

EUROPEAN BANKNOTE CONFERENCE

Substitution in payments

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Knowns and unknowns on payment instruments and their underlying assets¹

The increase in electronic payments we are experiencing is paralleled by a somewhat surprising resilience of cash. This is due to the safe haven role played by cash in the aftermath of the 2007 financial crisis.² Cash has also been buoyed by the decline in markets interest rates and the picking up of economic activity. Foreign demand, concentrated on high-value denominations, had mixed effects (see slides pp. 4-6, in the attached file).

It is natural to ponder on the degree of substitution among payment instruments and indeed a lot has been written on this issue. We know from that literature one thing for sure: cards in the last years have spread out and crowded out other traditional non-cash instruments (mainly cheques) (slide p. 8).

It is less clear the extent to which electronic payments have displaced cash. From an empirical viewpoint we want to pin down sign and magnitude of the partial correlation between cash and non-cash usage. It is not an easy task since we need to disentangle the marginal contributions of the different sources of variation of cash demand: we should control for changes in interest rates, in consumption, in foreign demand, etc., factors on which we can dwell a lot except saying that they have been constant in the last years.

We may nonetheless find clues on that correlation in surveys on consumer habits in different countries (with a considerable time-lag unfortunately). Overall the surveys show that electronic payments did have a bearing on cash usage; but the depth and the intensity of the negative substitution vary across countries.

¹ I would like to thank Manuela Calderini, Gianluca Maddaloni and Ferdinando Sasso, all from the Currency Management Department of the Bank of Italy for their valuable assistance in drafting the text and preparing the slides.

² Bech, M., Faruqi, U., Ougaard F., Picillo C. (2018), "Payments are a-changin' but cash still rules", in BIS Quarterly Review, 11 March.

- In the Euro Area, the survey on cash at points of sale by households, carried out in 2016, points to a negative correlation between per capita card payments and use of cash (slide p. 9).³
- In Italy, the survey on household income and wealth shows that the share of cash outlays in overall spending has decreased from 55 per cent in 1993 to about 40 per cent in 2016; the share of households holding payment cards increased from 35 to 80 per cent (slide p. 10).⁴
- In the Netherlands the number of cash payments decreased from 4.37 billion in 2010 to 2.95 billion in 2016; over the same period card payments increased from 2.15 to 3.76 billion (slide p. 11).⁵
- In Sweden, as in other Nordic countries, cash is rapidly being crowded out by digital payments and it is under scrutiny the possibility that the central bank issues an electronic krona (slide p. 12).⁶
- In the US, on the contrary, the annual survey on consumer payment choices shows an increase in the use of cash following the 2008 crisis; since 2009 the use has been slowly decreasing (slide p. 13). The Fed argues that innovation in retail payments is indeed enlarging the range of instruments and that consumers choose these newer payment instruments without discarding all-together older ones.⁷

The innovation in retail payments is spreading thanks to digitalization, to the activity of low-cost providers (such as financial technology companies) and of large internet platform companies (Google, Facebook, Amazon). We observe app-based mobile payments, contactless and proximity ones, digital wallet solutions, payment initiation services. In the euro area fast/instant payments are on the

³ Esselink H., Hernandez L. (2017), “The use of cash by households in the euro area”, ECB Occasional Papers no. 201, November 2017.

⁴ Bank of Italy, Survey on household income and wealth 1993-2016.

⁵ Jonker N. (2017), “From cash to cards: how debit card payments overtook cash in the Netherlands”, Bundesbank International Cash Conference “War on cash: is there a future for cash?”, 25-26 April.

⁶ Sveriges Riksbank (2017), “The Riksbank’s e-krona project”, Report 1, http://archive.riksbank.se/Documents/Rapporter/E-rona/2017/rapport_ekrona_170920_eng.pdf.

⁷ Schuh, S. (2016) “Consumer payment choice: a central bank perspective”, Federal Reserve Bank Boston, Conference BAI-Payment Connect 2016, <https://www.bostonfed.org/publications/cpr-presentations/2016/consumer-payment-choice-a-central-bank-perspective.aspx>.

increase; authorities endeavor to enhance the services, and in some case provide them directly in competition with the market.⁸

These innovations will increase the efficiency of transfers of commercial bank money (slide p. 14); underlying assets-liabilities however do not change. Put it differently, these new instruments spread out in an environment where, say, the narrow aggregate M1 is invariably made up of liabilities of two traditional “agents”: the central bank and the commercial banks exchanging at par their own transaction liabilities.

Crypto-assets

Crypto-assets (terminology produced by the Financial Stability Board *in lieu* of “cryptocurrencies” for the reasons reported below) are issued by no-one (and the liability of no-one) and are a different phenomenon with respect to new forms of payment.⁹

The FSB suggested the use of “assets” instead of “currencies” because it was clear that bitcoin and others new form of digital value do not efficiently or properly exert the basic functions of money (see slides 17-19). As reported in ECB: “virtual currency (VC) is not money or currency from a legal perspective”, rather it is defined as “digital representation of value, not issued by a central banks, credit institution or e-money institution, ...”.¹⁰ Mersch writes: “Do VCs herald a new world of money? No, virtual currencies are a misnomer in the first place. They are not money, nor will they become money in the foreseeable future. They lack the official recognition and backing of a public authority. Their market value is relatively small, the amount of money at risk in financial market infrastructures is insignificant and their ties to the real economy are still limited”.¹¹ The IMF, as the FSB, redefines crypto-currencies as crypto-assets. In particular:

- *as regards the store of value function, due to their volatility, households cannot rely on crypto-assets as a stable store of value to optimize their spending over time by saving;*

⁸ Mersch, Y. (2018), “Les paiements instantanés comme vecteur d’innovation dans les paiement”, Paris, 15 février, in ECB Speeches.

⁹ Cochrane, J. (2017), “Bitcoin and Bubbles”, <https://johnhcochrane.blogspot.com> and Cochrane, J. (2018), “Basecoin”, <https://johnhcochrane.blogspot.com>.

¹⁰ ECB (2015), “Virtual currency schemes – a further analysis”, February.

¹¹ Mersch, Y. (2018), “Virtual currencies ante portas”, Speech at the 39th meeting of the Governor’s Club, Bodrum Turkey, 14 May, in ECB Speeches.

- *concerning the function of medium of exchange, crypto-assets are by far inferior to existing payment options. Around 0.2 million bitcoin transactions are carried out globally on a daily basis, compared to 330 million retail payments only in the euro area. Transactions are slow and expensive: they generally call for confirmation from 6 miners which may require 1 hour, or even longer due to network congestion; the cost of Bitcoin payments reached 25 euro in December 2017, in comparison with 0.2 cents and a maximum of ten seconds for each transaction on the forthcoming TARGET Instant Payment Settlement (TIPS) service. Bitcoins are also very expensive in terms of their environmental impact due to the electricity consumption required for their creation and transfer;*¹²
- *as regards the unit of account function, relative prices of crypto-assets are too volatile to establish a fairly stable reference value; their value is not linked to the value of central bank money. There is no institution, except the central bank itself, capable of guaranteeing their 1:1 convertibility with base money.*

Crypto-assets in any case do produce a change in the spectrum of assets available to the economy. On a financial conduct viewpoint, authorities warn about risks associated with crypto-assets financial investments; it is however acknowledged that the technological advances behind them do have the potential to increase the efficiency of the payment system as a whole.¹³

Central bank digital currencies

The opportunities opened by technological innovation and the decrease of cash in a few Nordic countries have pushed the academia and several central banks to consider the pros and cons of issuing a digital currency (central bank digital currency; CBDC).¹⁴

¹² Mersch, Y. (2018), “Les paiements instantanés comme vecteur d’innovation dans les paiements”, Paris, 15 Février, in ECB Speeches.

¹³ Visco, I. (2018), “The Governor’s Concluding Remarks – Annual Report” Bank of Italy, Rome 29 May.

¹⁴ Panetta, F., (2018), “21st century cash: Central banking, technological innovation and digital currencies” Bocconi University, Milan, 7 June.

Central banks already provide digital money in the form of reserves or settlement account balances held by commercial banks. In principle central banks may provide digital money in different forms: individual accounts, tokens of stored value; wholesale tokens (slide p. 20). Depending on these forms, several options as a payment instrument are feasible for CBDC: 24/7 availability; peer-to-peer management; etc.. CBDC could be used for remote payments and for e-commerce transactions. As a central bank liability, in principle CBDC would not be exposed to credit risk and would represent a convenient store of value.

In the case of CBDC the traditional functions of money obviously emerge; indeed the CBDC has features which make it a powerful competitor to both cash and banks transaction deposits.

When analyzing the monetary functions of CBDC it may be important to set a method to do so. A useful one, that tries to link the three basic functions of money, is provided by Carney.¹⁵ The Governor of the Bank of England proposes an “ordering” of the monetary functions. First of all, according to his approach, money has a store of value role. If this is satisfied (the asset does preserve over time its value in terms of goods) then it might be a valid candidate for being a mean of payments; being a store of value and a payment instrument, the asset can also play the fundamental role of unit of account.

We should be aware that the provision of a CBDC has the potential to change deeply the structure of the financial system as we know it today. In particular CBDC challenges the traditional role played by commercial banks in money creation. The likely substitution (presumably complete in the long run and partial in the short run) of bank deposits for CBDC would likely result in a contraction of the deposit base. Banks may either accept a reduction of their role in financial intermediation or endeavor to expand longer term liabilities, limiting maturity transformation. They might evolve towards “narrow banks” (see slides pp. 21-22). In bad times (in the transitional period in particular) the general public might convert (what is left of) bank deposits into CBDC in a sudden “flight to safety”, thereby contracting abruptly banks liquidity.

¹⁵ Carney, M., (2018), “The future of Money”, in Bank of England Speeches, Speech at the inaugural Scottish Economics Conference, Edinburgh University, 2 March.

I leave open the question whether the above possible events reinforce or weaken the financial system with a CBDC. It is a very important question and there are analyses under way at many central banks aiming at an answer.

Let me conclude by reminding the policy that the Bank of Italy has recently set out on the issues I touched upon: “I remain convinced that physical cash will continue for quite sometimes to be part of the payment system... “Cash is by far the dominant means of payment, both in the Euro area and elsewhere, and demand for it has been on the rise in most advanced economies in the last decade. While the jury is still out on whether we will have CBDC, the debate is already bringing benefit. Many central banks, including Banca d’Italia, are experimenting with new technologies such as the DLT (*distributed ledger technology*) and Artificial Intelligence, studying how they work and how they can be put to productive use”.¹⁶

¹⁶ Panetta, F. (2018), “21st century cash: Central banking, technological innovation and digital currencies” Bocconi University, Milan, 7 June.

SUBSTITUTION IN PAYMENTS

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Milan, 13th – 15th June 2018

OUTLINE

- 1. KNOWN FACTS ABOUT PAYMENT INSTRUMENTS AND UNDERLYING ASSETS**
- 2. CRYPTO-ASSETS; CENTRAL BANK DIGITAL CURRENCIES**



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1. KNOWN FACTS ABOUT PAYMENT INSTRUMENTS AND UNDERLYING ASSETS



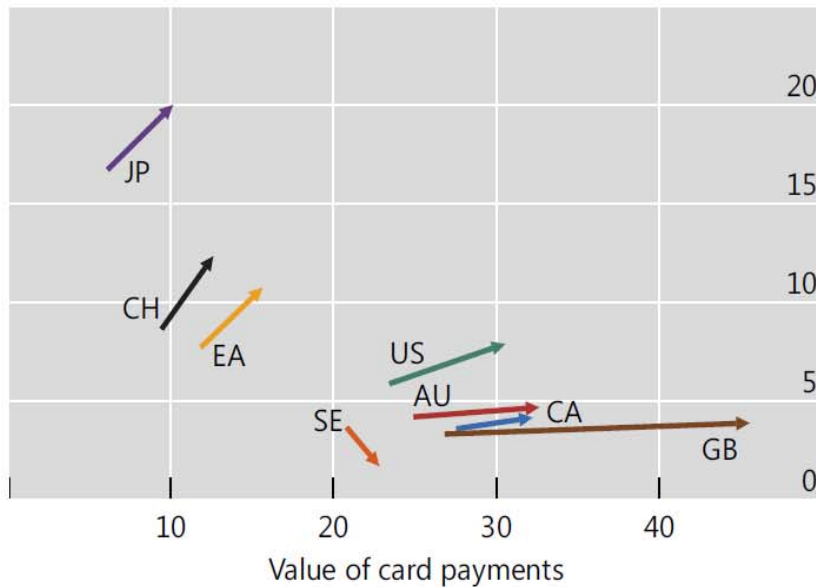
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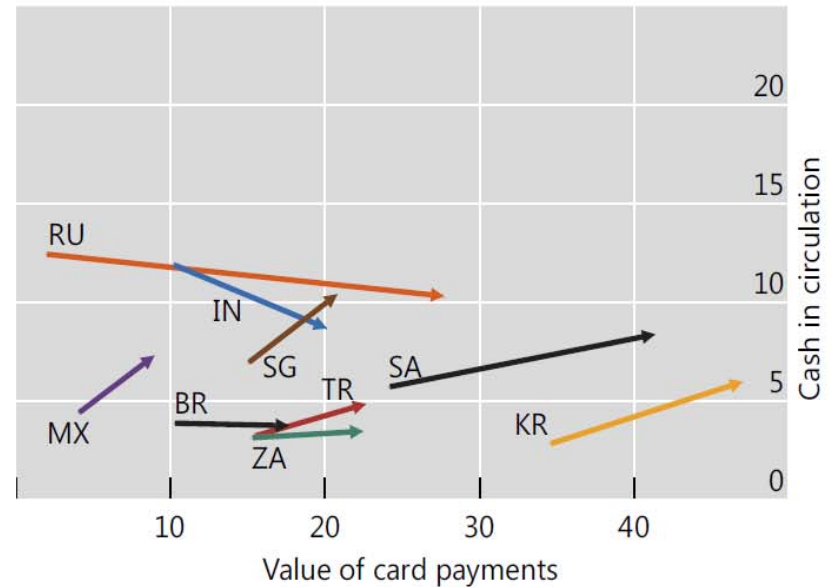
THE SURPRISING RESILIENCE OF CASH: GROWTH OF CARD PAYMENTS ALONG WITH CASH

(2007–16 changes)

Advanced economies



Emerging market economies



Source: Bech, Fatuqi, Ougaard, Picillo, "Payments are a-changin' but cash still rules"
BIS Quarterly Review, March 2018, page 68.



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WHAT IS DRIVING CASH DEMAND?

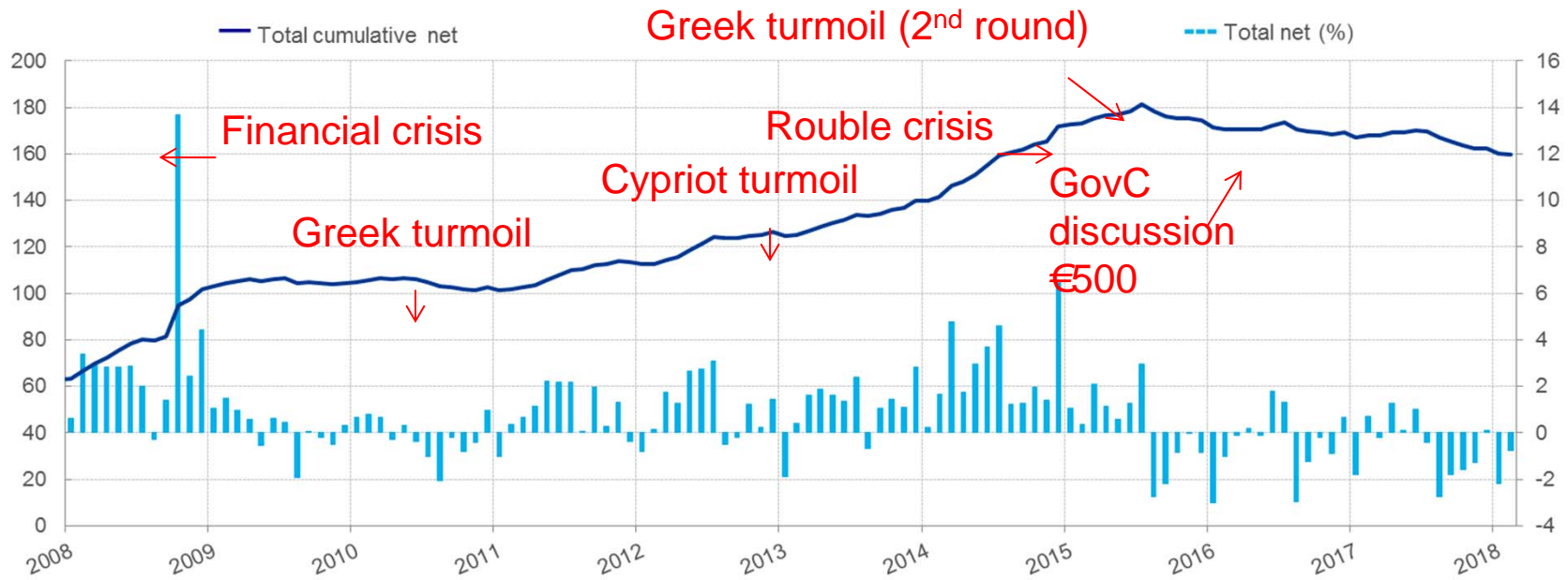


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NET SHIPMENTS OF EURO BANKNOTES TO NON-EURO AREA COUNTRIES

(Value, EUR billion)



Source: ECB.

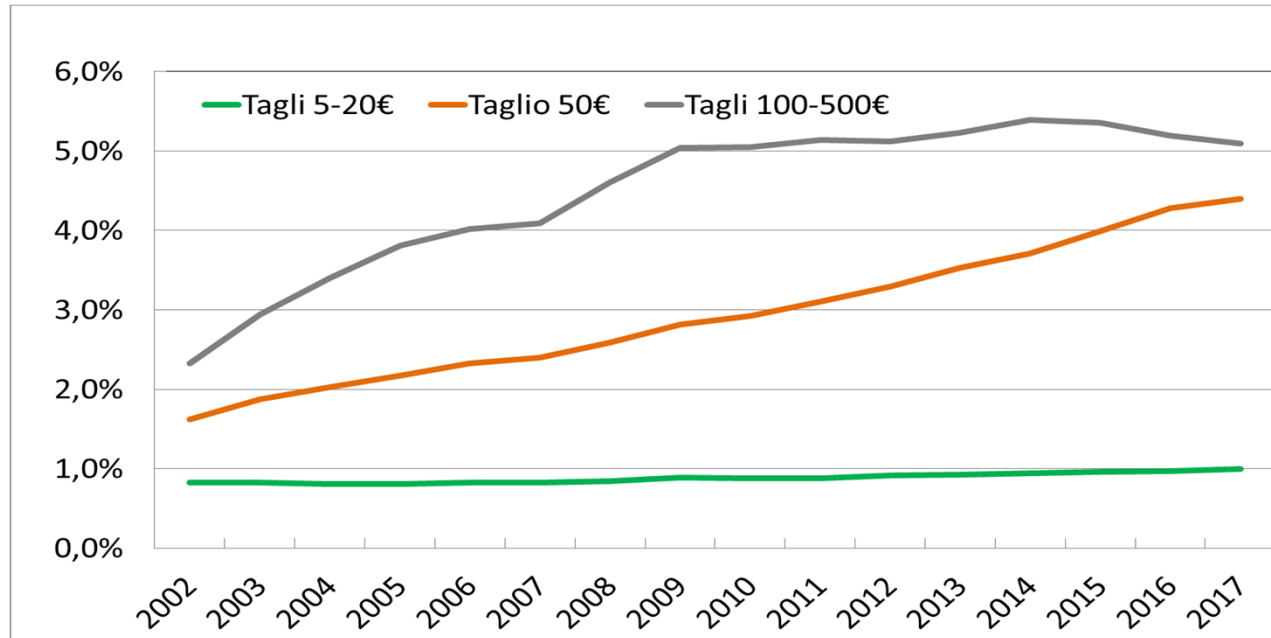


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EURO BANKNOTE CIRCULATION BROKEN DOWN BY DENOMINATIONS

(percentage of GDP)



Sources: ECB and Bank of Italy.

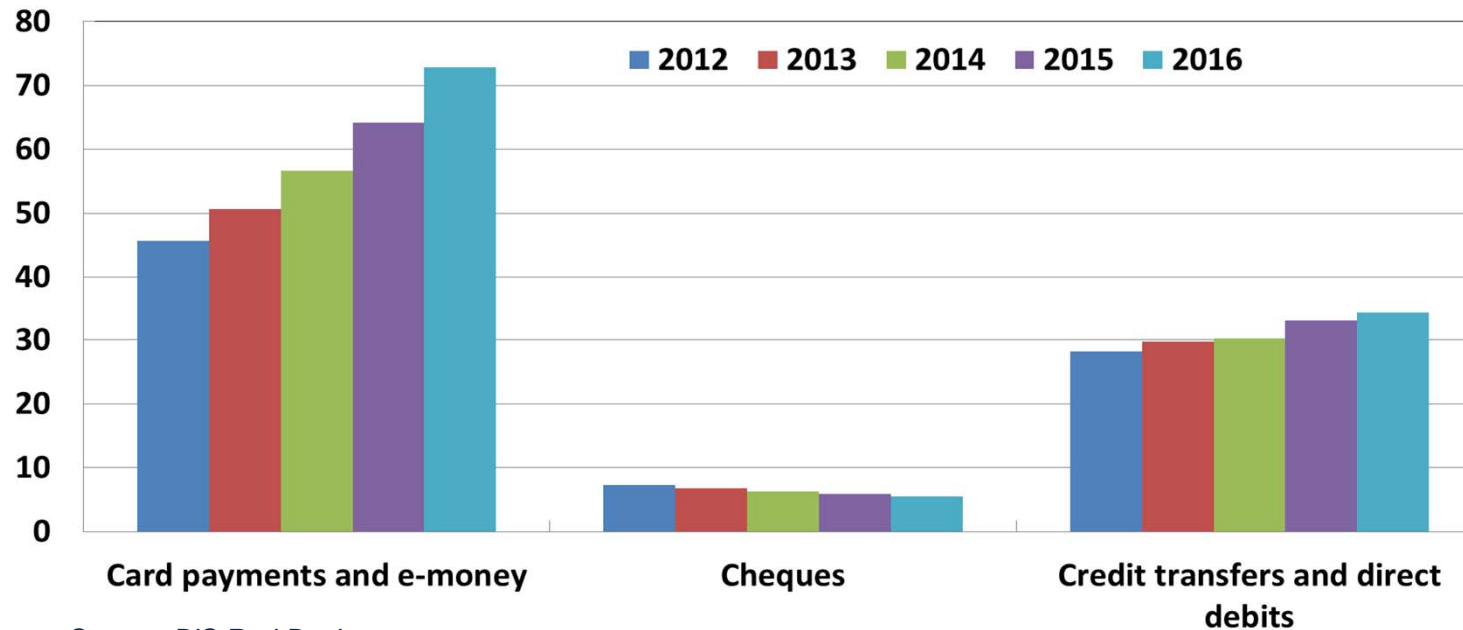


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REPLACEMENT OF CHEQUES WITH CARD PAYMENTS IN ADVANCED AND EMERGING ECONOMIES (Number of payments per capita)



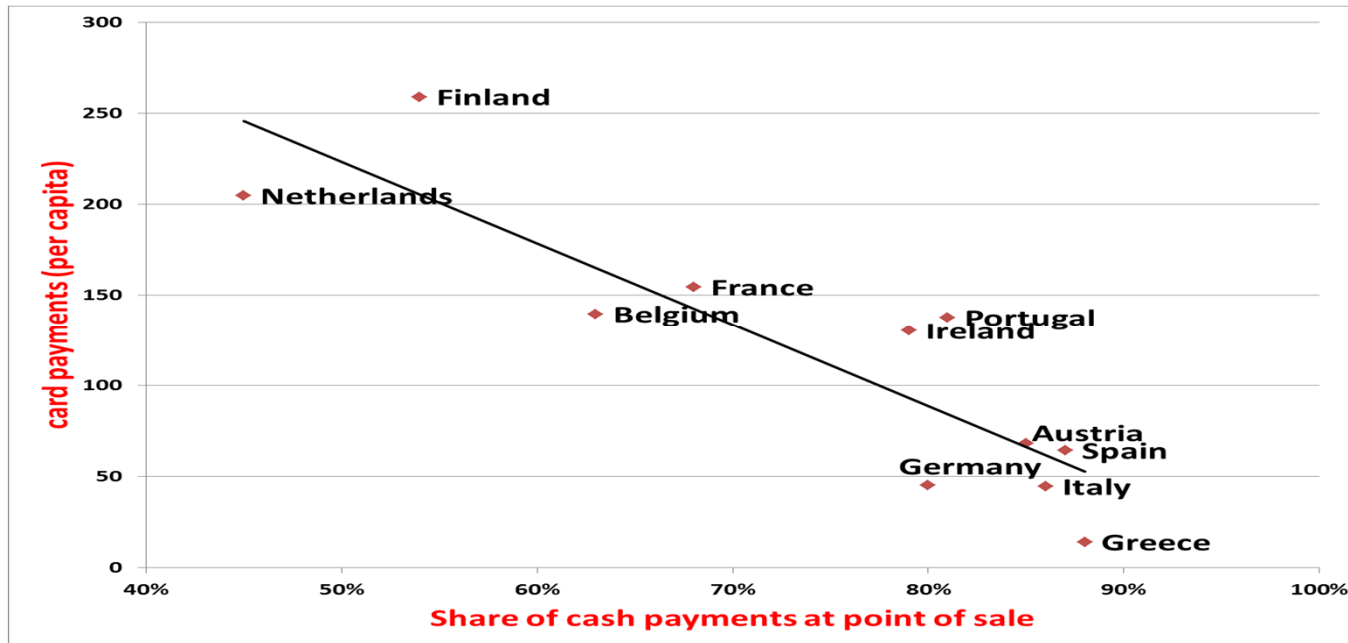
Source: BIS Red Book.



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USE OF CASH IN TRANSACTIONS: EURO AREA (2016)



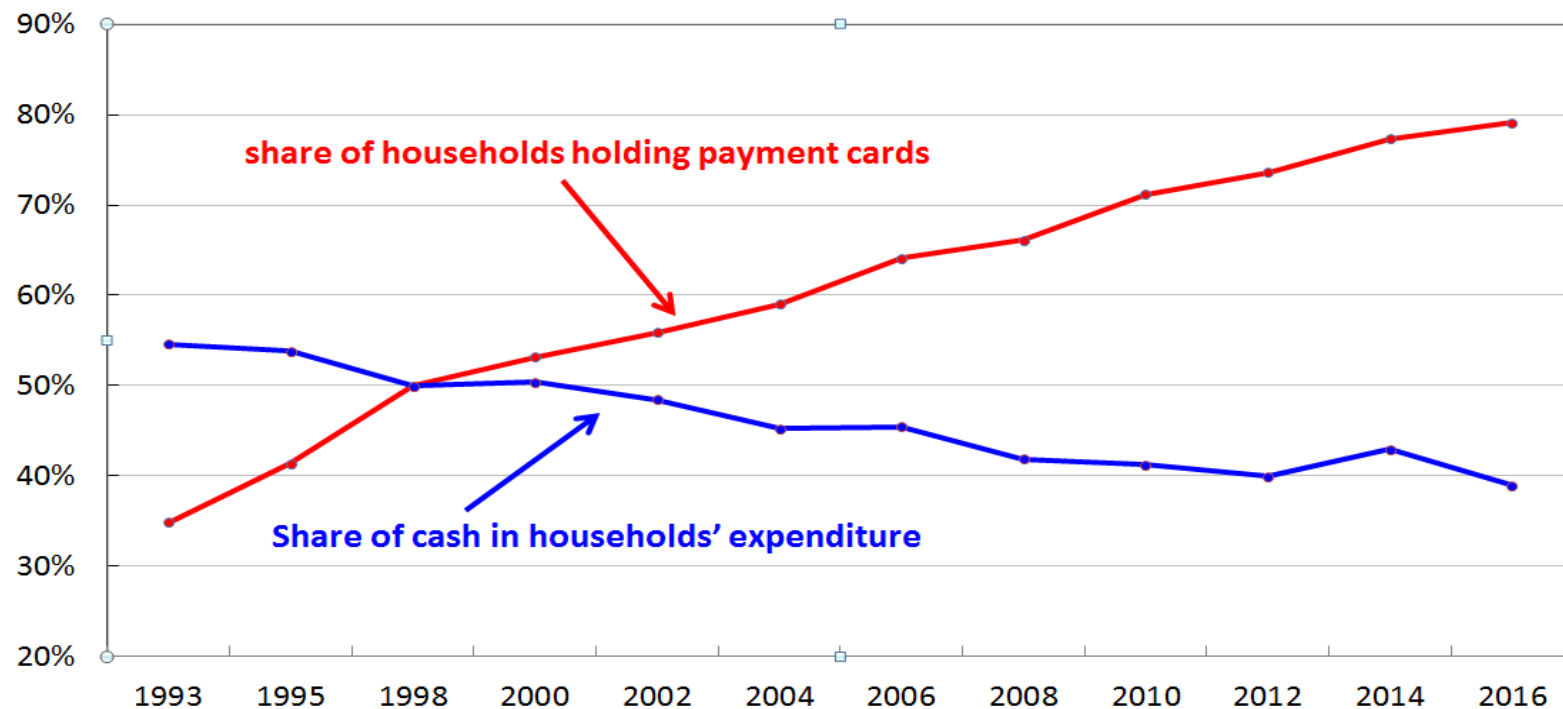
Source: our graphic based on data from ECB and Hesslink H., Hernandez L., "The use of cash by households in the euro area", ECB Occasional Paper No. 201, November 2017.



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USE OF CASH IN TRANSACTIONS: ITALY



Source: Survey on household income and wealth 1993-2016 - Bank of Italy.

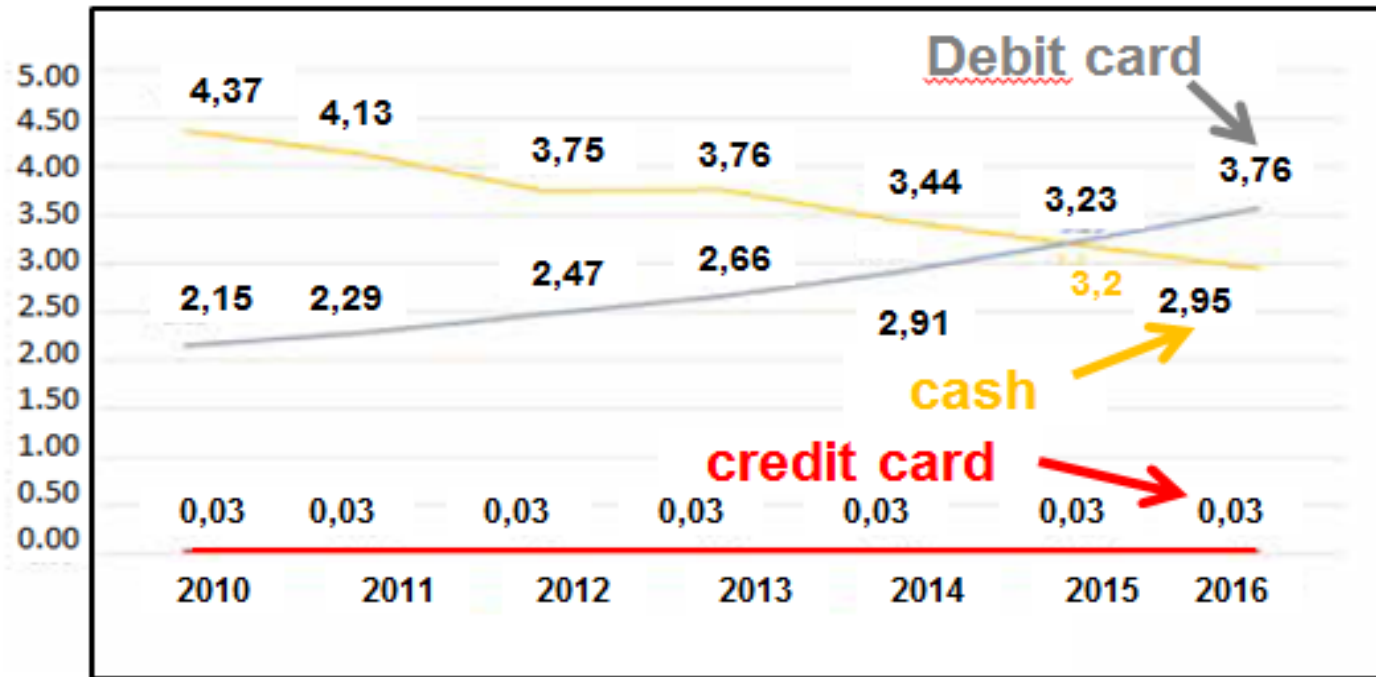


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USE OF CASH IN TRANSACTIONS: THE NETHERLANDS

Total number of payments
(billions of euros)



Source: Jonker N. "From cash to cards: how debit card payments overtook cash in the Netherlands", Bundesbank International Conference 2017, page 483.

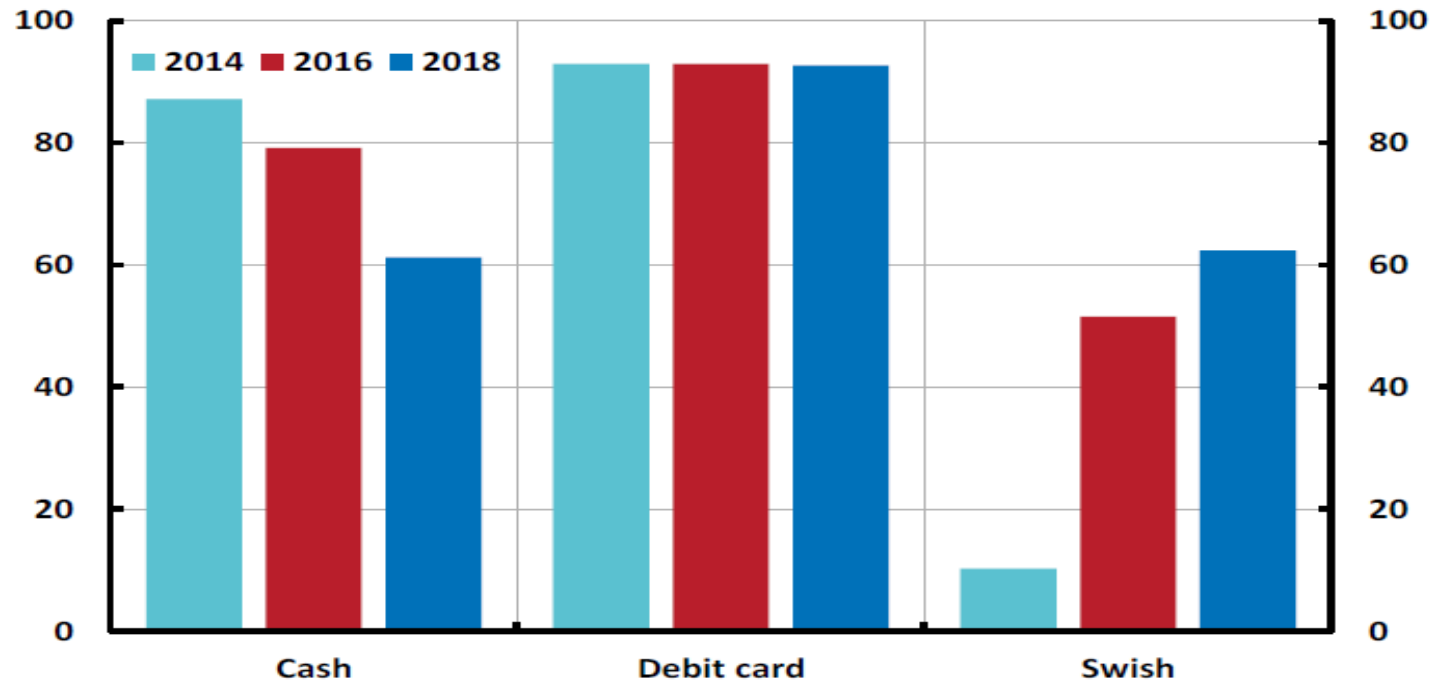


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USE OF CASH IN TRANSACTIONS: SWEDEN

Which means of payment have you used in the past month?
(per cent)



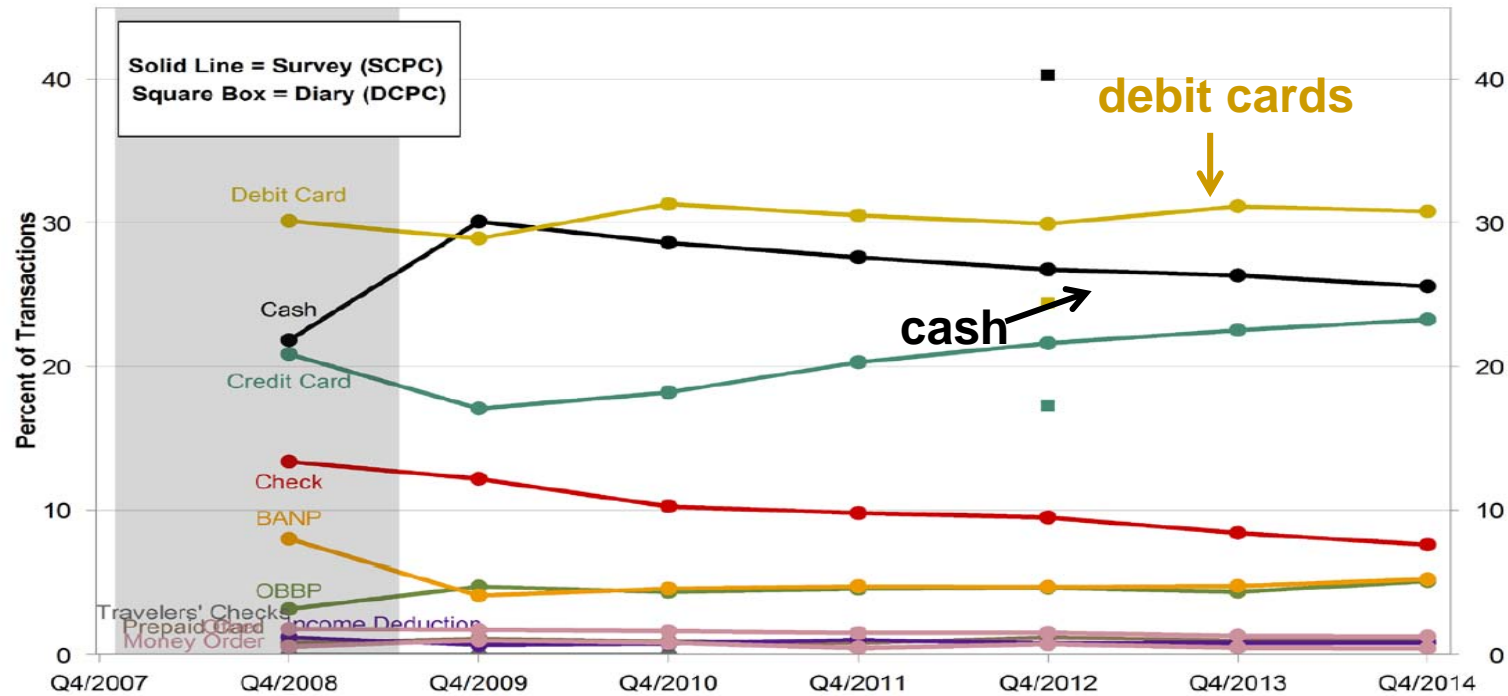
Source: The Riksbank .



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USE OF CASH IN TRANSACTIONS: UNITED STATES



Sources: 2008-2014 Survey of Consumer Payment Choice (SCPC), 2012 Diary of Consumer Payment Choice (DCPC).



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MOST RECENT COMPETITORS OF CASH IN PAYMENTS

- instant payments
- app based mobile payments
- contactless (NFC) payments
- digital wallet solutions
- payment initiation services

**Commercial
bank money**



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CASH VS. INNOVATIVE PAYMENT INSTRUMENTS

	Physical cash <i>(banknotes)</i>	Innovative payment instruments <i>(e.g. contactless cards, instant payments)</i>
Underlying asset	cash itself	bank deposits
- liability of	central bank	Commercial banks
- stability of value (*)	yes	yes
- supply	non limited - controlled by central bank	non limited - influenced by central banks
Management of payments		
- electronically	no	yes
- peer to peer	yes	no
- through third party	no	yes
- anonymity	yes	no
- speed	high	high
- cost per transaction	no cost	low



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2. CRYPTO-ASSETS; CENTRAL BANK DIGITAL CURRENCIES



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WHY «CRYPTO-ASSETS»; FSB DEFINITION

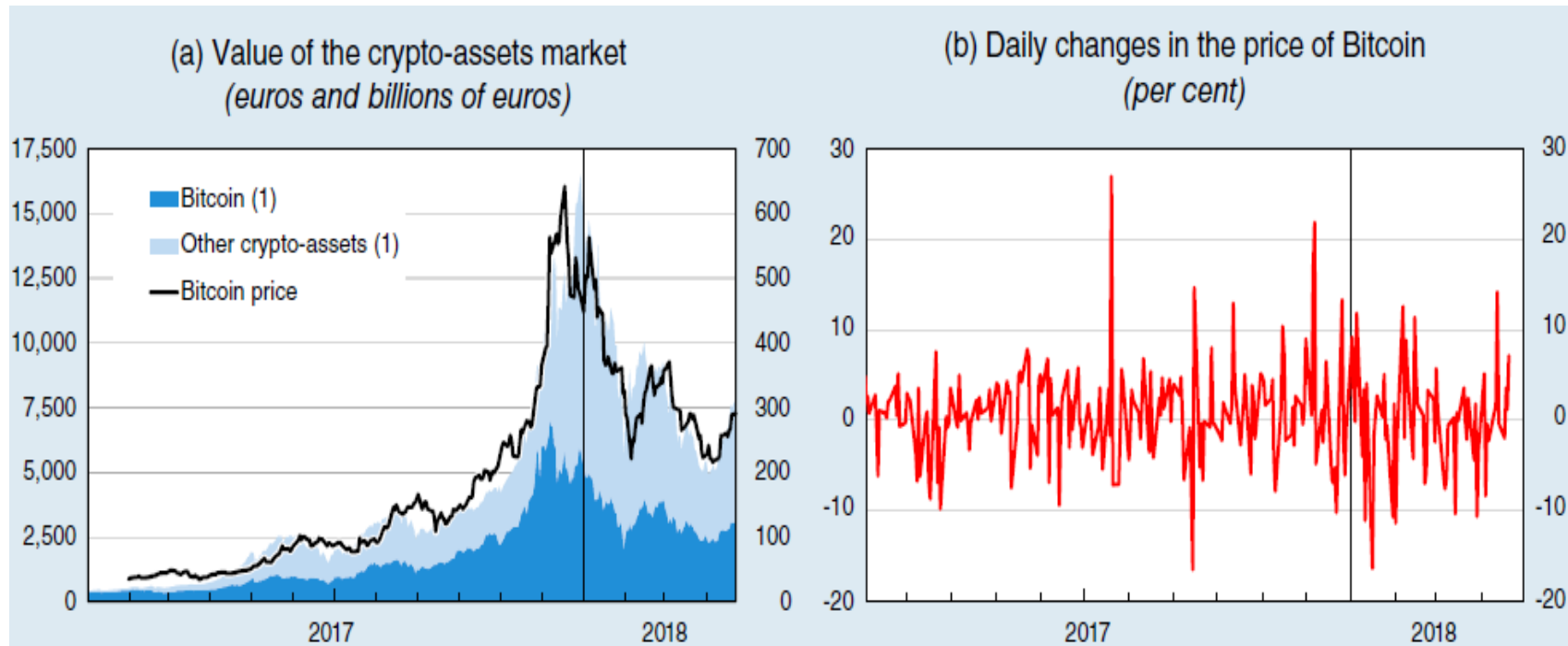
- **Store of value:** high volatility entails that they cannot represent a stable store of value; demand predominantly driven by speculative motives
- **Medium of exchange:** low speed and high costs in terms of fees and electricity consumption;
- **Unit of account:** High volatility; not convertible at par with money



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VOLATILITY OF BITCOIN



Sources: based on Bank of Italy and CoinMarket cap data; (1) Right-hand scale.



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AUTHORITIES' DEFINITIONS OF CRYPTO-ASSETS

ECB

“**Digital representation of value**, not issued by a central bank, credit institution or e-money institution...”*

() From: ECB «Virtual currency schemes – a further analysis», February 2015.*

BIS

“**Assets** with their value determined by supply and demand, similar in concept to commodities such as gold. However, in contrast to commodity, they have zero intrinsic value. Unlike traditional electronic money, they are not the liability of any individual or institution»**

*(**) From: BIS «Digital currencies», November 2015.*



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CENTRAL BANK DIGITAL CURRENCIES: POSSIBLE FEATURES

	Existing central bank		Central bank digital currencies		
	Cash	Reserves and settlements	General purpose		Wholesale
			token	accounts	only token
24/7 availability	yes	no	yes	possible	possible
Anonymity vis-a-vis central bank	yes	no	possible	no	possible
Peer-to-peer transfer	yes	no	yes	no	possible
Interest bearing	no	possible	possible	possible	possible
Limits or caps	no	no	possible	possible	possible

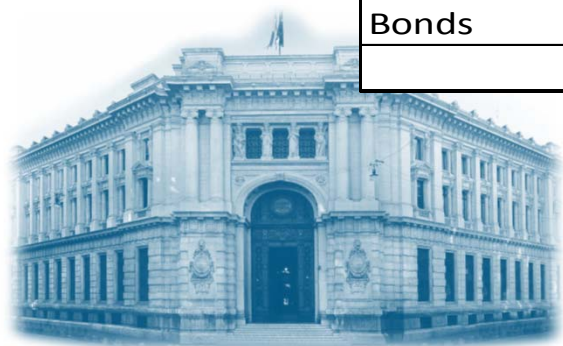


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IMPACT OF CB DIGITAL CURRENCY ON BALANCE SHEETS OF HOUSEHOLDS, BANKS, CENTRAL BANKS

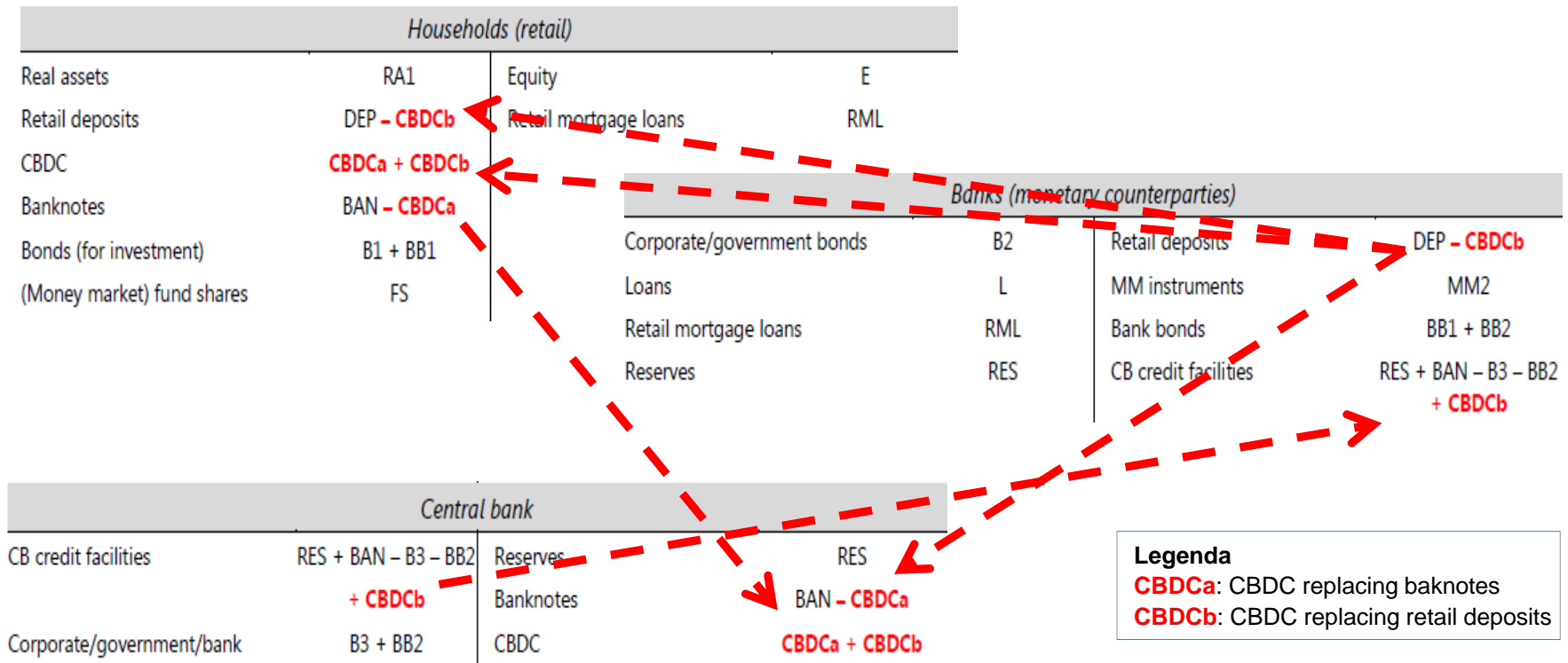
Households			
Banknotes	-	Personal loans	
CB digital currency	+	Mortgages	
Deposits	-		
MM fund shares			
Gov. Bonds			
Banks			
CB reserves	-	Deposits	-
Loans mortgages	-	MM instruments	
Bonds		Bank bonds	
		CB credit facilities	
Central Bank			
CB credit facilities		Banknotes	-
Bonds		CB digital currency	+
		CB Reserves	-



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CENTRAL BANK DIGITAL CURRENCIES AND STRUCTURE OF FINANCIAL SYSTEM: A FLOW OF FUND ANALYSIS



Source: our elaboration on BIS, Central bank digital currencies (2018).



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***THANK YOU
FOR YOUR ATTENTION !***

Roberto Rinaldi



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