CASH IS ALIVE: HOW ECONOMISTS EXPLAIN HOLDING AND USE OF CASH

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GUIDE TO CODE AND DATA

I. OVERVIEW

All data are taken from public sources (ECB, BIS, World Bank, and Federal Reserve websites). I certify that the author of the manuscript has legitimate access to use the data used in this manuscript. Each source is listed in each caption of each Figure and Table in the paper. More detailed descriptions of the sources are provided in this ReadMe.pdf file (see data section below).

There are eight (8) data files in R data format (.RDS) and one (1) R-code file (.R). To reproduce the tables and charts, please follow the following steps:

1. Place all 9 files into a single directory (folder) in your computer.
2. Launch the CASH_2022_4_4.R file using your R-software (for example, R-Studio for just R).
3. Change the working director (WD) to the folder where all 9 files are stored on your computer.
4. Run the code using theCASH_2022_4_4.R file.

The code should generate all tables and charts using the 8 data (RDS) files.

II. DATA AND PROGRAMS

Program. The code will run on R version 4 (I ran the code on v.4.0.3 and also on the currently latest version: v.4.1.3. The total run time is less than 40 seconds (tested on an Intel-i3 1.2GHz machine running Windows 10 with 8GB RAM, and also on an Intel-i9 2.9GHz machine running Windows 10 with 32GB RAM. The run time includes the time of loading the libraries (R packages).

R is a free software environment for statistical computing and graphics and can be downloaded from https://www.r-project.org. I recommend using R-Studio to run R, which can be downloaded from https://www.rstudio.com.

All tables and charts can be constructed using a single R-code file:CASH_2022_4_4.R. The tables are constructed as data frames and then transformed into the LaTeX table format. Charts can be exported from R-Studio in various formats such as PDF, PNG, JPEG, TIFF,

ESP, and more. If you are not using R-Studio, remove the comment sign (#) just before the ggsave(Figure_x.jpg, ...) command which you will find after each ggplot(...) command. This will save the plot on your hard drive in the desired format (JPG in the current code). You should also be able to resize the plot which is currently set for 11x8.5 (the size of a US Legal paper in landscape mode). For Figure 5 (decision tree), uncomment the png(filename=...) command and it will be saved in PNG format.

Data. The 8 data (RDS) files are called by the R-code file when they are needed for the construction of a table or a chart. Below, I list the name of each data file and how it is used by the R-code to construct a specific table or chart.

The description of the data files below contains also descriptions of the data sources. The source files had to be manually edited to reach their final formats that are provided in the RDS files.

HOARD.RDS. This data file is used for drawing Figure 3.
The raw data were taken from the Federal Reserve Board: Data on currency and coin Services.
Available at https://www.federalreserve.gov/paymentsystems/coin_data.htm#value (accessed April 4, 2022). This webpage provides charts and data tables of USD currency in circulation by volume and value by year. Click on Data Table, and then on ASCII. Save the text table to a TXT file and manually remov the text lines. The TXT can then be converted to an RDS file directly or via a CSV (Excel) file (TXT to CSV to RDS).

HOARD_EU.RDS. This data file is used for drawing Figure 4.
The raw data were taken from the European Central Bank (ECB): Banknotes and coins statistics. Available at https://sdw.ecb.europa.eu/reports.do?node=1000004105 (accessed April 4, 2022). This site provides data on euro currency in circulation (volume, value, and by denomination) from 2002 and on. Using the above website, follow these steps:

1. Click on Euro banknotes. Then,
2. Click on Values.
3. On the left menu, click on Data (just below 1.2 Values).
4. Click on the box below BKN denomination breakdown and choose 5 (for 5 euro denomination). Click anywhere outside that box and you will see that the box now includes 50P0.
5. Scroll down a little bit, and click on Net Circulation. You should now see a chart of net circulation of the 5 euro denomination and below it a time series since 2002. I took the December value from each year.
6. On the upper menu you can click on Data Download which allows you to save this time series in CSV format.

7. Repeat steps 4, 5, and 6 separately for the 10, 20, 50, 100, 200, and 500 euro denominations.

8. Manually merge all the 7 CSV files (7 denominations) into a single Excel file where each denomination time series is a column. Save as CSV and covert it to an RDS data file.

TREE_210210.RDS. This data file is used for drawing Figure 5.
The raw data were taken from the Federal Reserve Bank of Atlanta: The 2017, 2018, and 2019 Diary of Consumer Payment Choice (accessed April 4, 2022). See "additional information" below. From step 4 in the additional information below, this RDS data file contains only the relevant variables needed for the construction of Figure 5.

PI_SHARE_210207.RDS. This data file is used for drawing Figure 6 and also for the construction of Table 4.
The raw data were taken from the Federal Reserve Bank of Atlanta: The 2017, 2018, and 2019 Diary of Consumer Payment Choice (accessed April 4, 2022). See "additional information" below. From step 4 in the additional information below, this RDS data file contains only the relevant variables needed for the construction of Figure 6.

ATM_48_COUNTRIES.RDS. This data file is used for drawing Figure 7.
The raw data were taken from the World Bank: Data on automated teller machines (ATMs) and GDP per capita. Available at https://data.worldbank.org/indicator/FB.ATM.TOTL.P5 and https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD (accessed April 4, 2022). Both websites provide country-specific data for the latest year that the data are available. I downloaded an Excel file from the first link (ATMs) and manually selected 48 countries (deleted all other countries). I followed the same procedure for the second link (per-capital GDP). Then, using cut-and-paste, I merged the two Excel files into a single Excel (CSV) file with three columns: Country's name, number of ATMs, and per-capital GDP. Finally, I converted the CSV to the RDS data file.

CIC_BIS_2012_2019.RDS. This data file is used for the construction of Table 1.
The raw data were taken from the Bank of International Settlements (BIS): Payments and financial market infrastructures. Available at https://stats.bis.org/statx/toc/CPMI.html (accessed April 4, 2022). This website provides a comparative table on banknotes and coins in circulation for selected countries. Click on Banknotes and coins; institutions; transferable deposits (under Comparative tables) and then on CT2 Banknotes and coins in circulation and download a CSV file. The data on Norway is from a working paper Norges Bank (2020). I manually copied the numbers from Table 4 on p.26 (Banknotes and coins in circulation) and from Table 1 on p.25 (GDP and population).

ASSESSMENTS_210310.RDS. This data file is used for the construction of Table 5.
The raw data were taken from the Federal Reserve Bank of Atlanta: The 2019 Survey of Consumer Payment Choice. Available at https://www.atlantafed.org/banking-and-payments/consumer-payments/survey-of-consumer-payment-choice.aspx. This website provides archives of survey data from 2008 until 2020 (which are different from the diary datasets). Summary tables are also available including tables that summarize respondents' assessments of each payment method. Click on Archived

Surveys and then on 2019 Survey, and then on Datasets, (all these sites were accessed on April 4, 2022).

DIARY171819_210206.RDS. This data file is used for the construction of Table 6. The raw data were taken from the Federal Reserve Bank of Atlanta: The 2017, 2018, and 2019 Survey and Diary of Consumer Payment Choice. This data file combines data from step 4 in the additional information below and also from the 2019 survey data describe under ASSESSMENTS_210310.RDS.

Additional information on the Diary of Consumer Payment Choice. To obtain a decent sample size with respect to the number of respondents, I merged the 2017, 2018, and 2019 diaries of consumer payment choice (accessed April 4, 2022). To download these data follow the following steps:

1. Click on Archived Diaries (accessed April 4, 2022). This link displays archives of each year's diary.

2. Click on each year's archive (say, 2019) and then click on Data Sets.

3. Download 2 files in RDS format: Individual-level data set and transaction-level data set. The individual-level data set contains the demographic variables of each respondent. The transaction-level data set contains the payments made by each respondent by payment method (such as cash, credit cards, etc.). You can also download the Data Codebook which describes all the variables in the dataset.

4. Merge all 6 datasets by "id" variable (unique ID for each respondent) into a single dataset.

References.

Bank of International Settlements (BIS), 2022. "Payments and Financial Market Infrastructures [datasets]." https://stats.bis.org/statx/toc/CPMI.html (accessed April 4, 2022).

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World Bank (WB), 2022a. “Automated Teller Machines (ATMs) (per 100,000 adults) [dataset].” https://data.worldbank.org/indicator/FB.ATM.TOTL.P5 (accessed April 4, 2022).

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