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Digital payments make gains but cash remains

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Marc Glowka, Anneke Kosse and Robert Szemere

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Digital payments make gains but cash remains[1]

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Highlights

- The strong growth in digital payments over the past decade continued in 2021. The volume and value of fast payments reached record levels.
- Even so, digital payments have not yet fully replaced cash. Public demand for cash remains steady, both as a means of payment and as a safe haven.
- While the digitalisation of payments is a global trend, payment habits still differ across countries. Interoperability of payment systems within and between countries is key to ensuring that payments can be made seamlessly, regardless of the chosen payment method.

Introduction

Digitisation is changing the way people pay. Over the last decade, technological innovations have enabled new access modes, such as online banking and mobile apps. This has helped consumers and businesses to migrate away from cash and cheques towards electronic payments, including card payments, electronic fund transfers and e-money payments. In addition, an increased demand for convenience and speed has resulted in a growing use of contactless and fast payments.[2]

Some of these trends accelerated with the Covid-19 pandemic in 2020. The 2020 Red Book statistics (as well as other studies) were already pointing to a significant uptake in digital credit transfers and contactless card payments.[3] At the same time, the pandemic led to a surge in cash holdings.[4]

This CPMI Brief documents the extent to which these trends continued using the 2021 Red Book statistics collected in the second half of 2022 for the 27 member jurisdictions of the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI).[5] Studies on how payment habits

[1] We thank Raphael Auer, Stijn Claessens, Thomas Lammer, Tara Rice and Takeshi Shirakami for their valuable comments and are grateful to Ilaria Mattei and Nolan Young Zabala for their excellent research assistance.

[2] See eg Jakobsen (2018), Bech and Boar (2019), Boar and Szemere (2020), RBA (2021), and Kosse and Szemere (2021).

[3] See eg Kosse and Szemere (2021), Auer et al (2020a), Auer et al (2022), Jonker et al (2022), Danmarks Nationalbank (2020), SNB (2021), Norges Bank (2021), Federal Reserve (2021), Coletti et al (2022), Engert and Huynh (2022), RBA (2021) and Demirgüç-Kunt et al (2022).

[4] See Guttmann et al (2021) and Rösl and Seitz (2021).

[5] The Red Book statistics on payments and financial market infrastructures in the 27 CPMI member jurisdictions is collected annually by the Bank for International Settlements (BIS). This CPMI Brief is based on the statistics from 2012 to 2021. More historical data, though in a different structure and limited country coverage, have been published as CPMI statistics and can be downloaded at www.bis.org/cpmi_publs/. The 27 CPMI jurisdictions include 14 advanced economies (AEs) (Australia, Belgium, Canada, euro area, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States) and 13 emerging market and developing economies (EMDEs) (Argentina, Brazil, China, Hong Kong SAR, India, Indonesia, Korea, Mexico, Russia, Saudi Arabia, Singapore, South Africa, and Turkey). Note that the BIS ceased receiving data from the public authorities in Russia after 28 February 2022. Where possible, data publication will be continued if the BIS is able to use data from public or commercial sources. For more information and the latest 2021 data, see www.bis.org/statistics/payment_stats.htm. Also note that various graphs in this CPMI Brief show data for only a selection of jurisdictions. This is for reasons of clarity and comprehensibility, or because certain indicators have not been reported by all jurisdictions.

have evolved since the pandemic are still at an early stage, but latest research suggests that the decline in cash usage during the pandemic went into reverse after restrictions were eased. The same seems to be the case for the uptick in cash holdings seen during the pandemic.[6] But other trends continued, such as the accelerating use of contactless payment methods.[7]

Understanding the public's demand for cash and payment behaviour is important to central banks, given their roles in the issuance of cash and the smooth and secure functioning of payment systems. Data on retail payment trends also shed light on the potential use cases for a retail central bank digital currency (CBDC), a digital form of cash that many central banks are currently exploring.[8] Additionally, understanding trends in payments helps central banks and other authorities in their broader public policy objectives, such as improving financial inclusion and fostering economic growth.

General payment trends over the past decade

Over the past decade, technological advances and changes in user preferences, as well as changes in legal and regulatory frameworks, have increasingly moved consumers and businesses towards digital payments. Smartphones and enlarged internet coverage have supported the spread of online banking services, mobile money and electronic wallets. At the same time, the availability of point-of-sale (POS) terminals has grown, while the network of traditional cash access points, such as automated teller machines (ATMs) and bank branches, is shrinking.[9] Moreover, as the way that people shop and interact with each other becomes more digitalised, the demand for faster and real-time payments has increased. Further, payment services are no longer the domain of banks, as competition from non-bank payment service providers has intensified.[10]

These general trends have contributed to a steady shift away from cash, cheques and paper-based credit transfers and into digital instruments, such as direct debits, online credit transfers, and card and e-money payments. For example, the annual average number of digital payments per person in the Red Book statistics countries increased from 179 in 2012 to 332 in 2021. Also, fast payment systems (FPS) have spread around the world.[11] More than 60 jurisdictions have launched fast payment services and others are planning to do so.[12] FPS, available on a (near) 24/7 basis, allow the processing of small-value account-based transactions so that funds are immediately available to the payee.

In addition to allowing for efficient, faster and more convenient payments, the shift towards more accessible and cheaper digital payments can enhance financial inclusion.[13] The Covid-19 pandemic has further amplified the role of digital payments. Lockdowns, concerns about the viral transmission via cash,[14] and the growth in e-commerce among others accelerated the use of contactless and other digital

6 See Auer et al (2022) and Danmarks Nationalbank (2020).

7 See Auer et al (2022) and Jonker et al (2022).

8 See Kosse and Mattei (2022).

9 See Boar and Szemere (2020).

10 See Bech and Boar (2019).

11 See eg Bech and Boar (2019) and Boar and Szemere (2020).

12 See CPMI and World Bank (2020) and CPMI (2021).

13 See eg Feyen et al (2021), Gentilini et al (2022) and Auer et al (2020b).

14 Note though that research has shown that banknotes and coins do not pose a significantly higher risk of infection than other frequently touched surfaces, see eg Caswell et al (2020) and Tamele et al (2021).

payments in 2020.[15] For example, the average number of digital payments per person in the Red Book statistics countries increased with more than 10% from 2019 (300) to 2021 (332).

While digital payments have been growing steadily in recent years, cheques are still used in some countries, such as Canada, Singapore and the United States. Moreover, cash has remained an important role in many jurisdictions.[16] During the first year of the pandemic, as in earlier stress episodes, such as the Great Financial Crisis, cash in circulation reached a decade high due to a surge in demand for high-value banknotes. This suggests that cash was held more as a store of value than for making payments.[17]

Growth of digital payments reached a record high

The shift towards cashless and digital payments continued in 2021.[18] The total value of cashless payments grew to its highest level yet, both in advanced economies (AEs) and emerging market and developing economies (EMDEs) (Graph 1, first panel).[19] In AEs, the total value of cashless payments grew by 14% and in EMDEs by 15% in 2021. Most of the growth in value as a percentage of GDP in 2021 comes from credit transfers. However, e-money payments grew most strongly (27%), followed at a distance by card payments and credit transfers (both 4%).

The volume of cashless payments also increased sharply in 2021, both in AEs (11%) and EMDEs (34%), driven mainly by the uptake of card payments (Graph 1, second panel). The growth of card payments per person in AEs (11%) and EMDEs (23%) surpassed that seen in earlier years (6% and 13%, respectively). This strong increase suggests that consumers and businesses not only further increased their card usage, but in part also that consumers and businesses that had temporarily shifted to either paying with cards or accepting them in 2020 did not fully revert to their prior payment behaviour in 2021.

Developments differed notably across countries. On average, the number of credit transfers per person grew more strongly in EMDEs than in AEs. Further, as in earlier years, the number of e-money payments per person is significantly greater in EMDEs (43) than in AEs (12), while direct debits are used more often in AEs (56) than in EMDEs (12).[20] Further, more generally, consumers and businesses in AEs on average make twice as many digital transactions per person than they do in EMDEs.

[15] See eg Kosse and Szemere (2021), Akana (2021), Alfonso et al (2021), Auer et al (2020a), Auer et al (2022), Jonker et al (2022), Danmarks Nationalbank (2020), SNB (2021), Norges Bank (2021), Coletti et al (2022), Engert and Huynh (2022), RBA (2021), Demirgüç-Kunt et al (2022).

[16] See eg Jakobsen (2018), Bech and Boar (2019), Boar and Szemere (2020), Kosse and Szemere (2021), Federal Reserve (2021), and European Central Bank (2022).

[17] See eg Kosse and Szemere (2021), Guttmann et al (2021) and Rösl and Seitz (2021).

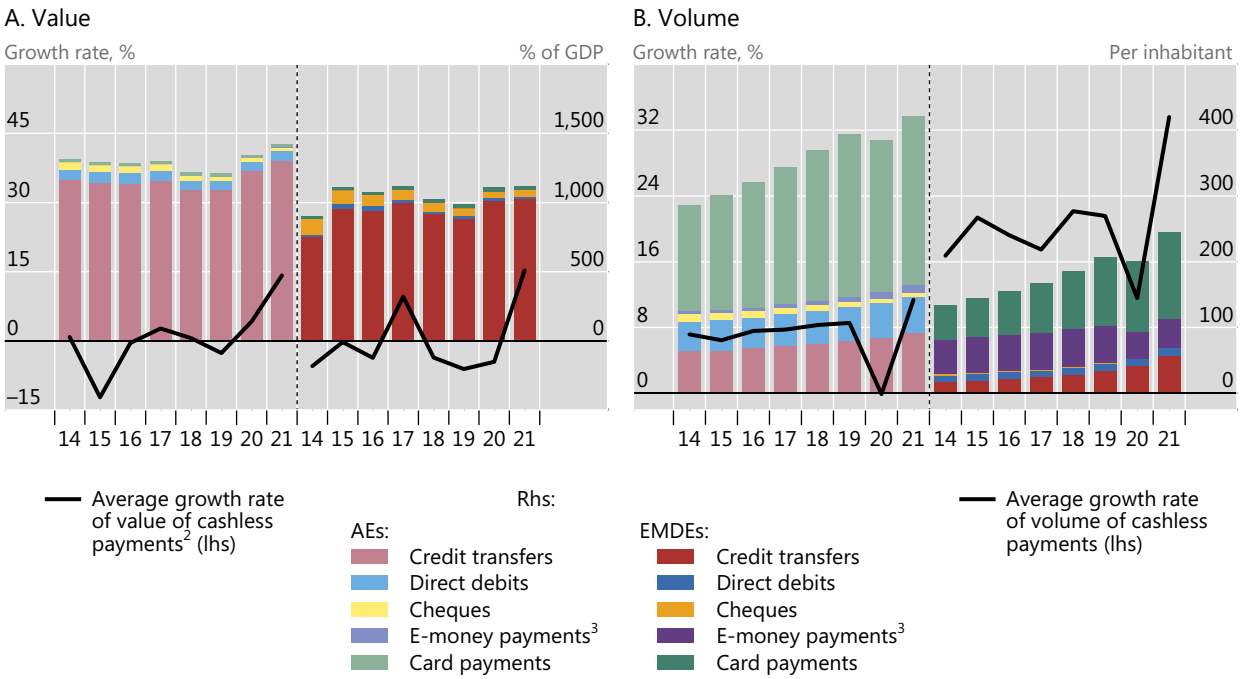
[18] Cashless payments are all payments made without cash. Cheques are considered a cashless but not a digital means of payment, since they start with the physical transfer of a paper cheque between the payer and the payee (even if they are now often presented in a digital form for clearing and settlement). Digital payments as referred to in this CPMI Brief are all payments made without cash or cheques. Credit transfers initiated on paper are included under digital payments due to their small share in the total volume and value of credit transfers for most countries and the fact that they are typically processed digitally. Since the Red Book statistics do not include statistics on CBDC usage, none of the definitions as used in this CPMI Brief cover CBDC payments.

[19] Growth rates of the values in consumer price index-adjusted (CPI-adjusted) local currencies instead of growth rates of the values as a percentage of GDP. While the latter is commonly used for cross-country comparisons, as in Kosse and Szemere (2021), large changes in GDP affect such comparisons over time and across countries, as in 2020 and 2021. For instance, the nominal GDP in EMDEs decreased in 2020 by 2.2% and increased by 17.6% in 2021. As a result, the value of cashless payments in EMDEs as a percentage of GDP hardly changed in 2021, while the CPI-adjusted absolute value in local currency grew significantly that year.

[20] Mobile money, ie a specific form of e-money that allows for digital payments via a mobile phone without involving a bank account, is very popular in Sub-Saharan Africa, which accounts for two thirds of the volume of global mobile money transfers and more than half of the world's active users (Alberola and Mattei (2022) and GSMA (2022)).

Cashless payments grew strongly[1]

Graph 1



[1] Data prior to 2014 may have been subject to changes in reporting methodology. Therefore, data are shown only from 2014 onwards. Only countries are included for which the Red Book statistics contain data about cashless payments. The AE and EMDE aggregates are unweighted averages across countries. In this graph, advanced economies (AEs) include AU, BE, CA, CH, DE, ES, FR, GB, IT, JP, NL, SE and US; and emerging market and developing economies (EMDEs) include AR, BR, CN, ID, IN, KR, MX, SA, SG, TR and ZA. [2] The average growth rate is calculated using growth rates based on the value in local currencies, adjusted by CPI inflation. [3] The distinction between card and e-money payments is not available for CA, CN, GB, MX, SA and ZA. For these countries, e-money payments might be included in card payments.

Source: CPMI Red Book statistics.

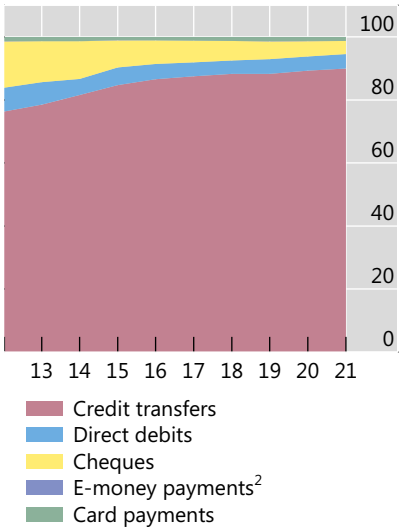
The use of cheques continued to decline globally, as they were replaced mainly by credit transfers (Graph 2, first panel). The share of cheques in the total value of cashless payments fell from 15% in 2012 to 4% in 2021, while that of credit transfers increased from 76% to 90%. Yet cheques still play a significant role in some countries, notably for higher-value consumer or corporate payments. In Canada and Singapore, cheques still accounted for one third of the total value of cashless payments in 2021 (Graph 2, second panel). However, the share of cheques is falling steadily in these and other countries (Graph 2, third panel), and legal frameworks increasingly allow for their digital processing.[21]

[21] For example, the Check 21 Act in the United States facilitates cheque truncation and electronic cheque exchange by authorising a new negotiable instrument (substitute cheque) as a legal equivalent of the original cheque. In Singapore, the Bill of Exchange Act 1949 allows for the electronic presentation of a cheque.

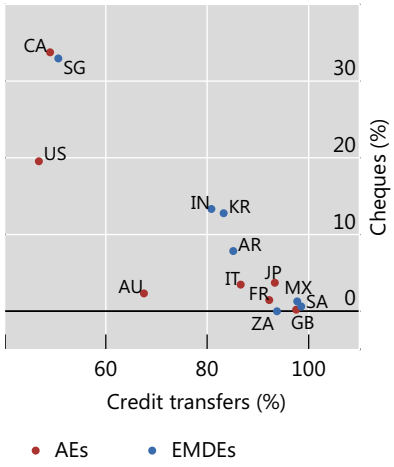
Cheque payments continued to decline

As a percentage of cashless payment values in US dollar — Graph 2

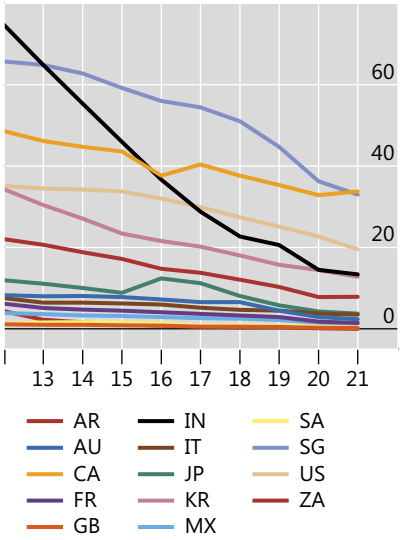
A. Breakdown by payment instrument[1]



B. Cheques vs credit transfers for selected countries in 2021[3]



C. Value of cheques over time for selected countries[3]



[1] Only countries are included for which the Red Book statistics contain data about cashless payments. [2] The distinction between card payments and e-money payments is unavailable for CA, CN, GB, MX, SA and ZA. For these countries, e-money payments might be included in card payments. [3] For reasons of clarity and comprehensibility, BE, BR, CN, DE, ID, NL, ES, SE, TR are not shown in this graph.

Source: CPMI Red Book statistics.

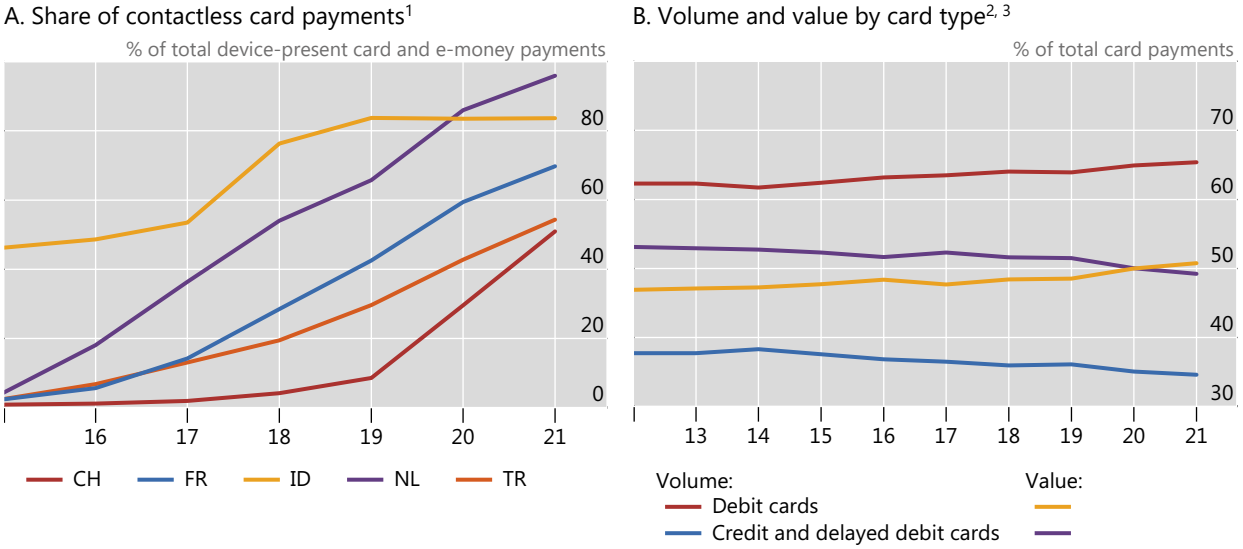
Contactless and debit card payments grew further

The increase in the share of contactless card payments, as seen in 2020, continued in 2021 (Graph 3, first panel).[22] Contactless card payments usually do not require card holders to sign a receipt or type in a personal identification number (PIN) at the POS if the transaction is below a certain value. While still growing, in various countries, the growth of contactless card payments slowed slightly in 2021, flattening out noticeably in France, Indonesia and the Netherlands.

The share of debit cards in total card payments has increased modestly but steadily in recent years, in terms of both volume and value (Graph 3, second panel). Debit card volume shares increased from 62% in 2012 to 65% in 2021, while the value increased from 47% to 51%. The larger volume share of debit cards (as compared with that of credit and delayed debit cards) in combination with the similar shares of value indicates that they are used more often for lower-value transactions than are credit and delayed debit cards.

[22] In line with the reporting methodology for the Red Book statistics (see CPMI (2017)), payments initiated via physical devices such as mobile phones are classified according to the instrument type used to perform the payment. As a result, payments initiated through the transmission of card information stored on mobile phones using contactless technology, such as payments with ApplePay or GooglePay, are included in the number and value of contactless card payments.

Share of contactless and debit card payments increased further — Graph 3



[1] Only countries are included for which the Red Book statistics contain data about contactless card payments in 2021. [2] Value in USD. [3] Only countries are included for which the Red Book statistics contain data about card type.

Source: CPMI Red Book statistics.

Fast payments usage reached new heights

The number of fast payments per inhabitant continued to grow, reaching new heights in 2021 (Graph 4, first panel). On average, for all countries for which we have data for the last three years, the number of fast payments per inhabitant grew with 30% between 2020 and 2021.[23] Moreover, the growth in the average value of fast payments per inhabitant was similar to that of previous years, or in many countries more rapid still (Graph 4, second panel).

As in previous years, the number of fast payments per inhabitant in 2021 was highest in Korea (138), followed at a distance, by Sweden (75) (Graph 4, first panel). Korea also outnumbered other countries in terms of average total value per inhabitant in 2021 ($488,104), followed by Mexico ($146,893) (Graph 4, third panel).

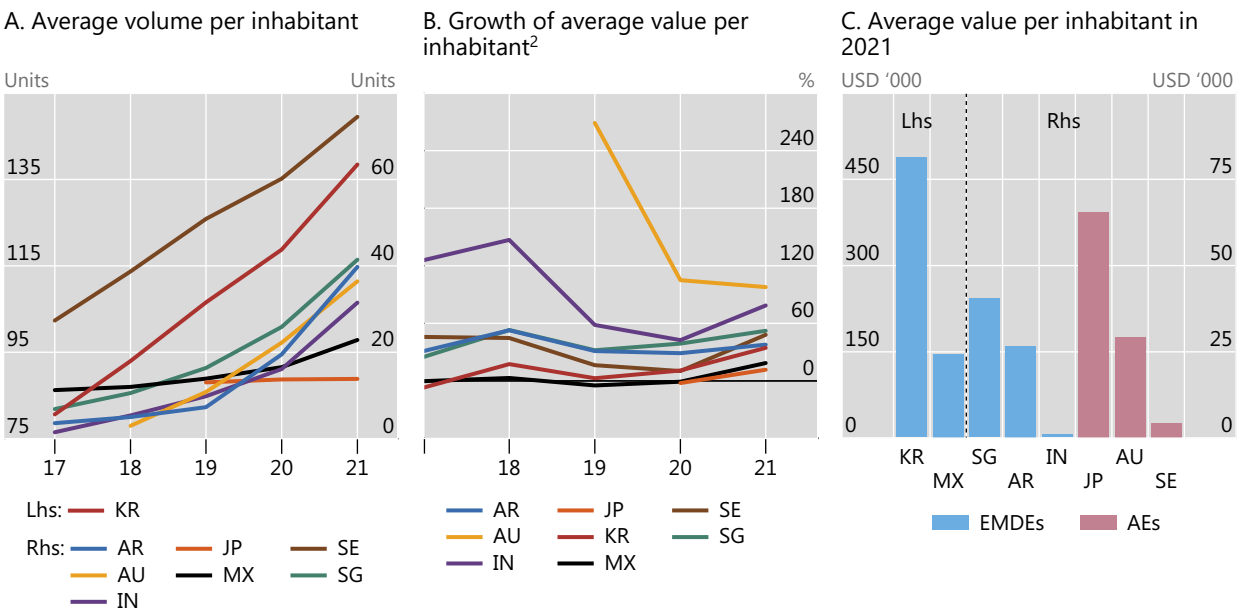
In general, within AEs and EMDEs, the average value per inhabitant varies greatly between countries, possibly reflecting different levels of adoption and use cases. For example, in Turkey, fast payments are used mainly for person-to-person and person-to-business payments, while fast payments in Japan and Korea are also used for government payments and transactions between businesses.[24] As the adoption of FPS has been shown to follow the general pattern of technology diffusion in payments, further growth of FPS may be expected.[25]

[23] Graph 4 includes only countries for which the Red Book statistics contain data for the past three years. However, data for a shorter period from Belgium, Brazil, China, France and Turkey show similar developments. In addition, these observations are in line with the reported data on the volume and value of transactions processed by fast payment systems (see Red Book statistics, Tables 7 and 8).

[24] CPMI (2021).

[25] Based on the global adoption of RTGS systems, Bech et al (2017) proved that technology diffusion in payments is consistent with general models of technology diffusion, ie that the rate of adoption follows a bell curve and that the share of adopters generally forms an S-curve.

Use of fast payments soared[1] Graph 4



[1] Only countries are included for which the Red Book statistics contain data about fast payments since 2019. [2] In domestic currency, adjusted by CPI inflation.

Source: CPMI Red Book statistics.

Cash withdrawals declined more slowly

The volume and value of cash withdrawals in 2021 declined by less than in 2020, albeit with significant country differences. In half of the countries, mainly AEs, the volume of withdrawals fell at a lower rate in 2021 than in 2020, while in other countries, mainly EMDEs, the volume of withdrawals slightly increased (Graph 5, first panel). In terms of value, withdrawals fell in all countries, although not as strongly as in the year before (Graph 5, second panel). Overall, the 2021 growth rate of cash withdrawals was nearly everywhere either lower than or similar to the pre-pandemic rate. These developments suggest an ongoing, albeit declining, demand for cash.

The average value per withdrawal in 2021 was higher in Australia, Germany, the Netherlands, Switzerland, Sweden and the United Kingdom than in Argentina, India, Mexico and South Africa– reflecting the generally higher GDP per capita in AEs (Graph 6, first panel). Additionally, the average withdrawal values reflect the presence of ATMs: in countries where the number of ATMs has declined over the past decade (ie countries with an ATM index value below 100), the average withdrawal value has mostly increased (withdrawals index values above 100) (Graph 6, second panel).[26] The opposite is seen in countries where ATM availability has grown over time (ie those with ATM index values larger than 100).

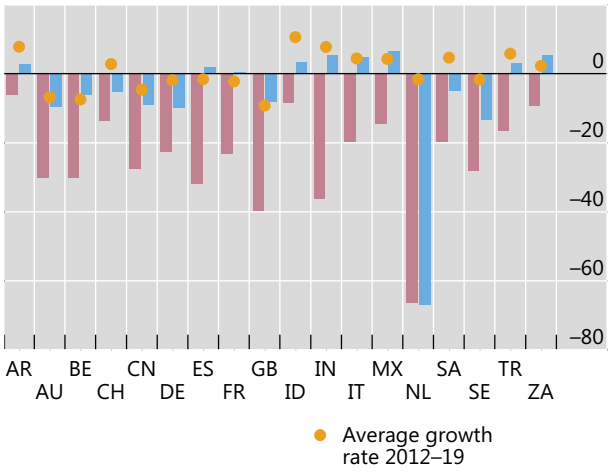
[26] The index for cash withdrawals is calculated by taking the relative difference between the average value per cash withdrawal in USD in the first year that data are available in the Red Book statistics (ie the base year) and its value in 2021, and by subsequently adding 100. The index for ATMs is calculated using the same approach while looking at the number of ATMs with a cash withdrawal function. For instance, the 2021 ATM index value of 36 for Belgium indicates that the number of ATMs fell by 64% between 2012 (ie the first year that data are available) and 2021. Similarly, the 2021 cash withdrawal index value of 136 indicates that the average cash withdrawal value rose by 36% between 2012 and 2021.

Decline in volumes and values of cash withdrawals slowed[1]

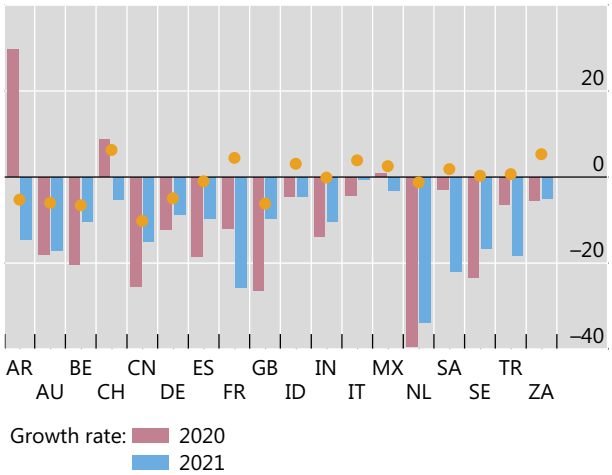
In per cent

Graph 5

A. Growth of average volume per inhabitant



B. Growth of value as share of GDP



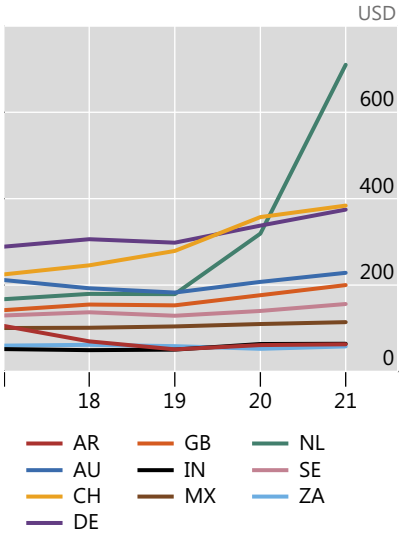
[1] Only countries are included for which the Red Book statistics contain data about cash withdrawals. For certain countries, data are available only from 2013 (FR, IT and IN) or 2014 (NL) onwards. In these cases, the average growth rate is computed from the relevant starting year to 2019.

Source: CPMI Red Book statistics.

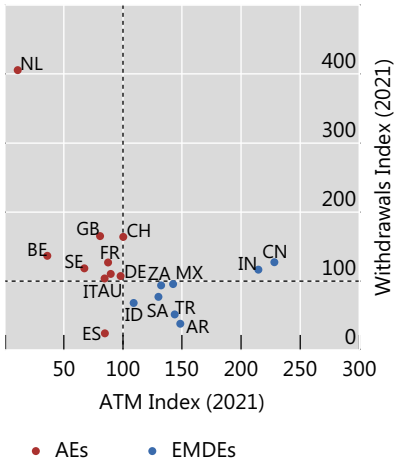
Cash withdrawals rose in value as ATM availability fell and vice versa

Graph 6

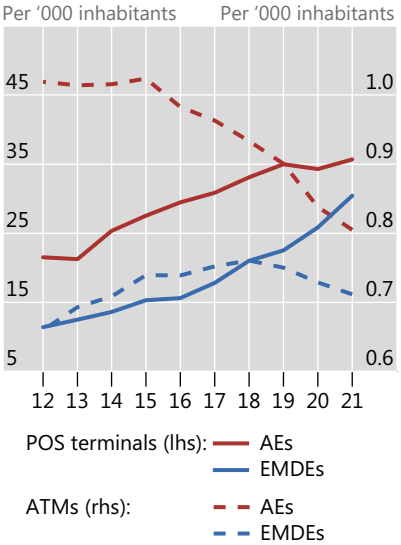
A. Average cash withdrawal value in selected countries[1]



B. Comparison of ATMs and average cash withdrawal value[2, 3]



C. ATM and POS terminals over time[3, 4]



[1] Only countries are included for which the Red Book statistics contain data about withdrawals. For reasons of clarity and comprehensibility, BE, CN, FR, ID, IT, SA, ES, TR are not shown in this graph. [2] Only countries are included for which the Red Book statistics contain data about withdrawals and ATMS. The base value of the index is either 2012 or the year in which the indicator was first reported. The index for cash withdrawals is based on the average value per cash withdrawal in USD. The index for ATMs is based on the number of ATMs with a cash withdrawal function. [3] The AE and EMDE aggregates are unweighted averages across countries. In this graph, advanced economies (AEs) include AU, BE, CA, CH, DE, ES, FR, GB, IT, NL and SE; and emerging market and developing economies (EMDEs) include AR, BR, CN, IN, MX, SA, SG, TR and ZA. [4] Only countries are included for which the Red Book statistics contain data about ATMs and POS terminals.

Source: CPMI Red Book statistics.

Developments in the Netherlands confirm the correlation between the strong decline of ATMs and the sharp increase in the average withdrawal values, as well with the sharp decline in cash withdrawals as depicted in Graph 5.[27] This suggests that the shrinking number of ATMs has prompted consumers to withdraw cash less frequently but in larger amounts.

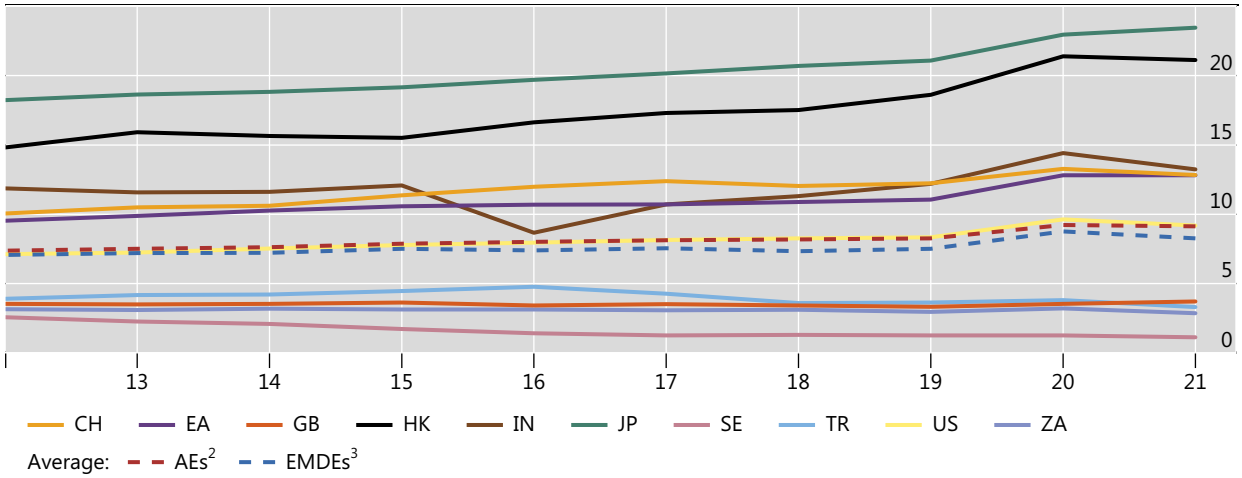
Since 2018, the availability of ATMs has been falling in both AEs and EMDEs. This decline in ATMs has gradually been accompanied by an increasing number of POS terminals (Graph 6, third panel).

Cash in circulation is still higher than pre-pandemic

Currency in circulation as a share of GDP fell somewhat in most countries in 2021. This decline partly reverses the trend in the first year of the pandemic, when the value of coins and banknotes in circulation grew to an all-time high (Graph 7).[28] Yet, currency in circulation still exceeded its pre-pandemic levels nearly everywhere. As in previous years, the value of cash in circulation as a percentage of GDP held steady in both AEs and EMDEs, albeit with significant differences within each country group. For instance, cash in circulation exceeded a fifth of GDP in Hong Kong SAR and Japan, whereas it was as low as 1% in Sweden.

Currency in circulation exceeded pre-pandemic levels[1]

As a percentage of GDP — Graph 7



[1] For reasons of clarity and comprehensibility, AR, AU, BR, CA, CN, ID, KR, MX, SA and SG are not plotted individually in this graph. However, they are included in the AE and EMDE aggregates, which are unweighted averages across countries. National data for euro area countries were not reported separately. [2] In this graph, advanced economies (AEs) include AU, CA, CH, EA, GB, JP, SE and US. [3] In this graph, emerging market and developing economies (EMDEs) include AR, BR, CN, HK, ID, IN, KR, MX, SA, SG, TR and ZA.

Source: CPMI Red Book statistics.

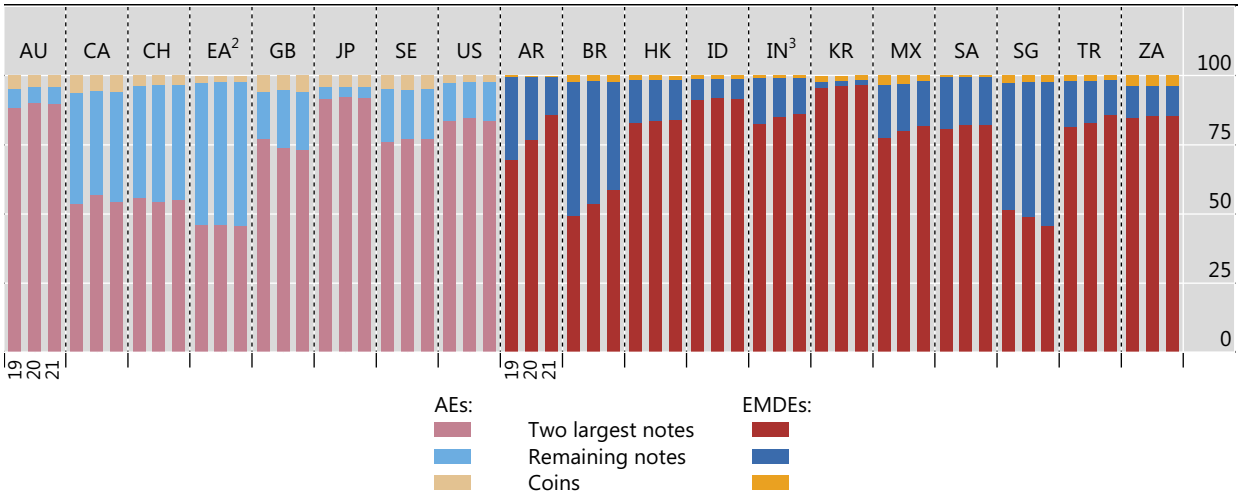
The composition of currency in circulation significantly varied across countries (Graph 8). In Brazil, Canada, the euro area, Singapore and Switzerland, the highest denominations accounted roughly for half of the total currency in circulation in 2021, whereas it exceeded 75% elsewhere. In most jurisdictions the share of the highest denominations increased or stabilised in 2021.

[27] In the Netherlands, the number of ATMs fell from 4,986 in 2019 to 839 in 2021. See Red Book statistics Table T4: https://stats.bis.org/statx/srs/table/T4?c=NL&p=2021.

[28] See also Guttmann et al (2021) and Chen et al (2021).

Share of largest-denomination notes soared[1]

As a percentage of total currency in circulation — Graph 8



[1] Only countries are included for which the Red Book statistics contain data about currency in circulation by denomination. Euro area countries were not reported separately. [2] Euro area (EA): EUR 500, EUR 200 and EUR 100 notes are included in the two largest denominations, as EUR 500 notes are no longer issued [3] India (IN): The second largest denomination is excluded, as this is a commemorative banknote.

Source: CPMI Red Book statistics.

Cash and digital payments: a glance into the future

The strong growth in digital payments observed in 2020 continued in 2021. Credit transfers and contactless card payments were among the main drivers of this growth. In particular, the use of fast payments reached an all-time high. The trend is likely to persist as more countries launch FPS.[29] While, for the time being, most FPS can be used only for domestic payments, they also have the potential to improve cross-border payments. Interlinking of FPS is one of the priority actions of the G20 cross-border payments programme to make cross-border payments cheaper, faster, more accessible and more transparent.[30]

Despite the move towards digital, contactless, and fast payments, the graphs above show that there is still a demand for cash.[31] This raises the question of how to meet this public demand in a world that is becoming increasingly digitalised. Many central banks are exploring the potential issuance of a retail CBDC and several have already launched one or are conducting a pilot in the public domain.[32] Driven by differences in current payment infrastructures and payment habits, as well as diverging social and economic circumstances, central banks have varying aims in considering the issuance of a CBDC.[33] The effects of a retail CBDC on the use of physical cash and other payment instruments will depend on the targeted use cases and related design choices.

29 See CPMI (2021).

30 See CPMI (2022).

31 According to Khiaonarong and Humphrey (2022), cash withdrawals is the most promising indicator of the use of cash as a means of payment.

32 The People's Bank of China, the Central Bank of the Bahamas, the Eastern Caribbean Central Bank, the Central Bank of Nigeria, and the Bank of Jamaica have already launched or are piloting a retail CBDC. For further details, see CPMI et al (2022) and https://boj.org.jm/core-functions/currency/cbdc/.

33 See Kosse and Mattei (2022).

The future trajectory of retail payments is unlikely to be a singular one; there will probably be a multitude of payment methods and arrangements. Therefore, interoperability within and between countries is key to ensuring that payers and payees can seamlessly make and receive payments, regardless of their location, payment method of choice or payment service provider.[34] Interoperability involves multiple dimensions: technically interlinking payment systems is fundamental, but it also requires harmonisation across legal and regulatory frameworks and business rules. Thoroughgoing domestic and cross-border interoperability can further support the general trend towards faster, cheaper and more inclusive payments.[35]

[34] See Boar et al (2021) for a discussion of the benefits and trade-offs of interoperability between payment systems across borders.

[35] Buna, P27, PAPSS and TIPS are examples of recent cross-border interlinking projects. For more information on these initiatives, see ARPCSO (2022), P27 (2022), Renzetti et al (2021) and https://papss.com.

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