

## Appendix

<b>Table A.1</b>				
<b>Summary of Data and Data Sources</b>				
Economy	Gross Domestic Product	Inflation	Unemployment	Capacity
United States	Quarterly, real, SAGDPC1 FRED	Quarterly, SA JCXFE FRED	Monthly, SA UNRATE FRED	Monthly, SA TCU FRED
AU	Quarterly, real, SA OECD LNBRQSA (ABS)	Quarterly, SA OECD	Monthly, SA GLFSURSA, ABS	Monthly, SA National bank survey NAB Data
CA	Quarterly, real SA OECD VOBARSA	CPI, CPI Core Monthly (SA, NSA) StatCan	Monthly, SA OECD MEI	Quarterly, SA StatCan (NAICS) Series Code 029-002
DEU	Quarterly, Real, SA OECD LBRQRS	CPI, CPI Core Monthly (SA, NSA) OECD MEI	Monthly, SA OECD MEI	Quarterly, SA OECD MEI
FRA	Quarterly, real, SA OECD LBRQRS	CPI, CPI Core Monthly (SA, NSA) OECD MEI	Monthly, SA OECD MEI	Quarterly, SA OECD MEI
IT	Quarterly, real, SA OECD VOBARSA	CPI, CPI Core Monthly (SA, NSA) OECD MEI	Monthly, SA OECD MEI	Quarterly, SA OECD MEI
JP	Quarterly, Real, NSA Cabinet Office	CPI, CPI Core Monthly, NSA OECD MEI	Monthly, SA Cabinet Office	Quarterly, SA Japan Ministry of Economy
KR	Quarterly, Real, SA OECD VOBARSA	CPI, CPI Core (NSA, SA) OECD MEI	Monthly, SA OECD MEI	Quarterly, SA KOSTAT
NZ	Quarterly, Real, SA OECD VOBARSA	CPI, CPI core NSA, SA	Monthly, SA OECD MEI	Quarterly, SA OECD MEI
UK	Quarterly, Real, SA OECD VOBARSA	CPI, CPI Core, SA OECD MEI	Monthly, SA OECD MEI	Quarterly, SA Office of National Statistics (Business Tendency Survey)

Notes: All monthly series were converted to quarterly frequency using arithmetic averages. The series that were not seasonally adjusted by the source were seasonally adjusted using the X12 filter. To facilitate comparison with previous studies, we had a preference for OECD VOBARSA GDP series, except when an alternative measure was available for a much longer sample. In all cases when we used a series other than the VOBARSA measure, the correlation with the VOBARSA measure for the overlapping sample periods was above 0.97. Similarly, we had a preference for the OECD Main Economic Indicator (MEI) harmonized unemployment rate, except when an alternative measure was available for a much longer sample. In the case of the US, the FRED series match the preferred OECD measures.

<b>Table A.2</b>		
<b>Structural Break Tests</b>		
Economy	Number of breaks	Break Dates (Test Statistics and significance level)
US	1 (2)	2000Q3 (19.10***)      1973Q1 (6.88) <i>p</i> -value =0.13
Australia	0	-
Canada	1	1974Q2 (20.278***)
France	1	1974Q2 (65.82***)
Germany	1 (2)	1973Q2 (15.871***)      1991Q2 (4.95) <i>p</i> -value=0.11
Italy	1	1974Q1 (48.127***)
Japan	2	1973Q2 (131.695***)      1991Q3 (19.87***)
Korea	1	1997Q3 (26.07***)
New Zealand	0	-
UK	0 (1)	1973Q1 (6.07) <i>p</i> -value=0.15

Notes: The table reports the results of the Bai-Perron (1998, 2003) sequential test. We consider trimming of 15% of the sample from its end points and between breaks for admissible break dates. The table reports the number of breaks, the estimated break date, and the test statistic with the significance level (three stars corresponds to significance at the 1% level, two stars corresponds to significance at the 5% level, and one star corresponds to significance at the 10% level). In the cases when the Bai-Perron test selected a smaller number of breaks than the number of breaks commonly imposed in the literature, we list the maximum number of breaks we considered in parentheses and the *p*-value for the additional break date below the test statistic.

**Table A.3**  
**Tests for Markov Switching**

	Null	Alternatives		
		L-shaped	U-shaped	Depth
United States	AR(2)	0.151 (0.409) 1.213	2.516 (0.166) 4.272	8.401 (0.055) 9.243
	AR(2)-t	0.307 (0.164) 0.721	1.373 (0.161) 2.797	9.554 (0.035) 9.022
Australia	AR(2)	0.880 (0.116) 1.833	0.197 (0.688) 3.270	14.826 (0.005) 9.218
	AR(2)-t	0.637 (0.070) 0.904	0.020 0.999 2.814	10.686 (0.045) 9.195
Canada	AR(2)	0.003 (0.989) 0.932	1.914 0.221 3.516	24.122 (0.000) 9.224
	AR(2)-t	0.003 (0.689) 0.932	1.914 (0.221) 3.516	17.825 (0.000) 9.575
Germany	AR(2)	0.974 (0.210) 1.109	3.688 (0.030) 3.376	59.000 (0.000) 8.846
	AR(2)-t	0.030 (0.437) 0.885	6.250 (0.000) 2.2886	108.344 (0.000) 10.756
France	AR(2)	0.001 (1.000) 1.223	1.220 (0.432) 3.915	2.803 (0.825) 27.829
	AR(2)-t	0.000 (1.000) 1.507	0.673 (0.236) 2.458	50.794 (0.000) 9.826
Italy	AR(2)	1.962 (0.035) 1.736	1.065 (0.452) 4.641	1.827 (0.800) 10.903
	AR(2)-t	0.057 (0.462) 1.356	1.171 (0.201) 2.255	0.473 (0.960) 10.732
Japan	AR(2)	0.492 (0.146) 1.353	2.752 (0.121) 4.177	36.310 (0.081) 54.323
	AR(2)-t	3.774 0.000 1.315	2.527 (0.040) 2.397	15.378 (0.011) 10.137
Korea	AR(2)	0.027 (0.389) 1.172	0.369 (0.382) 2.251	17.964 (0.290) 27.062
	AR(2)-t	0.026 (0.527) 1.449	0.0940 (0.537) 3.896	2.079 (0.825) 11.332
New Zealand	AR(2)	1.231 (0.085) 1.458	0.138 (0.758) 4.036	6.198 (0.265) 11.115
	AR(2)-t	1.235 (0.030) 0.917	0.206 (0.462) 2.157	2.974 (0.570) 10.055
United Kingdom	AR(2)	0.001 (1.000) 1.158	2.969 (0.075) 3.399	16.000 (0.002) 9.914
	AR(2)-t	0.001 (1.000) 0.993	0.065 (0.708) 2.440	6.592 (0.260) 11.464

Notes: The test statistics for the L-shaped and U-shaped Recessions are based on Carrasco et al. (2014). The test statistics for the depth-based recovery alternatives are based on estimation using a grid for the continuous probabilities. All  $p$ -values (reported in parentheses) and 5% critical values (reported below  $p$ -values) are based on parametric bootstrap experiments with 499 simulations. All tests accounted for structural breaks in the long-run growth rate.

**Table A.4**  
**Unit Root and Stationarity Tests**

	Adjustment for structural breaks	Test				
		ADF (asymptotic <i>p</i> -value)	DF ERS*	LMC (bootstrapped <i>p</i> -value)	KPSS (bootstrapped <i>p</i> -value)	MPS (bootstrapped <i>p</i> -value)
US	1973Q1, 2000Q3	-3.201 (0.085)	8.903	0.085 (0.362)	0.163 (0.182)	1.634 (0.065)
AU	None	-1.834 (0.363)	3.209	2.088 (0.330)	0.211 (0.545)	10.876 (0.015)
CA	1974Q2	-2.289 (0.438)	2.404	3.411 (0.010)	0.378 (0.116)	3.698 (0.201)
FRA	1974Q2	-1.585 (0.796)	2.575	1.897 (0.377)	0.186 (0.683)	7.835 (0.000)
DEU	1973Q1, 1991Q2	-2.696 (0.239)	2.889	2.564 (0.025)	0.274 (0.055)	12.440 (0.000)
IT	1974Q1	0.525 (0.993)	2.686	1.502 (0.151)	0.318 (0.729)	3.080 (0.101)
JP	1973Q1, 1991Q3	-3.147 (0.098)	2.461	0.063 (0.603)	0.152 (0.357)	0.030 (0.537)
KR	1997Q3	-3.055 (0.120)	3.078	0.071 (0.839)	0.574 (0.386)	0.430 (0.307)
NZ	None	-2.618 (0.273)	4.072	1.573 (0.261)	0.182 (0.407)	6.432 (0.100)
UK	1973Q2	-2.448 (0.353)	2.981	1.225 (0.256)	0.139 (0.708)	12.294 (0.005)

Notes: The 5% asymptotic critical value for the DF-ERS unit root tests is -1.941. We also performed unit root and stationarity tests that allowed for structural breaks in the variance and unit root tests that did not allow for structural breaks in the long-term drift. The results for the different specifications that allow for breaks in the variance and specifications that do not allow for structural breaks in means are available upon request. Allowing for structural breaks in the variance did not alter the *p*-values of any of the tests substantially.

**Table A.5**  
**Prior Distributions for Model Parameters**

	Parameter Description	Model(s)	Prior
$\mu$	Unconditional mean growth	All except UC-HP and BB	$N(1,3^2)$
$\gamma_0$	Growth in expansion regime	BB	$N(2.5,3^2)$
$-\gamma_1$	Impact of other regime	BB	$Gamma(\frac{15}{2}, \frac{5}{2})$
$\lambda$	Bounceback coefficient	BB	$N(0,0.25^2)$
$-\tau$	Mean of transitory shocks in other regime	UC-FP	$Gamma(\frac{15}{2}, \frac{5}{2})$
$\phi_j$	AR parameter at lag $j$	All except UC-HP	$TN\left(0, \left(\frac{0.25}{j}\right)^2\right)_{[ z >1, \phi(z)=0]}$
$p_{00}$	Expansion regime continuation probability	BB, UC-FP	$Beta(1,20)$
$p_{11}$	Other regime continuation probability	BB, UC-FP	$Beta(5,15)$
$\nu$	Degree of freedom for Student $t$ errors	All except UC	$Gamma(\frac{1}{2}, \frac{0.1}{2})$
$\frac{1}{\sigma_e}, \frac{1}{\sigma_\eta}, \frac{1}{\sigma_\omega}$	Precision for independent shocks	All except UCUR and UCUR-FP	$Gamma\left(\frac{5}{2}, \frac{2}{2}\right)$
$\Sigma_{\eta\omega}^{-1}$	Precision for correlated shocks	UCUR and UCUR-FP	$Wishart(5, 2 \times I_2)$