The foreign exchange market and derivatives activity

In this article, Carrick Lucas and Lauren Rosborough present the findings of a survey of foreign exchange and derivatives activity in New Zealand and compare key features of the local market with the international market.

The article is a forerunner to another, on exchange rate and interest rate derivatives, planned for the June *Bulletin*. The aim of this subsequent article will be to serve as a 'primer' on derivatives.

1 Introduction

This article presents a 'snapshot' of the foreign exchange and derivative markets in New Zealand. This snapshot is derived from an international survey of forty-three countries conducted by the Bank for International Settlements[1] (BIS) in an effort to gauge the size and structure of the global foreign exchange market. This was the third time New Zealand contributed to the triennial central bank survey of foreign exchange market activity. There are six banks in the New Zealand market[2] that offer foreign exchange price-making facilities, down from eight in the previous survey. Each was surveyed for market activity over the month of April 1998.

The remainder of this article is set out in two sections. The next, and main, section presents survey results for activity in the New Zealand foreign exchange market, categorised by currency pair, counterparty and transaction type. The figures for the New Zealand market in April 1998 are compared with the New Zealand market in previous years, and with markets in other countries. This section also includes an example of a typical foreign exchange transaction between a bank and an exporter. It demonstrates that a transaction, for, say, USD5 million, may generate total foreign exchange turnover many times that amount. The additional turnover reflects the management and reallocation of foreign exchange risk amongst price-making institutions. The following section looks briefly at the results of the survey of activity in the interest rate derivatives market, which was also covered by the BIS survey.

2 Foreign exchange market survey

Total foreign exchange turnover

In global terms, London, New York and Tokyo are the three major foreign exchange dealing centres. Between 1995 and 1998, the United Kingdom's share of global turnover grew from 30 percent to 32 percent, the United States' share increased from 16 percent to 18 percent, while Japan's, the third largest market participant, fell to 7.5 percent. These three centres contributed USD1,137 billion (58 percent) of the estimated USD1,971 billion of daily average global turnover in the month of April 1998. (See table 1, overleaf).

Turnover in the New Zealand market was equivalent to 0.35 percent of the world total, down from the 1995 result of 0.45 percent.[3] Although New Zealand's share of the world market fell, the absolute daily turnover in the New Zealand market was USD6.9 billion, similar to the USD7.1 billion recorded in 1995, and a 17 percent increase in New Zealand dollar terms.[4]

New Zealand ranked twenty-fourth among forty-three par-

[1] Central Bank Survey of Foreign Exchange Market Activity in April 1998: Preliminary Global Findings, Bank for International Settlements, Basle, October 1998.

[2] In the context of this survey, the "New Zealand foreign exchange market" refers to those banks whose price-making facilities are located in New Zealand – namely ANZ Banking Group (NZ) Ltd, Bank of New Zealand, Bankers Trust NZ Ltd, Hong Kong & Shanghai Banking Corporation, The National Bank of New Zealand Limited and Westpac Banking Corporation. At least one side of any "New Zealand foreign exchange market" transaction will involve a New Zealand domiciled dealer. However, transactions between two dealers within the New Zealand market, which will have been reported in the survey by each dealer, are included in the results only once. Also transactions in New Zealand dollars involving two dealers in, say, New York are not included in the New Zealand turnover, but are included in that for the United States.

[3] Gross turnover in the New Zealand foreign exchange market over the 20-day period was USD151.1 billion, compared with USD136.9 billion in 1995 (17 business days). Adjusted for the variation in the day count, this represents a six percent fall in gross turnover.

[4] The BIS survey used a US dollar measure for comparing turnover between countries. Over the three-year period to April 1998, the New Zealand dollar depreciated from 0.6675 to 0.5531 in US dollar terms.

Table 1
Global foreign exchange market turnover
Average daily turnover by country (USD billion)

Ranking	Country	April 1998 Average daily turnover USD billion	%	April 1995 Average daily turnover USD billion	%	April 1992 Average daily turnover USD billion	%
1	United Kingdom	**637.3**	*32.3*	463.8	*29.5*	290.5	*27.0*
2	United States	**350.9**	*17.8*	244.4	*15.5*	166.9	*15.5*
3	Japan	**148.6**	*7.5*	161.3	*10.3*	120.2	*11.2*
4	Singapore	**139.0**	*7.1*	105.4	*6.7*	73.6	*6.8*
5	Germany	**94.3**	*4.8*	76.2	*4.8*	55.0	*5.1*
6	Switzerland	**81.7**	*4.1*	86.5	*5.5*	65.5	*6.1*
..	..	..	..	..	..	..	..
9	Australia	**46.6**	*2.4*	39.5	*2.5*	29.0	*2.7*
..	..	..	..	..	..	..	..
23	Greece	**7.2**	*0.4*	3.3	*0.2*	1.1	*0.1*
24	New Zealand	**6.9**	*0.4*	7.1	*0.5*	4.2	*0.4*
25	Russia	**6.8**	*0.3*	-	-	-	-
..	..	..	..	..	..	..	..
42	Brazil	**0.4 ***	*0.0*	-	-	-	-
43	China	**0.2 ***	*0.0*	-	-	-	-

** Spot turnover only*

Table 2
New Zealand foreign exchange market turnover
Average daily total market turnover by currency pair (USD million)

Currency pair	April 1998 Average daily turnover USD million	%	April 1995 Average daily turnover USD million	%	April 1992 Average daily turnover USD million	%
NZD/USD	**4741**	*67.7*	3,740	*51.9*	1,736	*41.2*
NZD/Other	**235**	*3.4*	284	*3.9*	127	*3.0*
USD/DEM	**208**	*3.0*	934	*13.0*	849	*20.1*
AUD/USD	**655**	*9.3*	881	*12.2*	666	*15.8*
USD/JPY	**695**	*9.9*	852	*11.8*	416	*9.9*
GBP/USD	**154**	*2.2*	239	*3.3*	252	*6.0*
USD/Other	**246**	*3.5*	184	*2.6*	81	*1.9*
All Other	**72**	*1.0*	87	*1.2*	91	*2.2*
TOTAL	**7006**	*100.0*	*7,201*	*100.0*	*4,218*	*100.0*

ticipants, with a market size comparable to that of Russia, Greece and Mexico. The survey covered a larger number of countries than in 1995 when New Zealand ranked twentieth of twenty-six participants. In relative terms, New Zealand fell three places amongst those nations in the 1995 survey.

Market segmentation by currency

New Zealand market turnover was dominated by transactions in the NZ dollar, which increased significantly to 71 percent of total turnover, up from 56 percent in 1995 and 44 percent in 1992. (See Table 2.) A majority of these transactions were recorded against the US dollar. Because the US dollar market is the deepest and most liquid in an international context, the majority of transactions between the New Zealand dollar and non-US dollar currencies occur through two back-to-back transactions with the US dollar. For example, a NZD/yen trade will typically be transacted as a NZD/USD trade and a USD/yen trade. The predominance of New Zealand dollar trading in the New Zealand market is

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Foreign Exchange Dealing by an Exporter

This box illustrates a foreign exchange transaction by an exporter within the framework of the overall foreign exchange market.

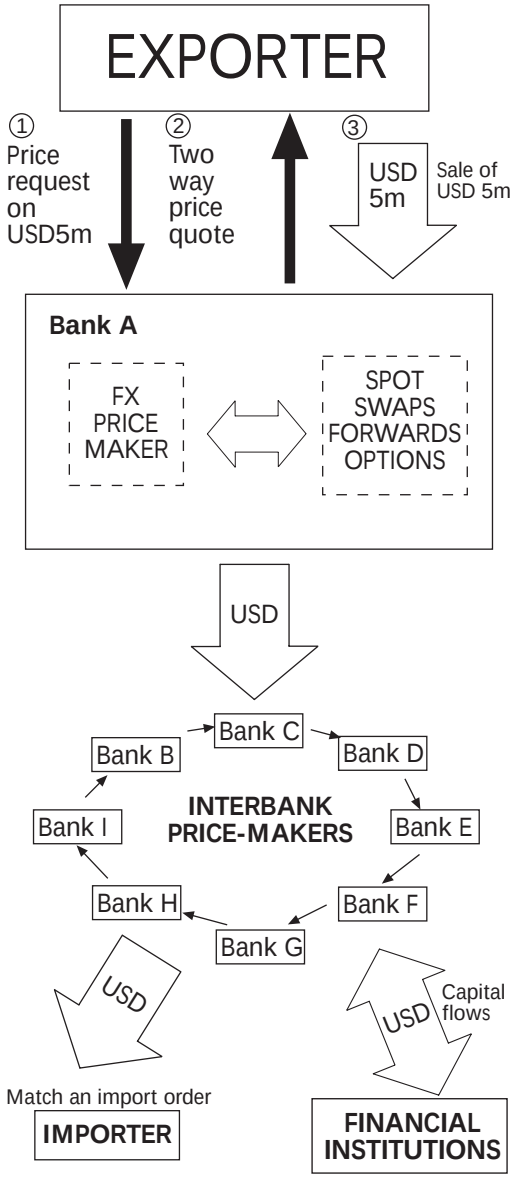
Sale of US dollars by an exporter

1 An exporter wishes to sell USD5 million (through the spot or forward markets). This may be simply to turn a US dollar receipt for goods sold into NZ dollars, or to hedge against the risk of future export receipts losing value due to a NZ dollar appreciation. The exporter will contact Bank A's foreign exchange sales desk with a price request for a NZ dollar (against the US dollar) exchange rate.

2 Upon receiving the order, Bank A's spot or forwards dealer will be obliged instantaneously to quote a "two-way" (bid/offer) price. For example the quote may be 0.5400/0.5410, given a current mid rate of 0.5405. The 10-point spread (difference between the bid and the offer price) reflects the price-maker's willingness to take on the USD5million position. The size of the spread will be dependent on the dealer's judgement of market liquidity.

3 The exporter has the choice of taking Bank A's NZ dollar offer and selling the USD5 million at an exchange rate of USD0.5410, or calling another price-maker in search of a better price.

These steps appear as steps 1, 2 and 3 in the illustration.



Position management by the interbank price maker

The execution of the foreign exchange transaction between the exporter and Bank A results in Bank A taking on a foreign exchange position. The rest of this box describes how that position typically will generate further foreign exchange transactions in the inter-bank market. If the exporter transacts, Bank A will be "long" USD5 million. For the bank several options then exist:

Sell US dollars to other price-makers

The usual response would be to square-up the position by conducting a round of calls to local and offshore price-makers, in an effort to sell the USD5 million, and at a better rate than 0.5410 so as to make a profit. This would involve simultaneously contacting interbank dealers requesting an immediate two-way price on USD5 million. Interbank dealers will continue to pass the transaction ("parcel") around the market until the risk associated with the USD5 million is held by either another interbank price-maker, a corporate or a capital investor (fund manager or

institution) who wants to hold it, or has an existing (opposite) position it wants to hedge. If the parcel passes through five sets of hands it creates turnover of USD25 million. The extent of this multiplier effect stems from the tight position limits placed on price-makers. A trader may not want to hold a position of this size for too long, as an unfavourable move of one point (USD0.0001) in the exchange rate would cost the trader USD1,000 on a USD5 million position.

Hold the short position temporarily

Bank A's price-maker may hold the position to meet a pending order from an importer or institutional client, or hold it to square-up a currency derivative position held by Bank A.

Hold the position on the basis of a directional view

Bank A may wish to hold the position on its own books, on the strength of a view that the US dollar will appreciate.

Implications

The key point illustrated is that a single export related foreign exchange transaction typically will generate successive rounds of dealing in the inter-bank foreign exchange market, as the result of banks wishing to shed and manage foreign currency risk. It is these successive rounds of dealing that are the main reason why total foreign exchange turnover is a multiple of the export amount involved. It also bears emphasising that the large volume of inter-bank dealing we see mostly relates to the management and shedding of foreign exchange risk, not currency speculation.

consistent with the global trend for financial institutions to return to markets they know best.

The most liquid NZ dollar market is located in New Zealand, although there are many overseas institutions that trade in the NZ dollar who, because they are domiciled abroad, are excluded from the New Zealand market for the purpose of the survey.[5] Consequently, total turnover of the NZ dollar is greater than the New Zealand survey shows. Additional New Zealand dollar business traded in other countries is captured in the BIS survey data for those countries, but the NZ dollar component is not separately identified.

Globally, the proportion of trading involving the US dollar increased from 83 percent in 1995 to 87 percent in the 1998 survey. Conversely, deutschemark turnover fell from 37 percent of global transactions to 30 percent in 1998. The Yen turnover share fell three percentage points to 21 percent, while, pound and Australian dollar turnover remained steady at 11 percent and 3 percent respectively.[6]

Market segmentation by counterparty

In the New Zealand market, 15 percent of gross foreign exchange transactions were between local dealers (compared with 26 percent in the 1995 survey). Since the 1995 survey, the number of foreign exchange price-makers has fallen from eight to six. This fall in local activity is consistent with the global trend for banks to relocate their price-making activities to a centralised office, most likely located in either one of the major international dealing centres, or in the home market of the currency in question. Seventy-four percent of local market transactions were with parties abroad[7] (62 percent in 1995), 8 percent with New Zealand corporates, and 3 percent with other local financial institutions.

[5] Note that as there are two currencies in each foreign exchange transaction, the total of all currency shares is 200 percent.

[6] For example, financial institutions in Sydney, London, Tokyo and New York transact in New Zealand dollars on behalf of their clients.

Foreign exchange market definitions

Spot transaction

A 'spot' transaction refers to the exchange of one currency for another, for immediate delivery. In practice, settlement of a spot transaction is made two business days after the agreement is entered into. A foreign exchange spot transaction entails a single outright exchange of currency amounts, at the agreed exchange rate.

Outright forward transaction

An outright forward transaction differs from a spot transaction in that settlement occurs more than two business days ahead. The forward transaction allows each party to lock in a known forward exchange rate today, with the outright exchange of currency amounts occurring at a future date. Outright forward products are used primarily by corporate customers to hedge against currency movements affecting expected future cash flows.

Swap transaction

A foreign currency swap is an agreement to exchange two currencies on one date and to reverse the transaction at a future date. Entering into a currency swap is equivalent to borrowing in one currency and lending in another, allowing management of cross-currency cash flows. The swap market can be a more efficient way of borrowing and lending currency amounts than accessing the relevant currency money markets directly. A majority of foreign exchange swap transactions have a very short term to maturity. This is reflected in eighty percent of transactions in New Zealand's foreign exchange swap market have a maturity of less than seven days.

Currency Option

A currency option gives the holder the right, but not the obligation, to buy or sell one currency against another at a specified exchange rate, over a specified period. Option products can be classified as either 'over the counter' (OTC) or 'exchange-traded' (ET). OTC options are written by financial institutions to meet the exact needs of the option buyer. ET options are transacted in standard amounts, with standard expiry dates on futures exchanges. The New Zealand currency option market is served predominantly by three financial institutions that trade OTC options.

Market segmentation by transaction type

Turnover in spot and swap markets dominated New Zealand's foreign exchange market (see the box on foreign exchange market definitions for a brief description of these products). Swap activity increased to 65 percent of total turnover (from 51 percent in 1995) while spot activity contributed another 30 percent (down from 43 percent in 1995). Outright forwards maintained a stable share at five percent of turnover. This pattern differs slightly from the global foreign exchange market, where spot and swap shares were largely unchanged.

Of the larger financial centres, the United Kingdom had a similar structure to New Zealand with 58 percent of turnover in swap activity and 35 percent spot. The United States had equal proportions in spot and swap transactions, in part due to the US dollar being the currency against which most other currencies are quoted and traded.

Spot market

The average daily turnover in the New Zealand spot market was USD2.2 billion, down from USD3.1 billion in the 1995 survey. In New Zealand dollar terms, this represents a 14 percent fall in turnover. The fall can be attributed to the reduction in turnover of non-NZ dollar products, as price-making in "third currencies" has been returned to offshore centres.

Of the overall spot turnover in the New Zealand market, 64 percent was New Zealand dollar based, compared with 43 percent in 1995 and 25 percent in 1992. British pound/US

[7] Mainly commercial or investment banks and security houses in other countries who participate in the BIS's global survey. Some of these participants play the role of price-makers or intermediaries, while others will be taking positions in their own right.

Table 3
April 1998 transaction type by country

Country	Spot (%)	Swap (%)	Forward (%)
United Kingdom	35	58	7
United States	42	47	11
Japan	45	50*	5*
Australia	42	53	5
New Zealand	30	65	5

* *A breakdown of swap and outright forward data was not directly available for Japan – we have used an estimate.*

dollar turnover fell from an 18 percent share in 1995, to one percent in 1998, as the remaining local price-maker in the pound ceased price making activity in that currency. US dollar/Deutschemark and US dollar/yen turnover together accounted for 20 percent of New Zealand market spot turnover, down from 40 percent in 1995. The trends reflect that New Zealand has lost some of its advantage as a liquidity provider between the close of New York and the open of Asian markets due to the development of electronic foreign exchange brokering and 24-hour trading in other centres.

Swap market

Daily turnover in the New Zealand foreign exchange swap market averaged USD4.9 billion in April 1998, up from USD3.6 billion in 1995. Of this activity, 77 percent was New Zealand dollar based, up from 65 percent in 1995 and 59 percent in 1992.

Swap market turnover relates mainly to the activities of foreign exchange market dealers (ie market-makers), and institutional investors in managing foreign exchange positions and cash flows. More detail will be given on how foreign exchange swaps, and other derivative contracts, are used for these purposes in a separate article planned for the June *Bulletin*.

Outright forward market

Outright forward contracts are one of the main instruments used by corporates to hedge expected future foreign currency receipts and payments against the risk of exchange rate movements. Average April 1998 daily turnover in the New Zealand outright forward market was USD0.37 billion, similar to the 1995 figure of USD0.39 billion. The NZ dollar was involved in 76 percent of outright forward transactions. Outright forward activity continues to make up approximately five percent of the overall foreign exchange market in New Zealand. This low percentage reflects that forward transactions are mostly between foreign exchange dealers and end-customer corporates, whereas forward dealing in the inter-bank foreign exchange market takes place mainly in the more liquid spot and swap markets.[8]

Options market

In April 1998 average daily turnover in the New Zealand foreign currency options (OTC) market was USD62 million, down from USD77 million in 1995. Since reporting began in 1992, options turnover has accounted for less than one percent of total foreign exchange turnover. While options turnover increased globally, there now exist only three active options price-makers in the New Zealand market.

3 Interest rate derivatives

Single-currency interest rate derivatives turnover

For April 1998, reported average daily turnover in the New Zealand interest rate derivatives market was USD2.6 billion. This compares favourably with the 1995 figure of USD0.94 billion. The substantial increase in interest rate derivative turnover has been evident across the interest rate product range. Heightened turnover in the forward rate agreement (FRA) (see the box on interest rate derivative definitions) and interest rate futures markets can be attributed to improved technology and the desire to meet hedging requirements in a volatile environment. The increase in interest rate swap turnover is due to banks' hedging against their fixed rate mortgage activity, and higher eurokiwi[9] bond issuance. Reported over-the-counter interest rate options turnover increased as institutions became more aware of basic strat-

[8] In the forthcoming June *Bulletin* it will be shown how a forward contract can be decomposed into a spot transaction and a foreign exchange swap transaction.

[9] Eurokiwi bonds are New Zealand dollar denominated bonds issued by offshore borrowers to offshore investors. See the June quarter 1998 *Reserve Bank Bulletin* for a description of how these bond issues work and how they involve the use of interest rate swaps.

Table 4: New Zealand foreign exchange market turnover

Average daily *spot* market turnover by currency pair

Currency Pair	April 1998 Average daily turnover USD billion	%	April 1995 Average daily turnover USD billion	%	April 1992 Average daily turnover USD billion	%
NZD/USD	**1,307**	**58.4**	1,181	*38.0*	439	*22.1*
NZD/Other	**115**	**5.1**	150	*4.8*	59	*3.0*
USD/DEM	**114**	**5.1**	299	*9.6*	170	*8.6*
AUD/USD	**249**	**11.1**	94	*3.0*	156	*7.9*
USD/JPY	**342**	**15.3**	684	*22.0*	721	*36.4*
GBP/USD	**30**	**1.3**	551	*17.7*	320	*16.1*
USD/Other	**52**	**2.3**	80	*2.6*	27	*1.4*
All Other	**28**	**1.3**	68	*2.2*	90	*4.5*
TOTAL	**2,237**	**100.0**	3,107	*100.0*	1,982	*100.0*

Table 5: New Zealand foreign exchange market turnover

Average daily *swap* market turnover by currency pair

Currency Pair	April 1998 Average daily turnover USD million	%	April 1995 Average daily turnover USD million	%	April 1992 Average daily turnover USD million	%
NZD/USD	**3,691**	***75.6***	2,283	*63.7*	1,156	*57.5*
NZD/Other	**58**	***1.2***	52	*1.5*	35	*1.7*
USD/DEM	**88**	***1.8***	545	*15.2*	478	*23.8*
AUD/USD	**387**	***7.9***	94	*2.6*	84	*4.2*
USD/JPY	**345**	***7.1***	221	*6.2*	114	*5.7*
GBP/USD	**115**	***2.4***	287	*8.0*	92	*4.6*
USD/Other	**163**	***3.3***	104	*2.9*	52	*2.6*
All Other	**35**	***0.7***	-	-	-	-
TOTAL	**4,882**	***100.0***	3,586	*100.0*	2,011	*100.0*

Table 6: New Zealand foreign exchange market turnover

Average daily *outright forward* turnover by currency pair

Currency pair	April 1998 Average daily turnover USD million	%	April 1995 Average daily turnover USD million	%	April 1992 Average daily turnover USD million	%
NZD/USD	**226**	***60.9***	211	*54.5*	117	*61.3*
NZD/Other	**55**	***14.8***	79	*20.4*	29	*15.2*
USD/DEM	**5**	***1.3***	32	*8.3*	13	*6.8*
AUD/USD	**30**	***8.1***	12	*3.1*	4	*2.1*
USD/JPY	**8**	***2.2***	28	*7.2*	13	*6.8*
GBP/USD	**10**	***2.7***	14	*3.6*	12	*6.3*
USD/Other	**30**	***8.1***	11	*2.8*	3	*1.6*
All Other	**7**	***1.9***	-	-	-	-
TOTAL	**371**	***100.0***	387	*100.0*	191	*100.0*

Interest rate derivative definitions

Forward Rate Agreement (FRA)

A forward rate agreement is an interest rate forward contract in which the interest rate to be paid or received on a specified obligation for a set period of time, beginning at some time in the future, is determined at contract initiation. For example, a 6X9 FRA refers to a forward rate agreement to borrow or invest for a term of three months, beginning in six months time.

Interest rate swap

An interest rate swap is a contract in which two parties agree to exchange periodic interest payments. Interest rate swaps enable a party raising cash on, say, fixed rate terms to transform the interest rate into a floating rate (or vice versa). Interest rate swaps allow an institution to hedge or take a view on future interest rates.

Interest rate option

An interest rate option gives the holder the right, but not the obligation, to pay or receive interest at a specific rate. Within New Zealand, the majority of interest rate options are written "over the counter" (OTC) to meet the exact needs of the option buyer. The New Zealand Futures & Options exchange also offers the facility to trade "exchange-traded" (ET) interest rate options, although few actually trade.

Table 7: New Zealand interest rate derivatives market turnover
(Including exchange traded futures)

Instrument	April 1998 Average daily turnover NZD million	%	April 1995 Average daily turnover NZD million	%
Forward Rate Agreements	**328**	*12.8*	81	*8.6*
Swaps	**111**	*4.3*	40	*4.2*
Futures	**2,067**	*80.7*	739	*78.5*
ET options	**1**	*0.0*	46	*4.9*
OTC options	**54**	*2.1*	36	*3.8*
TOTAL	**2,561**	*100.0*	942	*100.0*

egies to guard against adverse movements in interest rate yields, and faced a period of higher interest rate volatility.

The BIS central banks' survey excludes interest rate futures turnover as this data is already reported by futures exchanges. In New Zealand, exchange traded futures turnover accounted for more than four times the turnover in other interest rate derivatives (in April 1998), with an overwhelming majority of these contracts being standardised 90-day bank bill futures.

Surveyed turnover in the New Zealand market was a mere 0.1 percent of single-currency interest rate derivatives in the global market.