Central banks and the new world of payments

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This year's Annual Economic Report has a special chapter on "central banks and payments in the digital era". It follows in the footsteps of the chapters on cryptocurrencies and on big tech in finance in the previous two years. If you recall, those two chapters focused on what digital innovation meant for the nature of money and the payment system. There is also a strong technology theme this year, but our focus is broader. The special chapter this year highlights the **central bank's role** in the payment system.

Over the centuries, the institutional arrangements underpinning money and the payment system have evolved to keep pace with the changing needs of the day. Technology has carried us a long way on this journey, but the key theme of the chapter is that technology by itself is not sufficient to put in place a fast, efficient and cost-effective payment system. The **underlying economics and the nature of competition** in the payment system are important too. The good news is that new technology will help central banks put the pieces together more easily.

Before going into the details, I should put my remarks in the context of the pandemic, which, as Agustín notes, is a defining moment for the global economy.

Payments amid the pandemic

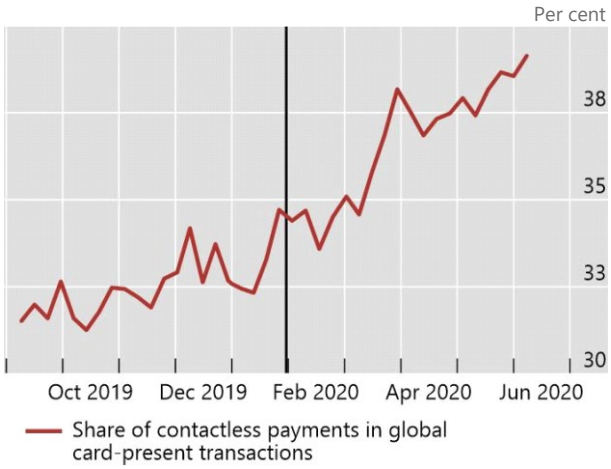
We chose the topic for the special chapter well before the pandemic, but the pandemic has served to highlight the importance of some of the main themes in the chapter. The crisis has highlighted how financial services need to be more inclusive and accessible in order to spur the recovery, and the central bank has an important role to play.

In some respects, the pandemic has accelerated trends that were already under way. One example is the use of contactless payments at the physical point of sale, such as in shops (Graph 1, left-hand panel). Both contactless payments, and remote payments for online transactions, were rising before the pandemic, but the pandemic has given them further impetus. Also worth noting is the use of cash. Its use for transactions has fallen, but the precautionary holding of cash has gone up. This is broadly consistent with past episodes of economic uncertainty.

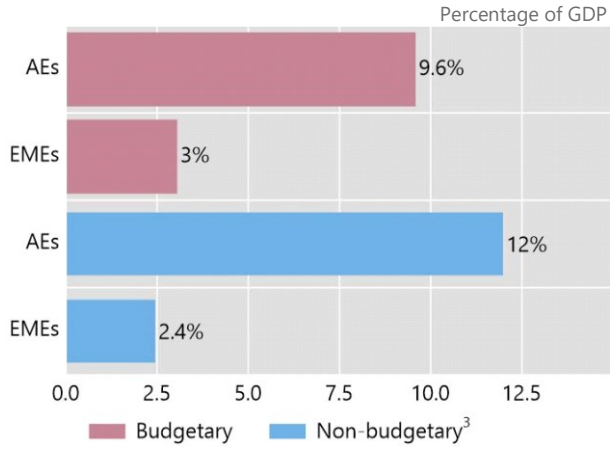
One very important issue is the efficiency and timeliness of **disbursement of government fiscal support** to individuals and small businesses that have suffered most from the pandemic. As this slide shows (Graph 1, right-hand panel), governments around the world have reacted swiftly to put in place fiscal support measures, including direct transfers to households. Announced budgetary measures add up to 10% of GDP in advanced economies and 3% of GDP in emerging market economies. Funding and guarantees come on top on this, and they are of comparable magnitudes to budgetary measures.

Payments amid the pandemic — Graph 1

Greater use of contactless cards[1]



Pledged fiscal packages[2]



The black vertical line in the left-hand panel indicates 30 January 2020, when the World Health Organization (WHO) declared the Covid-19 outbreak a "public health emergency of international concern".

[1] In many countries, transaction limits for contactless payments were raised in Q2 2020. [2] Estimates focus on government discretionary measures that supplement existing automatic stabilisers, which differ across countries in their breadth and scope. Advanced economies (AEs) = AU, CA, DE, ES, FR, GB, IT, JP and US; emerging market economies (EMEs) = AR, BR, CN, ID, IN, KR, MX, RU, SA, TR and ZA. For regions, weighted averages based on GDP and PPP exchange rates. [3] Includes equity injections, asset purchases, loans and debt assumptions and guarantees on loans and other contingent liabilities such as loans channelled through public financial agencies.

Sources: IMF, *Fiscal Monitor*, April 2020 and update June 2020; IMF, *World Economic Outlook*; a global card network; BIS calculations.

However, actually reaching the affected people has been another matter. Some countries have been able to harness technology to reach those in need swiftly – for example, through disbursement into e-wallets and direct payments to bank accounts. But the record has been mixed.

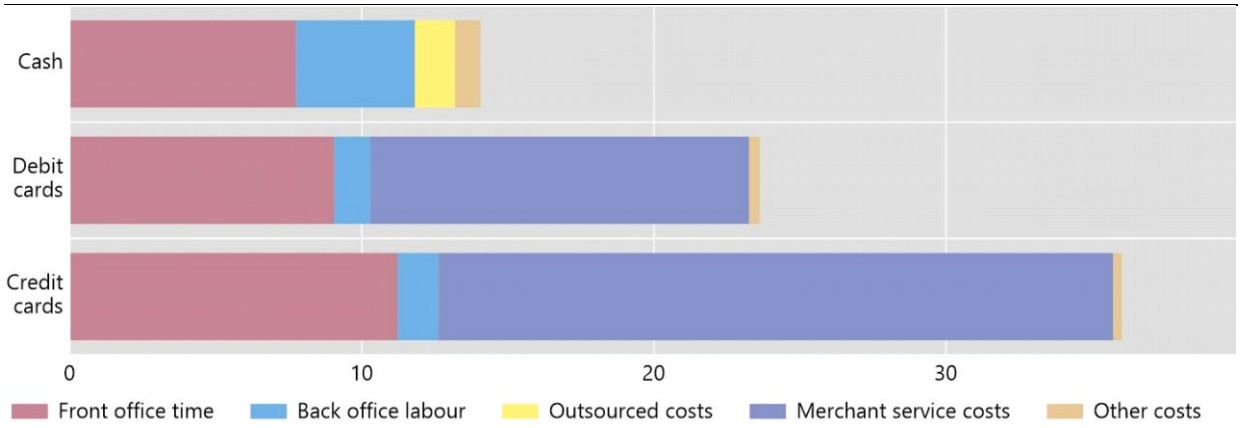
Shortcomings in payments

One problem is that not all those affected have **access** to bank accounts. And in some cases, even those who do have bank accounts have to wait for paper cheques to arrive in the post. In the future, central bank digital currencies, or CBDCs, could be a means of expediting this type of payment – I'll get to that later. All of this shines a light on the importance of the issues discussed in the special chapter.

Another issue is the **cost** of payment services. For credit and debit cards, it is mostly retailers and merchants that bear the costs, through charges to the card networks and to the banks. These charges (Graph 2) are shown here in purple, from a European Commission survey. Consumers do not see these charges, but they can add up for the economy as a whole.

Merchant service costs are important for card payments[1]

Marginal cost, EUR cents Graph 2



[1] Data for Europe (AT, BE, DE, ES, FR, GB, IT, NL, PL and SE), 2015. The graph reflects a scenario in which merchants were asked to assess fixed or variable costs for accepting cash, debit card and credit card payments for a €25 transaction over a three- to four-year time horizon.

Source: European Commission, *Survey on merchants' costs of processing cash and card payments*, March 2015.

The economics of the payments marketplace

Technology has certainly helped to lower costs. That is the good news. But technology cannot solve everything. The costs also have to do with the underlying economics, and the nature of competition in payment services.

Payment services are a good example of an industry with strong **network effects**. This means that the more other users flock to a particular platform, the more attractive it is for a new user to join that same network. Social media and messaging are good examples of network effects. As we discussed in the special chapter last year, big tech firms with existing customer bases have entered payment services by using their advantage in access to user data. Once they reach a dominant position, they can create bottlenecks for external competitors, or raise fees for retailers.

In this respect, network effects might be a mixed blessing for users. On the one hand, network effects can generate a virtuous circle of greater user participation, lower costs and better services. But if all this leads to greater market dominance that eventually reduces competition, then the users may ultimately end up being worse off.

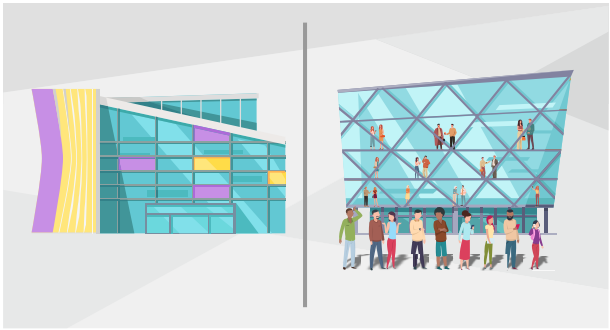
Let me explain with the example of competition between two full-service department stores, rather like these two (Graph 3, left-hand panel). You can see that one of them has become much more popular than the other one. The two department stores offer the full range of goods, but once inside you cannot access the goods sold by the other department store. This is rather like competition between two payment platforms. To use a different analogy, closed networks that exclude competitors are rather like a walled garden: it's very nice inside at first, but once inside you're cut off from the outside world, and you may get trapped.

In contrast, imagine a town market that sets up on a public square – like the one on *Marktplatz* here in the centre of Basel, just in front of city hall (Graph 3, right-hand panel). Unlike the full-service department stores, when you are in an open market in the town square, a buyer can have access to all the sellers, without artificial barriers.

Illustrating the economics of the payments marketplace

Graph 3

Department stores: a model for platform competition?



Basel's *Marktplatz*, an open marketplace

Source: BIS elaboration.

A marketplace, like the one below in Graph 4, brings together buyers and sellers (Graph 4, left-hand panel). The buyers come to the market because they expect sellers to be there, and sellers come and set up their stalls because they expect to find buyers there.

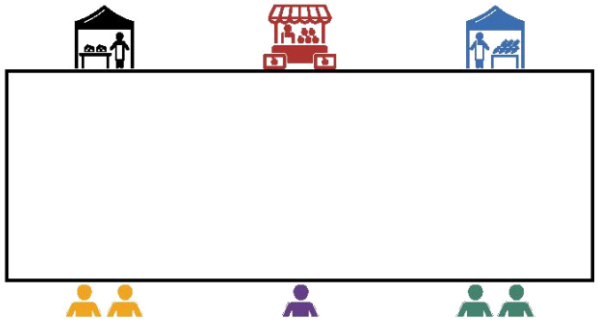
Shoppers enter, looking to buy cheese, which in turn makes the market more valuable to the sellers of cheese. The arrows indicate the mutually reinforcing nature of buyer and seller participation (Graph 4, right-hand panel). In the terminology of industrial organisation, there are strategic complementarities between buyers and sellers, where greater participation by one group brings greater participation by the other group.

The same effect holds for the buyers and sellers of fruit and vegetables, shown on the slide (Graph 5, left-hand panel). The sellers compete on the price and quality of their produce, and so you may think that sellers are worse off when there are many sellers. Importantly, this is a market for differentiated products, and buyers of cheese are also potential customers for vegetables. If buyers come for one good, but then also buy other goods, the sellers actually benefit from having each other in the same market.

The foundation of an open marketplace

Graph 4

A market brings together buyers and sellers…

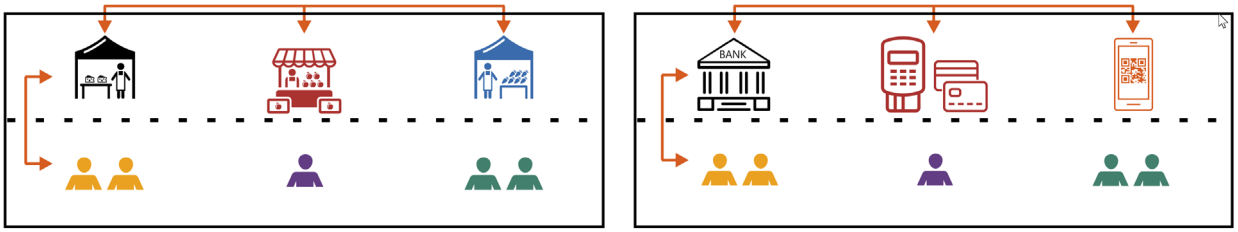


…with mutually reinforcing participation

Source: BIS elaboration.

An open market can support competition and innovation in payments Graph 5

There are also network effects between sellers… …much like those between private PSPs



Source: BIS elaboration.

When the sellers provide differentiated products, the entry of new sellers can end up benefiting other sellers in spite of more competition. This is because they contribute to attracting more buyers. In this slide, the arrows at the top indicate the network effects between sellers.

These network effects mean that when all these buyers and sellers come to the market, they add to the bustling and vibrant nature of the market, which makes it attractive to other buyers and sellers to come. In this way, network effects generate a public good that benefits everyone. The strategic complementarities also hold between sellers, even though they compete against each other. What this means is that competition and a bustling market through better services can be made compatible.

Notice the contrast with the department stores. The important point is that the open market relies on rules and standards that preserve a competitive level playing field. The town square is a public space, where buyers and sellers can meet without artificial barriers. In return, the sellers have to stick to the standards laid down by the public authorities that allow the virtuous circle of greater participation and better services to take hold.

The analogy with the payment system is that the market stallholders are like payment service providers (PSPs) (Graph 5, right-hand panel), each offering their particular bundle of services that comes with basic payment functionality, such as e-commerce, messaging and social media. Just as the market stallholders have to stick to standards laid down by the town authorities, these payment service providers need to stick to various technical standards and data access requirements, including through open APIs, in order to allow a competitive level playing field. The key concept here is **interoperability**, where the services offered by payment service providers can "talk to" each other and work seamlessly for the user.

The role of central banks

In this context, the central bank can play the pivotal role as the **operator** of the underlying infrastructure, much as the town authorities operate the town market. It is the central bank that provides the public space through access to its settlement accounts. In that sense, the balance sheet of the central bank is a public space where the sellers of the payment services all interact.

The central bank is well placed to play this role, as it issues money (which is, after all, the unit of account in the economy), as well as ensuring finality of payments through settlement on the central bank's balance sheet. Like the town market, the central bank can help safeguard this bustling payments marketplace, where the network effects can be channelled towards achieving a virtuous circle of greater participation, lower costs and better services.

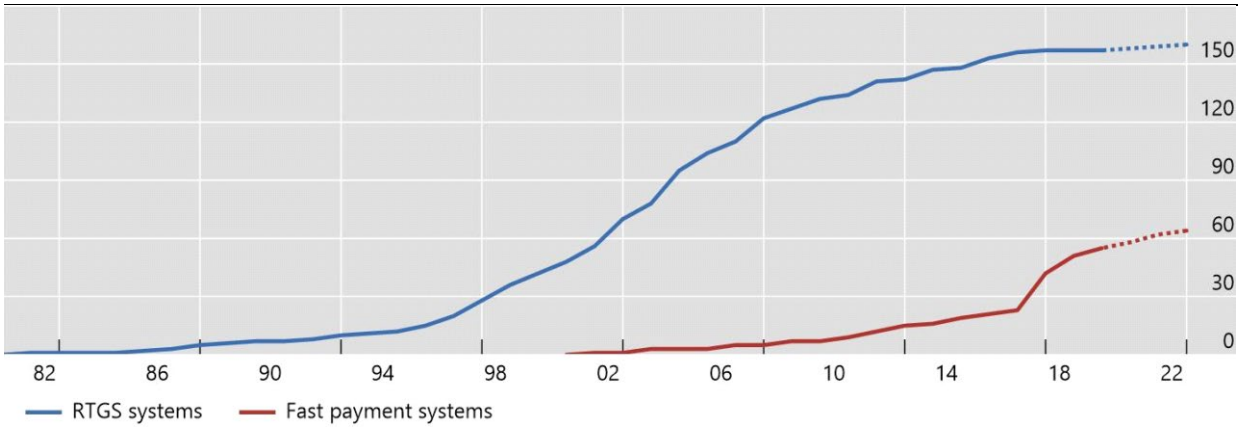
This slide illustrates the role for the central bank as an operator of the underlying infrastructure (Graph 6, left-hand panel). As you see in the blue line, beginning in the 1980s central banks rolled out real-time gross settlement, or RTGS, systems for wholesale payments. These systems are now very well

established. More recently, a growing number of central banks have played a key role in the development of retail fast payment systems, shown in the red line. Fast payment systems often allow settlement directly on the central bank balance sheet, or through public utilities overseen by the central bank. As you see in the red line, the diffusion of retail fast payment systems is following the same trajectory as the adoption of RTGS systems.

Diffusion of fast payments[1]

Number of countries

Graph 6



[1] The dotted part of the lines corresponds to projected implementation.

Sources: BIS, "Analysis of the 2018 Red Book statistics", November 2019; CPMI Survey; FIS, *Flavors of Fast report*, 2018; Instapay; national data.

Central bank digital currencies

Central bank digital currencies (CBDCs) can be seen in this broader context. CBDCs are another way in which central banks can play the role of the operator of the payment infrastructure. Wholesale CBDCs may be similar to existing central bank settlement accounts. But recent discussion has been about general purpose or **retail CBDCs** that give access to claims on the central bank to ordinary users, in electronic form.

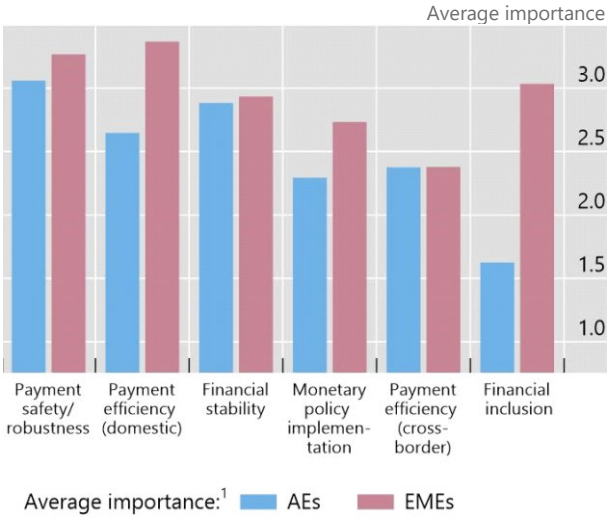
The reasons for considering retail CBDCs are numerous and vary across jurisdictions. A survey last year of 66 central banks revealed that the safety and efficiency of domestic payments are the most important motivations (Graph 7, let-hand panel). Also, many cited the decreasing use of cash and the need for financial inclusion as a motivation.

In some respects, retail CBDCs represent an incremental step. Users already have access to cash, which is a direct claim on the central bank. However, in other respects, retail CBDCs represent a more far-reaching change in the **nature of the relationship between central banks and society**. For instance, no matter how the CBDC is designed, there has to be some kind of ledger that keeps track of transactions so that the central bank can honour its obligations to the rightful owner of the CBDC. In such a setting, safeguarding personal data would present new challenges. We may also expect CBDCs to have an impact on the functioning of the financial system, potentially leading to a much larger footprint of the central bank on the financial system itself. For all these reasons, the overall consequences of retail CBDCs will need to be weighed up carefully to gauge their likely benefits and costs.

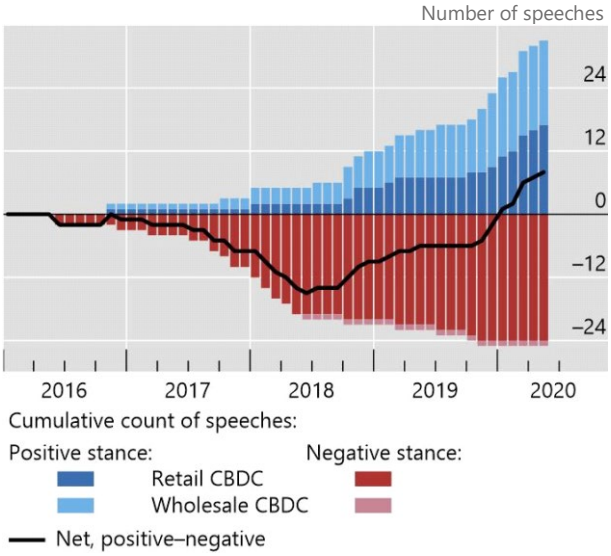
CBDC: an increasingly likely option

Graph 7

Motivations for issuing a general purpose (retail) CBDC



Central bank speeches on CBDC[2]



[1] 1 = not so important; 2 = somewhat important; 3 = important; and 4 = very important. [2] Search on keywords "CBDC", "digital currency" and "digital money". The classification is based on authors' judgment. The score takes a value of –1 if the speech stance was clearly negative or in case it was explicitly stated that there was no specific plan at present to issue digital currencies. It takes a value of +1 if the speech stance was clearly positive or a project/pilot was launched or was in the pipeline. Other speeches (not displayed) have been classified as neutral.

Sources: R Auer, G Cornelli and J Frost, "The rise of central bank digital currencies: drivers, approaches and technologies", forthcoming, 2020; C Boar, H Holden and A Wadsworth, "Impending arrival – a sequel to the survey on central bank digital currency", *BIS Working Papers*, no 107, January 2020.

Judging from the reports and speeches coming from central banks, the balance of opinion seems to be leaning more favourably towards CBDCs. Both wholesale and retail CBDCs have featured in a more positive light since late 2019, as shown here in the graph (Graph 7, right-hand panel). The number of central bank reports and speeches on retail CBDCs have generally turned more positive towards them, as indicated here by the blue bars going up relative to the red bars. At many central banks, there is work under way on the design and use cases for CBDCs. The BIS is supporting these discussions through the committees it hosts, through economic research and through the activities of the new BIS Innovation Hub.

Conclusion

If we look at the long arc of history, the social convention of money has undergone several key institutional changes. With the possible introduction of CBDCs, we may be at the cusp of another important step in the evolution of the relationship of the central bank with society.

Digital innovation has made central bank public goods more important than ever, and central banks need to be at the cutting edge of technology to serve society.

We may expect these efforts to make our payment systems more efficient, faster and more widely accessible for the new, digital world.