README for data and replication of "The Benefits of Forecasting Inflation with Machine Learning: New Evidence"

Note: all paths have to be edited to run the files in these documents. The working directory in R should be set to the "ForecastingInflation" sub-folder of the replication folder. The paths for saving and loading of files in all scripts must be edited to the relevant paths on the user's computer.

1 Data Files

1.1 CSV ASCII files

As required by the Journal of Applied Econometrics, all data files required for this study are saved in CSV (ASCII) format in the folder "data_csv". The raw Canada and UK data sets before processing are saved at

replication/ForecastingInflation/Canada/
LCDMA_March_2022/LCDMA_March_2022
replication/ForecastingInflation/UK/
UKMD_March_2022/UKMD_March_2022

In addition, the files in R data formats are described in detail below.

1.2 US First and Second Samples

The US data was provided by Medeiros et al. (2021) at a GitHub repository that has since been deleted. Nonetheless, forks of the original respository are still available at https://github.com/EoghanONeill/ForecastingInflation and https://github.com/Karagul/ForecastingInflation.

Within this replication folder, the first sample of US data (up to 2000) can be found at:

ForecastingInflation/first-sample/rawdata.rda

The first sample contains 491 observations of 122 variables from February 1960 to December 2000.

The second sample of US data (from 2000 to 2015) can be found at:

ForecastingInflation/second-sample/rawdata.RData

The second sample contains 671 observations of 122 variables from February 1960 to December 2015 (the scripts that produce forecasts subset the data to the second sample windows).

The same variables are included int he US first and second sample data sets. The variable names are given in order in Table 1 below. See McCracken and Ng (2016) https://research.stlouisfed.org/wp/more/2015-012 For a description of each variable. Some variables are no longer available in more recent vintages of data. It is necessary to check https://files.stlouisfed.org/files/htdocs/uploads/fredmdchanges.pdf for descriptions of discontinued variables.

CPI	PCE	RPI	W875RX1
DPCERA3M086SBEA	CMRMTSPLx	RETAILx	INDPRO
IPFPNSS	IPFINAL	IPCONGD	IPDCONGD
IPNCONGD	IPBUSEQ	IPMAT	IPDMAT
IPNMAT	IPMANSICS	IPB51222S	IPFUELS
CUMFNS	HWI	HWIURATIO	CLF16OV
CE16OV	UNRATE	UEMPMEAN	UEMPLT5
UEMP5TO14	UEMP15OV	UEMP15T26	UEMP27OV
CLAIMSx	PAYEMS	USGOOD	CES1021000001
USCONS	MANEMP	DMANEMP	NDMANEMP
SRVPRD	USTPU	USWTRADE	USTRADE
USFIRE	USGOVT	CES0600000007	AWOTMAN
AWHMAN	HOUST	HOUSTNE	HOUSTMW
HOUSTS	HOUSTW	PERMIT	PERMITNE
PERMITMW	PERMITS	PERMITW	AMDMNOx
AMDMUOx	BUSINVx	ISRATIOx	M1SL
M2SL	M2REAL	AMBSL	TOTRESNS
BUSLOANS	REALLN	NONREVSL	CONSPI
S.P.500	S.P..indust	S.P.div.yield	S.P.PE.ratio
FEDFUNDS	CP3Mx	TB3MS	TB6MS
GS1	GS5	GS10	AAA
BAA	COMPAPFFx	TB3SMFFM	TB6SMFFM
T1YFFM	T5YFFM	T10YFFM	AAAFFM
BAAFFM	EXSZUSx	EXJPUSx	EXUSUKx
EXCAUSx	WPSFD49207	WPSFD49502	WPSID61
WPSID62	OILPRICEx	PPICMM	CPIAPPSL
CPITRNSL	CPIMEDSL	CUSR0000SAC	CUUR0000SAD
CUSR0000SAS	CPIULFSL	CUUR0000SA0L2	CUSR0000SA0L5
DDURRG3M086SBEA	DNDGRG3M086SBEA	DSERRG3M086SBEA	CES0600000008
CES2000000008	CES3000000008	MZMSL	DTCOLNVHFNM
DTCTHFNM	INVEST		

Table 1: Variable Names for US first and second sample

1.3 US Extended Sample

The extended sample was downloaded from the FRED-MD database via an edited and extended version of a script available at: https://github.com/gabrielrvsc/ForecastingInflation/blob/main/01_get_fred_data.R

The script for downloading the edited data from FRED-MD is saved at:

ForecastingInflation/download_data_to_2023_4.R

Due to many changes in the set of variables available from the FRED-MD database since 2015, the extended sample analysis involves several separate data

sets. See https://files.stlouisfed.org/files/htdocs/uploads/fredmdchanges.pdf for a description of changes to the FRED-MD data set. Medeiros et al. (2021) used the most recent vintage in a pseudo out-of-sample exercise. Therefore, for all variables except discontinued variables we similarly use data from the most recently available vintage (as of March 2023). For discontinued variables, we use values from the last vintage before the variables were removed.

The following data sets are saved in ForecastingInflation/extended-sample

- data_02_17_latest_kept.RData : The variables CUUR0000SAD and CUUR0000SA0L2 are included instead of CUSR0000SAD and CUSR0000SA0L2. The data contains 685 observations.

- data_11_19_latest_kept.RData : Up to November 2019, the variable ABMSL is used instead of BOGMBASE. The data contains 718 observations.

- data_04_20_latest_kept.RData : After April 2020, CP3Mx and COMPAPFFx are dropped. The data contains 723 observations.

- data_imputed1_kept.RData : This includes all the data up to October 2022. Missing values were imputed using all variables except CPI, including variables that were later removed because they were not included by Medeiros et al. (2021). Imputation was implemented using the **R** package `fbi` function `tp_apc` with `kmax = 2` and all other options set to default values (Cahan et al., 2023). There are missing values in 2020, therefore it is necessary to impute values. The data contains 753 observations.

- data_imputed2_kept.RData : This includes all the data up to October 2022. Missing values were imputed using all variables except CPI, including variables that were later removed because they were not included by Medeiros et al. (2021). Imputation was implemented using the **R** package `fbi` function `tw_apc` with `kmax = 2` and all other options set to default values (Cahan et al., 2023). There are missing values in 2020, therefore it is necessary to impute values. The data contains 753 observations.

- data_02_21_latest_kept.RData , data_02_21_imputed1_kept.RData , and data_02_21_imputed2_kept.RData : MZMSL is NA after February 2021 (and was later removed from FRED-MD). There are three data sets corresponding

to whether 2020 missing values are imputed and the choice of imputation method. The data contains 733 observations.

- data_10_22_latest_kept.RData : The most recent month without NA values for recent observations of some variables as of February/March 2023 was October 2022. Therefore the extended sample ends in October 2022. The data contains 753 observations.

The imputed data sets were not actually used in the forecasting exercise. Instead, we simply dropped CP3Mx and COMPAPFFx.

In the extended sample forecasting exercise, each window is obtained from the appropriate data set from those described above. The window includes the variables that were available on FRED-MD at the end of the window.

1.4 UK Data

The UK data set is created by the script

ForecastingInflation/UK/create_UK_data.R

This script edits the original data downloaded from https://www.stevanovic.uqam.ca/DS_UKMD.html and saved at

ForecastingInflation/UK/UKMD_March_2022/UKMD_March_2022/balanced_uk_md.csv

The edited UK data is saved at

ForecastingInflation/UK/first-sample/rawdata.rda

The edited UK data contains 283 observations of 110 variables from January 1998 to July 2021. The variable names are in Table 2. See Goulet Coulombe et al. (2021) for a full description of the variables in the data.

CPI_ALL	RPI_ALL	EMP
EMP_PART	EMP_TEMP	UNEMP_RATE
UNEMP_DURA_6mth	UNEMP_DURA_6.12mth	UNEMP_DURA_12mth.
UNEMP_DURA_24mth.	EMP_RATE	EMP_ACT
EMP_ACT_RATE	CLAIMS	CLAIMS_RATE
TOT_WEEK_HRS	AVG_WEEK_HRS	AVG_WEEK_HRS_FULL
AWE_ALL	AWE_CONS	AWE_MANU
AWE_PRIV	AWE_PUB	AWE_SERV
VAC_TOT	VAC_CONS	VAC_MANU
IOP_PROD	IOP_CAP_GOOD	IOP_DUR
IOP_ENER	IOP_GOOD	IOP_INT_GOOD
IOP_MACH	IOP_MANU	IOP_MINE
IOP_NON_DUR	IOP_PETRO	IOP_OIL_EXTRACT
IOS	IOS_45	IOS_46
IOS_47	IOS_G	IOS_EDUC
IOS_PNDS	RSI	CAR_REGIS
RETAIL_TRADE_INDEX	AVG_WEEK_RETAIL_SALE	AVG_WEEK_RETAIL_SALE_NON_FOOD
CPIH_ALL	CPI_EX_ENER	CPI_GOOD
CPI_DUR	CPI_NON_DUR	CPI_SERV
CPI_CLOTH	CPI_TRANS	RPI_GOOD
RPI_SERV	RPI_HOUSE	EXP_TOT
EXP_GOOD	IMP_ALL	IMP_GOOD
EXP_FUEL	IMP_FUEL	EXP_OIL
IMP_OIL	EXP_MACH	IMP_MACH
EXP_METAL	IMP_METAL	EXP_CRUDE_MAT
IMP_CRUDE_MAT	GBP_BROAD	GBP_CAN
GBP_EUR	GBP_JAP	GBP_US
OIL_PRICE	BANK_RATE	CONS_CREDIT_ex_student_loan
TOT_LENDING_APP	TOT_HOUSE_APP	MORT_FIXED_RATE_5YRS
MORT_FIXED_RATE_2YRS	M1	M2
M3	M4	LIBOR_3mth
BGS_5yrs_yld	BGS_10yrs_yld	BGS_20yrs_yld
FTSE_ALL	FTSE250	VIX
SP500	UK_focused_equity	EUR_UNC_INDEX
BCI	CCI	CLI
PPI_MANU	PPI_MACH	PPI_OIL
PPI_METAL	PPI_MOTOR	

Table 2: Variable Names for UK Data

1.5 Canada Data

The Canada data set is created by the script

ForecastingInflation/Canada/create_Canada_data.R

This script edits the original data downloaded from https://www.stevanovic.uqam.ca/DS_LCMD.html and saved at

ForecastingInflation/Canada/LCDMA_March_2022/LCDMA_March_2022/balanced_can_md.csv

The edited Canada data is saved at

ForecastingInflation/Canada/first-sample/rawdata.rda

The edited Canada data contains 494 observations of 114 variables from January 1981 to February 2022. The variable names are in Table 3. The variable that we erroneously re-coded as "orig_data[,44]" is actually "hstart_CAN_new" (this did not impact the inclusion of this variable in any model). See Goulet Coulombe et al. (2021) for a full description of the variables in the data. Many provincial level variables provided by Fortin-Gagnon et al. (2018) were removed from the data.

CPI_ALL_CAN	GDP_new	BSI_new
GPI_new	SPI_new	IP_new
NDM_new	DM_new	OILP_new
CON_new	RT_new	WT_new
PA_new	FIN_new	OIL_CAN_new
EMP_CAN	EMP_SERV_CAN	EMP_FOR_OIL_CAN
EMP_CONS_CAN	EMP_SALES_CAN	EMP_FIN_CAN
EMP_MANU_CAN	EMP_PART_CAN	UNEMP_CAN
UNEMP_DURA_1.4_CAN	UNEMP_DURA_5.13_CAN	UNEMP_DURA_14.25_CAN
UNEMP_DURA_27._CAN	UNEMP_DURAvg_CAN_new	CLAIMS_CAN
TOT_HRS_CAN	GOOD_HRS_CAN	GOOD_OVT_HRS_CAN
NHOUSE_P_CAN	orig_data[, 44]	build_Total_CAN_new
build_Ind_CAN_new	build_Comm_CAN_new	MANU_N_ORD_new
MANU_UNFIL_new	MANU_TOT_INV_new	MANU_INV_RAT_new
N_DUR_INV_RAT_new	DUR_N_ORD_new	DUR_UNFIL_new
DUR_TOT_INV_new	DUR_INV_RAT_new	M3
M2p	M_BASE1	CRED_BUS_cb
CRED_HOUS_cb	CRED_MORT_HOUSE_cb	CRED_T_cb
CRED_HOUS_non_MORT	CRED_HOUS_MORT	CRED_HOUS
CRED_BUS	BANK_RATE_L	GOV_AVG_1_3Y
GOV_AVG_3_5Y	GOV_AVG_5_10Y	GOV_AVG_10pY
MORTG_1Y	MORTG_5Y	TBILL_3M
TBILL_6M	G_AVG_1.3.Bank_rate	G_AVG_3.5.Bank_rate
G_AVG_5.10.Bank_rate	TBILL_6M.Bank_rate	G_AVG_10p.TBILL_3M
RES_TOT	RES_USD	RES_IMF
Imp_BP_new	IOIL_BP_new	Exp_BP_new
EOIL_BP_new	EX_ENER_BP_new	EX_MINER_BP_new
EX_METAL_BP_new	EX_IND_EQUIP_BP_new	EX_TRANSP_BP_new
EX_CONS_BP_new	IMP_METAL_BP_new	IMP_IND_EQUIP_BP_new
IMP_TRANSP_BP_new	IMP_CONS_BP_new	USDCAD_new
JPYCAD_new	GBPCAD_new	CAN_EQTY_NETFLOW
CAN_SEC_NETFLOW	FOR_SEC_NETFLOW	CAN_US_SEC_NETFLOW
CPI_SHEL_CAN	CPI_CLOT_CAN	CPI_HEA_CAN
CPI_MINUS_FOO_CAN	CPI_MINUS_FEN_CAN	CPI_GOO_CAN
CPI_DUR_CAN	CPI_SERV_CAN	IPPI_CAN
IPPI_ENER_CAN	IPPI_WOOD_CAN	IPPI_METAL_CAN
IPPI_MOTOR_CAN	IPPI_MACH_CAN	WTISPLC
TSX_HI	TSX_LO	TSX_CLO

Table 3: Variable Names for Canada Data

2 Data analysis

2.1 Produce and save forecasts

The scripts to produce US forecasts for the original methods are saved in the sub-folders `pc` and `Snellius` within the folders:

ForecastingInflation/first-sample/run/rep_Eoghan_newPCAoldstart
ForecastingInflation/second-sample/run/rep_Eoghan_newPCAoldstart
ForecastingInflation/extended-sample/run/rep_Eoghan_newPCAoldstart

The scripts to produce US forecasts for the new methods are saved in the sub-folders `pc` and `Snellius` within the folders:

ForecastingInflation/first-sample/run/rep_Eoghan_newPCAoldstart
ForecastingInflation/second-sample/run/rep_Eoghan_newPCAoldstart
ForecastingInflation/extended-sample/run/rep_Eoghan_newPCAoldstart

These in turn call functions from the scripts located in the sub-folders in `pc` and `Snellius` in

ForecastingInflation/first-sample/functions/rep_Eoghan_newPCAoldstart
ForecastingInflation/second-sample/functions/rep_Eoghan_newPCAoldstart
ForecastingInflation/extended-sample/functions/rep_Eoghan_newPCAoldstart
ForecastingInflation/first-sample/functions/rep_Eoghan_newPCAoldstart
ForecastingInflation/second-sample/functions/rep_Eoghan_newPCAoldstart
ForecastingInflation/extended-sample/functions/rep_Eoghan_newPCAoldstart

The scripts to produce UK forecasts for the original methods are saved in the sub-folders `pc` and `Snellius` within the folders:

ForecastingInflation/UK/first-sample/run/rep_Eoghan_newPCAoldstart

The scripts to produce UK forecasts for the new methods are saved in the sub-folders `pc` and `Snellius` within the folders:

ForecastingInflation/UK/first-sample/run/rep_Eoghan_newPCAoldstart

These in turn call functions from the scripts located in the sub-folders in `pc` and `Snellius` in

ForecastingInflation/UK/first-sample/functions/ rep_Eoghan_newPCAoldstart
ForecastingInflation/UK/first-sample/functions/ rep_Eoghan_newPCAoldstart

The scripts to produce Canada forecasts for the original methods are saved in the sub-folders `pc` and `Snellius` within the folder:

ForecastingInflation/Canada/first-sample/run/
rep_Eoghan_newPCAoldstart

The scripts to produce Canada forecasts for the new methods are saved in the sub-folders `pc` and `Snellius` within the folder:

ForecastingInflation/Canada/first-sample/run/
rep_Eoghan_newPCAoldstart

These in turn call functions from the scripts located in the sub-folders in `pc` and `Snellius` in

ForecastingInflation/Canada/first-sample/functions/
rep_Eoghan_newPCAoldstart
ForecastingInflation/Canada/first-sample/functions/
rep_Eoghan_newPCAoldstart

The scripts in the `pc` sub-folders are written to be run on a personal computer (although this might not be feasible due to memory or time limitations). The scripts in the `Snellius` sub-folder are written to be run on a supercomputer. The code is parallelized across windows, and the number of cores used in parallelization must be edited according to the number of cores available to the user.

To obtain forecasts, run the scripts for each method from one of the sub-folders of the relevant `run` folder. Please note that there are more scripts in the `run` folder than necessary to re-produce results because some scripts are for methods that were not included in the original paper nor in our replication paper. Therefore to minimize computational time, it is strongly advised to run only the scripts for methods included in the replication paper with the parameter settings detailed in the supplementary appendix of the replication paper. Also, many **R** packages must be installed from CRAN or GitHub to successfully run the scripts.

Furthermore, these scripts take a considerable time to run. Some scripts take several days to run on a supercomputer with 120 cores. Therefore substantial computational resources may be required to replicate these results.

2.2 Create and save tables, and some figures

It is necessary to obtain forecasts for all methods before running the scripts that create tables and figures.

Note: in this subsection table numbers refer to tables in the replication paper, not this readme file nor the original paper by Medeiros et al. (2021).

Table 1 (US original sample, replication methods, and new methods): This table was created manually from other tables generated by the scripts

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_rep_both_samples.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_both_newmethods_3.R

The tables from which table 1 are constructed are saved by the above scripts at:

ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepcombinedtablesFIXED/ ord_tab1_cpi_rounded.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
UScombinedtablesFIXED/ ord_tab1_cpi_rounded.tex

Table 2 (US extended sample, UK, and Canada, replication methods): This table was created manually from other tables generated by the scripts

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_extended.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_UK_cpi_FIXED_rep.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_Canada_cpi_FIXED_rep.R

The tables from which table 2 are constructed are saved by the above scripts at:

ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepextendedtables/ ord_tab1_cpi_rounded.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/

CanadareptablesFIXED/ ord_tab1_cpi_rounded.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
UKreptablesFIXED/ ord_tab1_cpi_rounded.tex

Table 3 (US extended sample, UK, and Canada, new methods): This table was created manually from other tables generated by the scripts

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_extended.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_UK_cpi_FIXED.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_Canada_cpi_FIXED.R

The tables from which table 3 are constructed are saved by the above scripts at:

ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USextendedtables/ ord_tab1_cpi_rounded.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
CanadatablesFIXED/ ord_tab1_cpi_rounded.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
UKtablesFIXED/ ord_tab1_cpi_rounded.tex

Figure 1 is created by the script saved at:

ForecastingInflation/fastshap_graphs_ordered.R

Figure 1 is saved as

ForecastingInflation/extra_tex_tables/shapvalues/graphs/
fancy_maxabsshaps_combine_ordered.png

Fig 2 is created by running the following R script:

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_extended_withQLGBM.R

Figure 2 is saved at:

ForecastingInflation/predintgraphs/ tempUScpi_ext_h4_ggplot_combine_fig1.R

Table 4 (US original sample results by horizon and 95% coverage of BART and RLASSO) was created manually from tables created by

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_extended.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_extended.R

and saved at

ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepextendedtables/ side_ord_tab5parentheses_cpi.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USextendedtables/ side_ord_tab5parentheses_cpi.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepextendedtables/ predint_cov_table_cpi.tex
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USextendedtables/ predint_cov_table_cpi.tex

2.3 Additional tables and figures

The RMSE and MAE results by horizon, MCS results, and prediction interval coverage and width in appendix E are created by

US full initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_rep_both_samples.R
US full new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_both_newmethods_3.R UK initial: Forecasting-Inflation/tables_newPCA_oldstart/RWbase/
create_tables_UK_cpi_FIXED_rep.R
UK new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_UK_cpi_FIXED.R

Canada initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_Canada_cpi_FIXED_rep.R

Canada new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_Canada_cpi_FIXED.R

US extended initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_extended.R
US extended new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_extended.R

US Jan 21 - Oct 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_Jan21toOct22.R
US Jan 21 - Oct 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Jan21toOct22.R

US Feb 20 - Feb 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_Feb20toFeb22.R
US Feb 21 - Feb 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Feb20toFeb22.R

US Jan 16 - Oct 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_Jan16toOct22.R
US Jan 16 - Oct 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Jan16toOct22.R

US Jan 90 - Dec 07 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Jan90toDec07.R
US Jan 90 - Dec 07 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Jan90toDec07.R

US Jan 08 - Jun 09 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_Jan08toJun09.R
US Jan 08 - Jun 09 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_new_Jan08toJun09.R

US Jul 09 - Jan 20 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/ create_tables_cpi_synced_rep_Jul09toJan20
US Jul 09 - Jan 20 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/ create_tables_cpi_new_Jul09toJan20.R

The RMSE and MAE results by horizon are saved at:

US full initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepcombinedtablesFIXED/ side_ord_tab5parentheses_cpi.tex
US full new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UScombinedtablesFIXED/ side_ord_tab5parentheses_cpi.tex
UK initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UKreptablesFIXED/ side_ord_tab5parentheses_cpi.tex UK new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UKtablesFIXED/ side_ord_tab5parentheses_cpi.tex Canada initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ CanadareptablesFIXED/ side_ord_tab5parentheses_cpi.tex Canada new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ CanadatablesFIXED/ side_ord_tab5parentheses_cpi.tex US extended initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepextendedtables/ side_ord_tab5parentheses_cpi.tex
US extended new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USextendedtables/ side_ord_tab5parentheses_cpi.tex

US Jan 21 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan21toOct22tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Jan 21 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan21toOct22tablesFIXED/ side_ord_tab5parentheses_cpi.tex

US Feb 20 - Feb 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepFeb20toFeb22tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Feb 21 - Feb 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/

USFeb20toFeb22tablesFIXED/ side_ord_tab5parentheses_cpi.tex

US Jan 16 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan16toOct22tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Jan 16 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan16toOct22tablesFIXED/ side_ord_tab5parentheses_cpi.tex

US Jan 90 - Dec 07 - initial: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan90toDec07tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Jan 90 - Dec 07 - new: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/ USJan90toDec07tablesFIXED/ side_ord_tab5parentheses_cpi.tex

US Jan 08 - Jun 09 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan08toJun09tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Jan 08 - Jun 09 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan08toJun09tablesFIXED/ side_ord_tab5parentheses_cpi.tex

US Jul 09 - Jan 20 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJuly09toJan20tablesFIXED/ side_ord_tab5parentheses_cpi.tex
US Jul 09 - Jan 20 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJuly09toJan20tablesFIXED/ side_ord_tab5parentheses_cpi.tex

The model confidence set results in appendix E are saved at:

US full initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepcombinedtablesFIXED/ ord_MCS_results_square_cpi.tex
US full new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UScombinedtablesFIXED/ ord_MCS_results_square_cpi.tex

UK initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UKreptablesFIXED/ ord_MCS_results_square_cpi.tex UK new: Fore-

castingInflation/extra_tex_tables/newPCAoldstartRWbase/
UKtablesFIXED/ ord_MCS_results_square_cpi.tex

Canada initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
CanadareptablesFIXED/ ord_MCS_results_square_cpi.tex Canada new:
ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
CanadatablesFIXED/ ord_MCS_results_square_cpi.tex

US extended initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepextendedtables/ ord_MCS_results_square_cpi.tex
US extended new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USextendedtables/ ord_MCS_results_square_cpi.tex

US Jan 21 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan21toOct22tablesFIXED/ ord_MCS_results_square_cpi.tex
US Jan 21 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan21toOct22tablesFIXED/ ord_MCS_results_square_cpi.tex

US Feb 20 - Feb 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepFeb20toFeb22tablesFIXED/ ord_MCS_results_square_cpi.tex
US Feb 21 - Feb 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USFeb20toFeb22tablesFIXED/ ord_MCS_results_square_cpi.tex

US Jan 16 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan16toOct22tablesFIXED/ ord_MCS_results_square_cpi.tex
US Jan 16 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan16toOct22tablesFIXED/ ord_MCS_results_square_cpi.tex

US Jan 90 - Dec 07 - initial: US Jan 16 - Oct 22 - initial: Forecasting-
Inflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan90toDec07tablesFIXED/ ord_MCS_results_square_cpi.tex
US Jan 90 - Dec 07 - new: US Jan 16 - Oct 22 - initial: Forecasting-
Inflation/extra_tex_tables/newPCAoldstartRWbase/
USJan90toDec07tablesFIXED/ ord_MCS_results_square_cpi.tex

US Jan 08 - Jun 09 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan08toJun09tablesFIXED/ ord_MCS_results_square_cpi.tex
US Jan 08 - Jun 09 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan08toJun09tablesFIXED/ ord_MCS_results_square_cpi.tex

US Jul 09 - Jan 20 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJuly09toJan20tablesFIXED/ ord_MCS_results_square_cpi.tex
US Jul 09 - Jan 20 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJuly09toJan20tablesFIXED/ ord_MCS_results_square_cpi.tex

The prediction interval coverage results in appendix E are saved at:

US full initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepcombinedtablesFIXED/ predint_cov_table_cpi.tex
US full new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UScombinedtablesFIXED/ predint_cov_table_cpi.tex

UK initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UKreptablesFIXED/ predint_cov_table_cpi.tex UK new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ UKtablesFIXED/ predint_cov_table_cpi.tex

Canada initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ CanadareptablesFIXED/ predint_cov_table_cpi.tex Canada new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ CanadatablesFIXED/ predint_cov_table_cpi.tex

US extended initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepextendedtables/ predint_cov_table_cpi.tex
US extended new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USextendedtables/ predint_cov_table_cpi.tex

US Jan 21 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan21toOct22tablesFIXED/ predint_cov_table_cpi.tex

US Jan 21 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan21toOct22tablesFIXED/ predint_cov_table_cpi.tex

US Feb 20 - Feb 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepFeb20toFeb22tablesFIXED/ predint_cov_table_cpi.tex
US Feb 21 - Feb 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USFeb20toFeb22tablesFIXED/ predint_cov_table_cpi.tex

US Jan 16 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan16toOct22tablesFIXED/ predint_cov_table_cpi.tex
US Jan 16 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan16toOct22tablesFIXED/ predint_cov_table_cpi.tex

US Jan 90 - Dec 07 - initial: US Jan 16 - Oct 22 - initial: Forecasting-
Inflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan90toDec07tablesFIXED/ predint_cov_table_cpi.tex
US Jan 90 - Dec 07 - new: US Jan 16 - Oct 22 - initial: Forecasting-
Inflation/extra_tex_tables/newPCAoldstartRWbase/
USJan90toDec07tablesFIXED/ predint_cov_table_cpi.tex

US Jan 08 - Jun 09 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan08toJun09tablesFIXED/ predint_cov_table_cpi.tex
US Jan 08 - Jun 09 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan08toJun09tablesFIXED/ predint_cov_table_cpi.tex

US Jul 09 - Jan 20 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJuly09toJan20tablesFIXED/ predint_cov_table_cpi.tex
US Jul 09 - Jan 20 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJuly09toJan20tablesFIXED/ predint_cov_table_cpi.tex

The prediction interval width results in appendix E are saved at:

US full initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepcombinedtablesFIXED/ predint_width_table_cpi.tex
US full new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
UScombinedtablesFIXED/ predint_width_table_cpi.tex

UK initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
UKreptablesFIXED/ predint_width_table_cpi.tex UK new: Forecasting-
Inflation/extra_tex_tables/newPCAoldstartRWbase/
UKtablesFIXED/ predint_width_table_cpi.tex

Canada initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
CanadareptablesFIXED/ predint_width_table_cpi.tex Canada new: Fore-
castingInflation/extra_tex_tables/newPCAoldstartRWbase/
CanadatablesFIXED/ predint_width_table_cpi.tex

US extended initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepextendedtables/ predint_width_table_cpi.tex
US extended new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USextendedtables/ predint_width_table_cpi.tex

US Jan 21 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan21toOct22tablesFIXED/ predint_width_table_cpi.tex
US Jan 21 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan21toOct22tablesFIXED/ predint_width_table_cpi.tex

US Feb 20 - Feb 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepFeb20toFeb22tablesFIXED/ predint_width_table_cpi.tex
US Feb 21 - Feb 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USFeb20toFeb22tablesFIXED/ predint_width_table_cpi.tex

US Jan 16 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USrepJan16toOct22tablesFIXED/ predint_width_table_cpi.tex
US Jan 16 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/
USJan16toOct22tablesFIXED/ predint_width_table_cpi.tex

US Jan 90 - Dec 07 - initial: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/USrepJan90toDec07tablesFIXED/ predint_width_table_cpi.tex
US Jan 90 - Dec 07 - new: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/USJan90toDec07tablesFIXED/ predint_width_table_cpi.tex

US Jan 08 - Jun 09 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USrepJan08toJun09tablesFIXED/ predint_width_table_cpi.tex
US Jan 08 - Jun 09 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USJan08toJun09tablesFIXED/ predint_width_table_cpi.tex

US Jul 09 - Jan 20 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USrepJuly09toJan20tablesFIXED/ predint_width_table_cpi.tex
US Jul 09 - Jan 20 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USJuly09toJan20tablesFIXED/ predint_width_table_cpi.tex

The extended sample results in appendix F (similar to table 1) for the initial and new sets of methods are created by:

US extended initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_extended.R
US extended new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_extended.R

and are saved at:

US extended initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USrepextendedtables/ ord_tab1_cpi_rounded.tex
US extended new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/USextendedtables/ ord_tab1_cpi_rounded.tex

The sub-period sample results in appendix G (similar to table 1) for the initial and new sets of methods are created by:

US Jan 21 - Oct 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_Jan21toOct22.R
US Jan 21 - Oct 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jan21toOct22.R

US Feb 20 - Feb 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_Feb20toFeb22.R
US Feb 21 - Feb 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Feb20toFeb22.R

US Jan 16 - Oct 22 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_Jan16toOct22.R
US Jan 16 - Oct 22 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jan16toOct22.R

US Jan 90 - Dec 07 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jan90toDec07.R
US Jan 90 - Dec 07 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jan90toDec07.R

US Jan 08 - Jun 09 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_Jan08toJun09.R
US Jan 08 - Jun 09 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jan08toJun09.R

US Jul 09 - Jan 20 - initial: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_synced_rep_Jul09toJan20
US Jul 09 - Jan 20 - new: ForecastingInflation/tables_newPCA_oldstart/RWbase/create_tables_cpi_new_Jul09toJan20.R

and are saved at:

US Jan 21 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan21toOct22tablesFIXED/ ord_tab1_cpi_rounded.tex
US Jan 21 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan21toOct22tablesFIXED/ ord_tab1_cpi_rounded.tex

US Feb 20 - Feb 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepFeb20toFeb22tablesFIXED/ ord_tab1_cpi_rounded.tex
US Feb 21 - Feb 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USFeb20toFeb22tablesFIXED/ ord_tab1_cpi_rounded.tex

US Jan 16 - Oct 22 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan16toOct22tablesFIXED/ ord_tab1_cpi_rounded.tex
US Jan 16 - Oct 22 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan16toOct22tablesFIXED/ ord_tab1_cpi_rounded.tex

US Jan 90 - Dec 07 - initial: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan90toDec07tablesFIXED/ ord_tab1_cpi_rounded.tex
US Jan 90 - Dec 07 - new: US Jan 16 - Oct 22 - initial: Forecasting-Inflation/extra_tex_tables/newPCAoldstartRWbase/ USJan90toDec07tablesFIXED/ ord_tab1_cpi_rounded.tex

US Jan 08 - Jun 09 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJan08toJun09tablesFIXED/ ord_tab1_cpi_rounded.tex
US Jan 08 - Jun 09 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJan08toJun09tablesFIXED/ ord_tab1_cpi_rounded.tex

US Jul 09 - Jan 20 - initial: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USrepJuly09toJan20tablesFIXED/ ord_tab1_cpi_rounded.tex
US Jul 09 - Jan 20 - new: ForecastingInflation/extra_tex_tables/newPCAoldstartRWbase/ USJuly09toJan20tablesFIXED/ ord_tab1_cpi_rounded.tex

The graphs of forecasts of and forecast intervals in appendix H are created by:

ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_synced_rep_extended_withQLGBM.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_repsecond_QLGBM.R
ForecastingInflation/tables_newPCA_oldstart/RWbase/
create_tables_cpi_FIXED_repfirst_with_QLGBM.R

and saved at

ForecastingInflation/predintgraphs/

The additional Shapley value results in appendix I are created by:

ForecastingInflation/fastshap_graphs_ordered.R

and are saved at:

ForecastingInflation/extra_tex_tables/shapvalues/graphs/
fancy_maxabsshaps_combine_ordered.png

3 Location of saved forecasts

All method-specific forecast results for the US data are saved to the following subfolders of "ForecastingInflation/forecasts":

- US first sample original methods: rep_passado2000_fixed_oldstart
- US first sample new methods: passado2000_fixed_oldstart
- US second sample original methods: rep_presenteD_fixed_oldstart
- US second sample new methods: presenteD_fixed_oldstart
- US extended sample original methods:
  rep_extended_02_17_fixed_oldstart,
  rep_extended_11_19_fixed_oldstart,
  rep_extended_04_20_fixed_oldstart,
  rep_extended_02_21_fixed_oldstart,
  rep_extended_10_22_fixed_oldstart,
  rep_extended_all_fixed_oldstart

- US extended sample new methods:
  extended_02_17_fixed_oldstart,
  extended_11_19_fixed_oldstart,
  extended_04_20_fixed_oldstart,
  extended_02_21_fixed_oldstart,
  extended_10_22_fixed_oldstart,
  extended_all_fixed_oldstart

While for the UK and Canada, the forecasts are saved to:

- UK original methods:
  ForecastingInflation/UK/forecasts/rep_passado2000_fixed_oldstart
- UK new methods:
  ForecastingInflation/UK/forecasts/passado2000_fixed_oldstart
- Canada original methods:
  ForecastingInflation/Canada/forecasts/rep_passado2000_fixed_oldstart
- Canada new methods:
  ForecastingInflation/Canada/forecasts/passado2000_fixed_oldstart

References

Cahan, E., Bai, J., and Ng, S. (2023). Factor-based imputation of missing values and covariances in panel data of large dimensions. *Journal of Econometrics*, 233(1):113–131.

Fortin-Gagnon, O., Leroux, M., Stevanovic, D., and Surprenant, S. (2018). A large canadian database for macroeconomic analysis. Technical report, Document de travail.

Goulet Coulombe, P., Marcellino, M., and Stevanović, D. (2021). Can machine learning catch the Covid-19 recession? *National Institute Economic Review*, 256:71–109.

McCracken, M. W. and Ng, S. (2016). Fred-md: A monthly database for macroeconomic research. *Journal of Business & Economic Statistics*, 34(4):574–589.

Medeiros, M. C., Vasconcelos, G. F., Veiga, Á., and Zilberman, E. (2021). Forecasting inflation in a data-rich environment: the benefits of machine learning methods. *Journal of Business & Economic Statistics*, 39(1):98–119.