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The New Zealand dollar in global markets

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Turnover in global foreign exchange (FX) markets has declined over the past three years, driven by a decline in spot trading. The slowdown in FX turnover has been attributed to structural changes, such as regulation and an associated reduction in risk appetite. Financial institutions have reduced their market-making activities in response to these developments.

Recent global developments have contributed to signs of reduced depth in the New Zealand (NZ) dollar market. However, the NZ dollar remains highly traded relative to the size of the domestic economy. Factors that contribute to turnover in the NZ dollar include flows generated by participants when they use currency positions to invest and express trading views through NZ dollar assets, and turnover associated with financing the New Zealand economy.

As a small, open economy, the exchange of foreign currency is essential for New Zealand households and businesses to participate in the global economy. FX transactions range from people exchanging currency for travel overseas, to corporates receiving payments for exports or paying for imports. FX markets allow firms to trade, obtain funding from offshore, and hedge or manage exchange rate risk.

This article focuses on recent developments in the global FX market and uses of the NZ dollar in global markets. The first section discusses the recent slowdown in activity in the global FX market, using data from the Bank for International Settlements (BIS). The decline in turnover has been attributed to structural shifts in the market, with reduced 'market-making' activity by certain financial intermediaries.¹ More risk-averse participants, such as insurance companies and pension funds, have increased their presence in the foreign exchange market, while hedge fund and banks' proprietary trading has declined.

The second section focuses on developments in the NZ dollar market, where the changing structure of the global FX market has also had an effect, with limited periods of heightened volatility in recent years.

¹ IMF (2015), Moore *et al* (2016).

Turnover in the NZ dollar remains high. Although New Zealand is a small country, the NZ dollar is the 11th most traded currency.

The third section discusses some factors that contribute to the high levels of global turnover in the NZ dollar. New Zealand has open capital markets that allow participants to invest and express trading views through NZ dollar assets. The foreign exchange market also facilitates the funding of the New Zealand economy. Banks generate FX flows as they manage the foreign currency exposure on their balance sheets.

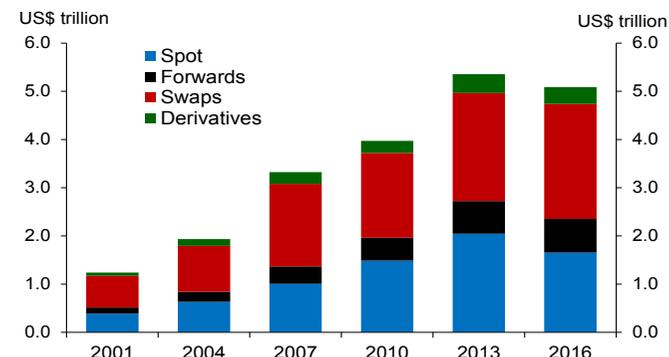
1 Global developments

The Bank for International Settlements (BIS) produces a comprehensive survey that measures global FX turnover every three years. Central banks and other authorities in 52 jurisdictions participated in the April 2016 survey, with data collected from more than 1200 banks and other dealers. The latest global survey shows that foreign exchange trading volumes contracted between two consecutive BIS Triennial Surveys for the first time in 15 years.²

Reported global foreign exchange turnover fell to US\$5.1 trillion per day from US\$5.3 trillion per day between 2013 and 2016. The reason for the decrease in foreign exchange turnover, which is measured in US dollar terms, is the appreciation of the United States dollar over the sample period. However, even on an exchange rate adjusted basis, turnover increased only 3 percent over the three-year period. This contrasts with

² Moore *et al* (2016) and BIS (2016) contain further information on the global foreign exchange turnover survey.

Figure 1
Global daily
foreign
exchange
turnover by
instrument



Source: BIS. Note: See Box 1 for definitions of instruments.

the strong average growth of 30 percent observed every three years since 2001.

The slowdown in global turnover has also been attributed to some structural shifts in the market, with reduced 'market-making' activity by financial institutions. Market makers play a key role in providing liquidity by quoting two-way prices to participants in over-the-counter markets (those not run on exchanges). As part of this role, market makers take on principal risk by holding inventories of the assets they offer to buy or sell. However, since the global financial crisis, a combination of regulatory changes and the reduced risk appetite of market makers has resulted in less willingness to provide market-making services.

Some market participants have noted that the Volcker rule has reduced market liquidity due to restrictions on proprietary trading among banks that traditionally provided liquidity, while Basel III rules have increased capital requirements.

Box 1

Foreign exchange instrument definitions

Foreign exchange transactions are agreements that involve the exchange of two currencies. Turnover is defined as the gross value in US dollar equivalents of purchases and sales entered into during the reporting period.

Spot: A spot foreign exchange transaction is the outright purchase of one currency in exchange for another. The price (i.e. exchange rate) is agreed today, with market convention dictating that settlement occurs within two business days.

Outright forward: An outright forward transaction is similar to a spot transaction, with a settlement date that occurs more than two days hence.

FX swap: A foreign exchange swap is an agreement to exchange one currency for another on one date and to reverse the transaction at a future agreed date. The exchange of two currencies at the outset is based on the prevailing spot exchange rate while the reverse payment, also agreed at the outset, is based on the currency's forward rate.

Cross-currency swap (currency swap or a basis swap): A cross-currency swap is a foreign exchange swap that also involves the exchange of streams of interest payments in different currencies for an agreed period of time. The principal amount exchanged is based on the spot rate at both the outset and contract expiry. A cross-currency swap essentially combines an interest rate swap and an FX swap.

Currency option: Gives the holder the right, but not the obligation, to buy or sell a given amount of one currency against another at a specified exchange rate over a specified period, or at a specified future date.

The benefits of these regulatory changes are that they have increased the transparency and soundness of the FX market.

The driver of the slowdown in turnover was spot turnover; which fell to \$1.7 trillion per day in 2016, from \$2.0 trillion in 2013 – the first decline since 2001. More active trading of FX derivatives has partially offset the fall in spot trading. FX swap turnover rose 6 percent to US\$2.4 trillion, remaining the most traded instrument at 47 percent of total turnover.

The increase in FX swaps was driven by an increase in swaps involving the yen. There is a close association between FX swap turnover and US dollar cross-currency funding positions of banks and corporates.

Japanese financial institutions have been increasingly using FX swaps

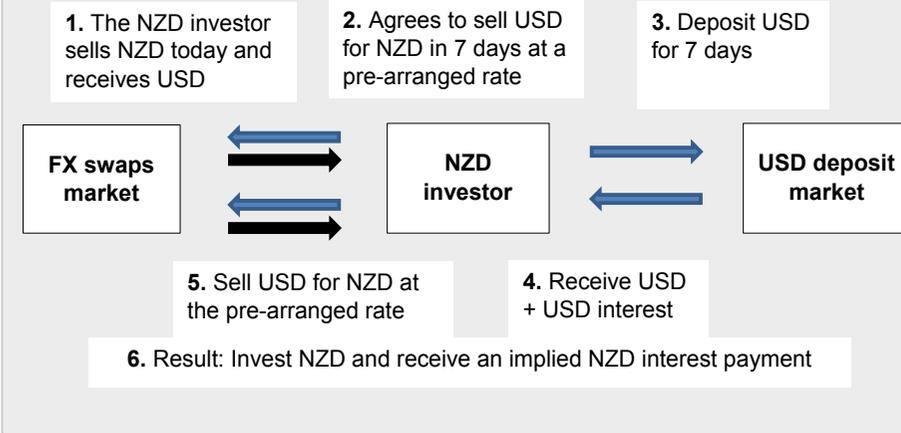
to fund their US operations by raising funds in yen and swapping into US dollars. Institutions taking the other side of the transaction have been attracted by the growing return from swapping US dollars into yen, as Japanese financial institutions have been willing to pay a premium to obtain dollar funding.

The decline in global market activity was partly due to reduced currency trading by hedge funds and proprietary traders. Activity in the global FX market by these participants has declined more than 30 percent in the past three years. Market participants suggest that leveraged borrowing has become more difficult for hedge funds to obtain, given regulatory changes. Meanwhile, institutional investors such as insurance companies and pension funds have increased their trading turnover in the past three

Box 2

Investing through the FX swaps market

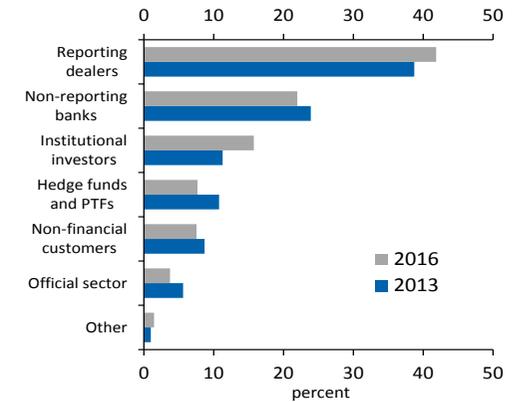
FX swaps are the most traded FX instruments traded globally. An FX swap involves selling a currency today, while simultaneously agreeing on an exchange rate to buy the currency back in the future. It is equivalent to a spot FX transaction and an offsetting forward FX transaction. An FX swap provides the investor with an assured NZD return, even though the interest payments they receive are in USD:



years. These institutional investors accounted for 16 percent of daily turnover in April 2016, up from 11 percent three years earlier (figure 2).

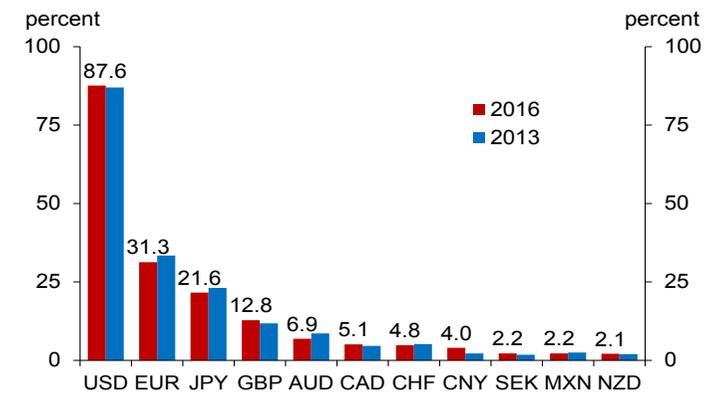
The US dollar has remained the most traded currency, being on one side of 88 percent of all trades in April 2016. The euro, yen and Australian dollar all lost market share. The most heavily traded currency pairs tend to have the lowest bid-ask spreads, meaning lower transaction

Figure 2
Turnover
by type of
market
participant



Source: BIS. Note: See Box 3 for definitions of counterparties.

Figure 3
Foreign
exchange
turnover by
currency



Source: BIS. Note: As two currencies are involved in each transaction, the sum of shares total 200 percent.

Box 3

Participants in the foreign exchange market

Market participants have various motivations, investment horizons, and risk tolerances. In the BIS Triennial survey, participants are classified as follows:

- *Reporting dealers* – financial institutions that participate as reporters in the Triennial Survey. They are mainly commercial and investment banks and securities houses.
- *Institutional investors* – real money investors such as mutual funds, pension funds, insurance and reinsurance companies and endowments. Primary motives for FX participation are hedging, investing, and risk management purposes.
- *Non-reporting banks* – smaller and regional banks that serve as clients of the larger FX dealing banks, but do not engage in market making.
- *Hedge funds and proprietary trading firms* – Investment funds and various types of money managers, including commodity trading advisers (CTAs).
- *Official sector financial institutions* – central banks, sovereign wealth funds, international financial institutions in the public sector (BIS, IMF etc.), development banks and agencies.
- *Non-financial customers* – Non-financial end users, such as corporations and non-financial government entities. May also include private individuals who directly transact with reporting dealers for investment purposes.

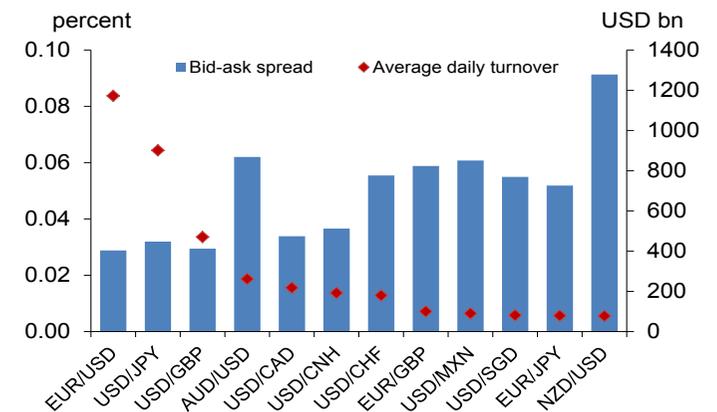
costs (figure 4).³ Foreign exchange trading continues to be increasingly concentrated in the major financial centres, with the United Kingdom, United States, Singapore, Hong Kong, and Japan intermediating 77 percent of foreign exchange trading.

The rise of the Chinese renminbi

An important development for Asia-Pacific economies is the continued internationalisation of the Chinese renminbi (RMB). The RMB has become the most actively traded emerging market currency, with average daily turnover almost doubling to US\$200 billion, from \$120 billion three

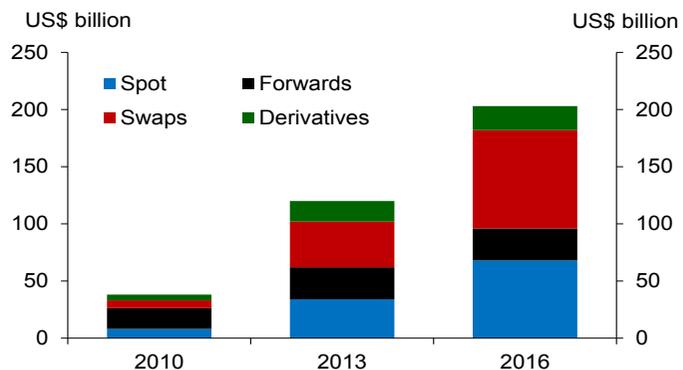
³ The bid-ask spread is a measure of transaction costs; it is the quoted ask price minus the quoted bid price. It shows how much a trader pays by buying and then immediately selling a given security.

Figure 4
Bid-ask
spreads of
most traded
currency
pairs



Source: BIS, Thomson Reuters. Note: Data for bid-ask spreads are generic screen prices, averaged over five years and standardised to the level of the exchange rate.

**Figure 5
Chinese renminbi turnover by instrument**



Source: BIS.

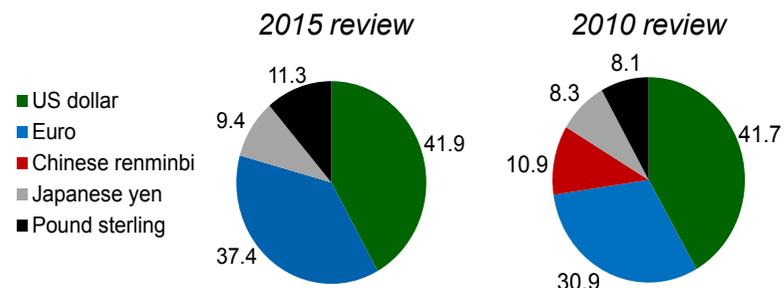
years ago. This has made the renminbi the eighth most traded currency, involved in 4 percent of global FX turnover.

As trading volumes have continued to grow rapidly, a greater proportion of turnover has been related to derivative trading rather than spot trading (figure 5). There is also a greater portion of trading occurring among financial rather than non-financial participants. The rise in renminbi turnover was primarily due to the increase in trading against the US dollar, with 95 percent of renminbi trading volume against the US dollar.

In November 2015, the IMF included the Chinese renminbi (RMB) in the Special Drawing Right (SDR) currency basket as a fifth currency, effective 1 October 2016 (figure 6).⁴ The renminbi's inclusion in the SDR marks a milestone in China's integration into international financial markets as well as a sign of international support for Beijing's efforts to liberalise its markets.

⁴ The SDR is an international reserve asset created by the IMF in 1969 to supplement its member countries' official reserves. SDRs can be exchanged for freely usable currencies.

**Figure 6
Weights in the SDR basket (percent)**



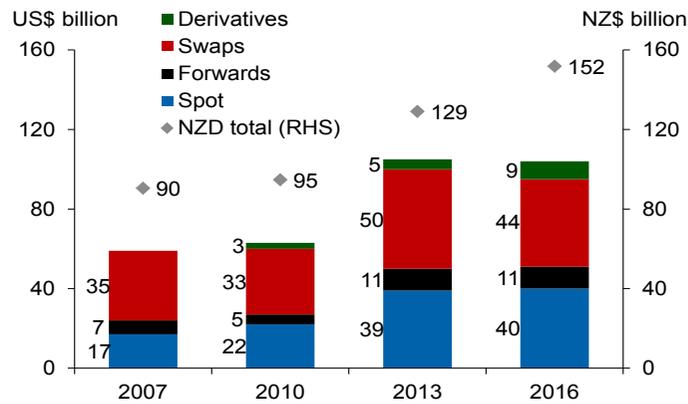
2 The New Zealand dollar

The New Zealand dollar remains a highly traded currency, relative to the size of the domestic economy. Total *daily* turnover equates to almost 60 percent of New Zealand's *annual* nominal GDP (figure 8). The New Zealand dollar was involved in 2.1 percent of total global currency transactions in April 2016, and was the 11th most traded currency globally.

Total average daily turnover in the New Zealand dollar was US\$104 billion, of which US\$40 billion were spot transactions. These figures are similar to turnover in 2013 in US dollar terms. In New Zealand dollar terms, turnover increased about 18 percent (figure 7).

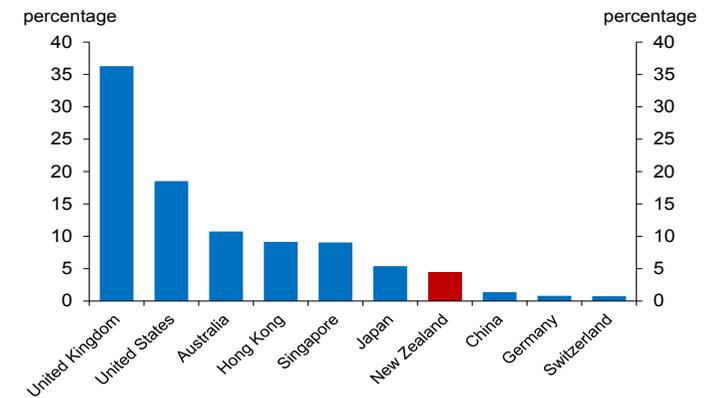
The majority of NZD trading occurs offshore, with the bulk of turnover taking place in the United Kingdom and United States (figure 9). In 2016, New Zealand was the seventh largest trading centre for NZD turnover

**Figure 7
Global
NZ dollar
turnover by
instrument**



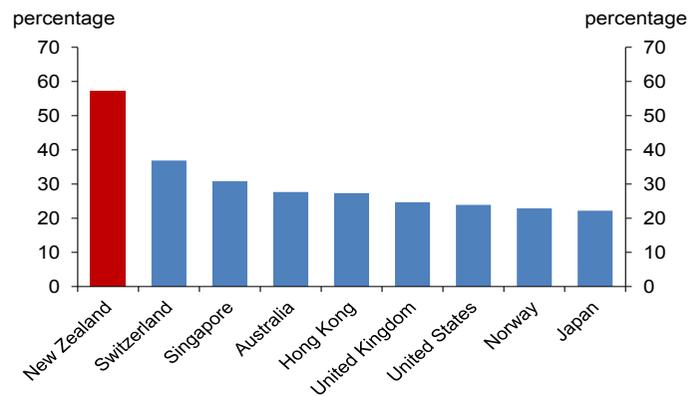
Source: BIS.

**Figure 9
NZD foreign
exchange
turnover by
country**



Source: BIS. Note: Net-gross basis – not adjusted for cross-border interdealer double counting.

**Figure 8
Global
domestic
currency FX
turnover to
nominal GDP**



Source: BIS, IMF, RBNZ estimates.

at 4.4 percent. Daily turnover of NZD in the offshore spot market was US\$39.7bn, while only US\$0.9bn was traded in New Zealand.

In onshore markets, spot trading activity in the NZD/AUD increased to 30 percent of NZ dollar turnover compared to 19 percent in 2013, even as Australia became a smaller trading partner over this period. Trading

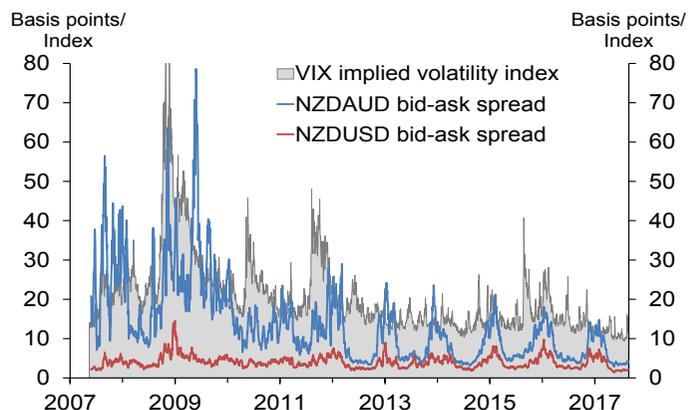
has become less focused on the US dollar since 2013, with trading in the NZD/USD declining 11 percentage points to 61 percent of turnover. While the renminbi has the second largest weighting in the NZD TWI basket at about 20 percent in 2017, less than 1 percent of onshore NZ dollar trades are against the renminbi.

Market liquidity refers to the ability of market participants to execute large transactions at low cost with only a limited effect on the price.⁵ Turnover is one quantity measure of liquidity, but it may overstate true liquidity by reflecting churn in short-dated financial market instruments.

The bid-ask spread, a cost-based measure of liquidity, is the difference between the quoted ask price and the quoted bid price. The spread tends to widen during periods of market turbulence as risk aversion increases and market participants are less certain about underlying value – such as at the onset of the global financial crisis. NZ dollar transaction costs tend to be low during normal times, but spreads can widen during market

5 Kendall (2016).

Figure 10
Bid-ask
spreads
and the VIX
implied
volatility
index



Source: Thomson Reuters, RBNZ. Note: 10-day moving average. Data captured at 11.10am daily NZ time. In this figure a basis point represents 0.01 of a cent.

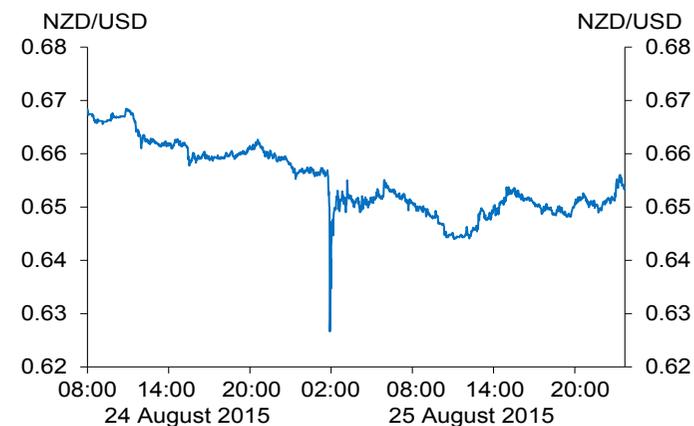
turmoil or when trading activity is low, for example at calendar year-end (figure 10).

Market participants note that technological developments have been supportive of liquidity by: facilitating better access to data; reducing trade execution costs; and increasing access for liquidity providers and users. However, the emergence of high-frequency automated trading may contribute to reduced market depth in some circumstances. Market depth refers to the ability to absorb large buy and sell orders before an order moves the price. In stressed periods, algorithmic traders often respond by becoming more cautious in pricing risk, widening spreads, or ceasing quoting.⁶ Automated trading can be halted when volatility or loss limits thresholds are breached, amplifying FX volatility.⁷

6 Automated trading is a trading technology in which order and trade decisions are made electronically and autonomously. Algorithms can be used for trade execution, market-making, or arbitrage strategies (Bank for International Settlements, 2011).

7 Bank for International Settlements (2017).

Figure 11
NZD/USD
cross rate
(New Zealand
local time)



Source: Thomson Reuters.

Recent 'flash crash' episodes seen in the UK sterling and the New Zealand dollar are evidence of periods of diminished depth in currency markets. On 25 August 2015, the NZD/USD cross rate fell around 5 percent over 10 minutes (figure 11). The NZ dollar also depreciated by 10 percent against the Japanese yen. The decline was triggered by a sharp sell-off in the US equity market, with an increase in risk aversion and closing of carry trades (see Box 5 for a description of carry trades).⁸

While the NZ dollar exchange rate quickly rebounded, the rapid decline in price highlights a lack of depth in the market. Depth in the market is low if there are few buy and sell orders at each price. The lack of depth in markets is consistent with the global theme of reduced market making and willingness to bear risk in FX markets, even as turnover in the NZ dollar remains high. A by-product of reduced market depth is increased difficulty in executing large trades, higher costs and higher volatility in

8 BIS Markets Committee (2017), Bank for International Settlements (2017)

some markets. However, flash crash episodes to date have been short-lived, with limited spillovers.

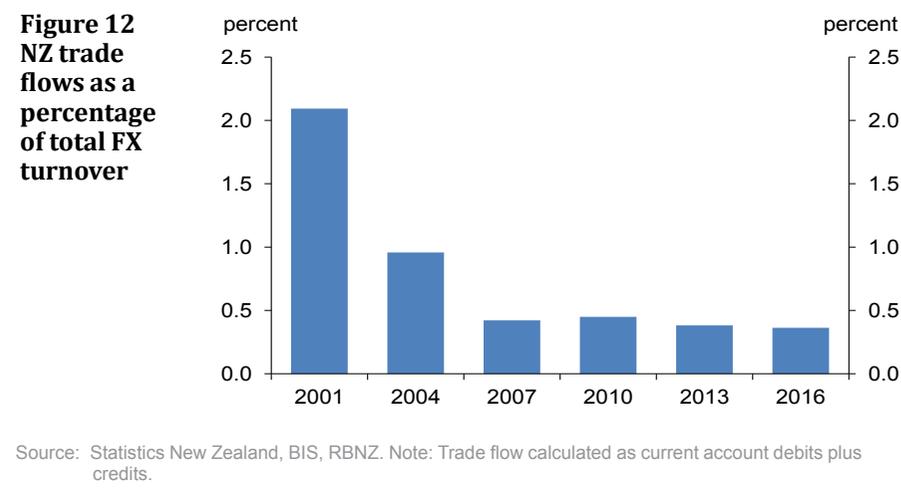
3 Factors that contribute to NZ dollar turnover

New Zealand dollar turnover has steadily increased over the past 15 years, and has consistently been within the top 16 traded currencies since 2001. New Zealand is a small open economy that depends on trade, but trade in goods and services have become a less prominent driver of turnover in recent decades (figure 12). In 2001, international trade in goods and services accounted for about 2 percent of NZD foreign exchange market turnover. By 2016, international trade in goods and services accounted for less than 0.5 percent of total NZ dollar foreign exchange turnover.

The trend increase in turnover related to financial transactions, rather than trade, is in line with global developments. As economies develop and GDP per capita rises, currencies become less connected to the real economy and more related to the financial economy.⁹ For emerging market economies, higher FX turnover is associated with higher income, capital account openness, bond market size, non-resident bond issuance and large external liabilities.¹⁰ There are several factors that contribute to turnover in the NZ dollar:

9 McCauley and Scatigna (2013).

10 Upper and Valli (2016).



- Participants can invest and express trading views through New Zealand dollar assets
 - New Zealand has open capital markets, well-defined property rights, and strong, transparent institutions.
 - Investors often use NZ dollar assets as a trading proxy for agricultural commodities and for emerging market risk. Investors seeking a high yield (e.g. via the carry trade) can take positions in NZ dollar assets.
- New Zealand funds from offshore, generating FX turnover
 - Banks in New Zealand intermediate by funding from offshore markets and hedging foreign exchange risks in the FX market.
 - NZ firms obtain funding on international markets, and these loans are converted into New Zealand dollars.

Box 4

FX swaps and New Zealand funding

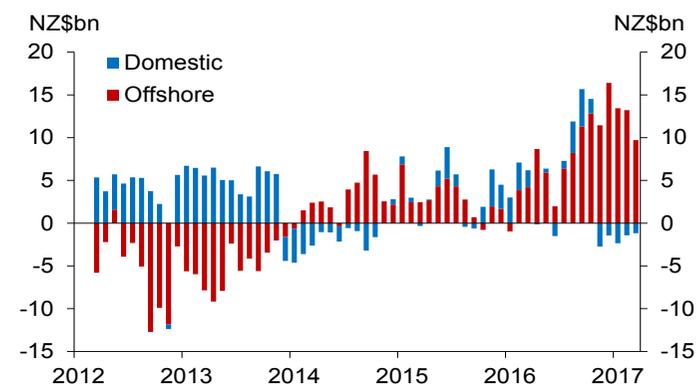
Banks play an important role facilitating the financing needs of the New Zealand economy. Banks have been the main channel for the intermediation of external financing to other sectors in the economy; accounting for about two-thirds of net external liabilities in the economy. When banks raise funding offshore, they swap this funding back into NZ dollars using FX swaps and cross-currency swaps, hedging the foreign exchange risk. Almost 98 percent of New Zealand's external liabilities were effectively denominated in domestic currency in mid-2016.¹

FX swaps remain the most traded NZ dollar instrument, and turnover has increased one third in the past decade (figure 7). Since 2014, banks have largely turned to offshore markets in order to fund marginal credit growth (figure 4.1).

The RBNZ is also an active participant in the NZ dollar FX swap market. FX swaps are used to inject or withdraw cash from the banking system. For example, if the financial system is short of NZD liquidity (e.g. because of tax payments to the Government) the Bank may wish to inject liquidity by investing in the FX swaps market. The initial leg of the FX swaps contract, of selling NZD for USD today, injects New Zealand dollars into the system, while the forward leg, which involves buying the NZD back, withdraws cash at that later date (see Box 2).² The Bank actively monitors short-term interest rates in the foreign exchange swap

market and provides liquidity support so that short-term FX swap rates trade around the official cash rate³

Figure 4.1
Annual change in the stock of market funding



Source: RBNZ Liquidity Survey.

1 IMF (2017).

2 Hawkesby (1999).

3 See Parekh (2016) for a discussion on how the RBNZ manages liquidity for monetary policy implementation.

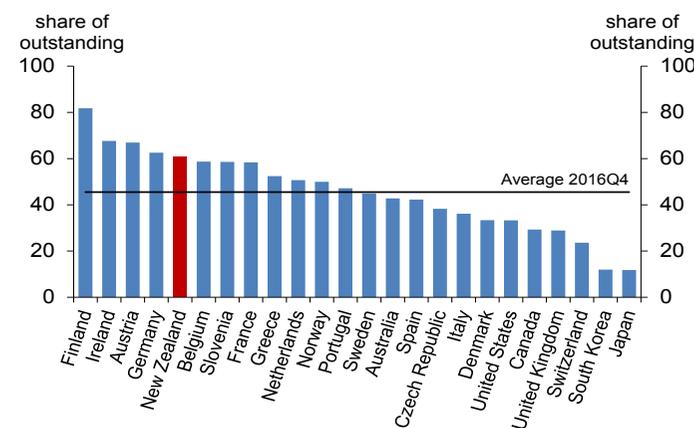
Trade and debt flows alone cannot fully explain the high level of turnover in the NZ dollar. The high level of turnover is partly due to churn – the frequent turnover of short-maturity financial market instruments as they mature. For example in April 2016, 79 percent of FX swap transactions in New Zealand had a maturity of 7 days or less, with the rest maturing in less than 1 year. Banks generate a large proportion of this FX swap churn, as they hedge exchange rate risk from offshore funding (Box 4).

As foreign exchange market turnover has become more dominated by financial transactions rather than those related to trade, the exchange rate has increasingly come to be viewed as an asset price.¹¹ Factors that affect capital transactions, such as relative rates of return on New Zealand dollar assets and changes in investors' risk appetite, can be a major influence on market activity and FX turnover.

Fund managers that hedge some of the currency exposure of their foreign equity portfolios generate flows in the foreign exchange market as they adjust positions in response to portfolio changes. Participants also generate flows when they use currency positions to invest and express trading views through NZ dollar assets.

The New Zealand bond market can be a source of FX turnover as issuers and investors hedge foreign exchange risk. New Zealand has a high proportion of government debt securities held by offshore investors, relative to other economies (figure 13). These investors create turnover when they purchase and sell these NZ dollar bonds and sometimes the currency risk of these holdings are hedged (figure 14).

Figure 13
Foreign ownership of advanced economy government securities



Source: IMF. Note: As of 2016Q4.

Banks are the largest issuers of foreign currency bonds, accounting for around 80 percent of issuance in offshore public debt markets.¹² This funding is largely hedged through FX and cross currency swaps, as discussed in Box 3. Non-resident issuers can also issue NZ dollar denominated debt through Kauris, Eurokiwis, or Uridashis (table 1).

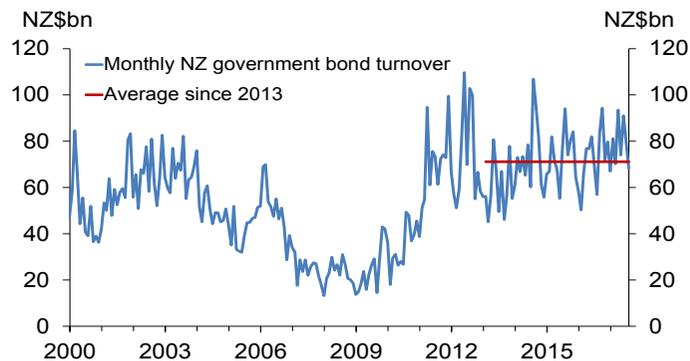
Kauri bonds are debt securities denominated in New Zealand dollars that are issued within New Zealand by a non-New Zealand entity (usually highly rated entities). Eurokiwi and Uridashi bonds are New Zealand dollar denominated bonds issued outside New Zealand by a foreign borrower.

Issuers of Kauri, Eurokiwi, and Uridashi bonds play an important role in New Zealand's financial system. Issuers typically use cross-currency swaps to hedge their foreign currency risk, providing natural counterparties for New Zealand banks wanting to hedge their foreign

11 See Munro (2004) for an asset pricing view of the New Zealand dollar.

12 Rosborough et al. (2015).

Figure 14
Turnover
in NZ
government
bonds



Source: RBNZ.

currency funding.¹³ Onshore turnover in cross-currency swaps has tripled since 2001.

While Uridashi and Eurokiwi issuance has fallen out of favour compared to the pre-GFC period, issuance of Kauri bonds has steadily increased since 2013. The total issuance value outstanding has climbed almost NZ\$20bn since 2013 (figure 15). Kauri issuances tend to be from financial institutions and development agencies, and the increase in Kauri issuance has been accompanied by a rising foreign investor share in the Kauri market. Increased Kauri issuance has been attributed to greater investor risk appetite, investors' search for yield amid low global interest rates, and favourable pricing conditions.¹⁴

13 Kauri, Eurokiwi and Uridashi issuers effectively raise NZ dollar, but ultimately want US dollar funds. New Zealand banks, on the other hand, typically raise US dollar funding from offshore but ultimately want NZ dollar funding. See Drage, Munro and Sleeman (2005) for further discussion on Eurokiwi and Uridashi bonds.

14 Reid (2014) provides further discussion on the Kauri market.

Table 1
The New Zealand bond market

		Issued by	
		Residential	Non-residential
Registered	Onshore	Domestic government and corporate bonds	Kauri bonds
	Offshore	Offshore corporate bonds	Eurokiwi and Eurodashi bonds

4 Conclusion

The growth in global FX turnover slowed between 2013 and 2016. The slowdown has been attributed to some structural shifts in the market. Market-making activity by financial institutions has reduced, in part due to regulatory changes and an associated reduction in risk appetite. Participation in the global foreign exchange market has shifted towards institutional investors and away from hedge funds and proprietary traders. The US dollar remained the currency with the highest share of global turnover, while the Chinese renminbi was the fastest-growing emerging market currency.

The New Zealand dollar remains highly traded relative to the size of the domestic economy. However, the changing structure of the global FX market has also had an effect on NZ dollar markets, resulting in limited

Box 5

The carry trade

The carry trade is a way for investors to gain exposure to New Zealand's high-yielding interest rates. Currency carry traders borrow funds in low-yielding currencies, such as the Japanese yen, and invest the proceeds in higher-yielding currencies, such as the New Zealand dollar.

Exchange rate volatility is the main risk for a carry trade investor, as a small depreciation of the investment currency can erase the gains from the higher rate of interest. Carry trades therefore tend to take place during periods when exchange rate volatility has been low, although it is difficult to quantify the aggregate size of outstanding carry trade positions.

One explanation for the profitability of carry trades is that these trades bear currency crash risk – the risk that the investment currency will depreciate sharply in an extreme event.¹ This crash risk may discourage speculators from taking on large enough positions to enforce uncovered interest rate parity, i.e. carry traders earn a risk premium.²

Financial market pricing is consistent with this risk-based explanation of the carry trade. In the case of the NZ dollar, implied volatility is especially high for options that protect against depreciation.³ This suggests that:

1 Burnside, (2011).

2 In the absence of risk, uncovered interest rate parity (UIP) suggests that gains from the interest-rate differential will be offset by a depreciation of the investment currency. The carry trade is profitable only if UIP does not hold over the investment horizon.

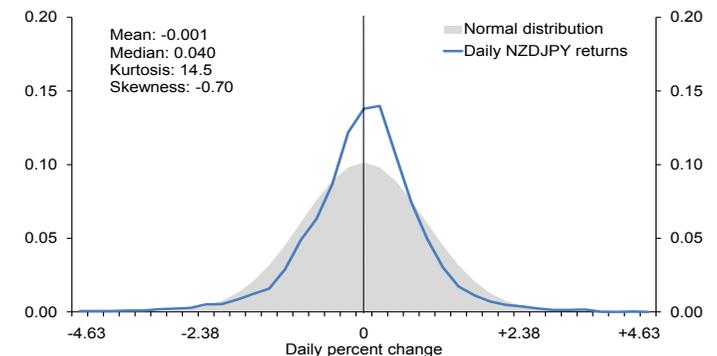
3 For example, risk reversals on the NZ dollar are negative. See Lewis (2012) for further discussion on market perceptions of exchange rate risk implied from FX options.

Figure 5.1
NZD/JPY
carry trade
return



Source: Bloomberg. Note: Cumulative return, 90-day rates.

Figure 5.2
Distribution
of daily
NZDJPY
returns



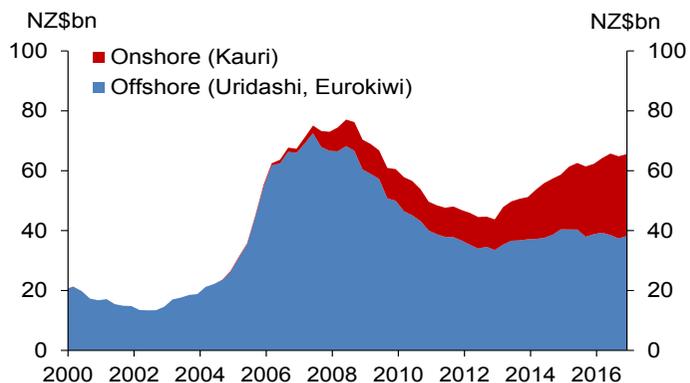
Source: RBNZ. Note: For the period 1990-2017.

- the underlying distribution of the NZ dollar is negatively skewed, so that the probability of large losses is higher than the probability of large gains

- the NZ dollar tends to depreciate at times when investors are particularly sensitive to losses, such as during the global financial crisis.

The negative skew and high kurtosis (fat tails) in figure 5.2 confirms that the probability of a large loss is higher than the probability implied under a symmetric distribution.

Figure 15
Outstanding
issuance of
NZ dollar
denominated
debt



Source: BIS, Bloomberg, RBNZ.

periods of heightened volatility in the NZ dollar. New Zealand's open capital markets allow market participants to invest and express trading views through NZ dollar assets. FX swaps remain the most popular instrument to trade the New Zealand dollar, being used by banks to hedge currency exposure and by the RBNZ to manage liquidity.

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