to the volume of transactions over the trading day. The average number of transactions in an hour tends to peak around the time of the London fix. In 2006, there were around 225 transactions on average in the hour of the London fix. In comparison, the number of transactions over the New Zealand morning session averaged around 75 transactions in 2006.

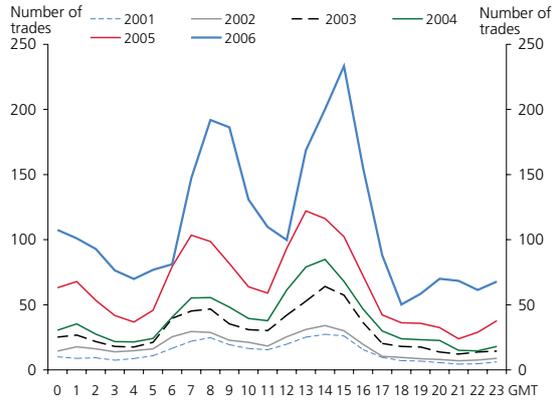
Figure 11
Average hourly trading volumes in NZD/USD



Source: Reuters

Figure 12

Average number of transactions in NZD/USD



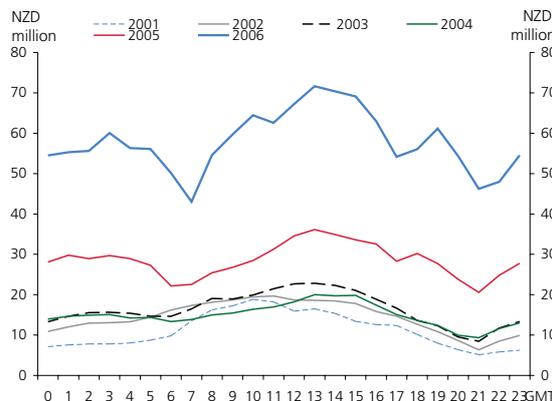
Source: Reuters

The depth of the limit order book

The limit order book also tends to be deepest – in that there are usually the most orders in the limit order book – during the offshore sessions, particularly so around the time of the London fix. The volume of bids averaged around 70 million around the time of the London fix in 2006, while the volume of offers averaged around 65 million. At quieter times of the day, such as the period before London opens and the period before Tokyo opens, the volume of outstanding orders was somewhat less.

Figure 13

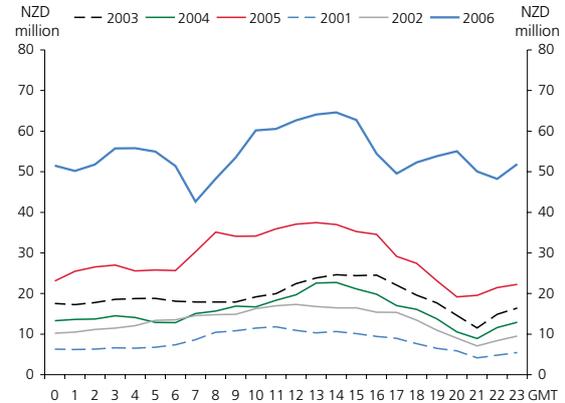
Average volume of bids in the NZD/USD across the trading day



Source: Reuters

Figure 14

Average volume of offers in the NZD/USD across the trading day



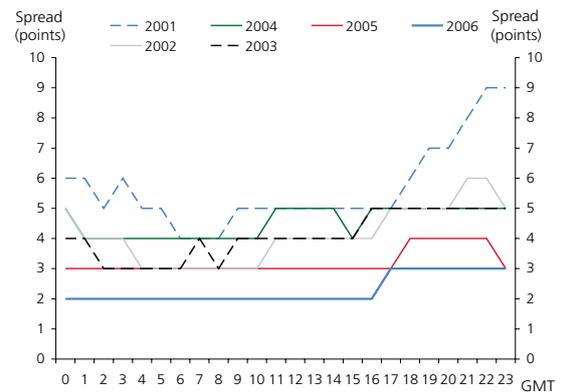
Source: Reuters

The bid-offer spread

The bid-offer spread tends to be narrowest during the London and New York trading sessions. In 2001, the median bid-offer spread was around 7-9 points during the New Zealand morning session and around 4-5 points over the remainder of the trading day. In 2006, bid-offer spreads had narrowed significantly and were relatively stable across the trading day – the median bid-offer spread was usually between 2-3 points over the trading day.

Figure 15

Median bid-offer spread in the NZD/USD across the trading day

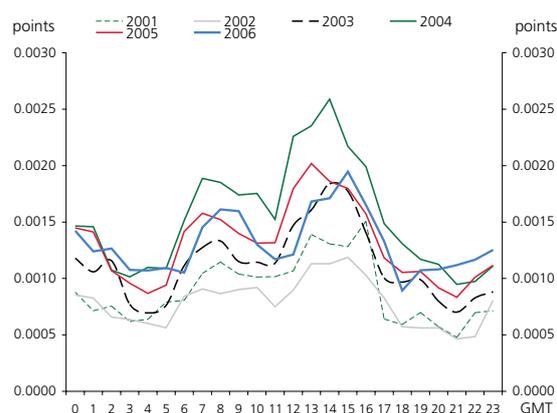


Source: Reuters

The trading range

The trading range is the difference between the highest traded price and the lowest traded price over a specified period. The hourly trading range tends to be wider during the London and New York sessions, where most of the trading is concentrated. Most major market moving events, such as the regular releases of US and European economic statistics, take place during the offshore sessions and can cause large price movements in the major exchange rates. While the NZD/USD can move significantly after New Zealand monetary policy announcements and New Zealand economic data, movements in the NZD/USD, on average, tend to be fairly subdued during the New Zealand trading day.

Figure 16
Average hourly trading range in the NZD/USD across the trading day



Source: Reuters

6 Two case studies: September 11 and the February 2006 retail sales release

The FX market incorporates new information into exchange rates very quickly. Dealers are quick to react to the release of information that affects the perceived value of currencies, and they trade accordingly. Here we look at the reaction of the NZD market to two interesting events – the attacks on the World Trade Centre and Pentagon on 11 September 2001 and the release of NZ retail sales on 14 March 2006. One of the very appealing features of the data from the Reuters Spot Matching service is that it is very high frequency, so we can look at how the market dynamics evolved second-by-second around the time of these events.

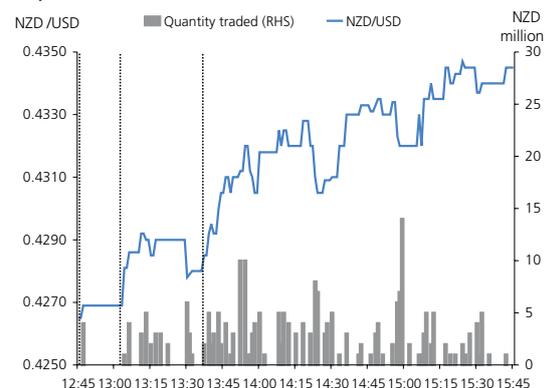
The September 11 attacks

The attacks on the World Trade Centre and the Pentagon took place on the morning of 11 September 2001 New York time. A plane struck the World Trade Centre at around 8:46am New York time (12:46 GMT), and two further attacks took place over the next hour (a second plane struck the World Trade Centre at around 13:03 GMT and a third plane struck the Pentagon at around 13:37 GMT). The timings of the three attacks are highlighted by the dashed lines in figures 17 to 21.

In the minutes following each attack, the NZD/USD increased slightly, although it is difficult to determine whether this was a direct response to the attacks. It took time for news agencies to report on the attacks and longer still to confirm that terrorists were behind the plot, so there was considerable uncertainty in the market during this period.

Once people became aware of the seriousness of the attacks, the market's response was to sell the USD, presumably because the market (on balance) believed that the economic implications of the attacks would be worse for the US than other countries, including New Zealand. Three hours after the first attack had taken place the NZD/USD had risen almost 80 points, or close to 2 percent.¹²

Figure 17
NZD/USD and trading volumes around the September 11 attacks



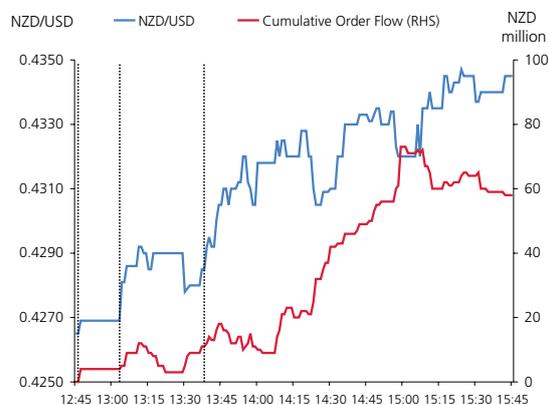
Source: Reuters

¹² It is interesting to note that in the days following the attacks, the NZD/USD started weakening, as market participants came around to the view that it was safer to have money in the US than in smaller economies, such as New Zealand, in such uncertain times.

Trading volumes were relatively small in the hour after the first attack, but increased somewhat after the attacks became widely reported. NZD 138 million was traded in the three hours after the first attack, around the average trading volume in 2001 and 2002 over this time of the day. Figure 17 shows the trading volumes minute-by-minute over the three hour period.

Figure 18 shows the cumulative NZD/USD 'order flow' over the three-hour period. Order flow is the total volume of aggressive buy orders less the total volume of aggressive sell orders.¹³ Order flow effectively measures the net buying or selling pressure in the market. Positive order flow indicates there is net buying pressure in the market, whereas negative order flow indicates there is net selling pressure. Over the three-hour period after the first attack, dealers aggressively bought the NZD/USD, causing the NZD/USD to appreciate.¹⁴ Cumulative order flow for the three-hour period was around 60 million NZD.

Figure 18
NZD/USD and cumulative order flow around the September 11 attacks



Source: Reuters

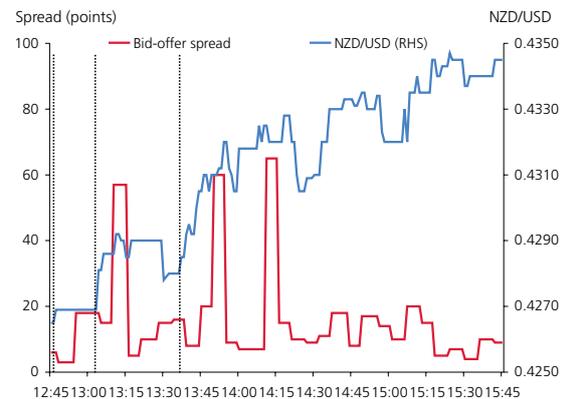
On several occasions in the hours following the first attack, the bid-offer spread widened significantly as dealers cancelled their limit orders and waited to determine the severity of the

¹³ As mentioned in Section 3, an aggressive order is any order that once entered into the Reuters system results in an immediate trade being completed. This can be either a market order, or a limit order entered at the same price as the best opposing limit order in the limit order book.

¹⁴ There is now a substantial literature on the link between order flow and exchange rate changes. See Osler (2006) for a recent review of the literature or Lyons (2001) for a more comprehensive review.

attacks. Soon after the second attack took place, the bid-offer spread widened from around 20 points to almost 60 points. The bid-offer spread usually widens during times of uncertainty, as dealers do not want to commit to buying or selling large amounts in potentially volatile circumstances. The bid-offer spread returned to more normal levels around two hours after the first attack.

Figure 19
The Bid-offer spread around the September 11 attacks

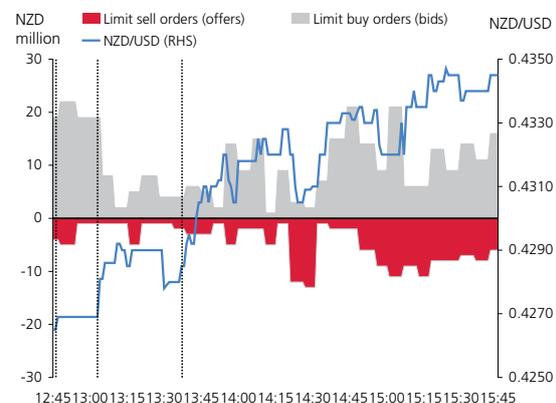


Source: Reuters

Note: The spread is taken every five minutes when 'snapshots' of the order book are captured.

For the most part, the limit order book was skewed towards buyers, and at times there were almost no offers in the market (see figures 20 and 21). After the second attack, the limit order book became thinner as dealers cancelled existing orders and were hesitant about entering new orders

Figure 20
The depth of the limit order book around the September 11 attacks

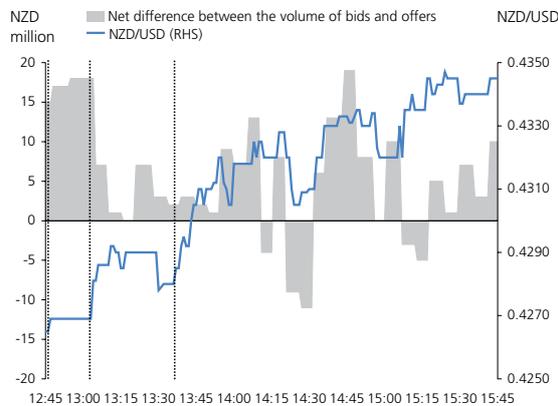


Source: Reuters

Note: The volume of bids and offers is recorded every five minutes when 'snapshots' of the order book are captured.

Figure 21

The net difference between the volume of bids and offers around the September 11 attacks



Source: Reuters

in such an uncertain environment. Dealers started entering more limit orders around two hours after the first attack, and the order book became more balanced between bids and offers.

September 11 provides an interesting case study into the dynamics of the NZD market around a period of significant uncertainty. As news of the attacks became public, the liquidity in the market decreased – the limit order book became shallower (meaning dealers could not buy or sell as much as before), the bid-offer spread widened, and the exchange rate became volatile (increasing almost 2 percent in under three hours). The liquidity in the market appeared to return to more normal levels several hours after the initial attacks.

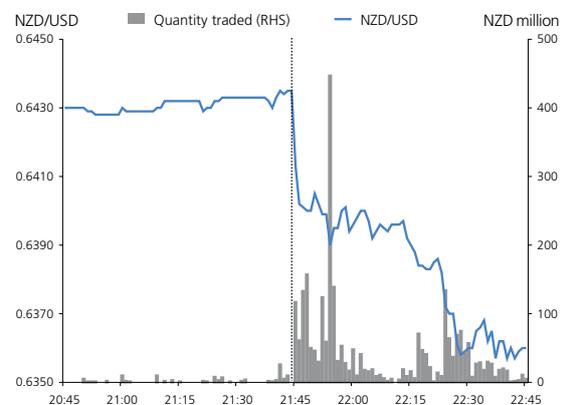
The release of New Zealand retail sales – 14 March 2006

Economic statistics – such as GDP and CPI – are an important determinant of exchange rates. Market participants pay close attention to the release of economic statistics, and often revise their views on the exchange rate if the statistics are well away from their expectations. The release of New Zealand’s retail sales in March 2006 provides an interesting example. In early 2006, a series of weak New Zealand economic statistics had led the market to anticipate interest rate cuts by the Reserve Bank. Dealers were watching the release closely to see whether it would confirm some commentators’ views that the economy was about to slow sharply.

On 14 March at 10:45am NZT (13 March, 21:45 GMT) Statistics New Zealand announced that retail sales were ‘flat’ (unchanged) between January and February 2006, much lower than what economists were expecting (the median economist estimate was +0.5 percent). Following on from a ‘flat’ retail sales release the previous month and other indicators that suggested the New Zealand economy was slowing considerably, markets moved to anticipate further interest rate cuts by the Reserve Bank. The NZD/USD fell around 35 points (or just over 0.5 percent) immediately after the release, as dealers reacted to the lower than expected headline number.

Trading volumes were relatively small in the hour leading up to the release. However, once the data was released, trading activity increased substantially, with some very large trades taking place. Almost 450 million NZD was traded in a one minute period after the release, much higher than usual.

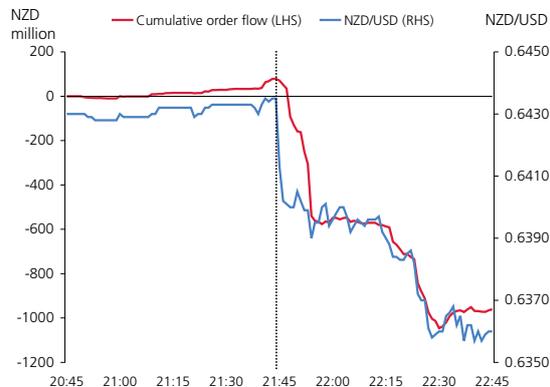
Figure 22
NZD/USD and trading volumes around the retail sales release



Source: Reuters

Cumulative order flow was around -1 billion NZD in the hour following the retail sales release, meaning dealers were large aggressive sellers of the NZD/USD. Dealers determined that the economy was not as strong as they had expected and that the Reserve Bank might have to cut interest rates sooner than they had anticipated, and they subsequently sold the NZD aggressively. The aggressive selling occurred in two main ‘waves’ – first, straight after the release, and then again around 30 minutes later. This corresponded with the NZD/USD falling around 80 points (just over one percent) over the hour following the release.

Figure 23
NZD/USD and cumulative order flow around the retail sales release

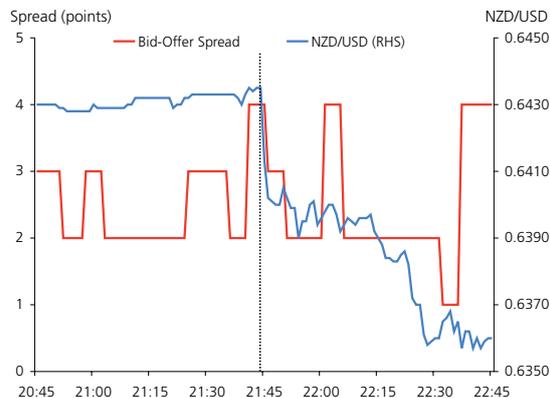


Source: Reuters

Figure 24 shows the bid-offer spread around the release. The spread widened just before the release as dealers withdrew their limit orders. Dealers who leave limit orders in the market over data releases risk buying or selling at unfavourable exchange rates, so they often prefer to cancel their limit orders beforehand and then re-enter them afterwards. While the spread spiked a little wider on a few occasions over the hour following the release, for the most part it was reasonably stable around 2 points.

An hour before the retail sales release, the limit order book was very deep and skewed towards buyers, suggesting there was good underlying demand for the NZD (the NZD/USD was increasing prior to the data release, and dealers may have been looking to buy at lower levels). However, dealers

Figure 24
The bid-offer spread around the retail sales release



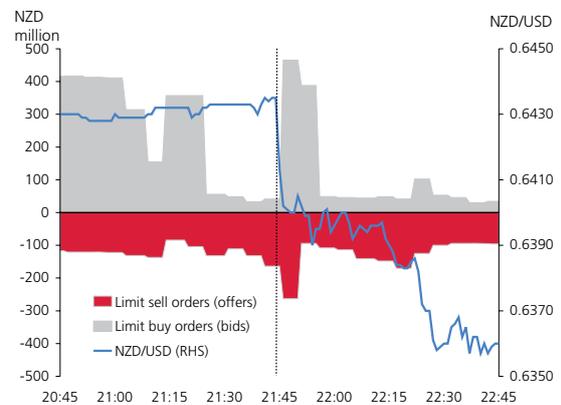
Source: Reuters

Note: The spread is taken every five minutes when 'snapshots' of the order book are captured.

withdrew their orders just prior to the data release – as noted above, this caused the bid-offer spread to widen.

After the data release, a number of limit orders were resubmitted – including two substantial bids. However, aggressive selling by other dealers eliminated these bids, and the order book switched to being skewed towards sellers (there were more offers in the market than there were bids). The volume of orders in the limit order book around the retail sales release was reasonably substantial compared to average.

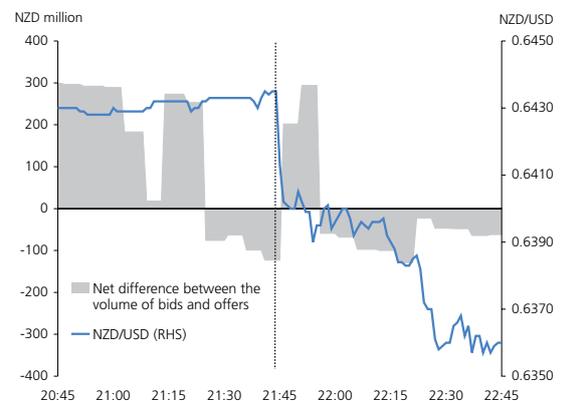
Figure 25
The depth of the limit order book after the retail sales release



Source: Reuters

Note: the volume of bids and offers is recorded every five minutes when 'snapshots' of the order book are captured.

Figure 26
The net difference between the volume of bids and offers after the retail sales release



Source: Reuters

The February retail sales release provides an insight into how the market reacts to scheduled releases. The exchange rate is very quick to incorporate new information – the exchange rate fell almost instantly, although in this case it continued to

fall over the following hour as market participants took time to determine the full implications of the release for the New Zealand economy. Trading activity fell away just before the release, but picked up again noticeably afterwards. Trading volumes were particularly heavy at times and the order book was sometimes full of several large limit orders.

7 Conclusion

From the Reserve Bank's perspective, we have an obvious interest in the FX market. A well functioning FX market is crucial to New Zealand as a small open economy. Importers and exporters rely on the FX market to make and receive payments for their goods and services, while some businesses borrow and lend money overseas. The Reserve Bank actively monitors conditions in the NZD market, and maintains a capacity to intervene in the FX market for monetary policy purposes and in the event that the market becomes disorderly.

Data from Spot Matching at Reuters allows us to take a detailed look back at how the interbank NZD market functioned between 2001 and 2006. While the data is historical, there are some clear trading patterns at different times of the day evident between 2001 and 2006 that are still the case today.

Most trading in the NZD/USD takes place in offshore markets, particularly in London, the major centre for foreign exchange globally. Trading volumes are around two-to-four times higher in London, the order book is generally deeper, and bid-offer spreads tend to be narrower, reflecting the wide range of active market participants who trade during the London timezone.

Across a broad range of indicators from the Reuters electronic broker, trading activity has picked up and the liquidity of the NZD market has increased over the past few years. Transaction volumes have increased, the limit order book has become deeper, and bid-offer spreads have narrowed, making trading generally easier and cheaper for dealers in the interbank market. This is consistent with anecdotes and other partial indicators that suggest there has been a much higher interest in trading the NZD in recent years.

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