

README file for the replication package
to accompany the paper

”Consumer Spending in Switzerland:
Insights from a Novel Transactional Data Index”
by

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Version date of readme file: March 6, 2026

Overview

The `ReplicationPackage` reproduces the results presented in the paper and is organised into three subfolders: `Code`, `Input` and `Output`.

- The `Code` folder contains the R scripts used to generate all the figures, tables and numerical results in the paper.
- The `Input` folder contains the supplementary data required for the analysis, excluding the primary Worldline data source.
- The `Output` folder is automatically populated with figures when the code is executed.

Below we outline the data required, provide a detailed description of the code folder, map exhibits to their corresponding scripts, and give instructions for reproducing the results of the paper. This package is designed for use with R 4.4.1 on [Nuvolos].

Data

Access to Worldline Data

Our main primary data source for the paper is the transactional data set provided by Worldline Schweiz AG. Access to the data is granted by Worldline on a discretionary basis.

Additional Data

In addition to Worldline’s transactional data, supplementary datasets are stored in the subdirectory `ReplicationPackage/Input` after being downloaded. These datasets are automatically loaded into the environment upon execution of the code. These datasets are organized into three folders as described below:

- **Indices:** Daily time series of all different consumer spending (sub)-indices.
 - `Indices.csv` contains scaled (sub-)indices across regions and categories (as defined in [Brown et al. \(2023\)](#)). The labeling of the indices is as follows:
`T_Region_Category_Sample_Origin_Correction_NomReal`
 - * **Region:** Defines the region of the index. *AllRegions* is the sum across regions. There are eight regions (including *e-commerce*) and the total.
 - * **Category:** Defines the category of the index. *AllCat* is the sum across categories. There are six categories and the total.
 - * **Sample:** Defines whether the active merchant sample (AMS) correction is applied or not (Plain). Can be *AMS* or *Plain*.

- * **Origin:** Defines whether only domestic, foreign or all cardholders are included. Can be *Domestic*, *Foreign* or *Total*, where *Total* is the sum of *Domestic* and *Foreign*.
- * **Correction:** Defines whether the index is corrected for the switch from cash payments to digital payments. Can be *Uncorrected* or *Corrected*.
- * **NomReal:** Defines whether the index is corrected for inflation. Can be *Nominal* or *Real*.

Hence, there are $9 \times 7 \times 2 \times 3 \times 2 \times 2 = 1,512$ different (sub-)indices.

- **Indices_COICOP.csv** contains scaled subindices across COICOP categories. The labeling of the indices is as follows:

T_Category_Sample_Origin_Correction_NomReal_weighted

- * **Category** Defines the COICOP category of the index. *AllCat* is the sum across categories. There are eleven categories and the total.
- * **Sample:** Defines whether the active merchant sample (AMS) correction is applied or not (Plain). Can be *AMS* or *Plain*.
- * **Origin:** Defines whether only domestic, foreign or all cardholders are included. Can be *Domestic*, *Foreign* or *Total*, where *Total* is the sum of *Domestic* and *Foreign*.
- * **Correction:** Defines whether the index is corrected for the switch from cash payments to digital payments. Can be *Uncorrected* or *Corrected*.
- * **NomReal:** Defines whether the index is corrected for inflation. Can be *Nominal* or *Real*.
- * **Weighted:** Defines whether the total index is weighted according to HABE weights. Can be empty or *weighted*.

Hence, there are $12 \times 2 \times 3 \times 2 \times 2 + 24$ (total weighted) = 312 different (sub-)indices.

- **Validation:** Official data from the Federal Statistical Office (FSO) to validate the Consumer Spending Index (CSI) Switzerland.
 - **je-d-06.03.02.01.00.xlsx** from the [FSO](#) contains data from the Retail Trade Turnover Statistics.
 - **px-x-0602010000_103_20251114-135548.xlsx** from the [FSO](#) contains data from the Structural Business Statistics (STATENT). To retrieve the same data set, select the years 2018-2022, all cantons (except for *Schweiz*), *Wirtschaftsart - Total*, and *Vol-lzeitäquivalente*.
 - **je-d-20.02.01.00.02.xlsx** from the [FSO](#) contains data from the Household Budget Survey (HABE) by *Grossregion*.
 - **je-d-20.02.01.02.01.xlsx** from the [FSO](#) contains data from the Household Budget Survey (HABE) by year.
 - Note that the files containing data from the HABE are not saved in the replication package but have to be downloaded from the website.
- **Miscellaneous**
 - **Monetary Policy**
 - * **MonetaryPolicy.csv** contains the monetary policy shocks (*MP_median*), central bank information shocks (*CBI_median*) and the SNB's policy rate (*PolicyRate*). For the shocks, we apply the standard identification of monetary policy shocks, based on the first principal component of surprises to futures' contracts up

to four quarters ahead, and apply the median rotation as described in [Jarociński and Karadi \(2020\)](#). The surprises to futures' contracts are updated series from [Nitschka and Ramelet \(2023\)](#) and [Koeniger et al. \(2022\)](#) and are made available upon request. For the policy rate, we rely on the [SNB data portal](#).

– **Sample Composition**

- * `SampleComposition.csv` contains the share of merchants across categories and regions in different active merchant samples.

– **Payment Factor**

- * **Swiss Payment Monitor:** The data is proprietary. For data access, please contact the Swiss Payment Monitor team.
 - `Swiss_Payment_MonitorYEAR.sav` contains the raw data of the Swiss Payment Monitor for the respective year.
 - `Swiss_Payment_MonitorYEAR_ID_Wemf_PLZ.sav` contains the place of residence of the participants in the Swiss Payment Monitor.
- * **Payment Methods Survey of Private Individuals:** The data is proprietary. For data access, please contact the Swiss National Bank.
 - `ZMUP_ZM_Anteile_Grossregionen_v3.xlsx` contains aggregated payment statistics by category and region for 2017-2022.
 - `ZMUP_ZM_Anteile_Grossregionen_24.xlsx` contains aggregated payment statistics by category and region for 2024.
- * **Further Data**
 - `plz4_regions.csv` contains a mapping from zip codes to regions.

– **Revision**

- * `ProcessingDate.csv` contains the cumulative share of late recordings in the data.
- * `MerchantReclassification.csv` contains the cumulative share of merchants in an active merchant sample.
- * `IndicesVintage.csv` contains 84 vintages of the scaled CSI. The first vintage is constructed with data until the end of January 2018, the second with data until the end of February 2018 and so on until the end of December 2024.

Structure and Content of ReplicationPackage/Code

The directory `ReplicationPackage/Code` contains all R scripts necessary to generate the statistics, figures, and tables presented in the paper.

List of Scripts

Below is a summary of the scripts.

- `00_Master.R`: The master script that executes all other scripts. Running this file populates the `ReplicationPackage/Output` folder with the figures presented in the paper. The master script contains a detailed description of the output of each file.
- `01_SetUp.R`: Prepares the environment by loading necessary packages and the indices.
- `02_Validation.R`: Compares indices to official statistics.
- `03_ExpenditurePatterns.R`: Generates matrices of the CSI and illustrates spending origin and inflation-adjustment.

- **04_Applications.R**: Calculates weekday patterns, Black Friday patterns and the reaction to monetary policy shocks.
- **05_Miscellaneous.R**: Generates sample composition plots, payment adjustment factors and the revision analysis.

Table 1 provides a detailed mapping between the exhibits in the paper and the corresponding scripts in the **ReplicationPackage/Code** directory.

Exhibits	Program
Figure 1, 2, 3, 4, 16, 19; Table 1	02_Validation.R
Figure 5, 6, 17, 18	03_ExpenditurePatterns.R
Figure 7, 8, 9, 10, 11, 24, 25, 26	04_Applications.R
Figure 13, 14, 15, 20, 21, 22, 23	05_Miscellaneous.R

Table 1: Mapping of Exhibits to Scripts in **ReplicationPackage/Code**

Instructions to Replicators

After extracting the **.zip file**, review the directory structure. The code for replicating the tables, figures and statistics presented in the paper is located in the **Code** subfolder. All scripts can be run sequentially by using the **00_Master.R** file, which will run the files in the correct order. Generated figures are stored in the **Output** subfolder, while other statistics are stored in R's workspace. Additional data required for the replication process is stored in the **Input** subfolder and is automatically sourced when the scripts are run. File paths are set relative to the program location, so no manual adjustments are required for execution.

References

- Brown, Martin, Matthias R Fengler, Jonas Huwyler, Winfried Koeniger, Rafael Lalive, and Robert Rohrkemper (2023) "Monitoring Consumption Switzerland: Data, Background, and Use Cases," *Swiss Journal of Economics and Statistics*, 159 (4), [10.1186/s41937-023-00108-9](https://doi.org/10.1186/s41937-023-00108-9).
- Jarociński, Marek and Peter Karadi (2020) "Deconstructing Monetary Policy Surprises—The Role of Information Shocks," *American Economic Journal: Macroeconomics*, 12 (2), 1–43, [10.1257/mac.20180090](https://doi.org/10.1257/mac.20180090).
- Koeniger, Winfried, Benedikt Lennartz, and Marc-Antoine Ramelet (2022) "On the Transmission of Monetary Policy to the Housing Market," *European Economic Review*, 145 (104107).
- Nitschka, Thomas and Marc-Antoine Ramelet (2023) "Shock and Awe? Bond Yield Responses to Domestic Monetary Policy in a Small-Open Economy," *Economics Letters*, 231, 111308, <https://doi.org/10.1016/j.econlet.2023.111308>.