

Salone dei Pagamenti

Cash: recent trends and future developments

Roberto Rinaldi

Head of the Directorate General for Currency Circulation and Accounting

Banca d'Italia

Milan, 9 November 2018

Last year I spoke here about the currency circulation trends in Italy and in the euro area, and on the puzzle of the growth on the one hand of cash and on the other hand of alternative payment instruments.¹

On this occasion I would like to return to the long-debated issue of the competition between payment instruments, following a partially different approach and defining the ‘field’ of the competition. I would like to focus specifically on the point that the competition concerns a part of the total circulation, namely that linked with the purpose of spending. Can we make an approximate estimate of this share? Is it high or low?

We will see how useful it is for this exercise to use both the information on individual denominations and that which is available when a series of banknotes is changed or when the production or issuance of a specific denomination is interrupted. Such changes or interruptions influence the pace of return of the banknotes and may reveal the underlying motives for the demand of operators for cash.

I would then like to illustrate, with particular reference to the spending component being estimated, the replacement process between cash and other instruments based on the information taken from sample surveys on household behaviour.

I will use these elements to comment on the use of cash looking to the future, in a scenario that in any case includes the growing use of new means of payment.

Cash: how much is needed to carry out transactions?

A look at the aggregate trends

The cash-to-GDP ratio is growing in many countries, with the exception of northern Europe; it is growing together with the use of alternative payment instruments (Figure 1).² This co-movement is due to low interest rates and

¹ Rinaldi, R. (2017). *Cash payments evolution in Italy*. BANCARIA, 11, 20-29.

² Bech, M. L., Faruqui, U., Ougaard, F., & Picillo, C. (2018). *Payments are a-changin’but cash still rules*. BIS Quarterly Review, March 2018. Available at: https://www.bis.org/publ/qtrpdf/r_qt1803g.pdf.

the growth in consumption; the precautionary choices linked to widespread and serious financial crises and geopolitical tensions are another contributory factor. The growth in cash has been driven by the large denominations of currency for which the function of a store of value prevails (Figure 2).

The Eurosystem's net issues had risen by 13 per cent in 2008 in relation to the Lehman Brothers' bankruptcy (Figure 3); between 2009 and 2017 they recorded growth rates of around 4 per cent, with dramatic changes in conjunction with the 2010-2013 sovereign debt crisis and with the rouble crisis.

There has been a particularly sustained growth in cash for the most widespread international currencies, such as the dollar, the euro, the yen, and the Swiss franc, which are widely requested as a store of value (Figure 4).³

Which aggregate should be compared in order to understand the competition between payment instruments in the euro area from a quantitative point of view? How big is this aggregate?

It should be emphasized that as regards international currencies, a comparison between overall net issues and the use of alternative payment instruments may be misleading. For a correct comparison, it is necessary to identify and estimate just the transaction component, subtracting the part held as a store of value or for precautionary reasons from the currency in circulation.

Two steps must be taken to achieve this. With regard to the euro area, first of all it may be assumed that the balances in euros held abroad are not generally for spending purposes. Once foreign demand has been subtracted, a second partition of the 'internal' currency circulation can be made by using some cash cycle indicators that are monitored and quantified by the NCBs.

The ECB's analyses are very useful as regards the foreign component of currency circulation. The ECB estimates the banknotes in circulation outside the euro area by using net shipments, i.e. transactions between euro-area financial institutions and entities (legal persons) resident outside the area.⁴ The demand comes above all from eastern European countries and from Russia, but also from Switzerland and the United Kingdom and

³ Jobst, C. and H. Stix (2017). *Doomed to Disappear? The surprising return of cash across time and across countries*. C.E.P.R. Discussion Papers. Available at: <https://ideas.repec.org/p/cpr/ceprdp/12327.html>

⁴ European central bank (2018). *The international role of the euro*. Available at: <https://www.ecb.europa.eu/pub/ire/html/ecb.ire201806.en.html#toc1>

to a lesser extent from non-European countries. The financial crises and geopolitical tensions that have hit regions close to the euro area boosted the demand for euros, which increased up until mid-2015; inflows from outside the area subsequently exceeded outflows as a result of less financial and economic uncertainty (Figure 5). The net shipments conservatively estimate the movements of banknotes outside the euro area since they do not include the flows associated with tourism or immigrants' remittances. To quantify the net total flows of banknotes outside the euro area, the ECB uses a second independent estimate of the shipments, obtained by assuming that the internal circulation of banknotes maintains a stable proportion in relation to coins circulation, only marginally affected by migrations outside the area.⁵ The average of the two estimates indicates that about 30 per cent of the overall value of Eurosystem issues are held outside of the euro area.

To estimate the breakdown of internal circulation (equal to 70 per cent of total circulation; see the previous section) between stocks for spending and stocks held as stores of value, methods are used that take account of the different characteristics of the denominations in the cash cycle.

In this regard, indications are drawn from the following indicators:

Ratio between issues of individual denominations and GDP; in principle, a stable ratio indicates a link with GDP and prices and presumably, therefore with the use of the denomination for spending purposes (this is the case for €5 and €10 banknotes; Figure 6.a); an increase in the ratio to GDP could mean that the demand for a specific denomination at least partially reflects its use as a store of value (typically the large denominations) or that the denomination is a hybrid, and is used for transactions and as a store of value (€50);

The return rates, which indicate the average frequency with which the various denominations return to the central banks: under normal conditions it is higher for transaction denominations and lower for those typically used as a store of value (Figure 6.b). It should be noted that the return rate of various denominations fell considerably between 2010 and 2017. This depends first of all on the greater capacity of the private sector to recirculate banknotes without sending them back to the NCBs. This could partly reflect

⁵ European Central Bank (2017). *Estimation of euro currency in circulation outside the euro area*. Available at: https://www.ecb.europa.eu/pub/pdf/other/estimating_eur_in_circulation_outside_the_euro_area-201704.en.pdf

the increase in saving money rather than spending it or also a slower rotation of the transaction stocks;

the speed with which first series banknotes return, after the launch of the corresponding second series banknotes (Figure 6.c). The banknotes that tend to be returned more quickly to be replaced by second series ones are those for transaction purposes; in contrast, the replacement process is slower for banknotes held as a store of value and may even not take place for those held abroad.⁶

In light of these factors concerning the various denominations, the ECB estimates that about 30 per cent of the total currency in the euro area is held for transactional purposes. These are approximate evaluations, but they do illustrate how, in the case of the euro, the share of banknotes kept and used to make transactions and which effectively circulates among operators and is then returned to and withdrawn from NCBs again is low, and in light of what the changes in rotation rates show, it could reduce further, or in any case recirculate more slowly.

The replacement of cash with alternative payment instruments

The process of replacing cash and the competition between traditional and new payment instruments therefore only concern a limited share of the stock of banknotes; in the case of the euro area, equal to less than a third of the total, namely around €300 billion of the over €1,000 billion of cash outstanding. How can the ‘competition’ between instruments be explained in this context?

The number of transactions per capita with alternative payment instruments is increasing in most countries, especially the use of payment cards. They are replacing traditional instruments such as cheques and are used for increasingly smaller amounts.⁷

⁶ The estimates based on the return of first series banknotes have some limitations. Each euro-area country has decided its issuance policy independently, namely whether or not to adopt a parallel reissuance (the central bank issues the second series of banknotes in parallel). Announcing the launch of the second series might have accelerated the return or the use of the banknotes, which would otherwise have been kept as a store of value. Finally, the minimum period after which a returned banknote can be defined as a store of value cannot be precisely established.

⁷ Banca d'Italia (2018). Available at: <https://www.bancaditalia.it/pubblicazioni/interventi-vari/int-var-2018/Rinaldi-20180615.pdf>.

To assess the extent to which cash is used for payments, sample surveys on payment behaviour are being conducted in a growing number of countries (Figure 7). These surveys have been conducted for several years in some countries, such as Germany and the USA, and make it possible to assess the changes in the use of cash over time. In other cases, this type of survey has been launched more recently; specifically, a harmonized survey relating to the various member countries, was conducted in 2016 for the euro area.

These surveys show, first of all, that the number of payments made in cash varies considerably: in Germany and Switzerland the use of cash is widespread; the use of cash throughout the euro area is comparable to that in Germany. In contrast, Sweden is close to being a cashless economy.

Secondly, the surveys (for those countries that have been repeating them for a longer period) show if and how quickly alternative instruments are replacing cash. In this regard, in some countries, there has been a rapid decline in the use of cash (primarily Sweden but also the United Kingdom and the Netherlands). In other countries, the drop in the number of cash purchases appears to be gradual (e.g. Germany) and suggests that despite competition from alternative instruments, cash will continue to play an important role, at least in the medium term. Lastly, there is the case of the USA, where the number of consumer payments in cash increased after the 2008 crisis: it then decreased gradually between 2009 and 2014 and rose slightly in 2015, stabilizing in the years thereafter (Figure 8). With regard to this, the Federal Reserve believes that innovation in retail payments translates into a broader range of payment options for consumers, who tend to use new instruments alongside traditional ones and modify their behaviour extremely slowly.⁸

Specifically, the ECB's recent euro-area survey, conducted in the two years 2015-2016 on consumers' payments habits at points of sale, highlighted that cash is the leading payment instrument (Figure 9): some 79 per cent of all transactions are made in cash, accounting for 54 per cent of total value. Payment cards are the second most frequently used instrument: 19 per cent (39 per cent of total value).⁹

⁸ Greene, C., and Stavins, J (2018), *The 2016 and 2017 Surveys of Consumer Payments Choice: Summary Results*. Federal Reserve Bank of Boston.

⁹ Esselink, H. and L. Hernández, L. (2017). *The use of cash by households in the euro area*. ECB Occasional Paper series 201/2017. Available at: <http://www.ecb.europa.eu/pub/pdf/scpops/ecb.op201.en.pdf>.

For Italy,¹⁰ the analyses carried out on ECB data show that in 2016:

- cash is the instrument used most for payments at points of sale: 86 per cent of transactions (68 per cent of total value), although payment cards and alternative instruments would be preferred if people could choose payment methods with no constraints;
- the most frequently used instruments alternative to cash are payment cards, which were used to settle 13 per cent of transactions (29 per cent in value). Contactless technology is still not used much;
- the average value of transactions was €14 in cash and €38 for payment cards. The fact that the transactions considered in the payment diaries are those at points of sale, which is why the amounts are low (90 per cent are for less than €40), could explain why cash is shown to be used more than other payment instruments;
- the choice of payment instrument is influenced more by the characteristics of the transaction than by socio-demographic factors: cash dominates low-value day-to-day payments.

What is the future for cash?

We can draw some indications from what we have seen: i) as in the past, cash is the most frequently used instrument for low-value payments; ii) its share in transactions, also of this kind, is gradually decreasing; iii) there is significant demand for cash (about 70 per cent) as a store of value and even more so in situations of financial and economic uncertainty, for precautionary purposes.

Developments in innovative instruments have competed first of all with traditional instruments such as cheques but, given the extent to which they have managed to enter the low-value payments sector, they are also competing with cash.

¹⁰ For Italy, certain information on the use of cash for payments has been collected since the end of the 1990s in the Bank of Italy's Household Income and Wealth survey, conducted every two years. The survey promoted by the ECB (*Study on the use of cash by households- SUCH 2016*) provided information enabling a more complete assessment of this phenomenon. Banca d'Italia and ISTAT are currently working together to collect data on the use of cash for payments through surveys conducted by ISTAT.

Among the most recent innovations are some that lend themselves to the sectors typically served by cash. This is the case of payment methods using contactless technology and those based on apps downloaded onto smartphones which can also be used in traditional shops and for payments between individuals.

The issue that we have to deal with when we wonder about the future is not whether replacement is plus or minus (it is, in fact, negative) but rather its size and its distribution over time.

The rapid marginalization of cash that has occurred in some northern European countries has to be seen in relation to their specific social context and to the particular role of the banking system in discouraging the use of cash. It can be argued that in the euro area, cash will continue to be an important means of payment, especially at retail outlets. However, the increase in the use of contactless cards and mobile payments, the rise in online purchases and the growth of instant payments will lead to the erosion of cash as a payment instrument, at a pace as yet uncertain. There is no particular reason to expect a fall in the demand for cash as a store of value and we might see further slowdowns in the speed of stock rotation.

* * *

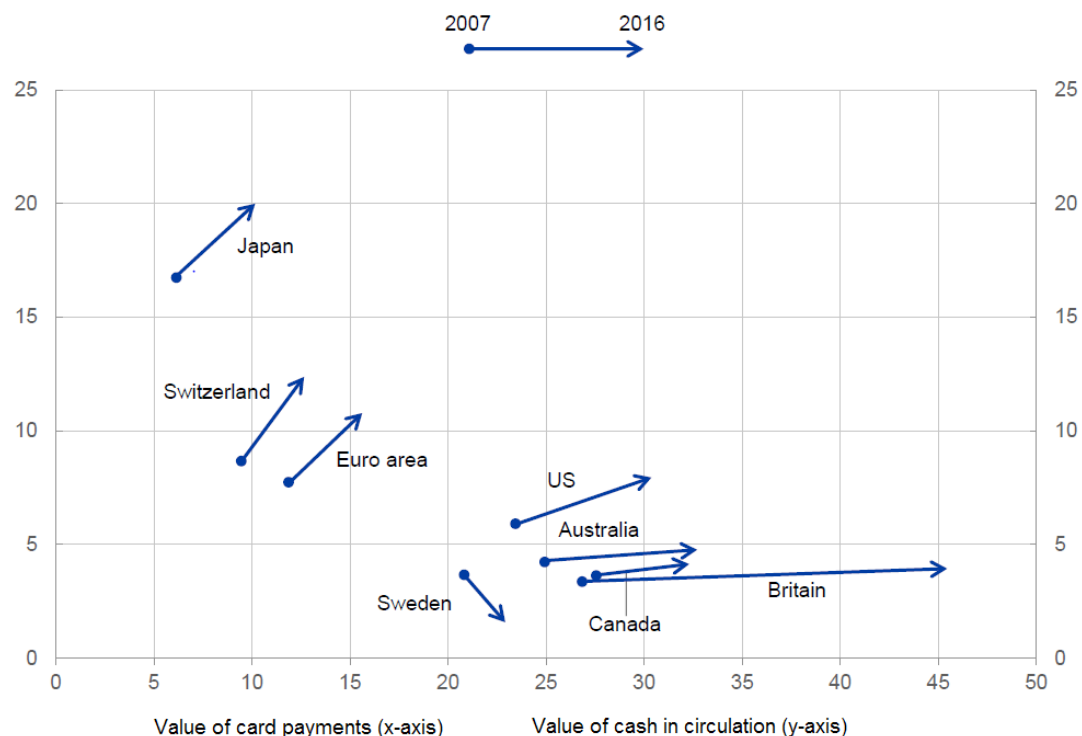
From the point of view of the policy towards different forms of payment, it should be remembered that it is the responsibility of central banks, in their role as issuing institutions, to continue to ensure the supply of high quality banknotes, in the quantities required by the economy. At the same time, central banks are fostering the development of competitive, innovative and integrated retail payment systems. The Eurosystem's stance on the choice of payment instruments is therefore a neutral one: it is up to the people and the operators to decide. To quote Yves Mersch, Member of the ECB's Executive Board: "If, one day, cash is replaced by electronic means of payments, that decision should reflect the will of the people, not the force of lobby groups".¹¹

¹¹ *Why Europe still needs cash.* Contribution by Yves Mersch, Member of the Executive Board of the ECB for Project Syndicate – 28 April 2017.
Available at: <https://www.ecb.europa.eu/press/key/date/2017/html/ecb.sp170428.en.html>.

FIGURES AND TABLES

Figure 1

International comparison: use of payment cards and the circulation of cash (1)
(per cent of GDP)

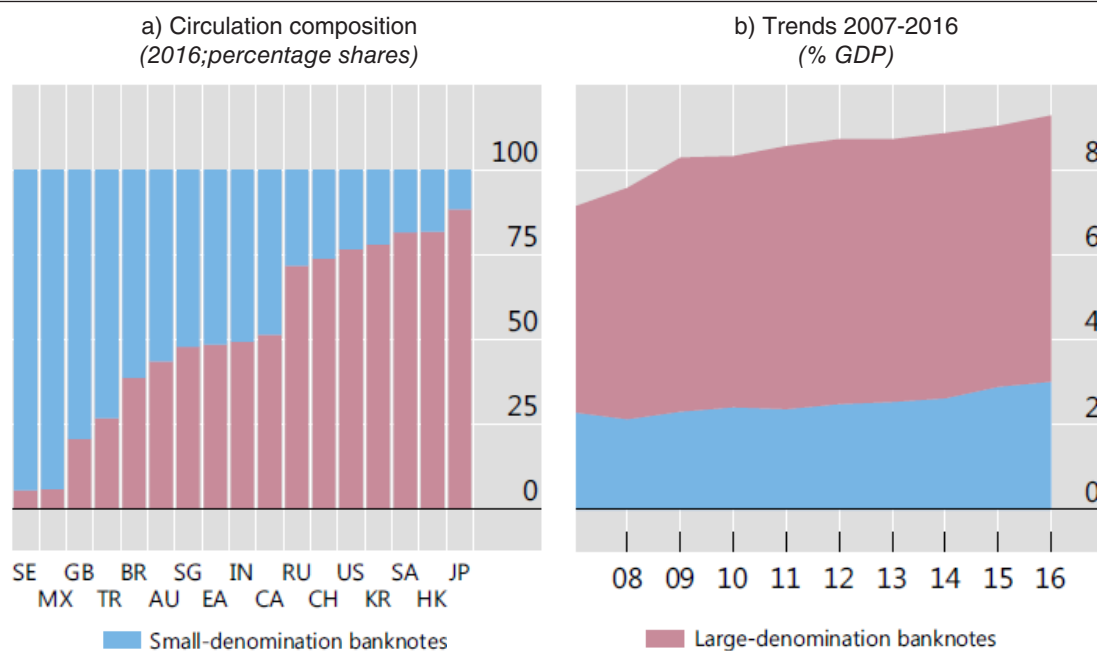


Source: CPMI (2017b)

(1) Changes in the indicators in the period 2007-2016. The circular base and the arrowhead of the lines represent the situation in 2007 and 2016 respectively.

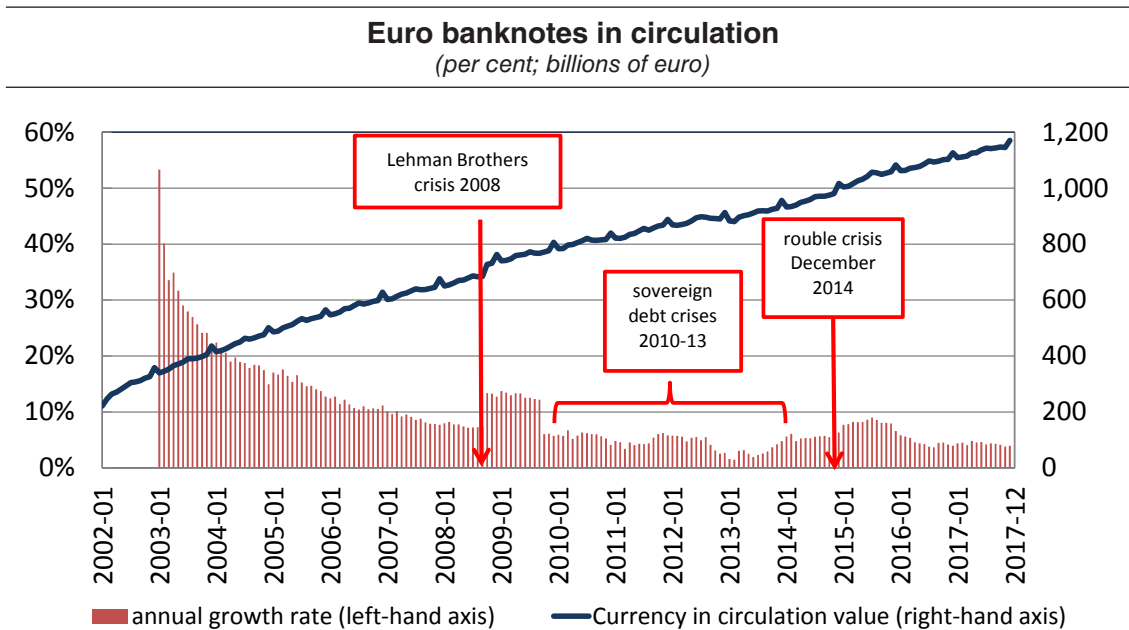
Figure 2

International comparison: composition of cash circulation by denomination



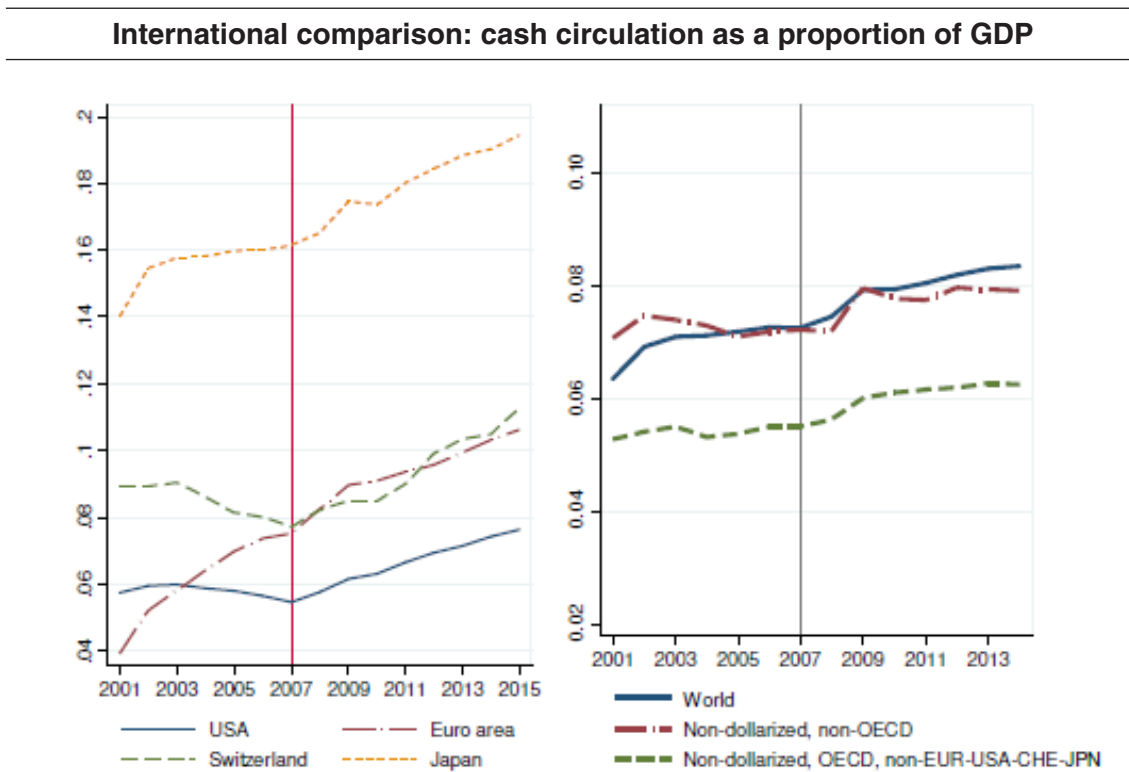
Source: Bech, M. L., Faruqui, U., Ougaar, F., & Picillo, C. (2018). *Payments are a-changin' but cash still rules*. p. 74. *Bis Quarterly Review*.

Figure 3



Source: Based on ECB data.

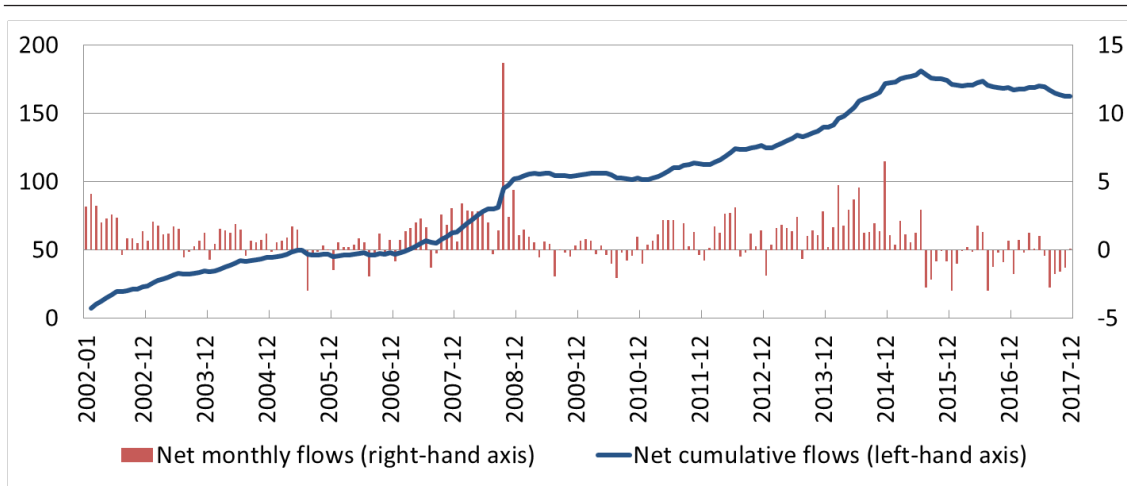
Figure 4



Source: Jobst, C., & Stix, H. (2017). *Doomed to Disappear? The Surprising Return of Cash Across Time and Across Countries*. Pag. 2. CEPR Discussion Papers.

Figure 5

Net transfers of euro banknotes to and from regions outside the euro area (billions of euro)

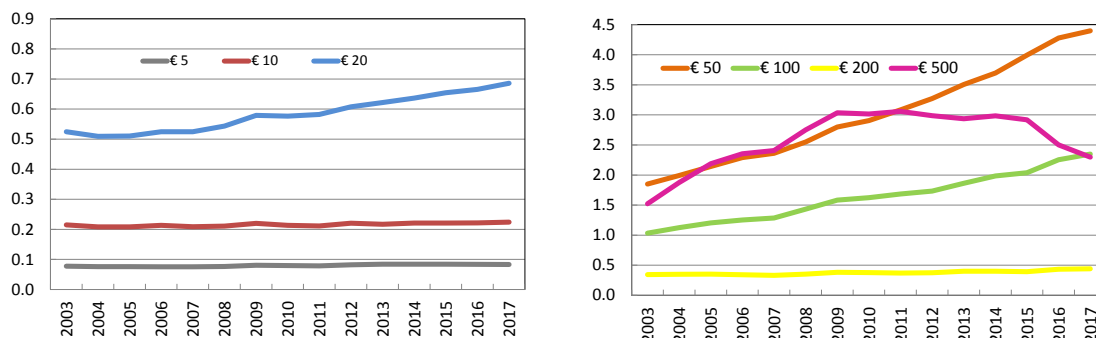


Source: Based on ECB data.

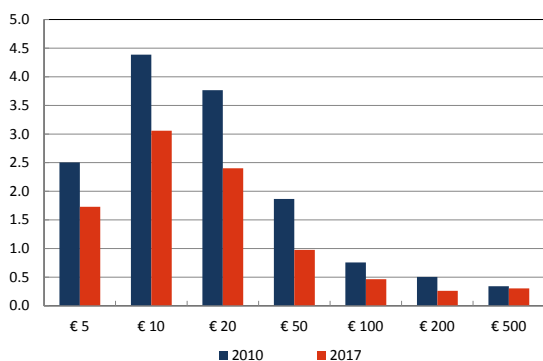
Figure 6

Empirical approaches to the estimation of the components of demand for euro banknotes

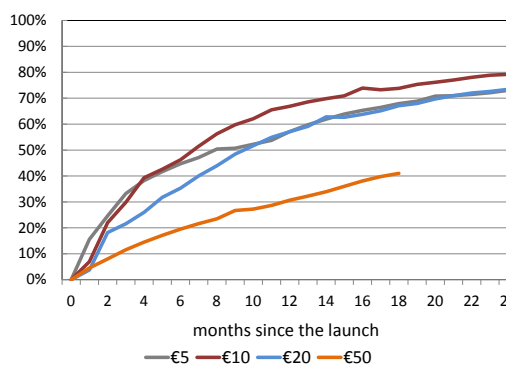
(a) Circulation of currency/GDP by denomination
(percentage shares)



(b) Return frequency of banknotes in circulation (1)
(number of banknotes returned to NCBs in one year)



(c) Saturation rate, second series (2)



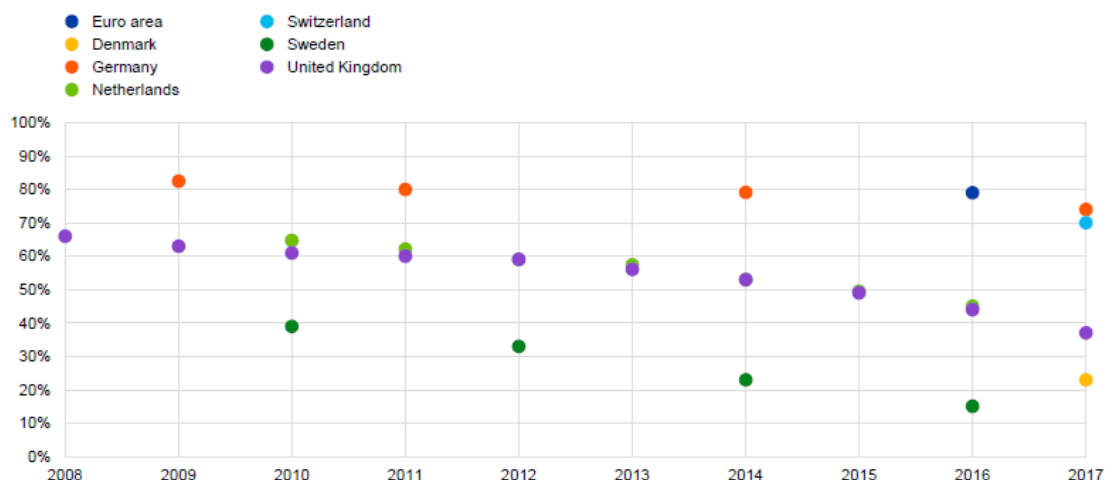
Source: Based on ECB data.

(1) The return rate for an individual denomination is equal to the ratio of the number of banknotes deposited with NCBs over a 12-month period to the average circulation for the same period.

(2) The saturation rate for an individual denomination is equal to the ratio of the number of second series banknotes in circulation to the total circulation.

Figure 7

Cash transactions as a percentage of total transactions (1)
(percentage shares)

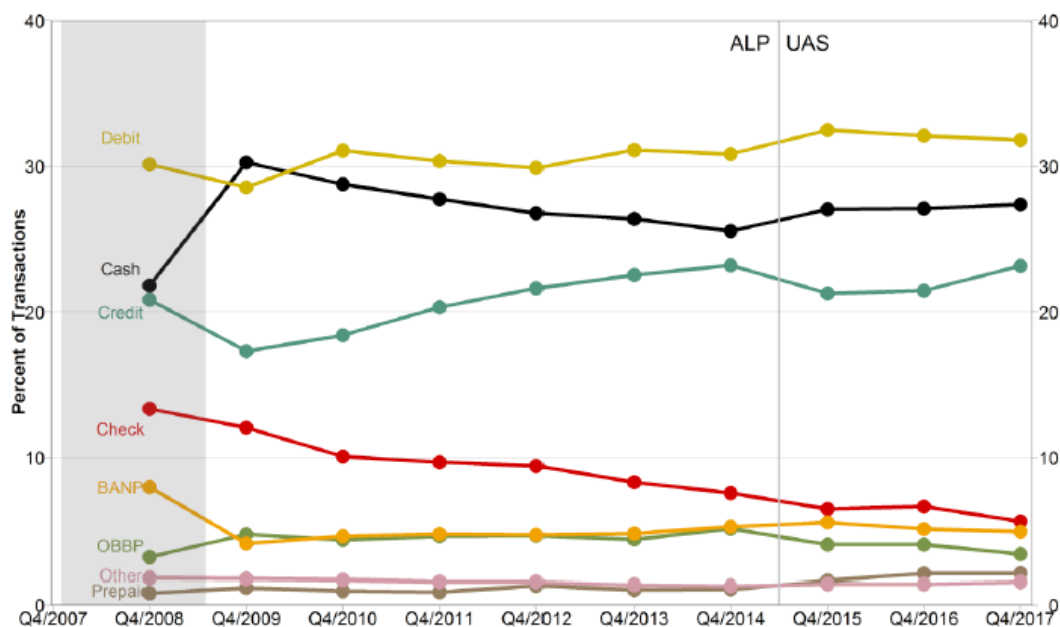


Source: ECB Economic Bulletin, Issue 6/2018

(1) The surveys are based on various methodologies and scopes (they may only consider transactions at points of sale or consider all transactions).

Figure 8

Percentage of payments by type of instrument used in the United States (1)
(number of transactions)



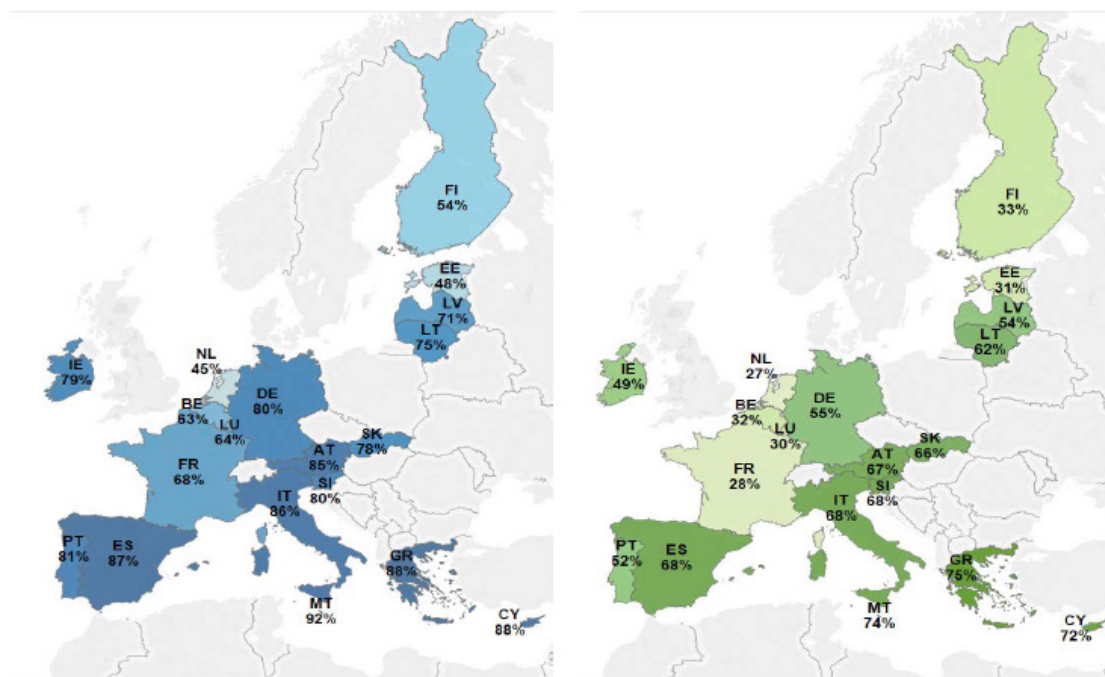
Source: Survey of Consumer Payment Choice. Research Data Reports, (18-3).

(1) The results from 2008 to 2014 are based on the American Life Panel (ALP); the results from 2015 to 2017 are based on the Understanding America Study (UAS) panel. OBBP stands for online banking bill payment; BANP stands for bank account number payment.

Use of cash at points of sale in the euro area (2015-2016)

(number of transactions)

(value of transactions)



Source: ECB, Study on the use of cash by households (SUCH 2016).

Appendix 1

The cases of Germany and Italy

As a preamble we must remember that estimating currency circulation in individual euro-area countries presents the challenge of removing net flows towards other euro-area countries from issuance calculations, a complex process in an integrated monetary area (as if we wanted to estimate the net flows of imported/exported banknotes for Lombardy to/from the other regions).

Germany is the euro-area country with the highest net issuances, which grew from the launch of the monetary union to the end of 2017 at an average annual rate of 9 per cent (against 6 per cent for the rest of the area); the share of net German issuances on the Eurosystem total rose from 36 per cent in 2002 to 54 per cent in 2017.

The Bundesbank, which promotes surveys on household behaviour and on tourist flows, has concluded that the marked growth in German issuances is connected above all to foreign demand.¹²

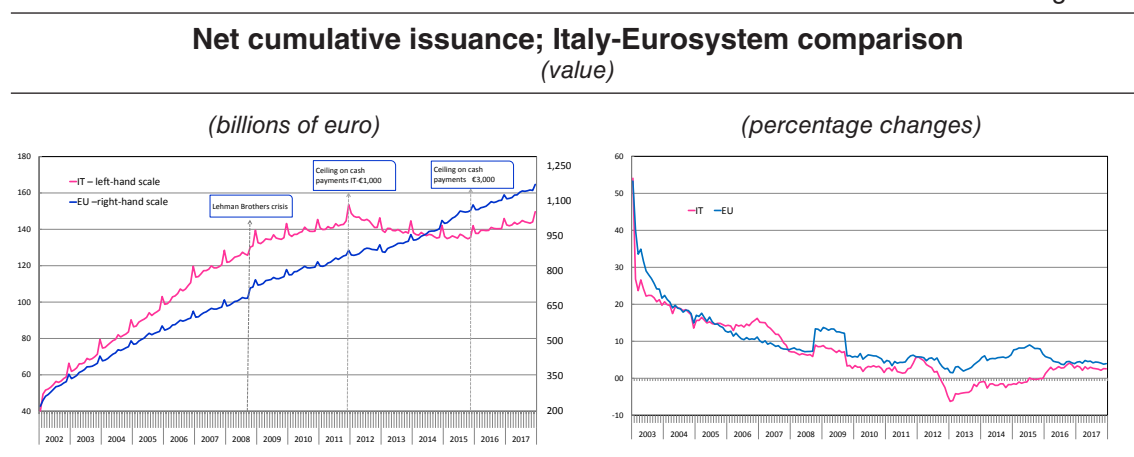
The flows abroad especially involve eastern European countries and Russia but are also associated with tourism, especially towards countries inside the euro area. At the end of 2016, about €390 billion, equal to two thirds of net German issuances, were in circulation abroad. Bearing in mind that the ECB estimates that about one third of total Eurosystem issuances have migrated abroad, Germany is the source of over 70 per cent of the banknotes that have migrated outside the euro area. Only 30 per cent of net German issuances are held by national operators and are divided into about 20-25 per cent in stocks held as a store of value and 5-10 per cent in stocks for transactions for households, shopkeepers and banks.¹³ The amount held for spending by households, measured by sample surveys, is stationary. Banks' cash holdings have instead increased (including stocks for transactions) in relation to the negative interest rates on deposits with the Eurosystem.

¹² Bartzsch, N., G. Rösl, and F. Seitz (2011). *Foreign demand for euro banknotes issued in Germany: estimation using indirect approaches*. Discussion Paper Series 1: Economic Studies No 21/2011. Available at: <https://www.bundesbank.de/resource/blob/703622/5973cc7ff8c8a4ebfa17b9394c711d71/mL/2011-09-05-dkp-21-data.pdf>.

¹³ Deutsche Bundesbank- Monthly Report (2018, March). Available at: <https://www.bundesbank.de/resource/blob/723928/e33e9ef7bd00491a6458f599ff95cb1d/mL/2018-03-banknoten-data.pdf>.

Compared with the other euro-area countries, Italy is known to have a high propensity to use cash, while tourism results in cash inflows from abroad. Banca d'Italia's net issuances, equal to 18 per cent of total euro-area issuances up until 2008, initially showed signs of a slowdown, followed by sharp downturns after 2011, against the euro-area trend. These trends are affected by measures for putting limits on cash payments: setting a ceiling of €1,000 at the end of 2011 led to large returns of the highest denomination banknotes which rapidly ended up in the 'negative circulation', revealing the existence of considerable stocks of cash hoarded by national operators as a result of inflows from abroad. The marked decrease in demand, starting from 2012, probably concerned both the stocks held as a store of value (significant returns of the higher denominations) and those for spending, as seems to be demonstrated by the marked contraction in withdrawals from the banking system and the acceleration in the growth of the use of alternative payment instruments.¹⁴ Italian issuances have only returned to growth since the beginning of 2016, in conjunction with the raising of the ceiling on cash payments to €3,000; growth rates, however, remained lower than in the rest of the euro area (Figure 1.1). At the end of 2017, Italy's share of euro-area issuances stood at 12 per cent. Aside from Banca d'Italia's net issuances, it is estimated¹⁵ that Italy received net inflows of euro banknotes from abroad of around €40.2 billion between 2002 and 2017 as a result of tourist flows and of banknote sales carried out by national banks with foreign counterparties.

Figure 1.1



Sources: Banca d'Italia and ECB

¹⁴ For Italy, there has not yet been a precise estimation of the share of the currency circulation attributable to the demand for cash to spend and cash to keep as a store of value. This could also be achieved by using the information derived from the speed of return of first series banknotes, following the launch of the second series.

¹⁵ Based on the survey conducted by Banca d'Italia on international tourism and the statistics on net shipments.

