

Trends in Retail Payments and Insights from Public Survey Results

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- *While the use of cash as a means of payment has been affected by the growing use of electronic alternatives, the volume and value of bank notes in circulation have continued to increase.*
- *In 2004, the Bank of Canada commissioned a national survey on the general public's willingness and propensity to use cash as a means of payment and as a store of value. The survey provided insights into consumers' payment habits and their perceptions of cash and its alternatives. It also presented a unique opportunity to assess how confident Canadians are in the security of bank notes.*
- *Statistical analyses show that the demand for bank notes is significantly related to income, age, education, gender, frequency of debit and credit card usage, and the perceived convenience of cash.*
- *From the results, a bank note confidence index was constructed as a benchmark for future surveys.*

Bank notes remain an important method of payment and store of value in the Canadian economy.¹ In 2005, there were 1.5 billion bank notes in circulation, for a total value of \$43 billion, or \$1,700 for every adult Canadian.² Over the past 10 years, the value and volume of bank notes in circulation have grown at average annual rates of 5 per cent and 3 per cent, respectively.

The main attributes of cash, namely, convenience, broad acceptance, and public confidence, explain why bank notes continue to be used by Canadians. Nevertheless, the payment environment is evolving. The growing use of credit cards and, particularly, debit cards has had an impact on cash usage at the point of sale (POS). As well, emerging payment technologies offered by financial or non-financial institutions will likely broaden consumer payment choices in the future.

Given the trends in retail payments, understanding how bank notes are used and perceived in society is increasingly important to a central bank. Towards this end, the Bank of Canada commissioned a public survey to assess some of the intangible factors underlying the demand for bank notes. The survey provided interesting insights into public payment habits and perceptions, including demographic traits that help to explain cash demand compared with the alternatives.

The survey also presented a unique opportunity to measure public confidence in the security of bank notes. By constructing an index based on attitudinal questions related to counterfeiting, the Bank can now track bank note confidence over time, using the initial results as a benchmark.

*This work builds on the original analysis done by Kim McPhail and is the result of the collective efforts of many people in the Department of Banking Operations, including Chantal Ayotte, Patrizia Mion, and members of the Counterfeit Situational Analysis Team. I am also indebted to Pierre Duguay and Sean O'Connor for their extensive comments, suggestions, and contributions.

1. The terms "bank notes" and "cash" are used interchangeably in this article and refer only to notes issued by the Bank of Canada.

2. Excluding \$1, \$2, and \$1,000 bills, the value of notes in circulation falls to \$1,600 per adult Canadian.

This article presents an overview of bank notes in circulation and the advances made by electronic means of payment, specifically debit and credit cards. It highlights the key survey findings on cash holdings, cash usage versus electronic payments, and public confidence in bank notes, and describes how the confidence index was constructed.

Bank Notes in Circulation

Since its creation in 1934, the Bank of Canada has been responsible for issuing the bank notes that Canadians use on a daily basis. To meet this demand, the Bank supplies bank notes to the public indirectly through financial institutions, which hold accounts at the Bank and obtain notes through the national Bank Note Distribution System. They also return to the Bank any notes that are considered unfit for further circulation.³ The public can withdraw cash from automated teller machines (ATMs) or in person at financial institutions. Throughout this process, the Bank is also responsible for ensuring that the notes in circulation are of acceptable quality and are secure from counterfeiting. Canadians continue to use bank notes as a means of payment and as a store of value, despite the growing use of electronic alternatives. The persistence of bank notes is explained by their unique qualities which, in combination, have yet to be surpassed by other payment instruments:

- **Convenience:** Cash is portable, accessible, and relatively cheap to use. It can be processed quickly during transactions and can be transferred from person to person without the use of technology, personal identification numbers (PINs), or signatures.
- **Protection of privacy:** Cash transactions do not require the disclosure of personal information, and pose no risk of identity theft.
- **Legal tender:** Bank of Canada notes are legal tender⁴ in Canada, as are (to a certain extent) coins issued by the Royal Canadian Mint.
- **Payment finality:** The use of bank notes allows for a final means of settlement once the transaction has been completed.
- **Liquidity:** Because cash is readily accepted as a means of payment, it is the most liquid asset in terms of its

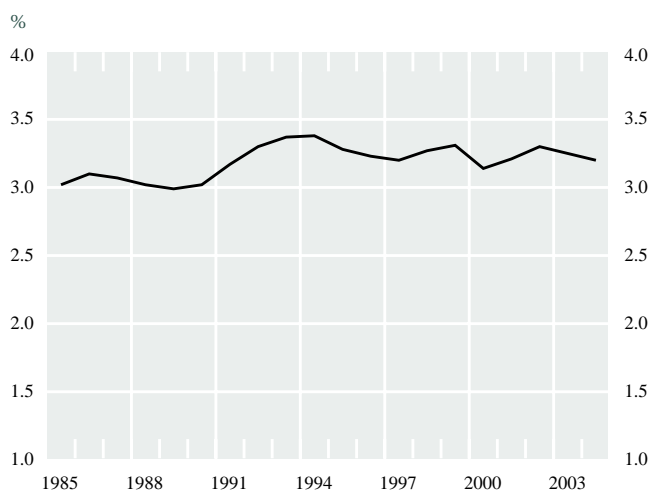
convertibility into goods, services, and other financial assets.

- **Confidence and acceptance:** Confidence in the use of cash is based on the credibility of the central bank in maintaining low and stable inflation (i.e., retaining the purchasing power of the currency) and providing security against the threat of counterfeiting.

The use of cash is not centrally recorded. Once bank notes have been released into circulation, the extent of cash usage and distribution must be estimated, generally through surveys and sampling techniques. Estimating the value of cash holdings in the economy is like piecing together a \$43 billion puzzle (the average value of bank notes in 2005). A small fraction, about 8 per cent of the total value of bank notes in circulation, are held in the inventories of chartered banks. The survey results suggest that adult Canadians may hold as much as 30 per cent of the total value of notes in circulation. Aside from those that are lost, destroyed, or held abroad, the remaining notes outstanding must be held by retailers, non-retail businesses (including non-bank deposit-taking institutions, foreign exchange counters, cheque-cashing outlets, and casinos), and households (not fully represented by the sample).

Although the distribution of cash holdings and the flow of cash transactions need to be estimated, the Bank has observed a trend increase in the stock of notes in circulation. Rising prices, population growth, and increased economic activity help to explain why the value of notes in circulation has been increasing. Taking inflation into account, bank note circulation has

Chart 1
Value of Bank Notes in Circulation as a Percentage of Gross Domestic Product, 1985–2004



3. For more information about Canada's Bank Note Distribution System, see Bilkes (1997) or visit www.bankofcanada.ca/en/banknotes/fi.html.

4. A tender is an offer of payment of a debt. Merchants, however, are not legally required to accept cash payments for purchases.

grown in real terms over the past 20 years at an average annual rate of 3 per cent—faster than the population. Thus, the number of bank notes in circulation has also increased in per capita terms.

During the year, the demand for bank notes fluctuates with the seasonality of consumer spending, peaking in late December. However, as illustrated in Chart 1, over the period 1985 to 2004, the average annual value of notes in circulation grew broadly in line with economic activity.

Electronic Payments and the Relative Decline in Cash Transactions

Debit cards and credit cards are by far the most commonly used and widely accepted form of electronic payment at the point of sale.⁵ On a per capita basis, debit and credit card usage is relatively high by international standards. In 2004, Canadians made 2.8 billion debit card transactions, or 88 transactions per person, worth over \$124 billion.⁶ The average value was \$44. Canadians also made 1.8 billion credit card transactions, or 55 transactions per person, worth \$181 billion.⁷ The average value of credit card transactions in 2004 surpassed \$100.

The growing use of electronic payments in retail transactions has been impressive. The combined volume and value of debit and credit card transactions have grown at average annual rates of 10 and 11 per cent, respectively, over the past five years. Because of the Internet, prospects for further growth continue to be positive. In addition to credit cards, Canadians now have the opportunity to use their debit cards for online purchases, through a recently introduced service called Interac Online.⁸

Since their introduction in 1994, debit cards have almost completely displaced cheques, and, to a certain extent,

cash as a method of making retail payments at the point of sale. Credit cards may have also affected the use of cash at the point of sale, but debit cards currently represent the closest substitute. Considering the trends in electronic payments, there is some indication that cash usage at the point of sale has been in relative decline, despite the growth in the number of bank notes in circulation.

A slow but steady downward trend is observed, suggesting the displacement of cash in retail sales by debit and credit.

While the exact figures are unknown, various attempts have been made (e.g., Humphrey, Kaloudis, and Øwre 2004) to estimate either the volume or the value of cash payments. A rough estimation is to assume that all withdrawals from ATMs are made for the sole purpose of retail transactions. Canadians made 963 million ATM withdrawals in 2004, worth \$92 billion,⁹ the average value was \$96. Assuming that an average cash transaction is worth \$15, as indicated by our public survey data, each withdrawal of \$96 would cover 6.4 cash transactions ($\$96/\15). Therefore, the total number of cash transactions for that year is estimated to be 6.2 billion—an average of 250 cash transactions per person over the year, or five cash transactions per week per person (based on the methodology reported in Gerdes et al. 2005). This estimation technique was applied to the period 1998 to 2004, and assumes that the average value of a cash transaction remains constant, adjusted for inflation. Chart 2a graphs the volume of each method of payment relative to the sum of estimated cash, debit, and credit card transactions. The value of ATM withdrawals is used to proxy the total value of cash transactions per year. Chart 2b graphs the value of each method of payment relative to the total value of estimated transactions. In both charts, a slow but steady downward trend is observed, suggesting the displacement of cash in retail sales by debit and credit.¹⁰

9. Excludes other sources of cash withdrawals, such as private-label ATMs, cash-back from debit card transactions, and bank tellers, which would cause a downward bias in estimated cash transactions (BIS 2006).

10. Data on credit card transactions (BIS 2006) also include non-POS retail transactions, such as those made on the Internet, which cause an upward bias in credit card transactions at the point of sale.

5. Debit cards allow for the immediate electronic transfer of funds from the cardholder's account to the merchant. Credit cards allow consumers to defer payment until the end of the billing period, generally one month. Most credit cards in Canada have revolving credit arrangements, where credit is repeatedly available up to a specified amount as periodic repayments are made. Charge cards, which require that the monthly balance be paid in full, are also used in Canada.

6. The Interac Association, which operates the national POS debit card system, provides data on its website (www.interac.ca/en_n3_31_idpstats.html#a2). The value of debit transactions includes cash withdrawn by the consumer at the point of sale.

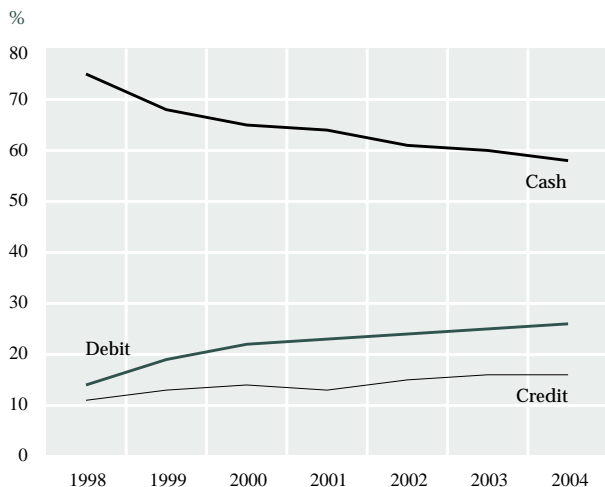
7. Data are taken from the Bank for International Settlements (BIS) website at www.bis.org/publ/cpps74.pdf.

8. A number of Canada's major banks participate in this service, which allows consumers to pay for goods and services over the Internet by debiting their bank account directly.

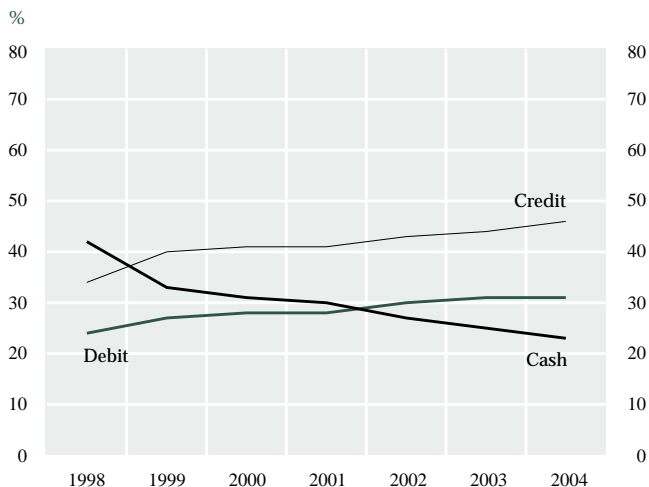
Chart 2

Estimated Transactions, by Payment Method at the Point of Sale

a. Transactions by volume



b. Transactions by value



The displacement of cash will likely continue if the public perceives electronic payments as a preferred substitute for cash. Canadians seem to adopt new technology fairly well, as indicated by the ease with which they adopted debit cards, and it may therefore become increasingly difficult for cash to withstand the competitive pressures of the new payment innovations on the horizon.

Public Survey on Cash Holdings and Usage

Traditionally, the Bank of Canada forecasts public demand for bank notes with economic models that incorporate macroeconomic variables, such as inflation, income, interest rates, and the number of ATMs, or through purely statistical time-series models (see Laflèche 1994). Missing in those equations are the intangible variables that capture changes in perceptions of convenience, habit, and confidence. One method of obtaining such data is through public surveys.

To this end, the Bank commissioned a national telephone survey to assess the general public's holdings of cash and their use of cash versus alternative methods of payment.¹¹ Participants were asked how much cash they held on hand at that moment and how much they kept for emergencies. Survey questions also focused

11. More than 2,000 adult Canadians participated in telephone interviews during January 2004. National results are statistically accurate within +/- 2.2 per cent, 19 times out of 20. However, when broken down by community size, province, income, level of education, age, and gender, results have wider confidence intervals.

on consumer payment habits and perceptions. For example, Canadians were asked how often they use various payment instruments and how convenient or safe they perceived such instruments to be. As well, the survey attempted to measure the public's confidence in bank note security, which is essential to its overall acceptance.

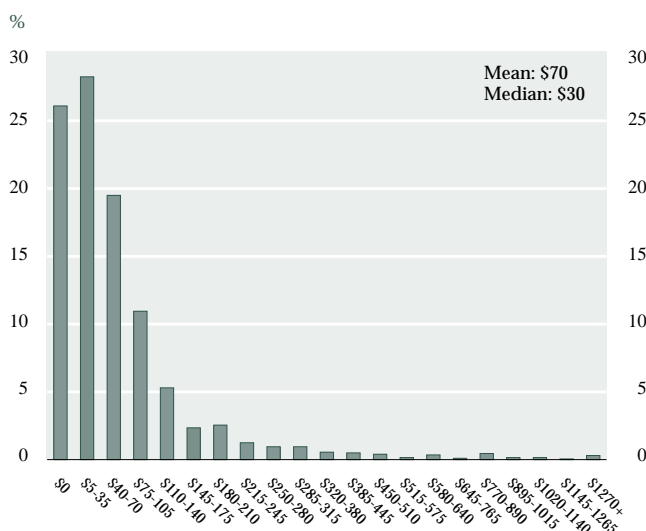
As with many surveys, some care should be taken when generalizing for the population as a whole, considering the measurement error that may arise when participants are reluctant to answer such questions candidly or may have difficulty recollecting precise details. This was most evident when participants were asked to recall the amount of cash they reserved for emergency use, leading to results that will likely require further analysis. Another caveat is related to the self-selection bias resulting from the high non-response rate. Only 12 per cent of the total number of eligible respondents contacted actually completed the interviews.

Survey Findings

Value of bank notes held for transactions

The survey asked individuals for the value of bank notes presently held in their purse or wallet, which allowed for a direct estimate of transactions balances. According to the survey, the average Canadian holds about \$70 in bank notes for transactions purposes (or \$30 if taking the survey median). Surprisingly, about 25 per cent of respondents reported having no bank notes in their possession at the time they were surveyed (Chart 3). Given that only 2 per cent of respondents

Chart 3
Distribution of the Value of Bank Notes Held for Transactions Purposes



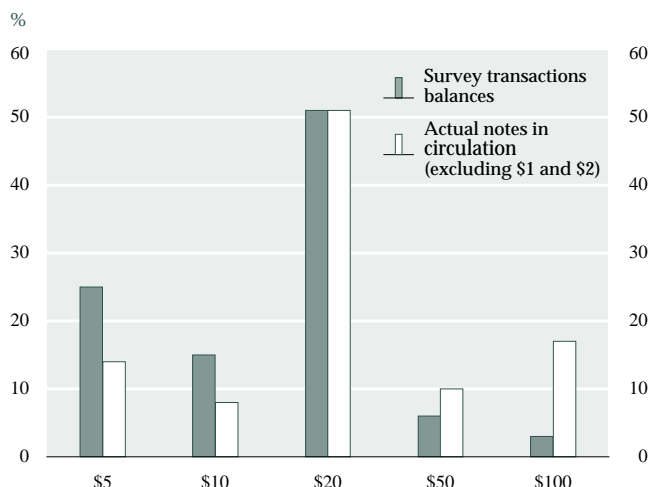
claim they never use cash, this suggests that a significant proportion of the population allow their in-pocket cash balances to deplete to zero before replenishing them at a bank or ATM. Indeed, ATMs are widely accessible in Canada, and most Canadians (64 per cent) use an ATM at least once a week. In comparison, 17 per cent of respondents use the “cash-back”¹² service associated with debit cards, and 13 per cent visit a teller at least once a week to obtain bank notes. Incidentally, there is a tendency to withdraw smaller amounts using the cash-back service offered by retailers, but larger amounts from ATMs and tellers.

The average Canadian holds about \$70 in bank notes for transactions purposes.

Because respondents were asked to report the quantity of each denomination held in their purse or wallet, a comparison can be made with the actual composition of notes in circulation. According to the survey, the composition of notes held for transactions purposes is over-represented in \$5 and \$10 notes and under-represented in \$50 and \$100 notes (Chart 4). This suggests

12. Cash-back is a cash-withdrawal service available to customers when they use a debit card at the point of sale.

Chart 4
Denominations of Bank Notes Held for Transactions vs. Notes in Circulation



that the public uses \$5 and \$10 notes more frequently for transactions than the \$50 and \$100 notes, which are predominantly used for other purposes. The \$20 note is well represented by the sample, likely because ATM withdrawals generally consist of \$20 notes.

Correlations between bank note holdings and selected variables

The survey provided some insight into the factors underlying bank note demand. For instance, the value of bank notes held by Canadians for transactions purposes increases with household income (Chart 5). However, the ratio of cash holding to income decreases as income rises. Chart 6 shows how the average transactions balance as a fraction of weekly income declines as income increases. This broadly supports inventory theories of currency demand, which predict an income elasticity substantially less than one.

Transactions balances also increase with age, with a clear demarcation at age 50, suggesting that Canadians above that age, who may be less familiar or less comfortable with debit card technology, prefer to hold higher levels of bank notes to support more frequent transactions made with cash (Chart 7).

Those who rarely or never use debit cards hold more than double the cash balances of those who use debit cards every day. Indeed, frequent users of debit cards hold less cash, indicating that bank notes and debit cards are substitutes for each other (Chart 8).

Perceptions of convenience appear to affect cash holdings. The amount of cash held is highly correlated

Chart 5

Average Value of Bank Notes Held, by Household Income

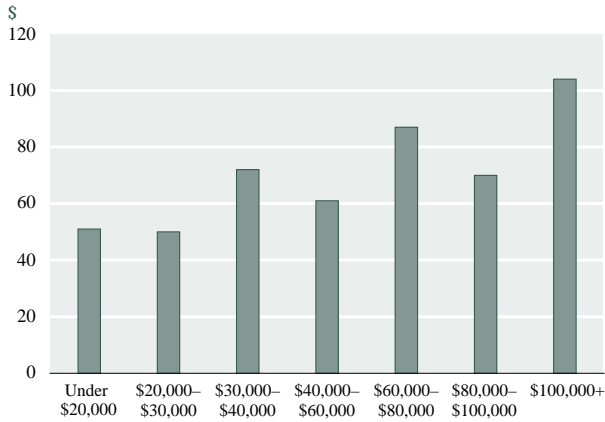


Chart 6

Average Value of Bank Notes Held as a Fraction of Weekly Income, by Income Category

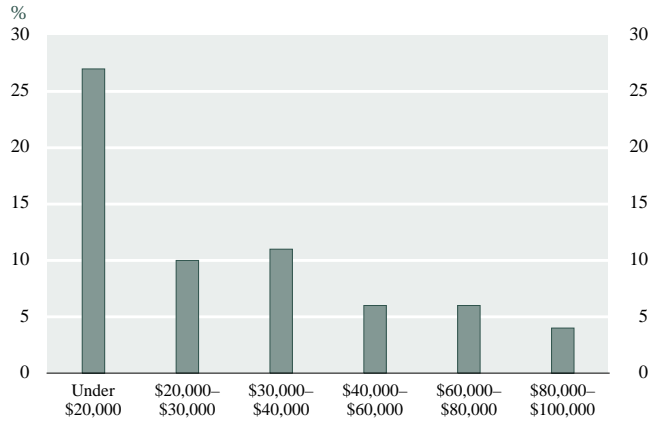


Chart 7

Average Value of Bank Notes Held, by Age

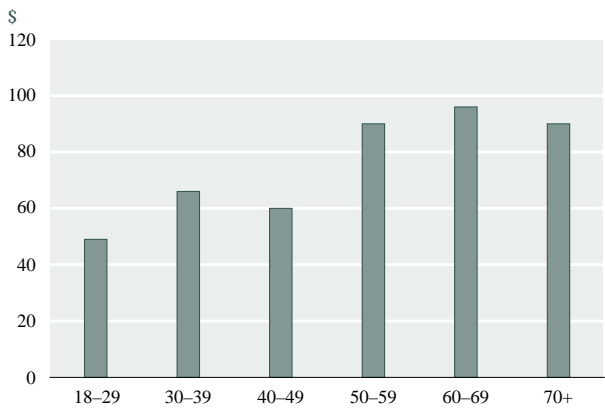


Chart 8

Average Value of Bank Notes Held, by Frequency of Debit Card Use

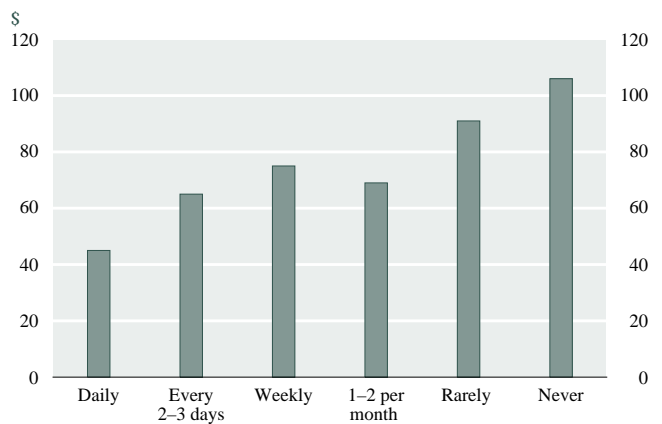


Chart 9

Average Value of Bank Notes Held, by Perceived Convenience of Cash

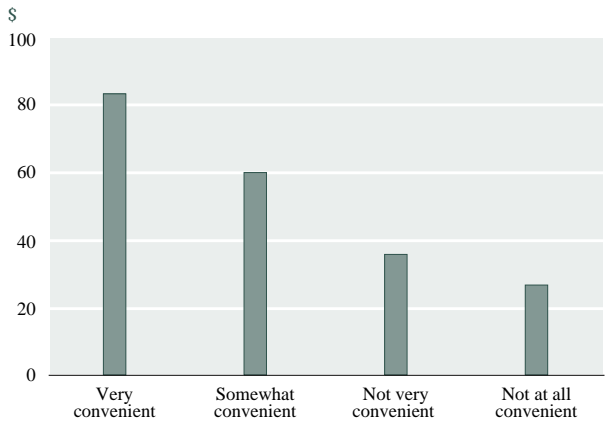
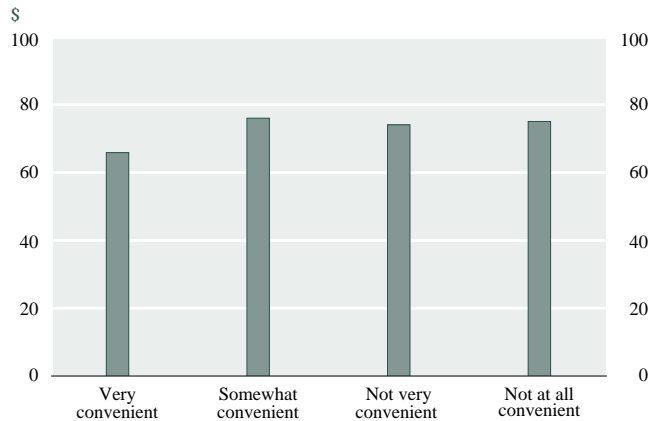


Chart 10

Average Value of Bank Notes Held, by Perceived Convenience of Debit Cards



with its perceived convenience (Chart 9) and negatively correlated with the perceived convenience of debit cards (Chart 10). Incidentally, 83 per cent of Canadians aged 18 to 29 find debit cards very convenient, and all but 2 per cent responded to the question. In comparison, only 45 per cent of Canadians aged 60 and older find debit cards very convenient, and 26 per cent did not respond.

Although not graphed, the perceived safety of cash was also highly correlated with cash balances. Other factors, such as privacy and payment finality, were not included in the survey but may well be equally important.

Regression analysis of transactions balances

Bivariate correlations are interesting, but since some of the determinants of bank note holdings are correlated—for example, income tends to rise with age—one cannot draw firm conclusions from them. Table 1 shows the results of regressions that attempt to disentangle the effects of individual variables on the demand for bank notes held for transactions purposes.

As noted earlier, a large number of respondents reported having no bank notes in their possession. The model explaining bank note demand may be different for these individuals. Thus, regressions were first run including these observations, and then excluding them. While the explanatory power of the regressions is statistically weak, the results are consistent with the survey indicators presented earlier.¹³ The variables have the expected sign, and all the coefficients, except community size (population of the city or town), have some degree of influence on cash holdings. The variable for gender suggests that women hold less cash than men, on average. Other demographic variables, such as higher age and income, tend to increase average cash holdings, while higher education has the opposite effect.

The results also show that individuals with middle to very high incomes are likely to hold more cash balances than low-income individuals. In this case, a dummy-variable approach was used, where individuals whose income was less than \$30,000 served as the benchmark against higher-income categories. For example, the coefficient on income greater than \$100,000 suggests that, when all else is held constant, very wealthy people are likely to hold, on average, \$41 more than low-income

13. The explanatory power of the regressions is low, with an R^2 of about 8 per cent in the first regression and 6 per cent in the second. This is not unusual in cross-sectional analyses. In the present case, this is exacerbated by the long tail of the distribution of cash holdings among individuals, as shown in Chart 3.

Table 1
Regression Analysis of Transactions Balances by Ordinary Least Squares

Explanatory variables	All observations included ¹	Observations of \$0 excluded ¹
Constant (including average balances of males with household incomes under \$30,000)	67.05 (3.59)	101.77 (4.20)
Gender (M = 0, F = 1)	-19.44 (-3.76)	-19.95 (-3.09)
Community size (per 100,000)	0.83 (1.46)	0.72 (1.07)
Age (in years)	0.83 (3.95)	0.75 (2.96)
Education ²	-6.89 (-2.20)	-10.90 (-2.83)
Household income dummies		
Low: <\$30,000	–	–
Medium: \$30,000–\$60,000	18.15 (3.04)	20.18 (2.60)
High: \$60,000–\$100,000	19.03 (2.82)	17.05 (2.02)
Very high: >\$100,000	41.42 (4.33)	36.67 (3.31)
Convenience of cash ³	17.00 (6.19)	15.49 (4.06)
Frequency of debit card use ⁴	-6.54 (-3.84)	-6.65 (-3.21)
Frequency of credit card use ⁴	5.51 (2.88)	6.44 (2.67)
Standard error of regression	102.55	112.11
Rbar squared	0.08	0.06
Number of observations	1619	1224

Notes: Standard errors are corrected for heteroskedasticity using Newey-West HAC. Outliers on transactions balances were defined as values greater than four times the standard error and removed from the regressions. Consequently, seven observations were omitted.

1. *t*-statistics in parentheses.
2. Education is a categorized variable, with responses ranging from “some/completed elementary” (1) to “post graduate/professional schooling” (5).
3. Convenience of cash is a categorized variable, with responses ranging from “not at all convenient” (1) to “very convenient” (4).
4. Frequency of debit/credit card use is a categorized variable, with responses ranging from “never” (1) to “daily” (6).

individuals (\$37 more in the regression excluding \$0 cash balances).

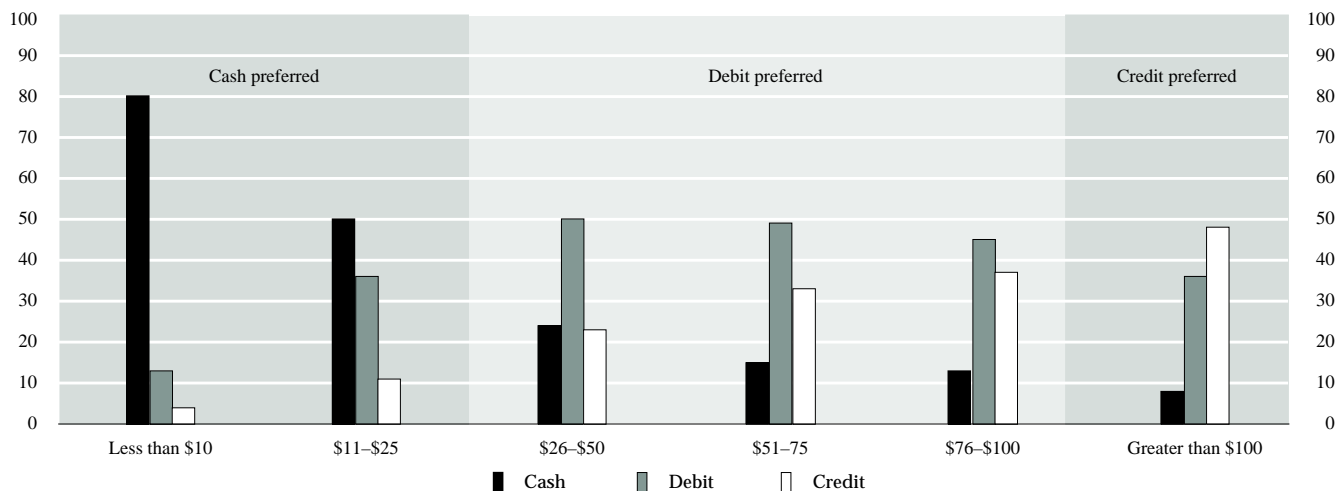
The perceived convenience of cash and the use of electronic payments are very significant in the regressions and go beyond what can be explained by the demographic traits of individuals. Not surprisingly, as the perceived convenience of cash increases, so do average cash holdings. It also appears that the increased fre-

Chart 11

Consumer Preferences for Payment Method

By transaction value

Percentage of Canadians



quency of debit card use decreases average cash holdings, clearly indicating a substitution effect between the two payment instruments. However, the most interesting result is the increase of cash holdings by individuals who are frequent credit card users. This suggests that cash and credit cards are not close substitutes. As shown below, there is a wide disparity between the preference for credit cards or cash in terms of the values of the transactions for which they are used (in other words, cash and credit cards are most preferred at opposite ends of the payment-value spectrum).

Payment method and transaction value

The value of the transaction appears to influence the choice of payment instrument. Since cash is used more frequently than any other payment method—72 per cent of survey respondents use cash at least once a week, followed by debit cards (64 per cent), and credit cards (36 per cent)—it is not unreasonable to assume that cash is used most intensively in small-value transactions. Distinct preferences according to the value of the transaction have been revealed in numerous studies, including Interac’s annual consumer tracking survey and the Visa Payments Systems Panel Study in the United States (Evans and Schmalensee 2005). To confirm these preferences among consumers, the Bank of Canada conducted a separate survey on preferred methods of payment by transaction value (Chart 11).¹⁴

14. Results based on a national survey of 1,000 Canadians, with a margin of error of +/- 3.1 per cent.

The results were indeed consistent: cash is the most preferred method for making purchases less than \$25; debit is most preferred for purchases between \$25 and \$100; and credit is most preferred for purchases greater than \$100.

Cash is used more frequently than any other payment method.

Cash holdings for precautionary reasons

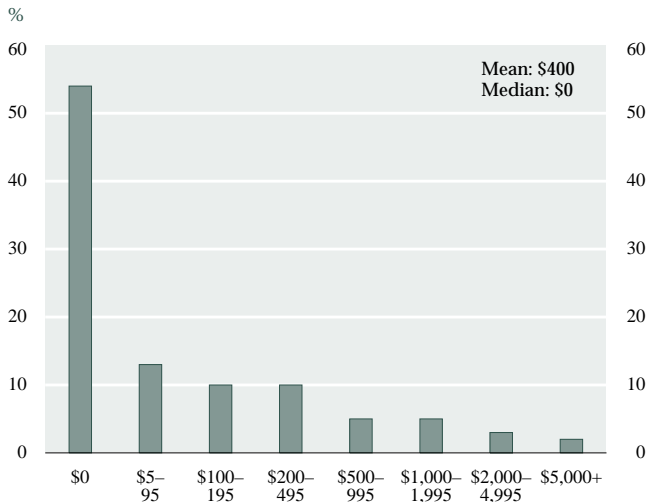
In addition to the amount of cash held in their purse or wallet, respondents were asked for the total value of Canadian bank notes they reserved for emergencies. About 40 per cent of respondents do not set aside bank notes for this purpose. Of those who do set aside precautionary balances, 24 per cent could not or would not report the amount. For those who reported the value of their precautionary balances, whether it was \$0 or otherwise, the average value was \$400 (Chart 12).

About 40 per cent of respondents do not set aside bank notes for use in case of emergencies.

Chart 12

Distribution of Balances Held for Precautionary Purposes

For those who know how much they set aside



Survey results on precautionary cash holdings are not as reliable and are more ambiguous than the results on cash holdings for transactions. Further analysis is required before extrapolating for the Canadian public at large. However, assuming that the average Canadian holds \$70 for transactions and \$496¹⁵ for precaution, cash holding by the public would account for roughly one-third of the total value of bank notes in circulation, or \$14 billion.

Perceptions of counterfeiting and confidence in bank notes

A key objective of the 2004 survey was to explore the factors underlying confidence in bank notes. Individuals were asked questions about their perceptions of bank note security, as well as their experience and behaviour regarding counterfeiting and the authentication of bank notes.¹⁶

Results of the survey indicate that almost three-quarters of Canadians believe that counterfeiting is a problem, including 28 per cent who indicated that it is a “big problem.” Yet surprisingly, a majority (69 per cent) thought it was unlikely that they would receive a counterfeit in the next six months. As well, approximately three-quarters of Canadians have confidence

15. The average value of notes held by respondents who reported a positive precautionary balance was \$865. If those who did not reveal how much they held in precautionary balances are assigned an average of \$900, then the average value for all respondents would be \$496.

16. See the appendix for a graphical representation of the results.

in the systems to remove counterfeit bills from circulation.

In recalling personal experience, 13 per cent claimed they have been offered or received a counterfeit (Canadian) bank note. When probed further, however, 23 per cent of those who reportedly received a counterfeit could not recall which denomination they received. Of those who reported receiving a counterfeit, the \$20 note was the most frequently cited. As well, a large proportion of respondents (41 per cent) could not recall where the counterfeit notes were received, while over a third claimed to have received them at retail outlets. Finally, 53 per cent said that the likelihood of fraud or loss associated with bank notes was high to moderate.

Despite their concerns, the public accepts Canadian bank notes with relative ease. Most Canadians (76 per cent) never or almost never check the authenticity of the bank notes they receive in a transaction.

Bank Note Confidence Index

In a unique attempt to quantify Canadian perceptions of bank note security, the Bank devised a confidence index that can be used to measure and track public confidence over time (see box, page 34, for an explanation of how the confidence index was constructed). The index is based on responses to four survey questions:

1. To what extent is counterfeiting a problem?
2. How likely are you to receive a counterfeit note within the next six months?
3. What is the likelihood that you will experience fraud or loss when using cash?
4. How confident are you in the systems currently in place to remove counterfeit notes?

These four questions all relate to perceptions and not directly to experience. The index is therefore unique in that it quantifies valuable information on consumer confidence in bank notes that probably could not be obtained elsewhere.

The index is constructed to lie between zero and 100, with 100 reflecting the highest level of confidence. Based on the 2004 results, the confidence index came close to 50, a level that lies between “somewhat confident” and “not very confident.”¹⁷ The confidence survey was

17. The level of the aggregate index should be interpreted with caution because the calculated level of the index is sensitive to the assumptions used to construct it. It will be more important to focus on how the value of the index changes over time than to place too much emphasis on its level.

Constructing an Index of Bank Note Confidence

The survey included nine questions that were considered eligible for constructing an index of bank note confidence. Factor analysis was used to select the questions because it allows for the elimination of unnecessary questions while retaining those that provide the most information about confidence.

The nine questions are listed in Table B1, together with the results of the factor analysis, which focus on the three factors that contribute the most to explaining the survey results. By design, each factor is uncorrelated. The values in the table refer to factor loadings, which indicate the importance, or weight, of each question in explaining a factor. The bold figures indicate the questions that are most highly correlated with each factor.

The first factor identified by the statistical analysis (column 1) explains about 20 per cent of the variation in responses and appears to be related to perceptions of confidence. It is most influenced by perceptions of the likelihood of experiencing fraud or loss when using bank notes and of the severity of the counterfeiting problem, as well as by the perceived likelihood of receiving a counterfeit note within the next six months and the degree of confidence in the systems for detecting and removing counterfeit notes. All four questions measure attitudes and perceptions rather than experience and behaviour, and they intuitively appear to be appropriate indicators of confidence in bank notes.

The second and third factors each explain about 50 per cent less variation than the first. Judging from the questions that are most significant to these factors, they are related less to attitudes with respect to confidence and more to actual experience and behaviour with respect to bank notes and counterfeiting.

While experience may shape bank note confidence, attitudes to and perceptions of confidence are likely to exhibit persistence. For example, a person who had a note refused some time in the past, but not necessarily in the past six months, may continue to lack confidence in bank notes. Although the second and third factors provide useful ancillary information, they are not as relevant to current levels of confidence. Therefore, we did not consider these factors in constructing the confidence index.

The four attitudinal questions were selected for the index because they have the most weight within the first factor. Because the factor loadings of these

Table B1
Factor Analysis

Survey question	Factor		
	1	2	3
In the past three months, have you had bank notes refused?	-0.08	0.20	0.69
In the past three months, have you seen signs in stores refusing \$50 or \$100 notes?	0.14	-0.04	0.77
How confident are you in the systems currently in place to remove counterfeit notes from circulation?	0.56	-0.13	0.24
How likely are you to receive a counterfeit note within the next six months?	0.57	0.29	0.00
To what extent is counterfeiting of paper money a problem?	0.61	0.13	0.08
How often do you check a bank note to determine if it is genuine?	0.03	0.81	0.01
What is the likelihood that you will experience fraud or loss when using bank notes?	0.67	0.04	-0.14
In the past six months, do you recall any media stories about bank notes?	-0.02	0.06	-0.06
How many times have you received a counterfeit note within the past year?	0.21	0.70	0.14
Eigenvalues	1.89	1.12	1.03
% of variance explained by the factor	21.0	12.5	11.5

Rotation method: Varimax

questions are of similar magnitude (ranging from 0.56 to 0.67), each question received equal weight.

The index is calculated using a linear scale for the responses. Although this method is discretionary, it is the most straightforward. For example, “very confident” was assigned a value of 3; “somewhat confident,” a value of 2; “not very confident,” a value of 1; and “not at all confident,” a value of 0. A non-linear scale may be more appropriate to capture the varying degree of differences between responses. For example, “very confident” could be assigned a value of 5, and “somewhat confident,” a value of 3. However, choosing a non-linear scale is arbitrary, and the level of the index is sensitive to the form of non-linearity assumed. Consequently, we focus on the results of the linear model, for which scores were tabulated and presented as an index ranging from zero to 100.

repeated in 2005, using the same questions, and produced a score of 49, which was similar (i.e., generally within the original margin of error) to the score for the previous year.¹⁸

Conclusion

Cash remains a significant means of payment and a store of value in the Canadian economy, and thus the Bank of Canada continues to face increasing demand for bank notes. In recent years, however, cash has been somewhat displaced by electronic payment methods. The rate of further displacement is dependent on technological innovation and on the willingness of the public to adopt new methods and to change their existing habits. To date, a widely successful “e-money” scheme has not been developed in Canada, nor in many other

countries, in part because of confidence and security concerns. As the development of new technology progresses, however, and becomes cheaper to use, the traditional role of cash in transactions might one day be considerably compromised.

For these reasons, an important research initiative of the Bank has been the development of surveys to explore the current use and holdings of cash by the public. The statistical and regression analyses provide a preliminary view of some of the important factors that explain the general public’s demand for bank notes, including demographics and perceptions and use of electronic substitutes, particularly debit. Debit cards are in fact used most often by a younger generation more apt to change with technology and more likely to define payment choices in the future. Further research is therefore necessary to elaborate on these issues and to develop better models to incorporate these survey findings.

18. The 2005 survey on bank note confidence was conducted using a sample comparable in size to the one used in the 2004 survey.

Literature Cited

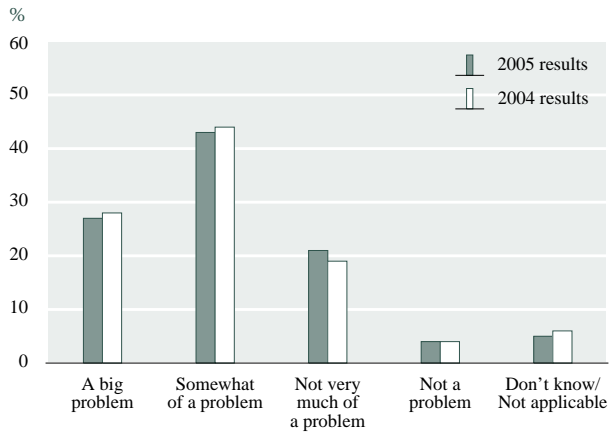
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Appendix

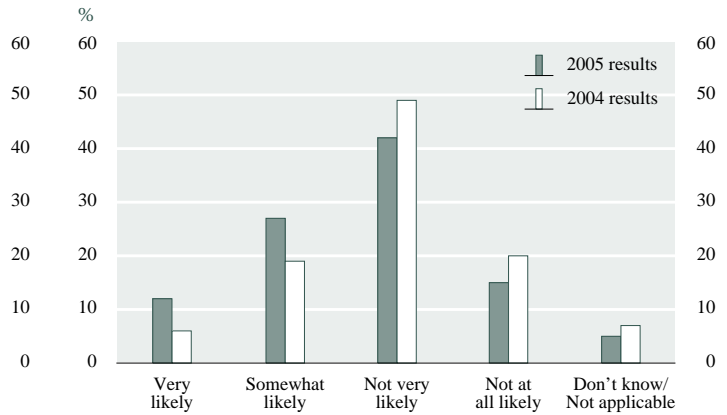
Chart A1

Survey Results: Bank Note Security

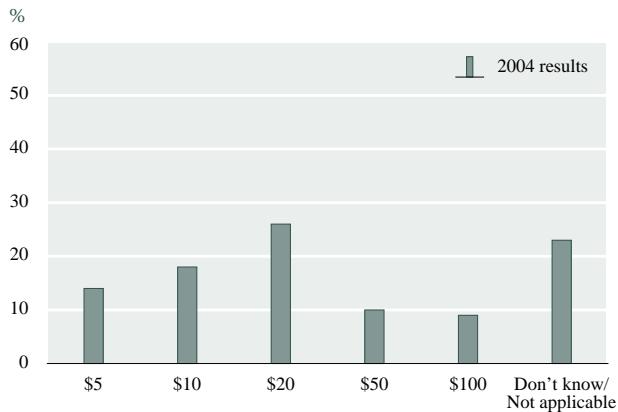
a. Perception of counterfeiting as a problem



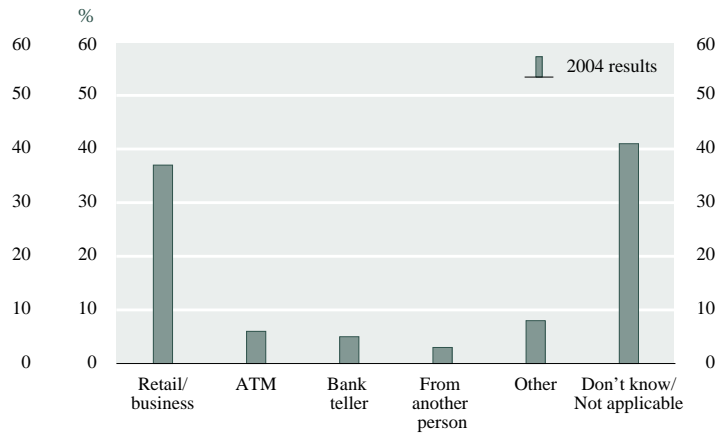
b. Likelihood of receiving a counterfeit note in the next 6 months



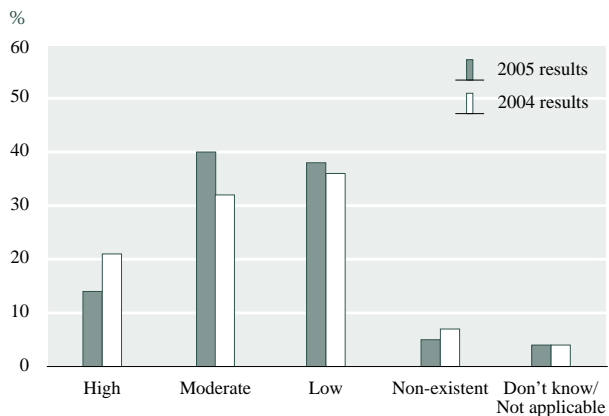
c. Denomination of counterfeit note reportedly received (among those who say they received counterfeits in the past year)



d. Where counterfeit notes were reportedly received



e. Likelihood of fraud or loss when using cash



f. Confidence in systems in place to remove counterfeit notes

