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Assessing recent increases in cash demand

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Abstract: Contrary to predictions that demand for cash will decline with the increased availability and use of non-cash payment means, currency demand has increased in the Euro area and the US over the past 15 years. Against this background, this short article summarizes recent findings from Jobst and Stix (2017), who provide a discussion of trends in currency demand, and presents additional descriptive evidence. In a first step, currency demand over a longer period is analyzed for the USA, Germany and the Euro area. This is helpful for understanding and assessing recent trends. In a second step, evidence from 70 economies is analyzed for the period from 2001 to 2014. This broader perspective informs us about the development for currencies that do not circulate internationally. Our descriptive account provides several insights: (i) Recent increases for the euro and the US dollar are strong even if seen over a 100 year horizon. (ii) Over the period from 2001 to 2014 currency demand has increased in many economies. (iii) In economies where currency demand increased, the increase typically happened after the start of the economic and financial crisis of 2007/08. What are the drivers of recent increases in currency demand? Jobst and Stix (2017) estimate panel money demand models, accounting for changes in GDP, interest rates and shadow economic activities. In economies with high GDP, a substantial share of the increase cannot be explained by changes in interest rates or in the size of the shadow economy. We conjecture that the unexplained component is related to increased hoarding.

^{*} The views expressed in this paper are solely those of the author. No responsibility for them should be attributed to the Oesterreichische Nationalbank, or the Eurosystem. I thank Prof. Schneider for sharing the shadow economic indicators and Tobias Himmelbauer for excellent research assistance.

1. Introduction

Over the past decade, currency in circulation has increased sizably in a number of large economies, including the Euro area, the USA and Japan. This is difficult to reconcile with the extant and growing use of cashless payment technologies in industrialized economies (Amromin and Chakravorti 2009; Bagnall et al. 2014). Also, the mere size of physical cash that is circulating in the hands of the public is difficult to explain by transaction needs: In 2014 per capita holdings were around 4000 US dollar in the Euro area (EUR) and the USA. Accounting for foreign demand would sizably reduce these figures but would nevertheless not change the fact that per capita circulation is substantial. Both the magnitude of cash circulation and its increase over the past decade(s) raise questions that are of relevance for central banks and economic policy makers: What explains the puzzling size of cash circulation? Can the extent and the increase over time be explained by conventional economic forces, e.g. lower interest rates?

In this short paper we summarize results of Jobst and Stix (2017). To assess and to understand recent trends, the analysis looks at currency demand from a broader perspective, i.e. it goes beyond the literature's typically rather narrow focus on either relatively short time periods (e.g. the post-World War II period) or on relatively few economies (e.g. the USA, the Euro area, etc.). First, the demand for currency is analyzed from 1867 to 2015 for the United States, Germany and, at the end of the sample period, the Euro area. This perspective is informative with regard to the long-run trend in cash as well as how large financial crises affect cash demand. Second, we describe results from an analysis of the contemporaneous development of currency from 2001 until 2014 for a sample of 70 economies. This perspective allows us to econometrically study the drivers of cash demand. The focus is on changes in cash demand, not on absolute levels.

2. Demand for Deutsche mark und US dollar from a longer-term perspective

Figure 1 displays the ratio of currency in circulation (CiC) over nominal GDP from the last quarter of the 19th century to 2015 for the United States (USA), the Euro area (EUR) and Germany (DEU).¹ Generating long time series involves several compromises and judgments. While details are discussed in Jobst and Stix (2017), it should be mentioned that one important decision concerns the inclusion or exclusion of specie money. Until about the

¹ The euro series for the period from 1980 to 2001 reflects a synthetic aggregate of Euro area members.

1920s, countries differed sizably with respect to the circulation of gold coins which in some countries substituted for lower to medium denomination banknotes in payments and/or served as a store of wealth. As can be seen from Figure 1, the inclusion or exclusion of specie money makes a substantial difference in the case of Germany.²

In the following descriptive account, we focus on large trends. The following main observations can be taken from Figure 1.

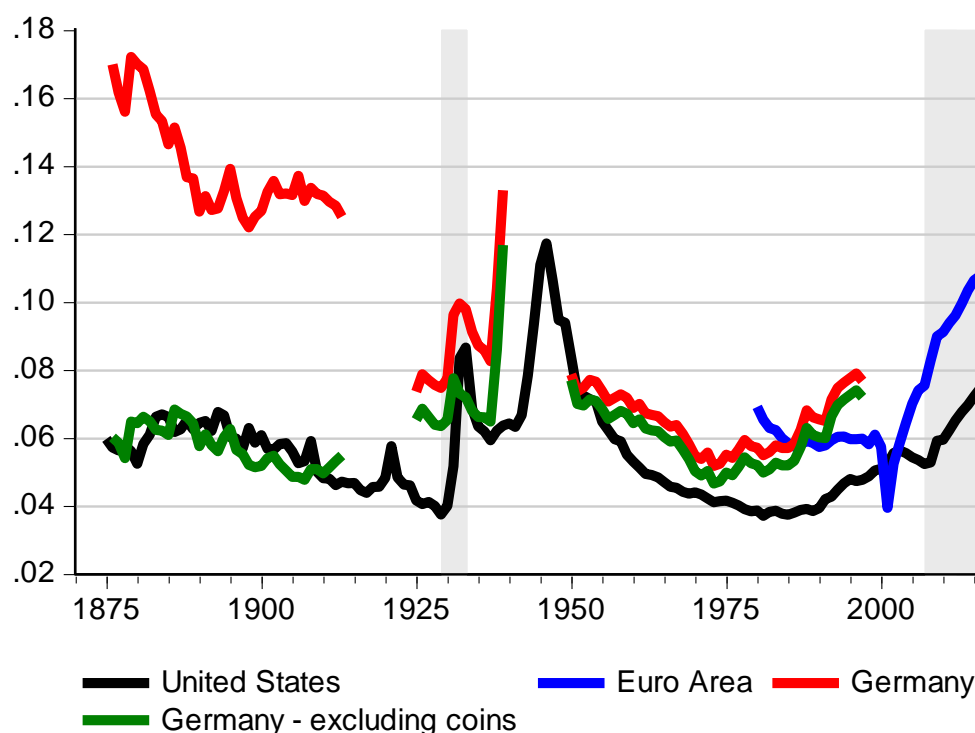
- 1) Comparing the values of 1990 with those from around 1890 informs us that cash use has declined: from 13% to 6% in DEU (including coins) and from 6% to 4% in the USA.
- 2) The decline in currency demand is not uniform. World War II marks the most dramatic change; other events which affected velocity are World War I and the Great Depression.
- 3) Over the post-World War II period there is a secular decline in currency demand. This is the time frame that is usually analyzed in studies on the use of currency. It is evident that the focus on only the post-World War II period “biases” the picture as CiC levels were outstandingly high after the war.
- 4) Since the mid-1980s the long-run trend decline has come to a halt or even reverted: CiC has increased in the USA and in DEU.
- 5) Since 2007, CiC over nom. GDP has increased further in the USA and EUR. The recent increases are large even if seen over a 150 year horizon.

Figure 1 informs us regarding some long-run trends that prevailed in both economies and that cannot be attributed to country-specific developments. There is large agreement as to the causes of the decline after World War II: increase in the dissemination of transaction accounts, the non-cash payment of wages, the increased use of payment cards and cheques and the dissemination of ATMs which allowed consumers to economize on cash balances (e.g. Krüger 2016). The increase in CiC after the mid-1980s fits well to political/economic events (e.g. the breakdown of Communism, developments in Latin American economies) which fueled international demand for US-dollar and Deutsche mark (Porter and Judson 1996, Seitz 1997).

² The USA series contains specie money. As the deposit to currency ratio is roughly the same in Germany and in the USA until 1914, this could imply that more wealth was held in assets other than cash or deposits (stocks, bonds, etc.) in the USA than in Germany. However, this conjecture would require further scrutiny, which is outside the scope of this paper.

One development which received considerable attention was the rapid increases in euro circulation after the introduction of euro cash in 2002 and before 2007. Figure 1 suggests that this is not so surprising given that the circulation of euro relative to nominal GDP in 2006 was around the level of the Deutsche mark before the introduction of the euro. In this sense, one could view the trend in euro circulation before 2007 as a catching up effect after the decline in circulation in the wake of the cash changeover in 2001/2002. However, what is astonishing is the very strong increase after the outbreak of the 2007 crisis, with an accelerating trend in EUR and an increase in the USA (cf. Judson 2017). With the exception of World War II, there is only one episode with a comparable increase, the Great Depression. However, closer scrutiny shows that the increase was much steeper and more sudden in the 1930 than it has been after 2007/08.³ A similarity between the Great Depression and the concurrent development is that the increase was (and has been) rather persistent.

Figure 1. Currency in Circulation over Nominal GDP (in %) in Germany and the USA



Note: The shaded area marks the period from 1929 to 1933 and from 2007 to 2015. The series for the Euro area has been constructed prior to 2002. Source: See Jobst and Stix (2017).

³ See also the analysis of deposit-to currency ratios in Goodhart and Ashworth (2017).

3. Some Facts about the Demand for Currency from 2001 to 2015 for many economies

Another way of assessing recent developments in currency demand in EUR and the USA is to compare them with those in other economies. One advantage of this approach is that it provides evidence on currencies which are not demanded internationally. The disadvantage is that comparable data are only available for a relatively short time period. Specifically, Jobst and Stix (2017) have collected data from around 70 economies for the period from 2001 to 2014.⁴

3.1 *Data description and aggregation*

Jobst and Stix (2017) provide a description of how economies were selected. In essence, the sample covers the richest economies in terms of their absolute economic size plus some regionally important economies that were added for breadth of geographical coverage. Overall, all included economies account for about 96% of World GDP in each year from 2001 to 2014. Henceforth, this sample will be denoted as the “World”.

Aggregating economies raises the issue of which exchange rate to apply. In this paper, all results which refer to aggregations are based on USD exchange rates that are fixed as of 2006. This eliminates the impact of exchange rate movements that have occurred in the course of the economic and financial crisis. Jobst and Stix (2017) provide results on aggregations based on other exchange rates and find that results are largely unaffected, qualitatively.

3.2 *Descriptives*

Table 1 lists the 20 economies with the highest per capita values of currency in circulation both using market exchange rates (USD) and purchasing power adjusted exchange rates (PPP-USD). Per capita circulation fluctuates enormously ranging from about 30-70 USD in African economies (Kenya, Tanzania, Uganda, Nigeria, Cameroon) to 9000 USD in Switzerland (CHE). The Euro area and the USA had a per capita circulation of around 4000 USD. This compares with values of 1250 USD in Sweden and 1520 USD in Norway which are considered as frontrunners in electronic payments. Although the purchasing power adjustment changes the ranking of economies, the table substantiates that cash is not only used for legal transactions but must also be hoarded in many economies and/or serves other purposes.

⁴ Goodhart and Ashworth (2017) conduct an analysis of currency demand for six economies. Additionally, they analyze the temporal evolution of currency to deposit ratios.

Table 1. Size of currency holdings in US dollar

Country	Currency in circulation per capita (USD)	Currency in circulation per capita (PPP-USD)
Switzerland	9009	6024
Japan	7257	7303
Hong Kong	5874	8055
Singapore	4546	6685
Euro area	4085	3997
United States	4059	4059
Australia	2565	1853
Czech Republic	2144	3338
Denmark	2127	1574
Israel	1927	1721
Canada	1781	1562
Qatar	1705	2556
Hungary	1634	2880
Norway	1525	1016
Kuwait	1507	na
Azerbaijan	1450	3221
South Korea	1409	1731
United Kingdom	1399	1201
Saudi Arabia	1396	3001
Iceland	1306	1087

Note: The table shows per capita values of currency in circulation expressed in US dollar (USD) and in purchasing power adjusted US dollar (PPP-USD) for the year 2014. The table shows the 20 countries with the highest values for currency in circulation (USD). Source: See Jobst and Stix (2017).

One interesting aspect concerns the relative importance of economies for total “World” currency demand. Table 2 shows that the four large economies EUR, USA, JPN and CHN account for 72% of total “World” currency in circulation.⁵ All other economies are substantially less important in this respect. Switzerland, Singapore and Hong Kong, for example, account for rather small shares in total “World” currency in circulation despite their large per capita circulation.

⁵ The exact ranking depends on the exchange rate (the table refers to the year 2012). In other years, USA is ranked second and JPN third.

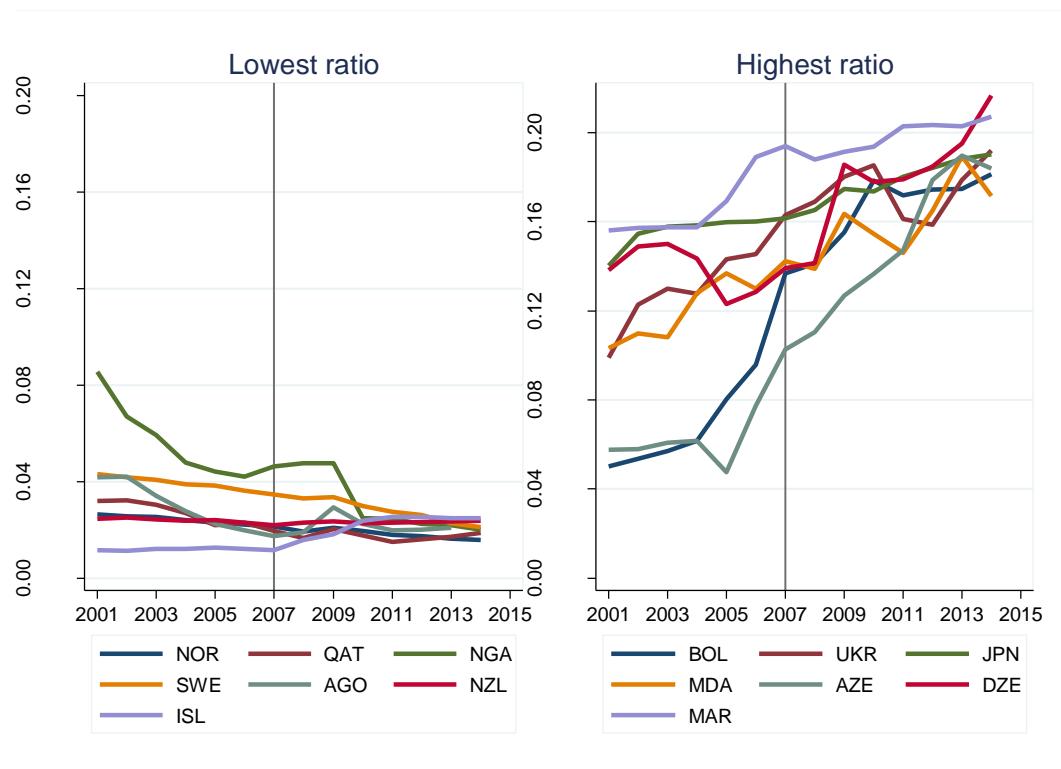
Table 2. Relative shares of currency in circulation

Country	Percentage share of "World" currency in circulation	Accumulated share	OECD member	Dollarized
Euro area	19.9	19.9	1	0
Japan	18.9	38.9	1	0
United States	18.6	57.5	1	0
China	14.3	71.8	1	0
Russia	3.5	75.2	1	1
India	3.4	78.6	0	0
Brazil	1.6	80.2	0	0
United Kingdom	1.3	81.5	1	0
Switzerland	1.1	82.6	1	0
Mexico	1.1	83.7	1	0
Canada	1.1	84.7	1	0
Australia	1.0	85.7	1	0
South Korea	0.8	86.5	1	0
Indonesia	0.8	87.3	1	1
Argentina	0.8	88.1	0	1
Saudi Arabia	0.7	88.8	0	0
Thailand	0.7	89.5	0	0
Algeria	0.6	90.1	0	0
Hong Kong	0.6	90.7	0	0
Egypt	0.6	91.3	0	1

Note: The table shows the 20 economies with the highest relative shares of “World” currency in circulation (column 2). Column 3 shows the accumulated share and column 4 and 5 express whether the respective economy is member of the OECD or whether it is classified as dollarized. All values refer to the year 2012. Market rate US dollar (USD) are used for calculating respective values. Source: See Jobst and Stix (2017).

An alternative way of comparison is to rank economies by their CiC over nominal GDP ratios. Figure 2 depicts the seven economies with the lowest and highest ratios as of 2013. Again, a very sizeable dispersion is evident. The group of economies with the lowest ratios contains three Nordic economies (NOR, SWE, ISL). The group of economies with the highest ratios typically consists of economies with lower GDP--with the notable exception of Japan. If one focuses on changes over time, then the ratio is trending downward (upward) in economies with the lowest (highest) ratio. However, there are some exceptions. For example, Island which had the lowest ratio prior to 2007, experienced an increase in the ratio after 2007. Also, in Angola, there is an increase from 2008 to 2009.

Figure 2. Economies with the lowest and highest currency in circulation over nominal GDP (in %) ratios

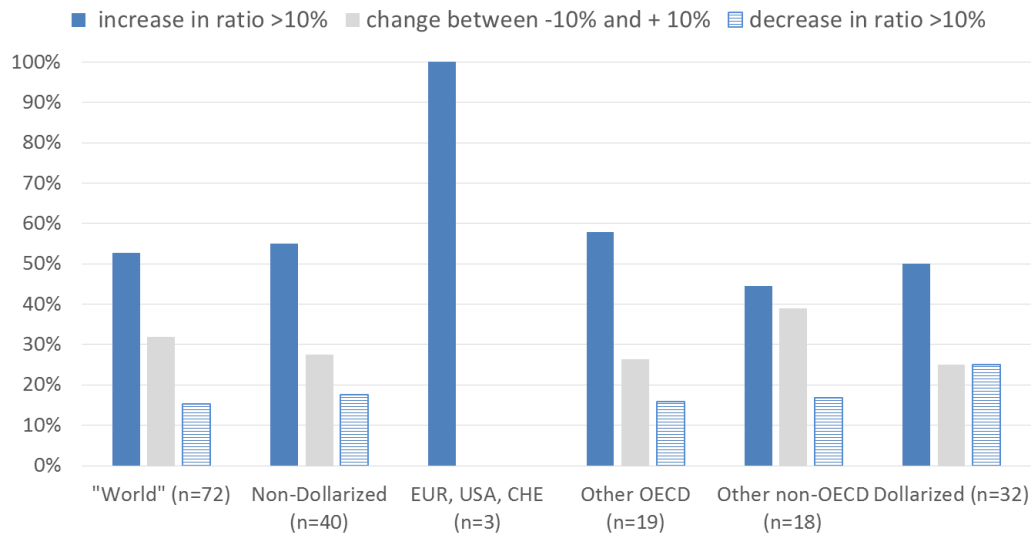


Note: The left panel shows the 7 economies with the lowest ratio of currency in circulation over nominal GDP as of 2013 (in %). The right panel shows the 7 economies with the highest ratio as of 2013. Source: See Jobst and Stix (2017).

Figure 3 provides a summary of the temporal development of currency in circulation to nominal GDP ratios in 72 economies. Specifically, we focus on the change in the ratios from 2004/05 to 2013/14 and show the relative proportion of economies in which the ratio increased by more than +10 percent as well as the proportion of economies in which the ratio decreased by more than -10 percent. In the sample of all economies (“World”), the unweighted mean (median) change is 17 (13) percent. One quarter of economies faced an increase by more than 37%.

Figure 3 shows that the share of economies with an increase (solid bars) is higher than the share of economies with a decrease (contoured bars). This holds for the “World”, for dollarized and for non-dollarized economies (the latter group is further separated in OECD and non-OECD members).

Figure 3. Changes in currency in circulation over nominal GDP ratios from 2004/05 to 2014/14



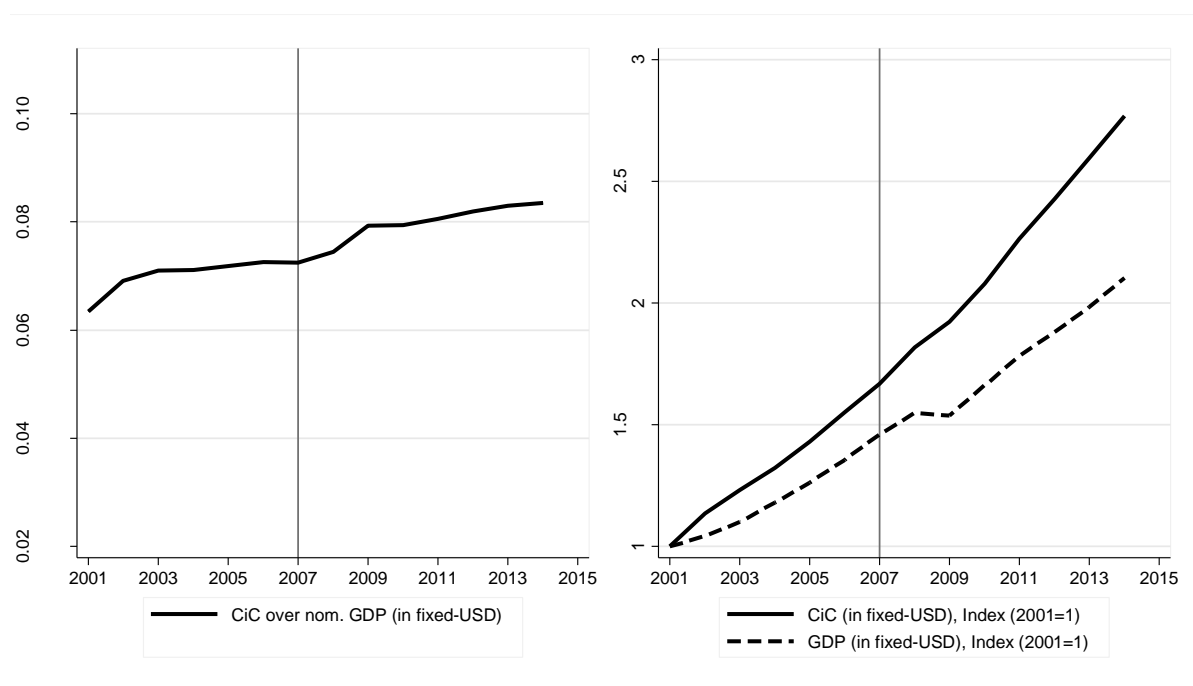
Note: The figure shows descriptive statistics about changes in the currency in circulation over nominal GDP ratios over the period from 2004/05 to 2013/14 for the “World” and several sub-aggregates. The solid bars depict the relative share of economies with an increase of the ratio by more than 10% (within each group). The contoured bars show the relative share of economies with a decrease of the ratio by more than -10%. The grey bars (in-between) show the remaining share of economies with a change in the ratio that lies between -10% and plus 10%. The group size is indicated in parenthesis. Averages are taken for 2004/05 and 2013/14 to reduce the effect of outliers. Source: See Jobst and Stix (2017).

3.3 Aggregate currency demand in the “World” and in sub-aggregates

Another way of analyzing the data is to aggregate economies, which implicitly accounts for their relative size. The left panel of Figure 4 depicts the CiC over nominal GDP ratio for the aggregate of all economies in our sample (“World”). The resulting ratio displays an upward slope throughout and a discernible level shift between 2007 and 2009.

The observed increase of the CiC over nom. GDP ratio could be the result of a declining GDP in the course of the global financial crisis. The right panel of Figure 4 depicts the indexed temporal evolution of nominal CiC and nominal GDP. Nominal GDP remained roughly constant from 2008 to 2009 but increased afterwards. At the same time, nominal CiC increased from 2008 to 2009. Therefore, the ratio of these two variables increased from 2008 to 2009. The interesting development is that the gap between CiC and nom. GDP was growing throughout the entire observation period.

Figure 4. Currency in circulation over nominal GDP (in %) – “World”



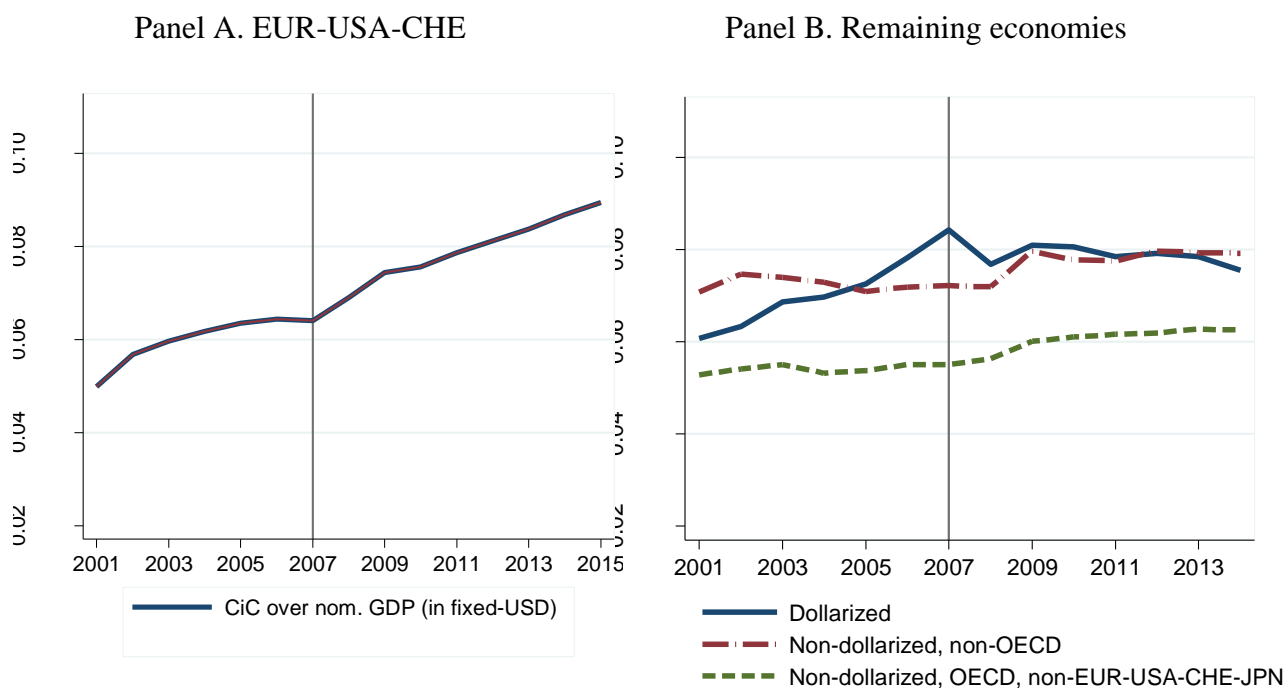
Note: The figures show the currency in circulation to nominal GDP ratios (left panel) as well as the evolution of currency in circulation and nominal GDP (right panel). All figures refer to the “World” as specified in Jobst and Stix (2017). The aggregation is based on market USD exchange rates that are fixed at 2006. Sources and methods are described in Jobst and Stix (2017).

Figure 5 contrasts the development in the main economies that face overseas demand, USA, EUR and CHE, with the development in the remaining economies. Among the remaining economies, three sub-aggregates are shown: (i) dollarized economies, (ii) non-dollarized economies that are not members of the OECD and (iii) non-dollarized economies that are OECD members. In the latter aggregate Japan has been excluded because of its large weight within this group.

The comparison shows that the increase in the CiC to GDP ratio is not confined to the international currencies – although the increase is less strong than for the EUR, the USD or the CHF. In non-dollarized non-OECD member economies, there is an increase from 2008 to 2009 and a constant ratio afterwards. Among non-dollarized OECD member, the increase around 2008 is smaller but the positive trend has continued until 2014. The development in dollarized economies contrasts strongly with the development in non-dollarized economies as a strong upward increase can be found until 2007. We conjecture that this increase is due to the period of “great moderation”, i.e., low interest rates and increasing levels of trust in national currencies resulting in a reduction of currency substitution. From 2007 onwards, this changed as the ratio was first declining and then relatively constant. If one presumed that

overall cash demand in dollarized economies, that is domestic currency plus cash of foreign denominations, increased also in dollarized economies around 2008/09, as it did in many other non-dollarized economies, then Figure 3 visually suggests that some EUR, USD and CHF cash flowed to dollarized economies after 2007.

Figure 5. Currency in circulation over nominal GDP (in %) – Sub-aggregates



Note: The figures show currency in circulation to nominal GDP for various aggregates of economies. Panel A refers to the aggregate of the Euro area, the USA and Switzerland. Panel B refers to (i) dollarized economies, (ii) non-dollarized non-OECD economies and to (iii) non-dollarized OECD economies excluding EUR, the USD, CHF and JPN. The yen was excluded because of its high weight in this aggregate. All aggregations are based on market USD exchange rates that are fixed at 2006. Sources and methods are described in Jobst and Stix (2017).

Overall, the descriptive account shows (i) that cash demand has increased in the World as a whole, (ii) that cash demand has increased not only in EUR and the USA but in the majority of economies from 2003 to 2014 and (iii) that the increases cannot be assigned to only poorer or richer economies.

4. Reasons for recent increases in currency demand

There are four plausible arguments that could rationalize the increase in cash demand.

- First, after 2007/08 interest rates decreased in the majority of economies and reached near-zero levels in some economies.
- Second, it has been stipulated that increases in shadow economic activities, tax evasion and/or higher shares of self-employed could be drivers of higher cash demand (Goodhart and Ashworth 2014).
- Third, the increases could be a consequence of portfolio shifts either due to lower confidence in banks or due to increased uncertainty. This interpretation focuses on the asset (safe haven) role of cash. Note that this interpretation does not necessarily rely on the occurrence of banking panics as in the 1930s. Goodhart and Ashworth 2015, for example, exclude banking panic as a main driver of cash increases in some major economies.
- Forth, Friedman and Schwartz (1963) argue that velocity tends to decrease in contractions because agents' demand for cash is based on permanent income rather than period income. In this line of argument, cash holdings could be higher relative to GDP if agents have not adjusted their pre-crisis estimate of permanent income to the lower income growth that occurred after 2008.

To analyze the relative importance of these factors Jobst and Stix (2017) estimate a panel money demand model where (log) real per capita cash holdings is related to (log) real per capita GDP, deposit interest rates and a measure of shadow economic activities. This measure is based on Schneider (2017) and does not employ cash as an input in its computation. In addition time dummy variables for the years after 2008 are employed to measure whether any shift can be observe after 2008 that cannot be assigned to the other independent variables. The panel estimation is based on a fixed effects model such that the focus of the analysis is on changes over time (with different levels in cash demand across economies being controlled for). Also, it is important to note that point estimates reflect an average effect across economies, not accounting for their relative size.

Given the difficulties in isolating the foreign demand component we omit the USA, EUR and CHE from our sample such that all estimations primarily reflect domestic demand. Similarly, the estimations focus on non-dollarized economies only. The main results can be summarized as follows:

1) In general, the results yield plausible parameter estimates. This is reassuring as the economies that are included in the estimation differ substantially by their economic and

financial development.⁶ For example, the income elasticity, which is allowed to vary across economies is on average below one in higher GDP economies which suggest that there are economies of scale in the use of cash.

2) Interest rates are found to exert a significant negative impact on cash demand. Given the changes in interest rates after 2008, Jobst and Stix (2017) conduct various specifications to check for the robustness and to analyze whether the elasticity of cash demand changes as interest rates become very low (log-log, semi-log, different slopes after 2008, different parameters for interest rates below and above one percent). The findings suggest a saturation level of cash that agents are willing to hold even if interest rates are (very) close to zero. In general, this result implies that part of the increase in cash demand can be attributed to lower interest rates.

3) No significant effect is found for the shadow economy indicator, suggesting that changes in shadow economic activities exerted no impact on changes in cash demand during the period under study. The reason for this finding is that the shadow economic indicator is declining in many economies over the sample period, while demand for cash is increasing.⁷

4) Does the temporal evolution of GDP and interest rates explain all of the changes? Given the heterogeneity of economies, the sample is split into several groups. For economies with below median GDP per capita, it is found that the time dummy variables are insignificant, implying that all of the changes (increases) can be explained by these conventional economic forces. However, for economies with above median GDP the time dummy variables indicate an unexplained upward shift after 2009 that cannot be explained by GDP and interest rates. To delve deeper into the reason for this unexplained increase, further analyses are conducted for higher GDP economies.

5) The use of (an incomplete proxy for) permanent income instead of period income as a scale variable renders the unexplained shift smaller but does not eliminate it.

A natural next extension would be to include measures of trust in banks or perceived uncertainty and to study whether these variables account for the unexplained level shift. As such data are unavailable, an indirect test is conducted by splitting the sample into groups of economies. Specifically, economies (i) that did not experience any systemic financial crisis in

⁶ A few economies with very implausible point estimates for the income (scale) elasticity were omitted from the sample.

⁷ For example, it declined in 30 out of 32 OECD economies from 2003 to 2014. Although cash demand estimations omit the Euro area it should be noted that an increase of shadow economic activities is only found in Cyprus, Spain and Portugal. In the USA, GBR and JPN there is a slight decrease.

the post World War II period were compared with economies that (ii) either experienced a financial crisis in 2007/08 or had (iii) experienced a financial crisis before 2007/08.⁸ The idea for the inclusion of the latter group is that memories of crisis can have a strong impact on financial behavior of individuals (Malmendier and Nagel 2011, Osili and Paulson 2011, Stix 2013) even if no crisis occurred in the specific economy in 2007/08.

The currency demand model can be estimated for each of the three groups and it is tested whether the time dummy variables remain significant. The problem with this approach is that the group without any financial crisis is very small (the model is estimated only for above median GDP economies). Moreover, there might be unobserved variables which affect cash demand that are correlated with the groups. Therefore, results are indicative only and cannot be interpreted as causal.

The estimation results are in line with expectations. In the group of economies without a financial crisis no unexplained level shift is found. In the group of economies with a financial crisis a significant level shift is found⁹ such that results are indicative that financial crises have had an impact on post-crisis cash demand. The finding indicates that cash demand increased also in economies that had a financial crisis before 2007/08 but not in 2007/08.

5. Conclusions

The paper summarizes results from Jobst and Stix (2017) and provides some additional descriptive evidence. Findings show that cash demand has increased not only in EUR and the USA but also in many other economies over the past decade.

The results from panel estimations for non-dollarized economies and for currencies that are not circulating internationally indicate that lower interest rates and the evolution of income explain parts of the increase. However, in economies with a higher GDP, the increases after 2009 cannot fully be accounted for by these conventional economic forces. Changes in shadow economic activities are not found to have had an effect on changes in cash demand. As results represent an average effect across economies this does not mean that changes in shadow economic activities might not have been of importance for cash demand in some economies as, for example, stated in Goodhart and Ashworth (2015, 2017). Moreover, it

⁸ The separation of economies into these groups is based on Laeven and Valencia (2012).

⁹ With regard to the effect of the financial crisis of 2007/08, results depend on the functional form of money demand (log-log or semi-log) and are not unambiguous.

should be made clear that we focus on changes in cash demand and not on level differences across economies and that we just use one indicator of shadow economic activities.¹⁰

On a general note, the finding that cash demand has increased in relatively rich economies--whereas one would expect a decline in these economies due to the proliferation of cashless payments (Bagnall et al, 2016)--implies that overall currency in circulation is dominated by hoarding and other motives rather than by transaction motives.

What are the drivers for the unexplained increase in cash demand? Many factors other than income and interest rates could be important for the increase in cash demand. The problem is that good empirical measures are unavailable across time and across economies to solidly assess their importance. Therefore, any explanation of the unexplained increase in cash demand in higher GDP economies necessarily has to remain speculative.

In this sense, we conjecture that the financial crisis of 2007/08 and the subsequent turbulences in some economies might have lowered confidence in banks and/or increased uncertainty, notably also in economies without a financial crisis. Friedman and Schwartz (1963), discussing cash demand after the Great Depression, stress the general role of uncertainty: *“The more uncertain the future, the greater the value of [the] flexibility [of cash] and hence the greater the demand for money is likely to be”* (p. 673). This channel, in combination with very low interest rates, might constitute one additional important reason for the increase in cash demand in many richer economies after 2009. However, without detailed data on confidence in banks or the public’s perception of uncertainty, this explanation is difficult to test empirically. Not least in order to explain the observed pattern in cash demand the argument requires a rather persistent increase in uncertainty/decrease in confidence and not just a short-term temporary change in 2008/09.

Evidence about the temporal evolution of uncertainty is provided by the news-based Economic Policy Uncertainty Index which is available for some economies (Baker, Blum and Davis 2016). Figure 6 shows a substantial increase in policy uncertainty after 2008 in many economies, i.e. the Global index, Europe and the USA.¹¹ In Sweden, which is shown for comparison, there was no increase. In Europe, the increase in economic policy uncertainty has been persistent, in the USA it normalized around 2015. Alternative evidence is provided in

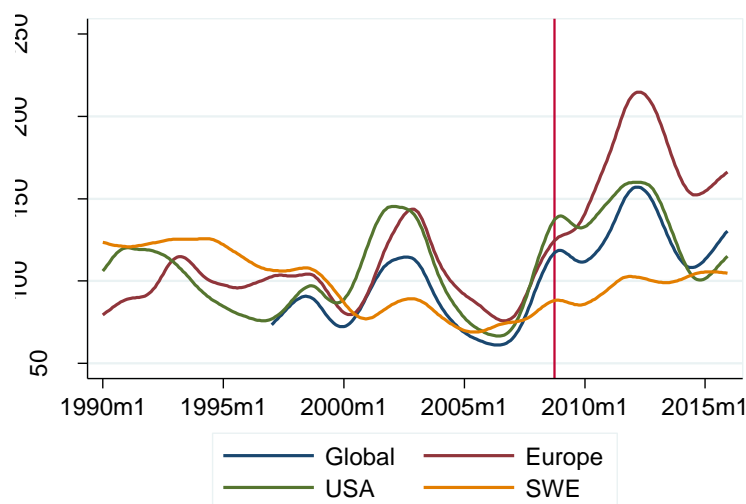
¹⁰ A measure of self-employment or alternative measures of tax evasion are available for a subset of economies (cf. Goodhart and Ashworth, 2017).

¹¹ The index for Europe reflects policy uncertainty in France, Germany, Italy, Spain und the United Kingdom.

Figure 7 which shows trends in Google searches for the word “gold” (Google Trends 2017).¹² The idea is to measure the tendency of the broad public to search for information about a safe asset. The respective index for the Euro area has deviated from the index for the USA or Sweden around 2010 (the time of the Greek debt crisis) and has been much higher since then.

The fact that the reasons underlying the increases in currency demand cannot be identified with reasonable certainty highlights that there is a dire need for more data and more research to better understand the public’s use of cash in calm times and in times of crisis/uncertainty. Without this understanding, it is not a good idea to phase out physical currency and to replace it by electronic means of payments as has been advocated by some scholars (e.g. Rogoff, 2016).

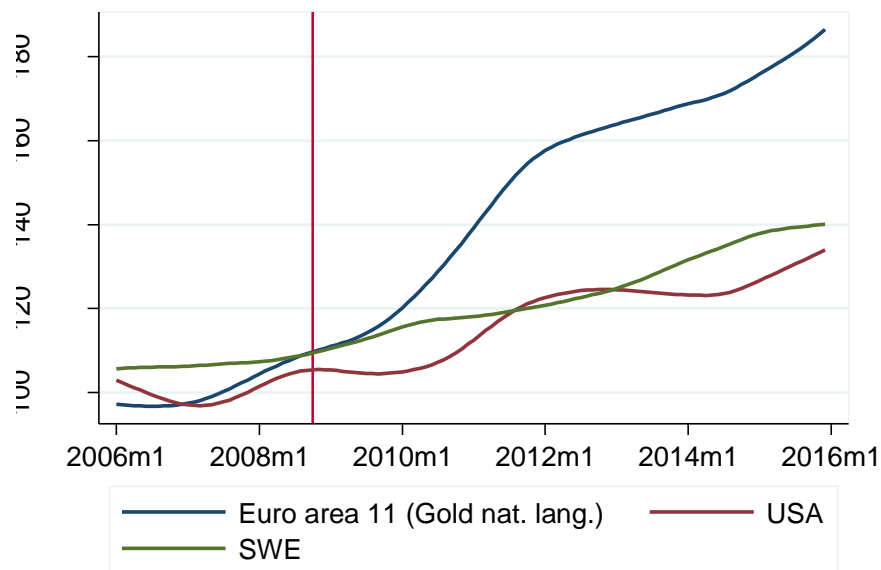
Figure 6. Economic policy uncertainty



Note: The figure shows news-based economic policy uncertainty indices. The original monthly series was HP filtered. Source: Global, USA and Europe: Baker., Bloom and Davis (2016). Sweden: Armelious, Hull and Stenbacka Köhler (2016). All series from www.PolicyUncertainty.com (accessed April 2017).

¹² Jobst and Stix (2017) construct a weighted index for the Euro area 11. In principle, Google records all searches for the term “gold” which could be “gold medal” or any other term and relates it to the overall number of Google searches. Further contextual information provided by Google Trends shows that “buying gold” is always in the top 10 list of searches which included the word “gold”. For the construction of the Euro area 11 index, the national language searches for “gold” were used.

Figure 7. Index of Google Searches for „Gold“



Note: The figure shows HP filtered indices of Google search trends for the word “Gold”. The series for the Euro area 11 aggregate was constructed using search terms in national language and weights according to the Eurosystem capital keys of individual economies. Source: Google Trends (trends.google.at/trends), accessed April 2017. Own calculation.

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