

Online Appendix for

A factor augmented vector autoregressive (FAVAR)
approach for monetary policy: Replication of the
empirical results in “Measuring the effects of
monetary policy”

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APPENDIX

In the appendix, we replicated all results of the paper. We also provided the data description and the source in detail.

Figure 1. Estimated impulse responses to an identified policy shock for alternative FAVAR specification, based on the two-step principal component's approach

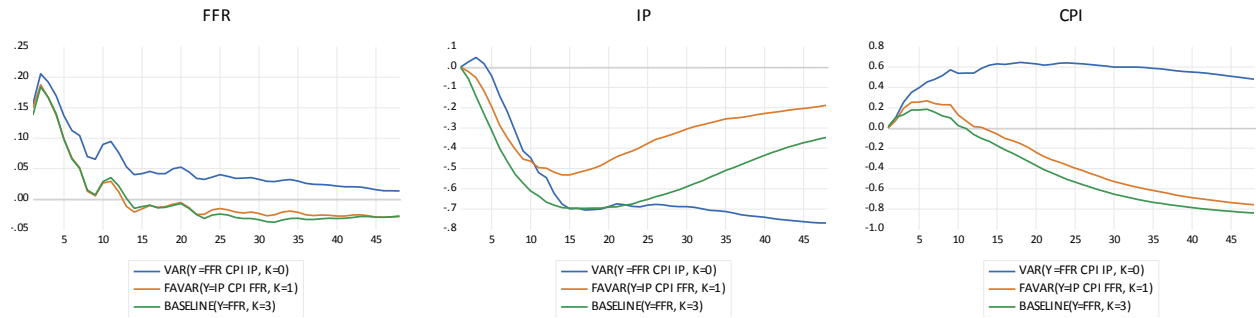


Figure 2. Impulse response generated from FAVAR with three factors and FFR estimated by principal components with two-step bootstrap

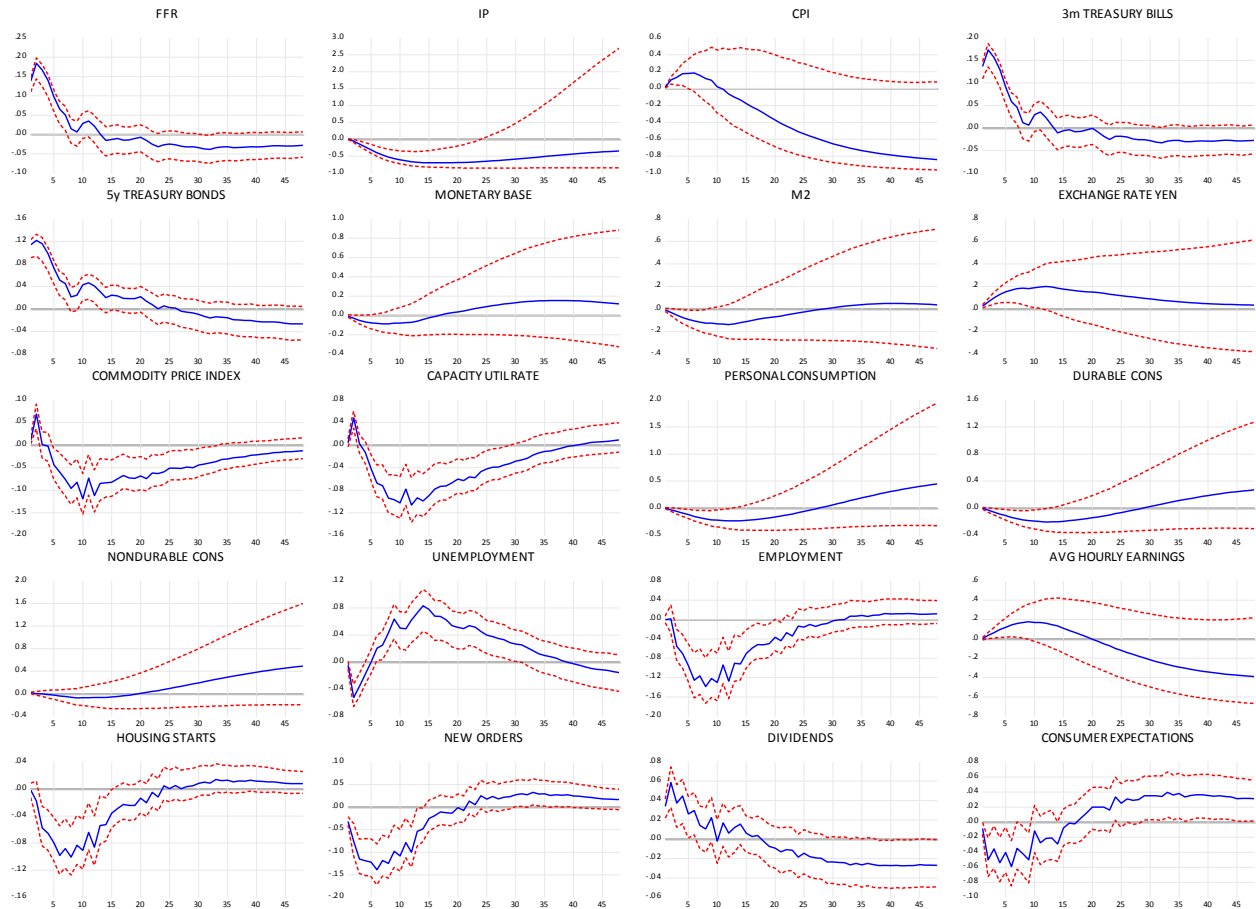


Figure 3. Impulse response generated from FAVAR with five factors and FFR estimated by principal components with two-step bootstrap

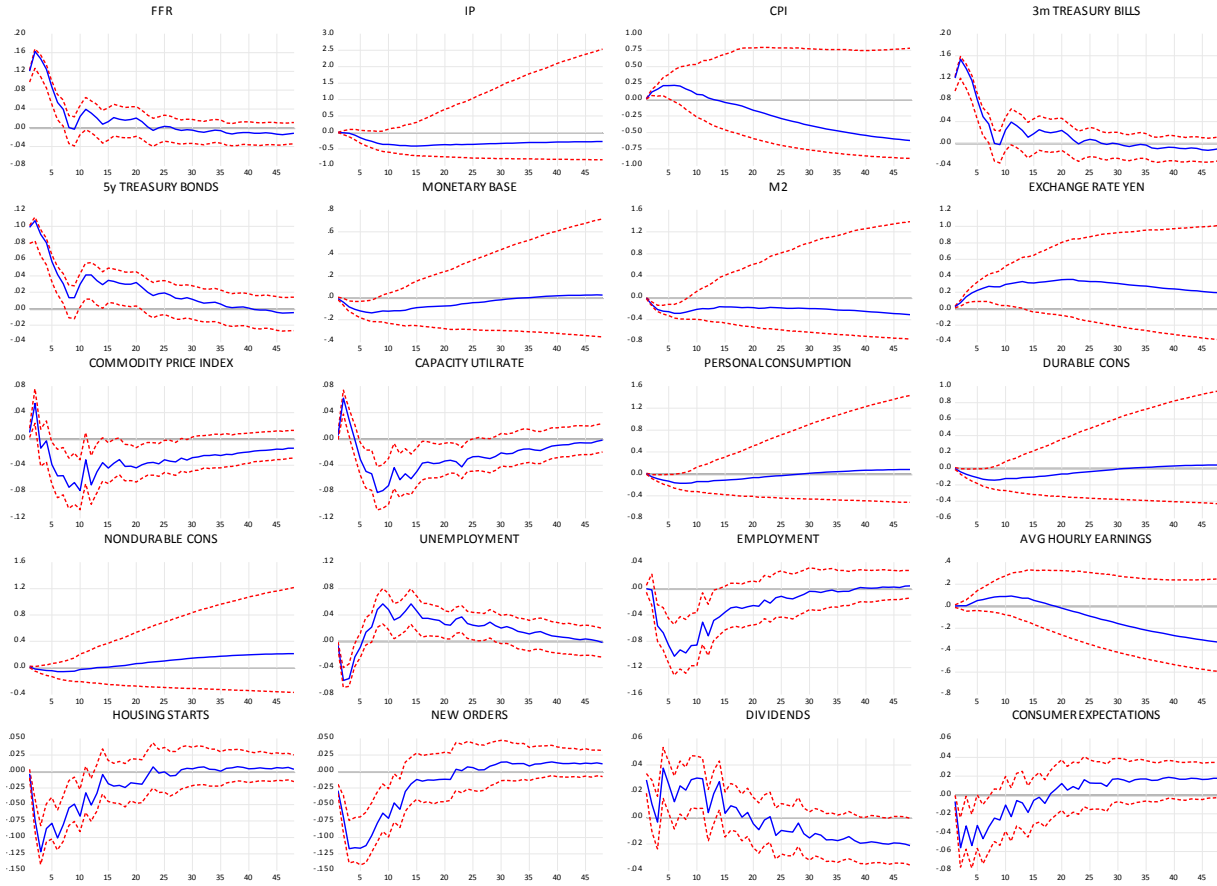


Table 1 Contribution of the policy shock to the variance of the common component

	Variance Decomposition	R2
Ip	0.057	0.693
Cpi	0.035	0.880
3m TREASURY BILLS	0.459	0.975
5y TREASURY BONDS	0.415	0.930
Monetary base	0.007	0.071
M2	0.005	0.050
Exchange rate yen	0.008	0.026
Commodity price index	0.046	0.659
Capacity util rate	0.098	0.737
Personal consumption	0.009	0.123
Durable cons	0.006	0.065
Nondurable cons	0.002	0.067
Unemployment	0.103	0.827
Employment	0.067	0.727
Avg hourly earnings	0.008	0.086
Housing starts	0.032	0.377
New orders	0.087	0.645
Dividends	0.044	0.557
Consumer expectations	0.035	0.695

Figure 4. Impulse responses generated from FAVAR with three factors and FFR estimated by Gibbs Sampling

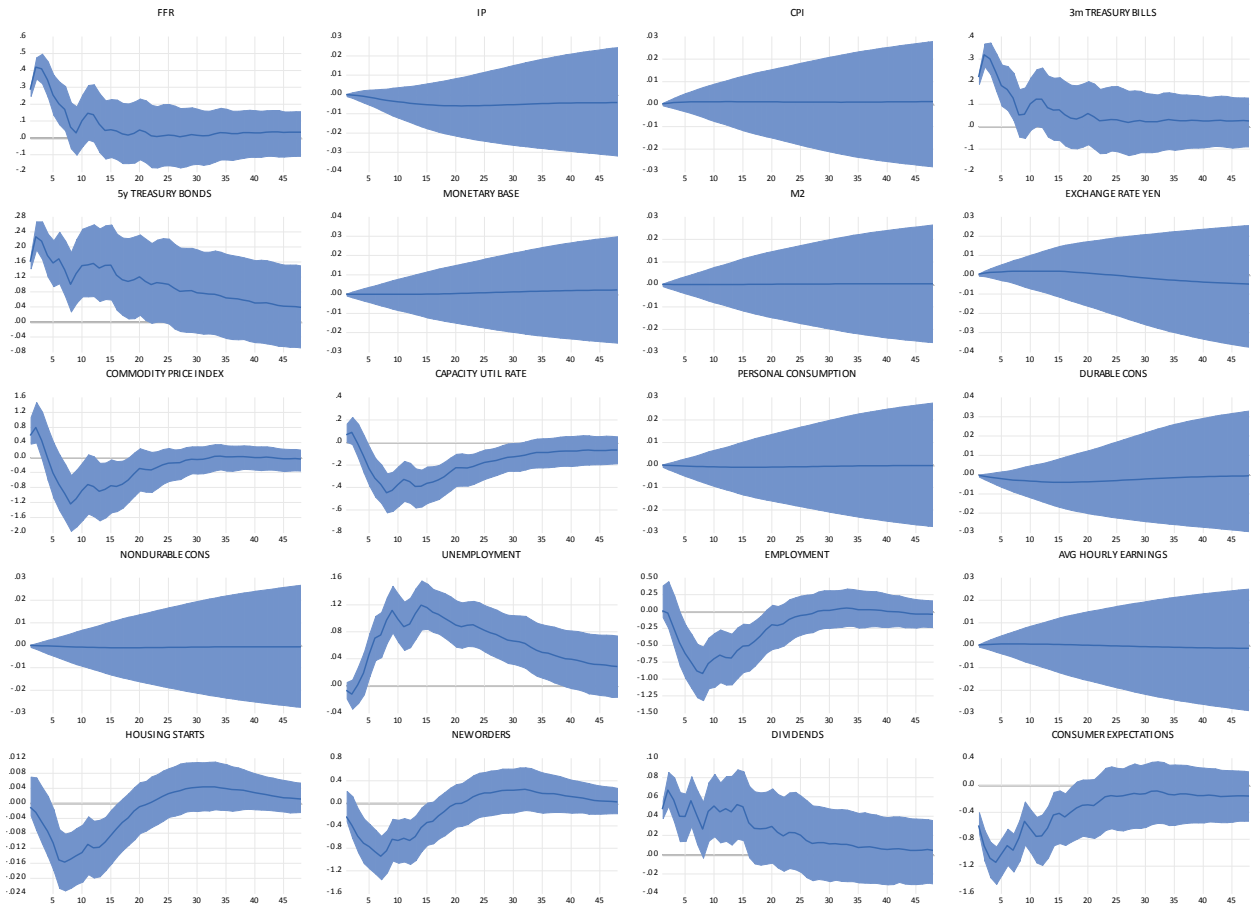
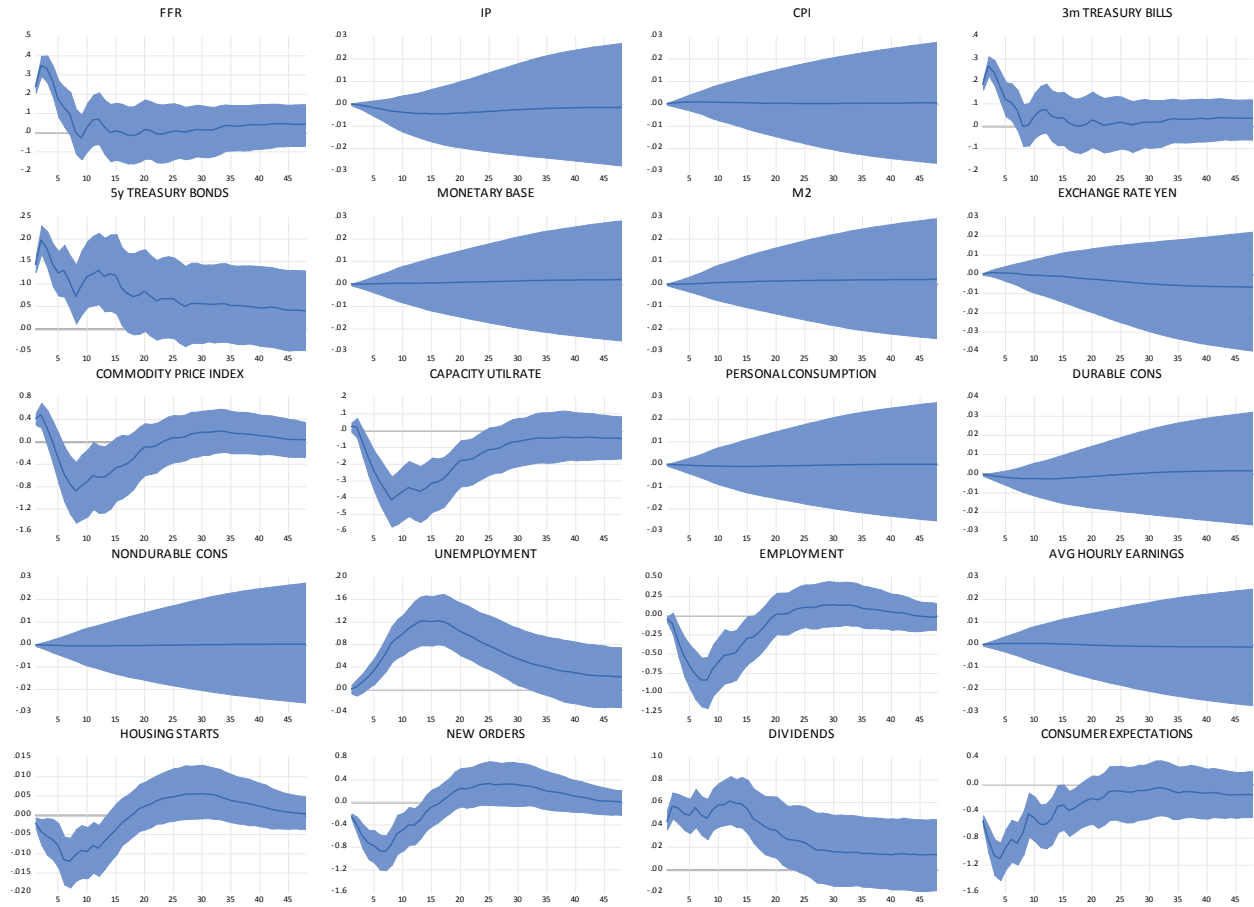


Figure 5. Impulse responses generated from FAVAR with three factors and FFR estimated by Gibbs Sampling



Data description

Bernanke, Boivin and Elias (2005) have taken 120 series from DRI/McGraw Hill Basic Economics Database. In our replication 110 series were retrieved from FRED database¹ while the remaining 10 series were missing. The missing series are indicated as red colors. Format is as in Bernanke, Boivin and Elias (2005): series id number; series DRI mnemonic; series FRED mnemonic; transformation code and series description as appears in FRED database. The sample size for all monthly series is 512 (1959:01 to 2001:08).

Table 2. Data description

Real output and income				
id	DRI/McGraw	FRED	TCODE	DESCRIPTION (FRED)
1	IPP	IPFNSS	5	IP: Final Products and Nonindustrial Supplies
2	IPF	IPFINAL	5	IP: Final Products (Market Group)
3	IPC	IPCONGD	5	IP: Consumer Goods

¹ McCracken and Ng (2015) have compiled large macroeconomic dataset for the United States (FRED-MD), which is available at <https://research.stlouisfed.org/econ/mccracken/fred-databases/>

4	IPCD	IPDCONGD	5	IP: Durable Consumer Goods
5	IPCN	IPNCONGD	5	IP: Nondurable Consumer Goods
6	IPE	IPBUSEQ	5	IP: Business Equipment
	IPI			IP: Intermediate products
7	IPM	IPMAT	5	IP: Materials
8	IPMD	IPDMAT	5	IP: Durable Materials
9	IPMND	IPNMAT	5	IP: Nondurable Materials
10	IPMFG	IPMANSICS	5	IP: Manufacturing (SIC)
	IPD			IP: Durable manufacturing
	IPN			IP: Nondurable manufacturing
11	IPMIN	IPMINE	5	IP: Mining
12	IPUT	IPB51222S	5	IP: Residential utilities
13	IP	INDPRO	5	IP: Index
14	IPXMCA	CUMFNS	1	Capacity Utilization: Manufacturing (SIC)
15	PMI	NAPM	1	ISM Manufacturing: PMI Composite Index
16	PMP	NAPMPI	1	ISM Manufacturing: Production Index
17	GMPYQ	RPI	5	Real personal income
				Real personal income excluding current transfer receipts
18	GMYPQ	W875RX1	5	

Employment and hours

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
19	LHEL	HWI	5	Help-Wanted Index for United States
20	LHELX	HWIURATIO	4	Ratio of Help Wanted / No. Unemployed
21	LHEM	CLF16OV	5	Civilian Labor Force
22	LHNAG	CE16OV	5	Civilian Employment Level
23	LHUR	UNRATE	1	Civilian Unemployment Rate
24	LHU680	UEMPMEAN	1	Average (Mean) Duration of Unemployment
25	LHU5	UEMPLT5	1	Civilians Unemployed for Less Than 5 Weeks
26	LHU14	UEMP5TO14	1	Civilians Unemployed for 5 to 14 Weeks
27	LHU15	UEMP15OV	1	Civilians Unemployed for 15 Weeks and Over
28	LHU26	UEMP15T26	1	Civilians Unemployed for 15 to 26 Weeks
29	LPNAG	PAYEMS	5	All Employees: Total Nonfarm Payrolls
30	LP	CEU050000001	5	All Employees: Total Private
31	LPGD	USGOOD	5	All Employees: Goods-Producing Industries
32	LPMI	CES102100001	5	All Employees: Mining and Logging: Mining
33	LPCC	USCONS	5	All Employees: Construction
34	LPEM	MANEMP	5	All Employees: Manufacturing
35	LPED	DMANEMP	5	All Employees: Durable Goods
36	LPEN	NDMANEMP	5	All Employees: Nondurable goods
37	LPSP	SRVPRD	5	All Employees: Service-Providing Industries
38	LPTU	USTPU	5	All Employees: Trade, Transportation and Utilities
39	LPT	USWTRADE	5	All Employees: Wholesale Trade
40	LPFR	USFIRE	5	All Employees: Financial Activities
41	LPS	USSERV	5	All Employees: Other Services
42	LPGOV	USGOVT	5	All Employees: Government
43	LPHRM	AWHMAN	1	Average Weekly Hours : Manufacturing
44	LPMOSA	AWOTMAN	1	Average Weekly Overtime Hours: Manufacturing
45	PMEMP	NAPMEI	1	ISM Manufacturing: Employment Index

Consumption

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
46	GMCQ	DPCERA3M086SBEA	5	Real personal consumption expenditures
47	GMCDQ	DDURRA3M086SBEA	5	Real personal consumption expenditures: Durable goods
48	GMCNQ	DNDGRA3M086SBEA	5	Real personal consumption expenditures: Nondurable goods
49	GMCSQ	DSERRA3M086SBEA	5	Real personal consumption expenditures: Services
	GMCANQ			Real personal consumption expenditures: New cars

Housing starts and sales

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
50	HSFR	HOUST	4	Housing Starts: Total New Privately Owned
51	HSNE	HOUSTNE	4	Housing Starts: Northeast Census Region
52	HSMW	HOUSTMW	4	Housing Starts: Midwest Census Region
53	HSSOU	HOUSTS	4	Housing Starts: South Census Region
54	HSWT	HOUSTW	4	Housing Starts: West Census Region
	HSBR			Housing Authorized: Total New Private Housing
	HMOB			Mobile Homes: Manufacturers' shipments

Real inventories, orders and unfilled orders

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
55	PMNV	NAPMII	1	ISM Manufacturing: Inventories Index
56	PMNO	NAPMNOI	1	ISM Manufacturing: New Orders Index
57	PMDEL	NAPMSDI	1	ISM Manufacturing: Supplier Deliveries Index
58	MOCMQ	A0M008*	5	Mfrs' new orders consumer goods and materials
59	MSONDQ	A0M027*	5	Mfrs' new orders nondefense capital goods

* source: The Conference Board

Stock prices

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
	FSNCOM			NYSE Common Stock Price Index: Composite
60	FSPCOM	S&P 500	5	S&P's Common Stock Price Index: Composite
61	FSPIN	S&P: indust	5	S&P's Common Stock Price Index: Industrials
	FSPCAP			S&P's Common Stock Price Index: Capital goods
	FSPUT			S&P's Common Stock Price Index: Utilities
62	FSDXP	S&P div yield	1	S&P's Composite Common Stock: Dividend Yield
				S&P's Composite Common Stock: Price-Earnings
63	FSPXE	S&P PE ratio	1	Ratio

Exchange rates

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
64	EXRSW	EXSZUSx	5	Switzerland / U.S. Foreign Exchange Rate
65	EXRJAN	EXJPUSx	5	Japan / U.S. Foreign Exchange Rate
66	EXRUK	EXUSUKx	5	U.S. / U.K. Foreign Exchange Rate
67	EXRCAN	EXCAUSx	5	Canada / U.S. Foreign Exchange Rate

Interest rates

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
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68	FYFF	FEDFUNDS	1	Effective Federal Funds Rate
69	FYGM3	TB3MS	1	3-Month Treasury Bill: Secondary Market Rate
70	FYGM6	TB6MS	1	6-Month Treasury Bill: Secondary Market Rate
71	FYGT1	GS1	1	1-Year Treasury Constant Maturity Rate
72	FYGT5	GS5	1	5-Year Treasury Constant Maturity Rate
73	FYGT10	GS10	1	10-Year Treasury Constant Maturity Rate
74	FYAAAC	AAA	1	Moody's Seasoned Aaa Corporate Bond Yield
75	FYBAAC	BAA	1	Moody's Seasoned Baa Corporate Bond Yield
76	SFYGM3	TB3SMFFM	1	3-Month Treasury Bill Minus Federal Funds Rate
77	SFYGM6	TB6SMFFM	1	6-Month Treasury Bill Minus Federal Funds Rate
78	SFYGT1	T1YFFM	1	1-Year Treasury Constant Maturity Minus Federal Funds Rate
79	SFYGT5	T5YFFM	1	5-Year Treasury Constant Maturity Minus Federal Funds Rate
80	SFYGT10	T10YFFM	1	10-Year Treasury Constant Maturity Minus Federal Funds Rate
81	SFYAAAC	AAAFFM	1	Moody's Seasoned Aaa Corporate Bond Minus Federal Funds Rate
82	SFYBAAC	BAAFFM	1	Moody's Seasoned Baa Corporate Bond Minus Federal Funds Rate

Money and credit quantity aggregates

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
83	FM1	M1SL	5	M1 Money Stock
84	FM2	M2SL	5	M2 Money Stock
85	FM3	M3SL	5	M3 Money Stock
86	FM2DQ	M2REAL	5	Real M2 Money Stock
87	FMFBA	AMBSL	5	St. Louis Adjusted Monetary Base
88	FMRRR	TOTRESNS	5	Total Reserves of Depository Institutions
89	FMRNBA	NONBORRES	5	Reserves of Depository Institutions, Nonborrowed Commercial and Industrial Loans, All Commercial Banks
90	FCLNQ	BUSLOANS	5	Commercial and Industrial Loans, All Commercial Banks
	FCLBMC			Wilky RP LG Com. Banks: net change com & ind. Loans
91	CCINRV	NONREVSL	5	Total Nonrevolving Credit Owned and Securitized, Outstanding

Price Indexes

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
92	PMCP	NAPMPRI	1	ISM Manufacturing: Prices Index
93	PWFSR	WPSFD49207	5	PPI: Commodity for Final Demand: Finished Goods
94	PWFCSA	WPSFD49502	5	PPI: Commodity for Final Demand: Finished Consumer Goods
95	PWIMSA	WPSID61	5	PPI: Processed Goods for Intermediate Demand
96	PWCMSA	WPSID62	5	PPI: Unprocessed Goods for Intermediate Demand
97	PSM99Q*	A0M099	5	Index of Sensitive Materials Prices
98	PUNEW	CPIAUCSL	5	CPI for All Urban Consumers: All Items
99	PU83	CPIAPPSL	5	CPI for All Urban Consumers: Apparel
100	PU84	CPITRNSL	5	CPI for All Urban Consumers: Transportation
101	PU85	CPIMEDSL	5	CPI for All Urban Consumers: Medical care
102	PUC	CUSR0000SAC	5	CPI for All Urban Consumers: Commodities

103	PUCD	CUSR0000SAD	5	CPI for All Urban Consumers: Durables
104	PUS	CUSR0000SAS	5	CPI for All Urban Consumers: Services
105	PUXF	CPIULFSL	5	CPI for All Urban Consumers: All Items Less Food
106	PUXHS	CUSR0000SA0L2	5	CPI for All Urban Consumers: All Items Less Shelter
107	PUXM	CUSR0000SA0L5	5	CPI for All Urban Consumers: All Items Less Medical care

*source: The Conference Board

Average hourly earnings

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
108	LEHCC	CES2000000008	5	Average Hourly Earnings: Construction
109	LEHM	CES3000000008	5	Average Hourly Earnings: Manufacturing

Miscellaneous

id	DRI/McGraw	FRED	TCODE	DESCRIPTION
110	HHSNTN	U0M093*	1	Consumer expectation index (U. OF. MICHIGAN)

*source: The Conference Board

References

Bernanke, B., Boivin, J., & Elias, P. (2005). Measuring the Effects of Monetary Policy: A Factor-Augmented Vector Autoregressive (FAVAR) approach. *Quarterly Journal of Economics*, v120, 387-422.

McCracken, M., Ng, S., 2015. FRED-MD: a monthly database for macroeconomic research. Federal Reserve Bank of St. Louis. Working paper 2015-012B.