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## CASHLESS SOCIETY A Real Revolution?



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on International Markets, Banking,  
Finance and Regulation



# Cashless Society: A Real Revolution?

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## Executive summary

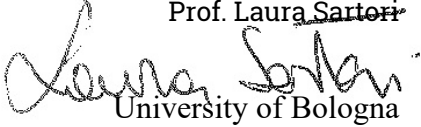
*In the last decades, there has been much speculation about the disappearance of cash. Given the spectacular progress and advancement in technology, mostly with enthusiasm, pundits have even predicted the advent of a “cashless society”. According to Olalekan Akinola (2012), “a cashless society is a community in which all payments are electronic”; a community in which everything is paid through digital electronic money, for instance through online payments, credit or debit cards or mobile payments. A society in which cash is no longer a generally accepted means of payment.*

*The 3rd MINTS Report, “Cashless Society: A Real Revolution?”, offers a unique understanding of the ongoing global trend towards generalised cashless payments. This is achieved through a novel methodology that measures the intensity of cash transactions across countries. The report contextualizes these empirical findings through an analysis of the main drivers of the transition towards a cashless society, followed by three case studies. The first case study sheds light on Sub-Saharan Africa at the crossroad of digitization and cashless.*

*The second case study refers to the pioneering approach of the Sveriges Riksbank, in Sweden. The interest for a CBDC was not driven by issues of financial stability or efficiency of monetary policy, but mostly by worries about financial exclusion. The Sveriges Riksbank anticipated a scenario where specific groups might be cut out of the participation in the society and economy, throwing a bridge to the challenges of a changing use of cash. This is contrasted with a focus on the policy choices adopted*

*by the Italian legislator to spur the transition to cashless payments, which is the object of our third case study.*

*Building on these cases, we develop general reflections about the different philosophies and organizing principles that might lead, sooner or later, to a fully developed global cashless society as a new way to re-imagine economic and social scenarios in an open future.*

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The contents and opinions in this paper are those of the authors alone and do not reflect the views of their institutions, or their affiliates.



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## Table of Contents

<b>What are Cashless Payments?</b> .....	<b>7</b>
<b>Shift Towards Cashlessness</b> .....	<b>9</b>
<b>Stages in the Transition</b> .....	<b>12</b>
Cashless Afrique: Mobile Money in Sub-Saharan Africa.....	15
<b>Policy transitions towards cashless payments</b> .....	<b>19</b>
The Swedish e-krona Central Bank Digital Currency pilot project.....	21
Italian national experimentations for a cashless society: applications and incentives for the new digital payment methods.....	25
<b>Cashless Society: Promises and Pitfalls</b> .....	<b>33</b>
<b>Conclusions</b> .....	<b>37</b>
<b>References</b> .....	<b>39</b>
<b>Supplementary Materials</b> .....	<b>45</b>
Appendix A: How to measure cashless transactions?.....	45
Appendix B: Country Plots for Countries with Complete Information.....	49
Appendix C: Country Plots for Countries Missing ATM Transactions .....	51
Appendix D: Specific country cases .....	53





## What are Cashless Payments?

'Cashless payments' is a term with many possible definitions. Put in the simplest terms, any payment that is not made in cash, is by definition "cash-less". However, the academic and professional discourse around the phenomenon of cashless payments has focused only on a subset of digital payments.

For example, **cheques** are a longstanding mean of payment not requiring the use of physical cash but are not considered in the literature when discussing cashless payments. By nature, cheques are in fact physical objects: while not requiring cash, they still require hand-to-hand transactions to transfer funds. In addition, they are generally not useful for the kinds of day-to-day operations that cash is so commonly used for, as they rely on at least some degree of trust between the two parties.

Similarly, **direct debits** between bank

accounts are by nature digital payments but suffer from the same substitutability issues as cheques in comparison with cash. It is not practical or feasible to wire on one's way to work the amount needed for a morning coffee, nor the bartender would accept a cheque for it. However, today, one would be able to pay with a tap of their card, using a token, or through their phone.

These considerations in mind, this 3<sup>rd</sup> MINTS report, *Mapping the Cashless Society*, and in particular those sections that utilize quantitative information, will focus on **forms of payment directly substitutable for cash in retail transactions, and utilizing solely digital means**. Specifically, the term cashless payments only focuses on payments through card, e-money and mobile transactions.



## Shift Towards Cashlessness

This international landscape of cash usage has been well explored by international organizations, private sector firms and academic researchers alike. General findings point to the fact that most countries have begun at least some form of shift towards **cashlessness**. However, there is still considerable heterogeneity in the extent to which countries around the world are making this shift. Due to the nature of cash, quantifying its use (or the lack thereof) is particularly challenging. Existing approaches, which fall into one of four methods (surveys, payments records, infrastructural data, and government-provided statistics), suffer several shortcomings, and can only offer a partial understanding on the use of cash across countries.

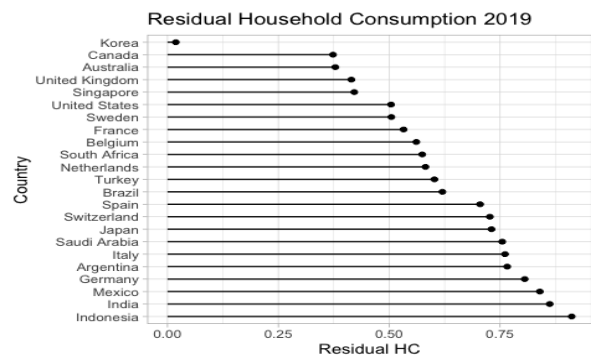
In this Report, we leverage a methodology that leverages measures of household consumption within each country, from which we subtract the value of all card and e-money transactions recorded in that same country (see Methodology Box in the Appendix of this Report). This assumes that card and e-money payments are primarily used for household consumption expenditure, and that most household transactions are conducted using one of these means of payment or instead in cash. Based on these assumptions, this indicator, that we call **Residual Household Consumption**, allows us to grasp the share that cash occupies as a means of payment in

household consumption:

$$\text{Residual HC} = \frac{\text{Total HC} - \text{Card} - \text{eMoney}}{\text{Total HC}}$$

Below, Chart 1 shows the 2019 values of the Residual HC variable for each country in the BIS data, except China and Russia (addressed in more detail in the Appendix of this Report). All payments and withdrawals data used in this analysis was obtained from the database available at the Bank for International Settlements (BIS). In the Appendix of this Report (see Supplementary Materials) we present a large set of alternative indicators and discuss at length issues with measuring cashless transactions in several areas of the world.

Chart 1. MINTS estimates of Cash Use

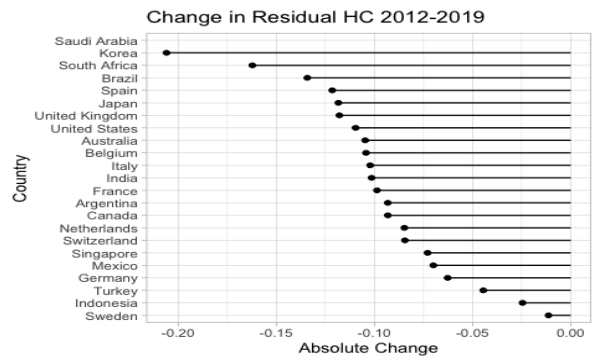


*Proportion of household consumption remaining once cashless transactions are accounted for. Household final consumption expenditure sourced from the World Bank, cashless payment statistics from the BIS.*

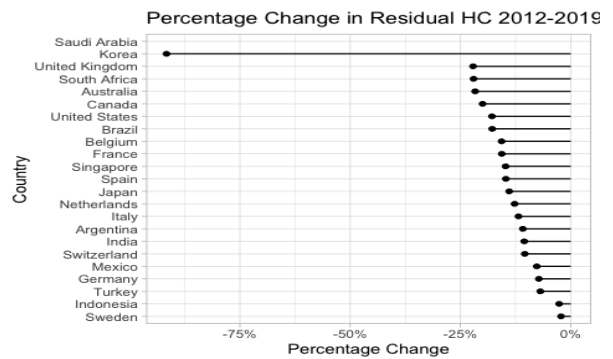
A few things appear immediately clear. The first is the outlier status of **South Korea** ('Korea' in the chart). While other literature reflects the finding that Korea is relatively ahead among countries in terms of cashlessness, the extent of this difference may also indicate issues in terms of data comparability. Following South Korea, the next cluster of nations contains Canada, Australia, the UK and Singapore, all countries that previous anecdotal evidence shows to be on the leading edge of the curve in the cashless transition. Curiously, Sweden, while still towards the higher end of the distribution, lags behind the United States. Most literature would suggest the opposite to be true. Upon closer inspection, Swedish e-money transactions are missing from the BIS database, which likely explains its overall position. It is worth noting that Sweden is the most cashless economy in the other metrics considered (we discuss Sweden in detail in another Section of this Report).

Below (Charts 2a and 2b), we show changes in our estimates of cash use between 2012 and 2019, divided by country. Korea remains quite evidently an outlier. The relative stagnation of Sweden may in part be due to the absence of the e-money statistics in the BIS, or perhaps to its already well-advanced position in cashless payments, having little more room for them to increase. Following Korea, the Commonwealth nations appear to be making the fastest progress. The slowest nations include **Germany**, in addition to lower income countries, such as Indonesia, Turkey and Mexico.

Chart 2a and 2b. Absolute and Percentage Changes in Residual Household Consumption



*Absolute difference in residual household consumption between the years 2012-2019. -0.05 refers to a 5-percentage point decline in residual HC, irrespective of starting level in 2012. Sources: World Bank, BIS*



*Relative difference in residual household consumption between the years 2012 and 2019, expressed in terms of the 2012 RHC. -25% refers to a 25 percent decline in residual household consumption, relative to its starting level in 2012.*

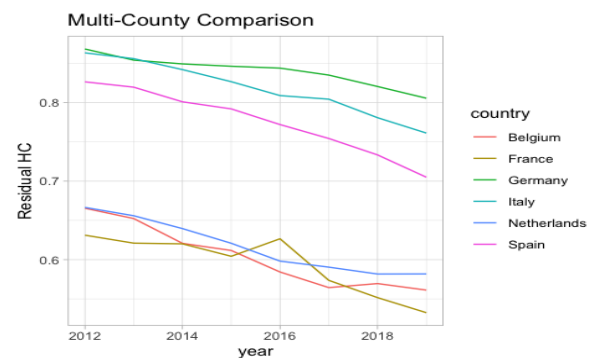
The measures presented above are altogether a useful set of indicators for the measurement of cash use in a country, far **more reliable** than the measure of currency in circulation used in other publications (which allows for comparisons only under the heroic assumption that the circuit velocity of money is constant across countries and over time). However, these, and really all indicators that rely on information sourced from disparate central banks, suffer from a fundamental issue related to comparability. Central banks worldwide do

not coordinate their efforts in measuring, presenting, and maintaining the aggregate figures they provide to international organizations such as the BIS. Therefore, cross-country comparisons remain problematic and should be approached with a particular caution.

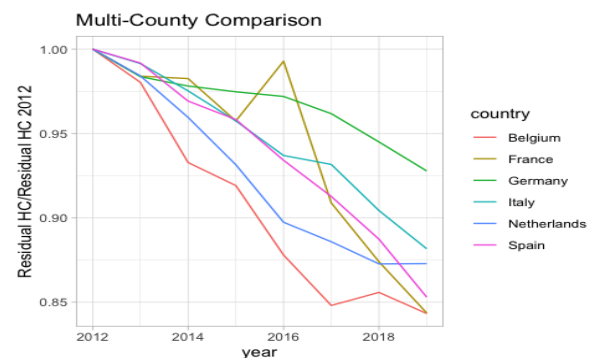
However, one context in which such cross-country comparisons are entirely appropriate is the **Eurozone**, given that all figures are sourced from the same central bank, the ECB. What follows is a cross-European visualization of these trends. This cross-country comparison is all the more useful in consideration of the issue mentioned earlier regarding the unreliability of measurements based on currency in circulation in the eurozone. In fact, the Residual HC measure is likely the most promising variable useful to chart and compare progress towards cashlessness in the Eurozone. Across Europe, we see the already familiar trend of declining cash usage, although with considerable heterogeneity between rates of decline and levels at the starting point of 2012. Belgium, France and the Netherlands are all considerably further ahead in the cashless transition, starting at similar points and descending at approximately the same rate. Germany, **Italy** and Spain are considerably further behind, with different trends post 2012. Germany's progress has been markedly slower than the two southern

European nations. Starting in 2012 from a similar level to Italy, but at the end of the period (2019) Germany still lags considerably behind. Spain and Italy exhibit trends much closer to Belgium, France and the Netherlands, albeit Italy has slightly slowed down in recent years.

**Chart 3a and 3b. Over time comparisons of trends towards cashlessness**



*Statistics reflect the yearly values of residual household consumption over the time span 2012-2019.*



*Statistics reflect the yearly values of residual household consumption over the time span 2012-2019, relative to their starting point in 2012 (scaled as 1.0). A value of 0.85 in 2019 implies the country's RHC declined 15% relative to its 2012 level. Sources: World Bank, BIS*

## Stages in the Transition

The ongoing push towards cashless payments is determined by global structural changes in both demand and supply of means of payments alternative to cash. The main drivers of the trend towards cashlessness include:

- 1) the growth of new technologies,
- 2) changing demographic trends,
- 3) changes in the overall cost of cash.

On the supply side, **technological trends** supporting the cashless movement include the growth of the fintech industry, the increasing availability of internet and mobile devices and the rise in prevalence of blockchain based technology. Despite the ingenuity required to overcome huge organizational issues to allow coordination among otherwise competing banking institutions (Hock 1999), the invention of payment cards decades ago seems quite simple in comparison to the sheer number of payment technologies that exist today. These include mobile payments, crypto currencies and digital wallets that have become commonplace in many countries. Such examples are illustrative of the broader trend that, as computing and telecommunications technology grows increasingly sophisticated and ubiquitous, so does its potential application to payment systems.

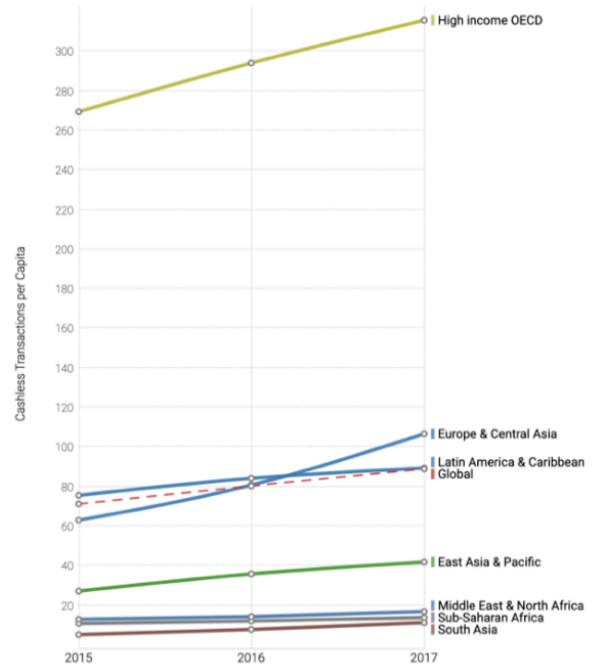
On the demand side, globally **demographics** are shifting towards younger and technologically savvy populations. So called

digital natives, these populations have spent their whole lives with internet and cell phone access and have higher demand for cashless payments compared to older cohorts (Access to Cash Review, 2019; Deloitte, 2019). Cash itself, in many regards, is seen as an **unsatisfactory** means of payment also by policymakers. It requires effort to create and maintain. It is vulnerable to criminal actions; it must be stored securely to prevent robbery and must contain deeply sophisticated security details to prevent counterfeiting. As such, cash is seen as a means of payment with a relatively **high cost** compared to other forms of payment, something echoed in empirical research (Garcia Swartz, Hahn & Layne-Farrar, 2006; Mastercard, 2013).

Although these trends are impacting to some extent all nations, the role of political and cultural pressures contribute to some of the heterogeneity observed worldwide. **Socio-cultural preferences** for cash appear to be hindering the progress of the trend towards cashlessness in several countries that would appear on the surface to be well set up for it. Nations like Germany and Japan, high income countries with strong banking systems and online infrastructures, lag considerably behind in this transition. Explanations for this slower uptake often reference cultural preferences for cash, as a form of privacy protection in the case of Germany (Deutsche Bank, 2020) or as a store of value in the case of Japan (Fujiki, 2020).

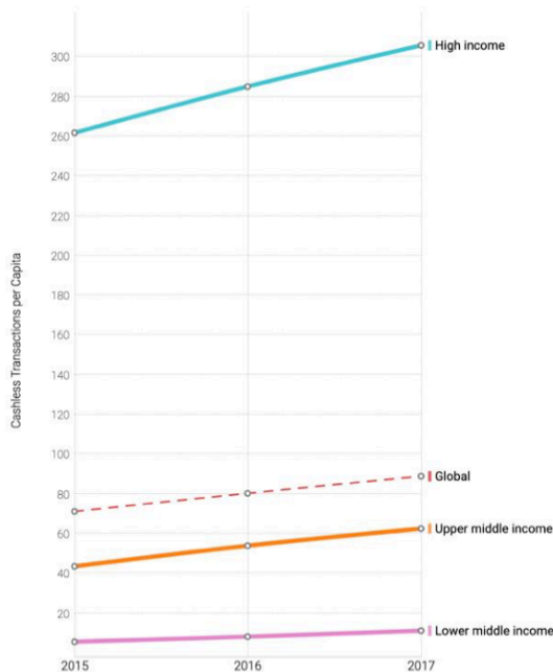
Nevertheless, empirically, the single factor that clearly dictates trends towards cashlessness is still the **income level** of the country. High income countries tend to be far ahead of their lower income peers, although the rate of adoption in lower income countries has been much faster recently (World Bank, 2021).

One of the factors explaining the historical stagnation of lower income countries is the relatively limited use and availability of **financial institutions**. Citizens in lower income countries tend to have far lower levels of access to and use of bank accounts, something that inhibits growth of cashless payment, unless alternative payment methods, such as mobile payments, are made accessible also to the unbanked.



*Cashless transactions per capita, by geographical region of the World. Sourced From World Bank (2021)*

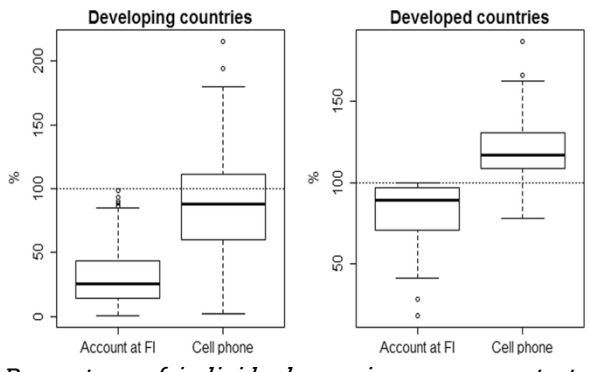
**Chart 4a and Chart 4b. Cashless Transactions per Capita According to Country Income and Regions**



*Cashless transactions per capita, by income region of the World. Sourced From World Bank (2021)*

In fact, recent trends in cashless payment systems have focused on the use of mobile phones as a delivery mechanism. While still relatively unbanked, low-income nations tend to exhibit high levels of mobile phone ownership, something that has allowed for their inclusion in digital payments systems in recent years. This has led to fast adoption of mobile means of payment in these countries in recent years (Reiss, 2018).

Chart 5. Prevalence of Cell phones and Bank Accounts by Country Development.



Percentage of individuals owning an account at a financial institution and a cell phone, by country level of development. Figure sourced from Reiss (2018).



## Cashless Afrique: Mobile Money in Sub-Saharan Africa

While a large part of its population is still lacking access to basic financial services – as well as basic amenities – some believe that **Sub-Saharan Africa** is already on its way of becoming cashless.

However, if a cashless Sub-Saharan Africa seems foreseeable to some, it is mainly thanks to **mobile money**, of which the region is leader. Mobile money systems allow users to store, receive and send digital payments and money transfers, as well as to access financial services such as savings and credit services, with just a mobile phone, even the most basic ones. For users of mobile money, their mobile number turns into an account number. Such systems have allowed to reach out to **unbanked** individuals without relying on a “brick and mortar” banking infrastructure and have greatly contributed enhancing the financial inclusion of the population. In Sub-Saharan Africa, mobile money accounts now exceed the number of bank accounts.

Of all mobile money accounts active globally, more than half are in Sub-Saharan Africa. In the region, we count 157 mobile money services, altogether representing **548 million registered accounts** in 2020 (Baah et al., 2021). Each country has on average between 3 and 4 competing mobile money services, but there are 5 in Kenya, 8 in Senegal, 9 in Ivory Coast, and up to 15 in Nigeria. Intra-regional disparities persist as East Africa alone makes up for 58 % of all the active mobile money accounts of the region.

Though the first mobile money systems appeared in the Philippines, Zambia and South Africa in the early 2000s (Porteous, 2006), their birth is usually dated in 2007 with the launch of **M-Pesa** in Kenya, which became the most successful mobile money system in the world. Today, there are more than 28 million active M-Pesa accounts (Safaricom, 2021), corresponding to 86% of the adult national population. Virtually all Kenyans now use M-Pesa, which became an integral part of the national economy as well as of the common financial practices of the people.

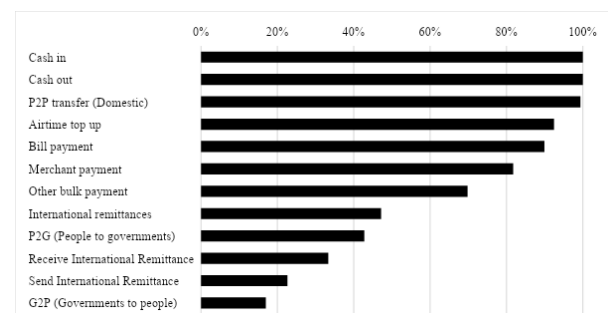
Like in Kenya with Safaricom, most mobile money services are offered by **mobile network operators** (MNOs). They partner with a bank responsible for the “trust account” in which all funds collected through putting mobile money into circulation are kept. In some cases, MNOs even acquired a banking licence to be fully independent; in others, banks entered the mobile network market in order to provide mobile money services directly. Public operators also run mobile money systems, like in the case of BotswanaPost, but it remains the exception. In all cases, the distribution of mobile money services is ensured through a network of “agents”: individual entrepreneurs who act as the interface between the service provider and its users. Their main role, beyond registering users, is to ensure the **convertibility** of mobile money with the conventional national currency: agents receive cash deposits from users (who have their mobile money

account credited of the same amount) and accommodate withdrawal requests (which result in a debit to the customer's account, equal to the sum withdrawn plus a fee). Unlike traditional banks, this distribution model via agents avoids the need for the operator to set up and manage a network of branches, and compensates for the **lack of infrastructures**, in particular the lack of banking infrastructures. For comparison, in 2020 in Kenya, there were 4,7 commercial bank branches and 7,30 ATMs per 100,000 adults (World Bank Data). At the same time, there were 756 M-Pesa agents per 100,000 adults (calculations based on Safaricom, 2021). The green paint of Safaricom covers an increasing number of shops and kiosks, thus becoming the dominant colour on Kenyan streets.

Mobile money is issued by mobile money operators in exchange of conventional national currency when it is converted by its users. The agents first acquire the mobile money units and then resell them to users. The mobile money then circulates among users and is destroyed when it is **converted back** into conventional national currency. So, with mobile money systems, there is no money creation, as the amount of mobile money in circulation is strictly equal to the amount of domestic currency collected by the operator. In this respect, mobile money is similar to other e-money services. If mobile money was broadly adopted and used as a regular means of payment, it could indeed replace cash. But as we shall see, this prospect is very far from being realised, and may even be unlikely.

Looking at the supply side, the functionalities offered by the available mobile money services in the region, offer a first glimpse into the extent of their possibilities as well as into the way these services are marketed by providers (Chart 6). The totality of mobile money services offers **cash-in and cash-out** services. Indeed, these services are highly reliant on cash: as targeted users are mostly unbanked, they can only access mobile money by depositing hard currency (except if they receive transfers from relatives, government bodies, or non-governmental organisations). Once converted, units of mobile money could circulate into the mobile money ecosystem, without the need for them to be converted back. This is seldom the case, and cash-out remains an important element of the mobile money architecture.

**Chart 6. Functionalities offered by available mobile money systems in Sub-Saharan Africa.**



*Percentage of mobile money systems offering the functionality. Source: calculations by author (T. Dissaux), based on GSMA Mobile Money Deployment Tracker.*

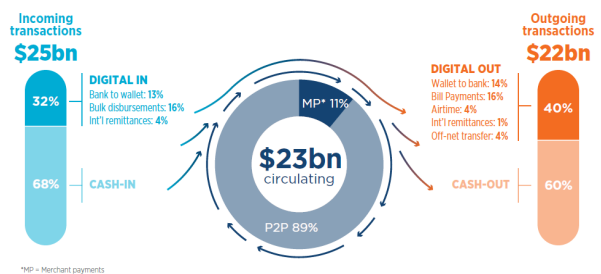
By far the main use case of mobile money in the region is **peer-to-peer transfers**: used to easily send money to a friend next door or to a relative in the countryside, mobile money took advantage of long-lasting practices of

**solidarity** and **mutual aid**, which they formalised (and monetised). Coming next as most offered functionality is **airtime top-up**, reminding that mobile money is also a way for MNOs to facilitate the sale of their products, with mobile money that can be instantly converted to airtime. Only next, in fifth position, comes the first functionality really relating to means of **payment functions**: bill payment, allowing users to pay for utility bills. Merchant payment, which would be the main functionality in a cashless economy based on mobile money, only comes next as 18 % of mobile money services do not offer this functionality. Other functionalities, like bulk payments, remittances and connection to public finances, are least available.

The provision of mobile money services can be very profitable for the operators (see Chart 7 for an estimate of the total circulating value). In a context in which people often have several mobile lines on different carriers, mobile money services increase customer loyalty and reduce the churn, i.e., the rate of lines disconnections compared to the total customers. Mobile money services are also useful to cross-sell other operators' products – airtime in the first place – and direct revenues from these services can be substantial. In the case of Safaricom, M-Pesa now contributes around 33% of the company's total revenues (Safaricom, 2021), significantly increasing its average revenue per user (ARPU). But beyond mobile money operators, there are also hundreds of “fintech” (financial technologies) companies “riding the rails of mobile

payments” (Rea et al., 2016), who take advantage of mobile money to gain access to new customers and provide their own services. Today, 50% of venture capital in Africa goes to the fintech sector, backed by a coalition of diverse actors which includes international institutions, development agencies, philanthropic foundations, lobbies and governments, all forming digital financial inclusion “crusaders” (Mader, 2016) whose own interests must not be ignored. Considering the asymmetric dimensions inherent to the structuration of the sector, one may even consider it as “digital extractivism” (Bateman and Teixeira, 2021).

Chart 7. Breakdown of global circulating value of mobile money in December 2020.



Source: Baah et al. (2021: 21)

This view from the supply side can be complemented by the **actual uses** of mobile money (GSMA, 2018: 11). It is here in fact that the glowing figures about the uptake of mobile money get a little tempered. Of the 548 million registered accounts in Sub-Saharan Africa in 2020, 71% of them were **inactive** (with inactivity measured as accounts for which no operation was conducted in the last 30 days; Baah et al., 2021). This means that a large share of people who have registered for a mobile money

account (or who have been registered by a relative, which is often the case especially for older persons) do not find it useful enough to use it, or face other **constraints** such as high perceived costs or lack of adequate skills. When considering active mobile money accounts, at most 24 % of the population older than 15 does use a mobile money account in Sub-Saharan Africa (this is at most, especially considering that it's not uncommon for the most active users to have several accounts with different providers).

Second, average user on an average month cashes out 81% of the value cashed in during the same period. Mobile money is **far from phasing out cash**, as most of the former is largely converted back into the latter at some point. Third, the value of peer-to-peer transfers represents 67% of the value transacted (cash-in and cash-out excluded). Interpersonal transfers are by far the main use of mobile money. Finally, the combined value of merchant payment and bill payment – the means of payment functions which matter when speaking about a potential cashless society – only represents 16 % of the transacted value (cash-in and cash-out excluded). Together, these figures show that **mobile money is far from being a closed-loop ecosystem** into which a cashless society would be developing. It is rather a channel, mostly used for a particular need – namely domestic remittances – and a channel at both ends of which is cash. If most recent data show an increase in the share of digital ins and outs compared to cash, mostly

explained by increased interoperability with banks and social transfers implemented in response to COVID-19, the means of payment function of mobile money remains very poorly developed, as shown by the share of merchant payments at 11 % in Chart 6 above. Even in Kenya, the quasi totality of retail transactions is still conducted in cash (Collins et al., 2012; Zollmann and Cojocar, 2015). Under this light, if the cashless society was underway, it would be leaving many behind.

Given the dynamics at play, the hopes put into digital financial inclusion as the new silver bullet against poverty should be reconsidered (Bernards, 2019; Mader, 2018; dos Santos and Harvold Kvangraven, 2017; Maurer, 2015; Bateman, 2012). Yet, mobile money is not the only **monetary innovation** developing in Sub-Saharan Africa and able to drive the shift towards a cashless society. This will not be the case of cryptocurrencies. They bring substantial benefits in terms of international remittances and cross-border payments, but are not suitable to be used as a general means of payment (see MINTS Report on Stablecoins and CBDCs). These various developments in monetary innovations in Sub-Saharan Africa should not overshadow the fact that the region still has many challenges to face for inclusive and sustainable development. Responding to these challenges will not be limited to the provision of the “right” payment device, whatever it may be.

## Policy transitions towards cashless payments

Governments around the world have been trying to accelerate the transition towards a cashless society in various ways. One particularly effective way to increase digital payment uptake is the use of digital means to access **government transfers**, and pay **government fees**. For example, the US government in the 1990's made cashless sources mandatory for receiving welfare expenses, significantly increasing the use of digital systems (Bátiz-Lazo, Efthymiou 2016). Similar results have been observed in other countries as well (World Bank, 2020; Reiss, 2018).

Government **infrastructure** plays a role as well. Fast payment systems, those that allow for the immediate availability of funds to the recipient of a transfer between individuals exist in a majority of high-income countries, but not in lower income ones. Availability of fast payment systems at the national level declines with the income level of the country, as does the overall access to this system for nationals (World Bank, 2020).

Some governments have gone even further in the pursuit of increasing the use of digital

payments. The government of **India** has produced an entire flagship program attempting to encourage the use of digital payments, using policy tools in the forms of support systems and various incentives encouraging the use of cashless payments (Cashless India, 2021). Among other things, Chinese state-controlled banks have pursued direct **investment strategies** in cashless payment services firms (Mozur & de la Merced, 2016), and the central bank is currently piloting its own digital currency (Kynge & Yu, 2021). As discussed in the MINTS Report on Central Bank Digital Currencies (CBDC), **central banks** can directly provide digital wallets to citizens, which can be very promising in terms of financial inclusion, depending on the organisational and technological arrangements which will be chosen. The future will tell if such alternatives can better serve poverty reduction and development: Nigeria for example, is currently launching the eNaira.



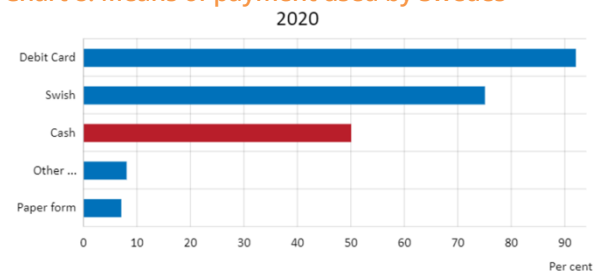
## The Swedish e-krona Central Bank Digital Currency pilot project

The Riksbank (the Swedish Central Bank) is at the forefront of exploring its own central bank digital currency. The undergoing cashless transition in Sweden has been spurred by a **quick decline in the use of cash** and in the circulation of cash related to GDP in the country, led by higher demand for cashless payment services, in its turn driven by a combination of changes in **consumer preferences** and **fintech innovation**. In the Chart below, data provided by the Sveriges Riksbank – the Swedish Central Bank – show that the usage of banknotes and coins by Swedish citizens has decreased in the past 10 years, in line with the increasing use of digital payments. This is reflected in the statistics on the use of cards and of the **app Swish**, created in 2012 by the six major national banks to encourage digital payments. Chart 8 shows the answer to the question “Which means of payment did you use in the last 30 days?”. 92% of the Swedish used debit cards, while three out of four used Swish, the mobile payments app whose functioning will be further detailed in the next paragraphs. This is in line with the decreasing trend in the use of cash, described in this Report.

By now, many Swedish banks have even stopped allowing transactions with cash. Despite this, retail purchase in shops can be easily done by cash too. Surveys of the Riksbank show that more than half of the population (61% of those interviewed) never had any problem paying with cash and 26%

experienced problems nearly once a month. This means that cash is still widely accepted in Sweden. In the paying habits, however, age plays a role. Surveys done by the Riksbank show that the younger people use less cash as they are keener on using the mobile apps or the debit cards.

Chart 8. Means of payment used by Swedes

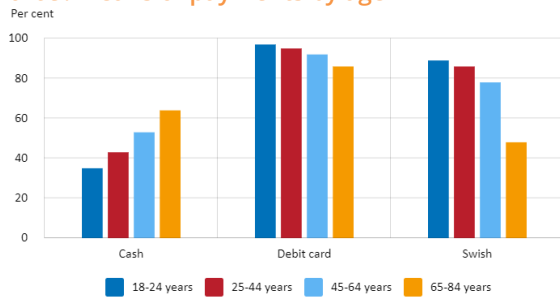


*Sveriges Riksbank. Responses to question: “Which means of payment have you used in the last 30 day...”*

The graph below (Chart 9) answers the same question “which means of payment have you used in the last 30 days?”, but breaks down its usage by age. Cards payments (both credit and debit cards) dominate purchases and in general the payment system across all ages. The older part of the population still uses cash more frequently than the app Swish, but only narrowly so, which is remarkable considering the lower level of digital literacy of older cohorts. This suggests that, in Sweden, there might be the conditions for a full transition to a cashless society. In fact, in 2020 75% of the population withdrew cash maximum once a month and 20% even never. Citizens do not need to completely change their habits because they are already keen on using mobile

payments app or debit and credit cards.

Chart 9. Means of payments by age



*Sveriges Riksbank. Responses to question: "Which means of payment have you used in the last 30 day...", by age.*

**E-krona Pilot Project.** Starting on 24 March 2023, in Sweden, the goal is to no longer accept cash nationwide as a mean of payment. To make this transition possible, the Swedish central bank has issued a CBDC called e-krona, currently in the pilot phase. A CBDC has the same main aim of cryptocurrencies to substitute cash in a digital form but with a fundamental difference: e-krona is backed by the Swedish central bank and this, as long as the central bank is credible in its mandate to stabilize inflation at the target level, guarantees the stability of the value of the means of payment. Announced on 31 May 2021, e-krona would be the first official CBDC adopted in an OECD country. It can be defined as a digital form of cash because it guarantees the anonymity of transactions (or at least their protection with cryptography), which is instead not guaranteed with debit and credit cards payments. The tested solution is based on a **Distributed Ledger Technology** (DLT), a blockchain technology, which should ensure safety of the transactions. The E-krona can be

created only by Riksbank, which ensures that the latter decides on the volumes and timing of the issuance. It is fundamental for the Central Bank to maintain control over the monetary system even in the event of a complete transition towards a cashless system. In fact, currently, all digital money is created in the form of bank deposits by the private banking system, although of course under the supervision of the central banks. The central bank's control over monetary policy relies ultimately on its ability to impose on private banks conversion of bank deposits (private digital money) into cash (public money). The creation of a CBDC is the only way for a central bank to maintain the **uniformity of money and control over monetary policy** in a cashless economy. Indeed, convertibility allows one payment instrument to replicate the store of value and unit of account properties of another (Brunnermeier, James and Landau, 2021). Hence, the e-krona is seen by the Bank of Sweden as a way to guarantee that **digital money remains a public good**, by ensuring uniformity, universal accessibility, defence of purchasing power and stability of financial relations.

E-krona is **token-based**, which means that it is a uniquely identifiable digital unit of value with the attribute that it can bear the value of Swedish krona. Citizens need a digital wallet, which can be in the form of a mobile application or a card, and the transactions will remain in the E-krona network. The Riksbank uses the **Corda R3 platform** to create the network for distribution of the e-krona.



Participants are banks or other intermediaries that can manage only the quantity of digital currency created by the Central Bank. In fact, the Riksbank is the only entity which can create e-krona and that decides how much e-krona circulates. The distribution is in the hands of participants that offer end-users the opportunity to exchange holdings in their payment accounts for e-kronor, via a digital wallet connected to a payment instrument, such as a mobile app or a card. In purely technical terms, the e-krona is governed by a certificate showing that it is issued by the Riksbank and, just as with banknotes, the State is thus **guarantor** of the value of the e-krona. Participants can ask for the issuance of new e-krona to allow end-users to do the transactions they want. The E-krona would also be expressed in Swedish kronor, and not be a new currency of its own. This means that it would be backed by Riksbank's mandate to strive for an inflation target and thereby **stable purchasing power** of the krona.

The authenticity of a transaction is given by the digital confirmation of the network. The task of ensuring the authenticity of the e-kronor is carried out by the participants' nodes by verifying that the e-kronor has a transaction history that can be traced to the Riksbank as the issuer. The control that the specific token used in a transaction is unconsumed, is carried out by a special control function in the network known as the **notary node**. After the transaction is made and the token is used, the remaining question is the following: "how should people accumulate/store the money in their digital

wallet?" Most recently, the Riksbank has decided to extend the agreement with **Accenture** as technical supplier to continue testing the possibilities of a technical solution. During phase 2 of the pilot, the Riksbank will expand the project's scope to include potential distributors of the e-krona as participants in the network. The goal of this is to test how an integration with their internal systems could function with the e-krona network. Further investigation is needed to see whether e-krona can manage retail payments at scale and fulfil the requirements of a digital central bank money. During phase 2, an off-line solution with local storage of keys and tokens will be implemented and this will help overcoming the threats represented by the otherwise constant need of internet connection, which exposes to the risk of having IT disruptions as above mentioned.

**Main benefits.** According to an IMF study on the Swedish e-krona and to research by Riksbank (Sveriges Riksbank Economic Review, 2020, p. 80-96), among the various benefits of a transition to a cashless society with the issuance of a CBDC, the most noteworthy ones are that universal access to money is ensured. The e-krona could also promote digitalization and innovation in other areas. For instance, a functioning public digital currency could facilitate the distribution of **fiscal stimulus** during future crises through the potential feasibility of direct **government-to-peer** (G2P) payments to households. Another big benefit of e-krona is the increase in

**competition.** Having a public actor that provides digital money will represent an alternative to the money provided by the private actors and will avoid the creation of monopolies in the payments market. However, it should be noted here that it is not clear how private actors would compete with the central bank and why the creation of private monopolies cannot be contrasted through traditional antitrust policies.

**Potential risks.** Studies by the Riksbank underline that there are some trade-offs and potential risks that need further investigation. The main one is bank disintermediation and the possibility of a breakdown in the traditional credit market. As bank deposits are increasingly converted into e-krona, this can lead to bank disintermediation over time, potentially resulting in a fall in the supply of credit as the banks' funding base shrinks or funding becomes more increasingly expensive. Converting deposits into e-krona in times of crisis could be easier and faster, and thus could increase the likelihood, speed, and severity of **bank runs**. Second, e-kronor provided through intermediaries imply that the Riksbank will not be able to supply an infrastructure that functions independently of other systems. In case of disruptions in the intermediary's system, the e-kronor might not be available to users, unless the Riksbank provided a backup solution. This is particularly important if many intermediaries are using the same IT-supplier.

The same logic applies to disruptions to energy provision, as in this case none of the different digital payment solutions, including e-kronor, would be available. Finally, threats coming from technologies are of two types: on the one hand, anti-money laundering and risks related to the financing of blacklisted activities could arise if anonymous transactions are made fully possible. On the other hand, there could be uncontrolled movements in capital flows if there are swings in the external demand for CBDC (which could be considered as safe assets) and if the creation of a CBDC reduces transaction costs and frictions in international financial markets.

**Legal basics.** The tests done until now have not allowed to find a robust legal settlement. The Riksbank needs a strong legal basis so as to allow it to issue its own digital currency on a legal framework as robust as that which has allowed it to print cash. The State should be regarded as the guarantor of last resort of the e-krona, irrespective of the number and types of intermediaries making up the whole e-krona system, and the Riksbank will be the sole issuer of the e-krona. As there are no adequate legislation or settled case law to refer to on the matter, issuing the e-krona would most probably require some new legislation, regardless of the model, design and technical solution used.

## Italian national experimentations for a cashless society: applications and incentives for the new digital payment methods

As we have seen in this Report, many countries are going cashless at a great speed and, in certain circumstances, the advantages of ditching hard cash may be waned by the risks of the use of different forms of money, especially from a legal standpoint. As with other cumbersome innovations, technology and market developments tend to precede regulatory responses, thus allowing for grey areas and loopholes where illegality may flourish, and user protection is not guaranteed. However, it is crucial to recognize that **incredible progress** has been achieved during these years and the establishment of an EU single market for payments had a great and most direct impact on the digitalisation of payments system in the EU. In fact, the European legislation has tried to balance public and private interests by allowing for the cooperation of different players and the development of a single European payment infrastructure. Recently, the most important piece of legislation for the digital payments industry is the Payment Services Directive 2

(hereinafter PSD2,<sup>1</sup>), which came into force in January 2018. The main EU strategy to promote a more cashless society is to provide a **clear regulatory framework** on certain critical aspects. Thus, the element of this strategy had been the PSD2, initially adopted in 2015 and became effective in January 2018. The PSD2 was drafted with the clear purpose of enhancing the existing EU rules for regulating the new digital payment services, which were emerging at the time among all the new financial projects based on open banking business models and leveraging mainly on the intensive and innovative processing methods of payment users' data. Inter alia, the main provisions and principles on which the PSD2 is based are as follows:

- the use of payment services on the internet is made easier, safer and trustworthy by setting certain technical and regulatory criteria that must be respected both by the payment service providers (hereinafter "PSP" or "PSPs")<sup>2</sup>

<sup>1</sup> Directive (EU) 2015/2366 of the European Parliament and of the Council on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC', 25 November 2015, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2366&from=EN>.

<sup>2</sup> It is worth clarifying that the category of PSPs under PSD1 included the following entities: Credit Institutions (a financial institution that can receive deposits from the public and grant credit), Electronic Money Institutions (EMIs) (a financial institution that is not a credit institution and is authorised to issue electronic money), Payment Institutions (PIs) (institutions that provide and execute payment services throughout the EU), Central

Banks, Postal Institutions and Government Ministries (local entities authorised by national law to supervise or provide payment services). However, since 2007 new stakeholders that were not contemplated in the provisions of the Directive have emerged, especially in the area of online payments. These new players were included among the PSPs only in 2015 with the intervention of the PSD2, which distinguished them primarily into ASPSPs (Account Servicing Payment Service Providers) and TPPs (Third Party Providers). ASPSPs are financial institutions offering payment accounts with online access, while TPPs are the new players within the scope of the directive and can be registered, authorised and regulated like all other PSPs. According to PSD2, TPPs should be authorised to access customers' payment accounts held with ASPSPs.

and the customers;

- the consumer shall be better protected against online payment related fraud;
- the use of non-transparent pricing methods by banks in relation to payments shall be prohibit;
- electronic payment services shall be promoted through devices such as smartphones or smart watches without consumer rights being adversely affected by any means;
- the European Banking Authority's (hereinafter "EBA") role in supervising compliance with and implementation of new technical standards shall be strengthened.

However, besides the PSD2 provisions other important requirements in relation to cashless payments are set out in the associated **Regulatory Technical Standards** (hereinafter "RTS"). In fact, the PSD2 RTS were first developed to guarantee customer protection but also to ensure effective and secure communication and they set out the technical requirements that PSPs must apply in practice to duly comply with PSD2 rules and principles. A core component of the PSD2 RTS is the requirement for the "**Strong Customer Authentication**" (hereinafter "SCA") that must be applied, also to verify the identity of the customer, with the aim of ensuring the protection of the payment users through a higher level of security. In fact, when applying the SCA the PSPs shall validate the

identity of the customer, using at least two of the following security elements:

1. Knowledge: a piece of information that only the customer knows (i.e. PIN or password);
2. Possession: a piece of information that only the customer has (i.e. smartphone, credit card or smartwatch);
3. Inherence: a piece of information only the customer could access (i.e. fingerprints or voice recognition)

SCA reduces the **risk of fraud** for e-payments and protects the privacy of a customer's financial data. In certain cases, payment service providers are allowed to exempt certain transactions from SCA, such as low-value transactions, contactless payments, and where the risk of fraud is very low. Conversely, there are cases where the application of SCA standards is mandatory for PSPs and in detail when the customer:

- accesses his or her account online; and/or
- makes an electronic payment.

In application of SCA impinge also the PSP liability regime. In case of an unauthorized payment, where the responsible PSP has not implemented the SCA standards and if the payer has not acted fraudulently, the PSD2 provided that customers are entitled to a full

refund of the amount of the unauthorized payment.

To date, the results of this legislation have been successful since, as revealed by a recent report published on 11 June 2021 by the EBA on the readiness of PSPs to implement SCA<sup>3</sup> 99% of EU merchants are ready to support SCA, 94% of all payment cards in the EU are SCA-enabled and 92% of e-commerce card-based authentication requests from acquirers are SCA-compliant, compared to 89% of similar transactions reported by issuers. Further to the above and on a different level, on 24 September 2020 the European Commission adopted the so-called "Retail Payments Strategy for the EU"<sup>4</sup> that seeks to fully develop the European payments market, in order that Europe may fully reap the **benefits of innovation** and opportunities arising from digitization, through the construction of a reforms package called "Digital Finance Package".<sup>5</sup> The strategy put in place by the EU focuses on the creation of conditions enabling the development of instant payments and payment solutions across the EU that are cost-effective and accessible to individuals and enterprises, and where digital finance will play a key role in the EU's post-Covid-19 recovery plan. The strategy confirms

the European Commission's intention to be at the forefront of payment sector regulation globally. In fact, part of the new rules is also dedicated to cryptocurrencies and crypto assets.<sup>6</sup>

In this context, the European Commission announced the launch of a review of the application and impact of the PSD2. In particular, the Commission will consider the impact of the SCA on the level of payment fraud in the EU and assess whether additional measures should be considered to address new types of fraud, particularly with respect to instant payments. It will also examine the existing legal limits on contactless payments in order to strike a balance between convenience and fraud risks. It will assess new risks arising from unregulated services, particularly technical services ancillary to the provision of regulated payment or e-money services and consider whether and how these risks can best be mitigated. It is also proposed to align the frameworks of PSD2 and the Electronic Money Directive (EMD2) by including the issuance of e-money as a payment service in PSD2.

However, numerous forms of other regulations have also been implemented at a

<sup>3</sup> 'On the data provided by payment service providers on their readiness to apply strong customer authentication for e-commerce card-based payment transactions', 11 June 2021, EBA, available at [https://www.eba.europa.eu/sites/default/documents/files/document\\_library/Publications/Reports/2021/1014781/Report%20on%20the%20data%20provided%20by%20PSPs%20on%20their%20readiness%20to%20apply%20SCA.pdf](https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1014781/Report%20on%20the%20data%20provided%20by%20PSPs%20on%20their%20readiness%20to%20apply%20SCA.pdf).

<sup>4</sup> 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a Retail Payments Strategy for the EU', 24 September 2020, available

at <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0592&from=EN>.

<sup>5</sup> 'Digital finance package', European Commission's website, 24 September 2020, available at [https://ec.europa.eu/info/publications/200924-digital-finance-proposals\\_en](https://ec.europa.eu/info/publications/200924-digital-finance-proposals_en).

<sup>6</sup> 'Proposal for a regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937', 24 September 2020, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593>.

national level by **EU Member States**. These had the specific objective of encouraging the use of digital payment instruments, lately also as an additional distancing measure to limit the spread of the Covid-19 during payment transactions. In Italy, this has been translated into projects such as the Cashless Italia Program (hereinafter "**Cashless Italia**")<sup>7</sup>, which have aimed at raising awareness on the adoption of digital payment methods by providing monetary advantages to those using cashless payments.

The Italia Cashless project was introduced and regulated by the Finance Act (Legge di Bilancio) of 2020<sup>8</sup> and the associated implementing decree adopted by the Ministry of Economy and Finance.<sup>9</sup> This project is based on monetary incentives aimed at facilitating electronic payments and at counteracting tax evasion associated with the use of cash. In fact, since electronic payments are easily traceable by the Italian Revenue Agency (Agenzia delle Entrate), their wider use could contribute to fight **tax evasion**. The plan developed by the Government to promote the use of cashless payments includes various measures. The regulation provides that each time an electronic payment is made, it is possible to obtain a refund of part of the expense and to participate in various contests to win cash prizes. Thus, the idea behind the Italia Cashless

project is that every small daily expense could become a profit: the more I spend, the more I stand to gain. The program has been designed also with the aim of encouraging the development of a more digital, fast, simple and transparent **national payment system**. To be eligible for the programme, the consumer must be a natural person ('persona fisica'), over 18 years old and resident in Italy. There are no limits for the types of items/services purchased, in the sense that the purchasing may concern goods or services without value limits, from a simple bottle of water up to a very expensive object.

Certain terms and conditions still apply: for example, online and mobile transactions are excluded. Also excluded are expenses made in the context of business, art, or profession, those made abroad or at pharmacies or parapharmacies if you are already eligible for the related favorable fiscal regime ('detrazione fiscale'). Furthermore, in order to participate in the programme, it is also necessary to have a public electronic identity (SPID) or an Electronic Identity Card (Carta d'Identità Elettronica). In addition, it is required that the consumer will use an APP and register the cards to be used for eligible payments. The process may result to be complex to those unfamiliar with electronic tools, and this can be a **barrier** for using the service. In particular, the

<sup>7</sup> Additional information at <https://www.cashlessitalia.it/> (consulted on 10 August 2021).

<sup>8</sup> 'Bilancio di previsione dello Stato per l'anno finanziario 2020 e bilancio pluriennale per il triennio 2020-2022', 30 December 2019, available at: <https://www.gazzettaufficiale.it/eli/gu/2019/12/30/304/so/45/sg/pdf>.

<sup>9</sup>Regolamento recante condizioni e criteri per l'attribuzione delle misure premiali per l'utilizzo degli strumenti di pagamento elettronici', Decree no. 156 of 24 November 2020, available at <https://www.gazzettaufficiale.it/eli/id/2020/11/28/20G00181/sg>.

Cashless Italia Plan encompasses three different ways to benefit from the government incentives: Cashback 2021, Super Cashback and the so-called Receipts Lottery (Lotteria degli Scontrini) that are analyzed in more detail here below.

**Cashback 2021 and Super Cashback: regulatory frameworks.** Cashback 2021 and Super Cashback are probably the two most discussed and most prominent methods by which, within the Cashless Italia plan, Italian consumers could avail of government incentives when making digital payments. Regarding Cashback 2021, it provided that starting from 1st January 2021 it would be possible to get 10% reimbursement, up to a maximum of 300 euros per year (150 euros every 6 months), if at least 50 payments were made with cards or payment apps for purchases at stores, bars, restaurants, supermarkets, artisans, and professionals. The first Euro 150 refunds were actually made by 1st July 2021, with direct payment directly to the bank account of the customer by 29th August 2021. With Cashback, there is no minimum spending amount, unlike the Receipts Lottery, for which a minimum sum is required to participate. On a different level, **Super Cashback** provided that also starting from 1st January 2021 and every 6 months, if you were among the first 100,000 citizens who made multiple payments with cards and payment apps, with no minimum spending amount, you would have the chance to win a prize of Euro 1,500. Thus, Super Cashback had a lump sum amount of Euro 1,500 every 6 months that could

have been won, with which you could potentially get a total refund of Euro 3,000 over the course of a year. Unlike Cashback, therefore, which is a percentage refund and thus variable according to the amount that has been spent, the Super Cashback is not calculated in proportion to the purchases made. Originally, the Cashback and the Super Cashback programs provided for 3 periods of validity of 6 months each, structured as follows:

- (i) 1st Semester - January 1st to 30th June 2021;
- (ii) 2nd Semester - from July 1st to 31st December 2021; and
- (iii) 3rd Semester - from January 1st to 30th June 2022.

However, the Draghi Cabinet has decided to suspend Cashback and Super Cashback from the 1st of July to the 31st of December 2021. The new Employment Decree (Decreto Lavoro, hereinafter the "Decree"), which introduced new measures for workers, businesses, and tax authorities, suspends indeed for six months the program of government refunds to incentivize electronic payments. This is a temporary suspension, and the program will then resume as of 1st January 2022 until 30 June 2022, probably with the implementation of brand-new regulatory measures designed to improve it. Concurrently, the Government also suspended the Super Cashback for the corresponding time, and with the pendency of the State Cashback, the timeframe for reimbursements slipped from 2 to 5 months. The Decree that suspends Cashback and Super

Cashback has the purpose of creating funds to activate other initiatives aimed at encouraging electronic and traceable payments to combat tax evasion, and to support income. Therefore, the resources initially earmarked for cashback will be used, instead, to boost the tax credits granted to self-employed workers (VAT numbers), traders and professionals who purchase or hire electronic payment instruments, and to finance a reform of welfare support in Italy. Therefore, according to the changes introduced, the refund provided for by the program will no longer be paid within 60 days but within 150 days (5 months).

#### **The Receipts Lottery (Lotteria degli Scontrini).**

With respect to the incentives that were previously compared in this section, the receipt lottery allows people to win cash rewards of up to Euro 5 million by simply buying in-store with electronic payment instruments. This is a kind of national lottery, which allows Italian consumers to participate in the draw of cash rewards amounting to thousands of euros. The purpose of the 'Lotteria' is that of awarding consumers and sellers for every purchase greater than or equal to 1 euro made with electronic payments. Purchases must be made at merchants who transmit their receipts electronically and therefore issue commercial receipts online. The receipt lottery does not cost anything as it is possible to participate for free every time a consumer buys something. The rewards awarded do not contribute to income and are not subject to taxation. Obviously, the initiative is not compulsory, and

it is up to the individual consumer to choose whether or not to participate by registering for the competition. Once registered, the consumer gets a lottery code, which is a personal 8-digit alphanumeric code, combined with the consumer's fiscal code, which must be kept and shown to merchants when making a purchase. In practice, every time you buy goods or services costing 1 euro or more, it is necessary to show the lottery code to the merchant, who combines it with the details of the purchase, namely the electronic receipt. For every euro spent, users receive one virtual lottery ticket, up to a maximum of 1000 virtual tickets per receipt. According to the way the receipt lottery works, a coffee that costs 1 Euro will entitle to 1 ticket, a dress that costs 500 Euro will entitle to 500 tickets. If, on the other hand, a person spends more than 1000 Euros, he or she will only ever get 1000 tickets. Winners do not need to check the lottery draws because they will be notified of their award by registered mail with return receipt or PEC. For those who have entered their mobile phone number in the reserved area, an informal notification will also be sent by SMS. The winners will receive rewards by bank transfer or by non-transferable bank cheque, directly from the Italian Customs and Monopolies Agency (Agenzia delle Dogane e dei Monopoli).

**The challenge of the digital divide: the inequalities and risks of the digital payment system.** Payments are the underlying fabric of any economic system. When these transactions are costly and inconvenient,



economic activity is hampered. For this reason, digital payments seem to be an improvement for any society with respect to efficiency. However, certain groups of individuals, like elderly people and poor households, do not benefit equally from the advent of new digital forms of payment. On the contrary, they seem threatened by them and the digital divide they are creating with their spread. In fact, a cashless society could potentially create stark inequities in the financial lives of certain categories of individuals, condemning them to financial exclusion. For this reason, lawmakers have always to be mindful that the protection of these groups is crucial and necessary for having a fair society, acting consequently. To date, the issue seems to be

addressed by institutions. In fact, the Deputy Director General of the Bank of Italy, Alessandra Perrazzelli, has publicly stated that Bank of Italy is aware of the fact that digitalization could have ambiguous effects on the access to credit for the most vulnerable segments of the population and will act consequently in order to mitigate the inequalities. Moreover, the decrease of digital disparities seems to be also a point that does not pass unnoticed in the recovery from Covid 19. A plan to strengthen the Italian digital infrastructure is also mentioned by the PNRR, although only in one section of the document.



## Cashless Society: Promises and Pitfalls

Cash has been the default payment mechanism in virtually all countries for decades now and, in some cases, even centuries. The ongoing trend toward cashlessness will undoubtedly come with a large social impact, and a serious disruption of citizens' established routines. There are two dominant visions and narratives about the cashless society, focusing on its benefits and costs.

List of **benefits/opportunities** of cashless society:

1. Safe and convenient means of payment, especially when e-payment are performed through innovative IT-based solutions
2. Reduced shadow and black economy
3. Disintermediation and lower transaction costs

Conversely, there is a list of **costs/threats** of cashless society:

1. Potential for new ways of money laundering
2. Exclusion of specific social groups for their characterization in terms of IT literacy, education, age, being unbanked
3. Cybercrime
4. Threats to privacy
5. Disruption of traditional instruments of monetary policy

Each list might be associated with a specific vision, more or less optimistic with regards to the upcoming cashless society. The first vision is focused on the benefits and clearly falls under a technological deterministic approach: the implementation and deployment of competitive and up-to-date technological solutions to the monetary ecosystem will transform current economic and social practices into the new 'cashless' ones. With a scent of techno-solutionism, e-payments will drag the society into a new era where non-efficient social and economic practices, such as using cash for payments, will easily **disappear**.

An overall optimistic vision is foreseeable in the benefits coming along with the diffusion of digital payments: more efficient services that also reinforce attitudes towards cashless payments within the population and the public administration. According to this view, a cashless culture will progressively come into place, favouring digital skills, and digital citizenship on top of increased consumption and wellbeing, greater traceability, and higher threshold for tax exemption (Ambrosetti 2019). Safe and convenient means of payment that help fight the 'black' economy while tackling privacy and security problems are the main heralds of an optimistic, although technologically driven, vision of the cashless society.

This would be all the more desirable as cash itself is said to be the source of many ills, especially for the poorest, while developing

economies are still largely cash based. Some, like Rodger Voorhies (2012) from the Bill & Melinda Gates Foundation, go as far as considering cash as ‘the enemy of the poor’: “Not only are cash payments costly and inefficient, but they represent a missed opportunity to bring the poor into the digital, formal financial system.” For the U.S. Agency for International Development (USAID), “If you care about reducing poverty, you must also care about reducing dependence on physical money.” (Johnson and Jaisinghani, 2012) That is what promotes the Better than Cash Alliance, “a partnership between governments, businesses and international organisations that accelerates the transition from cash to digital payments to reduce poverty and promote inclusive growth”. These facts could be seen as just the early stage of an ongoing and unstoppable trend from “cash-heavy” to “cash-lite” societies (BFA, 2012).

Along with the acknowledged benefits, though, there are also tolls to be paid to the cashless transition. The main social issues attached to the rise of cashless payments are related to **inequality**, privacy and security. The reduction in prevalence of cash as a mean of payment will most directly impact those who use it on a regular basis, causing financial exclusion for these populations. In general, these populations also tend to be those facing a degree of financial exclusion already. The most common cash users are older, lower income, less educated and rural populations. This finding is consistent across a wide variety of international contexts. Studies from the UK

(Access to Cash Review, 2019; Greenham, Travers-Smith, 2019), East Asia (Cheng, 2021) and the Middle East and North Africa (Mouna & Jarbouri, 2021) have come to the clear conclusion that these populations are less likely to use digital payment methods. An additional problem is the likely-to-increase financial exclusion of **vulnerable groups** that – bearing sensory, cognitive, and mental health problems (e.g., memory problems) – have more difficulties benefiting from financial services delivered through digital channels (see Finance Watch, Financial exclusion: *Making the invisible visible- A study on societal groups encountering barriers to accessing financial services in the EU*, March 2020). A report commissioned by the EU listed personal and cognitive characteristics along with the nature of purchased goods and services as the main factors supporting new forms of financial exclusion (see study “Financial Services Provision and Prevention of Financial Exclusion” prepared for the European Commission, March 2009). As already marginalized groups face further marginalization from the transition away from cash payment methods, this is an issue that governments will have to be tuned into as cash use declines broadly (see FSUG position paper on financial exclusion linked to broader accessibility issues – May 2021).

**Privacy** will also be a central issue as cash use, a fundamentally anonymous means of payment, further declines. We have discussed this issue in the case of Sweden, today engaged to create the first CBDC in an OECD country.

Common to many digital payments platforms are concerns related to government or private sector knowledge of consumer's intimate spending patterns. This can be mitigated with anonymized accounts, but this solution is in practice limited in its scope due to the heavy regulatory requirements that financial intermediaries are often subjected to with regards to know-your-customer requirements. To illustrate, consider the example of China, whose dominant AliPay and WePay platforms provide data to the Chinese government for use in the country's "social credit score" program. The program, considering a wide variety of other information collected by the government, in part considers the spending patterns of citizens in order to build a profile of trustworthiness (Brito, 2019). While similar to credit scores in other nations, China's social credit scores go further in that their value can be used to limit or promote access to common services, such as priority boarding for transportation. Increasing prevalence of **biometric identification** methods for cashless payments compounds this issue. Many digital payment services provide users the option to use fingerprint or facial recognition services in place of a bank PIN, leading to an increasingly comprehensive digital user profile, and of course related security concerns. (Access to Cash Review, 2019)

While cash use brings with it the issue of a number of related crimes (robbery etc) its replacement with cashless alternatives is associated with a different, but also dangerous set of similar issues. As cashless payments

increase, they come with them the inevitable threat of **cybercrime**, and other forms of online based fraudulent activity. Privately issued digital forms of money come with the additional risk of the possible enablement of money laundering and tax evasion. Increasing reliance on digital payments will require governments and law enforcement to develop strategies to mitigate the effects of the associated security risks.

Widening the perspective, the transition towards a cashless society would also impact on a more general societal level, underlining some relevant concerns. On the economic side, it is relevant to wonder how a platform-based market will restructure the traditional hierarchy of **financial relationships** where banks and Central Banks occupy a cornerstone position (Brunnemeier 2018). The most prominent example relates to the centrality of the payment system adopted by any economic platform and the associated fintech subsidiary of payments. On the social side, the supposed centrality of platforms relates to the **closed ecosystems** that they entail. When the underlying idea is to have people (users) use these platforms to perform most of their daily transactions (paying bills, buying tickets), we observe a conflict between the imperative of economic efficiency (the push for platform-as-a-monopoly) and **technical interoperability** (in the interest of the users managing different platforms). Both ways refer to an issue of control and autonomy of the consumer that is dependent on the widespread digitization of payments, calling for attention in terms of

financial exclusion. Not to belittle are broader questions that – sooner or later – are to be answered. How will **financial education** be reconsidered? Since there won't be pocket money anymore to educate children to the use of cash, how would children be educated to the use of money? How will the social meaning of money (Zelizer 1994) be reconfigured? As the classic functions served by money (medium of exchange, unit of account and store of value) are being restructured by digital innovations, so are the symbolic and social side of money.

Not only are the implications for financial inclusion to be investigated, but also are other relevant social phenomena that money elicits, from consumption to politics. Research has shown how digital expenses tend to **lower the awareness** about the value of goods and services bought through digital payments, leading to an **increased overall consumption and personal debt** levels with adverse consequences of the society and the environment (MacDonald et al. 2006). As money perceptions and use vary across social and cultural contexts, the speeds, and outcomes in different countries of a supposed cashless society are still to be elucidated. In this direction, the Italian case is telling: there is a widespread misrepresentation of the diffusion of cash among the Italian population that believe in being one of the virtuous countries in terms of cashless (Ambrosetti 2020). The perception on the amount of digital transactions is **3.2 times higher** than effective digital transactions. Moreover, as we have discussed in the previous Section, awareness of

digital forms of money and knowledge are positively correlated with education and age.

In general, obstacles to the cashless society are both economic and social. If the costs of digital payments and transaction (un)safety are the most relevant economic obstacles, the lack of social acceptance of digital channels are the social factors that mostly prevent consumers from using e-payments. Since the overall situation across Europe varies widely, a deeper investigation of the economic and social factors affecting the perception and the use of e-payment is needed for evaluating the social side of money in an upcoming cashless society. Certainly, the key dilemmas refer to whether a cashless society implies increased wellbeing (welfare growth) or not; what implications would it have for monetary policy, and would the attainment of key objectives be facilitated or made more difficult? What are the risks? Would a cashless society be better in meeting user demand for money? Novel research is needed in order to shed light on all potential implications of cashless society and, more generally, their relation to the economic futures ahead of us. Capitalist dynamics can be re-imagined (Beckert 2015) by means of differentiating forms of money that entails both e-payment and other forms of money rooted in social structures. Differentiation happens between pluralism and substitution of currencies (Amato and Fantacci 2020) that can register forms of money as different as complementary and virtual currencies.

## Conclusions

As for now, it is clear that ecstatic scenarios such as those elicited by Warwick (1994), where:

*"The immediate benefits would be profound and fundamental. Theft of cash would become impossible. Bank robberies and cash-register robberies would simply cease to occur. Attacks on shopkeepers, taxi drivers, and cashiers would all end. Urban streets would become safer. Security costs and insurance rates would fall. Property values would rise. Sales of illegal drugs, along with the concomitant violent crime, should diminish. Hospital emergency rooms would become less crowded. A change from cash to recorded electronic money would be accompanied by a flow of previously unpaid income-tax revenues running in the tens of billions of dollars. As a result, income-tax rates could be lowered or the national debt reduced."*

are not something to bet on, also for the increasing differentiation of e-payments spurred by emerging technologies and fin-tech ventures. From a purely technological perspective, the elimination of physical cash from the economy is already feasible. Yet, far from a technological deterministic approach, we have pinpointed some barriers to a rapid and widespread substitution for cash.

Money in fact is far from being a pure economic object. Money is fundamentally social. As each person integrates it in the intimacy of their monetary and financial practices, the forms of money are not neutral on

the various ways it can be used. Here, the materiality and tangibility of cash often has its importance, especially for individuals on limited budgets and facing high liquidity constraints. Being able to see and touch money allows for better control over finances. Research has shown how digital expenses lowered the awareness about the value of goods and services bought through digital payments, leading to an increased overall consumption and personal debt levels with adverse consequences for society and the environment (MacDonald et al. 2006). The material form of money is therefore valued, especially by the poorest, who can for example pre-allocate certain revenues to particular expenses by physically organising their cash holdings. Digital money in contrast, by homogenising one's capital and putting it 'out of sight', is often perceived as inadequate for satisfactory finances management.

Money is also social as it is the medium of a wide variety of collective relations and activities, including non-market relations and extra-economic activities. Informal financial practices respond as much to needs of liquidity, resilience or investment as they do to the reproduction of social ties, in which cash may play a role. For the advocates of a cashless society, these social aspects often appear as archaisms deemed to disappear with modernisation and the development of financial systems as well as with the education of populations. They should rather be

understood as such and taken into account, especially regarding what they tell about money – that it is an object irreducible to its costs and benefits, and about societies – which are not only made of the confrontation of supplies and demands but also of webs of solidarity and reciprocity. Failed attempts to phase out cash, for example in the mass transport system in Kenya, show how a purely technological approach to monetary uses is insufficient. Provided payment systems and devices, as efficient as they can be, will not be adopted if they are not aligned with users' economic as well as their social needs and representations.



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## Supplementary Materials

### Appendix A: How to measure cashless transactions?

One commonly used approach is through surveys, which allow researchers to get an in-depth micro account of the payment behaviors of a targeted group of individuals. These surveys often take the form of payment diaries, forms in which respondents are requested to create detailed accounts of their spending patterns. These surveys provide information of number and value of transactions, as well as means of payment and temporal patterns, offering researchers actual measures of cash use, something hard to obtain through other sources. Of course, this comes at the expense of a relatively high level of data collection cost, thus making it unfeasible for many research projects. In particular, the types of broad cross-country comparisons explored in this section become especially difficult.

The other main mechanism used to obtain micro-level data is the use of actual transactions data from payment service providers or individual businesses. For example, Garcia Swartz, Hahn & Layne-Farrar (2006) attempt to measure the relative cost of different payment methods utilizing a hybrid transactions data and survey approach. Credit card payments data was obtained through Visa, and merchant side transactions data were obtained through a combination of surveys and accounting data provided by PwC (then Coopers and Lybrand). Transaction data is another effective way to obtain micro level information on this topic, however it is not always readily available in every research project.

On the macro side, researchers sometimes choose to focus on measures of cash and cashless infrastructural capacities, such as number of ATMs or electronic payment terminals. These can be useful to get a sense of national capacity for a cashless system, although are at best a proxy for the number (and an even rougher proxy for the value) of cashless payments themselves. These kinds of measures have the advantage of being widely available internationally at the country level.

Finally, most central banks provide aggregate statistics on payments at the national level. It is these indicators that we have focused on. A simple, but commonly used indicator is the ratio of cash in circulation to GDP (Ambrosetti, 2020) or other monetary aggregates, such as M4 (Reiss, 2018). While these kinds of indicators have the advantage of simplicity, they have notable flaws. First, no distinction is made between cash in use and possible cash hoarding that may occur. One could quite conceivably imagine the existence of two societies with equal ratios, but in one cash is a common means of payment and in the other it functions more as a store of value for precautionary purposes. Additionally, there is no guarantee that the cash recorded in the circulation statistics actually stays inside the nation's borders. For some nations, this is unlikely to be an issue. However, for others, such as any nation in the Eurozone, this indicator becomes problematic. Euros printed in France are by nature legal tender in any other country, thus one could quite reasonably expect they could be used elsewhere. One

could work around this issue by using the ratio of cash to GDP for the entire Eurozone, but this would serve to obscure the large heterogeneity in cashlessness that exists in the region.

An alternative way to use central bank payment statistics is presented by Khiaonarong & Humphrey (2019), who propose three alternative measures for levels of cash and non-cash payment tools. They are as follows:

$$\text{Residual HC} = \frac{\text{Total HC} - \text{Card} - \text{eMoney}}{\text{Total HC}}$$

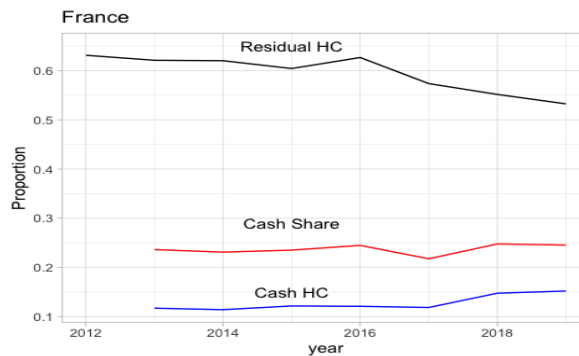
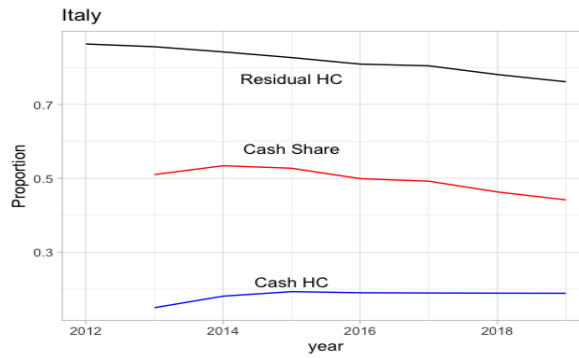
$$\text{Cash HC} = \frac{\text{Cash Withdrawals}}{\text{Total HC}}$$

$$\text{Cash Share} = \frac{\text{Cash Withdrawals}}{\text{Card} + \text{eMoney} + \text{Cash Withdrawals}}$$

HC refers to Household Consumption, Cash Withdrawals to the summed value of all ATM and over the counter (OTC) cash withdrawals and Card and eMoney to the values of all card and eMoney payments. In both the case of transactions and withdrawals, values refer to the behavior of all the nationals of a country, irrespective of where they are.

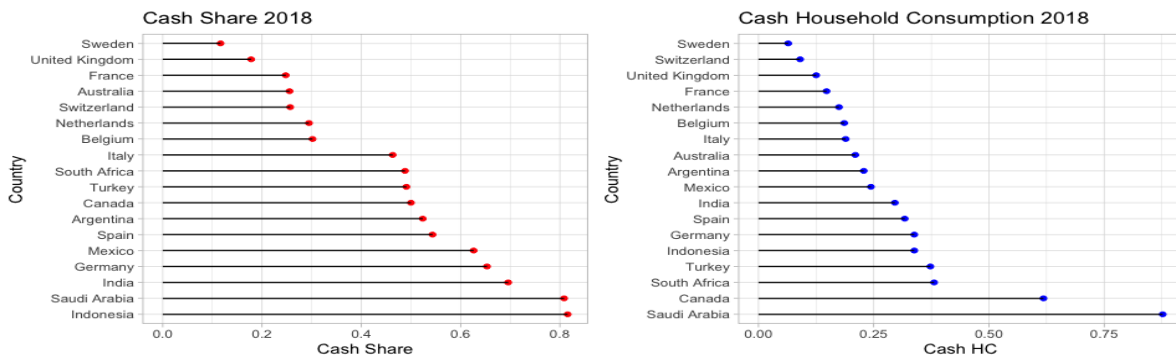
Since cash transactions are themselves generally untraceable, the closest statistics obtainable at central banks are cash withdrawals. While likely better than cash in circulation in many instances, these indicators come with their own set of flaws as well. Using cash withdrawals as a measure of cash transactions comes with the implicit assumption that the cash withdrawn is spent and not hoarded. Also, such a measure provides no indication of the overall use of cash once withdrawn. The same \$20 note could be used for \$200 worth of total transactions if used 10 times, or it could be immediately re-deposited after the first transaction. Such indicators make no distinction between these two levels of use.





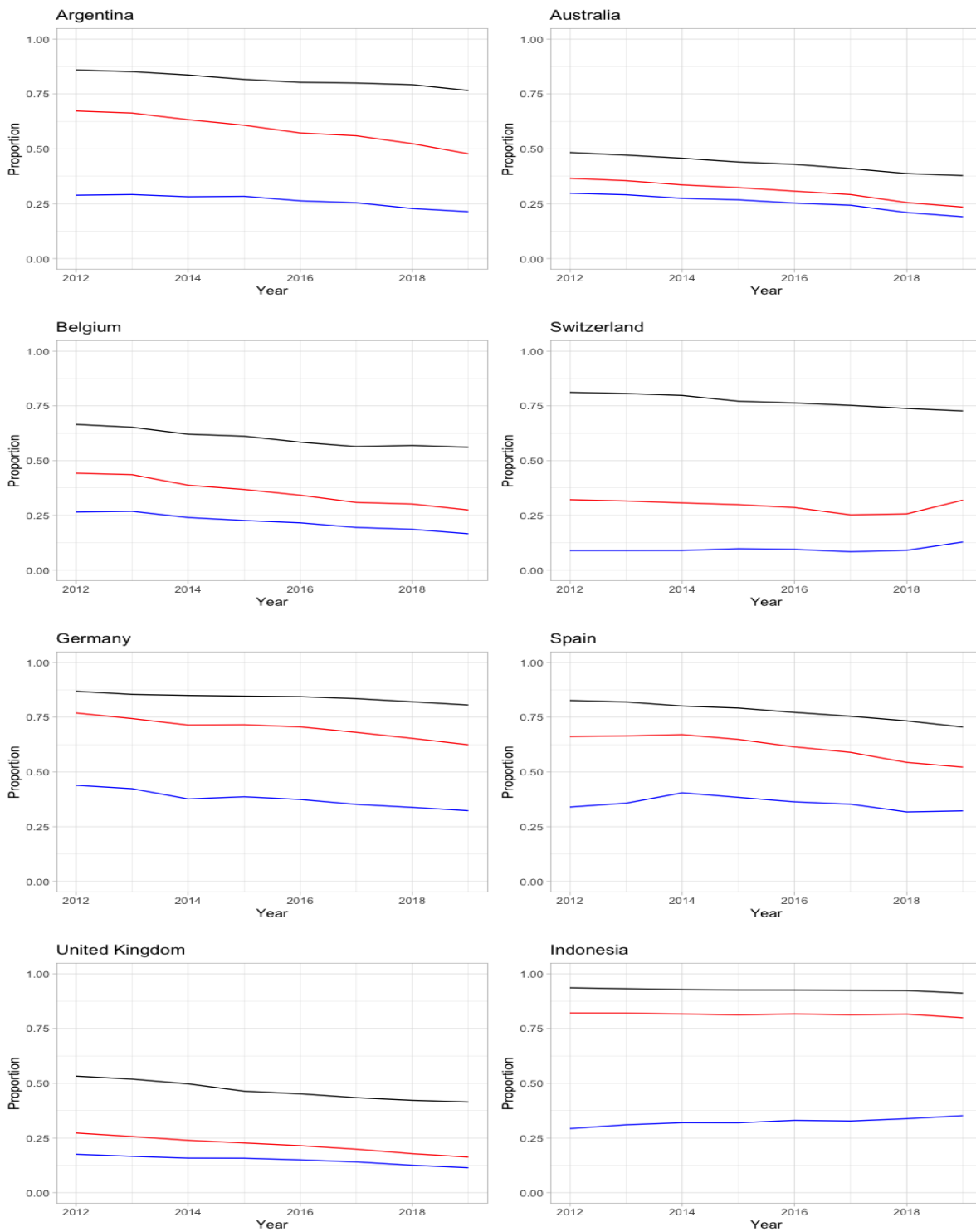
Above we plot all three previously mentioned statistics for both France and Italy. In general, they are indicative of what one will see in most other figures. Residual HC is usually the highest numerically, and in all cases declines over the period. Cash Share and Cash HC tend to be lower, and do not always decline. A complete set of figures can be found in the Appendix. The majority of the quantitative analysis in this Report focus on Residual HC. However, for the of sake completeness, the 2018 values of Cash Share and Cash HC by country are also provided. Below in Appendix D, we also present in-depth analysis of four peculiar cases (Canada, China, Russia, Saudi Arabia) to highlight the difficulties of gathering reliable cash usage statistics.

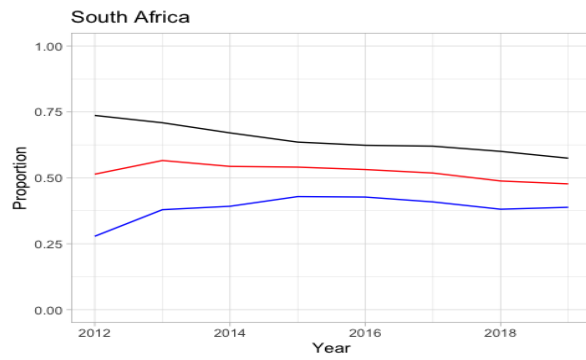
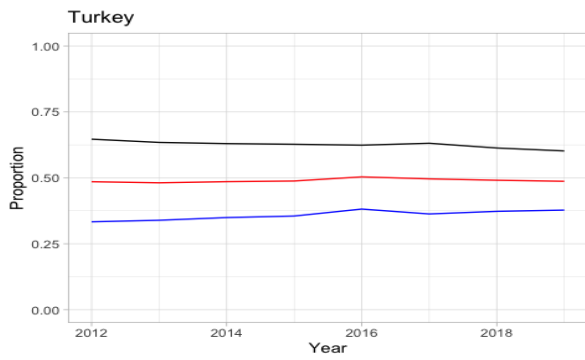
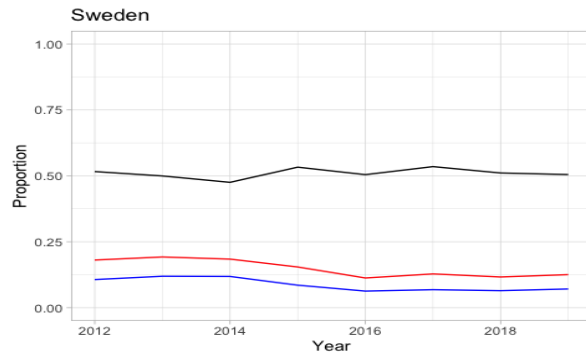
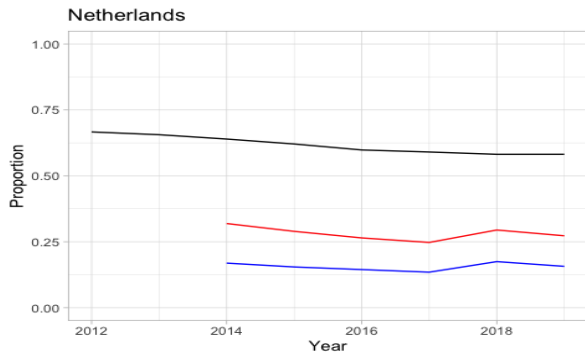
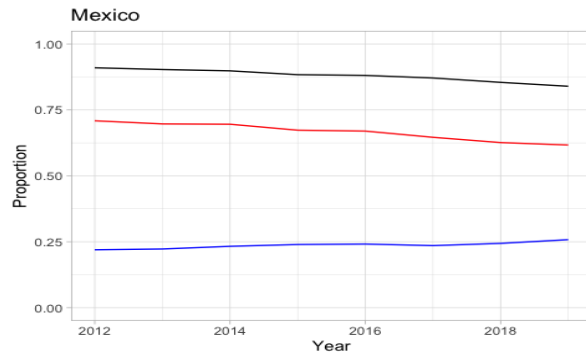
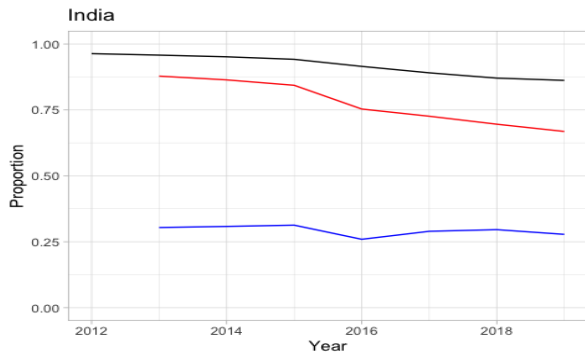
### Other Indicators by Country: 2018



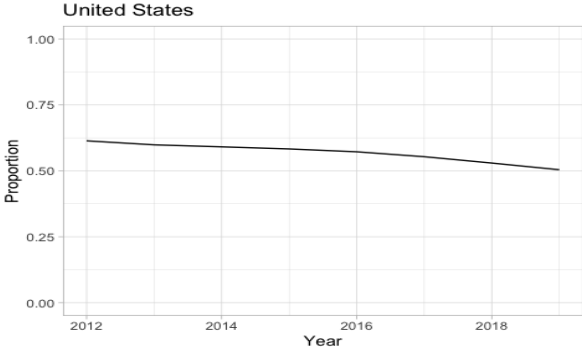
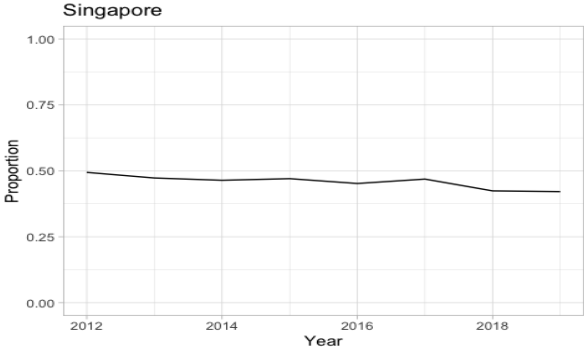
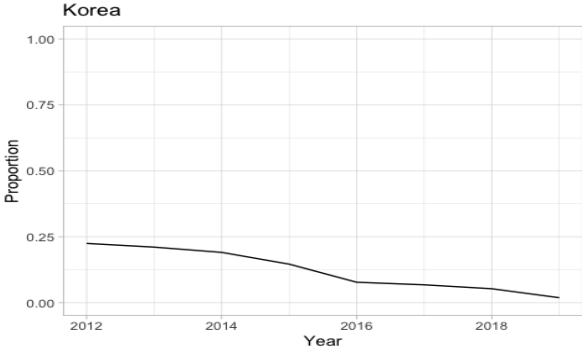
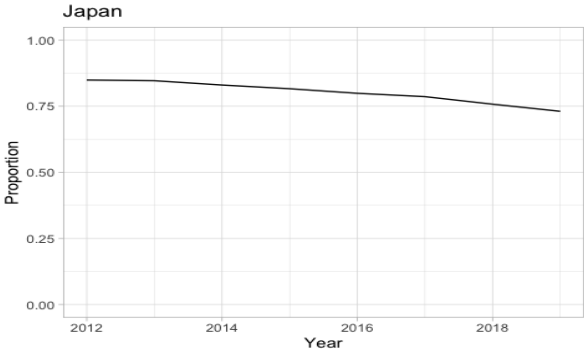
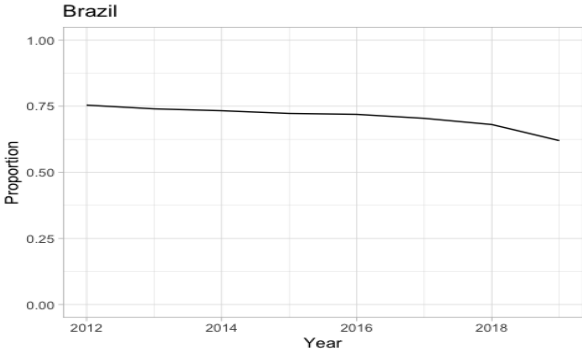


## Appendix B: Country Plots for Countries with Complete Information





# Appendix C: Country Plots for Countries Missing ATM Transactions

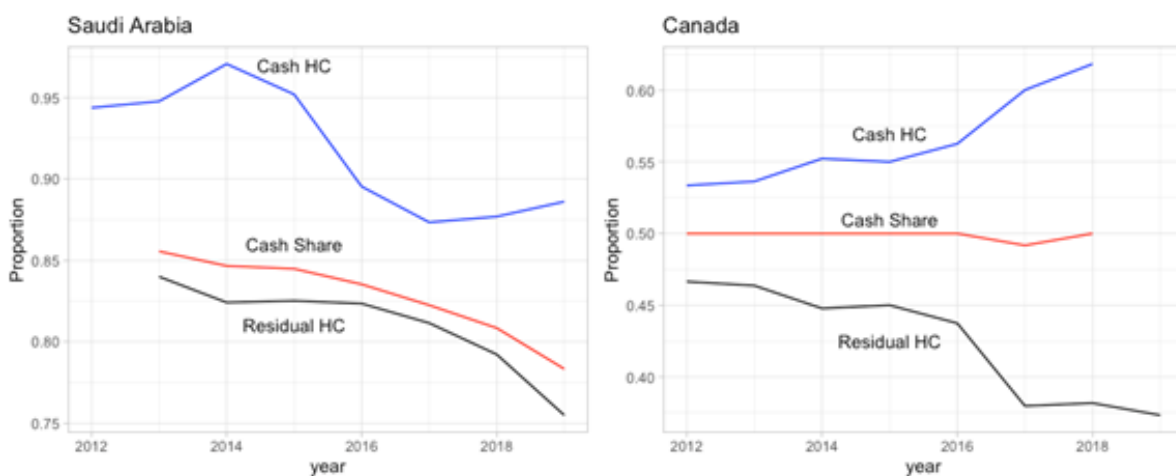




## Appendix D: Specific country cases

### Countries with High ATM Transactions

In general, the varying measures of cash use presented follow a common pattern, summarized as Residual HC > Cash Share > Cash HC. Two cases, however see the inverse of this trend. The reasoning behind this as current remains uncertain, however it may have to do with the way ATM transactions are measured in the data. Considering the behaviors of nationals rather than the behavior of all individuals within the countries borders when measuring ATM transactions is a decision made in the Khiaonarong & Humphrey (2019) paper replicated here. The more logical choice when discussing the evolving nature of payment technologies within a country would be to look at payments within borders. While visitors from abroad will have an influence on the nature payments within a country, fundamentally it is the visitors who are limited in their capacity to make transactions based on the options available. Unfortunately, data availability using the BIS is quite sparse for both transactions and withdrawals internal to a country by individuals from abroad. This issue may be important to the unusual form of the Saudi Arabia plot below. What we see here is a shockingly high ratio of cash withdrawals to household consumption. Saudi Arabia remains at quite a high level of cash use, as measured by its residual household consumption, but considering the Cash Share or Cash HC variables would suggest an even higher level. This may point to a tendency of Saudi nationals to make heavy use of ATM's abroad, something that would explain the level of ATM transactions outstripping the share of household consumption unexplained by cashless payments. A similar, albeit more puzzling, instance of this phenomenon is seen in the Canadian case. Canada is much further ahead than most countries in terms of declining cash use, so the suggested explanation used in the Saudi case of increased reliance on ATM's abroad would appear less likely for a national cohort with an observed strong tendency towards cashless payment mechanisms.



Possible Interference of Non-Household Payments

A further issue related to the use of the Residual Household Consumption variable is the possibility of accidental inclusion of non-household payments within the statistics measuring card and e-money transactions. This is likely the situation in the following figures, which display each of the three indicators in the Chinese and Russian contexts. What is noteworthy, is in both cases the residual household consumption goes negative, quite strongly so in the Chinese context. This means that the total value of digital payments is in excess of household consumption. Remember, direct debits and wire transfers, tools commonly used for business transactions in many countries, are not contained in the card and e-money aggregates. The most logical explanation for this is that the measures of card and e-money payments include a sizable number of non-household transactions. Perhaps in China and Russia there is some specific reason that credit cards and e-money are used for business transactions to a greater degree than that seen in other countries.

