

Recent trends and developments in currency

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This article reviews trends in the use of currency in New Zealand and reports developments of particular interest. The value of currency in circulation continues to grow, but there was an unusual increase in high-denomination notes late in 2008, associated with public nervousness about the state of the financial sector. Our review of the quality of one denomination of banknotes in circulation suggests that they meet our high quality standards, and our checking of the authenticity of bank notes indicates that the rate of counterfeiting is very low by international standards. Finally, coin issuance continues at high rates, most likely as the public are still filling stores of coins at home.

1 Introduction

The Reserve Bank has the sole right to issue currency – bank notes and coins – 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. Box 1 describes the Reserve Bank's currency function objectives in more detail.

In the rest of this article, we look at trends in the use of currency in New Zealand, and discuss developments of interest relating to our currency function objectives.¹ We look at growth in the value of currency in circulation (section 2), bank note processing and the quality of bank notes (section 3), the rate of counterfeiting (section 4), and coin issuance (section 5). Section 6 concludes.

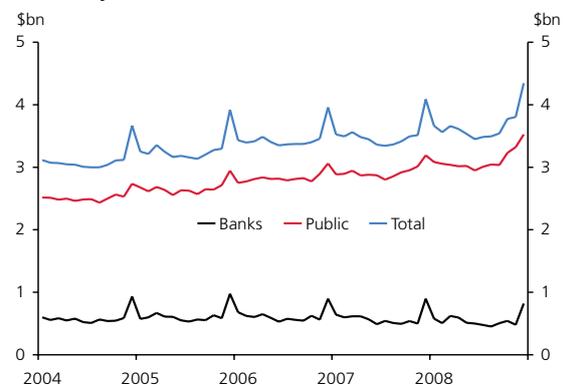
2 Currency in circulation

Currency in circulation comprises notes and coins held by the general public, ie, businesses and households, and that held by banks and other financial institutions. Figure 1 shows that currency in circulation has generally grown steadily over the last several years. 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. There was an unusually large increase in currency in circulation in late 2008, which we discuss later in this article.

¹ This article is the second of our annual reviews of trends and developments in currency. The first review is Boaden (2008).

Figure 1

Currency in circulation



Source: RBNZ

Table 1, overleaf, shows that over the last five years, the value of currency in circulation has risen from about \$3.5 billion to over \$4.3 billion, or by 24 percent. Cash held by the general public has risen by over 35 percent, while that held by banks has declined by almost 10 percent.

At the end of 2008, there were 146 million bank notes with a total value of \$4 billion in circulation in New Zealand. By comparison, the value of coins in circulation was about \$300 million.

Currency in the hands of the public – adjusting for inflation and real growth

Over the previous decade, currency held by the general public has doubled from just over \$1.5 billion (annual average for 1998) to slightly over \$3.1 billion (average for 2008). Assuming that the general public's demand for holding cash grows with increasing prices (inflation) and growing real income (real GDP growth), correcting for those

Table 1

Value of currency in circulation (\$m) and annual growth

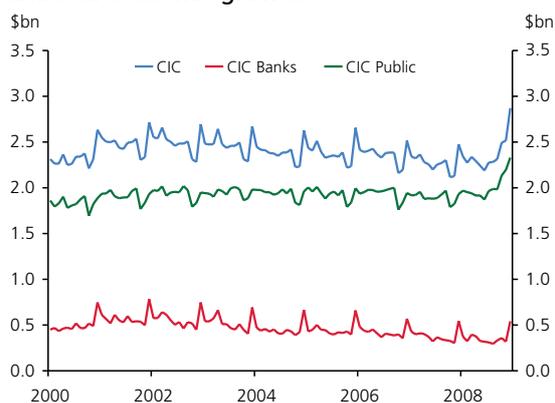
	General public	Banks	Total	Annual growth
Dec 2003	2,597	908	3,505	-
Dec 2004	2,737	930	3,666	4.6%
Dec 2005	2,946	974	3,920	6.9%
Dec 2006	3,061	896	3,958	1.0%
Dec 2007	3,190	896	4,087	3.3%
Dec 2008	3,525	819	4,345	6.3%
5-year growth	35.7%	(-9.8%)	24.0%	-

factors indicates the growth-adjusted real demand for cash as a means of making transactions.

The adjusted series in figure 2 show that, apart from the unusual increase in late 2008, currency held by the public has been almost constant over the previous decade in growth-adjusted real terms, while currency held by banks has decreased slightly in those terms. Overall, there was a slight downward trend in currency in circulation in those terms, visible for most of the decade.

Figure 2

Currency in circulation, corrected for inflation and real economic growth²



Source: RBNZ

The slight decline in the growth-adjusted real value of currency in circulation over most of the current decade is probably due to greater use of debit and credit card payment methods. In other words, the demand for holding cash as a means of making transactions relative to real income and

the price level is declining. The value of EFTPOS transactions grew from \$484 million in 2000 to almost \$1 billion in 2008.³ Had the value of transactions grown with the rate of inflation and economic growth since 2000, it would have reached only \$650 million by 2008. Another indicator for the wider use of electronic payments is the number of EFTPOS terminals, which grew from 84,000 to 131,000 in the same period. The rise of online banking and internet shopping might have also contributed to a reduced use of cash relative to the size of the economy.

Composition of currency in circulation

Table 2 and figure 3, opposite, show that \$20 notes make up half the bank notes in circulation. However, the number of \$50 and \$100 notes in circulation (NIC) increased significantly during 2008, while there was little or only moderate change in the numbers of other denominations. The rise in \$50 notes can probably be attributed to their increasing use in ATMs by some banks.

A more detailed illustration of the recent increase in higher denomination notes in circulation is shown in figure 4. Currency in circulation increases every year towards the end of the year – due to higher demand for cash in the Christmas period. However, the increase in demand for the higher denominations was unusually large in 2008.

² Calculation for the December quarter 2008 based on Reserve Bank estimate of real growth for the quarter.

³ Source: New Zealand Bankers' Association.

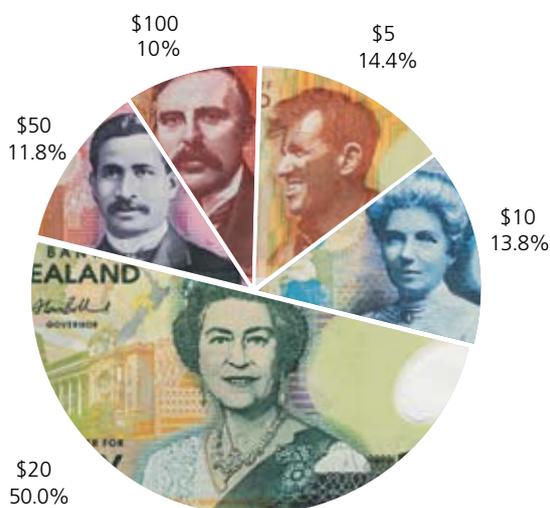
Table 2

Bank notes in circulation as at 31 December 2008

Bank notes	Number (000)	Value (\$000)	Annual growth in value over 2007
\$5	20,957	104,785	4.8%
\$10	20,167	201,674	(-5.3%)
\$20	72,948	1,458,964	(-0.1%)
\$50	17,223	861,165	15.0%
\$100	14,461	1,446,095	10.5%
Total	145,757	4,072,683	6.4%

Figure 3

Number of bank notes in circulation – December 2008 as percent of total



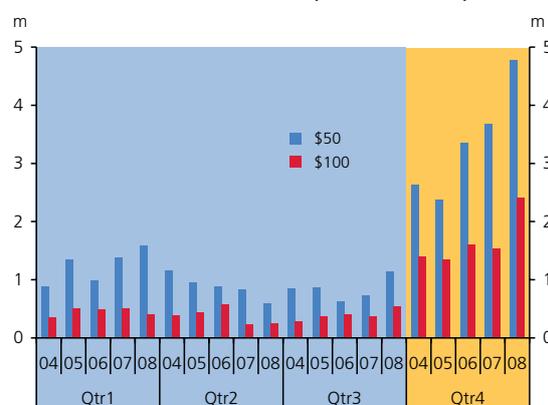
Source: RBNZ

Figure 4 clearly illustrates how, in the December quarter each year, more currency is issued than in other quarters. In October 2008, the crisis hitting financial markets was associated with an increased demand for cash as a store of value. Although there has been an underlying growth trend for the last few years in issuance of the \$50 note due to the shift away from \$20 notes towards \$50 notes in ATMs, comparing the 2008 and 2007 December quarter figures shows what appears to be a jump relative to the trend. The sharp rise in the number of \$100 notes issued in the last quarter of 2008 is more clearly obvious in figure 4.

The issuance of higher denomination notes returned to normal levels shortly after the government announced the Retail Deposit Guarantee Scheme. This suggests that the public had regained some confidence. However, repatriation

Figure 4

\$50 and \$100 notes issued (2004 to 2008)



Source: RBNZ

data does not show a return of the 'extra' \$50 and \$100 notes issued above normal levels in December quarter 2008. This could be partly due to a continuing adverse effect on confidence from the stream of bad news from overseas. It may also be the case, though, that the repatriation of these notes will happen gradually over a longer period.

3 Bank note processing and the quality of bank notes

Note processing

As discussed in box 1, 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 the machine processing of notes returned by banks. Notes are counted and checked for quality and authenticity. 'Unfit' notes, which do not meet specified quality standards, are destroyed. This helps to maintain good quality among the notes in circulation. It is also important to destroy unfit

notes because large numbers of old and faded notes in circulation would make it easier to distribute counterfeits, which tend to have a poor appearance.

Banks and Cash in Transit (CIT) companies return notes to the Reserve Bank that are surplus to requirements, particularly after Easter and Christmas. The banks and CIT companies also return notes that their machines or bank staff have identified as damaged or heavily worn.

The Reserve Bank processed about 36 million bank notes in 2008 (of which about 25 million notes were machine processed). The volume of note processing at the Reserve Bank has steadily increased in recent years. This has been due to a number of factors, including the growth in the number of notes in circulation, and the Reserve Bank's purchase of a new note processing machine with more advanced detectors and greater processing capacity.

Table 3 below shows that in 2008, a total of 20 million bank notes were destroyed. This accounted for about 16 percent of notes in circulation. Before polymer notes were introduced in New Zealand, cotton-based paper notes were used. They were less durable and about 60 percent of notes in circulation were destroyed each year. 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 Reserve Bank were those that had suffered damage in some way. Now, however, the Reserve Bank is receiving more notes that, through regular handling, have suffered a degree of ink fade or some other form of gradual wear and tear.

Figure 5 below shows that for each denomination, the rate of paper note destruction greatly exceeded the current rate

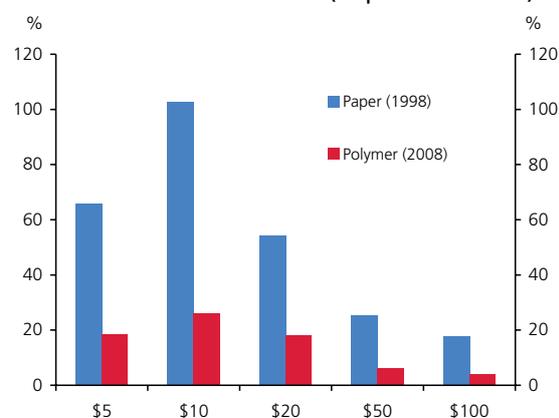
of polymer note destruction. Figure 5 also shows that lower denomination notes are the most commonly destroyed as they are used and handled most frequently while in circulation.

Quality of bank notes

An indication of the quality of notes in circulation has been provided by a recent analysis by the Reserve Bank of 400 \$10 notes collected from various places around New Zealand. One of the most important features in the public's perception of a bank note's quality is the note's ink wear. The ink on older notes becomes faded due to repeated handling. The quality of a bank note, in terms of ink wear, can be differentiated into three categories. A 'very good' note shows almost no ink wear, hence is new or almost new. A 'good' note shows very minor ink wear, while the ink on a 'poor' note has moderate to considerable fading.

Figure 5

Bank note destruction rates (as percent of NIC)



Source: RBNZ

Table 3

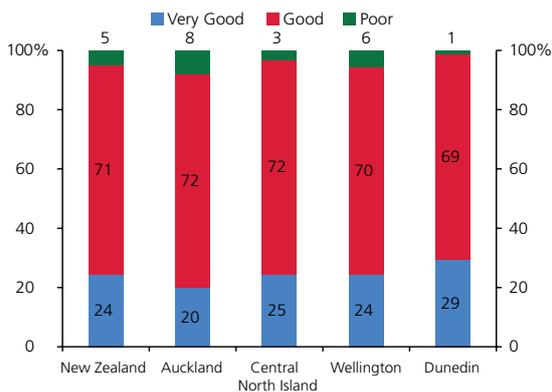
Destruction of polymer notes in 2008, and paper notes in 1998

(000)	\$5	\$10	\$20	\$50	\$100	Total
Polymer notes destroyed (2008)	3,515	4,738	10,560	847	482	20,142
Average polymer notes in circulation	19,235	18,265	58,461	13,542	12,498	122,001
as % of all notes in circulation	18.3%	25.9%	18.1%	6.3%	3.9%	16.5%
Paper notes destroyed (1998)	7,712	12,650	17,744	1,853	835	40,794
Average paper notes in circulation	11,742	12,300	32,742	7,300	4,733	68,817
as % of all notes in circulation	65.7%	102.8%	54.2%	25.4%	17.6%	59.3%

Source: RBNZ

Figure 6 displays the findings of the survey of \$10 notes. Overall, poor notes accounted for only 5 percent of the sample. Although regional differences are visible, nowhere in the country were more than 10 percent of poor quality notes found. Interestingly, more poor quality notes were found in Auckland and Wellington than in Dunedin and in more rural areas. One might have expected that in the larger cities notes would be more regularly sorted by banks and CIT companies, with poor notes being withdrawn from circulation more quickly. It is possible, though, that bank notes are used more frequently in larger cities and thus suffer more wear and tear.

Figure 6
\$10 note quality by ink wear – regional differences



Source: RBNZ

The Reserve Bank has also collected \$5 and \$20 notes (400 notes of each denomination) from around New Zealand. These are currently being analysed. Broader measures of quality, incorporating factors such as structural damage (holes and tears), loss of tactility or stains, are also being investigated.

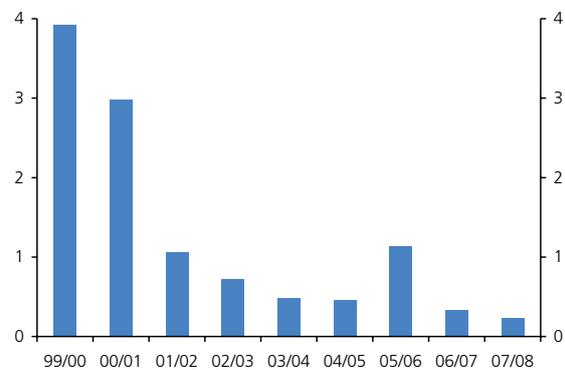
4 Counterfeiting

Another key objective of the Reserve Bank is to ensure that the rate of counterfeiting is as low as possible. The number of forgeries of New Zealand bank notes is, fortunately, very low by international standards.

The Reserve Bank monitors the number of counterfeits it finds in its note processing operations each year. Dividing

this number by the number of notes processed provides an estimate of the number of counterfeits in general circulation.⁴ It is normal practice to express the rate of counterfeiting as the number of counterfeits per million notes in circulation. Rates of 40 or 50 per million are found in some advanced countries, and rates have risen as high as 200 to 300 per million in some countries in some years. Figure 7 below shows that the counterfeit rate in New Zealand (measured as described above) was 3 to 4 per million ten years ago, but more recently has generally been less than 1 per million.

Figure 7
Counterfeits detected per million notes processed



Source: RBNZ

Note: The counterfeits detected in 2000 and 2001 were virtually all from the paper series.

The introduction of polymer bank notes in 1999 has contributed significantly to the decline in counterfeits. One of the prime motivations for the Reserve Bank's change to polymer notes was to take advantage of the security features offered by the new technology – especially the use of transparent windows. The New Zealand polymer notes have two clear windows, one of which has the denomination of the note embossed on it (see figure 8). This feature is designed to be easily seen by the public and cash handlers without the need to hold the note to the light.

⁴ The Reserve Bank is currently undertaking some work to check that this measure is an accurate indicator of the number of counterfeits in general circulation.

Figure 8
New Zealand \$50 polymer note with embossed window



Photo: Securrency Pty Ltd

The polymer substrate itself has also proved to be a significant deterrent to counterfeiting, as it is difficult, particularly for amateurs, to produce a copy of a bank note on plastic. To date, all counterfeit New Zealand notes detected have been produced on paper and have generally been relatively poor reproductions.

5 Coins

The number and value of coins in circulation at the end of December 2008 is shown in table 4 below. The total value of coins in circulation was \$275 million. This represented 6.3 percent of the value of currency in circulation as at 31 December 2008.

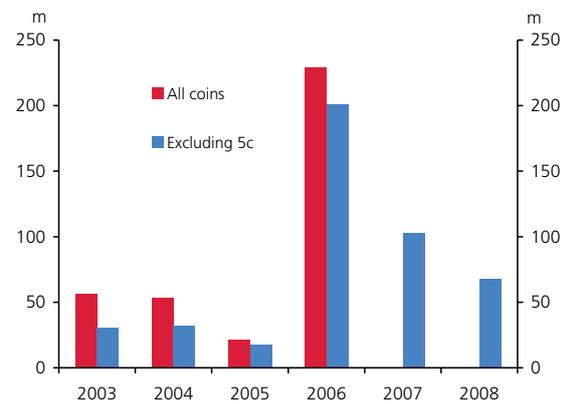
Table 4
Coins in circulation

	Number of coins (000)	Face value (\$000)
10 cent	130,407	13,041
20 cent	121,803	24,361
50 cent	56,659	28,329
1 dollar	73,833	73,833
2 dollar	67,476	134,952
TOTAL	450,177	274,516

Source: RBNZ

The demand for coins of all denominations has changed markedly since the introduction of the new copper- and nickel-plated steel 10, 20 and 50 cent coins in July 2006 and the demonetisation of the old cupronickel coins that they replaced.⁵ A high level of demand was expected in the second half of 2006 when the Reserve Bank replaced the working balances of banks, retailers, other businesses and households. However, strong demand continued all through 2007. Demand declined in 2008, but is still significantly higher than prior to the 'silver coin' changeover, particularly considering the withdrawal of the 5 cent coin, which accounted for about half of all coin issues prior to July 2006. Figure 9 below shows the total number of coins issued each year from 2003 to 2008.

Figure 9
Number of coins issued



Source: RBNZ

⁵ Boaden (2008) provides a detailed discussion of issuance of new coins and repatriation of old ones in the months following the Reserve Bank's 'silver' coin review in 2006. Oliver (2008) discusses the technical aspects we considered in the decision to move to copper- and nickel-plated steel coins.

The main reason why demand has remained so high appears to be that many households emptied large hoards of coins in 2006 and these emptied stores are still being refilled. Research undertaken by ACNielsen on behalf of the Reserve Bank suggested that the average New Zealand household in 2005 had about 200 coins stored in various places at home. This was two or three times the number of coins in active circulation; ie, being frequently used to make transactions. Even if all coins issued in 2007 and 2008 have found their way into these stores, they would represent only about 50 percent of the level in stores prior to the withdrawal of the old coins. The demand for new coins may therefore remain above pre-2006 levels for some years yet. To improve the efficiency of New Zealand's currency system, the Reserve Bank encourages all households to bring these coins out of store and use them again for purchasing goods and services.

5 Conclusion

Currency (bank notes and coin) remains an important means of settling transactions in New Zealand. The Reserve Bank will continue to ensure that the public's needs for cash are met by maintaining the supply and quality of legal tender currency.

References

- Boaden, A (2008) 'Recent trends and developments in currency', Reserve Bank of New Zealand *Bulletin*, 71(1), pp 16-24.
- Oliver, D (2008) 'Establishing technical specifications for New Zealand's new 10 cent, 20 cent and 50 cent coins', Reserve Bank of New Zealand *Bulletin*, 71(2), pp 57-63.

Box 1

Currency function objectives

The Reserve Bank has the sole right under the Reserve Bank Act (1989) to issue currency – bank notes and coins – in New Zealand. The Reserve Bank's Statement of Intent (SOI) for 2008–11 sets out the specific objectives and Key Performance Indicators (KPIs) for its currency function. This box describes the objectives and KPIs in more detail and explains how the Reserve Bank intends to achieve them.

The Reserve Bank's fundamental objective, or mission, for the currency function is "to meet the currency needs of the public, as the sole issuer of currency, by ensuring the supply and integrity of bank notes and coins". As the diagram illustrates, there are three distinct components, or measures, to this objective. These relate to the quantity, quality and integrity (authenticity) of currency. For each measure the Reserve Bank has a specific KPI that it aims to achieve. These are set out and explained below.

1. Quantity (supply)

KPI #1: All orders for notes and coins from banks that meet the Reserve Bank's guidelines are supplied within agreed times.

The Reserve Bank has a 'wholesale' role in the supply of currency. It supplies cash on demand to trading banks. Orders for cash must be in multiples of fixed 'wholesale' quantities and must conform to scheduling guidelines. The Reserve Bank also accepts 'repatriations' of currency from banks. These include 'fit' bank notes that are surplus to industry requirements and 'unfit' notes for destruction. It also accepts surplus and damaged coins on a similar basis.

The demand for currency in New Zealand has a strong seasonal element with peaks at Christmas, Easter and, to a lesser extent, other public holidays. The Reserve Bank holds reserves of currency so that it can meet the strong demand for cash at Christmas and other times of higher demand.

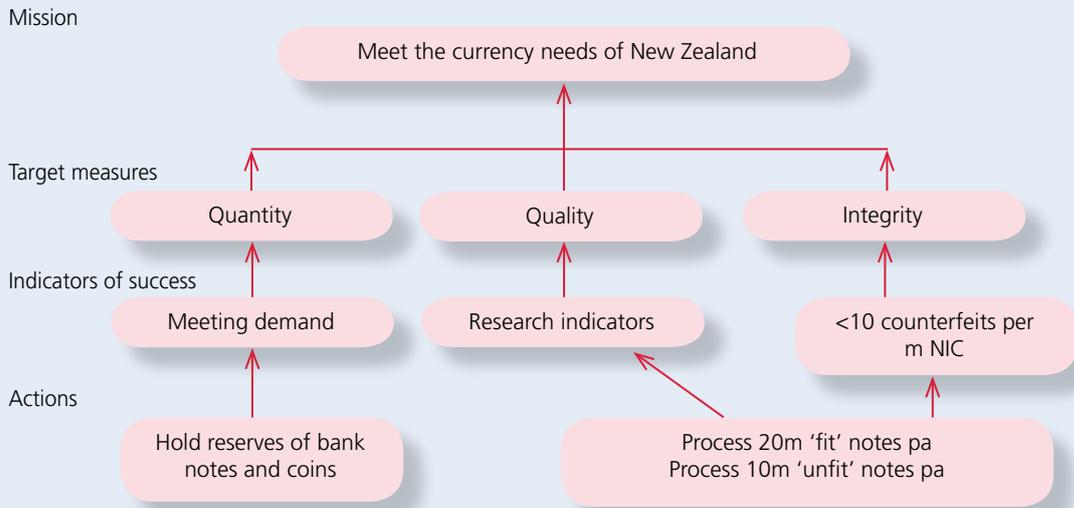
The Reserve Bank also holds currency reserves as a contingency for any crisis that might cause increased demand for cash. Such a crisis might be a major earthquake, a pandemic or a serious breakdown in electronic transaction systems.

The Reserve Bank's measure for its success (or otherwise) in achieving this objective is that it always meets orders for cash from banks that meet specified guidelines.

(continued overleaf)

Chart 1

Currency function objectives



2 Quality

KPI #2: Notes and coins in general circulation are of a good quality as indicated by planned biennial surveys of the condition of currency in circulation.

The Reserve Bank aims to ensure that notes and coins in general circulation are of a good standard. This is important so that the general public finds them suitable for use in making transactions. It also helps users to more readily identify counterfeit notes, which often tend to look like old worn notes.

The Reserve Bank's chief mechanism for maintaining the quality of notes in circulation is the machine processing of notes repatriated by banks (as described in section 3 of this article). Notes that do not meet a set quality standard are destroyed. Banks and security companies provide valuable assistance by sending the Reserve Bank unfit notes that they find as they handle and process notes for their customers.

The Reserve Bank will assess its success in achieving this objective by carrying out biennial surveys of notes in circulation. In late 2008, the Reserve Bank – working with Securrency, the manufacturer of the Guardian polymer used in our bank notes – collected 400 \$10 notes from around the country and evaluated their quality according

to several criteria. Some results are reported in section 3 of this article. A further 400 \$20 and 400 \$5 notes have also been collected and are currently being evaluated.

3 Integrity

KPI #3: The number of counterfeit notes in circulation should be fewer than 10 per million notes in circulation for each denomination.

The number of counterfeit bank notes found in New Zealand is very low by international standards. It is very important that the incidence of counterfeit notes be kept as low as possible so that the New Zealand public can have confidence in New Zealand's currency.

As described in sections 3 and 4 of this article, the Reserve Bank processes bank notes repatriated by banks. It checks the authenticity of these notes, as well their value and fitness. This is the Reserve Bank's principal method for monitoring the level of counterfeiting in New Zealand.

The Reserve Bank's KPI specifies that the number of counterfeits be less than 10 per million notes in circulation. As reported in section 4 of this article, the current rate of counterfeiting is well below this level.