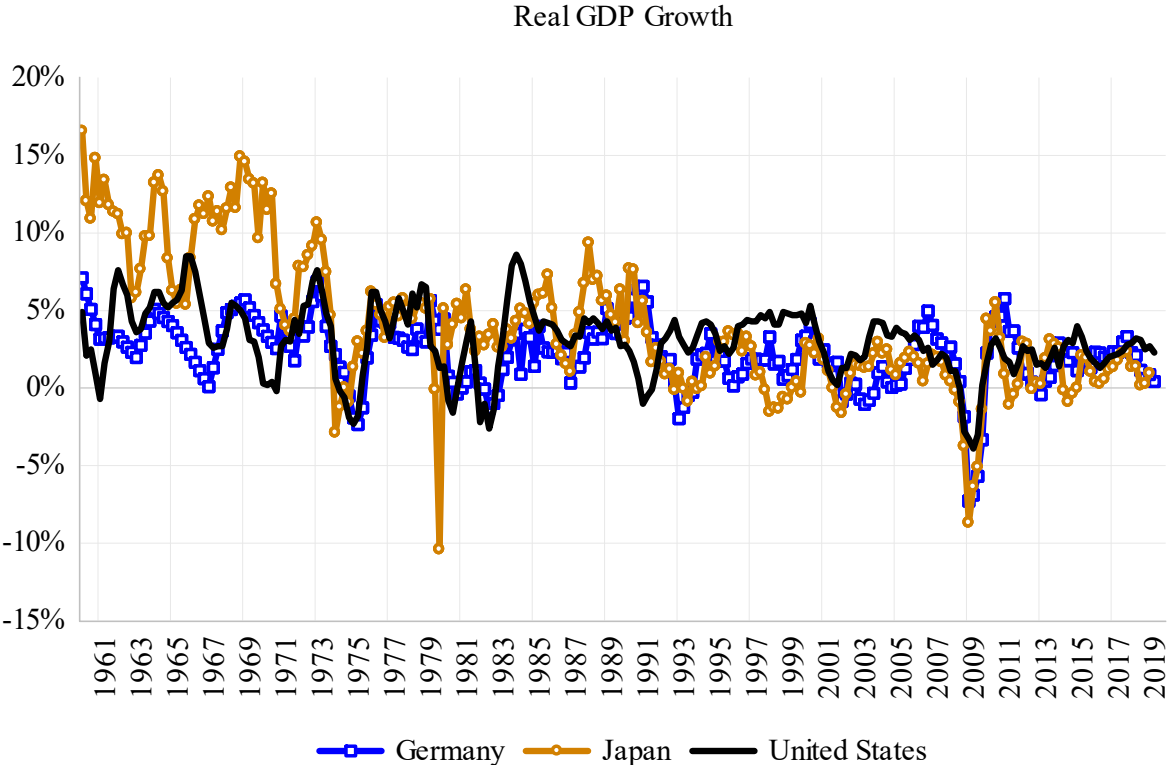


# APENDICES

1. Additional plots and tables;
2. Business Cycle Chronologies;
3. IMF Article IV Consultations;
4. OECD Economic Surveys;
5. G20, G7 Summit Issues;
6. Compendium of Key Dates and Events;
7. Forecasts: Definitions and Sources

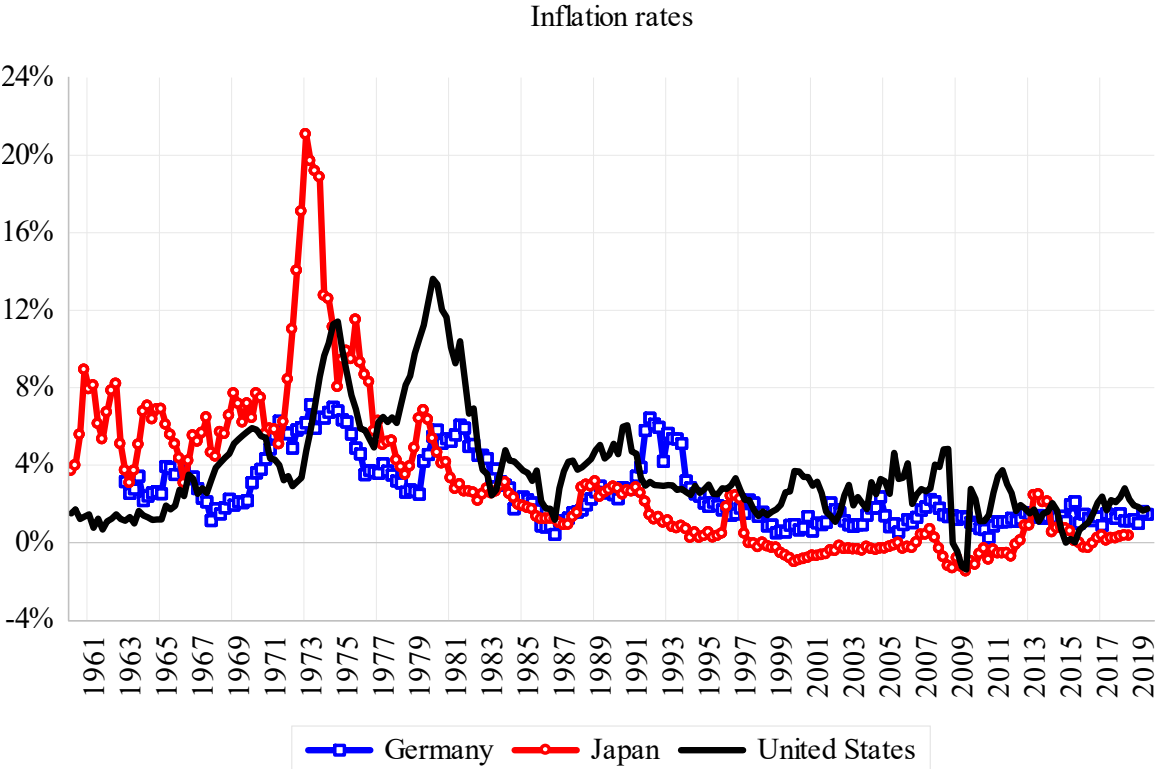
## **APPENDIX – ADDITIONAL PLOTS**

**Observed real GDP Growth Rates: Japan, U.S., and Germany Since 1960 (Quarterly)**



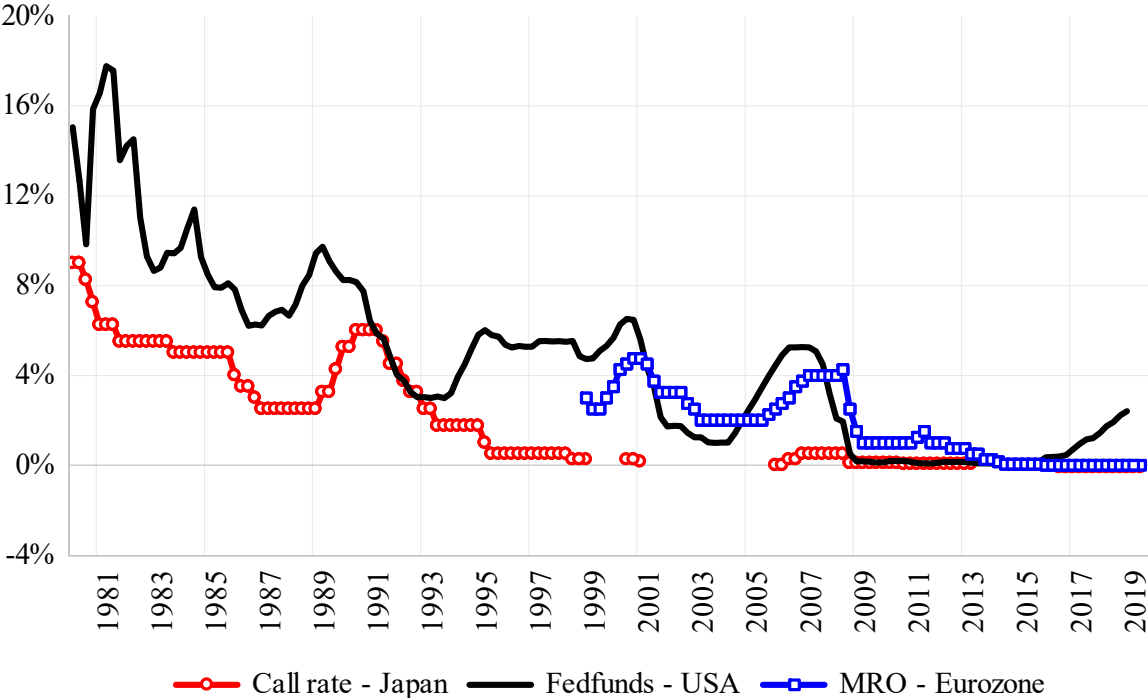
Annualized real GDP growth rates from FRED and supplemented with IMF IFS data.

# Observed Inflation Rates: Japan, U.S., and Germany Since 1960 (Quarterly)



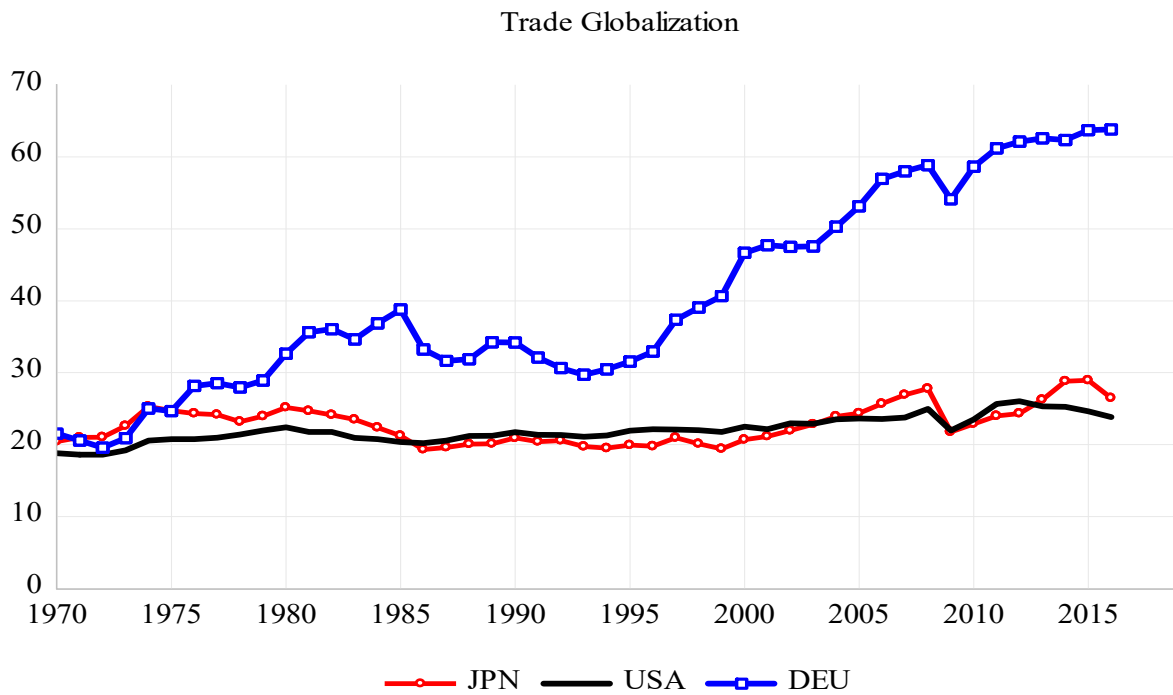
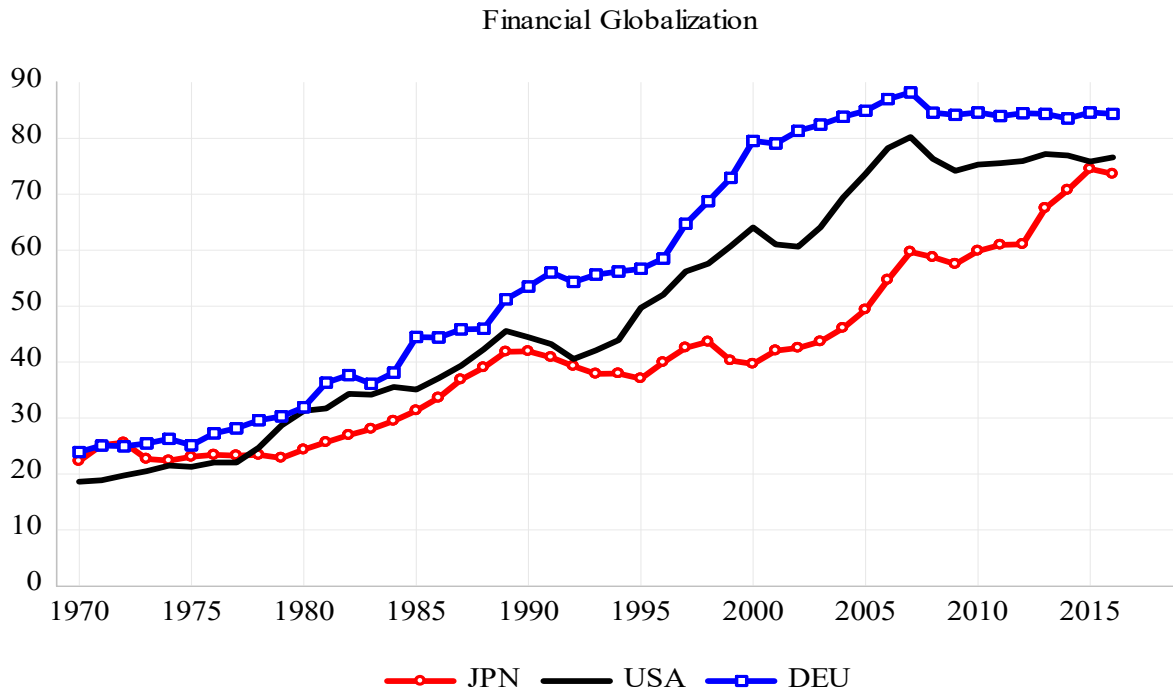
Annualized CPI inflation rates. Sources same as previous figure.

### Central Bank Policy Rates



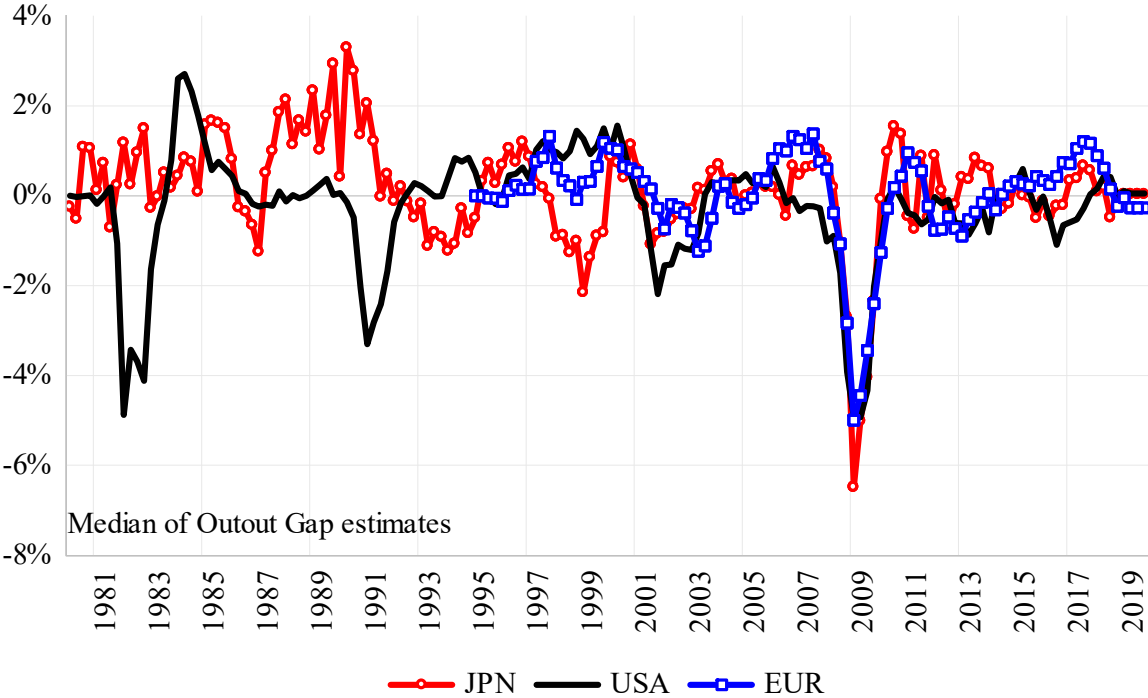
In percent. Data from BIS.

## Financial and Trade Globalization



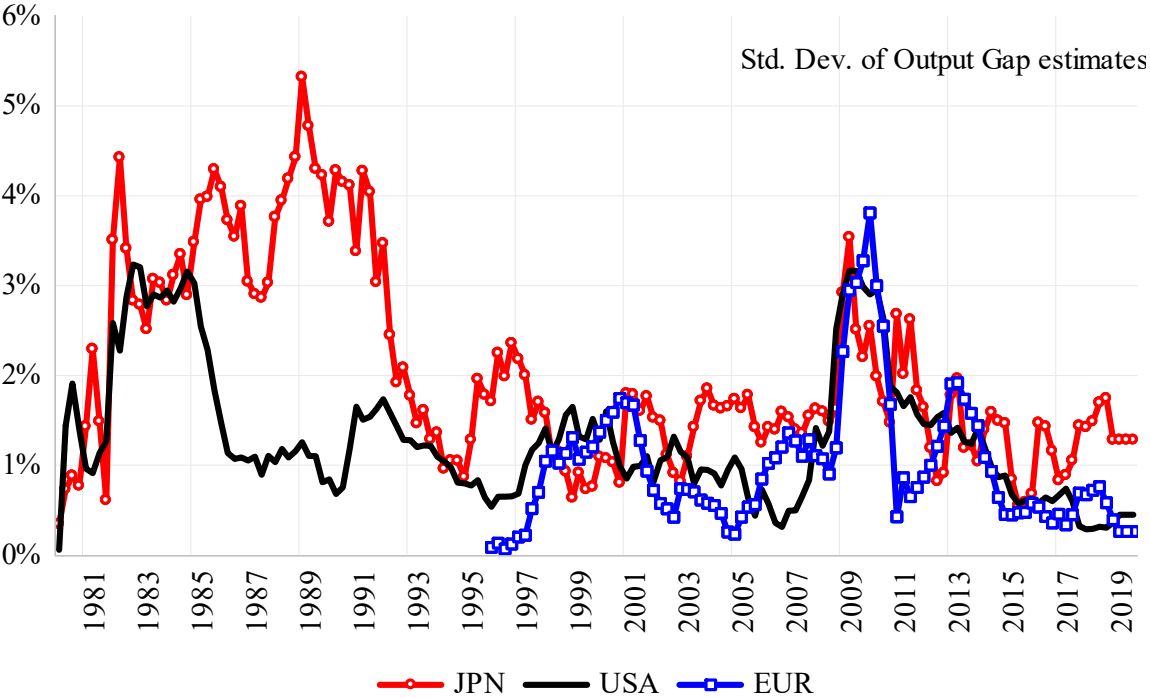
Data from KOF, see main text for link.

### Median Output Gap Estimates



Methodology explained in main body of the text. Data are quarterly.

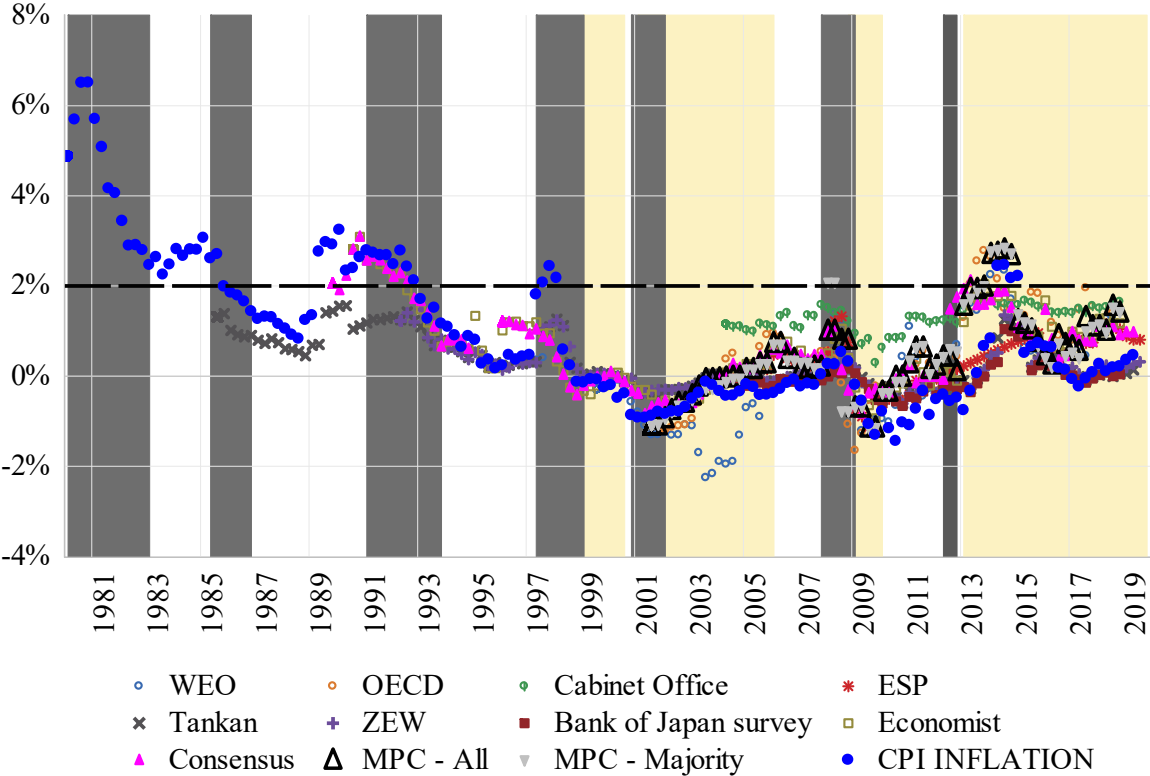
### Standard Deviation of Output Gap Estimates



See previous graph for details.

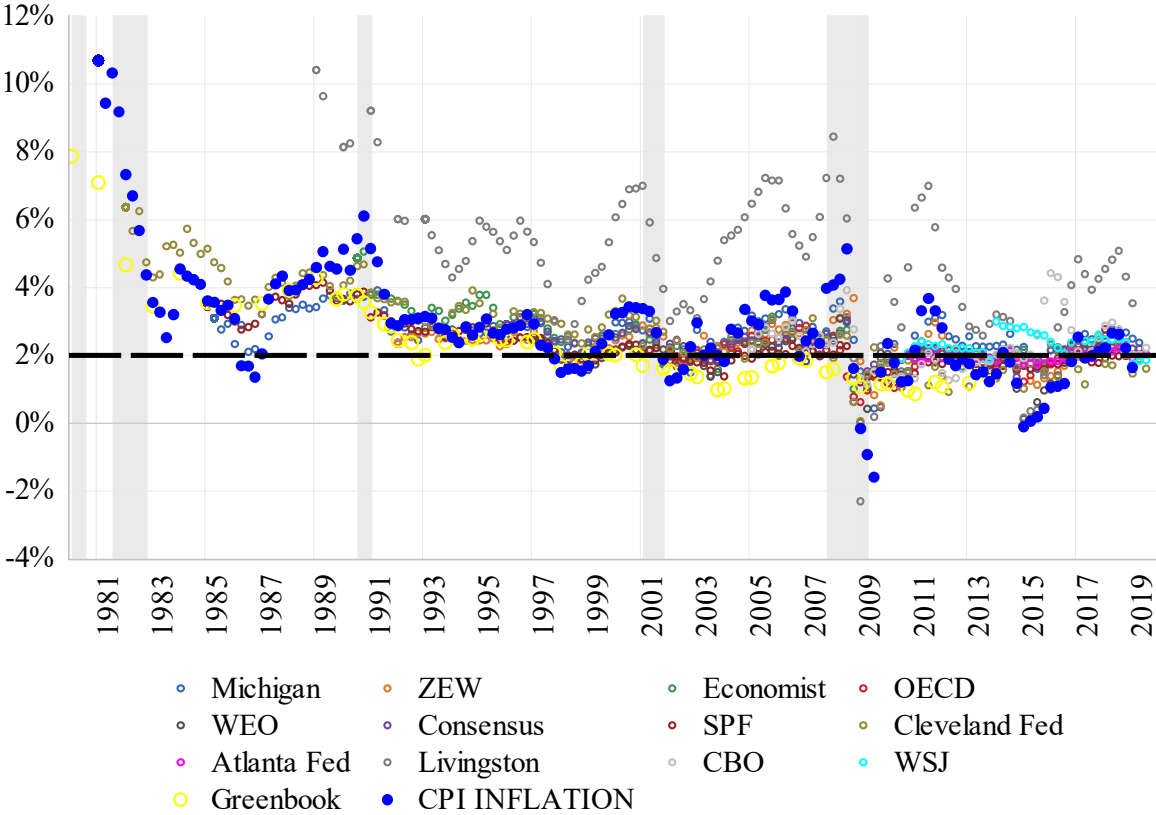


### Inflation Expectations: Japan



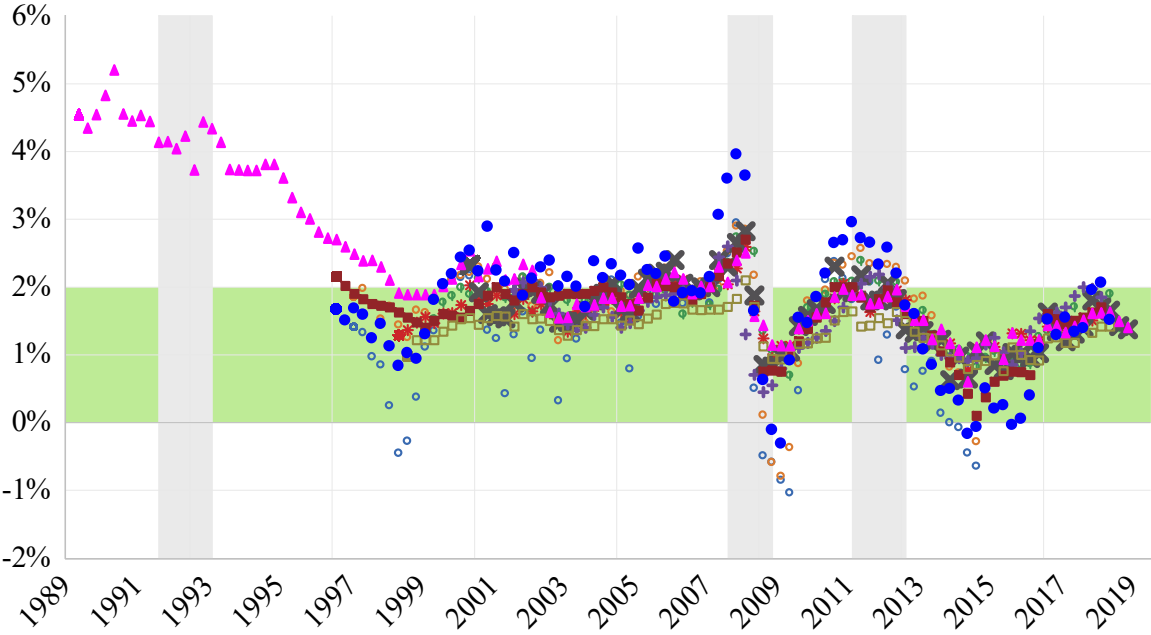
Light colored shading, see Table 1. Dark colored shading are recession periods (Japan Cabinet Office estimates).

### Inflation Expectations: USA



Light colored shading, NBER reference cycle chronology.

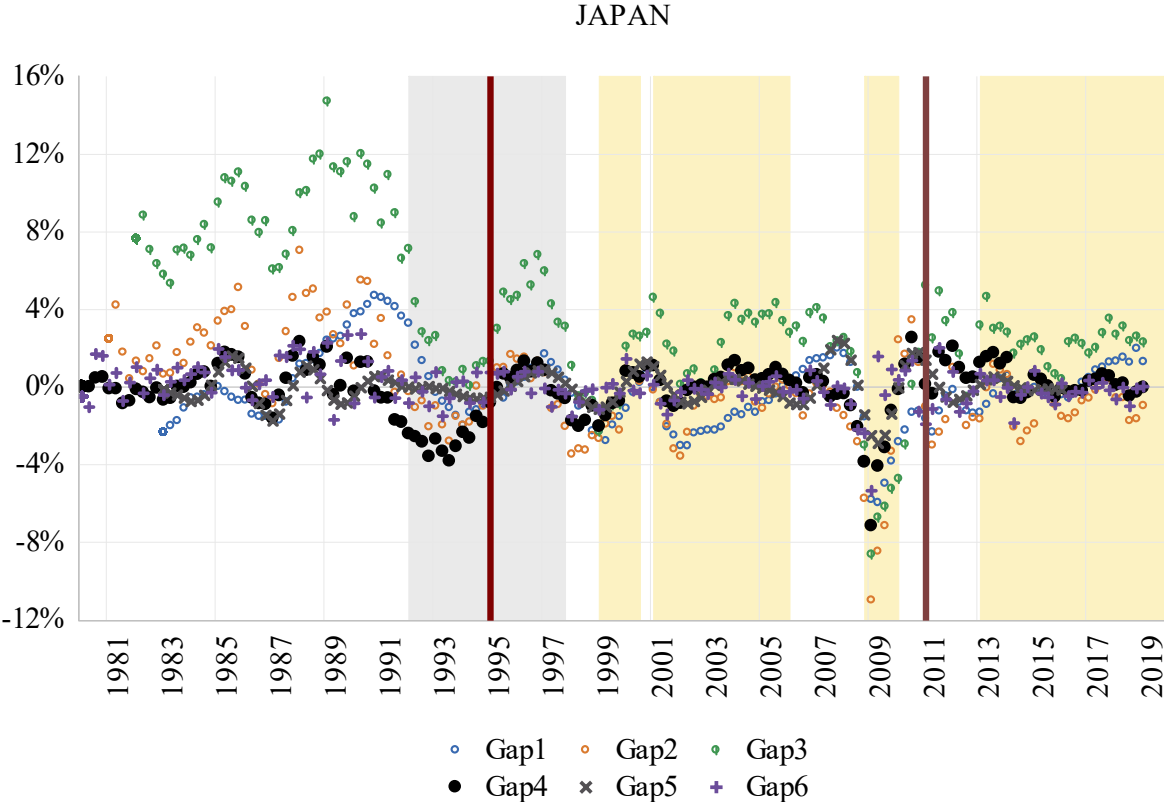
### Inflation Expectations: Eurozone



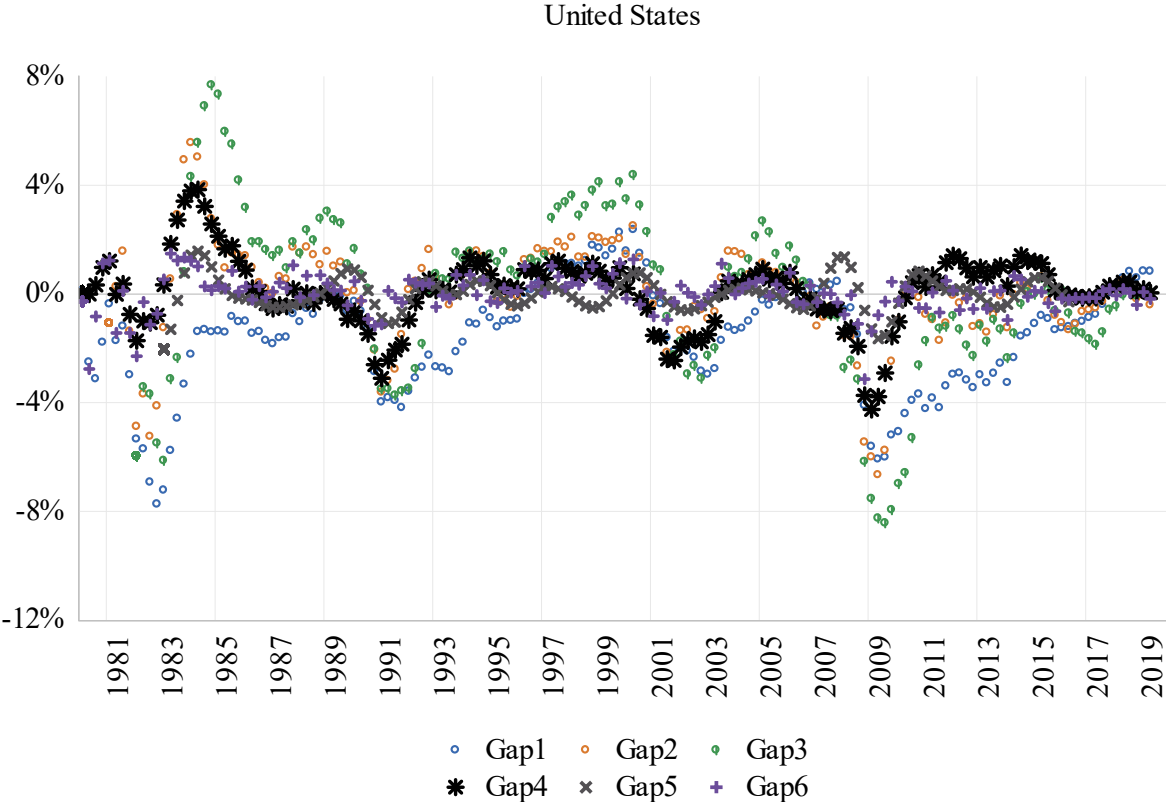
- European Commission BUS
  European Commission CONS
  ZEW
  Economist
- ECB
  OECD
  WEO
  SPF
- Consensus
  CPI INFLATION

Light colored shading, CEPR reference cycle chronology; horizontal shading, inflation tolerance range. CPI refers to HICP index.

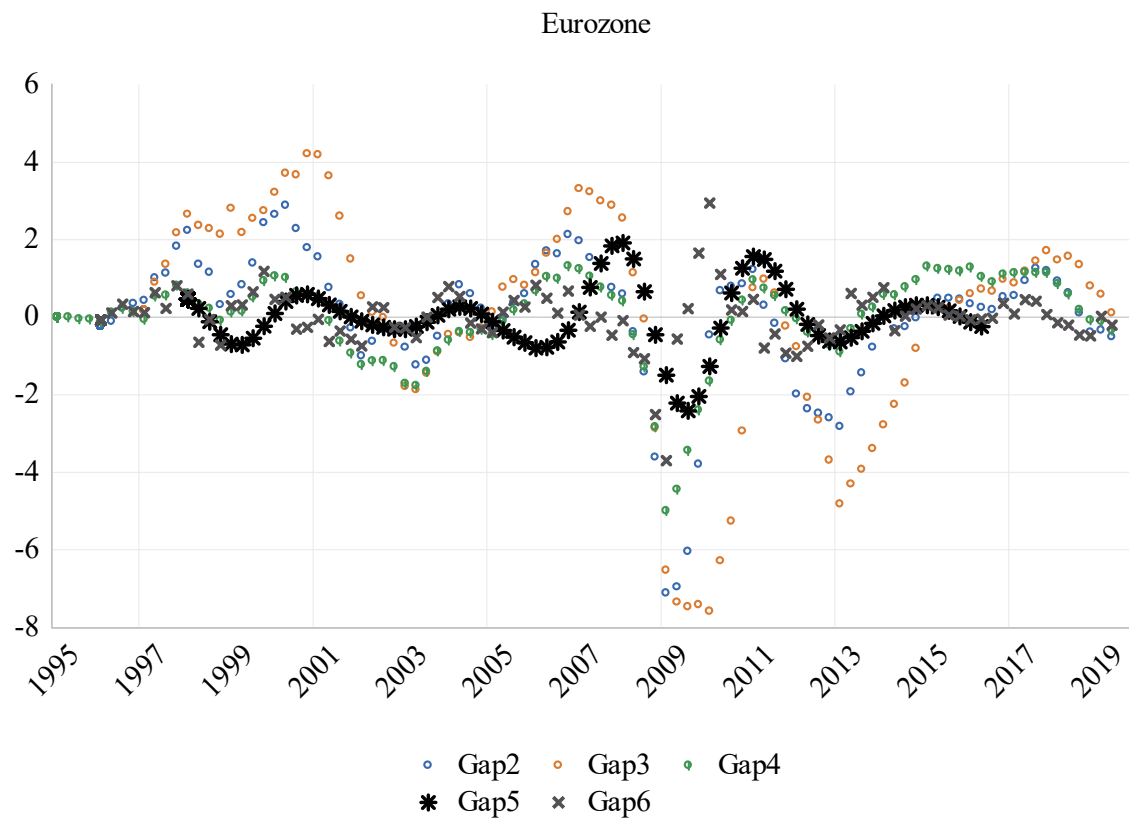
**Output Gap Range of Estimates: JAPAN**



**Output Gap Range of Estimates: U.S.A.**

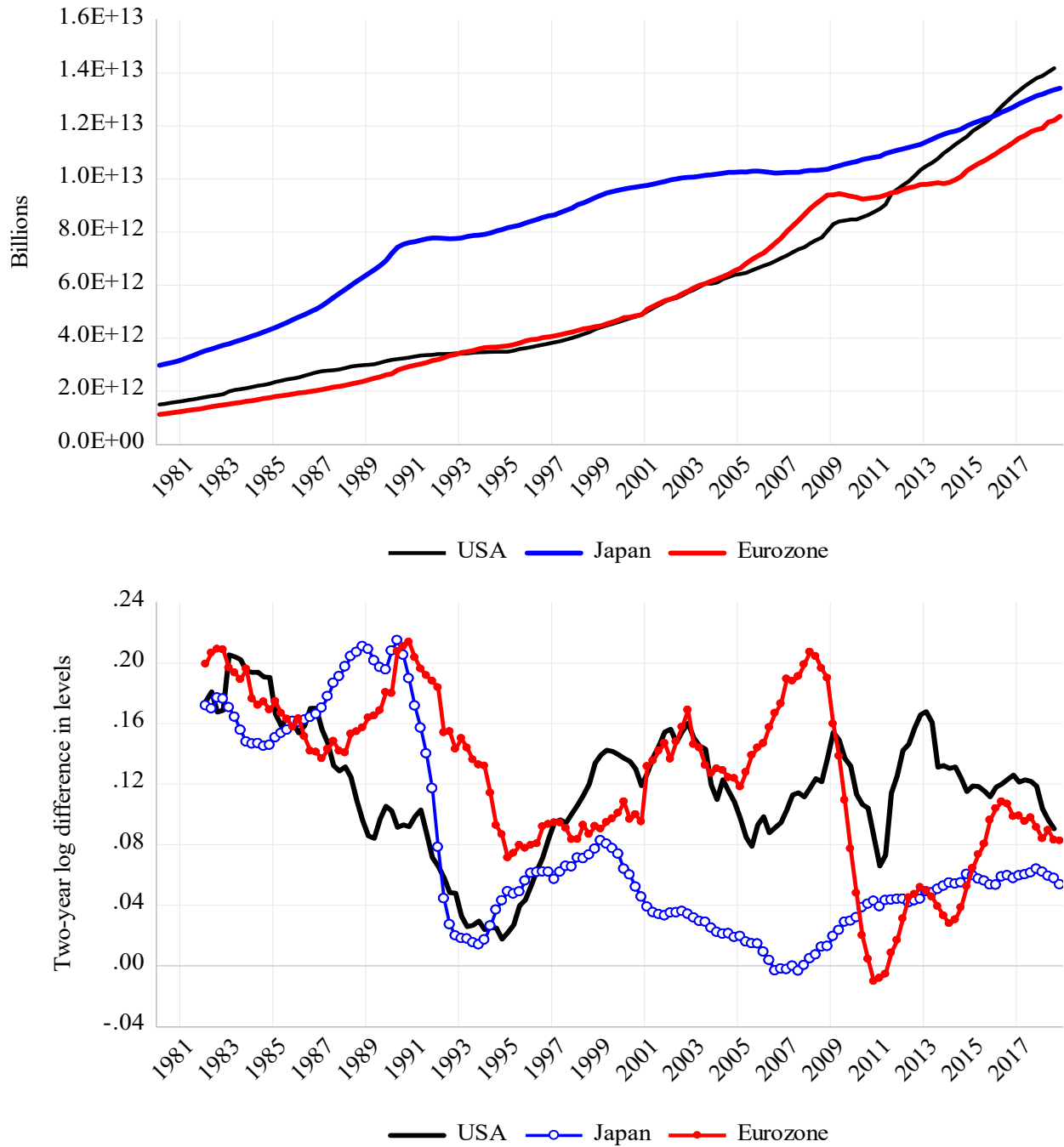


## Output Gap Range of Estimates: Eurozone



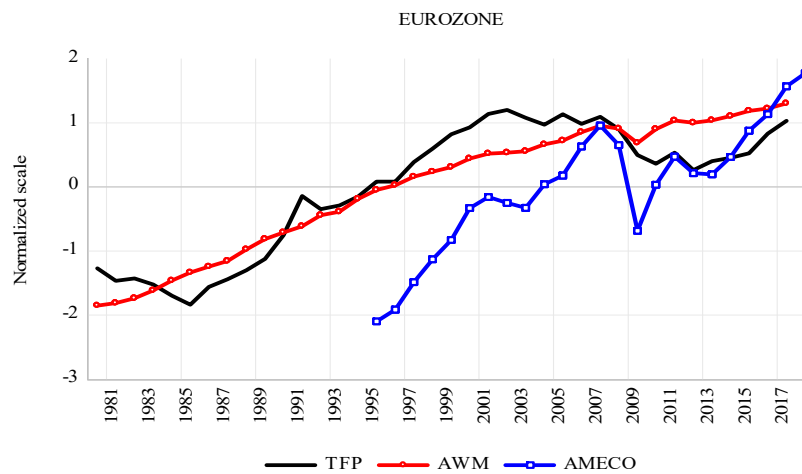
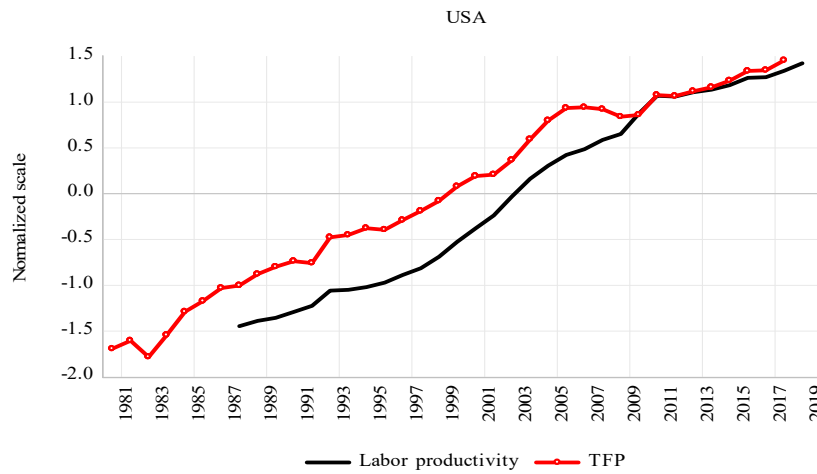
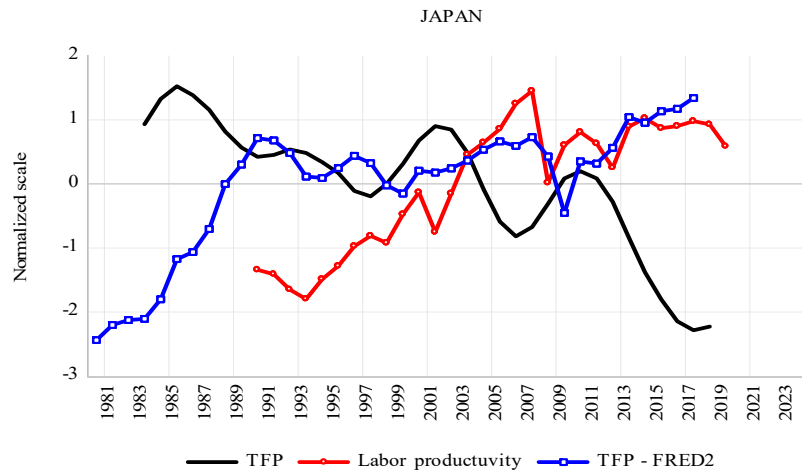
*Gap1*: CBO (U.S), BoJ (Japan), None for Eurozone; *Gap2*: Growth rate; *Gap3*: Hamilton filter (simple); *Gap4*: One-sided H-P Filter; *Gap5*: Christiano-Fitzgerald filter; *Gap6*: mean-adjusted residuals from a regression of log Real GDP on trend breaks estimated via Bai-Perron method. Additional information in the main body of the text (Table 3).

**Figure – Money Supply Levels and Growth Rates: Japan, USA, and the Eurozone**



Note: The top figure plots M3 as defined in the USA, Japan, and the Eurozone. In billions. The bottom plots represent growth rates for M3 over a two-year period. Data from FRED: MABMM301EZQ189S(Eurozone), MABMM301USM189S (USA), MABMM301JPJPM189S (Japan).

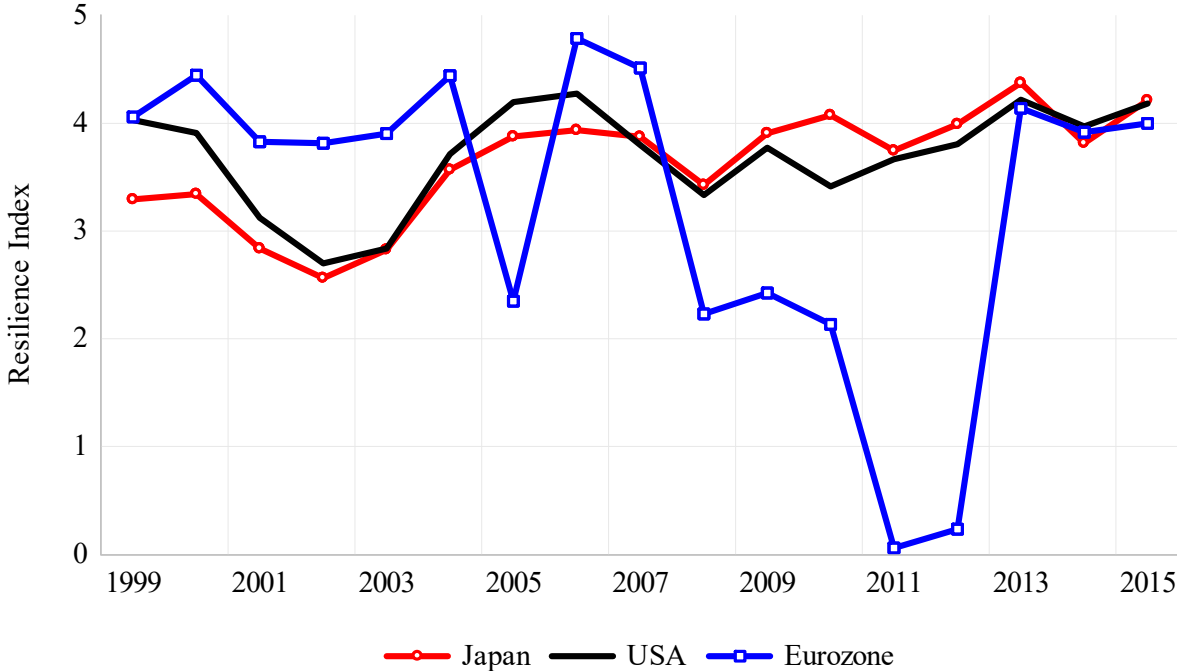
## Productivity in Japan, U.S., and the Eurozone



TFP is total factor productivity; AWM is the area wide model.

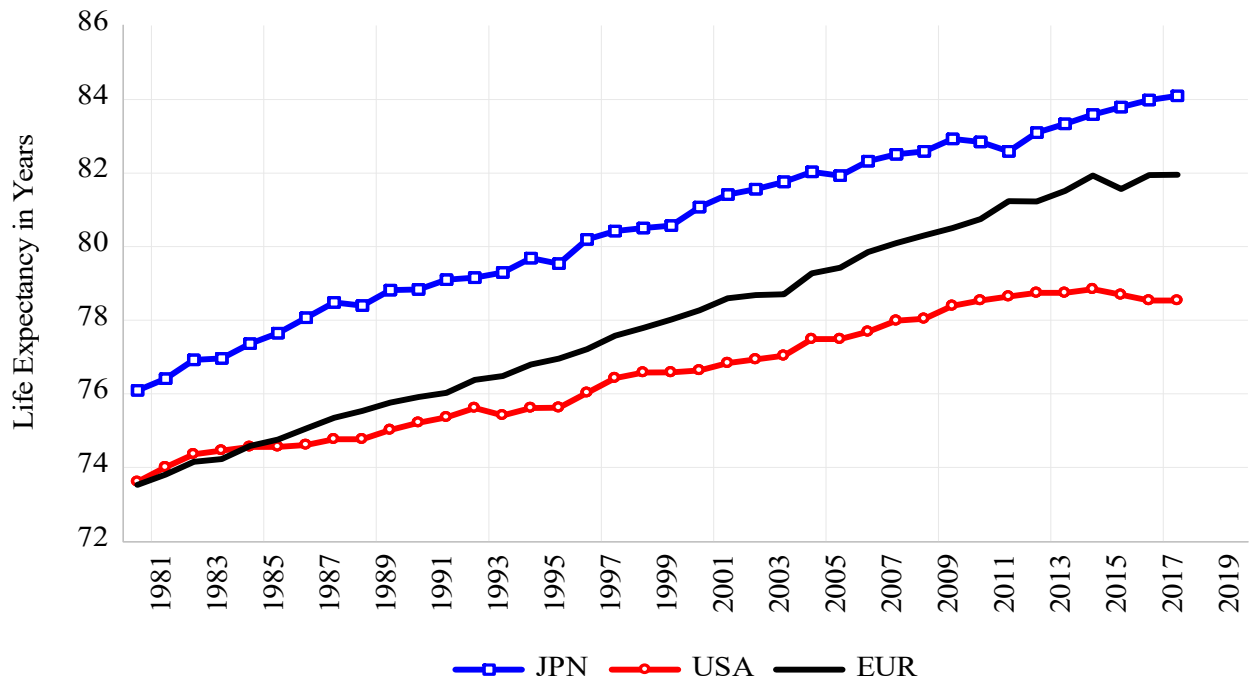
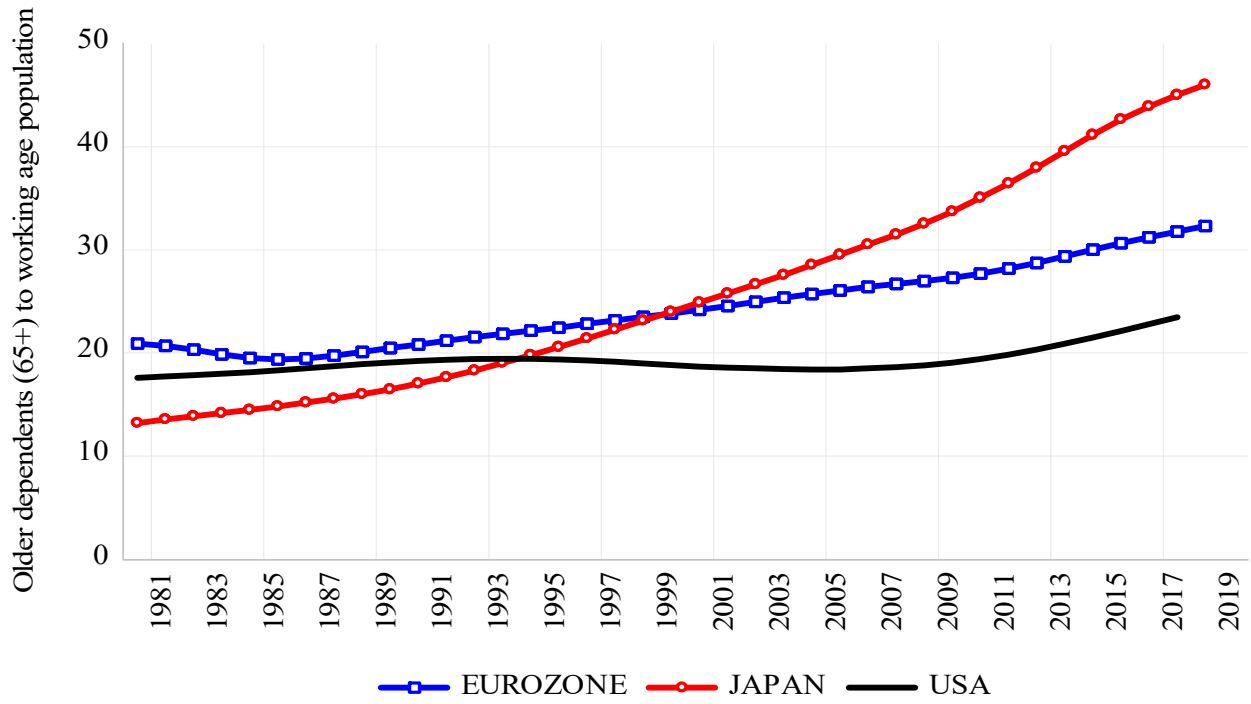


**Institutional Resilience**

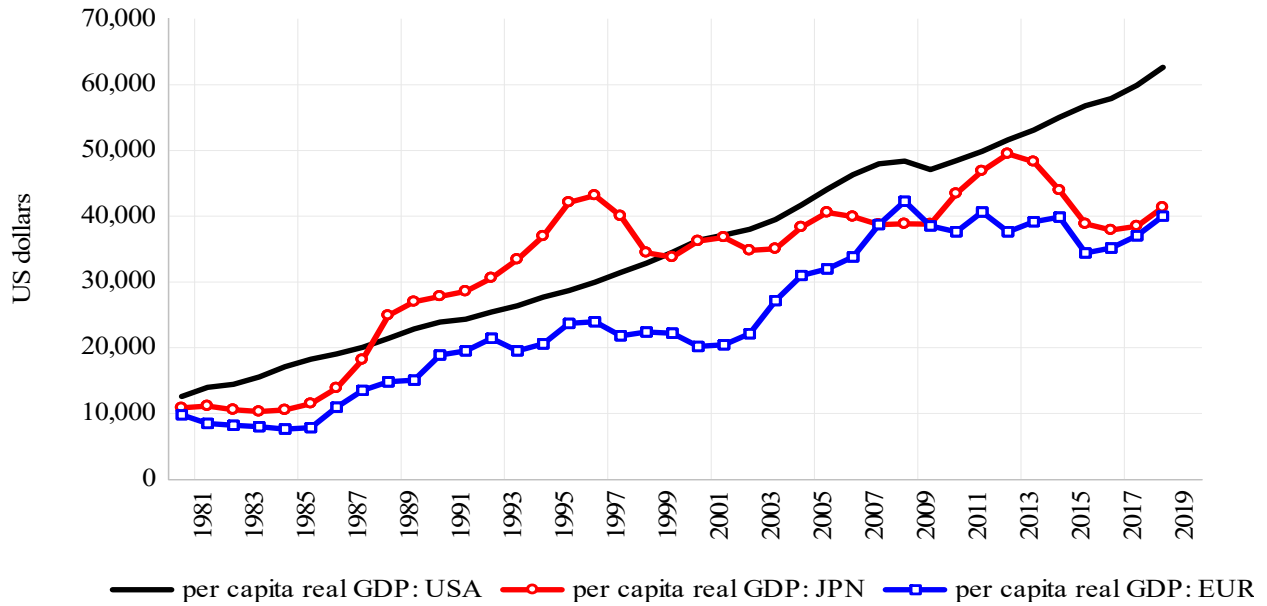


Data and methodology from Bordo and Siklos (2019).

## Population

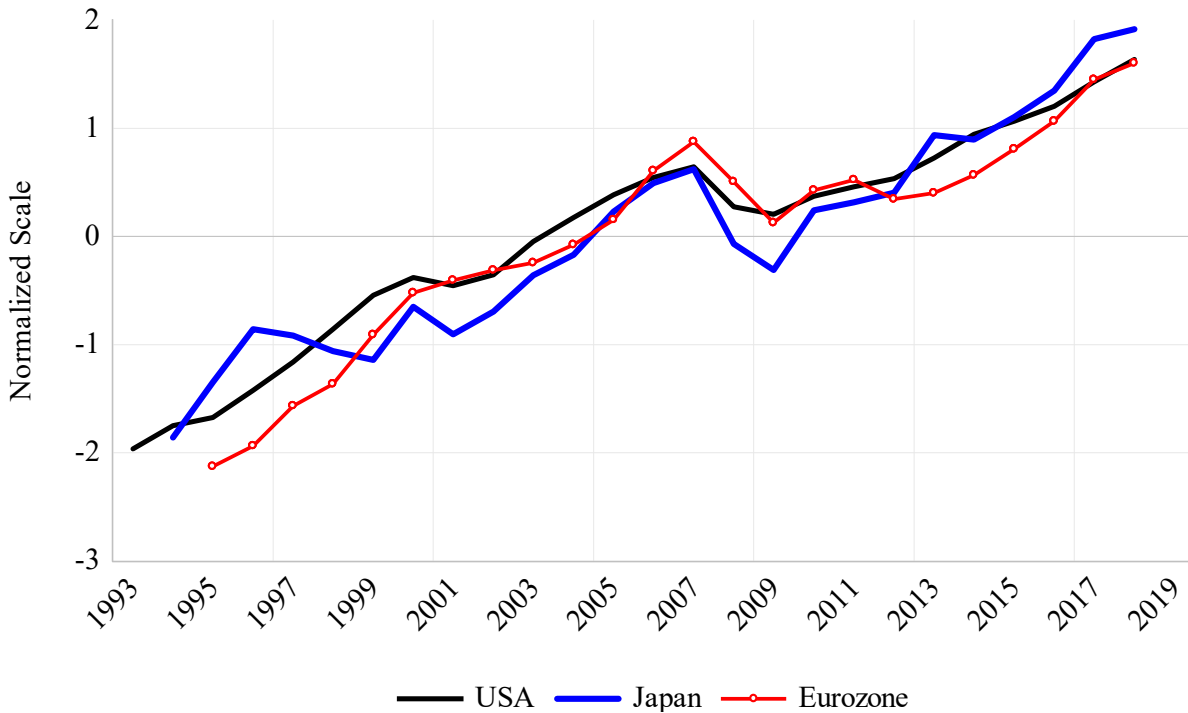


### Per Capital real GDP (USD)



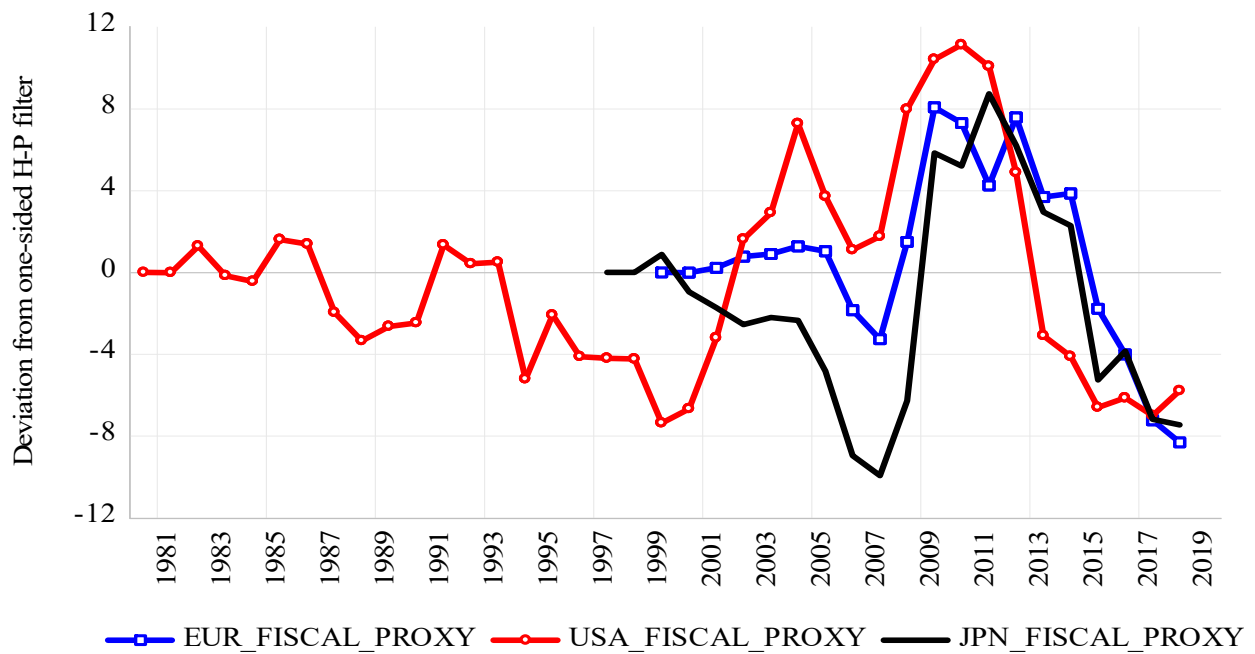
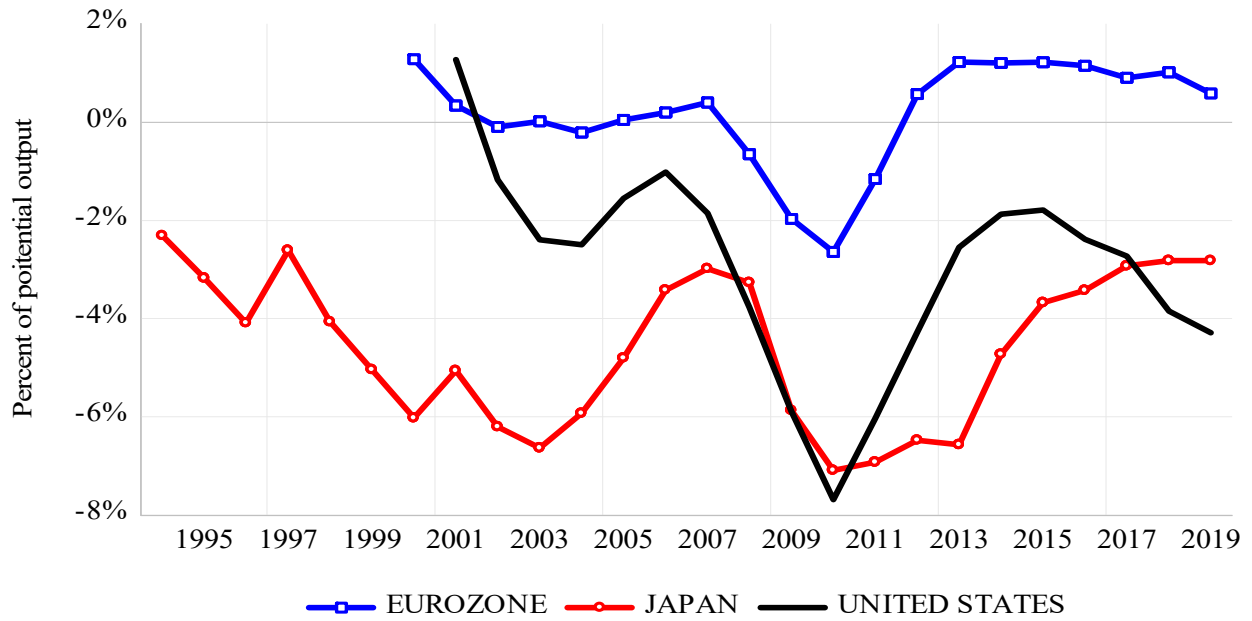
From World Bank World Development Indicators.

### Per Capita real GDP (Domestic Currency Units)

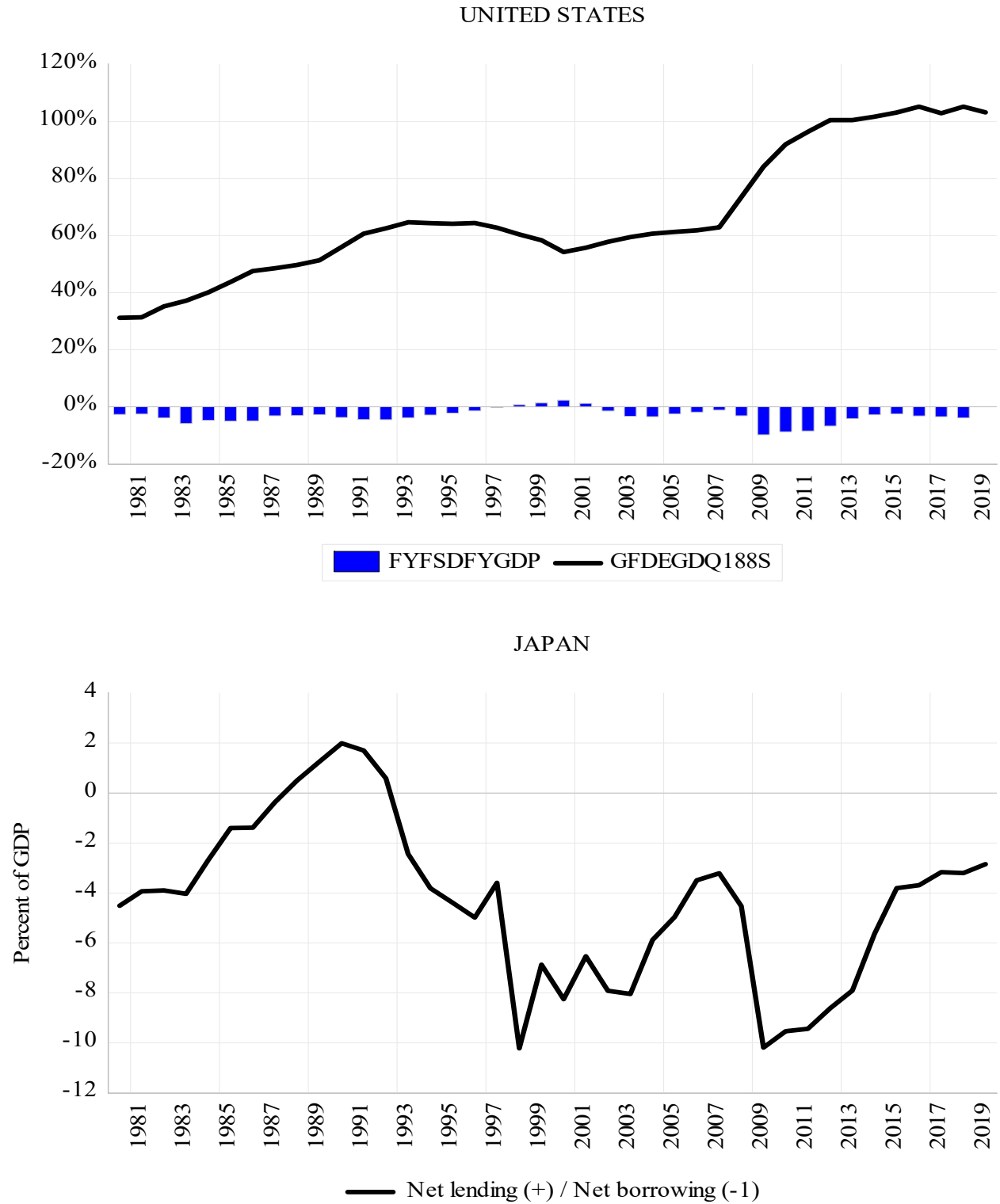


Note: For US series GDPC1 (real GDP), POPTHM (population); for Japan JPNTGDPEXP, POPTOTJPA647NWDB; for the Eurozone CLVMEURSCAB1GQEA19, SPPOPTOTLEMU. Source is FRED.

## Cyclically Adjusted and Filtered Fiscal Policy Indicators



## Additional Fiscal Policy Indicators: Japan and the U.S.



Series names for the US are from FRED. Data for Japan also from FRED (series GGNLBAJPA188N).

## Inflation Distribution Classifications

Tabulation of Observed Inflation: JAPAN

Sample (adjusted): 1980Q1 2019Q2

Included observations: 158 after adjustments

Number of categories: 5

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Value	Count	Percent	Cumulative Count	Cumulative Percent
[-2, 0)	57	36.08	57	36.08
[0, 2)	56	35.44	113	71.52
[2, 4)	37	23.42	150	94.94
[4, 6)	6	3.80	156	98.73
[6, 8)	2	1.27	158	100.00
Total	158	100.00	158	100.00

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Tabulation of Observed Inflation: USA

Sample (adjusted): 1981Q1 2019Q1

Included observations: 153 after adjustments

Number of categories: 4

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Value	Count	Percent	Cumulative Count	Cumulative Percent
[-5, 0)	4	2.61	4	2.61
[0, 5)	136	88.89	140	91.50
[5, 10)	11	7.19	151	98.69
[10, 15)	2	1.31	153	100.00
Total	153	100.00	153	100.00

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Tabulation of Observed Inflation: EUROZONE

Sample (adjusted): 1997Q1 2018Q4

Included observations: 88 after adjustments

Number of categories: 5

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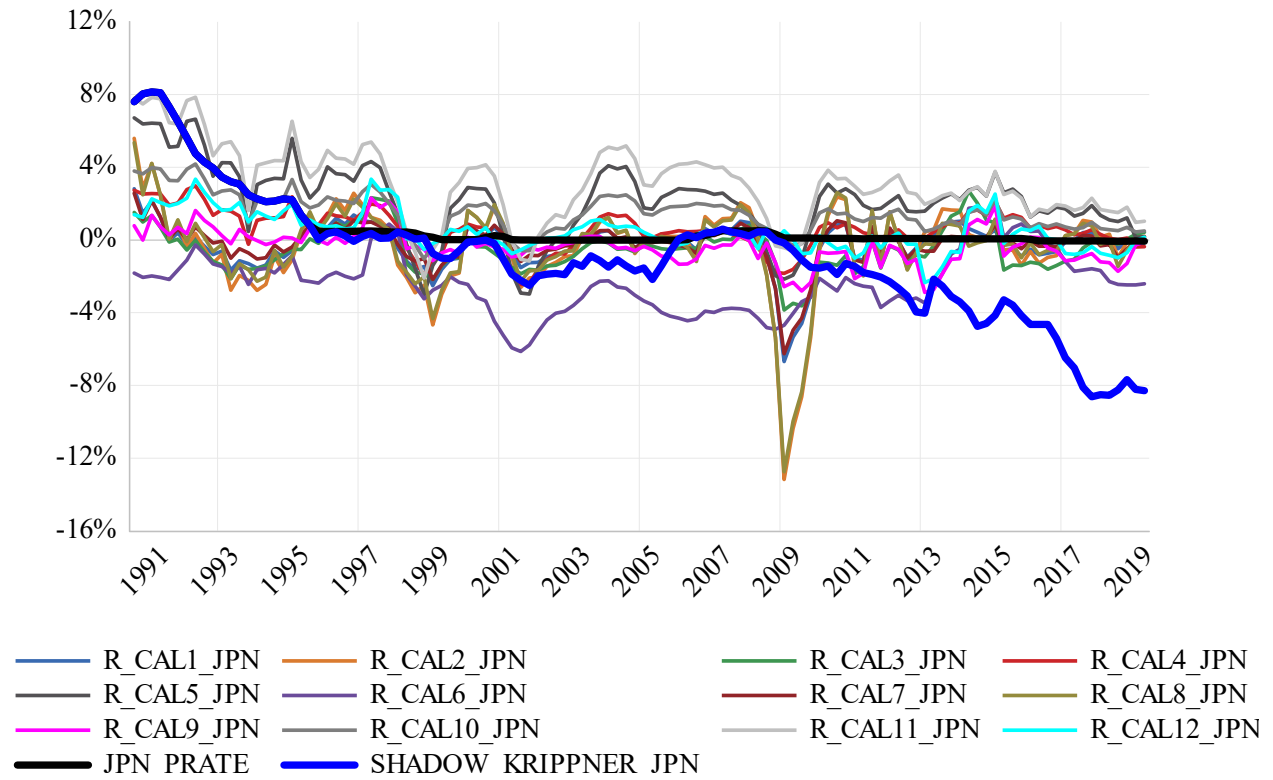
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Value	Count	Percent	Cumulative Count	Cumulative Percent
[-1, 0)	5	5.68	5	5.68
[0, 1)	13	14.77	18	20.45
[1, 2)	31	35.23	49	55.68
[2, 3)	35	39.77	84	95.45
[3, 4)	4	4.55	88	100.00
Total	88	100.00	88	100.00

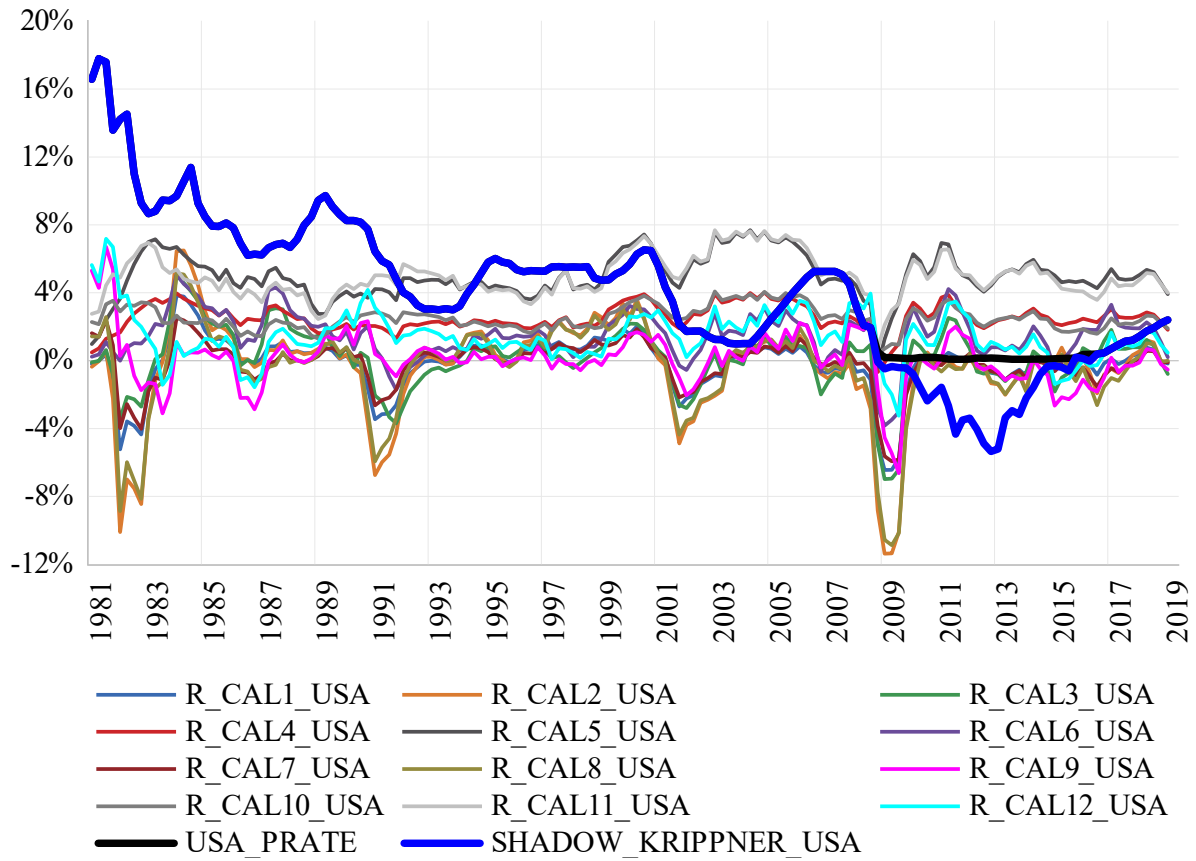
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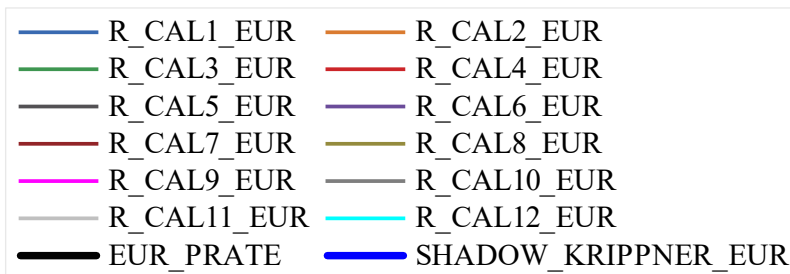
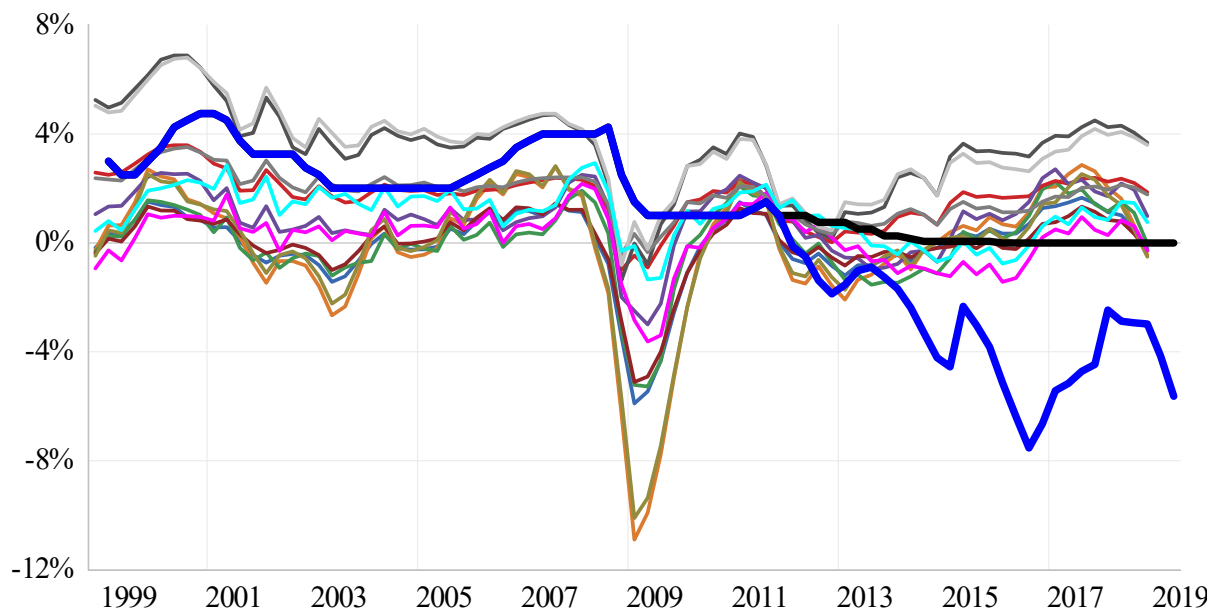
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### Varieties of Calibrated Taylor Rules: Japan (JPN), U.S. (USA), Eurozone (EUR)





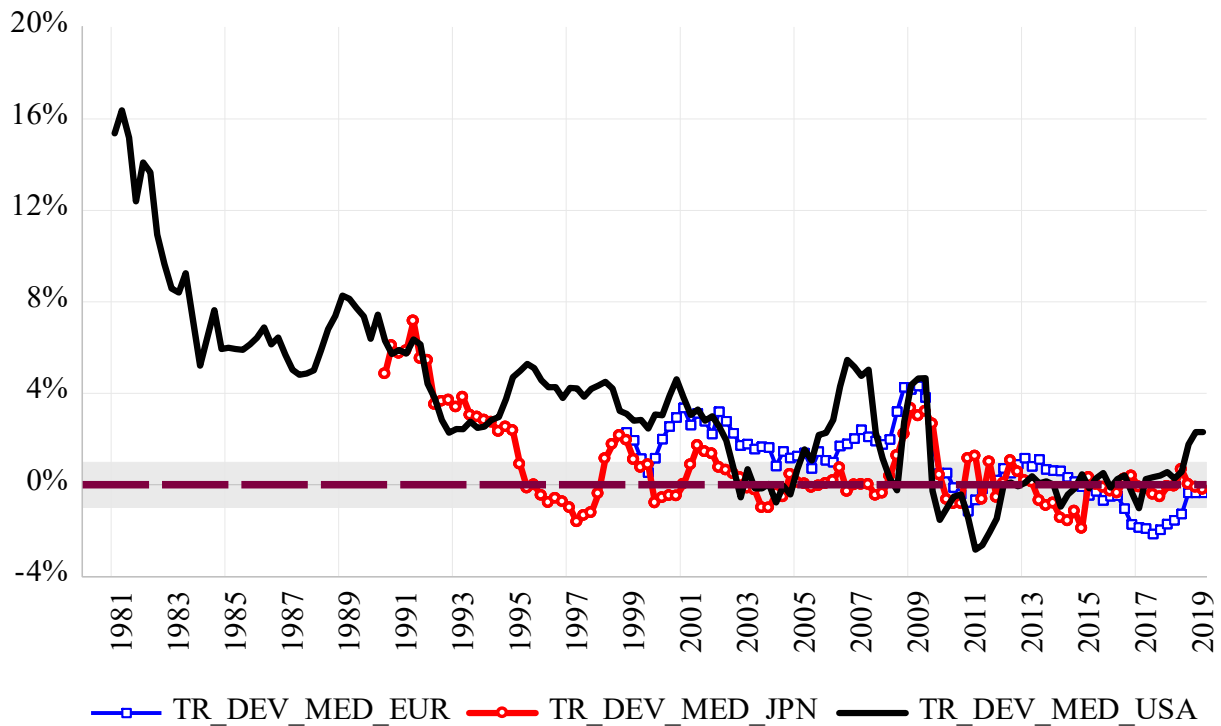
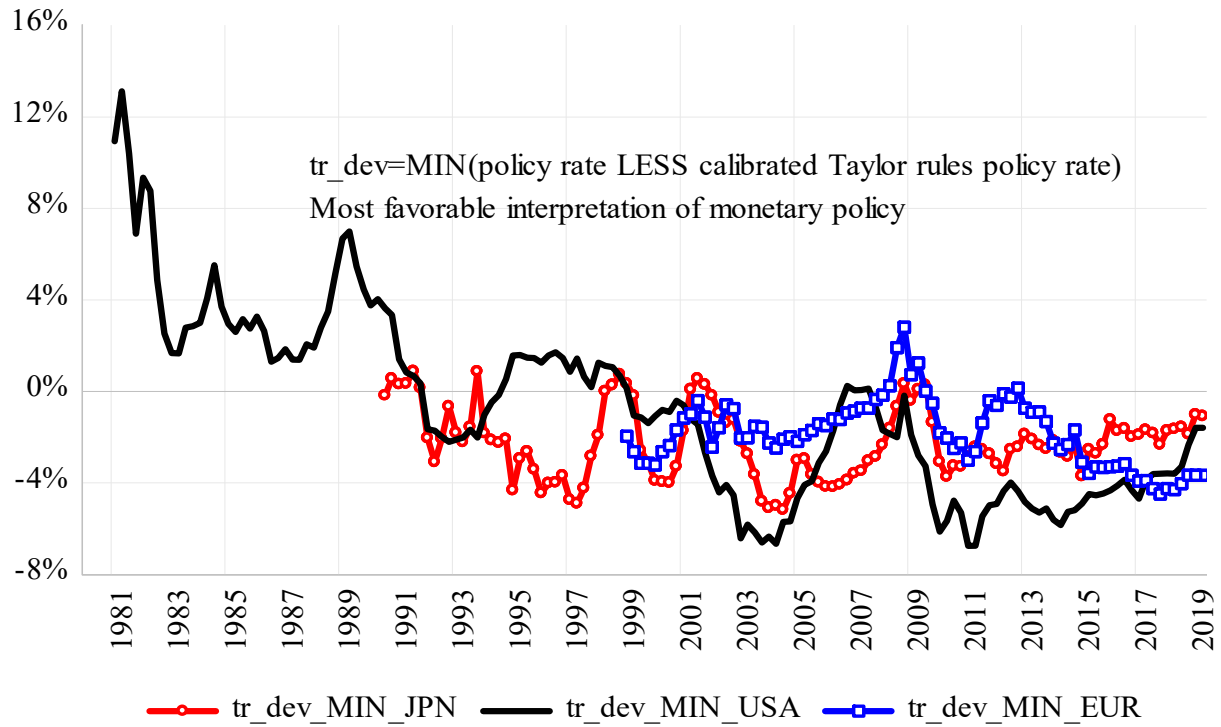




Calibration #	Taylor Rule Type	Coefficient on Inflation Gap, Output Gap
1, 4, 7, 10	Taylor 1993	.5, 1
2, 5, 8, 11	Balanced	.5, 2
3, 6, 9, 12	Taylor 1999	1.5, .5
MEASUREMENT OF VARIABLES		
Inflation: one-sided H-P filter; Output gap: Median estimate: 1, 2, 3		
Inflation: one-sided H-P filter; Output gap: Median forecast: 4, 5, 6		
Inflation: median inflation forecast; Output gap: Median estimate: 7, 8, 9		
Inflation: median inflation forecast; Output gap: Median forecast: 10, 11, 12		

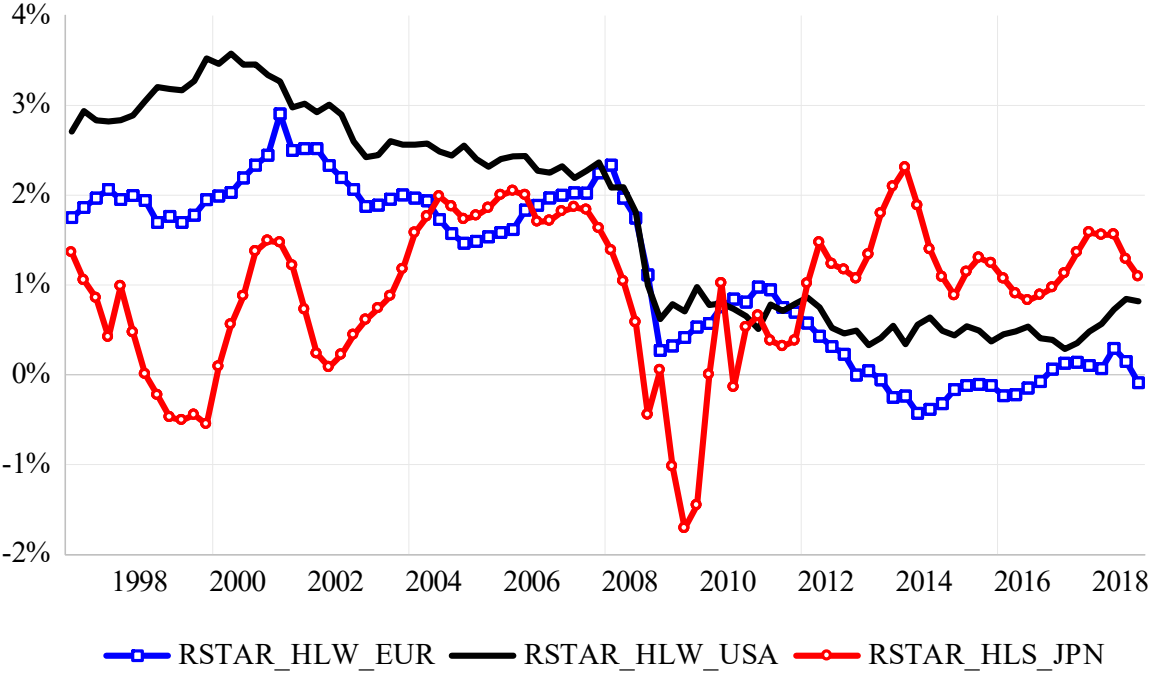
In the plots above the neutral real rate is arbitrarily set to 0.

## Taylor Rule Deviations



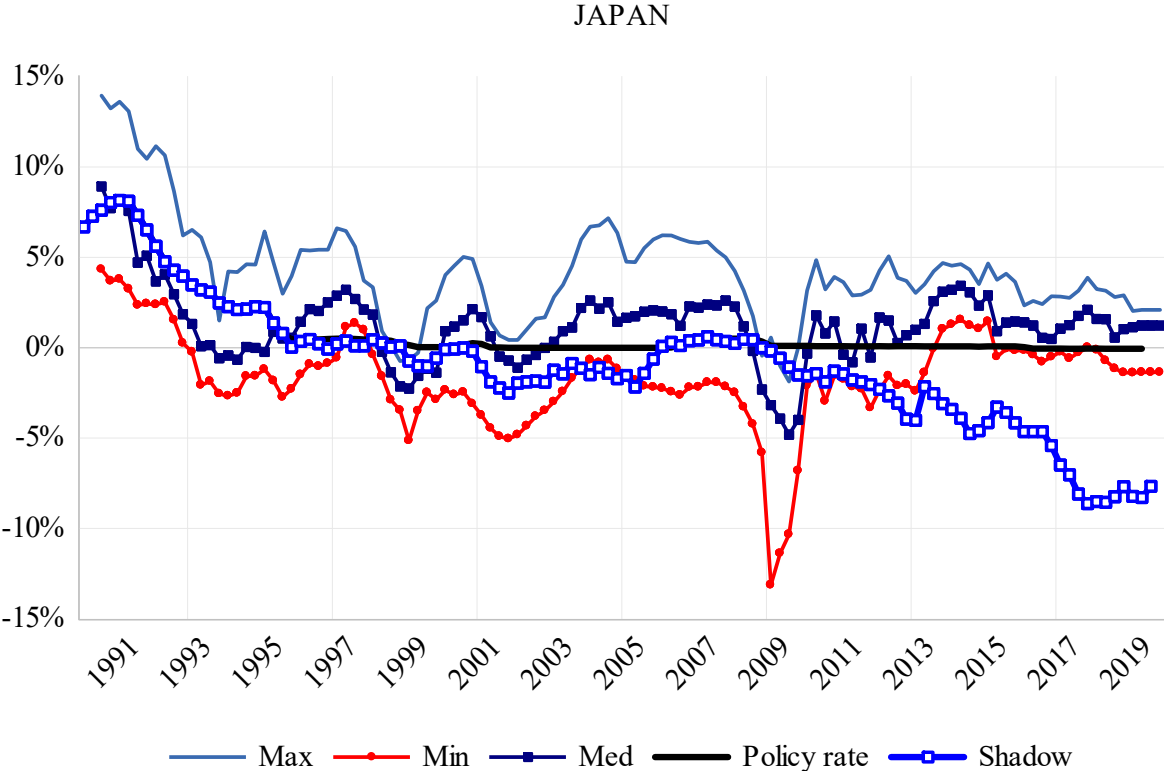
See previous figures for calibrated rules. Observed less calibrated policy rate is TR, MED means median of CAL estimates and MIN means minimum estimates (i.e., ones closest to zero).

**Estimates of the Neutral Real Interest Rate**



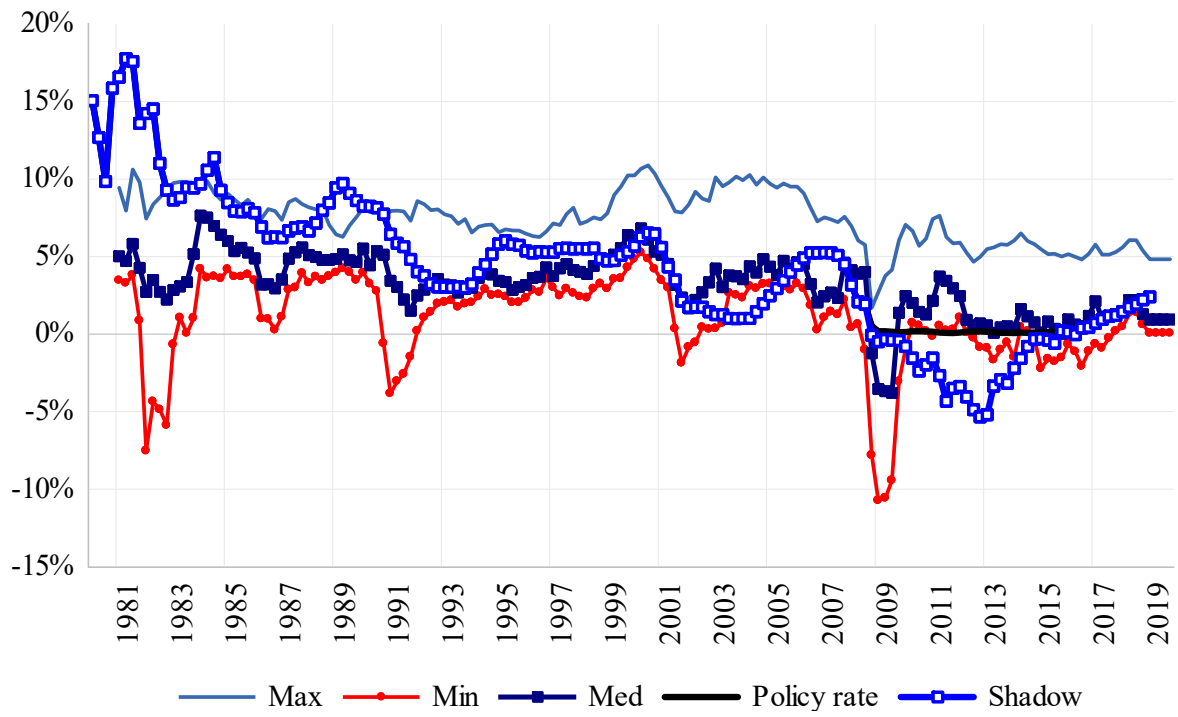
Sources: See main body of the text.

**Calibrated Taylor Rules for Japan (JPN), U.S. (USA), and Eurozone (EUR) Allowing for Time-Varying  $r^*$**

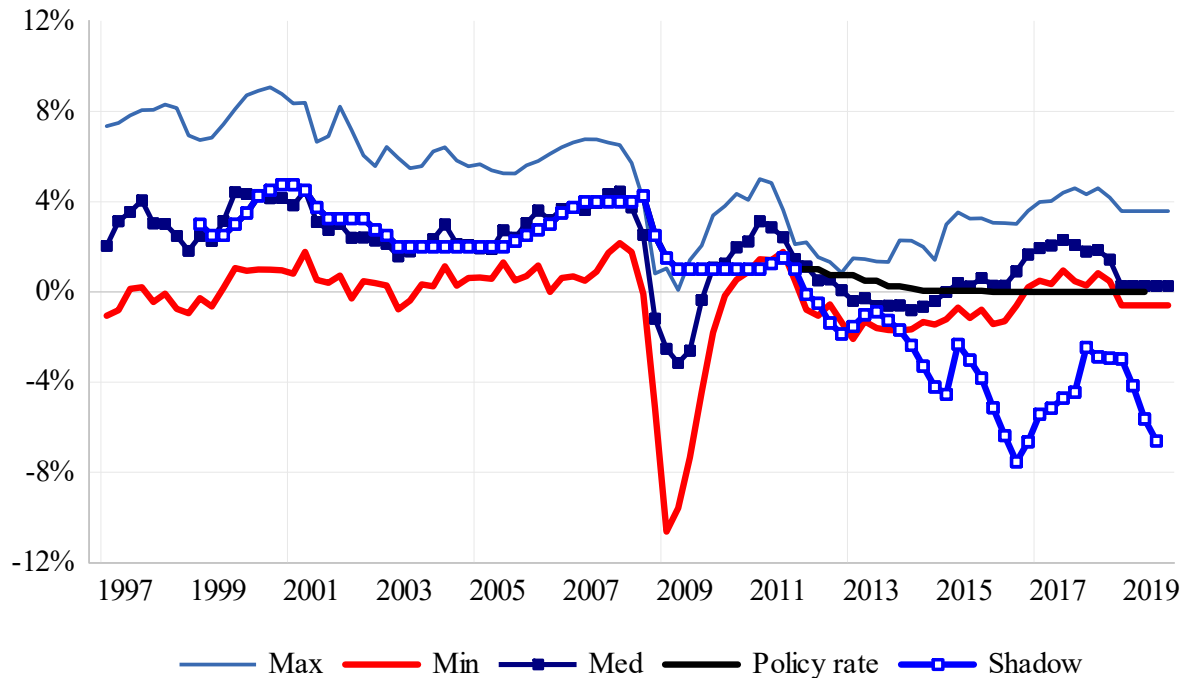


See earlier plot for series information and construction.

# USA



# EUROZONE



## Wiring Ratios

I explore informally, how similar are movements in some of the key time series that will form part of the econometric investigation below. This is accomplished by estimating wiring ratios for the series shown in Figure 4. Wiring ratios provide a short-hand measure of synchronicity in movements based on an estimate of turning points in the series of interest. A well-known approach that seeks to mirror judgment in the dating of business cycles with evidence based on numerical economic performance is a technique originally due to Bry and Boschan ((1971) and revived by Harding and Pagan (2002)). Essentially, their technique identifies turning points in the data, such as real GDP, which are then quantified as zeros and ones. This approach has the virtue of relying on observable economic performance while closely mimicking the NBER's chronology.<sup>1</sup> We apply this approach to the macroeconomic indicators shown in Figure 3. Next, we combine the estimates by asking how often these indicators likely send the same signal about overall economic conditions, that is, an indicator of business cycle synchronicity.<sup>2</sup>

Synchronicity is very much series dependent. For example, there is far more synchronicity in real GDP growth forecasts than in movements in the output gap. Synchronicity in credit is largely a post-GFC phenomenon while there is considerable synchronicity in the movement of housing prices. Finally, there is also some evidence of synchronous movements in the proxy for central bank credit but again mainly in the aftermath of the GFC. Hence, while a few macroeconomic developments appear to be common ones in Japan, the U.S., and the Eurozone, only the period of GFC stands out. Otherwise, it seems that this happens the effect is temporary. Of course, the results shown in Figure 4 can only be suggestive since the wiring ration measure is

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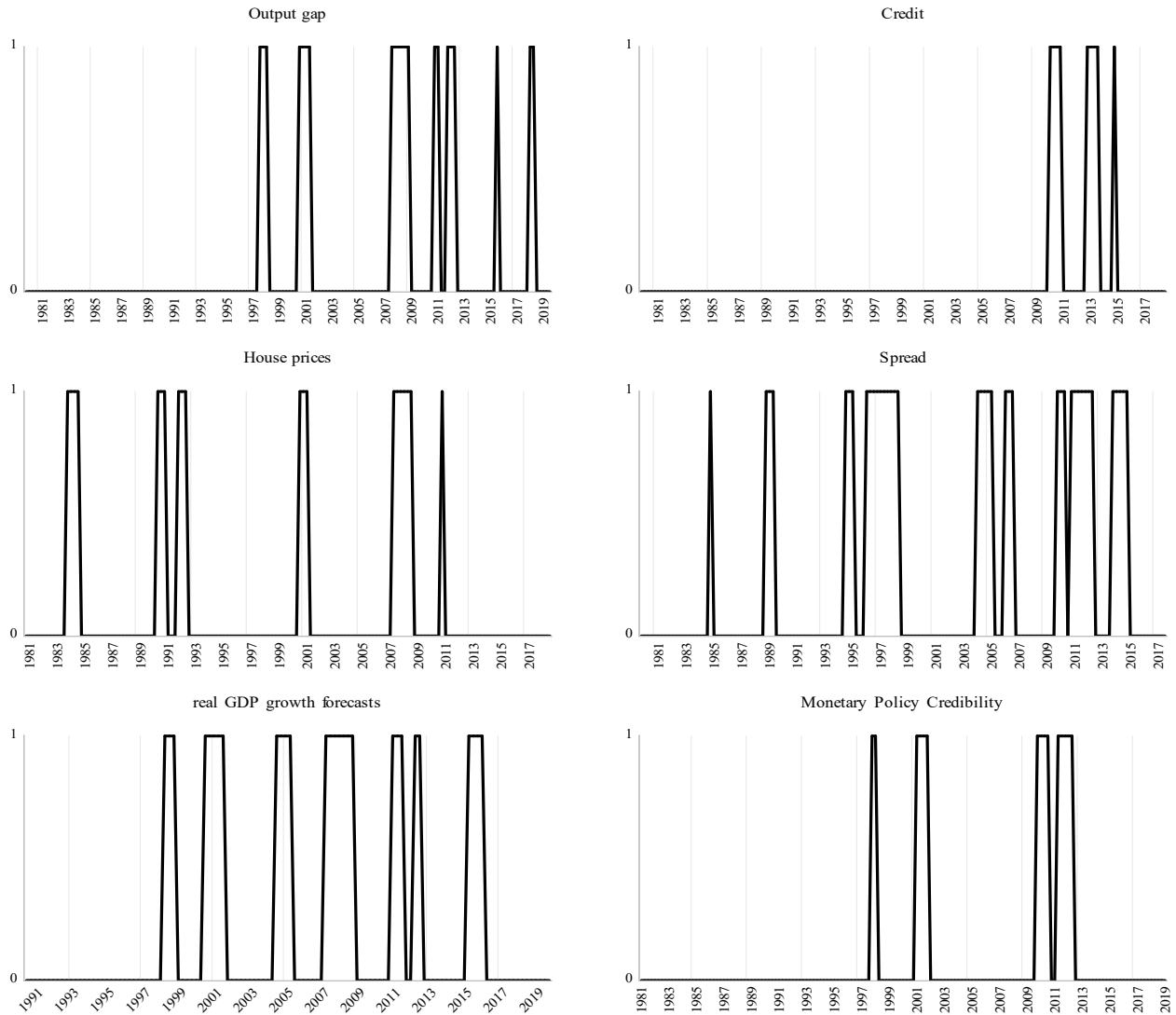
<sup>1</sup> The basic notion is to create an algorithm that minimizes the role of individual judgment when selecting turning points in economic activity that give rise to business (or financial) cycles. The closeness of the Bry-Boschan and NBER chronologies is considered a strength of the procedure and helps explain its wide applicability in dating business cycles.

<sup>2</sup> The 'wiring ratio' is defined as the fraction of times pairs of the chronologies generated signal a downturn. Let  $S_{it}$  represent the incidence of signals of the number of times an indicator indicates a recession. When a recession is identified,  $S=1$ . If  $n$  represents the total number of indicators and we define  $r_t = \sum_{i=1}^n S_{it}/n$  and  $\eta_t = \sum_{i=1}^n S_{it}$  then the wiring ratio is defined as  $w_t = \frac{\eta_t(\eta_t-1)}{n(n-1)}$ . Hence, for example, if there are at most 12 pairs of indicators and half of them agree there is a downturn then  $w=0.50$ . If all recession indicators point in the same direction, then  $w=1$ . Berge (2012), and Jordà, Schularick and Taylor (2011) also use the wiring ratio to combine recession indicators for the U.S., and financial crises across countries, respectively.



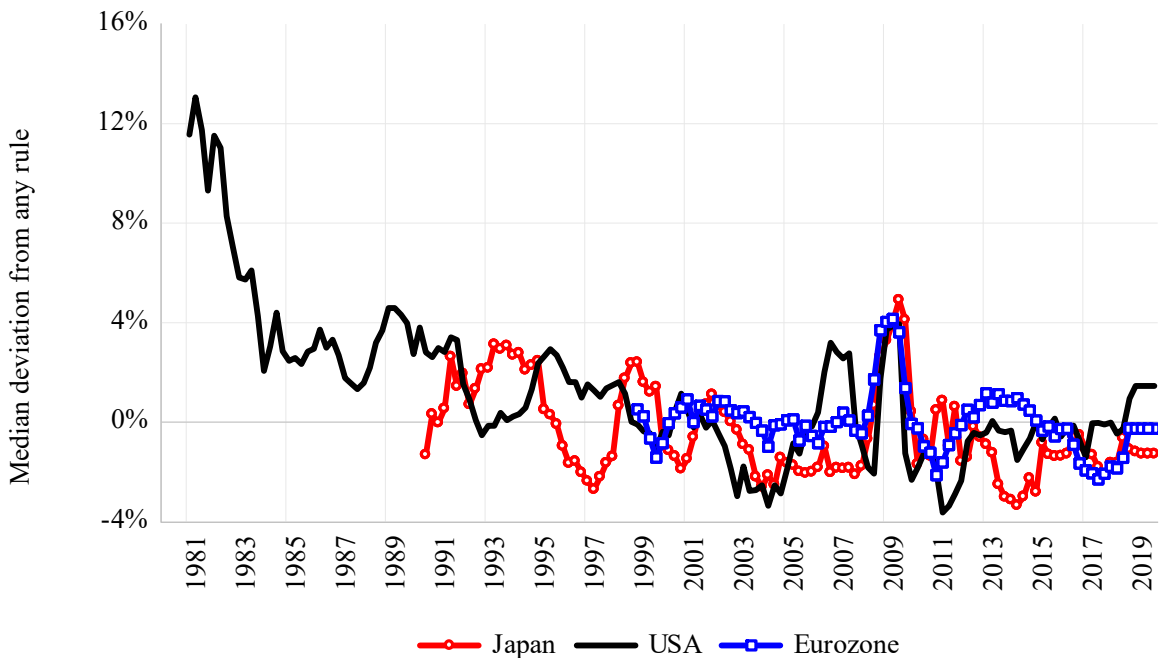
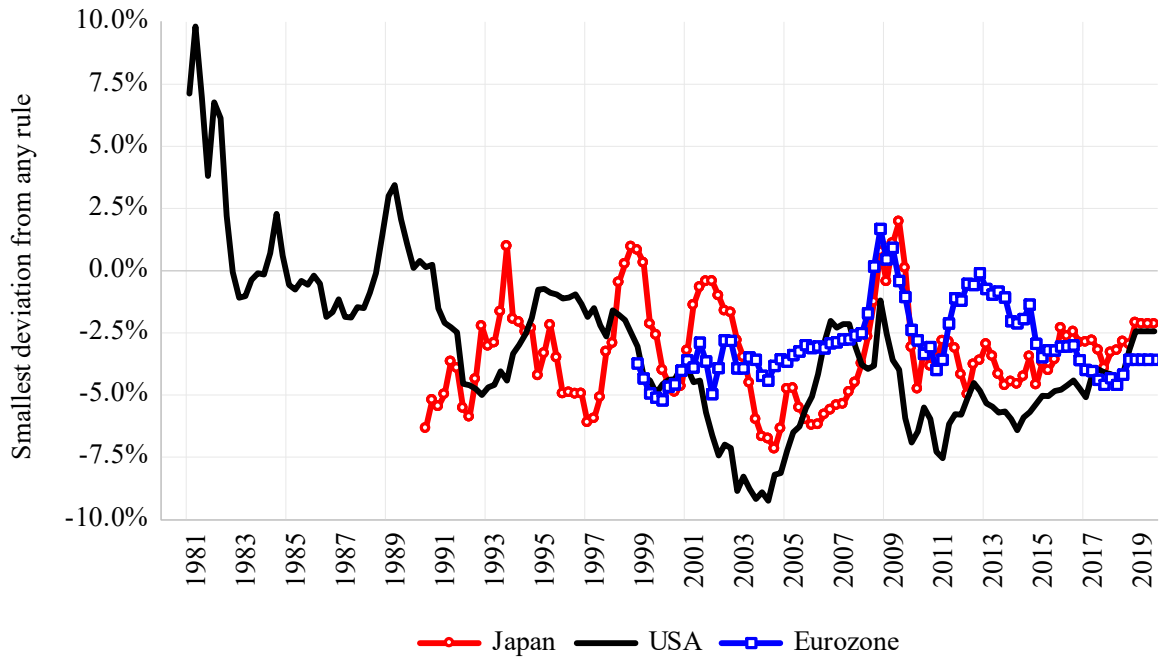
unconditional. The implication of these results is that there are likely spillovers, whose strength varies over time, between the three economies under study.<sup>3</sup>

**Figure 4 Wiring Ratios for Selected Series**



<sup>3</sup> I did consider the potential for spillovers but their inclusion did not impact the conclusions. Hence, to conserve degrees of freedom, the econometric estimates reported below exclude spillovers from the U.S. to the other two economies.

### Deviations of Observed From Calibrated Policy Rules: MIN and MED(IAN)



### Missing Variables Regressions

Dependent Variable: TR\_DEV\_MIN\_JPN  
 Method: Least Squares  
 Sample (adjusted): 1990Q3 2017Q3  
 Included observations: 109 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.92	1.02	-2.87	0.00
JPN_FD	0.07	0.08	0.84	0.40
RNJP_GAP	0.04	0.02	2.08	0.04
JPN_LENDINGSTANDARD	-0.05	0.02	-2.75	0.01
JPN_SPREAD2	-0.37	0.23	-1.56	0.12
CREDN4B_JPN	-8.18	2.05	-3.98	0.00
JP_EPU	0.02	0.01	3.72	0.00
TR_DEV_MIN_USA(-1)	0.26	0.08	3.30	0.00

R-squared	0.53	Mean dependent var	-3.43
Adjusted R-squared	0.49	S.D. dependent var	1.99

Dependent Variable: TR\_DEV\_MIN\_JPN  
 Method: Least Squares  
 Sample (adjusted): 1990Q3 2017Q4  
 Included observations: 110 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.03	0.74	-5.48	0.00
RNJP_GAP	0.07	0.02	3.68	0.00
CREDN4B_JPN	-7.16	1.72	-4.17	0.00
JP_EPU	0.03	0.00	5.45	0.00
TR_DEV_MIN_USA(-1)	0.34	0.08	4.42	0.00
MEAN_JPN_F1	-1.00	0.26	-3.89	0.00

R-squared	0.49	Mean dependent var	-3.44
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Adjusted R-squared 0.46 S.D. dependent var 1.98

Dependent Variable: TR\_DEV\_MIN\_EUR

Method: Least Squares

Sample (adjusted): 2003Q1 2017Q3

Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.56	0.47	-3.36	0.00
EUR_FD	0.42	0.07	5.75	0.00
RNXM_GAP	-0.02	0.03	-0.77	0.45
EUR_LENDINGSTANDARD	-0.05	0.01	-3.29	0.00
EUR_SPREAD	0.12	0.14	0.85	0.40
CREDN4B_EUR	-1.20	0.65	-1.85	0.07
EZ_EPU	-0.00	0.00	-1.31	0.20
TR_DEV_MIN_USA(-1)	0.27	0.07	3.97	0.00

R-squared 0.79 Mean dependent var -2.44  
Adjusted R-squared 0.76 S.D. dependent var 1.43

Dependent Variable: TR\_DEV\_MIN\_EUR

Method: Least Squares

Sample (adjusted): 2003Q1 2017Q4

Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.90	0.63	-1.42	0.16
RNXM_GAP	-0.02	0.02	-0.79	0.43
CREDN4B_EUR	-1.60	0.59	-2.71	0.01
EZ_EPU	0.00	0.00	0.80	0.43
TR_DEV_MIN_USA(-1)	0.28	0.05	5.32	0.00
JPN_SPREAD2	0.17	0.32	0.55	0.58

MEAN_EUR_F1	-1.53	0.14	-11.13	0.00
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R-squared	0.79	Mean dependent var	-2.47
Adjusted R-squared	0.77	S.D. dependent var	1.44

Dependent Variable: TR\_DEV\_MIN\_USA  
Method: Least Squares  
Sample (adjusted): 1991Q1 2016Q3  
Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.74	0.55	-3.14	0.00
USA_FCI	0.38	0.17	2.23	0.03
RNUS_GAP	0.22	0.04	5.73	0.00
USA_LENDINGSTANDARD	0.01	0.01	1.28	0.20
USA_SPREAD	-0.64	0.15	-4.21	0.00
CREDN4B_USA	-0.41	1.27	-0.32	0.75
US_EPU	-0.01	0.01	-1.90	0.06
GPR_US	-0.01	0.00	-3.53	0.00

R-squared	0.59	Mean dependent var	-4.47
Adjusted R-squared	0.56	S.D. dependent var	2.16

Dependent Variable: TR\_DEV\_MIN\_USA  
Method: Least Squares  
Sample (adjusted): 1985Q1 2017Q4  
Included observations: 132 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.41	0.92	-3.73	0.00
RNUS_GAP	-0.01	0.04	-0.25	0.80
CREDN4B_USA	6.16	1.57	3.92	0.00
US_EPU	-0.02	0.01	-1.86	0.07
MEAN_USA_F1	-0.93	0.39	-2.40	0.02

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R-squared	0.14	Mean dependent var	-3.68
Adjusted R-squared	0.11	S.D. dependent var	2.61

Dependent Variable: TR\_DEV\_MED\_JPN  
Method: Least Squares  
Sample (adjusted): 1990Q3 2017Q3  
Included observations: 109 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.95	0.95	1.00	0.32
JPN_FD	0.01	0.07	0.14	0.89
RNJP_GAP	0.10	0.02	5.60	0.00
JPN_LENDINGSTANDARD	-0.06	0.02	-3.56	0.00
JPN_SPREAD2	0.22	0.22	0.99	0.33
CREDN4B_JPN	0.50	1.91	0.26	0.79
JP_EPU	0.00	0.00	0.10	0.92
TR_DEV_MIN_USA(-1)	0.24	0.07	3.32	0.00

---

R-squared	0.53	Mean dependent var	-0.30
Adjusted R-squared	0.50	S.D. dependent var	1.87

Dependent Variable: TR\_DEV\_MED\_JPN  
Method: Least Squares  
Included observations: 110 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.34	0.66	2.01	0.05
RNJP_GAP	0.13	0.02	7.74	0.00
CREDN4B_JPN	-1.94	1.55	-1.25	0.21
JP_EPU	0.00	0.00	0.53	0.60
TR_DEV_MIN_USA(-1)	0.41	0.07	5.88	0.00
MEAN_JPN_F1	-1.37	0.23	-5.90	0.00

---

R-squared 0.53 Mean dependent var -0.32  
Adjusted R-squared 0.51 S.D. dependent var 1.87

Dependent Variable: TR\_DEV\_MED\_EUR  
Method: Least Squares  
Sample (adjusted): 2003Q1 2017Q3  
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.99	0.57	3.48	0.00
EUR_FD	0.08	0.09	0.95	0.35
RNXM_GAP	-0.01	0.03	-0.26	0.80
EUR_LENDINGSTANDARD	-0.08	0.02	-4.68	0.00
EUR_SPREAD	-0.01	0.17	-0.08	0.94
CREDN4B_EUR	-0.07	0.80	-0.08	0.93
EZ_EPU	-0.01	0.00	-2.87	0.01
TR_DEV_MIN_USA(-1)	0.24	0.08	2.84	0.01

R-squared 0.64 Mean dependent var 0.09  
Adjusted R-squared 0.59 S.D. dependent var 1.34

Dependent Variable: TR\_DEV\_MED\_EUR  
Method: Least Squares  
Sample (adjusted): 2003Q1 2017Q4  
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.59	0.79	3.29	0.00
RNXM_GAP	0.04	0.03	1.41	0.17
CREDN4B_EUR	-0.36	0.73	-0.49	0.63
EZ_EPU	-0.01	0.00	-2.54	0.01
TR_DEV_MIN_USA(-1)	0.15	0.06	2.31	0.02
JPN_SPREAD2	-0.33	0.39	-0.84	0.40
MEAN_EUR_F1	-1.25	0.17	-7.31	0.00

R-squared 0.64 Mean dependent var 0.06  
Adjusted R-squared 0.60 S.D. dependent var 1.35

Dependent Variable: TR\_DEV\_MED\_USA  
Method: Least Squares  
Sample (adjusted): 1991Q1 2016Q3

Included observations: 103 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.36	0.50	4.74	0.00
USA_FCI	-0.03	0.15	-0.20	0.84
RNUS_GAP	0.22	0.03	6.40	0.00
USA_LENDINGSTANDARD	0.03	0.01	3.83	0.00
USA_SPREAD	-0.51	0.14	-3.73	0.00
CREDN4B_USA	0.55	1.14	0.48	0.64
US_EPU	-0.02	0.01	-3.01	0.00
GPR_US	-0.00	0.00	-1.85	0.07

R-squared 0.51 Mean dependent var 0.05  
Adjusted R-squared 0.48 S.D. dependent var 1.79

Dependent Variable: TR\_DEV\_MED\_USA

Method: Least Squares

Sample (adjusted): 1985Q1 2017Q4

Included observations: 132 after adjustments

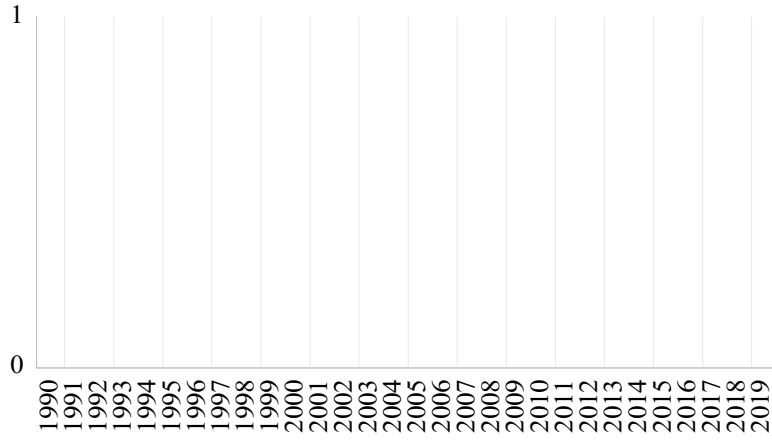
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.10	0.69	1.60	0.11
RNUS_GAP	-0.01	0.03	-0.16	0.87
CREDN4B_USA	5.01	1.18	4.24	0.00
US_EPU	-0.02	0.01	-2.49	0.01
MEAN_USA_F1	-0.54	0.29	-1.87	0.06
R-squared	0.15	Mean dependent var		0.56
Adjusted R-squared	0.13	S.D. dependent var		1.98



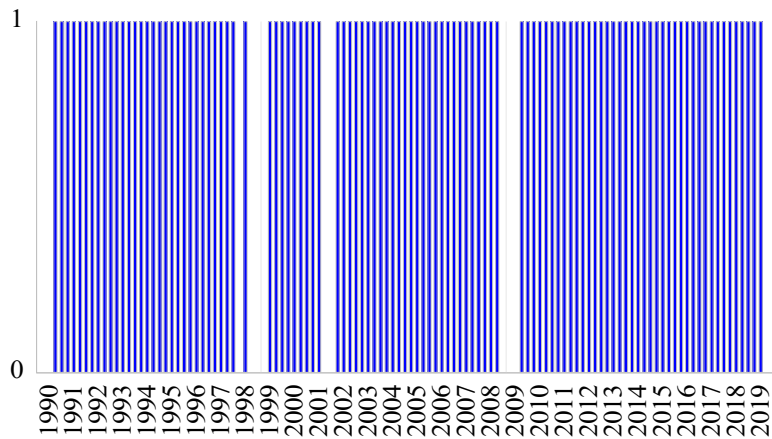
# Regime Selection Episodes

JAPAN

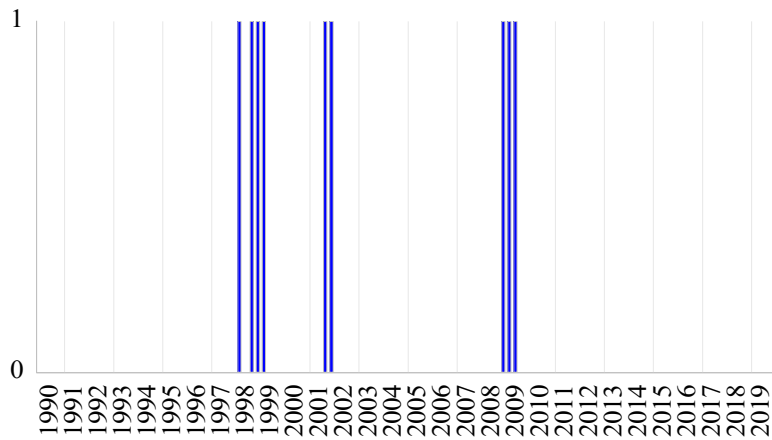
Taylor (1993)



Balanced

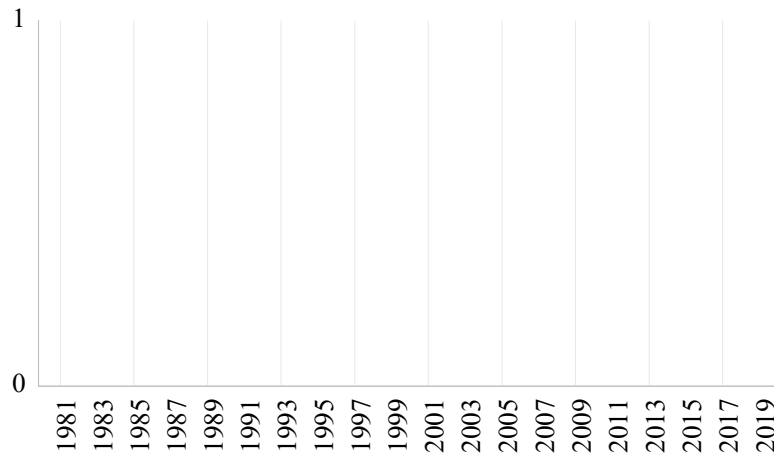


Taylor (1999)

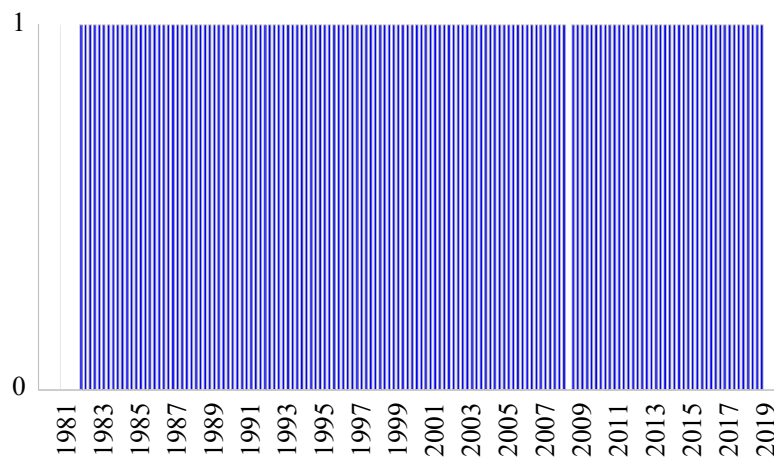


Based on min deviation from calibrated Taylor rule.

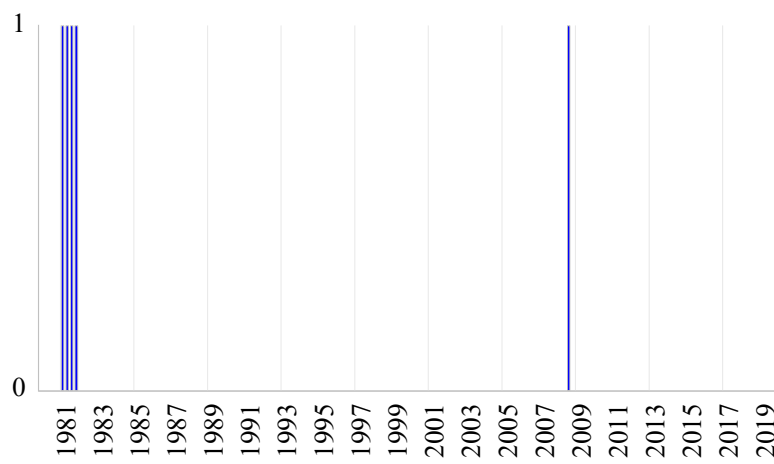
U.S.A.  
Taylor (1993)



Balanced

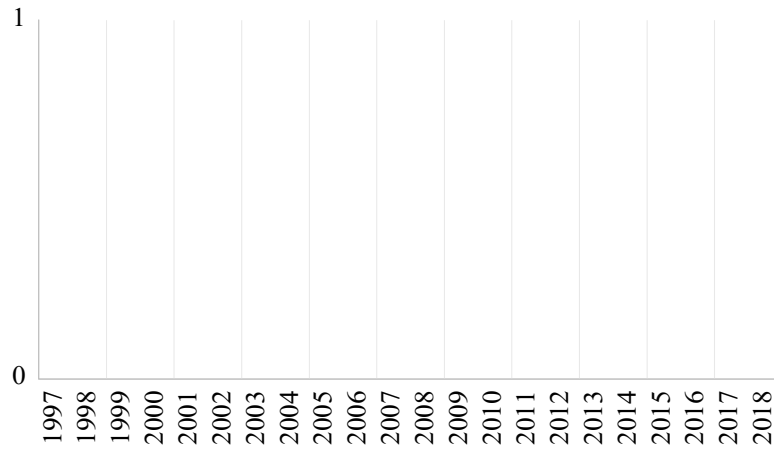


Taylor (1999)

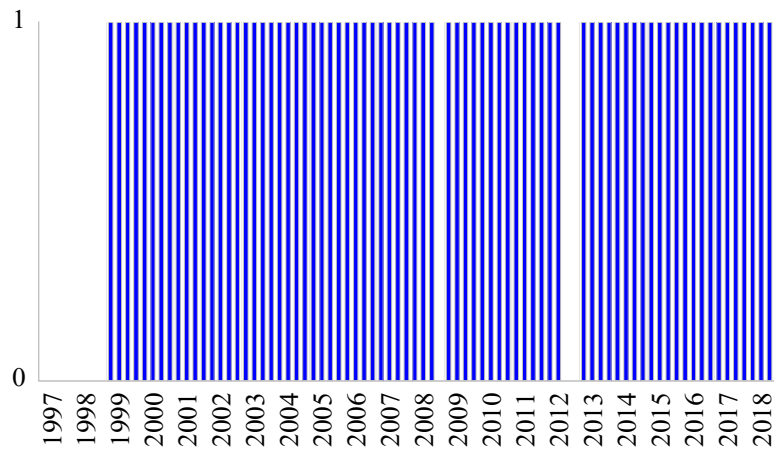


EUROZONE

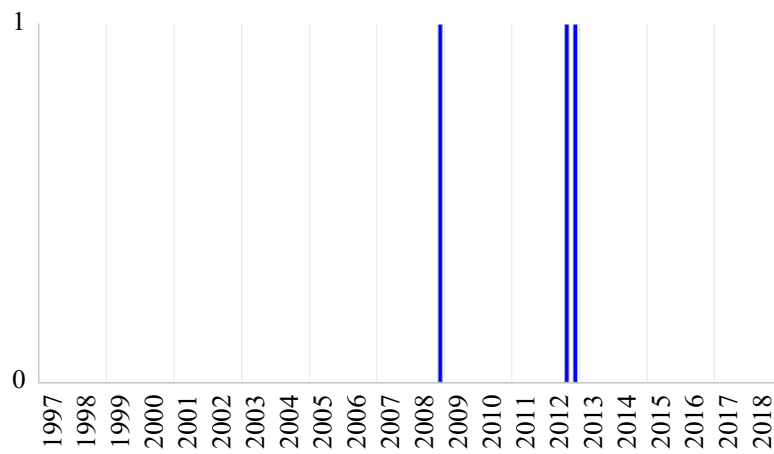
Taylor (1993)



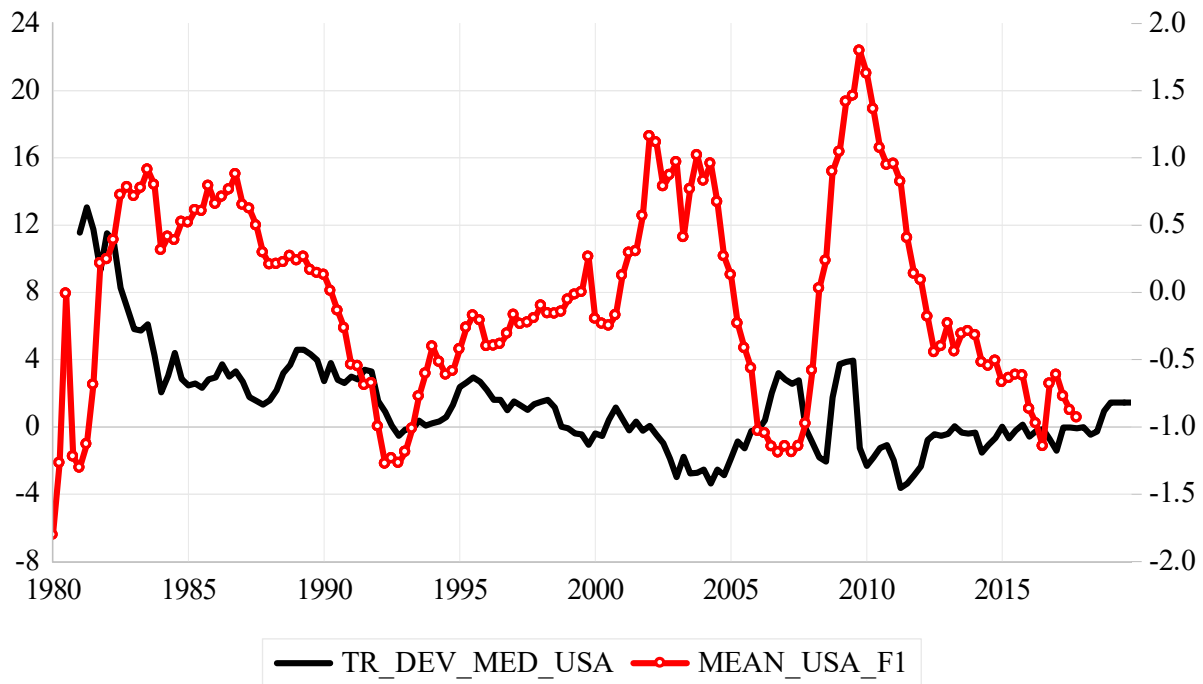
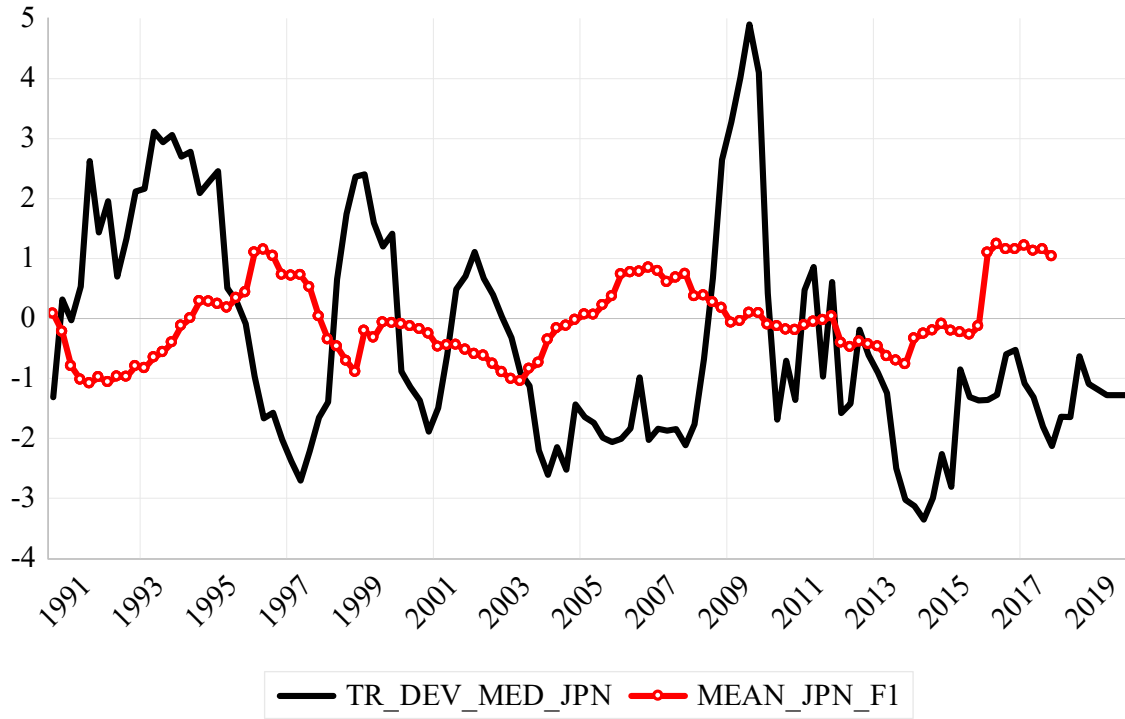
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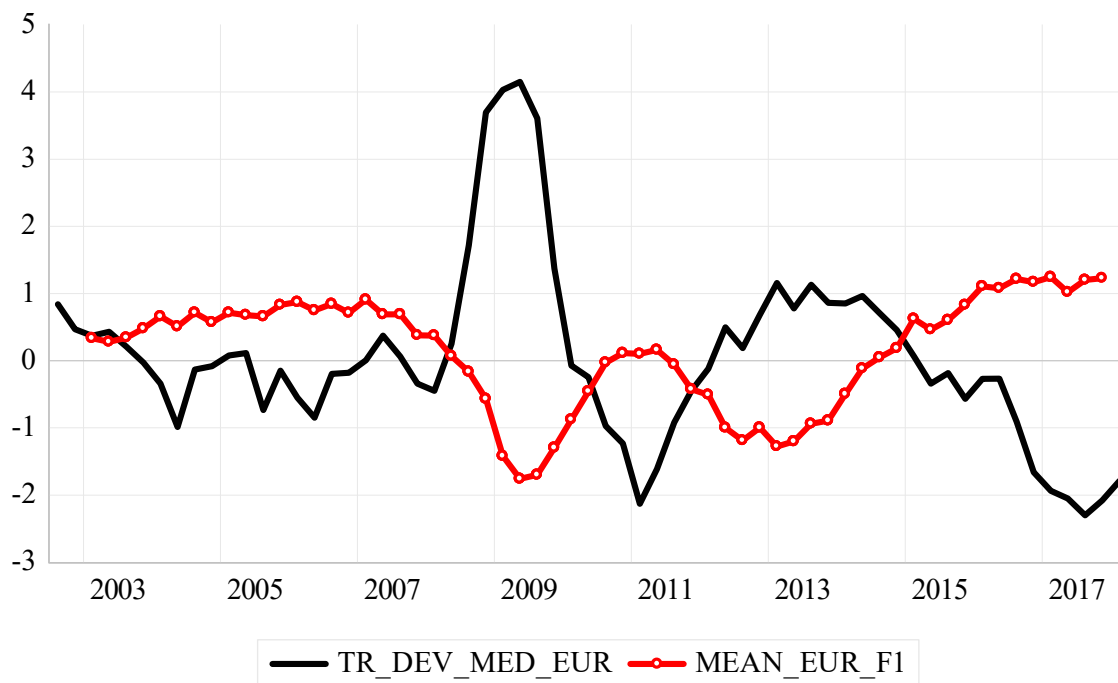


Taylor (1999)



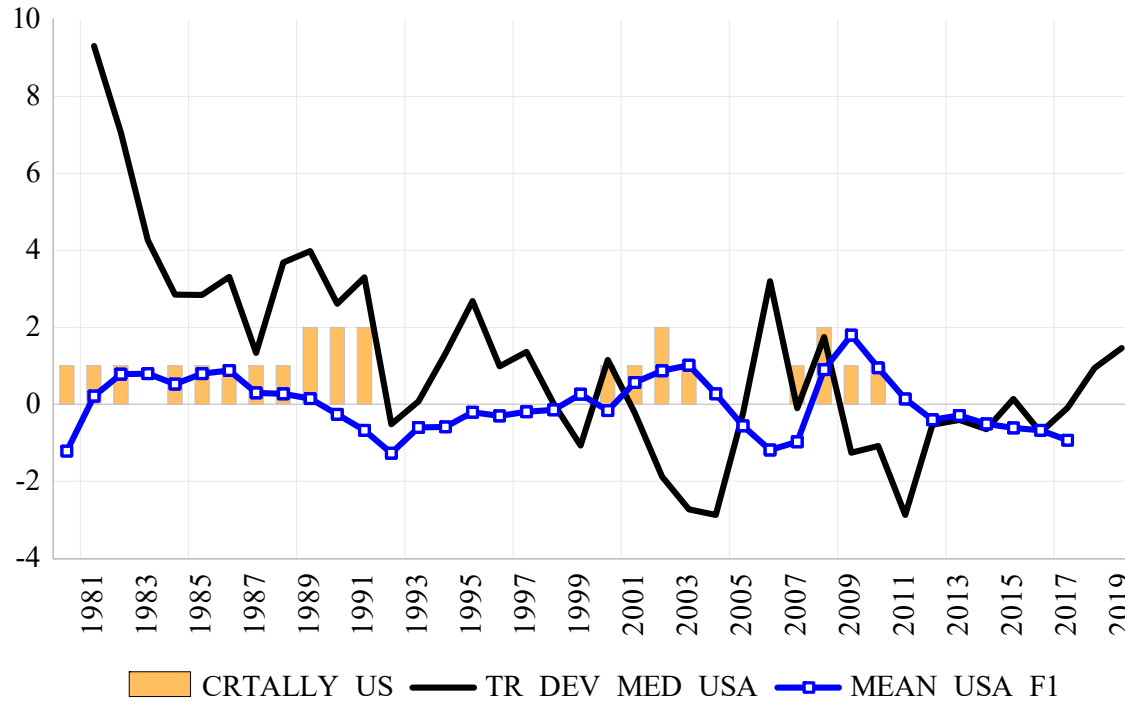
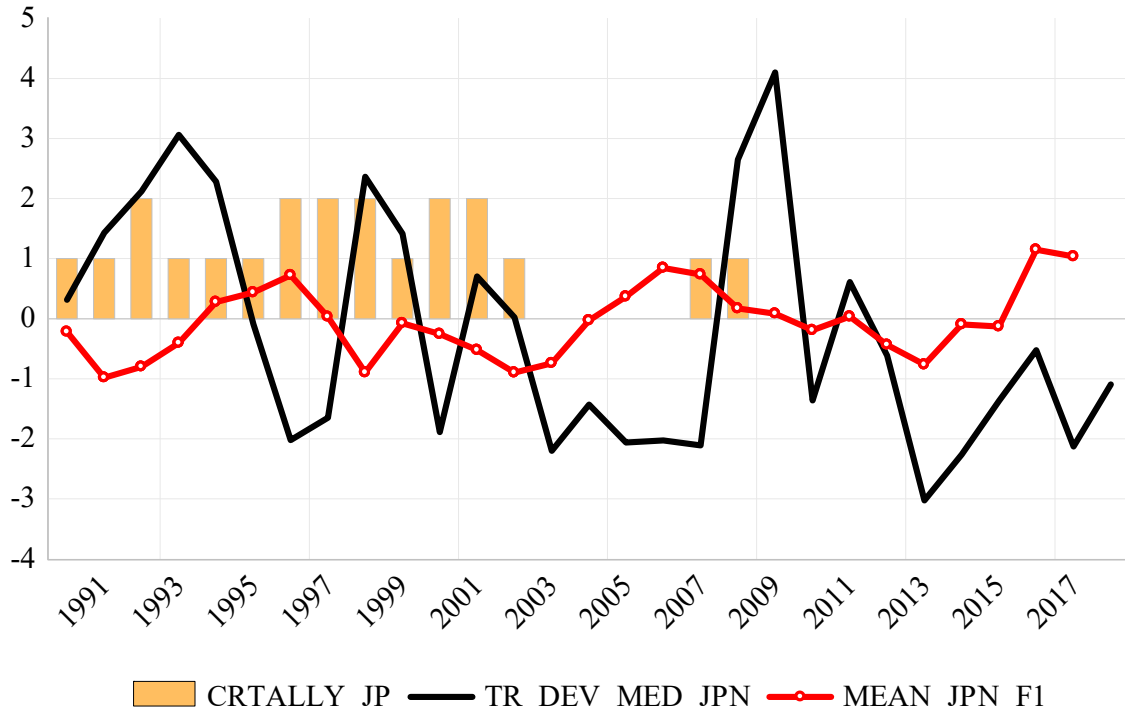
### Deviations From Policy Rule and Financial Conditions

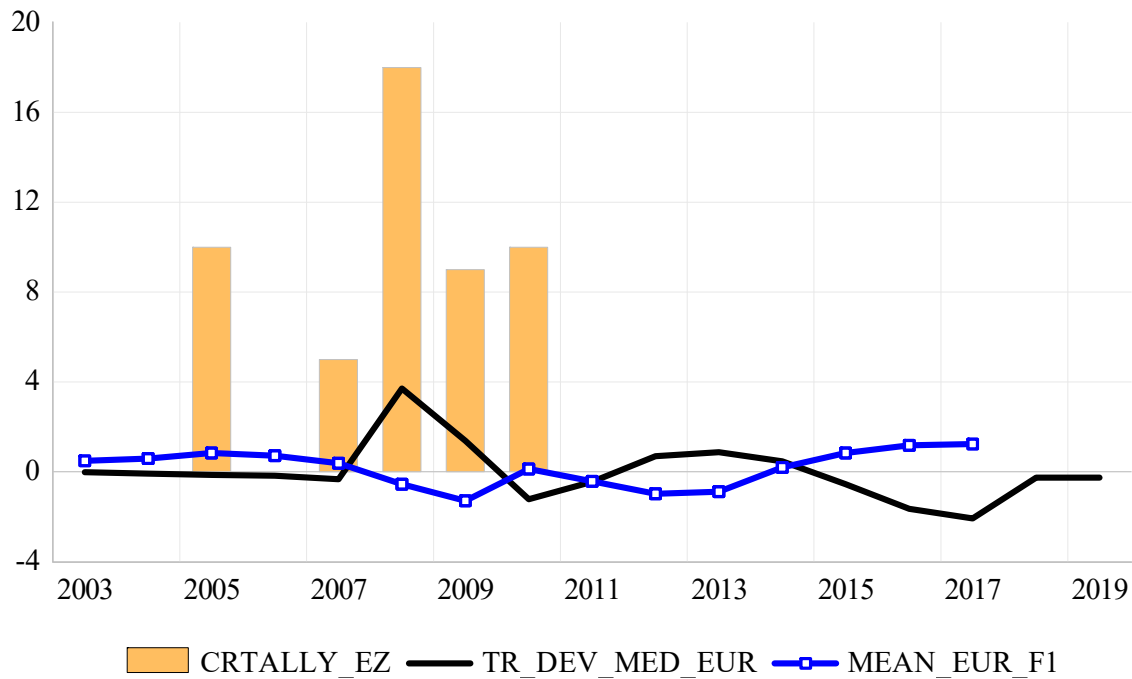




<b>Correlations (Simple)</b>	<b>TR_DEV_MED, F1</b>
<b>JPN</b>	-0.31 (.001)
<b>USA</b>	-0.04 (.62)
<b>EUR</b>	-0.71 (.000)

### Financial Crises, Taylor Rule Deviations and Financial Conditions



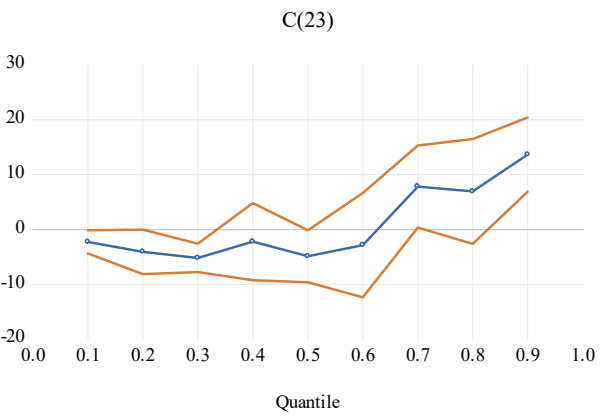
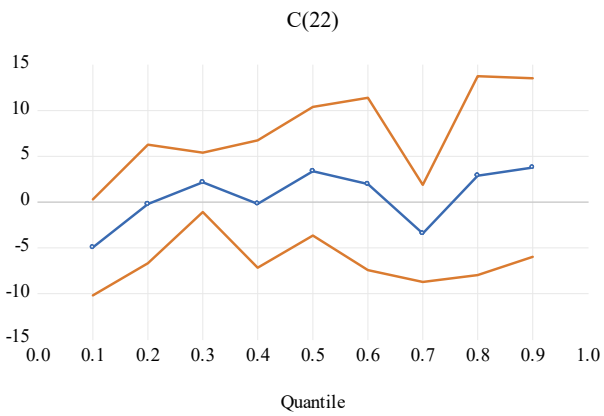
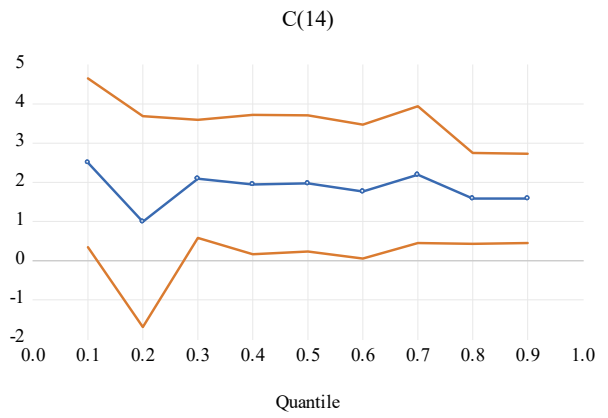
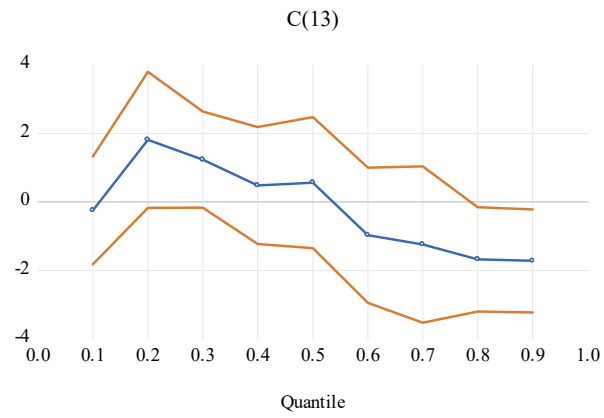
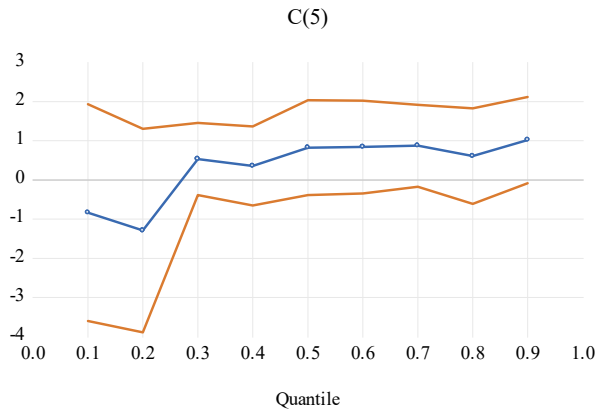
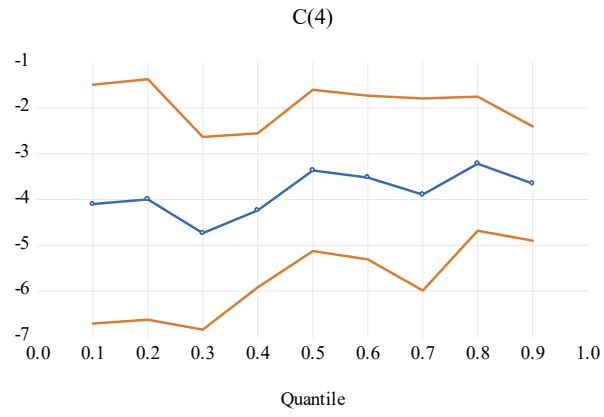


CRTALLY is the sum of crises identified by Reinhart and Rogoff (2009), that is, the sum of banking, currency, inflation, stock market crashes, and sovereign debt (domestic and foreign) crises.

# Quantile Factor Linear Projection Model – JAPAN

## (a) Estimated breaks

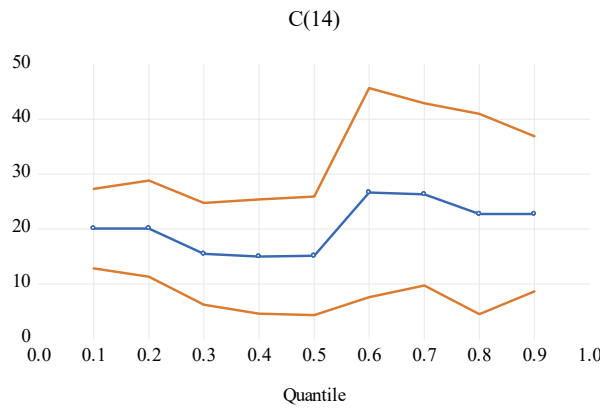
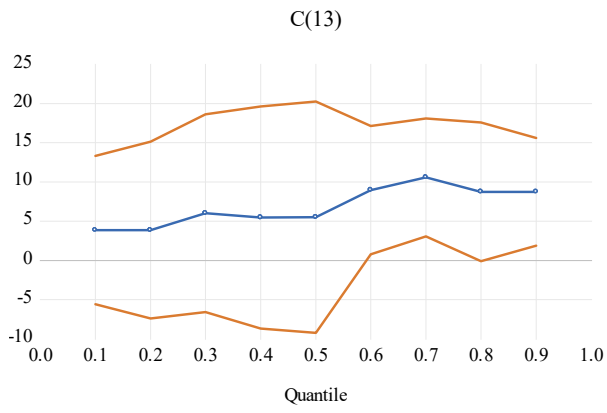
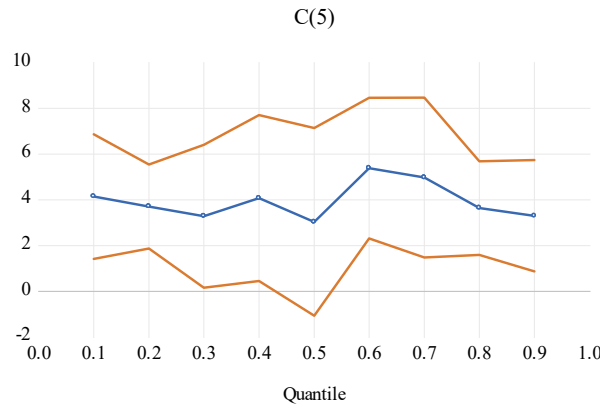
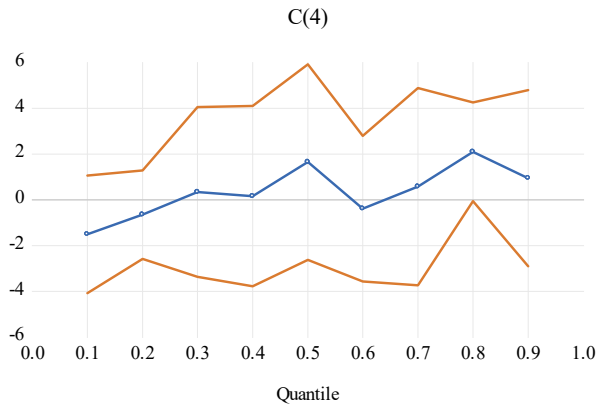
Quantile Process Estimates





**(b) Historical breaks**

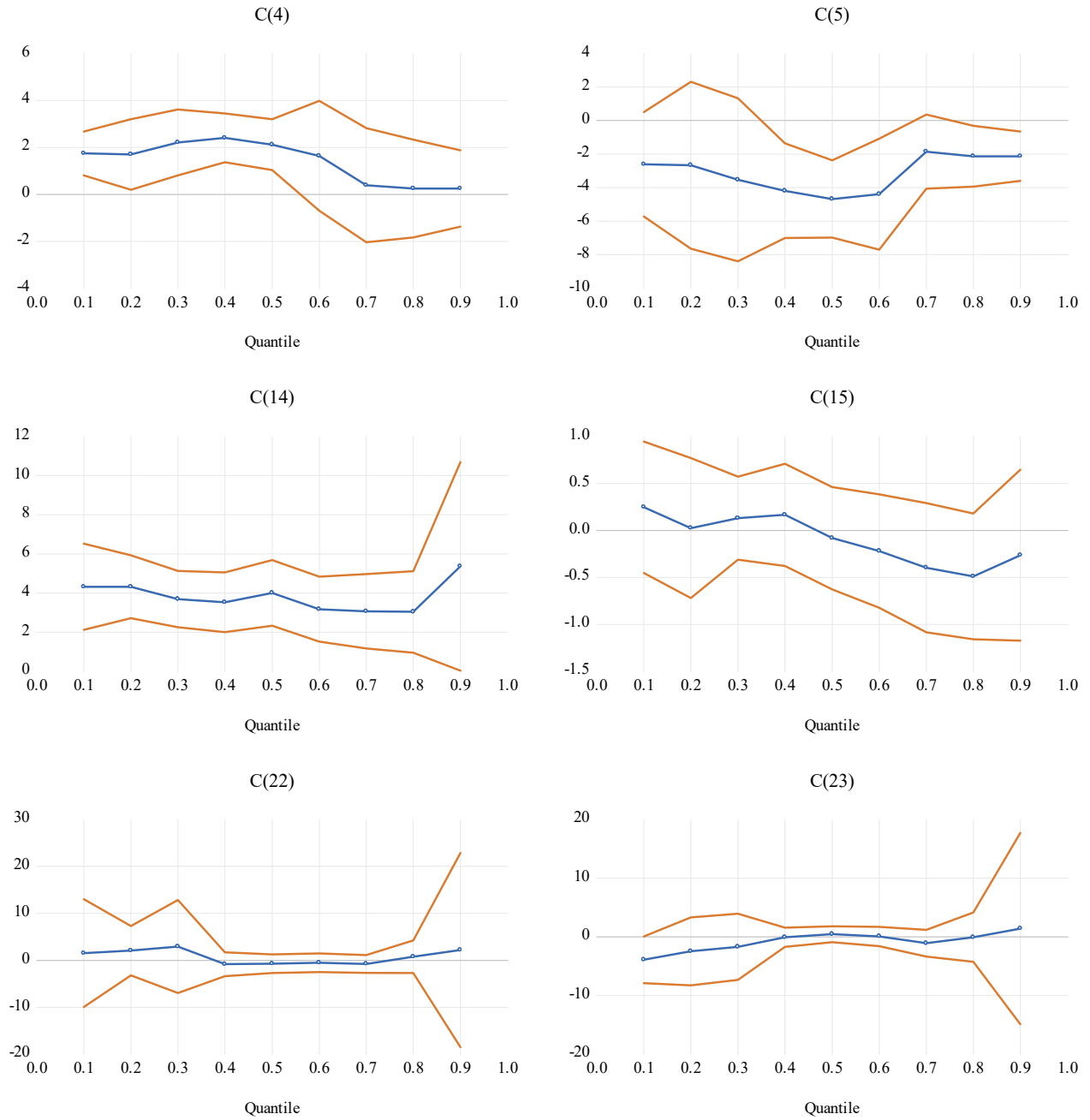
Quantile Process Estimates



# Quantile Factor Linear Projection Model – USA

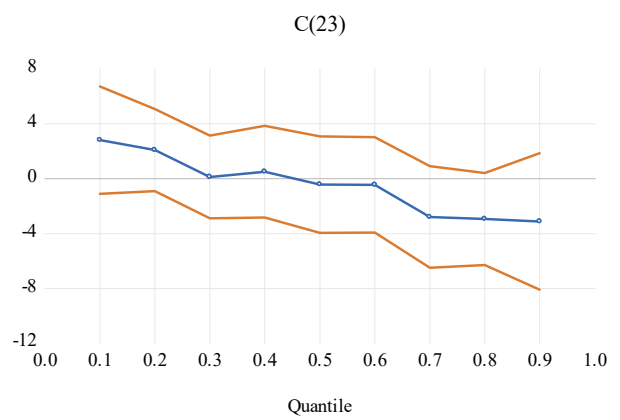
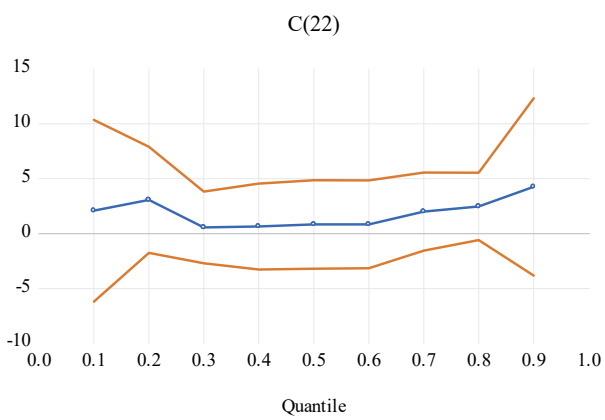
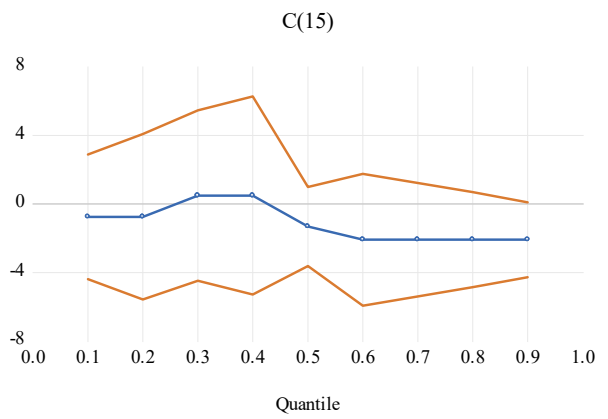
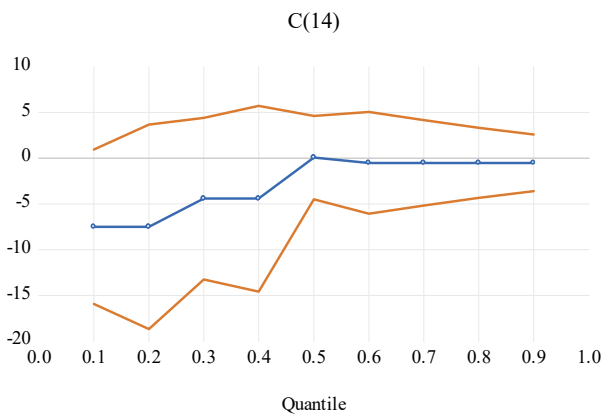
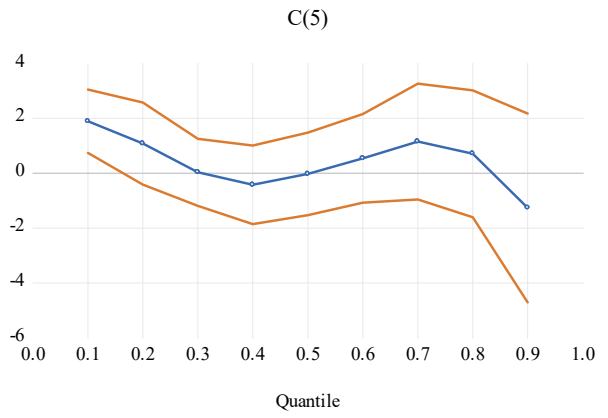
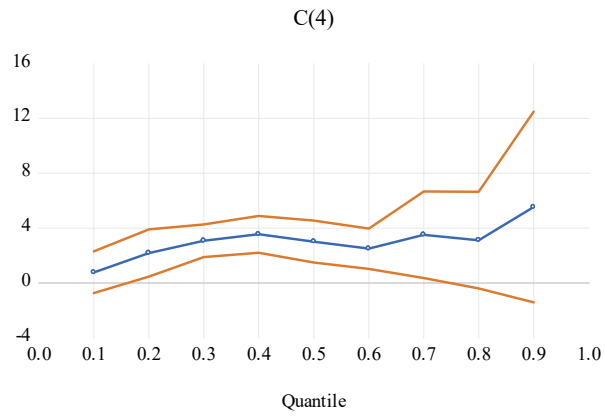
## (a) Estimated breaks

Quantile Process Estimates



## (b) Historical breaks

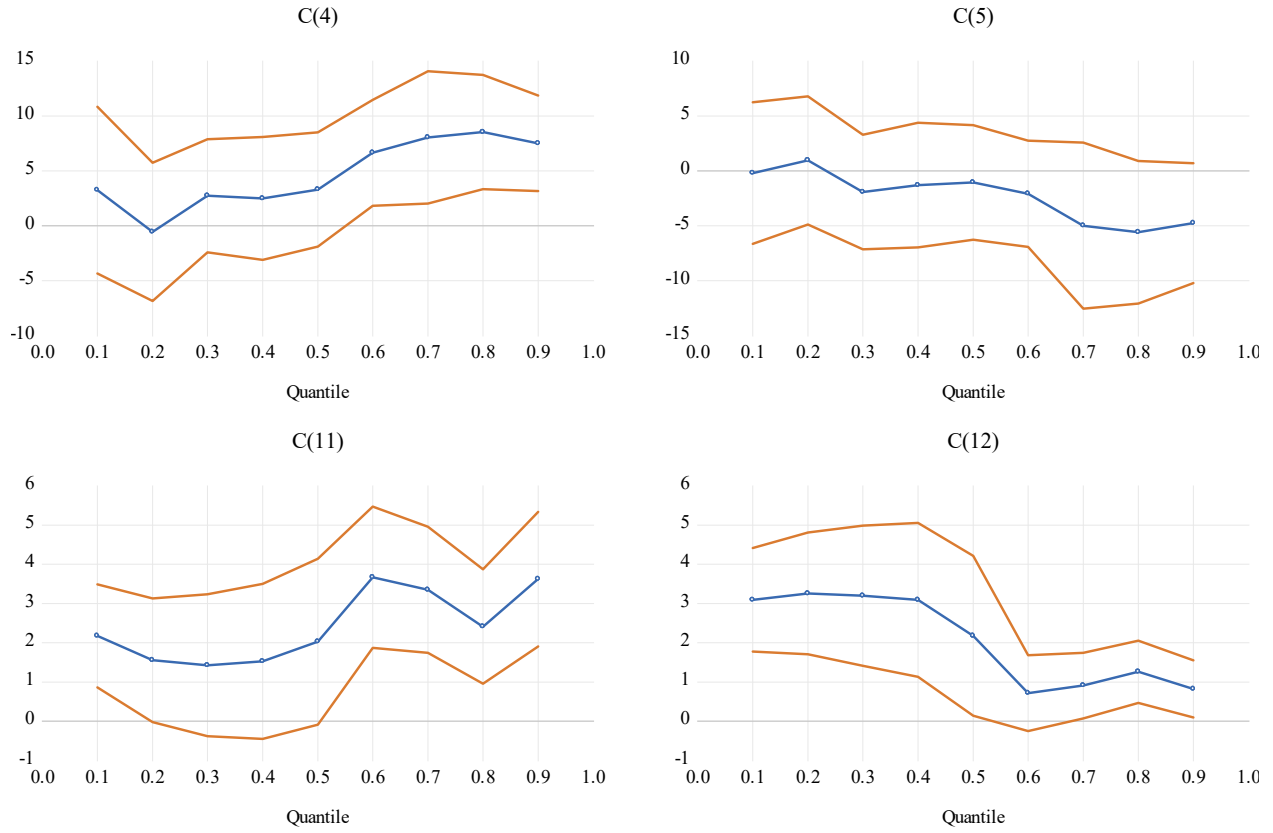
### Quantile Process Estimates



# Quantile Factor Linear Projection Model – Eurozone

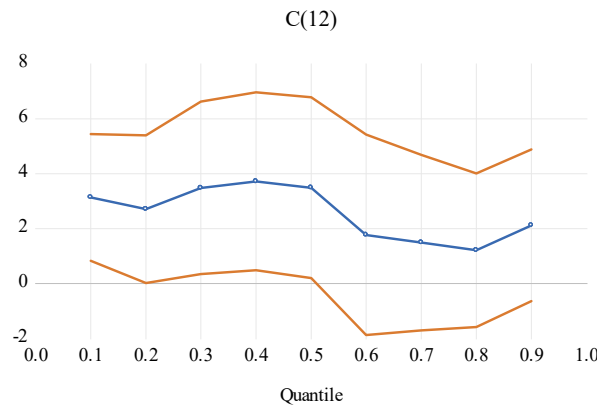
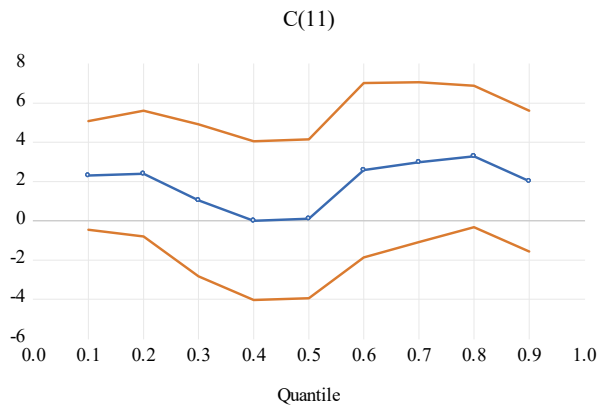
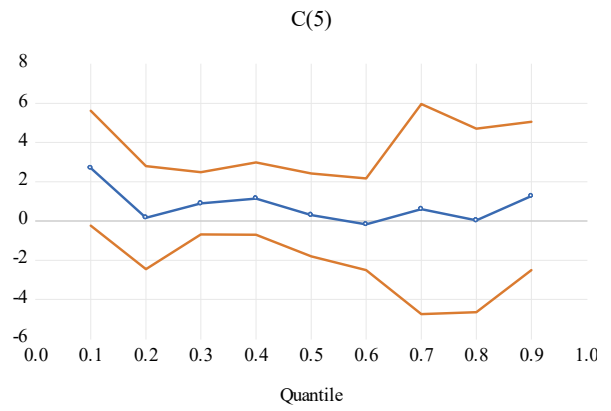
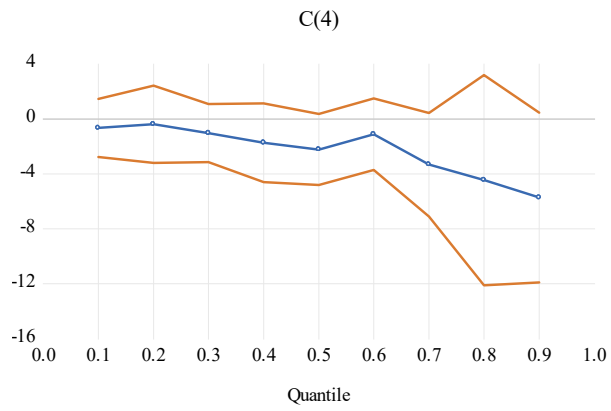
## (a) Estimated breaks

Quantile Process Estimates

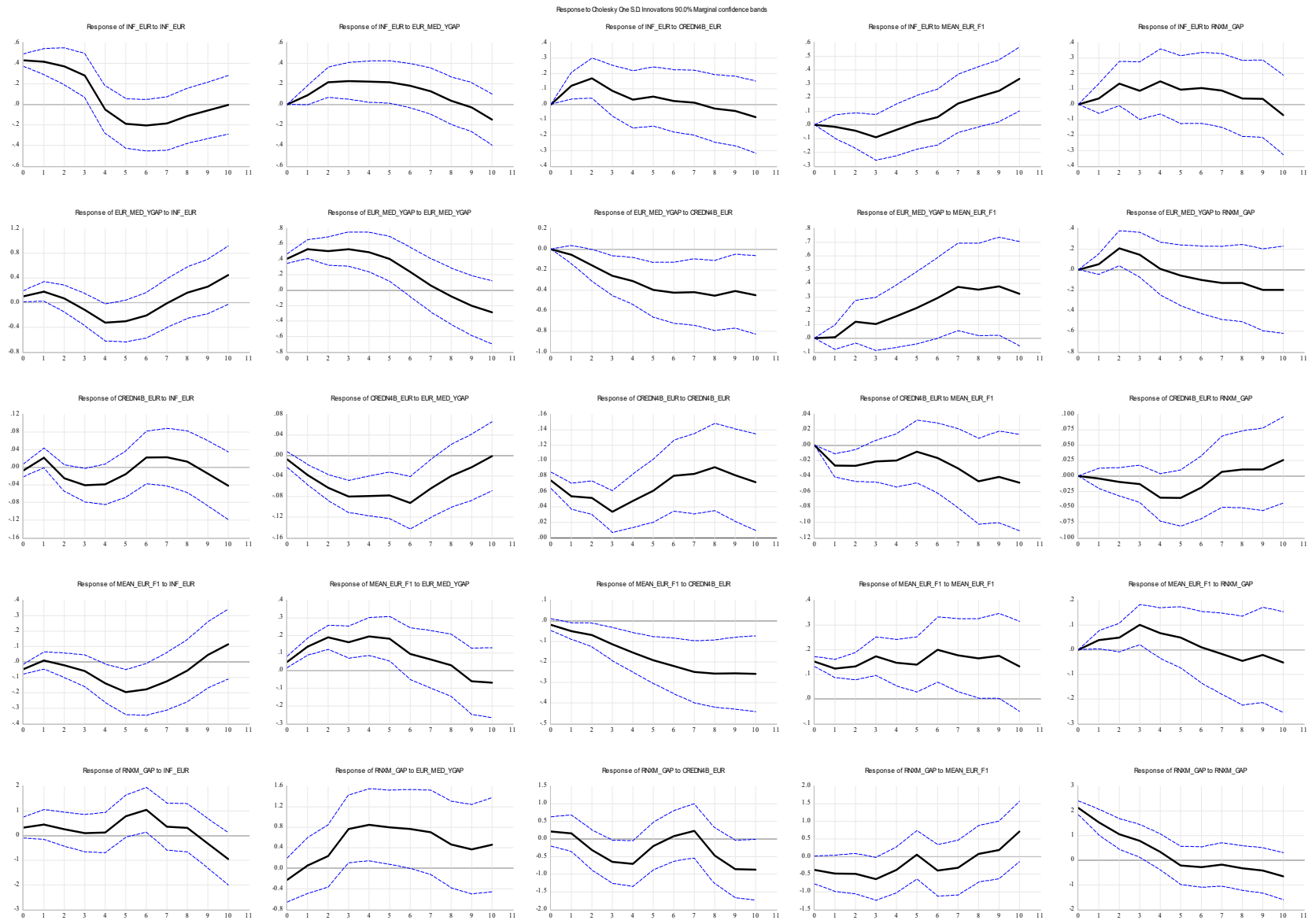


## (b) Historical breaks

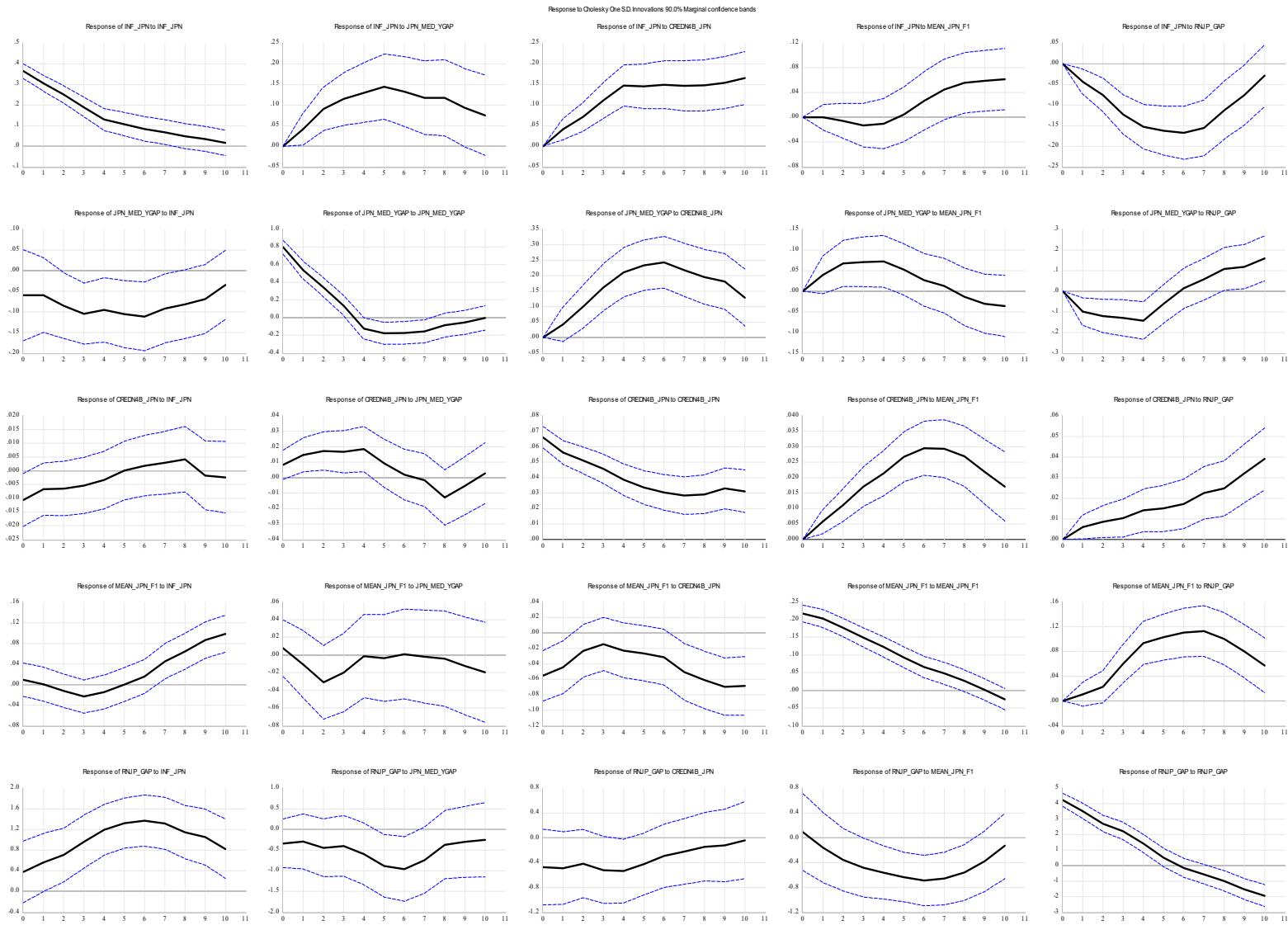
### Quantile Process Estimates



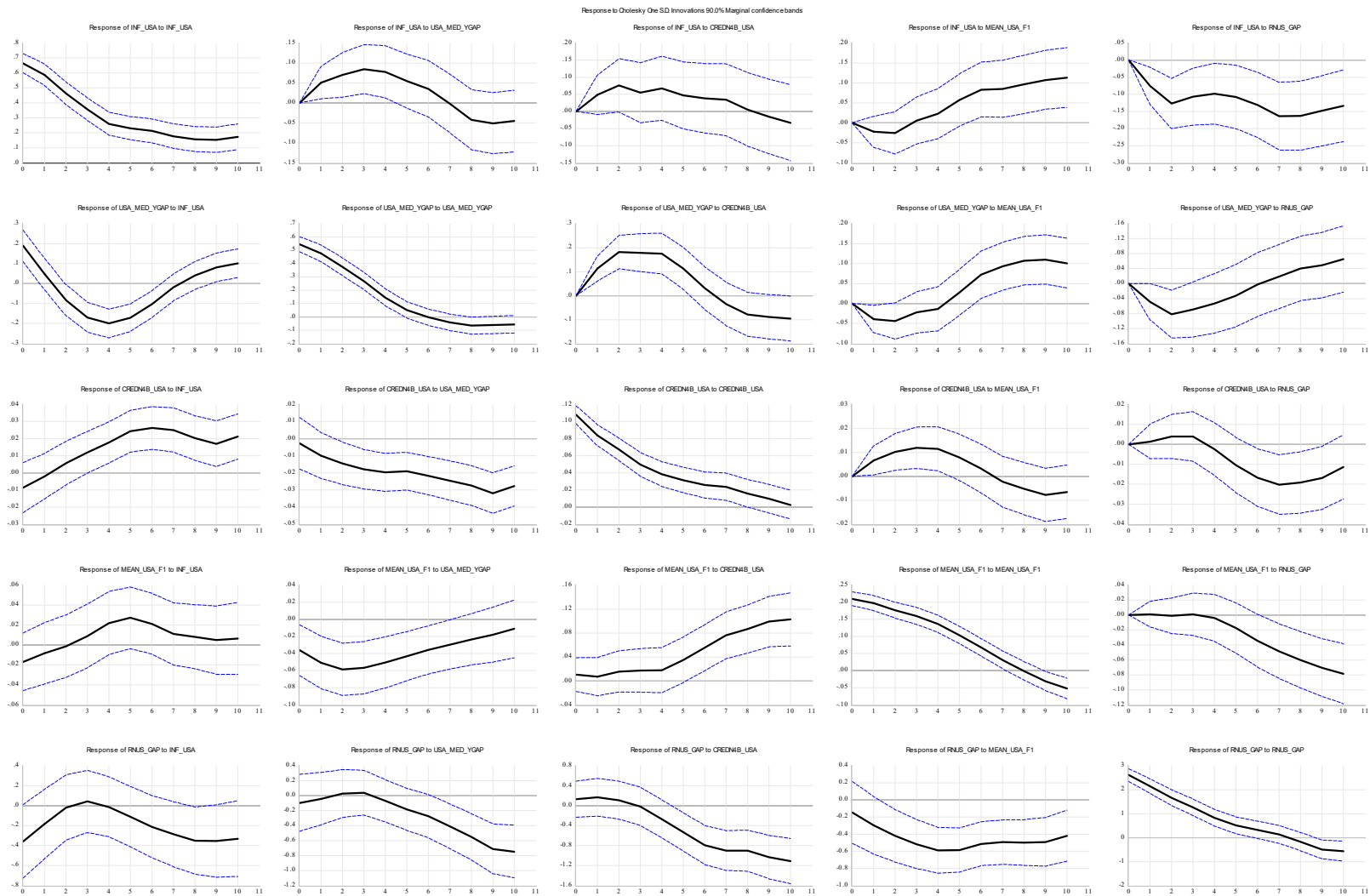
# Local Projection Impulse Responses (Estimated breaks) - Eurozone



# Local Projection Impulse Responses (Estimated breaks) – Japan



## Local Projection Impulse Responses (Estimated breaks) – USA



Note: VAR or order 1 for USA and JPN, 2 lags for EUR. 90% (marginal) confidence intervals.



## Business Cycle Chronologies

NBER recession dates: <https://www.nber.org/cycles.html>

PEAK	TROUGH	DURATION			
January 1980(I)	July 1980 (III)	6	58	64	74
July 1981(III)	November 1982 (IV)	16	12	28	18
July 1990(III)	<a href="#">March 1991(I)</a>	8	92	100	108
<a href="#">March 2001(I)</a>	<a href="#">November 2001 (IV)</a>	8	120	128	128
<a href="#">December 2007 (IV)</a>	<a href="#">June 2009 (II)</a>	18	73	91	81

## Chronology of Euro Area Business Cycles:

The Committee has identified the peak and trough quarters since 1970: <https://cepr.org/content/euro-area-business-cycle-dating-committee>

Date	Peak/Trough	Announcement Date	Findings
2013Q1	Trough	1 October 2015	<a href="#">Available here</a>
2011Q3	Peak	15 November 2012	<a href="#">Available here</a>
2009Q2	Trough	4 October 2010	<a href="#">Available here</a>
2008Q1	Peak	31 March 2009	<a href="#">Available here</a>
1993Q3	Trough	22 September 2003	<a href="#">Available here</a>
1992Q1	Peak	22 September 2003	<a href="#">Available here</a>
1982Q3	Trough	22 September 2003	<a href="#">Available here</a>
1980Q1	Peak	22 September 2003	<a href="#">Available here</a>
1975Q1	Trough	22 September 2003	<a href="#">Available here</a>
1974Q3	Peak	22 September 2003	<a href="#">Available here</a>

**Table 1. Peaks and Troughs**

Japan Cabinet office: <https://www.esri.cao.go.jp/en/stat/di/140530rdates.html>

The Reference Dates of Business Cycle			
Peak (By Month)	Trough (By Month)	Peak (By Quarter)	Trough (By Quarter)
Jun. 1951	Oct. 1951	2Q 1951	4Q 1951
Jan. 1954	Nov. 1954	1Q 1954	4Q 1954
Jun. 1957	Jun. 1958	2Q 1957	2Q 1958
Dec. 1961	Oct. 1962	4Q 1961	4Q 1962
Oct. 1964	Oct. 1965	4Q 1964	4Q 1965
Jul. 1970	Dec. 1971	3Q 1970	4Q 1971
Nov. 1973	Mar. 1975	4Q 1973	1Q 1975
Jan. 1977	Oct. 1977	1Q 1977	4Q 1977
Feb. 1980	Feb. 1983	1Q 1980	1Q 1983
Jun. 1985	Nov. 1986	2Q 1985	4Q 1986
Feb. 1991	Oct. 1993	1Q 1991	4Q 1993
May. 1997	Jan. 1999	2Q 1997	1Q 1999
Nov. 2000	Jan. 2002	4Q 2000	1Q 2002
Feb. 2008	Mar. 2009	1Q 2008	1Q 2009

Apr. 2012 (provisional)	Nov. 2012 (provisional)	2Q 2012 (provisional)	4Q 2012 (provisional)
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## International Monetary Fund – Highlights Article IV Staff Appraisals<sup>4</sup>

<i>Year</i>	<i>Highlights</i>
2018 NOV	<ul style="list-style-type: none"> <li>• Output above potential, <b>inflation low</b></li> <li>• <b>Avoid fiscal tightening</b></li> <li>• <b>“ambitious” structural reforms needed</b></li> <li>• <b>BoJ needs to strengthen its policy framework</b></li> </ul>
2017 JUL	<ul style="list-style-type: none"> <li>• <b>Inflation low</b>, demand support needed, downside risks remain</li> <li>• <b>Need to accelerate structural reforms</b></li> <li>• <b>Public debt unsustainable</b></li> </ul>
2016 AUG	<ul style="list-style-type: none"> <li>• <b>Inflation subdued</b>, downside risks</li> <li>• Abenomics needs a “coordinated policy reload”</li> <li>• <b>Structural reforms are needed</b></li> </ul>
2015 JUL	<ul style="list-style-type: none"> <li>• Modest recovery underway, inflation to rise gradually</li> <li>• <b>“entrenched deflationary mindset”</b></li> <li>• <b>Structural reforms needed</b></li> <li>• More “explicit monetary guidance” needed</li> </ul>
2014 JUL	<ul style="list-style-type: none"> <li>• Medium-term risks remain substantial</li> <li>• More powerful growth reforms needed</li> <li>• <b>Monetary policy is appropriately accommodative”</b></li> </ul>
2012 AUG	<ul style="list-style-type: none"> <li>• Japanese economy set to recover</li> <li>• Rise of consumption tax a crucial step in fiscal reform</li> <li>• Far-reaching <b>structural reforms are essential</b></li> <li>• <b>Further monetary easing required</b></li> </ul>
2011 JUN	<ul style="list-style-type: none"> <li>• Repair damaged infrastructure and improve electricity supply</li> <li>• More ambitious strategy needed to <b>bring down debt</b></li> <li>• <b>More monetary policy easing needed</b></li> </ul>
2010 JUL	<ul style="list-style-type: none"> <li>• Timely stimulus supports economic recovery</li> <li>• Credible <b>fiscal adjustment needed</b></li> <li>• <b>Further easing by BoJ needed</b></li> <li>• Banking sector faces challenges</li> </ul>
2009 JUL	<ul style="list-style-type: none"> <li>• Japan faces difficult immediate and long-term challenges</li> <li>• <b>BoJ’s policy response has been timely</b></li> <li>• <b>Structural reforms are needed</b></li> </ul>
2008 JUL	<ul style="list-style-type: none"> <li>• Modest slowdown in view</li> <li>• <b>Fiscal reforms are needed</b></li> <li>• BoJ improving communication</li> <li>• <b>Reinvigorate structural reforms</b></li> </ul>
2007AUG	<ul style="list-style-type: none"> <li>• Economic outlook remains favourable</li> <li>• Supported by appropriate macro and <b>structural policies but deeper reforms are needed</b></li> </ul>

<sup>4</sup> Terms and expressions in quotation marks are taken verbatim from the relevant report. Go to <https://www.imf.org/en/Countries/JPN> and click on the link to Article IV Staff Reports.

	<ul style="list-style-type: none"> <li>• <b>Monetary policy remains appropriately accommodative</b></li> <li>• Health of the banking system improving</li> </ul>
2006JUL	<ul style="list-style-type: none"> <li>• Post-bubble legacies have been resolved and deflation has ended</li> <li>• <b>Smooth transition out of QE represents a milestone for monetary policy and the monetary policy framework is well-suited to the new environment</b></li> <li>• Monetary policy communication should improve</li> <li>• <b>Acceleration of structural reforms needed</b></li> </ul>
2005 AUG	<ul style="list-style-type: none"> <li>• Progress in resolving legacies of the bubble years</li> <li>• <b>Structural reforms needed</b> to deal with mounting demographic pressures</li> <li>• <b>Monetary policy priority: conquering deflation</b> and clear communication has helped</li> </ul>
2004 AUG	<ul style="list-style-type: none"> <li>• Economic recovery has fostered progress</li> <li>• Unlock Japan's economic potential through <b>structural reforms that need to accelerate</b></li> <li>• Expanded bank reforms needed</li> <li>• <b>Current monetary policy stance and strategy are appropriate</b> but enhancements to the BoJ's communication can help</li> <li>• Concerns raised over <b>mounting public debt</b>, especially because of <i>aging population</i></li> </ul>
2003 SEP	<ul style="list-style-type: none"> <li>• Progress made in dealing with challenges but a "durable resolution" of banks' problems required</li> <li>• <b>End to deflation not yet in prospect</b></li> <li>• "bolder program" needed to restore growth including a <b>fiscal consolidation program</b></li> <li>• <b>More aggressive monetary policy needed</b> to end deflation: purchase a wider array of assets together with clear communication required</li> </ul>
2002 AUG	<ul style="list-style-type: none"> <li>• Bold strategy needed to "break the back" of Japan's structural economic problems with <b>structural reforms</b></li> <li>• Resolution of the problems of the banking sector</li> <li>• <b>Fiscal reforms needed and a fiscal consolidation strategy</b></li> <li>• <b>Monetary policy should aim to end deflation</b></li> </ul>
2001 AUG	<ul style="list-style-type: none"> <li>• "Window of opportunity" exists to address <b>"deep-seated" structural problems</b></li> <li>• Need for supportive macroeconomic policies</li> <li>• Banking sector problems a top priority</li> <li>• New monetary policy framework a welcome sign; <b>current policy stance will not end deflation "within a reasonable time frame"</b>.</li> <li>• Monetary policy transparency needs to be enhanced</li> </ul>

## OECD Economic Surveys – Highlights of Assessment and Recommendations<sup>5</sup>

<i>YEAR</i>	<i>Highlights</i>
2017 APR	<ul style="list-style-type: none"> <li>• <b>Monetary policy easing should remain</b></li> <li>• <b>Achieve fiscal sustainability</b></li> <li>• Propose specific structural policies to raise employment and productivity</li> </ul>
2015 APR	<ul style="list-style-type: none"> <li>• <b>Bold structural reforms needed</b></li> <li>• Reduce government debt</li> <li>• <b>End deflation</b>; aggressive monetary policy needed</li> </ul>
2013 APR	<ul style="list-style-type: none"> <li>• <b>Restore fiscal sustainability</b></li> <li>• <b>End deflation</b>, aim for 2% inflation. Aggressive monetary policy needed</li> <li>• Promote employment and raise productivity</li> </ul>
2011 APR	<ul style="list-style-type: none"> <li>• Earthquake: “worst disaster of the post-war era”</li> <li>• <b>Continued deflationary pressure</b>; BoJ to continue accommodative monetary policy framework. Improvements in monetary policy framework needed</li> <li>• <b>Fiscal situation has reached a critical point</b>. Reforms needed</li> <li>• Government’s New Growth Strategy important development</li> </ul>
2009 SEP	<ul style="list-style-type: none"> <li>• <b>Policy rate should be kept near zero</b></li> <li>• <b>Higher consumption tax recommended to improve fiscal situation</b></li> </ul>
2008 APR	<ul style="list-style-type: none"> <li>• Expansions since 2002 remains on track</li> <li>• Current policy rate should remain but <b>2006 monetary policy framework needs reform</b></li> <li>• <b>Progress made in fiscal consolidation</b></li> <li>• Productivity improvements needed (especially services sector)</li> </ul>
2006 JUL	<ul style="list-style-type: none"> <li>• Post-bubble obstacles have been overcome but difficult challenges remain</li> <li>• Double exit strategy facing country: exit ZIRP and fiscal consolidation</li> <li>• <b>New monetary policy framework</b> (0-2% inflation defined as price stability) with end of QE but annual review of price stability definition should be reconsidered</li> <li>• Further banking sector reforms are needed</li> </ul>
2005 MAR	<ul style="list-style-type: none"> <li>• Serious challenges exist to sustained growth</li> <li>• <b>Bring an end to deflation via QE</b></li> <li>• Further progress in rehabilitating banking sector</li> <li>• <b>Fiscal consolidation required</b></li> </ul>
2004 FEB	<ul style="list-style-type: none"> <li>• Structural reforms necessary</li> <li>• <b>Monetary policy aggressive</b> via QE but wider range of assets should be purchased</li> <li>• Strategy needed to return to positive inflation and strengthen health of banking sector</li> <li>• <b>Fiscal consolidation plan needed</b></li> </ul>
2003 JAN	<ul style="list-style-type: none"> <li>• Weak domestic demand</li> <li>• <b>Monetary policy in “uncharted territory”</b> with QE + ZIRP but needs to move further (wider range of asset purchases)</li> </ul>

<sup>5</sup> From 1980 – 1995, inclusive, largely based on the policy conclusions section of each survey. Between 1996 and 2018, largely based on the assessment and recommendations section of the survey.

	<ul style="list-style-type: none"> <li>• <b>Fiscal policy remains challenging</b></li> <li>• <b>Structural reforms face “intense” opposition</b></li> </ul>
2001 NOV	<ul style="list-style-type: none"> <li>• Fundamentals are weak and <b>structural reforms need to be prioritized</b></li> <li>• Change in operating procedures in monetary policy in March to <b>new inflation “guidelines” against “risks of strengthening deflation”</b> replaces “until threat of deflation subsides”</li> <li>• More monetary policy easing required but bank bad debts also need to be cleaned up</li> <li>• <b>Fiscal policy needs to be stabilized</b></li> </ul>
2000 DEC	<ul style="list-style-type: none"> <li>• Economic recovery underway and <b>deflationary concerns are receding.</b></li> <li>• <b>Structural reforms are necessary</b></li> <li>• ZIRP has served Japan well and monetary policy conditions should remain easy but a new framework is needed</li> <li>• <b>Government debt should be sustainable</b></li> <li>• Bank sector problems not fully dealt with</li> </ul>
1999	<ul style="list-style-type: none"> <li>• Slump due to foreign, financial, and fiscal shocks ended but recovery is fragile</li> <li>• Macro stimulus played decisive role but <b>fiscal stimulus should not be withdrawn prematurely.</b> Thought should be given to eventual fiscal consolidation</li> <li>• Structural reforms still in planning stage</li> </ul>
1998	<ul style="list-style-type: none"> <li>• Recession is deepening and significant fiscal tightening did not help</li> <li>• <b>Monetary policy has been used “almost to its limits”</b></li> <li>• Banking sector problems continue and has finally drawn public funds. Lack of transparency is a problem</li> <li>• <b>Structural reforms should be accelerated</b></li> </ul>
1997	<ul style="list-style-type: none"> <li>• Current economic upswing remains weak</li> <li>• <b>Monetary policy conditions “exceptionally accommodating”</b></li> </ul>
1996	<ul style="list-style-type: none"> <li>• Recovery strengthens</li> <li>• <b>Fiscal consolidation is necessary</b></li> <li>• <b>Monetary policy stance is easy</b> but health of the banking system needs to improve</li> <li>• <b>Reforms are needed</b> in many areas</li> </ul>
1995	<ul style="list-style-type: none"> <li>• Monetary policy easing beginning in 1995 and should be maintained</li> <li>• Banking sector problems continue and public money and deposit insurance scheme should be strengthened</li> <li>• <b>Structural reforms are key</b></li> <li>• Japan is experiencing an “<u>exceptionally long period of depressed economic activity</u>”</li> </ul>
1994	<ul style="list-style-type: none"> <li>• Recession continues and major risk is value of yen</li> <li>• Monetary policy easing has helped and should continue to play a key role in recovery but “<b>need for additional monetary relaxation appears less now</b>”</li> <li>• <b>Fiscal policy also essential with 4 packages since August 1992</b></li> <li>• <b>The key is structural reform</b></li> </ul>
1993	<ul style="list-style-type: none"> <li>• Economy remains vulnerable to financial imbalances and appreciation of yen has not helped</li> <li>• Banking sector is fragile and credit to small and medium-sized businesses is tight</li> <li>• <b>Greater emphasis on fiscal measures to support demand</b></li> </ul>



	<ul style="list-style-type: none"> <li>• Fiscal reforms necessary due, in part, <i>to ageing population</i></li> <li>• <b>Conventional macro measures have had limited effectiveness</b></li> </ul>
1992	<ul style="list-style-type: none"> <li>• <b>Monetary policy eased since mid-1991</b> but financial institutions are still perceived as being cautious</li> <li>• Banking sector problems still constitutes “one of the principal difficulties”</li> <li>• <b>Price stability “has virtually been achieved”</b> but a failure to respond to signs of weak domestic demand is a concern</li> <li>• Keiretsu (corporate groupings) remain a problem as is a lack of transparency in corporate governance</li> <li>• Economy is undergoing a period of <b>marked structural adjustment</b></li> </ul>
1991	<ul style="list-style-type: none"> <li>• Remarkable supply side performance of the economy</li> <li>• BoJ pursued <b>tight monetary policy</b> and pays close attention to the value of the yen</li> <li>• Expansion led by demand which distinguishes it from previous upswings</li> <li>• Reducing <b>debt ratio is a legitimate objective</b> due to ageing population</li> <li>• Liberalization of interest rates not yet complete</li> <li>• Japan undergoing <b>substantial structural change</b></li> </ul>
1990	<ul style="list-style-type: none"> <li>• Rapid expansion due to demand</li> <li>• <b>Monetary policy has shifted to containing inflation pressure and expectations</b></li> <li>• <i>Worries about ageing population</i></li> <li>• SII (structural impediment initiative) with US is ongoing issue (also in 1991-1992)</li> <li>• Macro performance since 1986 “excellent”</li> </ul>
1989	<ul style="list-style-type: none"> <li>• Strong domestic demand but weakening yen</li> <li>• <b>Debt to GDP ratio is “excessive”</b></li> <li>• 1986 Mayekawa Report identifies important microeconomic problems</li> <li>• Various <b>structural policy measures have been implemented</b></li> </ul>
1988	<ul style="list-style-type: none"> <li>• Main measures and timeline of interest rate liberalization since 1986 published in Table 34</li> <li>• <b>Major fiscal measures announced in May 1987</b></li> <li>• Present stance of <b>fiscal policy seems appropriate</b></li> <li>• <b>Monetary policy remains expansionary</b></li> </ul>
1987	<ul style="list-style-type: none"> <li>• Growing dollar/yen misalignment</li> <li>• Since end of 1985 <b>monetary policy has been significantly eased</b></li> <li>• <b>Structural reform (lad, tax) are needed</b></li> </ul>
1986	<ul style="list-style-type: none"> <li>• <b>Economic performance since 1983 “remarkable”</b></li> <li>• Successful structural adjustment of the economy to changes in relative prices and technological advances</li> <li>• Greater reliance on domestic demand needed</li> <li>• <b>Continued fiscal restraint required</b></li> </ul>
1984	<ul style="list-style-type: none"> <li>• <b>Easier monetary policy stance</b> adopted to bolster domestic demand</li> <li>• Pressure to tighten fiscal policy</li> </ul>
1983	<ul style="list-style-type: none"> <li>• Progress achieved in the <b>fight against inflation has been remarkable</b></li> <li>• <b>Containing growth in public spending is essential</b></li> </ul>
1982	<ul style="list-style-type: none"> <li>• <b>Monetary policy is expansionary</b></li> <li>• Overcame adverse effects of 2<sup>nd</sup> oil price shock a year earlier</li> </ul>

1981	<ul style="list-style-type: none"> <li>• After 1<sup>st</sup> oil price shock, <b>frequent adjustment of monetary policy and fiscal policy were instrumental in controlling inflation</b></li> <li>• Significant easing of monetary policy since August</li> <li>• Room to manoeuvre in fiscal policy is limited</li> </ul>
1980	<ul style="list-style-type: none"> <li>• Chronology of interest rate deregulation (p.76)</li> <li>• Priority given to containing accelerating inflation; recovery underway</li> <li>• <b>Monetary and fiscal policy expansionary</b></li> <li>• Large share of energy used in industrial production presents special problems</li> </ul>

**G20: Number of Commitments by Select Issue**

Issue	2008	2009*	2010*	2011	2012	2013	2014	2015	2016	2017	2018	2019
Financial Regulation	59	68	36	38	18	20	7	8	31	40	21	9
International Financial Institutions Reforms	14	40	20	22	8	5	4	2	25	39	22	10
<b>Employment &amp; Labour</b>	<b>0</b>	<b>7</b>	<b>4</b>	<b>8</b>	<b>18</b>	<b>29</b>	<b>16</b>	<b>10</b>	<b>4</b>	<b>14</b>	<b>7</b>	<b>4</b>
<b>Infrastructure</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>9</b>	<b>25</b>	<b>18</b>	<b>9</b>
Accountability	4	18	7	5	13	9	17	2	4	0	0	0
Governance	0	3	2	12	3	12	0	0	2	9	0	0
<b>Macroeconomic Policy</b>	<b>6</b>	<b>43</b>	<b>43</b>	<b>91</b>	<b>71</b>	<b>63</b>	<b>34</b>	<b>21</b>	<b>8</b>	<b>6</b>	<b>1</b>	<b>1</b>

Note: Drawn from information provided at [g20.utoronto.ca](http://g20.utoronto.ca). Data represent the total number of commitments based on Leaders' Statements as evaluated from a code book available from the previously listed website. \* indicates that two meetings were held during these calendar years.

## G7 Summit Declaration Salient Economic Issues

Year - Summit	Economic Issue Highlighted
1980 Venice	<b>Inflation</b>
1981 Ottawa	<b>Inflation, Debt</b>
1982 Versailles	<b>Growth</b> , Prudent <b>Monetary Policy</b> , <b>Deficits</b> , Trade liberalization
1983 Williamsburg	<b>Deficits</b> , <b>Monetary Policy</b> , Trade liberalization
1984 London	<b>Inflation</b> , Job creation
1985 Bonn	<b>Growth &amp; Employment</b> , <b>Deficits</b>
1986 Tokyo	<b>Structural Adjustment Policies</b> , <b>Deficits</b>
1987 Venice	Exchange rates, <b>Deficits</b> , <b>Monetary Policy</b> , <b>Structural Reforms</b>
1988 Toronto	<b>Structural Reforms</b> , <b>Inflation</b> , Exchange rates
1989 Paris	<b>Deficits</b> , current account deficits, exchange rates, <b>Structural Reforms</b>
1990 Houston	International Trade
1991 London	<b>Structural Reforms</b> , Growth
1992 Munich	<b>Growth &amp; Employment</b> , <b>Monetary Policy</b> , <b>Deficits</b>
1993 Tokyo	<b>Growth</b> , Structural Reforms
1994 Naples	<b>Growth &amp; Employment</b>
1995 Halifax	<b>Growth &amp; Employment</b> , <i>Ageing population</i>
1996 Lyon	<b>Inflation</b> , <b>Fiscal consolidation</b> , <b>Structural Reforms</b>
1997 Denver	<i>Ageing population</i>
1998 Birmingham	<b>Growth</b>
1999 Koln	Debt in poor countries
2000 Okinawa	International Financial Architecture
2001 Genoa	<b>Structural Reforms</b> , International Financial System
2002 Kananaskis	-
2003 Evian	<b>Growth</b> , <b>Structural Reform</b>
2004 Sea Island	-
2005 Gleneagles	-
2006 St. Petersburg	-
2007 Heiligendamm	Global imbalances
2008 Hokkaido	<b>Growth</b> , Global imbalances
2009 L'AgUILA	<b>Growth</b> , Economic crisis, <b>Exit from extraordinary policy measures</b>
2010 Muskoka	<u>Economic crisis &amp; recovery</u>
2011 Deauville	<u>Recovery</u> , <b>Growth &amp; Employment</b>
2012 Camp David	<b>Growth &amp; Employment</b> , <u>Recovery</u> , <b>Fiscal consolidation</b>
2013 Lough Erne	<b>Growth &amp; Employment</b>
2014 Brussels	<b>Growth &amp; Employment</b> , Financial reforms
2015 Elmau	<u>Recovery</u> , <b>Growth</b>
2016 Ise-Shima	<u>Recovery</u> , <b>Monetary Policy</b> , <b>Structural reforms</b> , exchange rates, financial reforms
2017 Taormina	<u>Recovery</u> , <b>Debt</b> , <b>Structural reforms</b> , exchange rates
2018 Charlevoix	<b>Growth</b>

2019 Biarritz	-
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## A COMPENDIUM OF DATES/EVENTS BY TYPE<sup>6</sup>

### A. JAPAN

<i>Monetary Policy</i> <sup>7</sup>	<i>Regulatory/ Fiscal Policy</i>	<i>Japan Cabinet Office Business Cycle Reference Dates</i>	<i>Other</i>
Bank of Japan Act of 1997	Consumption tax introduced: April 1989	1980Q1 (Feb)	February 1987: Louvre Agreement
ZIRP, 3 March 1999 - 14 July 2006	Consumption tax raised: April 1997	1983Q1 (Feb)	Nikkei peaks: 29 December 1989
QE: 19 March 2001 – 9 March 2006	A variety of stimulus packages <sup>8</sup>	1985Q2 (Jun)	Nikkei ‘bubble bursts’: 4 January 1990 – 28 December 1990
Bond and Commercial paper purchase: 19 December 2008	Stimulus package: 8 December 2009	1986Q4 (Nov)	Kobe earthquake: 17 January 1995
Stock purchases: 3 February 2009	Stimulus package (2 <sup>nd</sup> arrow): 26 December 2012	1991Q1 (Feb)	Bank of Japan Act revised (greater independence): April 1998
Bond purchase increase: 18 March 2009	Consumption tax raised: April 2014	1993Q4 (Oct)	Obuchi financial legislation reform: June 1998
Expansion of fixed rate loans: 17 March 2010	Consumption tax raised: October 2019	1997Q2 (May)	Tohoku earthquake: 11 March 2011
Inflation target: 2% February 2013		1999Q1 (Jan)	Revitalization (2 <sup>rd</sup> arrow): January 2013
QQE <sup>9</sup> : April 2013		2000Q4 (Nov)	
QQE +: October 2014		2002Q1 (Jan)	
QQE+S: December 2015		2008Q1 (Feb)	
QQE -ve <sup>10</sup> : January 2016		2009Q1 (Mar)	
QQE – ve E: July 2016		2012Q2 (Apr) <sup>11</sup>	

<sup>6</sup> The following is supplemented by other chronologies, information about Governors, and other information shown separately.

<sup>7</sup> A link to the Bank of Japan’s Asset Purchase Programs (English) is listed as “(Invalid)”. <https://www.federalreserve.gov/monetarypolicy/timeline-balance-sheet-policies.htm>. Perhaps these are meant to be interpreted as terminated or discontinued?

<sup>8</sup> See, for example, Koo (2003, 2008, 2015, 2018), Nakaso (2001), and references therein as well as OECD Economic Surveys and IMF article IV reports.

<sup>9</sup> Qualitative and Quantitative Easing.

<sup>10</sup> Negative interest rates

<sup>11</sup> Listed as “provisional”.

QQE -ve YCC <sup>12</sup> : September 2016		2012Q4 (Nov) <sup>13</sup>	
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<sup>12</sup> Yield Curve Control.

<sup>13</sup> Listed as “provisional”.

## B. EUROZONE

<i>Monetary Policy</i>	<i>Regulatory/Fiscal Policy<sup>14</sup></i>	<i>CEPR Reference Cycle Dates<sup>15</sup></i>	<i>Other</i>
ASSET PURCHASE PROGRAMS - ECB <sup>16</sup>	European Banking Authority, 1 January 2011	1980Q1 = PEAK	Maastricht Treaty: 7 February 1992
28 March 2008, LTRO1 <sup>17</sup>	European Securities and Markets Authority, 1 January 2011	1982Q3 = TROOUGH	1 January 1999: euro introduction
7 May 2009, LTRO2	European Systemic Risk Board, 16 December 2010	1992Q1 = PEAK	1 January 2002: euro becomes legal tender
10 May 2010, SMP		1993Q3 = TROUGH	12 September 1990: German reunification
6 October 2011/November 2011, Covered Bond Purchase – CBP1 & CBP2		2008Q1 = PEAK	9 August 2007: BNP Paribas freezes funds
8 December 2011, LTRO3		2009Q2 = TROUGH	26 July 2012: Draghi’s – “whatever it takes” remarks
6 September 2012, Outright Monetary Transactions		2011Q3 = PEAK	
5 June 2014, negative interest rate + LTRO4		2013 Q1 = TROUGH	
4 September 2014, Asset Purchase Program, CBP3			
22 January 2015, PSPP (Public Sector Purchase Program or QE)			
10 March 2016, CSPP (Corporate Sector Purchase Program), LTRO4			

<sup>14</sup> A detailed list of reforms, including ones pending but not yet approved, is available from [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-reforms-and-their-progress/progress-financial-reforms\\_en](https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-reforms-and-their-progress/progress-financial-reforms_en).

<sup>15</sup> Cycles until 1993 were announced in 2003 after the creation of the Eurozone. Others (e.g., 2009Q2 trough) announced over a year later.

<sup>16</sup> A partial list is given below. Full details can be found at <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html#pspp>.

<sup>17</sup> Long-term Refinancing Operation



### C. UNITED STATES

<i>Monetary Policy</i>	<i>Regulatory/Fiscal Policy</i>	<i>NBER Reference Cycle Dates</i>	<i>Other</i>
BALANCE SHEET PROGRAMS - FED <sup>18</sup>	3 September 1982: Tax equity and Fiscal Responsibility Act	1980Q1 (Jan) = PEAK	6 October 1979: fed funds rate targeting to monetary targeting
<i>12 December 2007, TAF</i>	28 January 2008: Economic Stimulus Act	1980Q3 (Jul) = TROUGH	5 October 1982: FFR targeting resumes
<i>11 March 2008, Term Securities Lending Facility</i>	29 September 2008: Congress rejects bailout	1981Q3 (Jul) = PEAK	19 October 1987: ‘Black Monday’ stock market crash
<i>16 March 2008, Primary Dealer Credit Facility</i>	3 October 2008: Congress approves bailout	1982Q4 (Nov) = TROUGH	10 March 2000 – November 2000: dot com bubble bursts
<i>7 October 2008, Commercial Paper Funding Facility</i>	10 February 2009: Financial Stability Plan	1990Q3 (Jul) = PEAK	11 September 2001: terrorist attack on the U.S.
<i>21 October 2008, Money Market Investor Funding Facility</i>	29 June 2010: Dodd-Frank legislation	1991Q1 (Mar) = TROUGH	14 March 2008: Bear Sterns failure
<i>25 November 2008, QE1 – Large Scale Asset Purchase</i>	16 December 2010: tax cut	2001Q1 (Mar) = PEAK	15 September 2008: Lehmann failure
<i>16 December 2008 – December 2015, (effective) Zero Lower Bound</i>	1-16 October 2013: debt ceiling crisis	2001Q4 (Nov) = TROUGH	2 March 2009: AIG restructuring
<i>10 August 2010, QE2</i>	2 December 2017: tax cuts and Jobs Act	2007Q4 (Dec) = PEAK	1 June 2009: GM bankruptcy
<i>13 September 2012, QE3</i>	Gramm-Leach-Bliley Act 1999 Dodd-Frank Act 2010	2009Q2 (Jun) = TROUGH	21 June 2009: Fed introduces bank stress test
	GOVERNMENT SHUTDOWNS		
	<i>1 May 1980</i>		
	<i>23 November 1981</i>		
	<i>4 October 1984</i>		
	<i>17 October 1995</i>		
	<i>17 October 1986</i>		
	<i>6-8 October 1990</i>		
	<i>14-19 November 1995</i>		

<sup>18</sup> Selection of most important milestones. More details are found at <https://www.federalreserve.gov/monetarypolicy/timeline-balance-sheet-policies.htm>.

	<i>16 December 1995 – 6 January 1996</i>		
	<i>1 – 17 October 2013</i>		
	<i>22 December 2018-25 January 2019</i>		

Sources: New York Federal Reserve, Board of Governors of the Federal Reserve, European Central Bank, Bank of Japan, Government of Japan, Wikipedia.

#### D. GLOBAL

<i>G20 Summits<sup>19</sup></i>	<i>G7 Summits<sup>20</sup></i>	<i>Other</i>
14-15 November 2008	22-23 June 1980	182: Latin American debt crisis
2 April 2009	20-21 July 1981	22 September 1985: Plaza Accord
24-25 September 2009	4-6 June 1982	22 February 1987: Louvre Accord
26-27 June 2010	28-30 May 1983	June 1989: Tiananmen Square
3-4 November 2011	7-9 June 1984	November 1989: Berlin Wall falls
18-19 June 2012	2-4 May 1985	31 December 1991: Dissolution of Soviet Union
5-6 September 2013	4-6 May 1986	1 January 1994: NAFTA
15-16 November 2014	8-10 June 1987	1997-98: Asian Financial Crisis
15-16 November 2015	19-21 June 1988	January – March 1999: Brazil crisis
4-5 September 2016	14-16 July 1989	2001: China enters WTO
7-8 July 2017	9-11 July 1990	December 2001-February 2002: Argentina debt crisis
30 November – December 1 2018	15-17 July 1991	
28-19 June 2019	6-8 July 1992	
	7-9 July 1993	
	8-10 July 1994	
	15-17 June 1995	
	27-29 June 1996	
	20-22 June 1997	
	15-17 May 1998	
	18-20 June 1999	
	21-23 July 2000	
	21-22 July 2001	
	26-27 June 2002	
	1-3 June 2003	
	8-10 June 2004	
	6-8 July 2005	
	15-17 July 2006	
	6-8 June 2007	

<sup>19</sup> Distribution: 0 in Q1, 4 in Q2, 4 in Q3, 5 in Q4. 2 summits held in 2009.

<sup>20</sup> 13 of 40 summits held in Q3.

	7-9 July 2008	
	8-10 July 2009	
	25-26 June 2010	
	26-27 May 2011	
	18-19 May 2012	
	17-18 June 2013	
	4-5 June 2014	
	7-8 June 2015	
	26-27 May 2016	
	26-27 May 2017	
	8-9 June 2018	
	24-26 August 2019	

**E. POLICY REGIMES AS DATED BY BORDO AND SIKLOS (2017)**

Economy	Gold Standard	Bretton Woods	Monetary Targeting	Inflation Targeting	Exchange Rate targeting/ Monetary Union
France	1878-1914 & 1926-1936	1959-1973			1993-1999 (MU)-2001
Germany	1871-1914 & 1924-1931	1959-1971	1975-1991		1993-1999 (MU)-2001
Japan	1897-1917 & 1930-1931	1964-1972		2013 –	1973-2012
Italy	1884-1917 & 1927-1934	1959-1973			1993-1999 (MU)-2001
USA	1880-1917 & 1922-1933	1959-1971	1975-1991	2012** –	

\*Eurozone members; \*\* Medium-term inflation objective;

Sources: Siklos (2002), Bordo and Siklos (2016), and references therein. Annual data are used. See the text for additional details. The first set of figures gives mean inflation; the second gives real GDP growth for the samples listed. The last column occasionally provides two sets of figures because two separate regimes are considered.

**F. Central Bank CEOs**

<i>Bank of Japan</i>	<i>ECB</i>	<i>FOMC</i>
Mayekawa 16 December 1979- 16 December 1984	Duisenberg 1 June 1998 – 31 October 2003	Volcker 6 August 1979 – 11 August 1987
Sumita 17 December 1984 – 16 December 1989	Trichet 1 November 2003 – 31 October 2011	Greenspan 11 August 1987 – 31 January 2006
Mieno 17 December 1989 – 16 December 1994	Draghi 1 November 2011 – 31 October 2019	Bernanke 1 February 2006 – 31 January 2014
Matsushita 17 December 1994 – 20 March 1998	Lagarde 1 November 2019 – present	Yellen 3 February 2014 – 3 February 2018
Hayami 20 March 1998 – 19 March 2003		Powell 5 February 2018 – present
Fukui 20 March 2003 – 19 March 2008		
Shirakawa 9 April 2008 – 19 March 2013		
Kuroda 20 March 2013 - present		

### G. BOJ GOVERNOR SPEECHES DATA<sup>21</sup>

<i>Year</i>	<i>Number</i>	<i>Governor</i> <sup>22</sup>	<i>Global</i> <sup>23</sup>	<i>Academic</i>	<i>Private</i>	<i>Government</i>	<i>Not for Profit</i>	<i>Other</i>
1996	3	3	0	2	1	0	0	0
1997	4	4	0	2	0	0	1	0
1998	4	2	2	1	2	1	0	0
1999	11	3	3	3	3	3	1	0
2000	10	4	3	3	4	2	0	0
2001	9	0	1	4	5	0	0	0
2002	10	3	1	2	3	5	0	0
2003	18	7	0	4	9	4	1	0
2004	9	5	0	1	6	1	1	0
2005	13	7	2	3	8	1	0	0
2006	18	8	1	6	12	0	0	0
2007	17	6	4	7	10	0	1	0
2008	21	8	1	3	18	0	0	0
2009	30	15	4	5	22	1	1	0
2010	31	12	4	9	21	0	1	0
2011	33	13	8	13	20	0	0	0
2012	37	16	11	17	18	2	0	0
2013	41	15	8	13	25	1	0	1
2014	47	17	15	18	27	0	2	0
2015	38	14	11	11	26	0	0	1
2016	31	13	7	8	21	1	1	0
2017	31	11	10	8	21	2	0	0
2018	21	5	2	3	18	0	0	0
2019 <sup>24</sup>	16	4	0	3	13	0	0	0

### H. TOPICS OF BOJ GOVERNOR'S SPEECHES<sup>25</sup>

<i>YEAR</i>	<i>TOPIC key</i>
1996	GMP, Financial Globalization
1997	GMP, MPR
1998	GMP
1999	GMP, G, Globalization
2000	MPS, EC, GMP

<sup>21</sup> Calculated from information at <https://www.boj.or.jp/en/announcements/press/index.htm/>. Academics include Universities, think tanks, academic conferences, central bank conferences. Private includes professional associations, chambers of commerce, boards of trade. Government includes government fora and sponsored events. Other includes museums, public fora. The selection criteria follow Siklos, St. Amand and Wajda (2018), available from <https://www.cigionline.org/publications/evolving-scope-and-content-central-bank-speeches>.

<sup>22</sup> Of which speeches given by the Governor.

<sup>23</sup> Refers to audience.

<sup>24</sup> Until 30 September 2019.

<sup>25</sup> See note 14 for data source and methodological source for the classification of topics.

2001	GMP
2002	G
2003	G, GMP
2004	G, GMP
2005	G, GMP
2006	MPS, GMP
2007	GMP, MPR, Globalization
2008	GMP, M, GFC
2009	GFC, M, UMP, BS, R
2010	GMP, M, G, JB, ER
2011	G, GI, M, E, JB, GMP, AP
2012	G, D, GFC, F, GMP, PS
2013	M, G, QQE, D, GMP
2014	D, QQE, PS, UMP, G, GMP
2015	PS, QQE, M, E, UMP, GMP, MPru
2016	ZLB, QQE, D, PS, EX, A, UMP, GMP, G, GFC
2017	QQE, YCC, G, EX, GMP
2018	GMP
2019	GMP, D

Note: see below for the key to the abbreviations above.



<b><i>KEY</i></b>	<b><i>TOPIC</i></b>
GMP	General monetary policy, recent, current, outlook
MPR	Monetary policy regime
MPS	Monetary policy strategy
G	General: not monetary policy specific
EC	Economic Challenges
M	Macroeconomic theory and policy
GFC	Global financial crisis
UMP	Unconventional monetary policy
BS	Balance sheet
R	Reforms (finance)
JB	Japan's bubble
RE	Economic recovery
GI	Global imbalances
E	Earthquake
AP	Aging population (demographics)
D	Deflation
F	Fiscal issues
PS	Price stability
EX	Expectations (usually inflation)
MPru	Macroprudential issues
A	Anchoring (inflation expectations)
YCC	Yield curve control

## APPENDIX (cont'd)– Forecast Data: Definition and Sources

### A. Private Sector, Governmental or International Institutions, including surveys

Economy	Forecast (Frequency <sup>1</sup> )	Horizons <sup>2</sup> RELEASE DATE	START	Forecast (Frequency) <sup>26</sup>	Horizons <sup>2</sup>	START
<b>EURO AREA (EUR)</b>	<i>1.The Economist (M)</i> <sup>27</sup>	cy, 1y	1998.11	<u>5.SPF<sup>3</sup> (Q)</u>	cy, 1y, 2y, 5y	1999.1
	<i>2.Consensus (M)</i>	cy, 1y	1989.10	<u>6.EC Consumer &amp; Business (M)</u>	ya-balance <sup>4</sup>	1985.01
	<b>3.OECD (SA)</b>	cy, ya	1990S1	<u>Survey (M)</u> <sup>28</sup> X2		
	<b>4. World Economic Outlook (SA)</b>	cy, ya	1993S1	<u>7.ZEW (M)</u>	ya-bins <sup>5</sup>	1991.12
<b>JAPAN (JPN)</b>	<i>1.The Economist (M)</i>	cy, 1y	<b>1990.08</b>	<u>5.ZEW (M)</u>	ya-bins	1991.12
	<i>2.Consensus (M)</i>	cy, 1y	1989.10	<u>6.BoJ Survey(Q)</u> <u>X2</u>	ya, 5y-bins	2001.2 (2004.2/5y)
	<b>3.World Economic Outlook (SA)</b>	cy, 1y cy, ya	<b>1993S1</b>	<u>7.TANKAN (Q)</u>	forecasted change in	1985.1 1971 (Q),
	<b>4.OECD (SA)</b>	cy, ya	1990S1	<u>8.Japan Centre for Economic Research (M)</u> <sup>29</sup>	output prices – All Ind. <sup>30</sup>	2004.06 (M)

<sup>26</sup> Survey data are underlined, private sector forecasts in italics, government or public/international agencies forecasts in bold.

<sup>27</sup> Discontinued publication in November 2018.

<sup>28</sup> Two separate surveys are conducted. Hence, the variable consists of two time series. They are: Economic sentiment indicator: price trends over the past and next 12 months; business survey expectations of selling prices in the months ahead (3 months past and ahead).

<sup>29</sup> Previously the Economic Planning Agency expectations data. The EPA was dissolved in 2012. Also referred to as ESP forecasts.

<sup>30</sup> Beginning 2014Q1 the TANKAN survey now includes a series entitled “Inflation Outlook of Enterprises – All industries”. This series is also collected. It is referred to as summary of “inflation Outlook for Enterprises”.

<b>UNITED STATES (USA)</b>				<b>9. Cabinet Office – Price Expectations (M)</b> <sup>31</sup>	ya	2004.04
	<b>1. The Economist (M)</b>	cy, 1y	1990.08	<b>6. SPF<sup>3</sup> (Q)</b>	cq, qb, cy, ya, 5yr, 10y	1981.3 (1991.4 for 10y)
	<b>2. Consensus (M)</b>	cy, 1y	1989.11 1990.31			
	<b>3. World Economic Outlook (SA)</b>	cy, ya	1993S1	<b>7. Michigan Survey (M)</b> <sup>33</sup>	ya median/mean	1978.1
	<b>4. OECD (SA)</b>		1990S1	<b>8. Livingston Survey (SA)</b>	cm, cy, 6m, 12m, 1y, 2y, 10y	1988S1
	<b>5. Wall Street Journal (SA/M)</b> <sup>32</sup>	cy, ya	2001.08	<b>9. ZEW (M)</b>	ya-bins	1991.12
				<b>10. Cleveland Fed (M)</b> <sup>34</sup>	1ya, 2ya	1982.01
	<b>11. Congressional Budget Office (SA)</b>	ya, 2y	2005.1			
	<b>12. Atlanta Fed (M)</b> <sup>35</sup>	ya	2011.10			

#### Additional notes to part A:

1. M, Q, SA are monthly, quarterly and semi-annual, respectively.
2. cy, 1y, ya, represent mean current year and one year ahead and year ahead, respectively. There is little substantive difference between 1y and ya other than different source use different language to refer to forecasts that pertain to the year following the publication of the forecast. In some cases, however, the forecast can refer to the calendar year ahead, or

<sup>31</sup> Consumer confidence survey, price expectations, one-year ahead.

<sup>32</sup> Originally semi-annual and becomes monthly in 2009. Interpolation is used to fill in missing data.

<sup>33</sup> Used to be released in bins but now converted to annual rates of change.

<sup>34</sup> Up to 30 years ahead using Treasury bill, inflation, inflation swaps, and survey-based inflation expectations measures.

<sup>35</sup> Business inflation expectations survey.

to a forecast for a calendar year ahead from the time of publication, in which case the forecast horizon may overlap the current and following calendar year. #m, #q, or #y refer to forecasts # months, quarters or years ahead.

3. Survey of Professional Forecasters.
4. Balance refers to the horizon stated applicable to the remainder (i.e., balance) of the year. Bins refers to the fact that forecasts are arranged in the form of a distribution of responses.

## B. Central Bank Forecasts

Economy	Frequency/AUTHOR	Horizons	START
EUROZONE (EUR)	Quarterly/ECB	One year ahead	2000
JAPAN (JPN)	Semi-Annual <sup>36</sup> /MPC	Current and 1 year ahead	2000
UNITED STATES (USA)	Semi-Annual/FOMC Greenbook	Current and up to 2 years ahead and “longer run” Up to 9 quarters ahead <sup>37</sup>	2000 1965

<sup>36</sup> Quarterly since 2016. Some interpolation required for missing data for the year 2000-2003.

<sup>37</sup> Data end on 2013Q4 at the time of writing. There are 8 meetings of the FOMC per year. This means that up to 3 quarterly forecasts are published in some quarters while only one forecast is available for some quarters. The first estimate in each quarter is used throughout.

### C. Sources for Forecasts and Surveys

Economy	Source(s)
EURO AREA	<a href="http://www.consensuseconomics.com/">http://www.consensuseconomics.com/</a> <a href="http://www.economist.com/">http://www.economist.com/</a> <sup>2</sup> <a href="http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm">http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm</a> <a href="http://www.ecb.int/stats/prices/indic/forecast/html/index.en.html">http://www.ecb.int/stats/prices/indic/forecast/html/index.en.html</a> <a href="http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html">http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html</a> <a href="http://www.zew.de/de/publikationen/finanzmarktreportarchiv.php3?year=2010">http://www.zew.de/de/publikationen/finanzmarktreportarchiv.php3?year=2010</a>
JAPAN	<a href="http://www.consensuseconomics.com/">http://www.consensuseconomics.com/</a> <a href="http://www.economist.com/">http://www.economist.com/</a> <a href="http://www.imf.org/external/ns/cs.aspx?id=29">http://www.imf.org/external/ns/cs.aspx?id=29</a> <a href="http://www.zew.de/en/daszew/daszew.php3">http://www.zew.de/en/daszew/daszew.php3</a> <a href="http://www.boj.or.jp/en/">http://www.boj.or.jp/en/</a> TANKAN Survey (INPUT and OUTPUT prices) <a href="http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html">http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html</a> <a href="http://www.zew.de/de/publikationen/finanzmarktreportarchiv.php3?year=2010">http://www.zew.de/de/publikationen/finanzmarktreportarchiv.php3?year=2010</a> <a href="http://www.cao.go.jp/index-e.html">http://www.cao.go.jp/index-e.html</a> <a href="http://www.epa.or.jp/esp/fcste.html">http://www.epa.or.jp/esp/fcste.html</a>
UNITED STATES	<a href="http://www.consensuseconomics.com/">http://www.consensuseconomics.com/</a>

<http://www.economist.com/>

<http://www.imf.org/external/ns/cs.aspx?id=29>

<http://www.philadelphiafed.org/research-and-data/real-time-center/>

<https://data.sca.isr.umich.edu/tables.php>

[http://www.oecd.org/document/59/0,3343,en\\_2649\\_34109\\_42234619\\_1\\_1\\_1\\_37443,00.html](http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html)

<http://online.wsj.com/home-page>

<http://www.zew.de/de/publikationen/finanzmarktreportarchiv.php3?year=2010>

<https://www.clevelandfed.org/en/our-research/indicators-and-data/inflation-expectations.aspx>

[http://online.wsj.com/public/page/economic-forecasting.html#mod=mdc\\_h\\_econhl](http://online.wsj.com/public/page/economic-forecasting.html#mod=mdc_h_econhl)

<https://www.frbatlanta.org/research/inflationproject/bie>

<https://www.cbo.gov/taxonomy/term/1583/recurring-reports>

**Additional notes to Part C:**

1. For year ahead forecasts the data for January-February for each year until 2007 were added by interpolating the forecasts for the available adjacent months. This was necessary because the forecasts are for the calendar year (current or one year ahead) published each month and the table published omitted these two months.
2. For the euro area forecasts are for EUR 11 countries until 2000 December, thereafter EUR forecasts. **The same calculation applies to the Consensus forecasts.**
3. For Germany the forecasts are for greater or consolidated Germany beginning in November 1995.



## E . Descriptors Used for Forecasts in Tables & Figures

Forecast Name	Code
<i>The Economist</i>	ECON
Consensus	CONS
European Commission Consumer Survey	ECCS
European Commission Business Survey	ECBS
European Central Bank	ECB
World Economic Outlook	WEO
Center for European Economic Research	ZEW
Tankan (Japan)	TAN
Greenbook, US Federal Reserve	GREEN
Federal Open Market Committee (US)	FOMC
Livingston Survey (US)	LIV
Survey of Professional Forecasters (US, euro area)	SPF
University of Michigan Survey (US) - mean	MICH
Bank of Japan	BOJ
Bank of Japan Monetary Policy Committee	PBOJMAJ (Majority of Committee) PBOJALL (Entire Committee)
Bank of Canada Global	BOCg
Organization for Economic Cooperation and Development	OECD
Infitted	Regression method conversion
Infitted1	Probability approach conversion

### **Miscellaneous additional notes to the Data:**

Data from the Economist are from individual banks or financial institutions. The representative forecasters change over time. Forecasts for January each year are for the previous calendar year due to lags in the release of final calendar year inflation rates.

The Wall Street Journal forecasts (USA) are released as part of their Economic Forecasting Survey of a large number of forecasters.

The ZEW Survey is released early each month and represents the previous month's forecast/expectation.

JCER and BoJ forecast data (JAP) are based on the fiscal year (1 April – 31 March).

U Michigan Survey data have now been converted to annualized inflation rates. Previously, a weighted average was used depending on the fraction of respondents in each bin ranging from don't know to 15% or more inflation.

Bank of Canada forecasts are released in their MPR in January (Q1), April (Q2), July (Q3), and October (Q4).

ECB Euro area projections were released in the Monthly Bulletin. This was replaced by the Economic Bulletin in 2015. Forecasts are released in March (Q1), June (Q2), September (Q3), and December (Q4).

Bank of Japan inflation forecasts are for CPI less fresh food and, beginning in 2015, less fresh food and the effect of consumption tax hikes.

FOMC forecasts are from the MPR to Congress Summary of Economic Projections and are for the PCE index. These are released ordinarily in February and July of each year.

OECD forecast are semi-annual and ordinarily released in January and June though dates have changed slightly over time.

WEO forecasts are semi-annual and are ordinarily released in April and October although there have occasionally been small variations in the month of the release.