

The Paradox of Banknotes, and how it could be key to understanding the extent of modern money laundering

Oliver Bullough

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The paradox of banknotes, otherwise known as the cash paradox, is one of the most puzzling aspects of the modern financial system. Thanks to the spread of electronic payment mechanisms, the usage of cash is falling across the developed world, yet the value of cash in circulation is increasing almost everywhere and has been for years.

Central banks issue cash elastically, which means they are committed to ensuring that anyone who wants to exchange reserves for physical banknotes is able to do so, and thus they place no limits on how many banknotes they print¹. Since there is ever-less demand for physical money to use in everyday transactions, we would expect more cash money to be returned to central banks than is being issued by them, and thus the value of outstanding banknotes to be in decline. However, the opposite is happening, which is the paradox.

It follows therefore that there must be a growing alternative demand for cash that is more-than-compensating for the decline in everyday usage among ordinary people, and which is happening everywhere at the same time. Central bankers, however, have been unable to establish conclusively where that demand is coming from.

First identified in 2009 by Andrew Bailey², then the chief cashier of the Bank of England, the paradox has been described in the United States, the Eurozone, Canada, Australia, Japan, Switzerland and elsewhere. In 2009, there was around \$2,800 outstanding for every resident of the United States; €2,400 for every resident of the Eurozone; around £670 for every resident of the United Kingdom; and 642,000 yen for every resident of Japan. Since 2009, those totals have increased markedly, making the paradox even more pronounced: to \$6,900 (an increase of almost 150 percent); €4,500 (an increase of 87 percent); £1,200 (an increase of 79 percent); and 968,000 yen (an increase of 50 percent).

¹ <https://www.frbsf.org/economic-research/publications/economic-letter/2012/july/monetary-policy-money-inflation/>

² <https://www.bankofengland.co.uk/-/media/boe/files/speech/2009/banknotes-in-circulation-still-rising.pdf?la=en&hash=0537194BDD50490F115F85E9B9698F60431FE8D3>

Although Central Banks have proposed explanations for the paradox that may explain some of it, their explanations fail to provide explanations sufficient to account for its scale, its resilience, and its increasing size.

In this paper, I argue that we should look for the solution to the paradox in a surging demand for cash from an increasingly sophisticated parallel financial system used by globalised criminal groups to move value around the world. Cash is used to finance transactions within jurisdictions, which are then settled internationally by the movement of goods.

Although some of this wealth is not necessarily of illicit origin – indeed, much of it appears to be money evading Chinese capital controls, which may well be legitimate – it is moved outside of the formal financial system, is therefore not identified by traditional monitoring tools, and thus helps support a money laundering mechanism essential for cartels, kleptocrats and other extra-large criminal enterprises.

As such, by continuing to issue banknotes elastically, in whichever volumes are requested, western countries' central banks are providing criminal groups with the tools they use to circumvent the money laundering regulations imposed by those same countries' governments. Officials urgently need to consider banknote issuance alongside their anti-money laundering policies, and to examine ways to prevent their physical currency from facilitating the global epidemic of financial crime.

THE SCALE OF THE PARADOX

Every year since Andrew Bailey first identified the paradox, it has become more pronounced. In December 2009, the total value of all US dollars in circulation was \$924 billion; by December 2022, that total had hit \$2.297 trillion³.

Meanwhile, cash usage has continued to decline. In the United States, according to the latest survey data, 41 percent of Americans no longer use cash in a typical week, which is an increase from just 24 percent in 2015. Meanwhile, the proportion who use only cash in everyday transactions has fallen to 14 percent, from 24 percent over the same period⁴. The Federal Reserve's own survey shows a similar picture, with a continuously decreasing role for cash in the transactions that it monitors⁵.

In November 2022, the total value of all euro banknotes came to €1.558 trillion. Although that is a slightly lower total than were outstanding in the first half of the year (the value peaked at €1.6

³ <https://fred.stlouisfed.org/series/CURRCIR>

⁴ <https://www.pewresearch.org/fact-tank/2022/10/05/more-americans-are-joining-the-cashless-economy/>

⁵ <https://www.frbsf.org/cash/publications/fed-notes/2022/may/2022-findings-from-the-diary-of-consumer-payment-choice/>

trillion in June 2022), it is significantly more than in 2021, and almost double the total for November 2009 when the outstanding total was €776 billion⁶.

European consumers use cash more than their American counterparts, but the total value of card payments is now – for the first time -- higher (at 46 percent of the total) than cash payments (41 percent), because most transactions valued at more than €50 are made with electronic payment means. Although cash remains the most frequent payment method for all transactions, it is in steady decline, making up just 59 percent of payments, down from 79 percent in 2016⁷. This is a trend that has been accelerated by the COVID-19 pandemic in all countries of the Eurozone, except Latvia and Estonia⁸.

The United Kingdom only publishes its banknotes statistics yearly (rather than monthly, as is standard for the Federal Reserve or European Central Bank), but in February 2022 the total value of outstanding sterling-denominated banknotes was £81.6 billion, up from £45 billion at the time Bailey was making his speech⁹. “It took 310 years to get to £34bn and then just over 16 years to move on to £77bn, and it has not fallen,” Bailey, who is now governor of the Bank of England, said in a speech in 2020¹⁰.

In Britain too, the usage of cash in the transactions monitored by regulators is in steep decline. By 2021, cash was used in approximately 15 percent of all UK transactions. UK Finance, which represents the country’s largest financial institutions, predicts that just six percent of transactions will still be made with cash by 2031¹¹.

⁶https://www.ecb.europa.eu/stats/policy_and_exchange_rates/banknotes+coins/circulation/html/index.en.html

⁷https://www.ecb.europa.eu/stats/ecb_surveys/space/html/ecb.spacereport202212~783ffdf46e.en.html#:~:text=The%20SPACE%202022%20results%20show,2016%20and%2025%25%20in%202019.

⁸https://www.ecb.europa.eu/stats/ecb_surveys/space/html/ecb.spacereport202212~783ffdf46e.en.html#toc8

⁹ <https://www.bankofengland.co.uk/statistics/banknote>

¹⁰ <https://www.bankofengland.co.uk/speech/2020/andrew-bailey-speech-on-the-future-of-cryptocurrencies-and-stablecoins>

¹¹ <https://www.bankofengland.co.uk/quarterly-bulletin/2022/2022-q3/knocked-down-during-lockdown-the-return-of-cash#:~:text=Cash%20remains%20an%20important%20payment,use%20it%20day%20to%20day.>

In Canada, the total volume of outstanding dollars in February 2021 was C\$115 billion, up from C\$85.9 billion in 2017¹². Cash usage has been falling steadily in Canada. In 2021, it made up just 22 percent of all transactions, down from 54 percent in 2009, and is no longer the dominant method of payment even for low value transactions¹³.

In November 2022, the value of yen banknotes in circulation came to 121 trillion yen, up from 81 trillion yen at the end of 2009¹⁴. Although cash remains more popular in Japan as a payment mechanism than in other developed economies, its share of payments is reducing here too. Electronic payment methods increased from 20 percent of transactions in 2016 to 30 percent by 2020.

EXPLANATIONS

In their assessments of the paradox, Central Bankers have put forward multiple explanations for it, some of them based on the specifics of their local economy; others derived from the conditions globally.

Three general observations stand out from all of them, however: the first of which is their failure to take it particularly seriously. Perhaps because the paradox relates specifically to physical currency, rather than to the more fashionable trends in post-financial crisis central banking, central banks have not put any significant degree of resourcing into establishing its causes, and looked at it solely through the frame of the formal financial system, which suggests only two roles for cash: a payment mechanism, used to move money between consumers' wallets and the financial system; or as a static store of value.

All analyses show that cash's role as a payment mechanism linked to the formal financial system is in long-term decline everywhere in the developed world so -- and if these are the only two uses for cash -- it follows that the answer to the paradox must lie in more people using cash as a store of value, and analysts have suggested multiple reasons why they might be doing so. However, they have put little time or effort into this work and, in the 13 years since the paradox was identified, have continued to favour the same explanations and this same analytical framework even after some of them have ceased to make even theoretical sense.

Simultaneously, what has been published has often treated the paradox as a bit of light relief, which does not require heavyweight engagement. The nadir of this tendency appeared in a 2018 Bank of International Settlements paper, which began with the disastrous first sentence "like 'the times' in

¹² <https://www.bankofcanada.ca/rates/banking-and-financial-statistics/bank-of-canada-note-liabilities-formerly-k1/#graph>

¹³ <https://www.bankofcanada.ca/wp-content/uploads/2022/12/sdp2022-23.pdf>

¹⁴ [https://www.boj.or.jp/en/about/education/oshiete/money/c06.htm#:~:text=At%20the%20end%20of%20December,yen%20\(18.3%20billion%20banknotes\)](https://www.boj.or.jp/en/about/education/oshiete/money/c06.htm#:~:text=At%20the%20end%20of%20December,yen%20(18.3%20billion%20banknotes))

Bob Dylan's song, the ways we pay are a-changin'" and ended with the banal conclusion that "cash is being increasingly used as a store of value rather than for payments", which is just another way of laying out the paradox¹⁵.

Curiously, the global nature of the paradox and the number of jurisdictions where it has been observed are widely cited as reasons not to worry about it rather than, as would seem more logical, the reverse.

The second observation is that, when analysts have taken the paradox seriously, their analyses have focussed overwhelmingly on its first part – i.e. the shrinking use of cash – rather than on the booming supply of paper money. As such, they have concentrated on efforts to ensure an adequate supply of cash money to those communities and individuals that risk being left stranded by the reduced availability of cash, rather than asked why so much money is being printed, and where it is going. An example of this is the UK House of Commons' Public Accounts Committee's report into the Production and Distribution of Cash, published in late 2020¹⁶.

The third observation is a – at times, almost perverse-seeming – failure to consider the role of cash in the criminal economy. The centrality of banknotes to money laundering, thanks to their untraceable nature, is so well-established as to be a staple of popular fiction, yet some central bank analyses of cash usage extend for as much as 60 pages without mentioning the shadow economy as a potential source of demand for cash.

If my analysis is correct, and the cash paradox is evidence of a booming and globalised money laundering network, acting as a shadow banking system for the world's criminals, where cash money is used as a payment mechanism entirely outside the formal financial system, then it is clear that this failure to take the paradox seriously is a significant dereliction of duty, which has allowed a criminal economy to spread far more widely than was necessary.

- THE UK

In the first framing of the paradox, Bailey gave us three potential explanations for why it was happening. In a speech to the Banknote 2009 conference in Washington DC, he considered a previous prolonged decline of the value of cash in circulation as a proportion of GDP to be of equal significance to the then-recent reversal of the trend, and the boom in the nominal value of outstanding cash. As such, he saw the late 1970s period of high inflation as significant in forming a habit among the users of sterling banknotes to pay them in to a bank, where their value would be protected, rather than holding them in paper form. Speaking as he was in 2009 and thus in the

¹⁵ https://www.bis.org/publ/qtrpdf/r_qt1803g.pdf

¹⁶ <https://committees.parliament.uk/publications/3833/documents/38384/default/>

immediate aftermath of the financial crisis, he sought an explanation for the apparent reversal of this trend in then-contemporary macroeconomic factors¹⁷.

“Two features of the current situation strike me as most relevant in explaining this development: first, lower levels of public confidence in the banking system; and second, very low interest rates which thereby reduce the opportunity cost of holding banknotes,” he said. “In the current recession, the demand for banknotes has risen, and it is likely that this reflects demand for central-bank money as a store of value.”

He also delved into the mechanics of the cash distribution business, and the increase in the provision of ATMs from around 20,000 in the UK in the early 1990s, to more than 60,000 at the time he was speaking.

“When we talk to ATM operators about their business model they stress that the least acceptable outcome is for their ATMs to run out of notes. As a consequence, ATMs are re-stocked well before they run out. This means that the overall ATM estate is holding what could be described as idle inventory stock,” he said.

Bank of England analysts have returned to the subject at least twice since then, with the Bank Underground blog first looking in 2017 at whether high denomination bills should be phased out to deter criminal activity and suggesting that the whole phenomenon was a focus of intensive study. “Understanding this ‘paradox of notes’ remains an important policy issue,” wrote Ronnie Driver, of the Bank’s Sterling Markets Division¹⁸.

If such intensive study was indeed going on, it has not yielded any fruit by 2019, when another analyst called Ellen Caswell used the fact that the year’s data showed a smaller-than-usual annual increase in the value of banknotes in circulation to ask if the paradox was finally coming to an end (it wasn’t, as subsequent years’ data showed), but failed to provide any fresh explanations for its persistence over the decade since Bailey first described it¹⁹.

A year later, Bailey held a webinar with the Brookings institution, in which he again highlighted the existence of the paradox but provided no explanations for it, for “the sake of brevity”²⁰.

¹⁷ <https://www.bankofengland.co.uk/-/media/boe/files/speech/2009/banknotes-in-circulation-still-rising.pdf?la=en&hash=0537194BDD50490F115F85E9B9698F60431FE8D3>

¹⁸ <https://bankunderground.co.uk/2017/06/16/eliminating-high-denomination-notes-and-making-the-mob-miserable/>

¹⁹ <https://bankunderground.co.uk/2019/06/13/bitesize-the-end-of-a-paradox/>

²⁰ <https://www.bankofengland.co.uk/speech/2020/andrew-bailey-speech-on-the-future-of-cryptocurrencies-and-stablecoins>

When Sarah John, Bailey's successor as chief cashier at the Bank of England, gave evidence to a parliamentary committee in October 2020, she repeated the same explanations for the paradox that he had put forward almost eleven years earlier, despite the dramatic changes in the global economy during the intervening period.

"It is a long-term trend. It is also not just happening in the UK; this is an international phenomenon. I regularly talk to my counterparts, who have done very similar analysis to ours. In fact, our estimate of the proportion of total notes used in the transactional cycle is about 20 percent to 24 percent. The figure is often even lower than that in the 18 developed economies. In 2018, Australia put out equivalent figures of between about 15 percent and 35 percent—a similar ballpark. This is not a UK phenomenon; this is an international phenomenon," she said²¹.

To summarise, therefore, the Bank of England has seen explanations for the paradox in a combination of low inflation (meaning people were in no hurry to pay cash into the banks), high uncertainty (meaning people did not trust banks with their money), and the spread of ATMs (meaning banks were obliged to maintain higher stockpiles of banknotes). It is notable that Bailey did not discuss, analyse or even mention the role that cash money plays in facilitating the criminal economy, and when it was mentioned by other officials it was not treated with the kind of seriousness given to discussion of inflation, prevalence of ATMs or distrust of financial institutions.

- THE US

US Central Bankers appear to have begun paying attention to the paradox – or, at any rate, recognising that it is a paradox – in 2012, with an essay by John C. Williams, president of the Federal Reserve Bank of San Francisco called, with the characteristic flippancy that this subject receives, "Cash Is Dead! Long Live Cash!"²². The San Francisco Fed is home to the Federal Reserve's Cash Product Office, so has oversight of the United States' large reserves of coins and banknotes, and he was an appropriate individual to address the phenomenon.

Particularly since the 1990s, when the Soviet Union's collapse led to a catastrophic loss of trust in both the rouble and the banking system, and the Argentinian economy entered a prolonged period of crisis, Fed officials have been monitoring the cash dollar's international role as a means for foreigners to store value outside of the formal financial system. Williams linked the paradox to this factor, before repeating many of the same arguments used by Bailey about low interest rates and low inflation, to explain why cash money was being used ever-more as a store of value. And he highlighted the outsize role played by the largest US denomination – the \$100 bill – in the value of cash in circulation.

²¹ <https://committees.parliament.uk/oralevidence/1067/default/>

²² <https://www.frbsf.org/our-district/about/annual-report/annual-report-2012/2012-annual-report-essay-cash-is-dead-long-live-cash/>

“The unusually large rise in cash holdings over the past five years reflects a combination of circumstances. Interest rates in the United States and other countries have been exceptionally low. Economic and political uncertainty have been exceptionally high. Future demand for currency will be driven in large part by how these factors evolve. Developments in alternative payment methods will also affect demand. Meanwhile, when interest rates return to more-normal levels, the opportunity cost of holding cash will rise, which should cause currency demand to fall somewhat. But the \$100 question is whether economic and political uncertainty will remain high. If uncertainty recedes, many people will probably take their \$100 bills back to the banks. But if events in Europe or elsewhere around the globe stir more anxiety, appetite for U.S. dollars could surge anew,” he wrote.

The explanations for the paradox being offered by the Fed therefore mirror those offered by the Bank of England: a period of low inflation combined with a period of high uncertainty, leading to a reduced cost from holding cash, along with a heightened perceived benefit. The Fed’s calculations were complicated, however, by the larger international role played by US dollars. There will always be uncertainty somewhere, which means it can always be cited as a reason for the paradox, unless it’s possible to establish where exactly the demand for banknotes comes from.

That is a difficult job, because it is extremely challenging to track the location of banknotes. The Federal Reserve Board economist Ruth Judson has, however, sought to at least lay out the size of the challenge by comparing the relative volume of cash issued by authorities in Canada and the United States, and concluded that – by 2018 – more than 60 percent of all US bills, and nearly 80 percent of all \$100 bills, are outside the United States, up from 15 to 30 percent in 1980. She didn’t offer many explanations for why this was happening but at least, unlike her counterparts in London, she asked some interesting questions about it.

“Are there ways to tease out the drivers of cash abroad? It is often asserted that cash is overwhelmingly used for illicit purposes, but can the forces driving licit and illicit use be identified and measured? Finally, as more and more ordinary transactions become cashless, will cash be increasingly marginalized?” she asked in her conclusion to a paper issued for a conference in Germany in 2017²³.

- THE EUROZONE

That conference was the first sign that European Central Bankers had become aware of the paradox, although attendees did not spend much time considering it, or offering explanations (though at least, when they did, they avoided the flippancy of colleagues elsewhere). The first full-scale analyses didn’t come until 2021, perhaps because of the dramatic surge in demand for Euro-denominated banknotes during the COVID-19 pandemic. They concluded that the share of banknotes being used for day-to-day transactions in the formal economy was, as in the UK and the US, in long-term decline. Analysis of how and when banknotes were paid into banks suggested that

²³ <https://econpapers.repec.org/paper/zbwiccp17/162910.htm>

between 13 and 30 percent (with a central estimate of 21.5 percent, down from around 33 percent in 2003) of issued banknotes were being used for transactions in the Eurozone²⁴.

One novel explanation offered for the location for the remaining money was that of “vault cash”, whereby large financial institutions were stockpiling physical cash as a means to avoid losing capital through negative interest rates, but the analyst conceded that could not explain more than a fraction of the phenomenon. “Vault cash only represented around seven percent of total banknote circulation at the end of 2019 so it can by no means entirely explain the increase of domestic store of value usage,” a report in the ECB’s Economic Bulletin notes. It suggested that ordinary citizens were under-stating their cash holdings in household surveys “due to the sensitivity of the questions”, so more cash may have been held by citizens than they were owning up to.

The title of the paper – “The paradox of banknotes: understanding the demand for cash beyond transactional use” – gives away, however, the underlying assumption of its author, which is that the paradox must be explained by cash as a static store of value. It spends some effort enumerating the reasons why people might wish to use euro banknotes outside of the eurozone, but somehow avoids mentioning the central role that cash plays in criminal transactions.

“The literature normally attributes the high use of cash in developing and transition countries to both supply-side problems (such as underdeveloped payment infrastructures and the lack of access to credible saving alternatives) as well as demand-side factors (lack of trust in banks, deeply entrenched habits or unfavourable perceptions towards electronic payments),” it states.

A second report, also published in 2021, went further by specifically pointing to foreign demand for euro banknotes as the key driver for the paradox and, interestingly, rejected the analyses put forward by the Bank of England and the Fed which had suggested global factors were behind the growth in demand for banknotes. “A first analysis of the determinants of euro cash net shipments corroborates some of the findings of the literature, confirming that euro cash is used abroad as a store of value and its flows are associated with economic activity in the receiving countries. Determinants of euro cash flows are mainly local-specific, meaning that they are found in factors which affect countries with a demand for euro (local inflation and economic activity) rather than external factors (global uncertainty or short-term interest rates in the euro area),” it stated²⁵.

This paper also makes no mention of the use of cash in the underground economy, except for one reference to a 1997 paper published in the United States looking at criminal use of the US dollar in the acknowledgements.

- CANADA

²⁴ https://www.ecb.europa.eu/pub/economic-bulletin/articles/2021/html/ecb.ebart202102_03~58cc4e1b97.en.html

²⁵ <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op253~5a3d5de1d1.en.pdf>

Two analysts writing a 2014 working paper for the Bank of Canada, Janet Hua Jiang and Enchuan Shao, grappled with the complexity of the paradox and came up with a satisfying alternative explanation that has not – frustratingly – been expanded upon by economists from other central banks. The crux of their argument is that the simple dichotomy between cash as a payment mechanism and cash as a store of value, which is elsewhere fundamental to analyses of the paradox, is a false one because not all payments are the same²⁶.

“While alternative means of payment directly compete with cash in many point-of-sale transactions, they are less-ideal substitutes for cash in the underground economy, bars, casinos, or in activities where agents desire anonymity or where unbanked or underbanked agents are involved. We capture this asymmetry by modelling an economy with two sectors: a cash-credit sector, where both cash and credit cards can be used as means of payment, and a cash-only sector, where credit is not accepted. The cash-credit sector resembles point-of-sale transactions where cash is subject to intensive competition from other means of payment; the cash-only sector captures cash-intensive activities, where it is hard for other means of payment to compete with cash,” they note.

As cash usage declines in the formal economy, the cash-credit sector becomes more of a purely credit-based sector, so cash becomes less and less attractive for both the buyers and sellers of goods and services. The cash-only sector increasingly therefore assumes the characteristics of a stand-alone economy, where cash circulates without touching the formal financial system, and can continue to do so almost indefinitely. This Bank of Canada publication is largely theoretical and not entirely applicable to other economies, since at the time the volume of Canadian dollars in circulation was largely flat, rather than increasing, as it now is. However, this is a new and original explanation, which has not featured elsewhere and suggests some important areas for further study, which have frustratingly not been followed up on.

“We need to gather time-series data on the velocity of cash, measured, for example, by the lifespan of bank notes. Second, we need to deepen our understanding about the cash-intensive sector such as the underground economy. Who are the participants? How do their cash management practices evolve over time? How do buyers in the sector acquire cash? What are the connections with less-cash-intensive sectors?” the report asks.

- JAPAN

Japan has the largest value of banknotes in circulation as a proportion of its economy for any developed country, and the Bank of Japan was asking why this was happening even before Bailey identified the situation as paradoxical, although its analysts looked primarily at domestic factors to explain it (possibly because other central banks had not published on the topic, so its international nature was not yet clear).

In 2008, Akira Otani and Takashi Suzuki linked the strong demand for banknotes to the ageing nature of Japanese society, and the preference of elderly people for cash. “The main factor behind the

²⁶ <https://www.bankofcanada.ca/wp-content/uploads/2014/06/wp2014-22.pdf>

changes in the volume of banknotes in circulation and demand deposits since the 1990s is the drastic increase in the preference for banknotes and demand deposits by the elderly age segment in response to developments in the external environment,” they noted²⁷. When another group of analysts returned to the question during the pandemic, they acknowledged the global nature of the paradox, and suggested that a key driver for the strong growth for banknote demand in 2020-1 had been public concern about the health risks of COVID-19.

“Our empirical analysis suggested that staying at home due to the pandemic and the introduction of public health measures led to an increase in banknotes in circulation via two channels: an increase in payments of banknotes and a decrease in receipts of banknotes,” they noted, in December 2021²⁸.

DO THESE EXPLANATIONS MAKE SENSE?

Although inflation was indeed unusually low when Bailey made his speech in 2009, and Williams followed it up with the Fed’s analysis in 2012, that is no longer the case. Prices have been rising unusually quickly in the United States and elsewhere in the developed world since the first half of 2021, yet there is no sign of reduced demand for dollars.

Although the value of euros in circulation has fallen over the second half of this year, it has not yet fallen back even to the level seen at the start of this period of high inflation, let alone erased the strong gains made in the last decade. It may take some time for people accustomed to holding high volumes of cash to adjust themselves to a world of high inflation, so it is possible we will see proof of the importance of inflation as a driver of the paradox in coming months. As yet, however, it does not look like it explains it to any significant extent.

Crisis was certainly a likely-looking explanation when Bailey first laid out the paradox. Considering he was speaking in the aftermath of the gigantic government bailouts of the financial system, it was reasonable to imagine that the resulting loss of faith in banks would lead to larger numbers of people keeping their money in physical form. It is also true that, with the Arab Spring, the successive crises in Ukraine, the Trump presidency, Brexit and so on, there has been an air of crisis surrounding the world for much of the period since. However, that has not translated into further loss of trust in the financial system. On the contrary, survey data show that banks have gradually regained the public trust that they lost in 2007-8 and, although, the war in Ukraine and tensions between Washington and Beijing, have led to dislocations in global trade, they have not caused the kind of banking collapses seen in Eastern Europe or South American in the 1990s²⁹.

²⁷ <https://econpapers.repec.org/paper/bojbojrev/08-e-5.htm>

²⁸ https://www.boj.or.jp/en/research/wps_rev/rev_2021/data/rev21e06.pdf

²⁹ https://www.edelman.com/sites/g/files/aatuss191/files/2022-01/2022%20Edelman%20Trust%20Barometer%20Global%20Report_Final.pdf

The COVID-19 crisis undoubtedly led to a massive increase in the value of cash in circulation but the paradox was firmly entrenched before the pandemic, so it merely accentuated an already existing trend, rather than created a new one.

It is hard therefore to consider that crises are valid as an explanation for the vast increase in cash money in circulation. In fact, we can see what a genuine crisis of confidence in the banking system looks like, thanks to concerns over the so-called millennium bug's effect on the financial system, which caused a short-lived spike in cash hoarding so significant it is clearly visible on the Fed's chart³⁰. There has been no equivalent spike at any time since.

It is also notable that surveys of citizens' domestic cash holdings show average totals far below the observed totals published by central banks. Although the Fed's 2021 survey showed that the average citizen was holding an elevated level of cash post-COVID-19, it was still only \$347, which explains barely five percent of the \$6,900 worth of banknotes outstanding for each US resident³¹.

The European Central Bank does not publish equivalent data, but its analysts have estimated that 28-50 percent of Euro banknotes are being used as a store of value by residents of the Eurozone. Even if the higher total is correct, which is unlikely, that still leaves half of the paradox to be explained³².

Bailey cited the increased prevalence of ATMs as a reason for the cash paradox, and it is true that there had been a marked increase in their provision, from around 24,600 in 1998 to 63,100 at the time he was speaking. That increase peaked in 2016, however, at 70,000 and has since gone into reverse. In September 2022, there were just 51,300 ATMs in the UK, which is fewer than there were at the time he identified the cash paradox³³.

Globally, World Bank data suggest that the number of ATMs rose steadily from the early 2000s to 2013, but has since then been broadly flat³⁴. Independent analysts suggest that the global total of ATMs is now in decline, and will continue to be so at least until 2027³⁵.

³⁰ <https://fred.stlouisfed.org/series/CURRCIR>

³¹ <https://www.frbsf.org/cash/publications/fed-notes/2022/may/2022-findings-from-the-diary-of-consumer-payment-choice/>

³² https://www.ecb.europa.eu/stats/ecb_surveys/space/html/ecb.spacereport202212~783ffdf46e.en.html#toc27

³³ <https://commonslibrary.parliament.uk/research-briefings/cbp-8570/>

³⁴ <https://data.worldbank.org/indicator/FB.ATM.TOTL.P5>

³⁵ https://www.rbrlondon.com/wp-content/uploads/2022/05/GA27_Press_Release_300522.pdf

It therefore looks highly unlikely that increased cash stockpiling to ensure ATMs are able to function properly plays any significant role in the paradox in the UK, or elsewhere.

The Bank of Japan's analysts argued that the growing share of elderly people in the Japanese population, and their preference for holding their wealth in cash, could explain the increasing value of outstanding yen banknotes.

"Today's elderly tend to have a relatively stronger preference for cash, supporting the view that the high share of the elderly in Japan contributes to pushing up banknotes in circulation. That said, in recent years, credit cards and other cashless payment methods have become widely used as everyday means of payment even among the elderly," they noted in their 2021 analysis³⁶.

There have also been suggestions in the UK that the ageing population could lead to an increasing preference for cash-hoarding, thanks to older Britons preferring to make payments in cash³⁷.

However, this does not explain the global demand for cash – particularly for dollars and Euros, the currencies with the largest outstanding value of banknotes in circulation, and for which estimates suggest at least half the total are held outside their home markets – since the average global age is far lower than it is in Japan. The world's median age is increasing, and is predicted to be 36 by 2050³⁸, but that is still significantly lower than the current Japanese median of 48 years³⁹.

In summary, although some of the explanations put forward by central banks may help to explain parts of the cash paradox, none of them seem able to explain all, or even a significant proportion, of it. We are left with a curious – and potentially extremely troubling -- phenomenon, which central banks have presided over but have not spent any resources in investigating, much to the astonishment of the few elected politicians who have examined this question.

"£50 billion of sterling notes – or about three quarters of this precious and dwindling supply – is stashed somewhere but the Bank of England doesn't know where, who by or what for – and doesn't seem very curious. It needs to be more concerned about where the missing £50 billion is. Depending where it is and what it's being used for, that amount of money could have material implications for public policy and the public purse. The Bank needs to get a better handle on the national currency it

³⁶ https://www.boj.or.jp/en/research/wps_rev/rev_2021/data/rev21e06.pdf

³⁷ <https://www.bankofengland.co.uk/quarterly-bulletin/2022/2022-q3/knocked-down-during-lockdown-the-return-of-cash#:~:text=Cash%20remains%20an%20important%20payment,use%20it%20day%20to%20day.>

³⁸ <https://www.imf.org/en/Publications/fandd/issues/2020/03/infographic-global-population-trends-picture>

³⁹ <https://www.imf.org/en/News/Articles/2020/02/10/na021020-japan-demographic-shift-opens-door-to-reforms>

controls,” said Meg Hillier, a British MP and chair of the House of Commons Public Accounts Committee after the committee published a report on cash usage last year⁴⁰.

AN ALTERNATIVE EXPLANATION

An alternative explanation lies in the key insight from Janet Hua Jiang and Enchuan Shao’s 2014 working paper for the Bank of Canada -- the idea of dividing cash transactions into those in the cash-credit economy, and those in the cash-only economy. Because cash has been outcompeted in the cash-credit economy, and electronic payment methods have become more cheap, convenient and secure, central banks have assumed the transactional use of cash has declined. However, there is no reason to suppose there has been any equivalent decline in the cash-only economy, which is favoured by criminals, tax-evaders or others who wish to keep their financial activity secret from the authorities. In fact, all suggestions point to the cash-only economy having expanded in recent decades.

Most central bank analyses of the cash paradox assume that, if not being used in the cash-credit economy, cash is a static store of value (being used, for example, as “vault cash” in the ECB’s analysis; or in ATMs, for the Bank of England’s Bailey). If, however, cash is being used in a cash-only economy, it is as dynamic as that in the cash-credit economy, but un-noticed because it does not return to the formal financial system, but continues to circulate outside of it.

But why would the cash-only economy have expanded in size?

Since the 1970s in the United States, and since the 1980s globally, governments have imposed ever-stricter rules on the formal financial system to prevent criminals from accessing its services, in an attempt to drive criminals out of business. However, estimates of the size of the global criminal economy suggest that this effort has had minimal if any success in reducing the profitability (and, therefore, the attractiveness) of crime⁴¹.

Heightened compliance has instead obliged criminals to seek alternative methods of arranging their finances, to which cash money is central. As a result, the more onerous money laundering restrictions become, the larger a float the cash-only economy requires because of the heightened risk and therefore laboriousness inherent in transporting and using cash money.

Outside of central banks, this is considered a statement of the obvious. “As financial institutions have strengthened anti-money laundering controls, terrorists and other criminals have increasingly turned to cash to transfer funds – capitalizing on its anonymity, portability, and liquidity,” the US Treasury Department noted in a 2022 report on “the future of money and payments”⁴².

⁴⁰ <https://publications.parliament.uk/pa/cm5801/cmselect/cmpublic/654/654.pdf>

⁴¹ <https://www.unodc.org/toc/en/crimes/organized-crime.html>

⁴² <https://home.treasury.gov/system/files/136/Future-of-Money-and-Payments.pdf>

“In spite of the changing face of criminality, with significant threats now stemming from new technologies, money laundering schemes detected by law enforcement are still largely characterised by traditional techniques, in particular the use of cash,” noted the European Union’s police cooperation agency Europol in an analysis published in 2015, and updated in 2021⁴³.

Discrete cash-exchange networks are connected by the movement of goods between countries (in what is called Trade Based Money Laundering), thus allowing criminal gangs to move value internationally without having to move funds through the formal financial system. Some versions of this had been described before Bailey identified the cash paradox: most notably the Black Market Peso Exchange, which has been used by South American drug cartels to get their profits out of the United States; as well as the hawala network used across the Middle East to move value via trade networks quickly and efficiently.

However, across the developed world in the last decade, law enforcement agencies have noted an increasingly sophisticated and efficient money laundering methodology pioneered by Chinese gangs, who are able to recycle criminal proceeds far more effectively than traditional organised criminals have been able to, in an Informal Value Transfer System (IVTS).

“Because the use of this form of IVTS is widespread, the amount of cash needed to service this demand in the UK is very large. Since the legitimate use of cash in significant volumes in the UK (and most Western countries) is relatively unusual, due to the continual refinement of anti-money laundering regulations, Chinese IVTS providers regularly source the cash they need from criminal groups all over the UK involved in a wide range of commodity based activity, such as drug trafficking, cigarette smuggling, organised immigration crime and human trafficking,” noted an analysis of the phenomenon prepared by Britain’s National Crime Agency⁴⁴.

Gangs coordinated their activities via Chinese-language chat apps such as WeChat, within the Chinese diaspora community, so it has been hard for Western law enforcement to penetrate their networks. However, some prosecutions have been brought, which expose the methodology. Notable recent cases have been those described in the indictment against Ying Sun and others (unsealed in 2021⁴⁵) in the United States; Operation Princekin in the United Kingdom⁴⁶ and equivalent cases elsewhere.

“Chinese money brokers transfer the drug proceeds in U.S. dollars to a processor in the United States. The processor is responsible for advertising and selling the bulk U.S. dollars to Chinese

⁴³ <https://www.europol.europa.eu/publications-events/publications/why-cash-still-king-strategic-report-use-of-cash-criminal-groups-facilitator-for-money-laundering>

⁴⁴ <https://www.nationalcrimeagency.gov.uk/who-we-are/publications/445-chinese-underground-banking/file>

⁴⁵ <https://www.justice.gov/usao-sdny/pr/7-defendants-nationwide-money-laundering-organization-charged-laundering-over-28>

⁴⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945411/NRA_2020_v1.2_FOR_PUBLICATION.pdf

nationals in the United States. The processor identifies customers by posting advertisements on internet bulletin boards or private WeChat forums online. The processor then sells the bulk U.S. dollars in exchange for mobile China-to-China bank transfers to Chinese bank account,” noted the Treasury Department in its latest money laundering risk assessment⁴⁷.

A forensic analysis of this phenomenon was provided in British Columbia by the Cullen Commission of Inquiry into Money Laundering, which was set up following concerns about connections between organised criminals, the province’s casinos and Vancouver’s hyper-inflated housing market. It heard evidence of how domestic criminals were providing bags full of cash money to Chinese high rollers seeking to place large bets, and in return receiving goods of equal value from Mexican and other drug cartels that also used the money laundering gangs’ services. The industry had two equal drivers: one being the desire of wealthy Chinese individuals to evade their government’s controls on movements of money outside of China, who thus had a demand for cash; the other being the desire of Canadian criminals to shift cash earned in illicit activities, who thus had a supply of cash.

“Patrons that wanted to gamble at high levels but could not remove their wealth from China through legitimate means were unable to make effective use of the cash alternatives that were available in casinos, which were largely predicated on access to the services of North American financial institutions. As a result, their options were limited to reliance on cash facilitators or not gambling at all. We have no way of knowing how many chose the latter option, but clearly some chose the former,” the commission’s report concluded⁴⁸.

The arrest in Spain in October of Irish national Johnny Morrissey on accusations of money laundering for the Kinahan organised criminal group suggests an identical methodology has developed in the European Union, which in just this one case was capable of laundering €350,000 a day by recycling cash within the criminal economy, while settling balances with the movement of drugs, luxury products and other goods⁴⁹.

It is clear from court cases that the methodology is also favoured across Latin America, and elsewhere. Indeed, it is now so widespread that law enforcement agencies refer to it as global. That is in marked contrast to hawala networks, for example, which were always confined to the Muslim world, and its diaspora communities. It is notable that law enforcement analyses remark that Chinese money laundering gangs have a far higher risk tolerance than the hawala counterparts, in that they are willing to move – and, thus, risk losing -- larger quantities of cash at any one time. That

⁴⁷ <https://home.treasury.gov/system/files/136/2022-National-Money-Laundering-Risk-Assessment.pdf>

⁴⁸ <https://cullencommission.ca/files/reports/CullenCommission-FinalReport-Full.pdf>

⁴⁹ <https://www.sundayworld.com/crime/world-crime/money-laundering-system-used-by-kinahan-gangster-also-used-by-bataclan-terrorists-says-ex-garda/1981523779.html>

is evidence that they are moving larger volumes of cash in total, meaning that the shipments may be more valuable in value terms, but are not larger in proportion to the totals being moved.

Central bank analysts admit that their ability to monitor cash usage is limited to how it moves through commercial banks, but there is no reason why that should be the case. It would be more laborious to track the movement of paper money through other parts of the economy, but not impossible, and would provide crucial insights into the size and scale of the criminal economy, which would allow them to assess whether it is indeed the source of the hidden demand driving the cash paradox.

As such, that would provide crucial information to inform money laundering policy in future, and to force central banks to consider whether they should be issuing cash elastically, or should be looking into alternative policies for cash issuance so as to make the lives of mobsters, tax-dodgers and kleptocrats more difficult.