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DP16618

**The Great Covid Cash Surge –
Digitalisation Hasn't Dented Cash's Safe
Haven Role**

Jonathan Ashworth and Charles A Goodhart

MONETARY ECONOMICS AND FLUCTUATIONS

CEPR

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Discussion Paper DP16618
Published 07 October 2021
Submitted 07 October 2021

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www.cepr.org

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Abstract

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JEL Classification: E40, E41, E49, N10, N20

Keywords: cash, Banknote Issue and Withdrawal, Covid 19, Panic Response

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Abstract

The pandemic fuelled a remarkable surge in currency in circulation across most countries, with cash once again defying premature obituaries of its demise. The somewhat enforced intensification of the digitalisation of economies clearly appears to have further diminished cash's role as a medium of exchange. However, other important aspects of digitalisation, such as the growth in private digital currencies, haven't weakened cash's role as a store of value. The recent experience shows that in a major crisis people still want to retreat to the security and safety of holding bank notes, especially large denomination notes, to provide reassurance. When in trouble, people want to go back to the tried and true; in this respect holding paper money in their wallets.

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The Great Covid Cash Surge – Digitalisation Hasn't Dented Cash's Safe Haven Role

2020 was an epochal year for the world and its economy. A once in a century pandemic, COVID-19, has resulted in more than 200 million infections globally and over 4 million deaths, with few parts of the globe unaffected¹. In addition to the terrible health consequences, there have been severe economic impacts. Activity collapsed and unemployment soared as governments enacted lockdown measures to try and prevent the spread of the virus and reduce pressure on their health systems. Global GDP is estimated to have contracted by 3.3% in 2020 (IMF, 2021), by far the fastest pace of decline on IMF data going back to 1980 and compares with a contraction of just -0.1% in 2009 amid the Great Financial Crisis (GFC). Reflecting declines in output and attempts by policymakers to support households and businesses, government debt has risen to record levels in both advanced and emerging economies.

There have also been major developments in the field of cash usage. Perhaps unsurprisingly, given the lockdowns and initial fears that the virus could be spread on banknotes, some observers argued that the pandemic would further hasten the death of cash (Cohn, 2020). Indeed, the use of cash as a medium of exchange did fall very sharply in most countries amid the increased use of electronic payment methods and the rise in online retailing. However, cash in circulation has once again not only defied its premature obituaries, but it has actually soared in most countries across the globe since the start of the pandemic.

We make four main contributions to the literature in this paper. First, we document the COVID-19 related surge in currency in circulation across the major Western economies, providing historical comparisons as far back as the 19th century for the US and the UK and the late 1940s for Canada. Second, using our dataset of almost seventy countries, representing over 90% of global GDP, we highlight the worldwide nature of the jump in cash in circulation. Third, we discuss the main drivers behind the rise in cash holdings, highlighting the sharp fall in banknotes returned to central banks in a number of countries, which appears somewhat unique to the current crisis. Fourth, we examine some countries that have achieved significant early success in vaccinating their populations and/or reducing COVID-19 cases and deaths for insights on the future direction of currency in circulation.

i) The COVID-19 cash surge in major western economies

In the weeks following the World Health Organization's (WHO) 11th March 2020 assessment that COVID-19 was a pandemic (WHO, 2020), there were panic driven increases in currency in circulation in the world's largest economy, the US. In the weeks ending Monday 16th March, 23rd March and the 30th March, currency in circulation increased by 0.47%, 0.92% and 0.54% respectively. The 0.92% seasonally adjusted gain was the third highest on record for weekly data back to 1975 and was only beaten by gains of 1.2% and 2% in the weeks ending Monday the 27th December 1999 and 3rd January 2000 at the height of fears over Y2K. The rapid gains coincided with a significant tightening in government-related lockdown measures. Oxford University's Blavatnik School of Government's Stringency Index for the US soared from 20.4 on the 9th March to 52.3 on the 16th and 72.7 on the 23rd (Hale et al. 2021)².

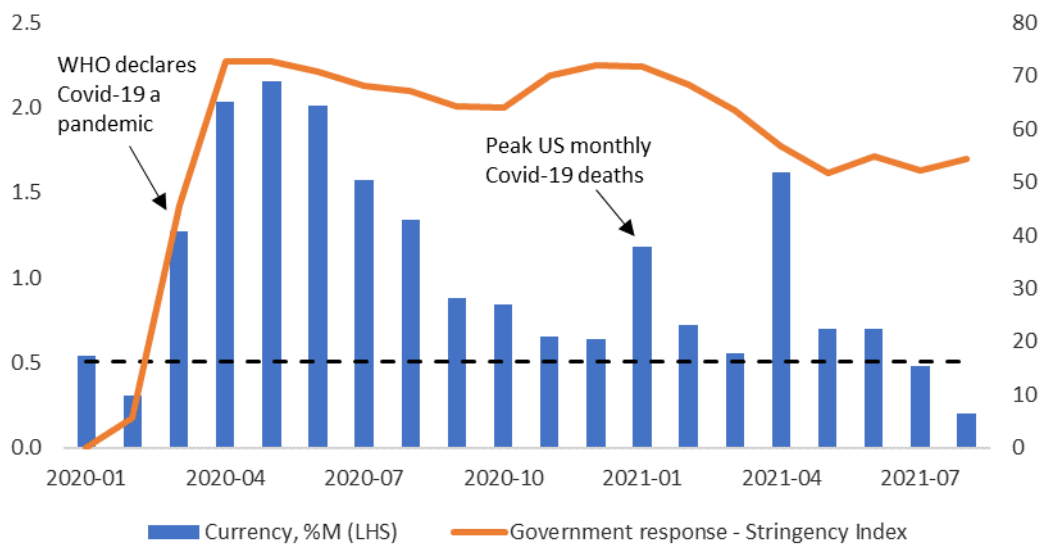
Furthermore, monthly gains in US currency in circulation of 2%, 2.2% and 2% between April and June 2020 were only beaten by the 2.5% increase in December 1999 and equaled by the 2% gain in

¹ <https://covid19.who.int/>. Where we discuss COVID-19 cases and deaths in the remainder of the note, the source of the data will be Reuters and the World Health Organization (WHO) respectively.

² Where we discuss government stringency/lockdown measures in the remainder of the note, our reference dataset is Oxford University's Blavatnik School of Government's Stringency Index - see Hale et al. (2021).

October 2008 amid the GFC, in a series from the US Board of Governors going back to just after World War 2 (WW2). Monthly gains subsequently remained robust, but began to moderate, particularly from the Autumn, and were close to the pre-virus average in November and December. However, there were still large monthly gains in January and April 2021 (Exhibit 1). The former coincided with the peak monthly deaths due to COVID-19 in the US, and media attention around this perhaps contributed to the rise amid increased precautionary motives.

Exhibit 1: US Currency in Circulation, seasonally adjusted (%M)



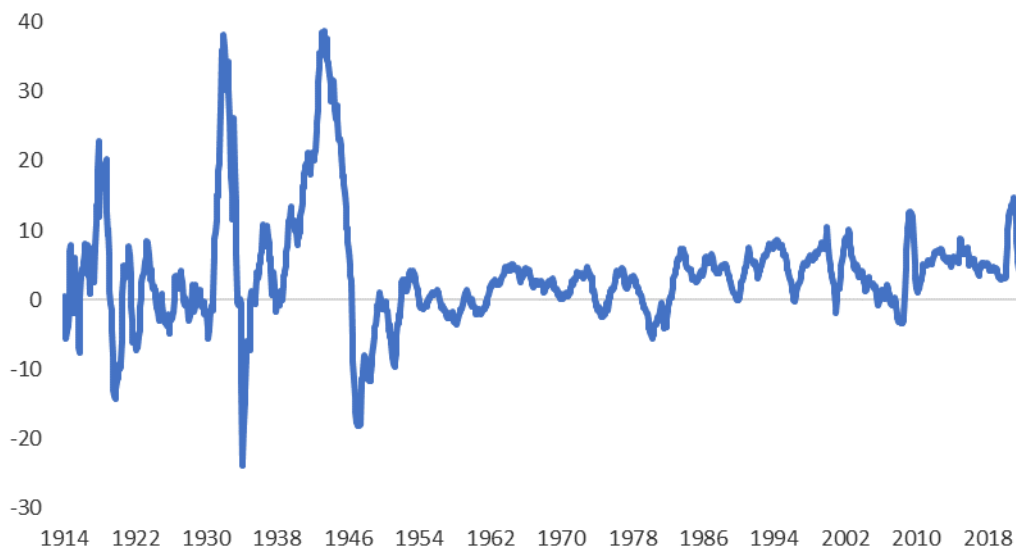
Source: Ashworth and Goodhart (2021); Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis (FRED); Hale et al. (2021), Oxford University Blavatnik School of Government, Refinitiv Datastream. The Stringency Index is the average of daily readings over the month. The black dashed line shows the five-year monthly average change in currency in circulation prior to March 2020.

Exhibit 2: US Currency in Circulation (%Y)



Source: Ashworth and Goodhart (2021); Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis (FRED); Friedman and Schwartz (1963). Friedman and Schwartz data were used before 1947. Prior to May 1907, Friedman and Schwartz currency data were on an: annual basis as of June each year until 1882; a bi-annual basis in February and August between 1881 and 1875; an annual basis in February between 1873 and 1874; and an annual basis in January between 1872 and 1867. We used linear interpolation to put the data on a monthly basis.

Exhibit 3: US Real Currency in Circulation (%Y)



Source: Ashworth and Goodhart (2021); Board of Governors of the Federal Reserve System, U.S. Bureau of Labour Statistics, Federal Reserve Bank of St. Louis (FRED); Friedman and Schwartz (1963).

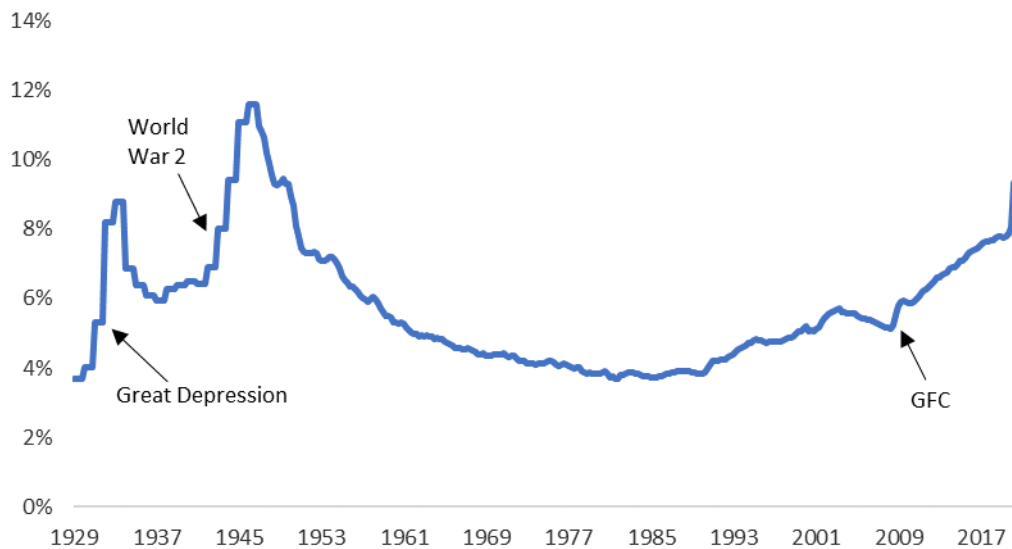
The sharp and consistent gains in currency resulted in the year-on-year rate of increase peaking at 16.4% in February 2021 (Exhibit 2). This is the fastest pace of gain since WW2 and the joint fifth fastest pace of increase in data going back to the late 1860s – only rises at the beginning of the 1880s and during World War 1 (WW1), the Great Depression and WW2 were larger (it was broadly equal to the 16.5% rise in June 1898 which was likely driven by the Spanish-American War). The peak was much higher than in the GFC and materially higher than during Y2K. The gains are similarly impressive in real terms when adjusted for inflation (Exhibit 3) and are particularly noteworthy given that cash’s use as a medium of exchange has been in marked structural decline and fell sharply during the pandemic. Reflecting the huge gains, around one in every six US dollars in circulation has been created since the start of COVID-19 and US currency in circulation is now at its highest level as a share of GDP since the aftermath of WW2 (Exhibit 4).

Almost half of US currency is now held overseas, largely in economies that have previously experienced “Dollarization” or where residents fear that inflation could potentially devalue domestic currencies. Economists such as Ken Rogoff have also argued that the US dollar is widely used overseas in the underground economy. Exhibit 5 highlights the surge in overseas holdings of US currency through the 1980s and 1990s amid various crises in emerging economies, and there were also very sharp spikes in overseas holdings during the GFC and the euro area sovereign debt crisis. Foreign holdings have since continued to grow briskly, perhaps related to crises in certain emerging economies³. However, it was domestic holdings of US currency that fueled the sharp increases during Y2K, although the rise in domestic holdings was rather modest during the GFC (Exhibit 5). Interestingly, the growth in cash holdings during the pandemic appears to have been driven by very large increases in both domestic and overseas demand for US dollars. This marks the current spike out from previous surges, which were often typically driven by one or the other. The marked increase in overseas demand for US cash is particularly notable since the tight restrictions on

³ For more on international demand for US currency, see Judson (2017).

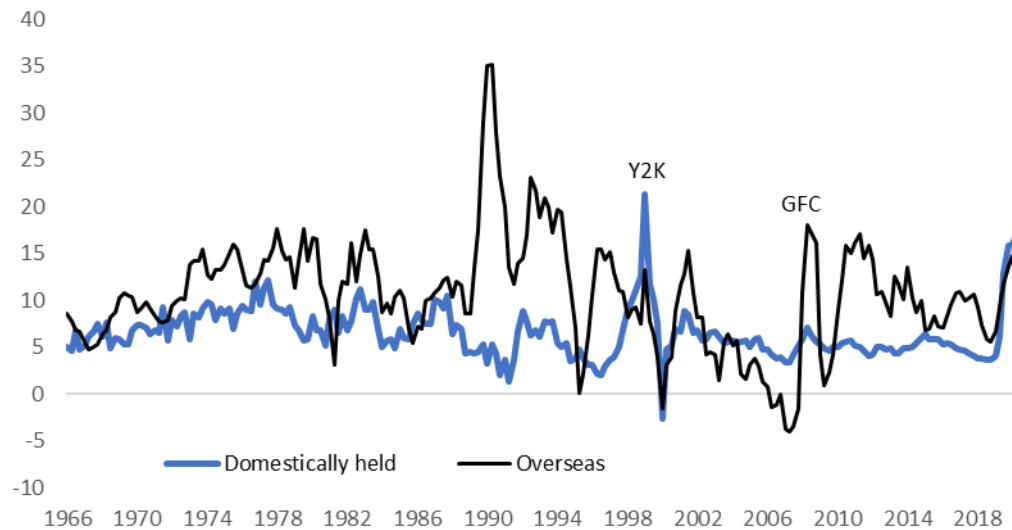
overseas travel will have significantly reduced the outflow of US dollars associated with outbound tourism.

Exhibit 4: US Currency in Circulation (% of GDP)



Source: Ashworth and Goodhart (2021); Board of Governors of the Federal Reserve System, U.S. Bureau of Economic Analysis, Federal Reserve Bank of St. Louis (FRED); Friedman and Schwartz (1963). Data is annual prior to 1947.

Exhibit 5: US Currency in Circulation (%Y) - domestic and overseas

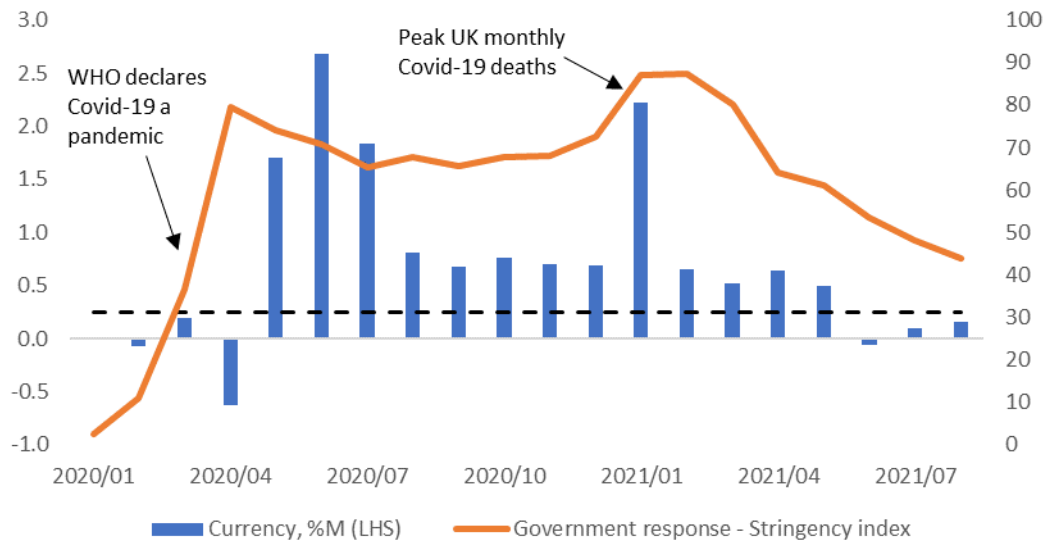


Source: Ashworth and Goodhart (2021); Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis (FRED).

There have been very large gains in currency in circulation in most other major western economies too. In the UK, an increase in currency in circulation was surprisingly absent in March and April 2020, despite the sharp increase in the stringency of lockdown measures in the second half of March. On a seasonally adjusted basis, currency in circulation increased by 0.2% in March 2020 and then fell by 0.6% in April (Exhibit 6). However, currency demand subsequently accelerated sharply. There were gains of 1.7%, 2.7% and 1.8% in May, June and July and monthly gains have subsequently averaged around 0.6%. This resulted in the year-on-year rate of increase surging to a peak of 14.5% in April

2021 (Exhibit 7), well ahead of the peaks during the GFC and in the aftermath of the BREXIT referendum, and slightly higher than the Y2K peak. Indeed, it represents one of the largest year-on-year increases since the 1870s – only significantly beaten by the gains in WW1 and WW2 and slightly beaten by the gains in 1974-75 (perhaps due to the second referendum on EU membership in June 1975) and 1978-79 (some of which may have been related to mass strikes ahead of the “Winter of Discontent”). On a real terms basis, adjusting for inflation, the 13.1% gain in currency in March 2021 was the fastest increase since the end of WW2 in September 1945 (Exhibit 8).

Exhibit 6: UK Currency in Circulation, seasonally adjusted (%M)



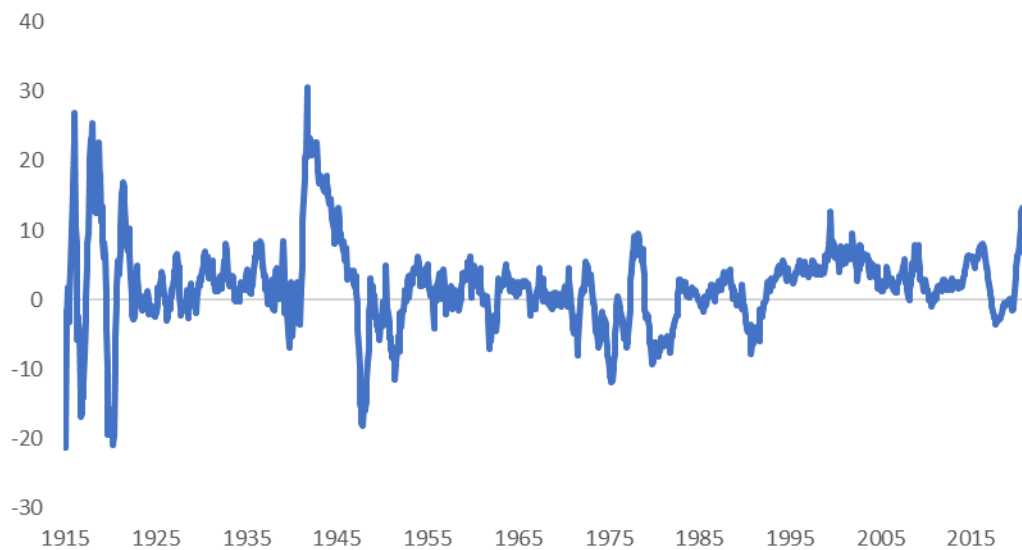
Source: Ashworth and Goodhart (2021); Bank of England; Hale et al. (2021), Oxford University Blavatnik School of Government, Refinitiv Datstream. The Stringency Index is the average of daily readings over the month. The black dashed line shows the five-year monthly average change in currency in circulation prior to March 2020.

Exhibit 7: UK Currency in Circulation (%Y)



Source: Ashworth and Goodhart (2021); Bank of England; Capie and Webber (1985), A Monetary History of the United Kingdom 1870-1982 - Vol. 1 Data, Sources, Methods Table II(3), Bank of England: A millennium of macroeconomic data.

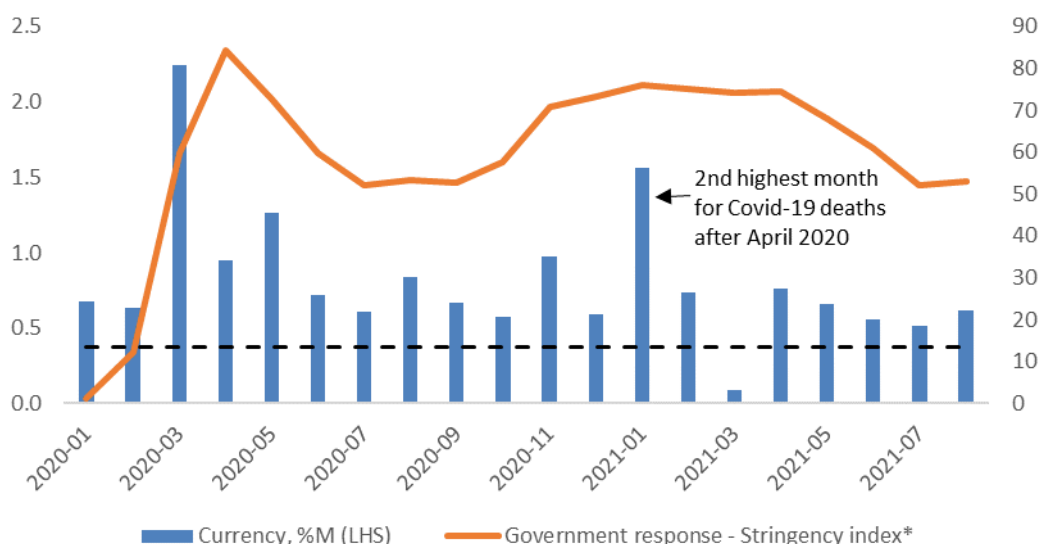
Exhibit 8: UK Real Currency in Circulation (%Y)



Source: Ashworth and Goodhart (2021); Bank of England; Capie and Webber (1985), A Monetary History of the United Kingdom 1870-1982 - Vol. 1 Data, Sources, Methods Table II(3), Bank of England: A millennium of macroeconomic data; ONS.

In Canada, weekly currency in circulation showed very large jumps of 1.1% and 1.7% in the weeks to Wednesday the 18th and 25th March respectively amid a sharp tightening of government lockdown measures. Currency in circulation outside of banks increased by 0.6%, 1.6%, 3%, 2.4%, 1.7% and 1.4% on a seasonally adjusted basis in March, April, May, June, July and August 2020. Subsequently, monthly gains have averaged 0.75%, well above the 0.4% average monthly gain in the five years before COVID-19. As a result of the sharp increases, the 17.6% year-on-year gain in March 2021 was the fastest since the series began shortly after WW2.

Exhibit 9: euro area Currency in Circulation, seasonally adjusted (%M)



Source: Ashworth and Goodhart (2021); European Central Bank; Hale et al. (2021), Oxford University Blavatnik School of Government, Refinitiv Datastream. *The Stringency Index is the average of daily readings over the month for Germany, France, Italy, Spain and the Netherlands. The black dashed line shows the five-year monthly average change in currency in circulation prior to March 2020.

In the euro area, currency in circulation rose by 0.4% in the week to the 9th March, 1.5% in the week to the 16th March and then by 0.5-0.6% over the following three weeks amid the sharp tightening in lockdown measures. The seasonally adjusted monthly gain was 2.2% in March, followed by increases of 0.9% and 1.3% in April and May (Exhibit 9). The year-on-year rate of gain in currency in circulation peaked in February 2021 at over 12%, the highest since 2009 in the aftermath of the GFC. One cannot really compare with the year-on-year rates of increase in the years following the euro's introduction and prior to the GFC, as currency in circulation surged during this period amid the new currency's use as a store of value internationally alongside the US dollar. Current estimates suggest that between 30% and 50% of euro area currency is held abroad, although there appears to have been no increase in overseas demand for euros during the pandemic (ECB, 2021). This is in stark contrast to the US and the experience of the euro area during the GFC, where the European Central Bank (ECB) notes a particularly strong increase in demand for euro notes from non-EU Eastern European countries.⁴

ii) The cash surge was a global phenomenon

The large rise in cash in circulation has not just been a phenomenon in major western economies, it has also been very global in nature. Our dataset consists of almost 70 countries, all 37 OECD members (mostly advanced economies, but some emerging countries) and emerging economies with a GDP greater than \$200bn at purchasing power parity in 2019⁵. These countries represent over 90% of global GDP when measured at purchasing power parity.

Of the countries, only four recorded slower growth of currency in circulation in 2020 than in 2019 – Sweden, Kuwait, Uzbekistan and Angola. The other 64 typically recorded significantly faster growth of currency in circulation. The median and mean growth rates were 13.2% and 16.1% respectively in 2020, which was more than double the respective numbers for 2019 and more than double and around double the average annual growth rates over 2015-2019 (Table 1). The lower and upper quartiles were 10.5% and 19.9% in 2020, which compares with 3.1% and 9.6% respectively in 2019.

Table 1: Growth in Currency in circulation globally (%Y)

Global	Median	Mean	Lower Quartile	Upper Quartile	Min	Max
2010-14	8.9	11.2	5.2	12.5	-5.5	95.3
2015-19	6.0	8.3	4.4	10.8	-4.9	67.1
2019	5.9	6.5	3.1	9.6	-10.7	34.2
2020	13.2	16.1	10.5	19.9	-4.5	64.5

Source: Ashworth and Goodhart (2021); national sources; IMF; Refinitiv Datastream. The annual changes in currency in circulation are calculated on a year-end basis. The high maximum readings for the 2010-14 and 2015-19 periods appear to be due to the adoption of the euro by some countries.

In terms of the OECD, the median and mean growth rates of currency in circulation in 2020 of 11.3% and 13.8% were around 2.5 times their rates of growth in 2019 (Table 2), with lower and upper quartiles of 10.4% and 15.7% respectively. The minimum growth rate was -1.5% in Norway (closely

⁴ <https://www.ecb.europa.eu/euro/intro/issuance/html/index.en.html>

⁵ Several were excluded where data was not available or not available for the whole of 2020 at the time of calculation.

followed by Sweden at -1%), while the maximum was 37.7% in Chile (closely followed by Poland at 36.9%).

Table 2: Growth in Currency in circulation in the OECD (%Y)

OECD	Median	Mean	Lower Quartile	Upper Quartile	Min	Max
2010-14	5.3	10.4	4.6	9.2	-5.5	95.3
2015-19	5.5	7.6	4.3	8.7	-4.9	67.1
2019	4.6	5.3	2.6	8.3	-10.7	18.1
2020	11.3	13.8	10.4	15.7	-1.5	37.7

Source: Ashworth and Goodhart (2021); national sources; IMF; Refinitiv Datastream.

In terms of the BRICS, the median and mean growth rates of currency in circulation in 2020 of 22.4% and 20% were around 4 times their rates of growth in 2019 (Table 3), with lower and upper quartiles of 9.8% and 26.4% respectively. The minimum growth rate in 2020 was 9.2% in China, while the maximum was 32% in Brazil (closely followed by Russia and India at 26.4% and 22.4% respectively).

Table 3: Growth in Currency in circulation in the BRICS (%Y)

BRICS	Median	Mean	Lower Quartile	Upper Quartile	Min	Max
2010-14	10.9	11.2	9.6	12.7	8.9	14.1
2015-19	5.1	7.5	4.9	6.2	3.8	17.2
2019	5.4	5.6	2.9	5.9	1.7	12.1
2020	22.4	20.0	9.8	26.4	9.2	32.0

Source: Ashworth and Goodhart (2021); national sources; IMF; Refinitiv Datastream.

China receives significant attention in the media given it was the first country to experience an outbreak of COVID-19 cases. It does not produce a seasonally adjusted measure of currency in circulation, hence, some caution is warranted when analyzing short-term monthly movements in the data. Different timings of the Chinese New Year can also add complications when looking at economic data in January and February⁶. The year-on-year rate of change in currency in circulation rose from 4.7-4.8% in October and November 2019 to 5.4% in December and 6.6% in January 2020. According to data from Oxford University's Blavatnik School of Government (Hale et al. 2021), the authorities significantly tightened the stringency of lockdown measures from the last week or so of January 2020 amid the beginning of the Chinese New Year. Cash in circulation showed a large jump in the year-on-year rate of increase to 10.9% in February, amid a much smaller monthly contraction than in February 2019. The year-on-year rate of gain subsequently remained around 10% for the rest of 2020. In summary, the data do suggest some precautionary increase in cash demand in China,

⁶ Cash in circulation usually rises quite strongly in the month the Chinese New Year occurs amid increased spending and the tradition of giving cash gifts. The New Year occurs in either January or February. The Chinese New Year began on the 5th February in 2019 and the 25th January in 2020, consistent with large increases in cash in circulation in January in both cases.

although this seems to have largely occurred in the Winter months, likely reflecting the success of the authorities in containing the virus and restarting the economy.

The Reserve Bank of India (2021) highlighted a large rise in precautionary currency demand during April-June 2020 and suggested that demand for currency remained elevated in the July-September period, before returning to normal levels as the number of new COVID-19 cases began to fall from mid-September 2020⁷. Brazil and Russia also recorded huge gains in currency in circulation in the early months of the pandemic. In the former, large monthly increases resulted in the year-on-year rate of gain rising from 9.7% in March 2020 to a peak of 48% by August 2020, with the gains slowing thereafter. In the latter, the year-on-year rate of increase soared from 6.5% in February to 25.8% by July 2020.

In Table 4, we show the data for selected countries chosen according to their economic importance and/or where there has been an interesting story. The numbers highlight how large and widespread the gains in cash in circulation have been across the globe.

Table 4 – Annual growth in currency in circulation (%Y)

	Australia	Chile	Germany	Israel	Italy	Japan	Korea	Mexico	NZ	Norway	Poland	Spain	Sweden	Switzerland	UK	US
2010-14	5.3	12.6	3.7	9.2	4.5	2.7	17.2	11.6	4.8	-0.5	7.8	5.9	-5.5	6.6	4.7	7.7
2015-19	4.7	7.3	5.5	7.8	4.4	3.8	12.3	10.9	5.6	-4.7	11.6	3.9	-4.9	4.8	3.1	6.4
2019	3.5	13.5	8.2	2.9	1.7	2.2	10.1	3.6	5.3	-7.1	10.3	0.3	2.1	2.6	0.5	5.3
2020	17.4	37.7	10.6	25.8	12.2	4.8	18.9	23.0	13.2	-1.5	36.9	10.2	-1.0	6.3	9.1	15.2

	China	India	Russia	Brazil	Nigeria	Argentina	Bangladesh	S. Africa	Ukraine	Kazakhstan	Peru	Qatar	Ethiopia	Uzbekistan	Kenya	Kuwait
2010-14	9.6	12.7	14.1	10.9	8.9	29.8	15.3	8.9	12.5	5.9	15.5	12.8	22.2		12.4	8.3
2015-19	5.1	17.2	3.8	4.9	6.5	26.7	13.8	6.2	6.9	16.2	6.1	2.5	13.7	24.2	3.4	5.1
2019	5.4	12.1	2.9	5.9	4.9	34.2	8.6	1.7	6.2	1.8	4.9	3.2	7.9	13.8	-10.2	3.6
2020	9.2	22.4	26.4	32.0	19.1	64.5	18.3	9.8	31.4	22.9	36.7	18.9	15.4	5.7	12.2	-4.5

Source: Goodhart and Ashworth (2021); national sources; IMF; Refinitiv Datastream.

iii) What have been the main drivers of the surge in currency in circulation?

The surge in currency in circulation across countries was particularly surprising given that government lockdowns fueled a sharp rise in online shopping, and amid increased use of electronic methods of payment given initial fears that physical cash could spread the virus. Alfonso et al. (2021) note that in 2020 the online share of retail sales increased by 4-7 percentage points in China, Germany, the UK and the US, and despite some recent falls in China and the US, the share remains well above its pre-pandemic level. In short, cash's use as a medium of exchange fell sharply. Hence, this would suggest that cash in circulation should have been falling not surging!

⁷ The last data point appears to have been March 2021 when the Reserve Bank of India Annual Report was written. They highlight that the rise in COVID-19 cases in the second wave from March 2021 may impact currency in circulation going forward.

Falling interest rates are unlikely to have been a major driver behind the rise in currency in circulation, particularly in advanced economies. When interest rates decline, this reduces the opportunity cost of holding cash which provides no interest. Hence, falling interest rates can often spur an increase in currency in circulation (Ashworth and Goodhart, 2020a). However, interest rates were already at or around zero in the advanced economies and quite low in many emerging countries.

Clearly, a panic driven hoarding of cash seems to have been a key driver and that was our initial thought in the early part of the pandemic (Ashworth and Goodhart, 2020b). As Hauser (2020) notes, there was an initial “dash for cash”. We previously highlighted the surge in currency in circulation in the US, euro area and Canada in the initial weeks following the WHO’s declaration of a pandemic and amid a significant tightening in stringency measures by governments, as well as the particularly sharp currency gains in the early months of the crisis in most countries.

Monthly data on currency *issuance* and by denomination of banknotes provides further evidence to support an initial panic driven increase in cash demand. Total changes in the value of currency in circulation equal the value of currency issued (put into circulation) minus the value of currency returned to the central bank (returned from circulation). During periods of panic, it is typically currency issuance that increases sharply, particularly of large denomination notes. In the euro area, there was a 40% monthly increase in the value of banknotes issued in March 2020, which compares with an average March increase of 18.5% over the previous 10 years. Strikingly, the highest denomination banknote issued, the €200, saw a 145% increase in the value of issuance. This compares with an average March increase of 15.4% over the previous ten years - a twelve standard deviation increase.⁸ The ECB suggest that some of the increase in cash demand at the start of the pandemic was likely due to panic buying of food (ECB, 2021), although the increase in issuance of smaller €50, €20 and €10 notes was not particularly remarkable by historical standards in March 2020⁹.

For the US, Kim et al. (2020) and Coyle et al. (2020) find that average consumer store of value cash holdings increased from around \$250 before the pandemic to \$483 in April 2020 and \$533 in August 2020. Based on survey data of individuals, the authors argue that increased uncertainty due to the pandemic was the main driver of the increase, rather than economic stimulus payments and increased unemployment benefits. Chen et al. (2021a) note a sharp jump in bank note withdrawals in Canada at the start of the pandemic, but suggest that withdrawals had returned to pre-pandemic levels by July. They also cite survey evidence showing a temporary rise in median cash holdings of Canadians in April 2020, although holdings had returned to pre-pandemic levels by July. Guttman et al. (2021) note a spike in the average value of over-the-counter cash withdrawals at Australian banks during March 2020, although the total value of withdrawals was lower, which they suggest pointed to a precautionary motive amongst a subset of the population during the initial stage of the pandemic.

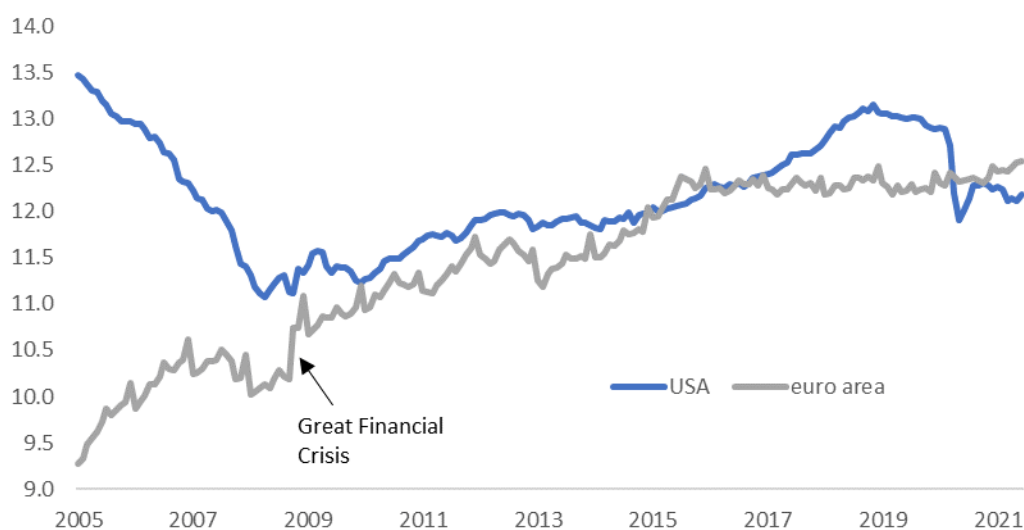
Interestingly, in a number of the major countries we did not see a rise in currency-to-deposit (C/D) ratios which typically occurs during panics (particularly banking panics) (Ashworth and Goodhart, 2015), as households switch some of their bank deposits into cash amid fears for the stability of the banking system (Exhibit 9). In the US and UK, C/D ratios actually fell quite materially amid the onset

⁸ The exceptionally sharp rise in demand for the €200 note may have been aided by the fact that the higher denomination €500 note is no longer issued.

⁹ Note, most countries do not regularly publish data on the breakdown of currency in circulation according to the value of currency issued and returned from circulation.

of the pandemic. The C/D ratio remained broadly stable in the euro area, although Guttman et al. (2021) highlight a rise in Australia to its highest level in around a decade. They note, however, that the strong growth in deposits suggests that confidence in the banking system as a whole was sustained, it was simply that cash in circulation grew even faster than deposits. Anecdotal evidence certainly suggests that there was some switching of bank deposits into cash in countries such as the US¹⁰. However, the increase in transfer payments from governments to households was very large in many countries, while lockdowns prevented most individuals from spending their earnings. This resulted in much faster growth in bank deposits than currency in circulation in many countries.

Exhibit 9: Currency-to-deposit ratios (%)



Source: Goodhart and Ashworth (2021); European Central Bank; Board of Governors of the Federal Reserve System, Federal Reserve Bank of St. Louis (FRED).

In addition to the initial rapid panic driven demand for cash at the onset of the pandemic, there also appears to have been a general level of hoarding which typically occurs during economic crises, geopolitical events and major periods of uncertainty. This is evidenced by the sharp increase in high denomination notes in circulation. Between the end of 2019 and the end of 1Q 2021, \$100 bills accounted for 75% of the increase in US currency in circulation; in the euro area, €200, €100 and €50 notes accounted for 30%, 21% and 54% of the increase in currency in circulation between the end of February 2020 and the end of April 2021¹¹; in Australia, the A\$100 and A\$50 notes represented 45% and 56% of the increase in currency in circulation between the end of February 2020 and the present; and in Japan, the ¥10000 note accounted for 98% of the increase in currency between February 2020 and the present. Some of this also likely represents the forced hoarding of cash. Due to the various lockdowns, savings rates surged in a number of countries as the general public could not spend their income on many of their usual activities e.g., eating out, attending sports events, vacations etc.

There is another major factor behind the large increase in currency in circulation which seems somewhat unique to the pandemic – a large decline in the value of currency *returned* to central banks. In the US, the value of banknotes returned from circulation fell by 15% over 2020, which is far

¹⁰ NYC bank temporarily runs out of \$100 bills as customers withdraw cash amid Wall Street crash | Daily Mail Online.

¹¹ note, the number is greater than 100% because the value of €500 notes in circulation continues to decline sharply.

greater than the next largest fall of 6.1% in 2009 in data going back to the turn of the century. A decline of almost a quarter in the value of \$100 bills returned accounted for around two-thirds of this decline (Exhibit 10), with \$20 bills accounting for around a quarter. A decline in the value of \$10 bills, \$5 bills and \$1 bills returned together accounted for around 9% of the decline in the value of currency returned. Judson (2017) estimated that around 70% of \$100 bills were held overseas in 2017. This suggests that the decisions of foreigners may have been an important driver behind the reduction in the return of \$100 bills, while the decline in the return of smaller denomination notes was likely driven by less domestic spending on cash-related activities. In the US, the sharp decline in currency returned from circulation occurred alongside a sharp jump in the value of currency issued. \$100 bills accounted for almost three-quarters of the increase in issuance, with \$50 and \$20 bills accounting for 19% and 17% of the increase respectively (Exhibit 11).

Exhibit 10: US banknotes returned from circulation (\$bn)

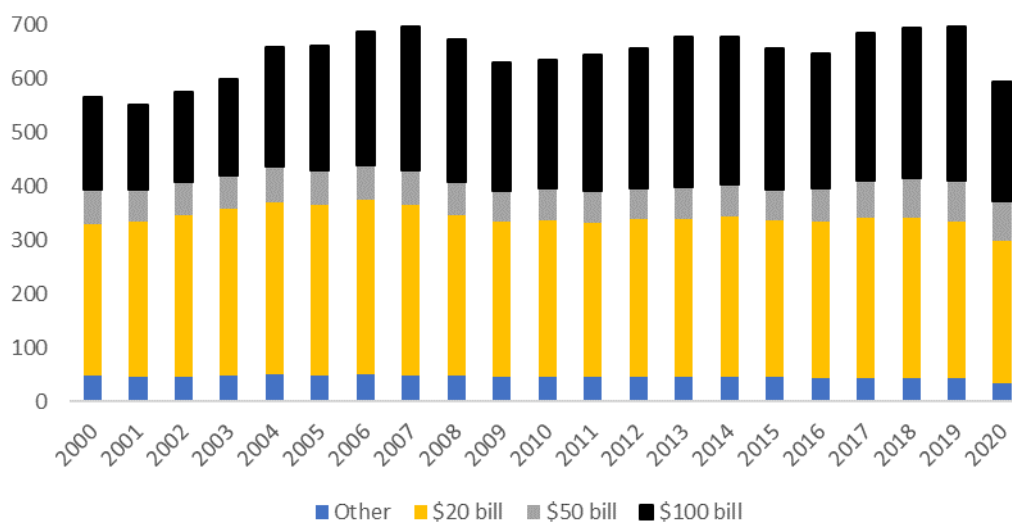
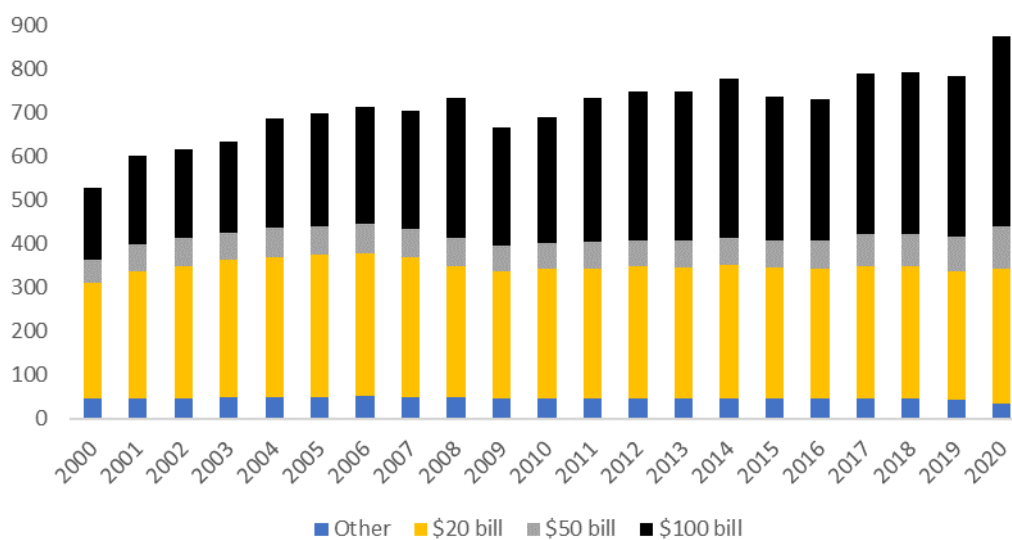


Exhibit 11: US banknotes issued (\$bn)



Source: Goodhart and Ashworth (2021); Board of Governors of the Federal Reserve System.

Exhibit 12: euro area banknotes returned (€bn)

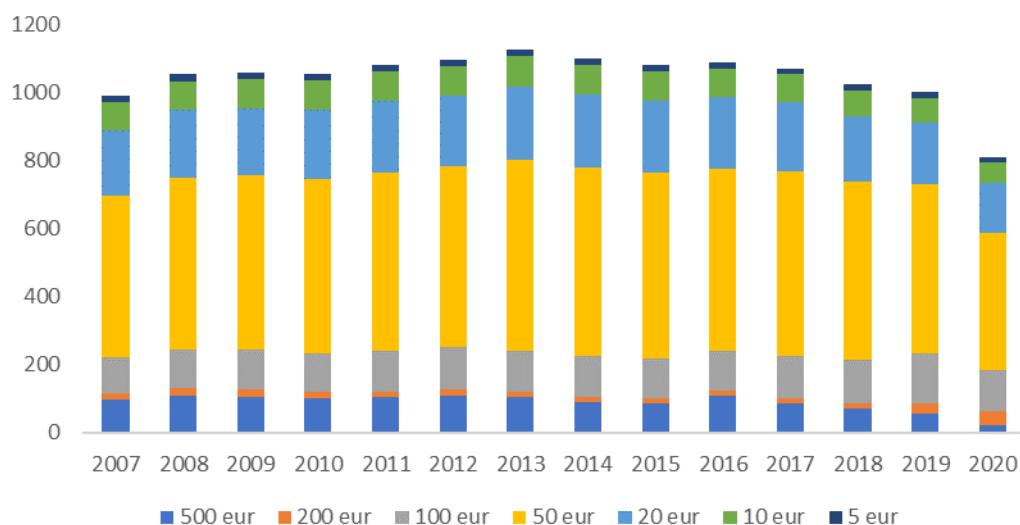
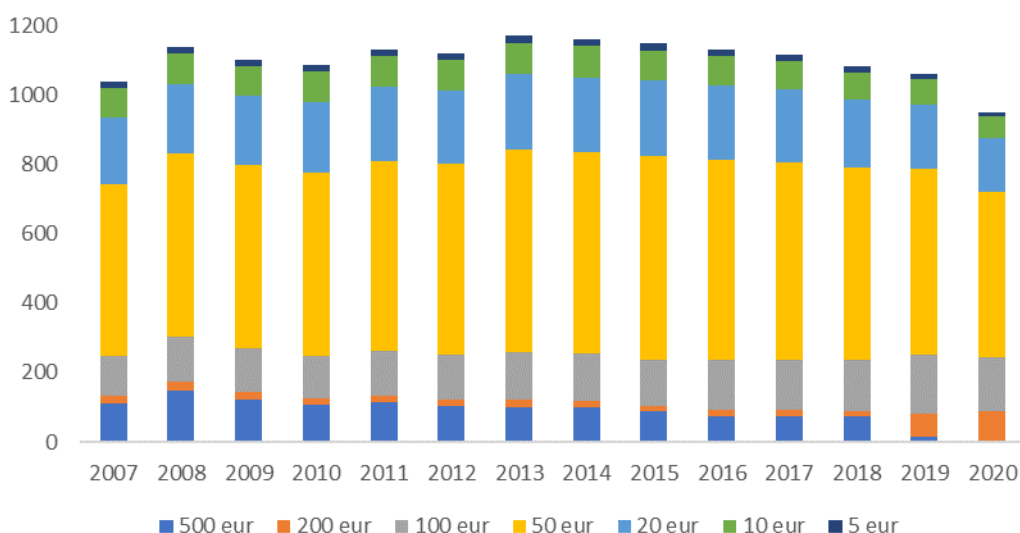


Exhibit 13: euro area banknotes issued (€bn)

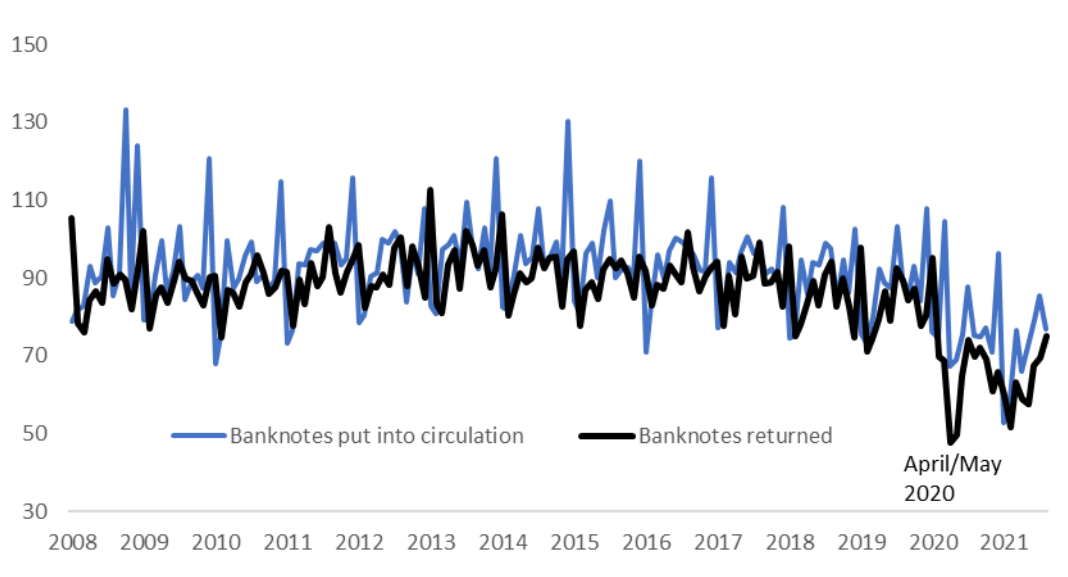


Source: Ashworth and Goodhart (2021); European Central Bank.

There was also a large decline in the value of banknotes returned to the ECB (Exhibit 12). Monthly data shows particularly sharp falls in April and May 2020 (Exhibit 14). This likely reflects the temporary closure of many banks and the unwillingness of currency holders to enter branches amid fears of catching the virus. In general, there is a close inverse relationship between currency returned and government stringency measures (Exhibit 15). Despite some recovery as stringency measures were eased over the summer, the value of banknotes returned declined as stringency measures were tightened again, and has remained well below pre-crisis levels. Between February 2020 and May 2021, €50 notes accounted for almost half of the decline in the value of banknotes returned, with €20 notes and €100 notes accounting for 20% and 16% of the decline. The material decline in the value of banknotes returned appears to be unique to the COVID-19 pandemic, there was no such fall in the euro area during the GFC. In contrast to the US, the sharp fall in banknotes returned occurred at the same time as a sharp fall in banknote issuance (apart from the panic driven

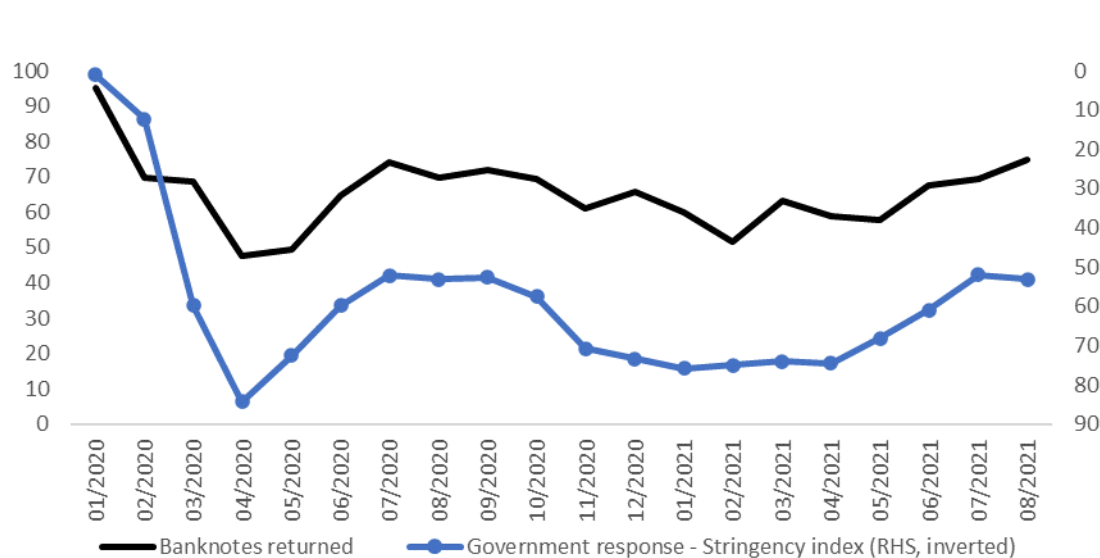
jump at the start of the pandemic) (Exhibit 13). Indeed, the value of banknotes both put into and returned from circulation continues to remain well below pre-pandemic levels in the euro area (Exhibit 14), consistent with a depressed cash cycle. This likely reflects the ongoing weakness in cash-related spending activities amid ongoing restrictions, some structural change in the method of spending from cash to electronic payments, and the fall in overseas tourists visiting the euro area^{12,13}.

Exhibit 14: euro area banknotes put into circulation and returned (€bn)



Source: Ashworth and Goodhart (2021); European Central Bank.

Exhibit 15: euro area banknotes returned (€bn) and government stringency index



Source: Ashworth and Goodhart (2021); European Central Bank; Hale et al. (2021), Oxford University Blavatnik School of Government, Refinitiv Datastream. The Stringency Index is the average of daily readings over the month. For the euro area, we take a monthly average of readings in Germany, France, Italy, Spain and the Netherlands.

¹² Caswell et al. (2020) note that UK tourist hotspots and cities experienced some of the biggest falls in people taking out cash during the lockdown.

¹³ Also see ECB (2021) for a discussion on developments in euro area cash in circulation during the pandemic.

Chen et al. (2021a) note that the rise in bank withdrawals in Canada at the start of the pandemic had returned to normal by mid-summer. However, they highlight a sharp and persistent decline in the value of banknotes returned to the central bank through the autumn (the latest point in their data). The authors suggest that in the early part of the pandemic, lockdown measures will have limited the opportunity for in person shopping that is necessary for cash spending. They also suggest that another factor could be the reduced capacity of participants in the cash ecosystem to handle notes or transport them, given physical distancing protocols. Data shown in Chen et al. (2021b) suggest that the value of banknotes returned to the central bank remained subdued through the end of 2020. Caswell et al. (2020) also highlight a sharp decline in banknotes returned from circulation in the UK in the early months of the pandemic, which was even larger than the marked fall in the flow of notes into circulation amid a collapse in ATM withdrawals. Both measures recorded some recovery through the summer and were broadly equal over September-October (the latest available data at the time of the publication), albeit at a level around a quarter lower than before the pandemic.

iv) What does the early evidence suggest about the impact on cash in circulation as some economies begin to emerge from the pandemic?

As discussed previously, gains in currency in circulation were particularly marked in most countries during the early months of the pandemic. They subsequently moderated somewhat, albeit typically remaining above their pre-pandemic averages, with some very large monthly gains still occurring e.g., in January 2021 in the US, UK and euro area amid peaks (or near peaks in the case of the latter) in monthly COVID-19 deaths. As the US, UK, Canada and the euro area increasingly vaccinate their populations, the monthly gains in currency appear to be trending closer to their pre-pandemic averages, although there remains some volatility e.g., there was a very large monthly jump of 1.6% in April in the US.

Israel and Chile are two non-western countries which made notable early progress in vaccinating their populations. In Israel, average monthly gains in currency in circulation of 1.4% in the first seven months of 2021 are lower than the 2.1% recorded in the equivalent period of 2020, but are higher than the 0.7% average in the five years before the pandemic. There was a sharp recent jump of 1.6% in July 2021, which appears to be related to a resurgence in virus cases. Since the second half of June the government has reversed some of its prior easing in stringency measures (Hale et al., 2021). The year-on-year rate of gain in currency in circulation remains very elevated at 19.7%, albeit down from its recent peak at over 27% in February. In Chile, currency in circulation has continued to surge. In the first seven months of 2021, currency in circulation has risen by 21% and was increasing at a year-on-year rate of 51% in July. A key issue appears to be the ineffectiveness of its vaccines in preventing a huge rise in COVID-19 cases and deaths.

Meanwhile, the major Australasian countries are interesting cases. New Zealand's total vaccination rate is currently relatively low at less than 40% in late September 2021¹⁴. However, after a surge in virus cases and deaths in March/April and April 2020 respectively, very tight restrictions resulted in a very modest number of new cases subsequently and very few deaths¹⁵. Stringency measures were eased significantly from mid-May 2020 (Hale et al. 2020)¹⁶. Currency in circulation had registered a massive 10.8% monthly increase in March 2020, but the year-on-year rate of increase peaked at

¹⁴ https://ourworldindata.org/covid-vaccinations?country=OWID_WRL

¹⁵ New cases have begun to rise again in August 2021.

¹⁶ There was subsequently some temporary tightening in stringency measures. One such case in August 2020, appears to coincide with quite a large monthly increase in currency in circulation.

19.1% in May 2020 and has since fallen to just 3.6% in July 2021. The total gain in currency between May 2020 and July 2021 was under 2%. In Australia, the total vaccination rate is also relatively low at around 40% currently¹⁷. However, the surge in virus cases and deaths appeared to have largely come to an end by September 2020¹⁸. After increasing by 16% in the eight months to October 2020, currency in circulation subsequently declined by 1% over the following eight months to June 2021.

In general, while there remains significant uncertainty about the prospects for the virus and its variants, it seems likely that those countries that achieve success in vaccinating their populations and keeping the virus largely in check, should see gains in currency in circulation revert back to more normal trends. It will be interesting, however, to see if there will be any major reversal of the huge gains in currency in circulation. Historically, large spikes in currency in circulation amid various crises or incidents do moderate as the initial panic fades. However, typically there is not a reversal of prior gains. It will also be interesting to try and monitor the main components of changes in currency in circulation – the value of banknotes issued and returned from circulation - to see if and why the cash cycle is improving as economies open up, and whether there have been any structural changes as a result of the pandemic. Unfortunately, most central banks do not regularly provide a breakdown of these components.

Conclusion

The pandemic fuelled a remarkable surge in currency in circulation across most countries, with cash once again defying premature obituaries of its demise. The somewhat enforced intensification of the digitalisation of economies clearly appears to have further diminished cash's role as a medium of exchange. However, other important aspects of digitalisation, such as the growth in private digital currencies, haven't weakened cash's role as a store of value. The recent experience shows, outside of a couple of relatively small Nordic countries, that in a major crisis people still want to retreat to the security and safety of holding bank notes, especially large denomination notes, to provide reassurance. When in trouble, people want to go back to the tried and true; in this respect holding paper money in their wallets.

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¹⁷ https://ourworldindata.org/covid-vaccinations?country=OWID_WRL

¹⁸ There has been a renewed rise in cases since July 2021.

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