Issues Paper
The future of cash use —
Te whakamahinga moni anamata

June 2019
Feedback due 31 August 2019
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Responses invited

The Reserve Bank of New Zealand — Te Pūtea Matua (Reserve Bank) would like to hear what individuals and groups think about the issues raised in this paper. It would be great to have this feedback by 31 August 2019.

We would appreciate responses being made through the online version of the questionnaire included at section 7, available at www.rbnz.govt.nz/futureofcash. Doing this will assist with collation and analysis. You do not need to answer every question, there is the opportunity to give free text answers, and you may attach documents if you wish.

Or, you can email or post responses to:

to futureofcash@rbnz.govt.nz

The Future of Cash — Te Moni Anamata
Economics, Financial Market, Banking Department
Reserve Bank of New Zealand
PO Box 2498
Wellington 6140

The Reserve Bank intends to publish a summary of responses on its website by 1 November 2019, where more information about The Future of Cash — Te Moni Anamata programme can be found.

www.rbnz.govt.nz/futureofcash
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Executive summary

The future of cash\(^1\) in New Zealand is uncertain. The Reserve Bank of New Zealand (Reserve Bank) is in the middle of a multi-year programme to establish The Future of Cash — Te Moni Anamata. This programme has identified that, despite a trending increase in the overall cash in circulation, New Zealand is becoming a society that uses little cash.

New Zealanders are using cash less and less for transactions. As the transactional demand for cash falls, the per-transaction cost of providing cash infrastructure increases. Commercial operators have natural incentives to reduce their costs and this reduction in cash demand and use could lead them to reduce their provision of cash infrastructure, or to stop accepting and issuing cash. Such decisions — driven by commercial considerations — would in turn further increase the per-transaction cost of providing cash and lead to further reductions in the cash network.

The benefits of having cash become greater and greater as more and more people use it. This so-called ‘network effect’ of cash also declines as fewer people use it. For example, if fewer consumers, businesses and banks dealt with cash, the ability for people to use cash for transactions in stores and between individuals would decline. If this occurred, some of the unique roles of cash could be lost. The legal tender status of cash does not oblige anyone to accept cash as a means of payment except for debt.

A contraction in the cash network without regard to the wider benefits of cash in society might significantly disadvantage people who rely on the unique role that cash plays in their lives. This would be considered a market failure\(^2\) to the extent that commercial operators did not fully incorporate the wider network benefits of cash. As a result, government action could be warranted following the completion of this review.

The Reserve Bank is the sole issuer of cash in New Zealand and is required to issue currency that meets the needs of the public.\(^3\) There is no agency responsible for overseeing the usability of cash by the public or the stability of the cash system in New Zealand. Therefore, the Reserve Bank is taking a leadership position to assess the future of cash.

This issues paper outlines our\(^4\) preliminary analysis of the role of cash in society and the trends in cash use and supply. It sets out the key issues to consider — both positive and negative — if less cash were being used and accepted in New Zealand that:

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\(^1\) Cash refers to tangible money: banknotes and coins. ‘Money’ and ‘currency’ are used interchangeably.

\(^2\) A market failure is a situation where individuals or businesses make decisions that are rational for their individual situations but do not result in rational decisions for society.

\(^3\) Reserve Bank of New Zealand Act 1989, section 1A.

\(^4\) Thanks to Amber Wadsworth for authoring this paper. Thanks also to Jeremy Richardson, Cavan O’Connor-Close, Rebecca Williams, Graeme Denny, John Park and Kirsten Ashley for their contributions.
1. People who are financially or digitally excluded could be **severely negatively affected**. These include:
   
a) People who are not banked or have limitations to accessing the banking system, such as people without identification and proof of address, people with convictions, people with disabilities, illegal immigrants and children.

b) People who face barriers to digital inclusion, such as people with disabilities, senior citizens, people with low socio-economic status, people who live in rural communities with low internet service, migrants and refugees with English as a second language, Pasifika and Māori.

2. Tourists, people in some Pacific islands and people who use cash for cultural customs might be **negatively affected** if they cannot use cash substitutes.

3. All members of society would **lose** the freedom and autonomy that cash provides and the ability to use cash as a back-up form of payment, and might be more exposed to national and personal cyber threats.

4. There would be **limited or balanced effects** on people’s ability to budget, New Zealand’s financial stability and government revenue.

5. Cash infrastructure is costly. Moving to a society with less cash **could increase efficiency** and reduce the overall transaction costs of payments.

The issues arising from a society with less cash have a broad reach. This issues paper invites your feedback on whether we have correctly identified the most important issues and whether there any other significant issues that should be taken into account. It also seeks initial views on the roles of government and the Reserve Bank regarding these main issues.

The Reserve Bank will publish an analysis of the feedback received, as well as further research. A formal policy consultation may follow depending on what emerges from feedback on this paper and further research and analysis.
1 Introduction

Money is an integral part of society. It provides an easily identifiable and easy-to-use unit in which to set prices, a means to facilitate transactions, and a store of wealth. For centuries societies used barter systems, tokens or assets such as gold and silver to meet these functions. The advent of banknotes provided a lighter and more convenient form of money and credit creation, as they were made of paper and backed only by trust in the issuer, rather than holdings of underlying assets.

Banknotes were first recorded as being used in China in the 12th century but did not gain traction as a common form of money until after 1661, when Sweden’s first bank issued paper currency. Nowadays most money in advanced economies is held and stored as digital currency. Just under 2 percent of the broad money holdings in New Zealand is held in banknotes and the rest is held in digital balances.

The Reserve Bank of New Zealand (Reserve Bank) is the sole issuer of banknotes and coins in New Zealand and is required to issue currency that meets the needs of the public. This requirement stems from the Reserve Bank’s overall purpose in the Reserve Bank of New Zealand Act (1989), which is to promote the prosperity and well-being of New Zealanders and contribute to a sustainable and productive economy. To achieve this, the Reserve Bank is mandated to conduct monetary policy towards the economic objectives of price stability and maximum sustainable employment, and to promote the maintenance of a stable financial system. These goals require a stable form of money in New Zealand. Because our money is fiat currency (i.e. not backed by commodities such as gold) the stability of our money relies on trust in the government and stability in prices, banks and the financial markets infrastructure. The Reserve Bank is required to show a sense of social responsibility as it does its work.

Reserve Bank research has revealed that how New Zealanders use money is changing over time. We do not yet know with confidence what is driving this change. The amount of cash in New Zealand is growing as a share of GDP and per capita, but we appear to be using cash less in our daily lives. In 2017 the Reserve Bank surveyed 2,917 people about their cash use. The survey found that New Zealanders were using cash relatively less for transactions and relatively more for a store of wealth.

- 19 percent of people had not used cash at all in the previous seven days, and a further 42 percent of people had only used cash once or twice during that time.

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5 Sweden’s first bank was the precursor to Sweden’s central bank ‘Riksbank’. Fung et al. (2018).
6 Digital currency or digital money refers to all non-tangible forms of currency. These include conventional digital money with a par value with cash (such as bank deposits and prepaid vouchers and cards) and cryptocurrencies. See Wadsworth (2018a).
7 Broad money refers to the broadest measure of money in the economy and includes less liquid forms of money such as large deposits or repurchase agreements (otherwise referred to as ‘M3 money holdings’ excluding non-resident holdings). Source: Haver Analytics.
8 The Reserve Bank surveyed 6,400 people with a 49 percent response rate.
80 percent of survey respondents carried cash in their wallets.

Older respondents (over 60 years of age) held and used cash more than younger age groups.

As the transactional use of cash declines, the incentive for banks, retailers and other cash providers to continue to invest in cash infrastructure might also decline. This is because not only is it less likely that they will lose significant business if they do not accept or provide cash, but the per-transaction cost of providing cash increases as it is used less (as cash infrastructure incurs high fixed costs). This could lead to an ongoing contraction in New Zealand’s cash system that leads to cash becoming difficult to withdraw or spend. Currently, no state agency has a mandate to ensure that the public can continue to use cash, and no agency has considered how reduced cash availability could affect our society.

The purpose of this issues paper is to review whether cash has a unique role in New Zealand and identify some of the implications of moving towards a society with less cash. Section 2 considers the role of cash in New Zealand, outlining the key features of cash and how it is used in society. Section 3 explains why, although the Reserve Bank is required to supply whatever cash is necessary to meet the demand of the public, the role of retailers and banks in the cash supply chain can affect the availability of cash. Section 4 illustrates the trends in cash in circulation (CIC) domestically and abroad, and section 5 considers what uses of cash are also met by electronic substitutes. Finally, section 6 considers what roles of cash do not have substitutes and the broader issues of moving towards less cash. Section 7 summarises the issues regarding the future of cash and seeks your views on those issues.

2 The role of cash in society

To assess the role of cash, we must understand the features that make cash unique. Cash (banknotes and coins) is a form of money you can touch. Digital money is a form of money you cannot touch. Most digital money, such as bank account balances and mobile wallets, have equal value with cash and rely on conventional payment infrastructure. It is referred to as ‘fixed conventional’ digital money.9 As such, both cash and fixed conventional digital money collectively represent New Zealand dollars and are useful forms of money for:

- Writing prices in terms of dollars (unit of account).
- Using dollars to buy goods or services (medium of exchange).
- Building up savings in dollars (store of value).10

9 Digital money can also be in the form of cryptocurrencies and digital currencies that do not have a par value with cash. See Wadsworth (2018a) for a full explanation.

10 Store of value is defined as any non-transactional use of cash. It can include holding notes for long periods of time (hoarding) or for spending in the medium term.
The usefulness of cash as a unit of account, medium of exchange and store of value partially stems from the fact that it is issued on behalf of the state and carries a stamp of ‘legal tender’. Governments (and the national economies they represent) are generally less likely to go bankrupt than commercial entities, so people are more likely to trust that state-issued money will hold its value over time. In New Zealand, legal tender means that cash must be accepted for debt repayment (including taxes) unless there is an agreement stating otherwise. The concept of legal tender provides some certainty for the usefulness of cash, but does not guarantee that cash will be accepted as payment for sales.\(^{11}\)

New Zealand banknotes and coins can also be spent by whoever holds the currency. The identity of the holder is not required to verify the value of the note — in other words ‘bearer pays’. Contrast this with digital money where payments from credit cards, bank accounts and mobile wallets require authentication from the owner of the funds before they can be spent.

The physical form and ‘bearer pays’ aspects of cash give banknotes several other payment features:

- **Instant payment settlement**: When cash is transferred between two parties, the transaction is said to be ‘settled’ instantly. No additional actions or back-office transactions are required to finish the payment. Conversely, conventional electronic payments are not settled instantly as the money is not typically swapped between bank accounts until a later time, despite the fact that the payment has been approved.

- **Anonymous payments**: No electronic record is directly generated by cash payments. This results in payments being anonymous and difficult to monitor.

- **Physical boundaries**: Cash payments must typically be exchanged between people (it is prohibited and risky to send cash by mail in New Zealand).

- **Low scalability**: Large values of cash are difficult to store, transport and use.

- **High security risk**: Cash is at risk of theft, robbery or accidental loss as well as fraud. Individuals have limited recourse compared to recourse for losses of most digital money (excluding cryptocurrencies).

- **Varying costs**: Retailers and banks must pay the costs of providing cash infrastructure and usually pass on these costs to consumers via generally higher retail prices.

Broadly speaking, cash is used either as a medium of exchange or as a store of value in three markets (table 1):

1. **The domestic economy**: Retailers and consumers in New Zealand.

\(^{11}\) McBride (2015).
2. The overseas economy: Offshore money changers, non-residents who come to New Zealand and use New Zealand cash, and New Zealand-dollarized economies.\textsuperscript{12}

3. The shadow economy: Illegal activities, tax evasion or bypassing New Zealand regulations.

As mentioned, cash is also useful as a unit of account.

\textsuperscript{12} Countries that use New Zealand dollars as their primary currency.
Table 1

Uses of cash
This table provides a high-level summary of the uses of cash. The tables in Appendix A assess each use of cash at a greater level of detail, the potential drivers of and substitutes for each cash use and issues that could arise if there were less cash in society.

<table>
<thead>
<tr>
<th>Use</th>
<th>Medium of exchange (transactions)</th>
<th>Store of value (hoarded)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domestic economy</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Consumer | • Retail payments:  
  o Non-electronic, small value or anonymous  
  • Settle transactions in remote areas  
  • Person-to-person payments or gifts  
  • Donations  
  • Cultural events and traditions  
  • Budgeting | • Keep savings separate from banking system  
  • Emergency back-up funds |
| Retailer | • Payment acceptance  
  • Business continuity | |
| **Overseas economy** | | |
| | • Tourist demand for cash  
  • Notes held abroad with money changers  
  • Notes and coins held in Cook Islands, Niue, Tokelau and Pitcairn Islands | • New Zealand notes held abroad as a store of value |
| **Shadow economy** | | |
| | • Tax evasion on legitimate activities  
  • Avoiding employment law  
  • Illegal transactions  
  • Illegal immigrants | • Stores of wealth acquired from criminal activities or for illegal immigrants |
3 Understanding the supply of cash in New Zealand

A crucial element of cash use in New Zealand is the supply of cash to the public. This section explains how cash is supplied to the public and explores the cost incentives faced by cash suppliers in the face of falling cash demand for transactions. It then explores the network effects of cash and whether reduced cash availability creates a network externality.

3.1 Describing the supply of cash to the public in New Zealand

The Reserve Bank produces and issues as much cash as is demanded by the public and other users via the banking sector and other commercial providers. The supply of cash through the economy and to end users is explained in Figure 1.

Figure 1
The supply of cash to the New Zealand public

Excess stores of cash and unfit notes are sent back to the Reserve Bank’s Wellington vault for quality assurance followed by recirculation, storage or destruction. Cash-in-transit operators (CITs) also provide nationwide storage, processing and recycling services to banks and retailers. The CITs network consists of 15 cash depots, eight in the North Island and seven in the South Island. The Reserve Bank pays for unfit notes to be sent back to its Wellington vault.
3.2 Costs of supplying cash

The Reserve Bank is currently undertaking an analysis to estimate the total cost of cash infrastructure in New Zealand. An independent review panel in the United Kingdom found that its total cost of providing cash infrastructure is about £5 billion a year (33 pence per transaction).\textsuperscript{13}

There are three broad costs of supplying cash in New Zealand:

1. Fixed and variable expenses in providing and operating cash infrastructure.
2. Risks to physical safety (and their mitigation).
3. AML/CFT (anti-money laundering/counteracting finance of terrorism) compliance.

First, there are fixed and variable costs in providing and operating infrastructure to accept, store and transport cash securely. The fixed costs of providing cash infrastructure are usually ‘set-up’ costs, which do not tend to fluctuate. The fixed costs include setting up:

- Storage infrastructure: Vaults, cash depots, ATMs and safes.
- Transport infrastructure: Armoured vehicles.
- Retail and payment infrastructure: Cash registers and security systems.

The costs also have variable components. These include the ongoing costs of accepting, transporting and processing cash — for example, the costs of paying staff to accept cash and check for counterfeit notes and the costs of transporting cash to banks for storage at the end of each day. The total costs of providing cash in New Zealand vary depending on cash volumes due to this variable component of providing cash infrastructure. The fixed costs of providing cash infrastructure are largely unaffected by changes in the volume of CIC, with the exception of large changes that require significant increases or decreases in infrastructure.

The second broad cost of supplying cash is the risk of (potentially violent) robberies occurring at retailers, banks and CITs. Examples include dairies and petrol stations that are situated in areas where crime is high and have late opening hours. Any risk to personal safety can be a powerful driver to remove cash tills from businesses, particularly when considered in light of health and safety obligations.

\textsuperscript{13} Access to cash review (2019).
The third broad cost of supplying cash is the cost of complying with AML/CFT regulations. Due to the anonymity of cash, any cash deposits over a certain value must be confirmed to have come from legitimate sources and not be products of criminal activity. This means cash deposit takers must know their clients and be satisfied that cash deposits were not obtained from illegal activities. For this reason some banks have moved away from fast-deposit boxes, which were commonly used by retailers to bank their excess cash. Some banks determined that fast-deposit boxes made it difficult to determine where cash was obtained from and so presented an AML/CFT risk.

3.2.1 Issues related to costs of supplying cash

The fixed-cost component of cash infrastructure means that the per-transaction cost of providing cash will change as cash volumes fluctuate. If fewer people use cash (due to either reduced cash availability or less demand) the per-unit cost of providing and accepting cash will increase. An increased per-unit cost of cash infrastructure might incentivise banks and retailers to increase their prices to cover cash-handling fees or look for ways to reduce their cash-handling costs. It is possible that the volume of cash used to purchase goods and services will fall to a point where retailers find that losing some cash sales would be less costly than installing or maintaining cash infrastructure.

Further, if banks decide to reduce their cash services, retailers must rely more on CITs. If this results in higher costs of managing cash, retailers might be further incentivised to charge fees or decline cash payments.

There is some early evidence that cash suppliers are looking for ways to reduce the costs of providing cash to the public. Reserve Bank research indicates that some large retailers are installing cash recycling back-office technology and smart safes in store to reduce the cost of ordering and returning cash from banks and CITs. Some casinos have introduced cashless gambling machines and account-based gambling systems to reduce their cash needs.

Banks also appear to be diversifying their branch models to include cash and cashless services. Some bank branches are replacing cash services with in-store ATMs that support retail needs, such as providing bulk change. In 2012 to 2017 the number of bank branches and ATMs fell (21.6 percent and 8.1 percent respectively) despite the increased substitution of some cash services in branches with ATMs. In addition, banks ending the practice of passing on ‘other bank’ ATM fees to customers in 2018 might have reduced the revenue of some ATM providers. The decline in bank branch numbers likely reflects the fact that cash and other in-branch services have become unprofitable for specific locations.

Some central and local government services are also looking to improve their payment efficiency by moving away from using or requiring cash payments. The Department of Internal Affairs has a goal of ensuring that 80 percent of the 20 most common public services are completed digitally by 2021. This goal appears to be driven by a desire to improve the ease of payment rather than to reduce the costs of handling cash.

14 New Zealand has approximately 703 ATMs per one million inhabitants. The majority of these ATMs are in the North Island, although the more sparsely populated South Island has a greater number of ATMs per capita.

15 https://www.dia.govt.nz/Better-Public-Services
### 3.3 Cash availability and network effects

The cash system is a network that produces greater benefits as more and more people use it. This is called a network effect. Cash is supplied by the commercial sector and enables retail or commercial transactions, but it also brings a range of other benefits to society and is used for a wide range of non-retail transactions, including donations and person-to-person transactions.

The network effects of cash mean that it is difficult to establish to what extent either the decreased transactional demand for cash or the cost-reducing actions by banks is driving the reduction in cash supply. For example, it is not clear to what extent the reduction in ATM and branch numbers reflects commercial decisions leading to a reduction in cash availability or a balanced response to lower demand for cash from customers. The presence of network effects also implies that the social benefits of cash infrastructure are greater than the bottom-line profits generated from cash services or accepting cash (as opposed to other means of payment).

Strategic and operational decisions taken by cash suppliers can directly and indirectly affect the availability of cash to the public and the network effect of cash. As less cash is provided and accepted by banks, retailers, casinos and ATM providers, the public demand for cash might fall further as people substitute to more universally accepted forms of payment.

If suppliers and consumers switched away from cash for transactions, the cash network would decline and cash would become difficult to use more generally. For example, it could become more difficult to access cash to make payments between people, use cash savings at retail stores or deposit cash savings at banks. Such a contraction in the cash network, which is driven by strict bottom-line considerations without regard for the wider benefits of having cash in society, could result in what is called a ‘network externality’. The consequences of this network externality would mean that some people who have real needs for the unique role that cash provides will no longer have their needs met. This could be considered a ‘market failure’ and could warrant government action.

### 4 Cash trends in New Zealand and internationally

CIC trends indicate that cash is being used less for transactions and more as a store of value in New Zealand and other advanced economies. This dynamic provides impetus to consider whether the government should respond to the strict bottom-line incentives faced by cash suppliers.
4.1 Domestic trends in cash in circulation

The total value of CIC in New Zealand is increasing as a percent of nominal GDP and on a per-capita basis (figure 2). International studies suggest that New Zealand’s CIC trend could be due to an increasing demand for cash as a store of value over time and a falling demand for cash as a medium of exchange.

Amromin and Chakravorti (2009) explain the trends in CIC across advanced economies by separating notes into large, medium and small denominations. These are based on note denominations that are commonly dispensed by ATMs (medium) or note denominations that are too large or too small to be dispensed. They find that decreased holdings of smaller denominations are associated with decreased use of cash for transactions (and higher use of electronic cards), while holdings of large-value notes respond more to short-term interest rates so are more likely used as a store of value. More recently, Bech et al. (2018) estimate the drivers of CIC across 16 countries and find that demand for large-value notes responds to changes in interest rates (so indicates use as store of value). They conclude that CIC across most countries is likely driven by store of value.

Figure 2
Cash in circulation

Figure 3 shows that holdings of New Zealand small-value denominations have fallen over history while holdings of 100 dollar notes have increased. The trends in 20 dollar and 50 dollar notes are difficult to attribute between demand and supply factors, as both notes are dispensed more intensively by ATMs. Figure 4 shows that the greater circulation of notes through ATMs in the early 2000s aligns with the increase in 20 dollar note holdings and the later decision by ATM providers in 2012 to disseminate relatively more 50 dollar notes. However, ATM distribution supports many uses and does not distinguish underlying drivers of note circulation.\textsuperscript{16}

\textsuperscript{16} Bascand (2014).
The Reserve Bank 2017 cash use survey also indicates that cash is used less for transactions compared to digital money:¹⁷

- 11 percent of the adult population (400,000 individuals) use cash on a daily basis.
- About 38 percent of the adult population (1.4 million individuals) use cash for transactional purposes three times a week or more.
- People aged 60 and over account for 41 percent of cash holdings for transactional purposes.

Figure 3
Cash in circulation by small-, medium- and large-denomination notes (percent of nominal GDP)

[Graph showing cash in circulation by denominations]

Source: Reserve Bank (F3), Haver

Figure 4
Cash in circulation for all denominations (value and volume)

[Graph showing cash in circulation by value and volume]

¹⁷ These findings were echoed in a recent BNZ survey on cash use in New Zealand. BNZ (2019).
The drivers of an apparent increase in demand for cash as a store of value are largely unknown — the Reserve Bank can only identify the whereabouts of 25 percent of CIC. Inflation could also be a contributor to the growth in note holdings over the history of the note series — as prices increase, people must hold more cash if they want to maintain a similar store of value. However, figure 2 accounts for inflation by showing CIC as a percentage of nominal GDP (real GDP and inflation) and shows that even after accounting for inflation the increasing trend is still evident.

Another possible driver of the trending increase in CIC could be increased currency issuance to offshore currency holders such as money changers abroad. This might reflect tourist demand for notes before they arrive in New Zealand. Total note exports increased from 6 percent as a share of annual note issuance in 2013 to 32 percent in 2017, and the majority of those notes were exported to key countries for New Zealand tourist arrivals. We are not yet able to determine what proportion of these notes returned to New Zealand and when relative to their issue.

**Figure 5**

*Domestic and international issuance of New Zealand banknotes*
4.2 International trends in cash in circulation

The broad trends in CIC described in the previous section are not unique to New Zealand. Figure 6 shows the changes in CIC and card payments from 2006 to 2016 in 11 advanced economies. The beginning of each arrow represents CIC as a share of nominal GDP and the value of card payments as a share of nominal GDP in 2006, and the end point of each arrow represents these values in 2016. Together they show how CIC and card payments evolved over the period. Each arrow represents a different country. Figure 6 shows that both CIC and the value of card payments grew in each advanced economy, except for Norway and Sweden. However, the value of card payments as a percent of nominal GDP was generally higher and faster growing than CIC as a percent of nominal GDP (figure 6).\(^\text{18}\)

New Zealand had the lowest CIC in 2007 and our trends in cash and card values as a share of nominal GDP, while similar, are more muted relative to those of the other advanced economies. This means New Zealand has a low but relatively stable cash demand and stable use of electronic cards compared with other advanced economies.

On a per-capita basis, New Zealand sat within the top six countries in terms of how many card (credit and debit) transactions each person made on average each year. However, Hong Kong and Singapore led the way in terms of how many cashless payments were made each year — on average each person made 760.7 and 599.3 ‘e-money’\(^\text{19}\) transactions in 2017 in Hong Kong and Singapore respectively. The remaining countries had a relatively small number of e-money transactions or did not collect e-money transaction data.\(^\text{20}\)

\(^\text{18}\) CIC is a stock measure that, due to data constraints, is often used as a proxy for the flow of CIC. It is compared to the value of card payments with caution. See Bech et al. (2018).

\(^\text{19}\) Compared to countries included in the Committee on Payments and Market Infrastructures [see https://www.bis.org/cpmi/] (CPMI) and Norway. The CPMI defines e-money as prepaid value stored electronically that represents a liability of the e-money issuer.

\(^\text{20}\) CPMI 2017 Red Book.
**Figure 6**
Card payments and cash demand trends from 2007 to 2016 in advanced economies (percent of nominal GDP)

Note: Euro area data is for 2007 and 2016. Source: CPMI Red Books, Norges Bank, Stats NZ, Reserve Bank

**Figure 7**
Volume of card and e-money transactions per capita in 2017

Source: CPMI Red Book, Stats NZ, Norges Bank
Norway and Sweden are the only advanced economies to experience decreasing CIC trends. In Sweden, the total value of CIC is falling (in absolute value, per capita and as a share of nominal GDP), despite Sweden having negative interest rates since 2015. Sweden’s holdings of its two highest notes (the 1,000 krona note and the 500 krona note) have fallen considerably. In Norway, the total value of CIC has been constant but the amount held per person and as a share of nominal GDP has been falling. Specifically, holdings of the 1,000 kroner note have been falling while holdings of the 500 kroner note have been increasing. The fall in CIC in these countries could be due to a number of factors:

- The widespread use of person-to-person mobile payments and card transactions could result in lower demand for cash. In Sweden, Ingves (2017) states that developments in technology have fostered the creation and development of payment alternatives like the government-provided mobile-based application ‘Swish’, which may partially account for this movement away from physical cash. New Zealand does not yet have a widespread mobile payment solution comparable to Swish.

- Bank branches and retailers are less willing to accept or issue cash due to higher costs, including those related to infrastructure, risk to people and AML/CFT considerations. The central banks of both countries (Riksbank and Norges Bank) shifted more of the cost of cash infrastructure to the private sector in the early 2000s.
  - In Sweden, Riksbank chose to reduce the number of Riksbank offices for cash management and provide incentives for the banks to open their own cash depots in 2004. Since then commercial banks have assumed the full cost of cash storage, distribution, quality assurance and recirculation since 2004. Currently, around half of Sweden’s bank branches no longer store or accept cash deposits.
  - In Norway, Norges Bank revised its cash system to reduce its cash-handling activities in the early 2000s. The Norges Bank is now only responsible for cash issuance and destruction (including final quality assurance before destruction). Commercial banks are responsible for cash storage, distribution, quality assurance and recirculation. Since then Norway’s largest and second-largest banks, DNB and Nordea, have signalled a move away from cash.

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21 Negative interest rates provide an incentive to hold cash.
23 Riksbank (2010).
24 Henley (2016).
• There might also be lower demand for Swedish and Norwegian cash from the shadow economy due to their close proximity to the Euro area, and due to local laws that make tax evasion more difficult. For example, Swedish retailers must use specific tax registers that record all point-of-sale transactions in a way that cannot be altered. In addition, the Swedish government has made household expenses tax deductible. This has reduced the opportunity for businesses to use cash payments to avoid taxes as more households request payment receipts.

5 Electronic substitutes for cash

Most of the functions of cash described in table 1 and Appendix A are also met by electronic substitutes or have the potential to be met by electronic substitutes as innovations continue.

5.1 Use of substitutes

Many of the transactional uses of cash in Appendix A are also met by electronic forms of payment, such as online transactions, credit and debit cards, and mobile wallets. In 2016 CIC in New Zealand totalled 1.92 percent of GDP compared to electronic card payments at 28.8 percent of GDP (figure 7). Payments NZ reports that card payments account for the largest share of electronic transaction values in New Zealand.26 In 2018, debit card payments were the most common form of card payment in New Zealand, averaging 214 transactions per capita, compared with credit and contactless cards at 144 per capita (total card transactions per capita averaged 358, almost one a day per person). Online credit and debit card transactions were the next most popular form of payment (averaging 100 transactions per capita). However, the number of credit and contactless card payments grew 148 percent (from 2010), while debit card transactions grew 8 percent. Electronic payments, like cash, are only useful to the extent that retailers accept them and customers want to use them.

Cash payments are faster than most card payments. There are no comprehensive studies of the speed of different payments in New Zealand. However, studies of cash use in Canada and Poland find that one of the reasons cash is often used for small-value retail payments is its speed. These studies find card payments can take on average about 20 seconds longer than cash payments. They also find that contactless card payments could be as fast, or faster, than cash payments if used in ‘offline’ mode, making them an effective cash substitute for small-value payments.27

27 Polasik et al. (2012) study Polish data and find that contactless card payments are almost as fast as cash for small-value payments when in online mode, and faster than cash when in offline mode. Arango et al. (2015) study Canadian data and find that in a scenario where cards are accepted everywhere and as easy to use as cash, i.e. contactless payments, the probability of a consumer paying in cash for small-value transaction drops by half. Vallle (2018) also
5.2 Future developments in electronic substitutes

Some of the transactional uses of cash in Appendix A could be met by electronic payments or innovations that are likely to occur in the future based on current projects and initiatives.

Payments NZ is leading an ‘open banking’ initiative in New Zealand by facilitating the development of Application Processing Interface (API) standards agreed to by New Zealand banks.28 Through this initiative, consumers could grant Fintech start-ups and mobile application developers access to their banking data. Fintech firms could use this data to develop a range of services for consumers, including more convenient person-to-person mobile payment applications and mobile budgeting applications. These applications could provide additional electronic substitutes for cash. The timing of these developments is uncertain given current challenges, including security models, governance of API standards, third-party access to bank APIs, and whether innovators keep a customer focus.

Electronic payments have some current limitations when it comes to competing with cash payments. As noted earlier, behind the scenes the payment settlement process for card and mobile wallet transactions is significantly slower than it is for cash. All electronic payments (except those made with cryptocurrencies) rely on the same back-end infrastructure for payment settlement. Although electronic payments are initiated and authorised relatively quickly, often the exchange of funds does not occur until a later time.29 This means that although a payment is legally ‘settled’ when it is authorised, the money does not show up in the receiver’s bank account until later. Payments NZ is now leading a ‘speeding up’ workstream to consider how New Zealand might enable faster payments and faster access to funds.30

Going forward, improvements to the settlement systems that process retail payments (such as the Reserve Bank of Australia’s New Payments Platform) could result in instant or very fast settlement of electronic card payments (as long as they are processed in ‘online’ mode). Payments that are processed using distributed ledger technology (DLT) could also have very fast settlement.31 Currently no mainstream retail payments in New Zealand are processed with DLT, although some New Zealand banks are exploring potential use cases of DLT for retail payments and insurance.32

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28 See Watson (2016) for a description of APIs and core banking systems.
29 See Wadsworth (2018b) for a description of payment settlement with electronic cards.
30 See https://www.paymentsnz.co.nz/our-work/payments-direction/speeding-up-workstream
31 See Wadsworth (2018b) for a description of payment settlement with DLT.
Considerations arising from having less cash in society

Given the trends in cash demand and the cost pressures on the commercial supply of cash in New Zealand, it is possible that cash will become less widely available or used in the medium to long term. The effects of less cash in society would be felt more keenly by certain groups of people who rely on cash and for whom no practicable substitute exists. The severity of these impacts would be worsened if the transition to a society with less cash acceptance occurred before mitigating measures could be put in place. Further, the size of the affected groups might not be large enough to motivate cash providers to ensure future cash availability, but the size might also not be negligible.

This section summarises the information in table 1 and Appendix A and the issues that should be considered if cash use and availability decline.

**Issue 1: People who are financially or digitally excluded could be severely negatively affected.**

Cash provides access to the financial system for those who face barriers to financial inclusion. Further, in a society with less cash, barriers to digital inclusion could become barriers to financial inclusion.

1. Barriers to financial inclusion include limited access to the banking system due to either a lack of trust in online security, skill or motivation to use online financial platforms, or banking restrictions. People who are not banked or have limitations to accessing the banking system tend to be people without identification and proof of address, people with convictions, people with poor credit histories, people with disabilities, illegal immigrants and children.

   Elderly people typically rely more than others on cash as a form of payment. This could be due to low trust in online payments, low ability or low motivation to learn new payment techniques. People with physical disabilities, such as sight or intellectual impairments, might also find cash a useful form of money. Children are also subject to financial exclusion as banks do not issue debit cards to children under the age of 13. Further, New Zealand banks have full discretion in the customers they service. This means that some people who do not meet certain bank policies cannot obtain or keep accounts with those banks. Appendix A describes additional groups that rely on cash rather than digital money.
The number of people who are currently excluded from the banking system in New Zealand is small but not zero. The World Bank estimates that only 1 percent of the population in New Zealand does not have a bank account.\textsuperscript{33} Meanwhile, the Reserve Bank survey of cash use in 2017 found that 4 percent of people surveyed had used only cash in the previous seven days; some of this will have been due to personal preference and some to financial exclusion. This group was weighted towards those aged over 60.

2. Barriers to digital inclusion include insufficient internet coverage, affordability constraints for technology hardware or data plans, lack of skills, lack of confidence and low motivation to use digital platforms. For example, even if people have access to the internet they might not be motivated to upload personal details to an online bank account due to privacy concerns.

People who face barriers to digital inclusion are people with disabilities, senior citizens, people with low socio-economic status, people who live in rural communities with low internet service, migrants and refugees with English as a second language, Pasifika and Māori.\textsuperscript{34} The 2013 census revealed that 33 percent of Māori did not have access to the internet (10 percentage points higher than the national average).

**Issue 2: Tourists, people in some Pacific islands and people who use cash for cultural customs might be negatively affected if they cannot use substitutes.**

**Tourists**

Currently most tourists use cash as a reliable and easy-to-use form of payment. Reserve Bank research has revealed that cash is typically issued to Auckland and overseas and sent back to the Reserve Bank from the South Island. This movement is likely due to the movement of tourists. Many retailers in New Zealand do not accept credit cards (or contactless payments) due to their higher interchange fees, preferring instead to accept debit and EFTPOS cards (which require a New Zealand bank account) that incur much lower costs for the retailers. We are not aware of the extent to which inbound tourists’ own financial services’ fees or portability, or their prior understanding of transacting in New Zealand, influence this behaviour.

As per Appendix A, tourist access to payments in New Zealand could be met by overseas-issued debit cards if cash were not available. Further, competition might cause some retailers to accept tourist credit cards despite higher interchange fees if cash were not available. Bounie \textit{et al.} (2015) show that higher competitive pressures (the threat of losing sales) increase the probability that a retailer will accept credit card payments despite the higher costs.

\textsuperscript{33} Based on a survey of 1,000 people in 2017. Demirguc-Kunt \textit{et al.} (2017).

\textsuperscript{34} Digital inclusion research group (2017). Lips (2015).
Even if electronic payment alternatives were reliable, tourists might be disadvantaged due to language and cultural barriers that create actual and perceived barriers to payments in New Zealand. Further, tourists might be particularly vulnerable to risks of robbery or loss of payment cards if they could not rely on cash as a back-up payment.

Pacific Islands

Niue, the Cook Islands and Tokelau rely on New Zealand banknotes and coins for their physical currency. The size of these island economies has been thought to be a contributing factor to their use of New Zealand currency. In addition, these islands are formally defined as states in free association within the Realm of New Zealand. New Zealand banknotes are also used in the Pitcairn Islands.

The Reserve Bank does not have a formal arrangement to supply these economies with banknotes and coins. The supply of banknotes and coins to these islands is facilitated by commercial providers, tourists and transfers from families. There are no ATMs on Niue and Tokelau. The Cook Islands has two ATM providers and also issues its own banknotes and coins. These islands also have access to digital money as in New Zealand.

Cultural customs

New Zealand’s banknotes have been referred to as the country’s business card. The designs on the notes represent many of our cultural icons and contribute to our national cultural identity. Cash is also used in many cultural customs in New Zealand. Some cultures that use cash as gifts in traditional ceremonies might find that part of their cultural identity is lost if they can no longer access cash easily. For instance:

1. A Chinese custom is to give cash to junior family members and friends during celebrations including New Year (Hoong Bouw — giving money in red envelopes), at funerals, and during tea ceremonies in traditional Chinese culture.

2. Some cultures have a wedding money dance where cash is gifted to the bride and groom as they dance (the Philippines’ Saya ng Pera, and the Taualuga in Samoa, Tonga and Western Polynesia).

3. Western cultures give coins to children who lose their baby teeth (Tooth Fairy).

**Issue 3:** All members of society will lose the freedom and autonomy that cash provides, be more exposed to cyber threats, and lose the ability to use cash as a back-up form of payment.

If cash use and availability were to decline, an issue for all members of society could be the loss of freedom that cash provides in terms of autonomous spending and wealth stores, privacy, ability to live off the grid, and ability to avoid the banking system. This could result in a significant loss of social freedom in aggregate and increased cyber security risks (leading to an increase in national security risks). Lastly, society would lose the benefit of cash as a back-up form of payment, although the usefulness of cash in this role is limited.
Reduced freedom

Cash is anonymous, so provides consumers with autonomy or discretion in how they choose to spend their money or store their wealth. The feature of full anonymity creates personal and societal freedom and has not been replicated in digital currencies. There are three elements in this freedom: the first relates to the desire for privacy in making transactions, the second relates to the desire to avoid banks or government regulation, and the third relates to exposure to cybercrime.

First, cash payments and balances cannot easily be traced. Central agents and third parties (such as banks and governments) cannot easily intervene or stop cash payments outside the banking system. This is a unique feature of cash and is not fully replicated by any other form of money. This anonymity gives people full control of and discretion with their finances. Independent bank accounts could provide personal freedoms but they are not always available or sufficient. For example, individuals who are in abusive and controlling circumstances might benefit from cash as it is easier to obtain and hide when other personal freedoms are restricted. Additionally, people might feel that they benefit from the choice of using an anonymous form of payment if it were ever needed.

However, the difficulty in tracing cash makes it relatively more vulnerable to theft, accidental losses and fraudulent payments (inadvertently accepting counterfeit notes). For this reason, some argue that people would be better off with a partially anonymous form of payment, where only the minimum information is given regarding the identity of the payer and payee in each transaction, but each transaction is recorded. These payments include, for example, vouchers and prepaid gift (debit or scheme) cards.

Second, the offline and anonymous features of cash enable people to separate their transactions and stores of wealth from the banking system and some government interventions. There are legitimate motivations for this separation:

1. There is currently no guarantee of the safety of bank deposits in New Zealand. Banks take household and business deposits and lend them to borrowers — there is a risk that borrowers might not be able to service their debts. Households and businesses could lose their deposits if banks were engaging in overly risky lending or if a severe series of events occurred and many loans were not repaid.

2. People might also want to remove their savings from the banking system if the Reserve Bank charged negative interest rates to stimulate the economy. Cash provides an avenue for people to avoid this form of government intervention or any other government intervention that might occur in the future, such as capital controls.

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35 Access to cash review (2019).
36 Birch (2017).
37 Deposit protection mechanisms are being considered as part of Phase 2 of the Reserve Bank Act Review.
3. Relatedly, people might want to store wealth outside the banking system if they have low fundamental trust in banks or the government. Examples are individuals who have immigrated to New Zealand from countries where trust in the financial system is low, or where government appropriations of assets were not uncommon. If there were less cash in society, individuals would lose their privacy and autonomy from government in the sense that all their transactions and savings would be fully traceable if permitted by law.

Third, storing and transacting in cash reduces exposure to cybercrime, such as financial losses and identity fraud. On a societal level, New Zealand might be more exposed to cybercrime such as state-funded cyber threats if it were totally reliant on the banking system and digital money for all transactions and savings. On a personal level, some people might prefer to keep their identities and finances offline due to cyber concerns.

The loss of freedom in society in the above three areas could result in demand for a form of digital currency issued by the central bank that replicates some of the autonomy of cash. There are other assets in which people could store their wealth that are offline and removed from the financial system, for example commodity assets and property. However, these are more difficult to transform into spendable money and can come with a different set of risks including fluctuating values.

Therefore, people might demand a central bank digital currency that provides lower traceability than current electronic payments and accounts and presents an alternative to the banking system. This could be in the form of accounts with the central bank or tokens issued by the central bank, which carry a very low risk of default and sit outside the commercial banking system. A central bank digital currency could also be designed to provide a low-cost form of payment to put downward pressure on uncompetitive prices in the payment system. Alternatively, consumers might ask for deposit protection and greater regulation of the banking system.\(^{38}\)

People might also value the freedom and autonomy of cash for illegitimate reasons. As noted in section 2, cash is used in the shadow economy to facilitate illegal transactions or as a means to hide income and reduce tax and other obligations. The International Monetary Fund estimated New Zealand’s shadow economy at 11.7 percent of GDP in 1991-2015.\(^{39}\) It is difficult to assert what might occur in the shadow economy if we had less cash. At the margin, some shadow economy activities could be reduced as people consider the additional difficulty of engaging in them without anonymous payments. For example, some people might be dissuaded from buying illegal goods and services if they could not avoid leaving electronic records of their purchases. However, it is also possible that criminal activity would innovate to other mechanisms or forms of payment discussed below.

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\(^{38}\) See Wadsworth (2018c) for a full discussion on central bank digital currencies.

\(^{39}\) Medina and Schneider (2018).
There is debate on whether the anonymity of cash enables crime or whether illegal transactions would continue without cash. Rogoff (2016) and McAndrews (2017) agree that, without cash, criminals could use commodity money (i.e. gold), foreign currency and inflated invoices. But they disagree on the extent to which these substitutes would be used. Rogoff (2016) argues that there is no complete substitute for cash, so criminal activity would be hindered if there were less cash in society. McAndrews (2017) argues that inflated invoices would become the most likely medium of exchange for criminals. He suggests that a society without cash would likely move towards deeper institutional corruption of businesses as criminals laundered money obtained from illegal transactions. He also warns that innocent businesses could find themselves forced into money laundering as criminals look for businesses to issue inflated invoices.

Issue 4 considers how some tax evasion might be reduced by less cash.

Loss of emergency back-up

Cash can be a back-up payment mechanism when electronic payment systems are not in operation or otherwise unavailable. The Reserve Bank survey on cash use indicated that 37 percent of people held cash just in case it was needed (i.e. not for immediate transactions). Cash is particularly useful in case of ‘personal emergencies’ or localised or short disruptions in electronic payment systems, and after large-scale events conditional on the availability of retail stores able to accept it. Figure 2 shows a spike in CIC as a percent of GDP in 1999 that could be attributed to the ‘Y2K’ uncertainty.

Cash has several limitations in its usefulness as a back-up payment in case of large-scale events or natural disasters. Because the supply of cash and most retail operations are reliant on electricity and communications, IOUs between small groups or people who are known to each other might be more effective in periods of long electricity outages such as those that occur in natural disasters. There might also not be sufficient cash infrastructure capacity to meet a national transition to cash in an emergency.

In addition, the National Risk Unit does not recommend including cash in a civil defence kit or give guidance on the best means of payment in a national disaster response period. This could be because people already have their essentials in their civil defence kits, retail stores might not be operating, and emergency responders will provide additional supplies. In the weeks following the Christchurch February 2011 earthquake, public demand for cash did not increase substantially. Commercial banks anticipated an increase in demand for cash and increased their stores of cash and set up temporary ATMs based on generators. However, the bulk of these cash stores returned to the Reserve Bank relatively quickly. Figure 2 shows CIC did not peak as a share of the population during 2011.

Issue 4: On balance, there would be limited effects on budgeting, financial stability and government revenue.

Transitioning to a society with less cash does not significantly or negatively affect household budgeting, financial stability and government revenue.
Budgeting

Cash is widely cited as a budgeting tool. Psychological studies show that paying in cash incites a higher psychological pain of parting with funds. This is because the tangible nature of cash results in high transparency of payments and so generates a greater awareness of spending. This greater ‘pain of paying’ encourages less spending and is useful for managing discretionary spending, but it could reduce willingness to pay bills or debt. Shah et al. (2016) suggest that consumers should automate their essential payments and savings using online banking then spend disposable (leftover) income using cash. Cash might also be useful for limiting spending when people need to keep money separate for other purposes.

People who prefer to use cash for budgeting might benefit from new electronic budgeting tools such as budgeting applications on mobile phones. For example, several banks in Dubai provide real-time balance updates or notifications every time money is spent, replicating the relatively high ‘pain of paying’ that cash provides.

Cash is not the only nor the most important budgeting tool available for people with low or no disposable incomes, high debts, overspending habits or poor mental health. For these groups, commonly cited budgeting tools include awareness and education, direct credits, multiple bank accounts and removing overdrafts and credit. Cash is used for people who are in full financial management in a Total Money Management programme, as they are allocated their weekly spending in cash.

However, the anonymity of cash makes it difficult for budgeting advisors to identify areas of overspending. Cash also enables people to default on automatic payments (for bills or debts) as they can withdraw their full bank account balances into cash. Further, withdrawing money into cash puts people at a higher risk of robberies than if they did not withdraw their money. For example, people who withdraw their income payments from ATMs at night to avoid automatic payments (processed in the morning) face a risk of robbery, particularly if these habits are well known in the community.

Financial stability

A society with less cash does not pose a risk to financial stability. Cash represents a claim on the government and carries low default risk. In theory, the ability of depositors to convert their savings into cash represents a form of market discipline on banks that encourages them to operate prudently. However, there is little empirical evidence to support this. Engert et al. (2018) evaluate the bank runs during the 2007-2008 Global Financial Crisis and determine that cash withdrawals are a small and unimportant source of market discipline on banks. Shin (2009) finds that the Northern Rock bank run was triggered predominantly by wholesale runs, and the in-branch runs to cash were insignificant.

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40 Shah et al. (2016) and Raghubir and Srivastava (2008).
41 Total Money Management is a budgeting model where a budgeting service provider holds a bank account on behalf of individuals to manage their direct debits. It is provided by a range of budgeting service providers across New Zealand.
Market discipline is only one form of discipline safeguarding our financial system. Another form is regulatory discipline. The Reserve Bank is mandated to use prudential regulation and supervision to contribute to a stable financial system. The third form is self-discipline, whereby financial market institutions self-regulate to ensure their ongoing prudent operation.

The second aspect of stability is payment stability. Migrating from two payment systems to one payment system would consolidate operational risk in the single payment system. Greater emphasis would be required on ensuring the operational reliability of the single payment system if people could not easily revert to cash if there were a system outage. Most electronic payments (except cryptocurrencies) rely on the same back-end payment systems, which exhibit several single points of failure.42

Increased tax revenue and reduced seigniorage

Government revenue could be affected in two ways if cash use and availability declined. First, removing the availability of notes and coins might increase tax revenue as businesses would no longer use cash to reduce their tax bills. Inland Revenue has reported that the most common ‘hidden economy’ activity is the underreporting of taxable income, which includes income from cash jobs and transactions.43

Exactly how much tax revenue is lost due to this type of activity is unknown. A tax working group paper suggests that unincorporated self-employed individuals under-report approximately 20 percent of their gross income. This estimate is based on a study commissioned by Inland Revenue44 and could represent $850 million per annum in lost tax revenue from unincorporated (non-trust or non-corporation) taxpayers. There is considerable uncertainty as to the extent to which this number includes self-employed people who are evading tax by underreporting cash revenue versus other types of underreporting. It is also not certain that those reducing their tax burdens by underreporting cash revenue would increase their tax payments if cash were used less.45

Second, seigniorage revenue might decline if the value of CIC declined significantly. Seigniorage revenue is the profit the Reserve Bank makes from producing and selling cash and investing the profits, as well as any profit the Reserve Bank makes from financial market trading.46 The Reserve Bank estimates that it made around $148 million in seigniorage revenue last financial year by issuing cash and investing the profits.

Other activity in the shadow economy is unlikely to be affected by the disappearance of cash as people find other ways to circumvent the law, as described in Appendix A. People who can no longer launder cash will likely switch to other methods.

42 Wadsworth (2018b).
46 The Reserve Bank produces banknotes and coins and sells them to bank branches (for less than the cost of production) for digital money. This profit is invested and tends to earn a positive return.
Issue 5: Cash infrastructure is costly.

An efficient financial system is one where there is an optimal allocation of resources. Moving to a society with less cash could improve efficiency to the extent that the nation would only be paying for one payment system instead of two.\(^{47}\)

The costs of payments would decrease if New Zealand gradually moved from a dual payment system to a single electronic payment system. Currently payment infrastructure is required for both cash payments and electronic payments. Cash infrastructure and electronic payments infrastructure are costly and, as noted in section 3, these costs are passed on to the economy through higher general prices of goods and services. Moving to a single payment network would increase the network effects (benefits) gained from that network — network effects in payments are greater the larger the system.\(^{48}\) However, a transition to a single payment system would incur short-term costs as consumers, banks and retailers adapted.

In addition, transitioning to a single electronic payment system could exacerbate some inefficiencies present in credit and contactless card interchange fees. EFTPOS and debit cards (that are inserted) are ‘switch-to-issuer’ schemes and do not incur fees when used.\(^{49}\) However, contactless cards (including debit) and credit cards are ‘switch-to-acquire’ schemes and rely on an interchange system that charges interchange fees.\(^{50}\) Retailers can pay fees of between 1 and 1.5 percent for each contactless and credit card transaction. The fees cover the cost of providing the interchange but also pay for banks’ credit card reward schemes.\(^{51}\)

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\(^{47}\) The Reserve Bank’s monetary policy would also be more efficient if cash were removed. The Reserve Bank affects interest rates in the economy by setting an Official Cash Rate (OCR). An OCR below zero would incentivise banks to charge negative interest rates on deposits. To avoid negative rates, people and businesses could take their savings out in cash (investing in safes or vaults). This would impose a lower bound on monetary policy because cash holdings are not directly subject to interest rates. See Wadsworth (2018c) for a more detailed discussion.

\(^{48}\) The electronic payment system is referred to as a singular system to the extent that it is electronic and there are several single points of failure in the system. However, the system as a whole is made up of various providers and mechanisms.

\(^{49}\) The ‘switch-to-issuer’ system involves an issuing bank (the bank used by the cardholder), a merchant and a cardholder. The merchant requests payment authorisation from the issuing bank. This system does not involve the merchant’s bank (the acquiring bank) for payment authorisation. Debit cards that are inserted, and EFTPOS systems are ‘switch to issuer’ schemes and do not incur fees. This is because EFTPOS, a New Zealand proprietary card scheme issued in the 1980s, operates on a ‘switch to issuer’ scheme that does not carry fees. At the time of introduction, commercial banks were encouraging the use of these cards so charged the consumers issuance fees rather than retailers. Switch to issuer is when the retailer point of sale communicates via the switch with the bank issuing the customer’s funds to the retailer’s bank.

\(^{50}\) A ‘switch-to-acquirer’ card scheme involves a card holder, an issuing bank (the bank used by the card holder), a merchant and an acquiring bank (the bank used by the merchant). The acquiring bank requests authorisation from the issuing bank to authorise the payment. This scheme involves a more complex system of fees and there are no historical precedents of lower or free fees.

\(^{51}\) Ministry of Business, Innovation and Employment (2016).
If these higher fees are passed on to credit card customers who seek to benefit from these reward schemes and access to credit, the presence of the interchange fees does not represent a market inefficiency. However, in New Zealand the Ministry of Business, Innovation and Employment (MBIE) has found that few retailers pass on the higher interchange fees to credit card customers. This means that the costs of using credit cards in New Zealand are recovered through generally higher prices paid by all consumers (cash and debit card payers are subsidising credit card rewards) or by the retailers themselves.

MBIE estimates that the use of credit cards instead of EFTPOS (without a need for credit) adds $45 million in unnecessary costs to the New Zealand economy annually. A reduction in cash availability might reduce this inefficiency, as the number of cash payers who subsidise credit card rewards might decrease (to the extent that cash payers switch to credit cards). But removing cash could also reduce competitive pressure on the credit card market and result in higher interchange fees.

7 Summary of issues

New Zealanders are using cash less and less for transactions. Although CIC is increasing, this is attributed to non-transactional uses of cash, including recent increased offshore exports, increased holdings of cash, and potentially activities in the shadow economy. The cash system is a network that has increasing benefits as more people use it. The opposite is also true. As the transactional demand for cash falls, the per-transaction cost of providing cash infrastructure increases. Commercial operators will be incentivised to reduce their costs and might reduce cash infrastructure, charge fees for cash payments or stop accepting and issuing cash. These commercial decisions could in turn reduce the network effects of cash. As fewer consumers, businesses and banks deal with cash, the benefits of using cash will decline. Cash held as a store of value might lose its liquidity as it becomes harder for depositors to find banks or retailers that will accept cash deposits and payments.

A ‘network externality’ could arise if cash supply decisions do not take into account the social impacts of reducing cash. This externality takes the form of people whose lives are negatively affected. This paper finds several key issues to consider if New Zealand has less cash:

1. People who are financially or digitally excluded could be severely negatively affected by a decline in cash.

2. Tourists, people in some Pacific islands and people who use cash for cultural customs could be negatively affected if they cannot use cash substitutes.

52 Chakravoti (2009). Gans and King (2003) argue that as long as retailers pass on the costs of higher interchange fees only to credit card payers, the interchange fee is neutral.
3. All members of society would lose the freedom and autonomy that cash provides and the ability to use cash as a back-up form of payment, and might be more exposed to national and personal cyber threats.

4. There would be limited or balanced effects on people’s ability to budget, New Zealand’s financial stability and government revenue.

5. Cash infrastructure is costly. Moving to a society with less cash could increase efficiency and reduce the overall transaction costs of payments.

We seek your views on the size, likelihood and impacts of the issues presented in this paper. We also invite your views on whether there is a role for the government to act in either preserving the cash system for future years or meeting the needs of cash users in other ways, and the Reserve Bank’s role in any of this.

7.1 Seeking your views

These questions seek your feedback on the issues discussed in this paper. We would like to hear whether you agree with the presentation of each issue, or whether you would value each issue differently. For each answer, please state your reasoning for agreeing or disagreeing.

Following are the questions used in the online survey. They are provided here so that you can see what is involved, and consider your answers in advance or compile a group response. Note that the questions will be randomised in the survey.

To go to the survey, click on the link below or copy it into your browser.

https://www.surveymonkey.com/r/FutureOfCashUseIssues

1. How strongly do you agree or disagree that cash will become harder to get and use in New Zealand?

   Strongly Agree / Agree / Neither agree nor disagree (or don’t know) / Disagree / Strongly disagree

   Why is that?

2. How soon do you think cash will become difficult to get or use in New Zealand if nothing is done to stop this?

   Within 2-3 years / Within 5 years / Within 10 years / Within 20 years / 20 years away or longer / Never / Don’t know

   Why is that?

3. Overall, how likely or unlikely do you believe it is that people who are financially or digitally excluded would be severely negatively impacted by the disappearance of cash?

   Very likely / Likely / Neither likely nor unlikely (or don’t know) / Unlikely / Very unlikely
Why is that?

### 4. How likely or unlikely do you think it is that each of the following groups of people would be severely negatively impacted if cash becomes difficult to get or use?

Very likely / Likely / Neither likely nor unlikely (or don't know) / Unlikely / Very unlikely

a) People older than 60 years of age  
b) People living in rural areas  
c) Disabled people  
d) Pacific people living in NZ  
e) Māori people  
f) Refugees and new migrants to NZ  
g) People with low incomes  
h) Children  
i) People unable to have or operate a bank account for any reason  
j) People without internet access  
k) People with English as a second language  
l) Illegal immigrants  
m) People without identification or proof of address  
n) People with convictions

Further comment

### 5. How would the following groups of people be impacted if cash becomes difficult to get or use and they cannot use another way to pay (or receive) money?

Will be negatively impacted / Might be negatively impacted / Neither negatively nor positively impacted (or don't know) / Might be positively impacted / Will be positively impacted

a) People wanting to give money in a cultural or religious tradition or celebration  
b) International visitors to New Zealand  
c) People in Pacific countries which use New Zealand cash  
d) People's sense of New Zealand identity gained from what is pictured on banknotes and coins

Further comment

### 6. For this question please pretend that cash is already hard to get and use in New Zealand. How strongly do you agree or disagree with the following statements?

Strongly agree / Agree / Neither agree nor disagree (or don't know) / Disagree / Strongly disagree

a) People lose privacy if they can't use cash to pay for some things.  
b) People lose the ability to decide their own spending if they can't use cash to pay for some things.  
c) Communities will find ways to cope with less cash if electronic payments systems go down.
Having to rely on electronic money means more risk to individuals from identity theft or scams.

Household savings are at a greater risk of being attacked by cyber criminals through the banking system.

Having the ability to withdraw their money from the bank in cash if they want is very important.

Banks do not need to be concerned about a bank-run if consumers cannot access cash.

Further comment

7. For this question please pretend that cash is already hard to get and use. How strongly do you agree or disagree with the following statements?

Strongly agree / Agree / Neither agree nor disagree (or don't know) / Disagree / Strongly disagree

a) Tax evasion or benefit fraud will be harder with less cash around.
b) Criminals will easily find other ways to do business without cash.
c) Having cash tucked away gives a personal back-up for a rainy day or when I can’t use another way to pay.
d) Having cash makes it easier for people to make and stick to a budget.
e) Tax revenue for the government won’t change with less cash being used.
f) The most important bills should be set up to pay with electronic money.

Further comment

8. Who do you think should bear the costs of cash? (These costs include production, moving, storing, withdrawal by any method, banking, checking for usability, destruction of unfit cash, compliance and risks to physical safety).

Only them / Shared based on where the costs fall / Shared, but subsidised for individual customers/ Not them at all / Don’t know for them

a) Reserve Bank (on behalf of the government)
b) Trading banks, credit unions, and other institutions who deal with cash now
c) Retailers, service providers, and others who sell things
d) Local councils and ratepayers (eg, for community ATMs)
e) Customers who use cash
f) Nobody. We should all be paying with electronic money (and not using cash)

Further comment: why is that? Or your own proposal for cost sharing

9. What, if anything, should be done by the people listed below to stop cash becoming hard to get or use?

a) Government
b) Reserve Bank
c) Trading banks
d) Retailers/businesses
10. What, if anything, should be done by the people listed below to manage the
disadvantage for some people if cash becomes hard to get or use?

a) Government
b) Reserve Bank
c) Trading banks
d) Retailers/businesses
e) Communities/Community groups
f) Families
g) Individuals
h) Other (say who and what they should do).

11. Please tell us about any other issues not raised by the issues paper or in this
survey that should be considered as we think about the future of cash use in New
Zealand (optional).

12. Please tell us about any strong agreement or disagreement to the issues paper
which you have not told us about through your previous answers or comments
(optional).

13. Please give us any feedback on this survey (optional).

14. Please attach any expansion on your answers, or written submission (see our
website for a separate template), or additional information in .doc .docx or .pdf
format (16MB max file size) (optional).

References


ANZ NZ (2018) ‘Distributed ledger technology for reconciliation between insurance
companies and brokers’.


Henley, J (2016) ‘Sweden leads the race to become cashless society,’ Observer.


## Appendix A: Uses of cash

<table>
<thead>
<tr>
<th>Market</th>
<th>Use: transactions</th>
<th>Examples</th>
<th>Demand drivers</th>
<th>Substitutes</th>
<th>Implications of less cash</th>
</tr>
</thead>
</table>
| Domestic economy: consumers | Non-electronic retail payments                                                    | • Payments in farmers’ markets, roadside stalls, to buskers and other retail situations  
• By people who cannot use electronic payments due to mental or physical disabilities or due to lack of access to banking system  
• By people who are making payments on behalf of others | • Convenience  
• Low inflation  
• Autonomy  
• Budgeting (self and others) | • Vouchers could be used when making payments on behalf of others | Digital and financial inclusion |
|                             | Small-value retail payments                                                       | • Small-change payments                                                 | • Convenience  
• Speed | • Contactless payments | Efficiency — speed of payments |
|                             | Discreet retail payments                                                          | • Gift buying                                                           | • Privacy | • Vouchers  
• Hidden bank accounts (hidden from people in community) | Privacy and autonomy |
|                             | Settle transaction in remote areas.                                               | • In environments without reliable internet access                      | • Lack of digital infrastructure | • IOUs  
• Barter  
• Mobile wallets | Digital inclusion; Privacy and autonomy |
|                             | Person-to-person transactions                                                     | • Settling trades where people do not know or trust each other, such as online trades | • Settlement finality  
• Trust | • Mobile wallets and online banking | Efficiency—speed of settlement |
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Financial and digital inclusion</th>
</tr>
</thead>
</table>
| Donations              | • Donations or collections that are performed outside retail infrastructure, i.e. on the street, in churches, for fundraisers, at pop-up stalls etc  
  • Donations to homeless people | • Convenience  
• Anonymity  
• Contactless and near field communication technology  
• Mobile wallets and payments such as PushPay (See [https://pushpay.com/](https://pushpay.com/)) |                                  |
| Cultural customs       | • Some cultures give cash as gifts in traditional ceremonies such as weddings and New Year. Western cultures give coins from the ‘Tooth Fairy’ when children lose their baby teeth | • Intrinsic value assets like gold or jewelry  
• Mobile wallets and online banking | Cultural identity |
| Domestic economy:      | Budgeting  
• To limit consumer spending  
• To increase the pain of paying and encourage better purchase decisions | • Financial literacy  
• Budgeting and self-control mechanism  
• Mobile banking apps with budgeting features  
• Education  
• Multiple bank accounts, account limits, direct credits and debits  
• Total Money Management |                                    |
|                        | Education  
• Children are often taught the value of money using cash and piggy banks  
• Children under 13 cannot receive an EFPTOS or debt card | • Financial literacy  
• Klever Kash savings bank with electronic total (see [https://www.asb.co.nz](https://www.asb.co.nz))  
• Parent’s EFPTOS and debit cards | Financial inclusion |
| Domestic economy: retailers | Payment acceptance | • Small businesses might find it easier to accept cash-only payments  
• Faster processing of small value transactions  
• Safety concerns for staff, particularly for dairies, petrol stations and other retailers open late at night  
• Increase sales by accepting cash  
• Risk of violent robberies, and staff theft  
• Efficiency — low cost and instant settlement  
• Digital money | Efficiency — speed of payments, costs of transactions; Security — physical safety, loss of funds |
| --- | --- | --- |
|  | Back-up when system failures occur | • Internet, electricity or other system outages  
• After natural disasters | • Business continuity  
• IOUs  
• Cheques (declining)  
• Offline card payments | Back-up form of payment |
| Overseas economy | Tourist demand for cash for transactions in New Zealand | • By tourists who take out cash when in New Zealand | • Reliability — some retailers do not accept credit cards  
• Language barriers — cash is easier to use  
• Delays in replacing lost credit cards | Digital money, in particular overseas-issued debit cards | Efficiency — card fees; Tourism |
|  | Notes held abroad with money changers | • To service tourist who take out New Zealand cash before arriving in New Zealand | • Commercial incentives  
• Digital money | Tourism |
|  | Digital money | --- | --- | --- | --- |

Notes held abroad with money changers
<table>
<thead>
<tr>
<th><strong>Use of New Zealand dollars in Cook Islands, Niue, Tokelau and Pitcairn Islands</strong></th>
<th>• The Cook Islands, Niue, Tokelau and Pitcairn Islands use the New Zealand dollars. There are ATMs that dispense New Zealand notes in the Cook Islands provided by two international banks</th>
<th>• The Cook Islands, Niue, and Tokelau are formally defined as states in free association within the Realm of New Zealand</th>
<th>• Digital money</th>
<th>Obligations to Pacific Islands in the Realm of New Zealand; Digital and financial inclusion in the Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Smaller economies can benefit from the stability of larger economies currency</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Shadow economy</strong></th>
<th><strong>Accepting payments for legitimate goods and services</strong></th>
<th>• Retailers and service providers can avoid paying tax on revenue by collecting payments in cash and not recording them</th>
<th>• Increase disposable income</th>
<th>Cryptocurrencies</th>
<th>Tax revenue; Autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Employees or self-employed businesses</td>
<td></td>
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<td>Foreign currency cash holdings</td>
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<td></td>
<td></td>
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<td>Inflated invoices</td>
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<td></td>
<td><strong>Paying staff wages in cash</strong></td>
<td>• Employers can avoid regulations by paying staff wages in cash. For example, can avoid PAYE and employment laws</td>
<td>• Increase disposable income</td>
<td>Vouchers that can be redeemed for cash anywhere in the world, e.g. iTunes and Amazon vouchers</td>
<td>Tax revenue; Autonomy</td>
</tr>
<tr>
<td></td>
<td>• Employees can lower their tax and other personal obligations by receiving wages in cash and not recording them</td>
<td></td>
<td></td>
<td>Cryptocurrencies</td>
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<td>Foreign currency cash holdings</td>
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<td>Commodity currencies</td>
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<tr>
<td>Illegal transactions</td>
<td>Cash is accepted for illegal transactions and then laundered into the banking systems through a legitimate business front</td>
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<td></td>
<td>Vouchers, Cryptocurrencies, Foreign currency cash holdings, Inflated invoices, Commodity currencies</td>
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<td></td>
<td>Tax revenue; Autonomy</td>
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<tr>
<td>Market</td>
<td>Use: store of value</td>
<td>Examples</td>
<td>Demand drivers</td>
<td>Substitutes</td>
<td>Implications of less cash</td>
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<tr>
<td>Domestic economy</td>
<td>To reduce exposure to banking system</td>
<td>Money is stored in banks that are not fully capitalised and can be lost if a bank were to fail</td>
<td>Financial stability risks</td>
<td>Low risk government bonds</td>
<td>Freedom and autonomy; Financial stability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low trust in home country financial institutions</td>
<td>Low trust in home-country government.</td>
<td>Private (non-bank) digital currencies such as cryptocurrencies</td>
<td>Freedom and autonomy</td>
</tr>
<tr>
<td></td>
<td>To avoid government intervention</td>
<td>To avoid losses if interest rates become negative due to monetary policy</td>
<td>Low trust in home-country government.</td>
<td>Low trust in home-country government.</td>
<td>Freedom and autonomy</td>
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<tr>
<td></td>
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<td>To avoid potential capital controls</td>
<td>Low trust in home-country government.</td>
<td>Low trust in home-country government.</td>
<td>Freedom and autonomy</td>
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<tr>
<td></td>
<td>To reduce exposure to cyber risks</td>
<td>Money stored in banks are in digital form and at risk of cyberattacks and fraud</td>
<td>Stability</td>
<td>Physical assets</td>
<td>Freedom and autonomy</td>
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<td></td>
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<td>Fewer liquid assets</td>
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<td></td>
<td>To hide savings from others</td>
<td>Hide savings from other people in a physical location</td>
<td>Privacy</td>
<td>Assets hidden in a trust or in a secret safe</td>
<td>Freedom and autonomy</td>
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<tr>
<td></td>
<td></td>
<td>Hide savings from the bank and other institutions by removing electronic record</td>
<td></td>
<td>Cryptocurrencies</td>
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<tr>
<td></td>
<td>Emergency back-up funds</td>
<td>In case of widespread natural disaster.</td>
<td>Stability</td>
<td>Mobile or online payments</td>
<td>Back-up form of payment</td>
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<td>In case of localised outages in electronic payment systems</td>
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<td>IOUs</td>
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<tr>
<td>Overseas economy</td>
<td>The Cook Islands, Niue and Tokelau use New Zealand dollars</td>
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<td></td>
<td>People in other countries might store wealth in New Zealand dollars</td>
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<td>The Cook Islands, Niue, and Tokelau are formally defined as states in free association within the Realm of New Zealand</td>
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<td>Digital and financial inclusion obligations to Islands in the Realm of New Zealand</td>
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<table>
<thead>
<tr>
<th>Shadow economy</th>
<th>To store wealth accumulated from undeclared revenue from legitimate activities or wealth accumulated from criminal activities</th>
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<td>Desire for anonymity</td>
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<td>Tax revenue; Autonomy</td>
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<tr>
<th>Hide legitimate wealth stores</th>
<th>To lower tax and other obligations such as parental obligations</th>
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