

Recent trends and developments in currency

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This article will be the first in an annual series that reviews recent trends in the use of notes and coins in New Zealand, and that reports on developments of particular interest. The article describes:

- the continuing growth in the value of currency in circulation, despite the popularity of electronic forms of payment;
- the Reserve Bank's new note processing machine and its operations;
- some major changes in the pattern of demand for coins after the introduction of the new 10, 20 and 50 cent coins in July 2006; and
- the recovery of the old 'silver coins' after they were 'demonetised' (declared no longer legal tender) in November 2006.

Introduction

The Reserve Bank has the sole right to issue currency – bank notes and coin – in New Zealand. Maintaining the supply, quality and integrity of the currency is one of the Reserve Bank's core functions. To fulfil this function, the Reserve Bank closely monitors trends in the demand for notes and coins, and undertakes bank note processing operations to maintain the quality, and to check the authenticity, of notes in circulation.

This article reports on:

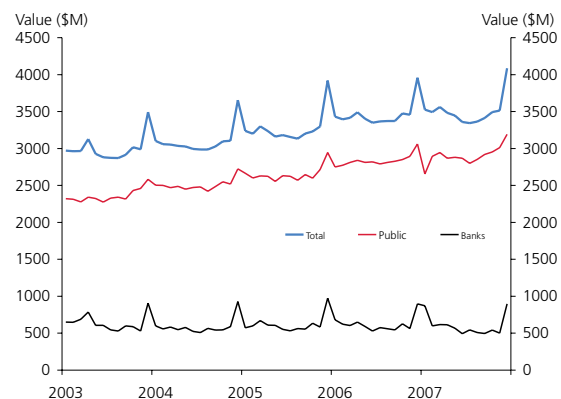
- the continuing growth in the value of currency in circulation, despite the increasing popularity of electronic forms of payment;
- the Reserve Bank's new note processing machine and its operations;
- some major changes in the pattern of demand for coins after the introduction of the new 10, 20 and 50 cent coins in July 2006; and
- the recovery of the old 'silver coins' after they were 'demonetised' (declared no longer legal tender) in November 2006.

Currency in circulation

Currency in circulation comprises notes and coins held by the general public, ie, businesses and households, and that held by banks and some other deposit-taking institutions. Figure 1 below shows that currency in circulation has continued to grow over the last several years despite the increased popularity of electronic forms of payment.²

The figure also illustrates the marked peak at Christmas each year when banks order additional cash from the Reserve Bank to meet their customers' needs. It is interesting to note that the spike for banks is typically greater than that for the general public. This suggests that they choose to hold rather

Figure 1
Currency in circulation



Source: RBNZ.

¹ The author would like to thank Reserve Bank colleagues for helpful suggestions and comments, particularly Sam Goddard for his research support.

² New Zealand Bankers' Association statistics show that debit and credit card transactions made through EFTPOS machines rose by 39 percent between 2003 and 2006.

Table 1

Composition and growth of currency in circulation (\$m)

	General Public	Banks	Total	Annual Growth
Dec 2002	2,451	941	3,391	-
Dec 2003	2,597	908	3,505	3.4%
Dec 2004	2,737	930	3,666	4.6%
Dec 2005	2,946	974	3,920	6.9%
Dec 2006	3,061	896	3,958	1.0%
Dec 2007	3,190	896	4,087	3.3%
5-year growth	30.2%	(-4.8%)	20.5%	-

Source: RBNZ.

more than their customers will need in order to be confident they will have sufficient to meet demand.

Table 1 shows that over the last five years the value of currency in circulation has risen from \$3.4 billion to \$4.1 billion, or by just over 20 percent. Cash held by the general public has risen by 30 percent while that held by banks has declined by about 5 percent.

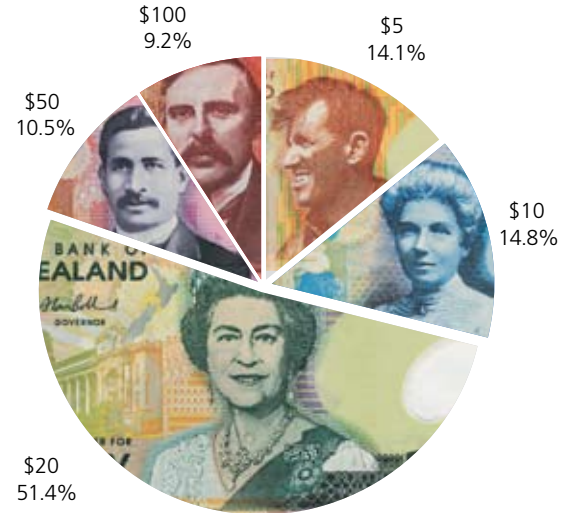
At the end of 2007, there were 142 million bank notes with a value of \$3.8 billion in circulation in New Zealand. By comparison, the value of coin in circulation is about \$300 million.

Table 2 and figure 2 show that \$20 notes make up over half the bank notes in circulation by number. However, the number of \$50 notes in circulation increased significantly during 2007, while there was little change in the numbers of other denominations. This rise in \$50 notes can be attributed to their increasing use in ATMs by some banks.

Figure 3 shows how the value of the average bank note in circulation (the red line) has increased over time. This can be expected if the value of transactions rises as prices rise.

Figure 2

Number of bank notes in circulation at December 2007 as a proportion of total



Source: RBNZ.

However, the value of the average note rose rather more slowly than the rate of inflation. This is shown by the blue line in the chart, which indicates how much the value of the average note would have increased since 2002 if it had kept pace with growth in the Consumers Price Index.

Table 2

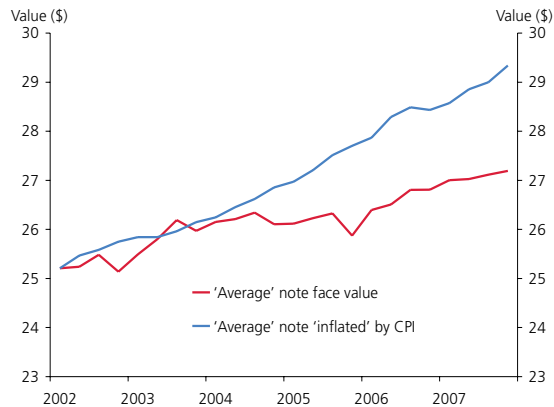
Bank notes in circulation as at 31 December 2007

Bank notes	Number (000)	Value (\$000)	Annual Growth in value over 2007
\$5	19,988	99,939	1.5%
\$10	21,100	211,003	(-0.4%)
\$20	73,001	1,460,025	0.4%
\$50	14,977	748,848	11.5%
\$100	13,088	1,308,808	1.2%
Total	142,154	3,828,622	2.7%

Source: RBNZ.

Figure 3

Average value of bank notes in circulation³

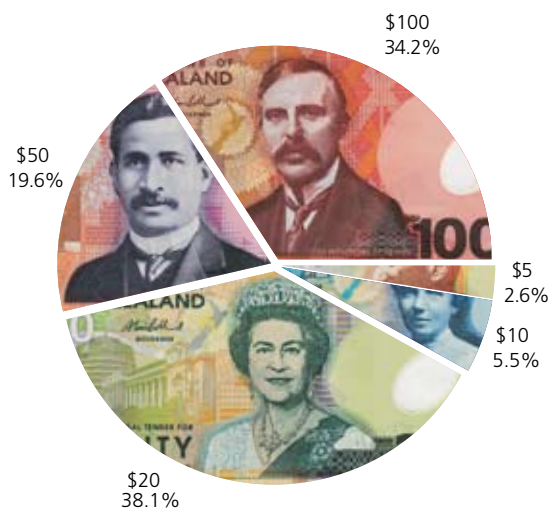


Source: RBNZ, Statistics New Zealand.

Figure 4 shows that although \$20 notes make up over half the bank notes in circulation by number, the value of \$100 notes in circulation was almost as large as that of \$20 notes.

Figure 4

Value of bank notes in circulation as at December 2007 as a proportion of the total



Source: RBNZ.

Bank note processing

A key function of the Reserve Bank's currency operations is to maintain the quality and integrity of New Zealand bank notes. The principal method for doing this is by machine processing of notes returned by banks. Notes are counted and checked for quality and authenticity.

Banks and 'Cash in Transit' (CIT) companies⁴ return notes that are surplus to the requirements of banks and other businesses to the Reserve Bank, particularly after Easter and Christmas. They also return notes that bank staff or machines operated by banks and CIT companies have identified as damaged or heavily worn.

In 2006, the Reserve Bank purchased a new note processing machine. The new machine was purchased for three main reasons:

- It has more advanced detectors that allow it to better identify counterfeit notes. This would be particularly important if the Bank were to introduce new security features on bank notes at some point in the future.
- The detectors also allow the machine to distinguish good notes from damaged or heavily worn notes much more effectively. This generates significant annual savings in currency expenses, as more good notes that would have been destroyed by older machines can be identified and reissued.
- The detectors also maintain the quality of notes in circulation better by ensuring that damaged and worn notes are withdrawn from circulation as promptly as possible.

The Reserve Bank machine processes about 35 million bank notes each year. The new machine can process up to 90,000 notes per hour if the notes are in good condition, though the rate for older notes can be much lower.

The volume of note processing at the Reserve Bank has steadily increased in recent years. This has been partly due to the growth in the numbers of notes in circulation.

³ The CPI-adjusted note (blue) line shows the value that the average note would have had if it had increased at the rate of inflation from March 2002 onwards.

Erratum

When the *Bulletin* was originally published, Graph 3 above incorrectly listed average note values as "\$M". This substitute PDF provides the correct graph axis label.

⁴ 'CIT' companies transport cash between the Reserve Bank, trading banks, retailers and other cash-handling businesses. The two main CIT companies in New Zealand are ADT (formerly called ArmourGuard) and Chubb.



Note processing machine
(Reserve Bank of New Zealand; photography, Stephen A'Court).

However, the number of worn notes processed in particular has also been rising.

The main reason for the increased inflow of worn notes is that the average age of the polymer notes is increasing. Polymer notes were first issued in New Zealand in 1999. For a number of years, most notes were quite new. Most of the unfit notes returned to the Bank were those that had suffered damage in some way. Now, however, the Bank is receiving more notes that, through regular handling, have suffered some form of gradual 'wear and tear'. It is normal, when a country issues a new series of notes, for them to have a 'honeymoon period' when attrition rates are very low. But, at some point, numbers of damaged or worn notes rise to a higher plateau. It is very likely that New Zealand is experiencing that transition now. Though the number of unfit notes has been rising, it must be noted that polymer notes have significantly longer lives than the cotton-based paper notes that they replaced.



Processed bank notes.
(Reserve Bank of New Zealand, photography, Stephen A'Court).

Sir Edmund Hillary

The recent death of Sir Edmund Hillary makes it timely to record the background to the decision to include his image on the New Zealand 5 dollar bank note.

In 1990, the Reserve Bank decided to completely revamp the appearance and features of New Zealand's bank notes. This was the first complete redesign since the introduction of decimal currency 23 years earlier. The result, after the Reserve Bank had consulted widely with the public, was a new series of notes with distinctly New Zealand designs.

The Reserve Bank decided to retain the Queen on the \$20 note and to include images of famous New Zealanders on the other four notes. These would be people who "were born, brought up and educated in New Zealand and performed noteworthy deeds in New Zealand, or elsewhere, as well as those who were born and brought up overseas and performed noteworthy deeds in New Zealand". It was initially agreed that people still alive would be excluded, due to the convention recognised internationally not to include the portraits of live persons apart from reigning monarchs or heads of state. This convention arose from the risk that a living person could 'blot their copybook' and create an awkward situation.

In May 1991, the Governor of the Reserve Bank, Dr Donald Brash, announced the Reserve Bank's intention to redesign the notes, drawing specific attention to the possible inclusion of images of New Zealanders, and invited public comments. Notwithstanding the Governor's reference

to the intended exclusion of living New Zealanders, Sir Edmund Hillary was the most favoured candidate by a large margin. This result was not altogether surprising. Sir Edmund's achievements, particularly the ascent of Mount Everest with Tenzing Norgay, his work building schools and hospitals for the Sherpa people of Nepal, his role as New Zealand Ambassador to India, and his personal qualities all earned him great respect in New Zealand and widely around the world.

Sir Edmund's popularity prompted the Reserve Bank to override the international convention regarding living people. The Reserve Bank concluded that Sir Edmund's achievements clearly warranted his inclusion on a bank note and that this outweighed any small risks associated with the choice of a person who was still alive. The Governor's decision, though, was subject to Sir Edmund's agreement. Sir Edmund was out of the country at the time but the Governor contacted him by telephone. He explained that the Reserve Bank would like to incorporate his image on a bank note and requested his agreement. Sir Edmund accepted the offer.

The first 5 dollar notes with Sir Edmund's image were issued on 10 July 1992. In 1999, the design was slightly changed when the Bank issued a new series of bank notes printed on polymer plastic. There are currently about 19 million 'Sir Edmund Hillary' 5 dollar notes in circulation.



Coins

The pattern of demand for new coins of all denominations has changed markedly since the introduction of new 10, 20 and 50 cent coins in July 2006. The section below examines this change in depth, with the benefit of over a year of data since the new coins were first issued. The next section reports on the Reserve Bank's recovery and export of a considerable quantity of the old cupronickel coins.

Demand for new coins

The demand for the new 10, 20 and 50 cent coins has been much higher than for the earlier cupronickel coins. This was expected in the short period between July and November 2006, when the Reserve Bank effectively replaced the existing working balances of businesses and households. However, strong issuance of the new coins continued all through 2007, well after the active balances of the community had been replaced.

Table 3 shows that the demand for each of the 10, 20 and 50 cent coins has been four to seven times higher than prior to the start of the process for replacing the old coins.

The change in the demand for the 20 cent coin is illustrated in figure 5.

The main reason why demand has risen so much appears to be that many households emptied large hoards of cupronickel coins in 2006 and these emptied stores are now being refilled. Also, the new coins are much lighter than the old coins. People appear to carry more around and leave them in jars and other places without quite realising how many they have.

Table 3

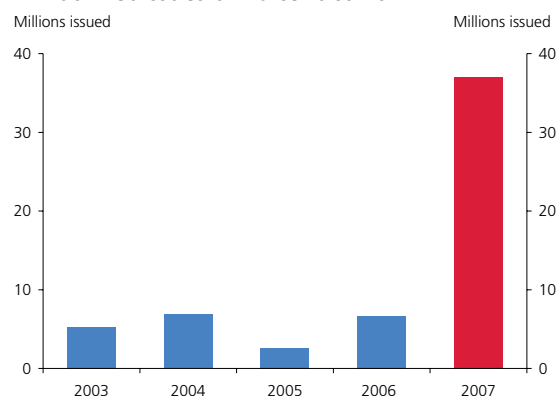
Annual net issues of 'silver' coins (000)

	Average 2003-2005	2007	Ratio (2007/2003-5)
(5 cent coin)	(16,608)	n/a	n/a
10 cent coin	7,495	33,314	4.44
20 cent coin	4,975	37,012	7.44
50 cent coin	2,689	13,895	5.17
Total	15,159*	84,221	5.56*

* Excluding five cent coins, which were withdrawn in 2006
Source: RBNZ.

Figure 5

Annual net issues of 20 cent coins*



* The figure for 2006 has been adjusted to remove coin issued between July and October 2006. These represented the replacement of working stocks of old coins, rather than net additions to coins in circulation which are shown for other years.

Source: RBNZ.

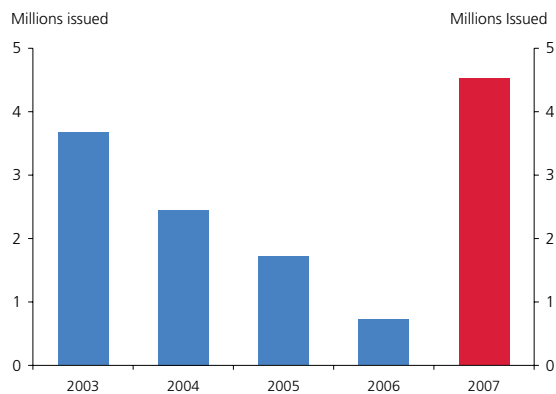
Research conducted by ACNielsen in 2005 showed that the average New Zealander carried about eight 'silver' coins with them each day for transaction purposes. However, the average household had almost 200 'silver' coins in stores of various kinds at home. The current high rate of issues could continue for some years before stores are replenished to their 2005 levels.

It is possible, though, that some underlying change in the way New Zealanders use coins has also been taking place over the last few years. This might have been disguised by changes generated by the coin changeover. This idea is supported by the fact that demand for the one dollar coins has also been very volatile as shown in figure 6 opposite. Demand for the one dollar coin was declining prior to the 'silver' coin change over, which was announced in March 2005. This decline was reinforced by the return of some

stores of dollar coins together with cupronickel coins. However, in 2007 demand bounced back so strongly that some other underlying factor might also be involved.

It is possible that many New Zealanders still often use bank notes for small transactions and receive coins as change. However, they may be using these coins less often in subsequent transactions. This is a trend that has been observed in some overseas countries. The net effect is for more coins to end up in household hoards and for issues of coin to be higher than are needed for transaction purposes.

Figure 6
Net issues of 1 dollar coins



Source: RBNZ.

Coin demonetisation and recoveries

The old cupronickel coins were demonetised, ie, declared no longer legal tender, with effect from 1 November 2006. This meant that shops and other businesses no longer needed to accept them as payment for goods and services. Demonetisation is a normal procedure following a currency change. In the past, the Reserve Bank had demonetised one and two cent coins and one and two dollar notes. However, the Reserve Bank will always pay the face value for any demonetised notes or coins that are returned by members of the public.

It was important that the old coins be demonetised and withdrawn from circulation for several reasons:

- Banks, shops and other large cash-handlers would face considerable staff costs in handling and sorting two sets of coins on an indefinite basis.
- Many bulk coin-handling and sorting machines would not be able to process an increased number of coin sizes.

Coin weighing machines would be rendered ineffective unless new and old coins were separated.

- Businesses operating vending machines, including parking meters, wanted to see a fast changeover so that they could quickly convert their machines to accept the new coins.
- Many members of the public would probably find it confusing and annoying having coins of two different sizes for some denominations.

It was important to estimate the amount of coin likely to be recovered for budgeting and for planning logistical arrangements. Initial estimates were based on information on the recovery of some 'legacy' currencies after the introduction of the euro. More reliable estimates were later prepared based on:

- data collected by the New Zealand Bankers' Association on coin holdings of every bank branch in the country on a particular day;
- a sample survey of retailers carried out by the NZ Retailers Association; and
- a survey conducted by ACNielsen of the numbers of coin New Zealanders carry for transaction purposes and the numbers in household stores.

Based on this research, it was estimated that:

- the number of coins in circulation for day to day use was approximately 120 million; and
- the number of coins in household stores was approximately 250 million.

After the Reserve Bank announced in March 2005 that it would introduce new coins, anecdotal evidence and a sharp decline in net coin issuance indicated that some people started returning stores of coins well before July 2006. The "Fives for under Fives" coin collection campaign by the Plunket Society probably assisted this. The Plunket Society raised about \$700,000, over 90 percent of which comprised 5 cent coins; ie, about 13 million coins.

The old cupronickel coins were sold to Poongsan Corporation of Korea. They were shipped out of Auckland, Wellington and Christchurch to Korea progressively as they accumulated.

Table 4

Percentages of coins returned

Coin	1 Nov 2006	30 Nov 2006	30 June 2007
5c	22.3%	25.1%	26.2%
10c	33.1%	37.1%	39.0%
20c	43.3%	47.5%	49.5%
50c	54.1%	58.1%	60.2%
Total	29.7%	33.1%	34.6%

Source: RBNZ.

Poongsan melted down the coins and used the cupronickel to make blank coins for other countries.

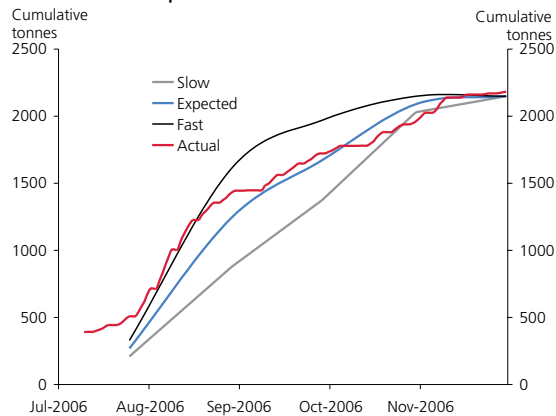
Figure 7 below illustrates the track of coin returns over time together with previously prepared fast, slow and expected recovery profiles based on the estimates described above. There were very strong inflows of old coins in August after the new coins were issued. The rate of inflow slowed in September and much of October, but there was a strong surge around the time the old coins were demonetised on 1 November.

The amount of coin recovered was close to or within the forecast range throughout the transition period. By 30 November, the Reserve Bank had recovered 2,183 tonnes of old coins, slightly exceeding the expected amount at that date.

Table 4 shows the percentages of coins of each denomination recovered as at:

- 1 November 2006 (when the coins were demonetised);
 - 30 November 2006 (after truck collection runs stopped);
- and

Figure 7
Cumulative cupronickel coin recoveries



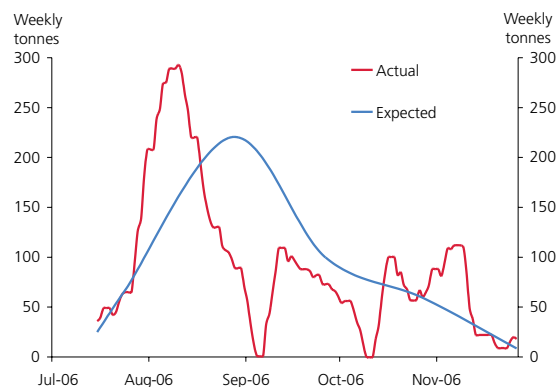
Source: RBNZ.

- 30 June 2007 (about a year after the new coins were issued).

For example, by 30 November 2006, the Reserve Bank had recovered 47.5 percent of 20 cent coins issued between 1967 and 2006.

Figure 8 below shows the rate at which coins were returned from mid-July to late November. It shows how coins were returned faster than expected initially, and then slowed down. There was a 'last minute' surge of people returning old coins to banks in the last week – and for a while later as banks continued to accept them after 1 November. These coins took a week or two to reach the Reserve Bank. After the end of November, the Reserve Bank continued to receive some coins (and it still does) but the large majority of coin recovered was between 31 July and 30 November. As noted above, the Reserve Bank will always pay the face value for demonetised notes and coins.

Figure 8
Weekly rate of cupro-nickel coin recoveries



Source: RBNZ

An observant reader will notice that the weekly running total in figure 8 falls to zero on two occasions in the middle of the recovery period. This is simply because the Reserve Bank had two one-week halts to truck collections from bank

branches in order to carry out checks and audits to ensure there were no missing consignments.

The income from the sale of the cupronickel coins covered the cost of producing the new coins and all project expenses. The changeover to smaller, plated steel coins and the withdrawal of the 5 cent coin have also generated significant ongoing savings. The composition of the old coins was 75 percent copper and 25 percent nickel. Since early 2004, when the change was first considered, the price of copper has risen from about USD 3,000 to USD 8,100 per tonne in mid-February 2008, while the price of nickel has increased from about USD 15,000 to USD 27,700 per tonne. The value of the metal content of the 5, 10 and 20 cent coins would now be almost as great as their face value if the Reserve Bank had not changed them – and their unit cost, after manufacturing and delivery expenses were added, would be well in excess of their face value.

The rise in metal prices substantially enhanced the long-term value of the coin changeover. If the Reserve Bank had not proceeded with the project, then cupronickel coin issue expenses would have risen substantially. Consequently, the introduction of smaller plated steel coins and the withdrawal of the 5 cent coin have led to significant savings even though numbers of coin being issued have risen.

Conclusion

The demand for currency by the New Zealand public continues to grow steadily each year despite the popularity of electronic methods of payment. There has been a gradual increase in the average value of bank notes in circulation, with a significant increase in 50 dollar notes over the last 12 months. The Reserve Bank's note processing operations play a key role in maintaining the quality and protecting the integrity of currency in circulation.

In 2006, the Reserve Bank introduced new, smaller 10, 20 and 50 cent coins, and withdrew the previous cupronickel coins. This changeover was completed in a few months, with little disruption to business activity and with the proceeds from the sale of old coins meeting all expenses. The demand for lower value 'silver' coins has risen substantially since the introduction of the new coins. It appears that New Zealanders are placing large numbers of coins in household stores rather than recirculating them.