Replication Instructions for
"Model Complexity, Expectations, and Asset Prices"
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Overview

The code in this replication package generates Figures 1–4 and Figure A.1 in the paper and Figures F.1 and F.2 and Table F.1 in the Online Appendix using MATLAB and Julia. The approximate time required to run the code is 4 hours.

1 Data

1.1 Availability and Provenance Statements

The paper uses data provided by Consensus Economics Inc. The data license agreement does not permit us to share the raw data directly with interested researchers. To replicate the results from the raw data, researchers should obtain the "Consensus Forecasts–G7 & Western Europe" dataset from Consensus Economics Inc. (Consensus Economics, 2022). We certify that the authors of the manuscript have legitimate access to and permission to use the raw data used in this manuscript.

The paper also uses exchange rate and one-month forwards data obtained from Datastream, trade data from WITS TradeStat Database, 3-month interest rates for the Eurozone, Switzerland, the United Kingdom, and the United States from the FRED database, and 3-month interest rates for Canada and Japan from Bank of Canada and Bank of Japan, respectively.

The following table provides a summary of the various dataset used as inputs in our programs.

1.2 Data analysis

Exchange rates and interest rate differentials. Exchange rates for Australia, Canada, the Eurozone, Japan, New Zealand, Switzerland, and the United Kingdom are obtained from Datastream. To calculate interest rate differentials, we use covered interest rate parity and use one-month forwards, also from Datastream. To calculate trade-weighted averages, we use weights calculated as the value of each country's exports and imports as a fraction of the average value of trade over the seven countries. The weight of each country is the sum of the country's world trade divided by the sum of the world trade of all countries. To calculate the weight for the Eurozone, we use trade data for Germany, France, Italy, Spain, and Portugal. Trade data is from WITS TradeStat Database (The World Bank, 2022).

Datafile: `DataModelComplexity.xlsx`, sheet `FX`

Surveys. We use the "Consensus Forecasts–G7 & Western Europe" survey data from Consensus Economics (2022). The surveys query respondents every month about a number of country-specific

Dataset	Source	Description
exchange rates	Datastream	
forward rates	Datastream	
WITS TradeStat Database	The World Bank (2022)	
interest rate forecasts	Consensus Economics (2022)	
3-month interest rates for		
the United Kingdom	OECD (2023a)	3-Month or 90-day Rates & Yields: Interbank Rates
Switzerland	OECD (2023b)	3-Month or 90-day Rates & Yields: Eurodollar Deposits
the Eurozone	OECD (2023c)	3-Month or 90-day Rates & Yields: Interbank Rates
the United States	Board of Governers (2023)	3-Month Treasury Bill Secondary Market Rate
Canada	Bank of Canada (2022)	3-Month Treasury Bill rate
Japan	Bank of Japan (2022)	3-Month Yen Certificates of Deposit until 06/2010; 3-month Yen TIBOR Rate from 07/2010

macroeconomic and financial variables, including 3-month ahead forecasts of 3-month interest rates in different countries. Using these surveys, we calculate a "consensus forecast" for 3-month interest rates for Canada, the Eurozone, Japan, Switzerland, the United Kingdom, and the United States by taking the median of all forecasts for each country. We then use these consensus forecasts to construct forecasts for interest rate differentials between the United States and each of the other five countries at a monthly frequency. Finally, we subtract the resulting forecasts from the corresponding realized interest rate differentials and obtain monthly estimates for forecast errors of interest rate differentials. We obtain realized 3-month interest rates for the Eurozone, Switzerland, the United Kingdom, and the United States from the FRED database (`https://fred.stlouisfed.org/`). We obtain the realized 3-month interest rates for Canada and Japan from Bank of Canada and Bank of Japan, respectively.

Datafile: `DataModelComplexity.xlsx`, sheet `Survey`

2 Computational Requirements

2.1 Software requirements

- MATLAB (code was run with MATLAB release 2023b)
  all required functions are saved in the folder `Codes/functions`.
- Julia v1.8.5
  required packages:
  - BlackBoxOptim (v0.6.1)
  - DataFrames (v1.3.6)
  - FilePaths(v0.8.3)
  - Ipopt (v1.0.4)
  - JuMP (v1.3.0)

- MatrixEquations (v2.2.2)
- Plots (v1.32.0)
- XLSX (v0.9.0)

2.2 Memory and run-time requirement

The code was run on a laptop computer. The approximate time required to run the code is 4 hours.

3 Codes

The `ModelComplexity_MainFile.m` and `ModelComplexity_Figure3.jl` files contain the programs that replicate all the figures in the paper. The `ModelComplexity_OnlineAppendix.m` file produces all figures and tables reported in the Online Appendix. The file `ModelComplexityFunctions.jl` and the subfolder `functions` contain the functions that are used by the code. The file `ModelComplexity_MainFile.m` must be run before the other two files.

4 Output

All output files are in the xlsx format and are saved in the folder `Output`. The programs also reproduce the figures directly from the code and save them as PDFs.

References

Bank of Canada (2022), "Selected Treasury Bill Yields [dataset]." https://www.bankofcanada.ca/rates/interest-rates/t-bill-yields/.

Bank of Japan (2022), "The Basic Discount Rates and Basic Loan Rates [dataset]." https://www.boj.or.jp/en/statistics/boj/other/discount/index.htm.

Board of Governors of the Federal Reserve System (2023), "3-Month Treasury Bill Secondary Market Rate, Discount Basis [TB3MS], retrieved from FRED, Federal Reserve Bank of St. Louis." https://fred.stlouisfed.org/series/TB3MS.

Consensus Economics (2022), "Consensus Forecasts–G7 & Western Europe [dataset]." http://www.consensuseconomics.com/publications/consensus-forecasts-g7-western-europe/.

Organization for Economic Co-operation and Development (2023a), "3-Month or 90-day Rates and Yields: Interbank Rates for the United Kingdom [IR3TIB01GBM156N], retrieved from FRED, Federal Reserve Bank of St. Louis." https://fred.stlouisfed.org/series/IR3TIB01GBM156N.

Organization for Economic Co-operation and Development (2023b), "Interest Rates: 3-Month or 90-Day Rates and Yields: Eurodollar Deposits: Total for Switzerland [IR3TED01CHM156N], retrieved from FRED, Federal Reserve Bank of St. Louis." https://fred.stlouisfed.org/series/IR3TED01CHM156N.

Organization for Economic Co-operation and Development (2023c), "Interest Rates: 3-Month or 90-Day Rates and Yields: Interbank Rates: Total for the Euro Area (19 Countries) [IR3TIB01EZM156N], retrieved from FRED, Federal Reserve Bank of St. Louis." https://fred.stlouisfed.org/series/IR3TIB01EZM156N.

The World Bank (2022), "WITS TradeStat Database [dataset]." https://wits.worldbank.org/countrystats.aspx.