ModYUK Report: USVER3

November 8, 2010

The Model

```
!variables:transition

    LGDP, LGDP_BAR, Y, G, GROWTH, GROWTH4, GROWTH_BAR, GROWTH4_BAR
    PIELTE, PIE4
    UNR, UNR_BAR, UNR_G, UNR_GAP
    CAPU, CAPU_BAR, CU_G, CAPU_GAP

!shocks:transition

    RES_LGDP_BAR, RES_G, RES_Y
    RES_PIELTE, RES_PIE
    RES_UNR_BAR, RES_UNR_G, RES_UNR_GAP
    RES_CAPU_BAR, RES_CU_G, RES_CAPU_GAP

!parameters

    lab_share, tau, growth_ss, rho1, rho2
    beta, omega
    parhist, lambda, unr_ss, alpha, phi1, phi2
    delta, kappa1, kappa2

!equations:transition

    % Output.
    LGDP = LGDP_BAR + Y;
    LGDP_BAR = LGDP_BAR{-1} + G/4 + RES_LGDP_BAR
        - lab_share*(UNR_BAR - UNR_BAR{-1}) -(1-lab_share)*(UNR_BAR{-1} - UNR_BAR{-20})/19;
    G = (1-tau)*G{-1} + tau*growth_ss + RES_G;
    Y = rho1*Y{-1} - rho2/100*(PIE4{-1} - PIELTE{-1}) + RES_Y;
    GROWTH = 4*(LGDP - LGDP{-1});
    GROWTH4 = LGDP - LGDP{-4};
    GROWTH_BAR = 4*(LGDP_BAR - LGDP_BAR{-1});
    GROWTH4_BAR = LGDP_BAR - LGDP_BAR{-4};

    % Inflation.
    PIELTE = PIELTE{-1} + RES_PIELTE;
    PIE4 = PIE4{-1} + beta*Y + omega*(Y - Y{-1}) + RES_PIE;
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    % Unemployment.
    UNR_GAP = UNR_BAR - UNR;
    UNR_BAR = UNR_BAR{-1} + UNR_G
        - parhist/100*Y{-1} - lambda/100*(UNR_BAR{-1} - unr_ss) + RES_UNR_BAR;
    UNR_G = (1-alpha)*UNR_G{-1} + RES_UNR_G;
    UNR_GAP = phi1*UNR_GAP{-1} + phi2*Y + RES_UNR_GAP;

    % Capacity utilization.
    CAPU = CAPU_BAR + CAPU_GAP;
    CAPU_BAR = CAPU_BAR{-1} + CU_G + RES_CAPU_BAR;
    CU_G = (1 - delta)*CU_G{-1} + RES_CU_G;
    CAPU_GAP = kappa1*CAPU_GAP{-1} + kappa2*Y + RES_CAPU_GAP;

!variables:measurement

    GROWTH_
    PIE4_
    PIE4_PIELTE_
    D_CAPU_
    UNR_

    % These measurement variables are used to impose priors on unobservables.
    GROWTH_BAR_

!shocks:measurement

    RES_GROWTH_BAR_

!equations:measurement

    GROWTH_ = GROWTH;
    PIE4_ = PIE4;
    PIE4_PIELTE_ = PIE4 - PIELTE;
    D_CAPU_ = CAPU - CAPU{-1};
    UNR_ = UNR;

    % These measurement equations are used to impose priors on unobservbles.
    GROWTH_BAR_ = GROWTH_BAR + RES_GROWTH_BAR_;
```
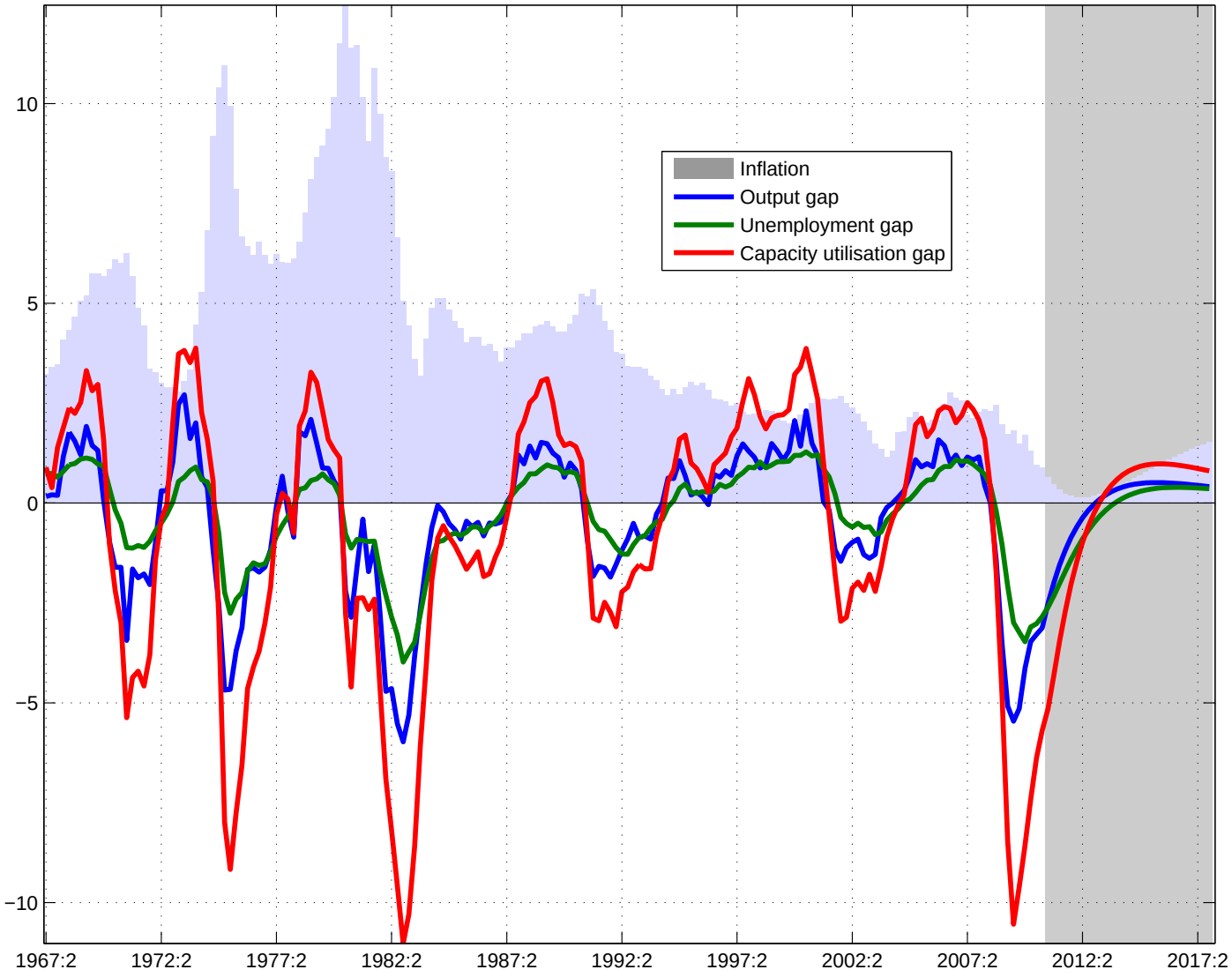
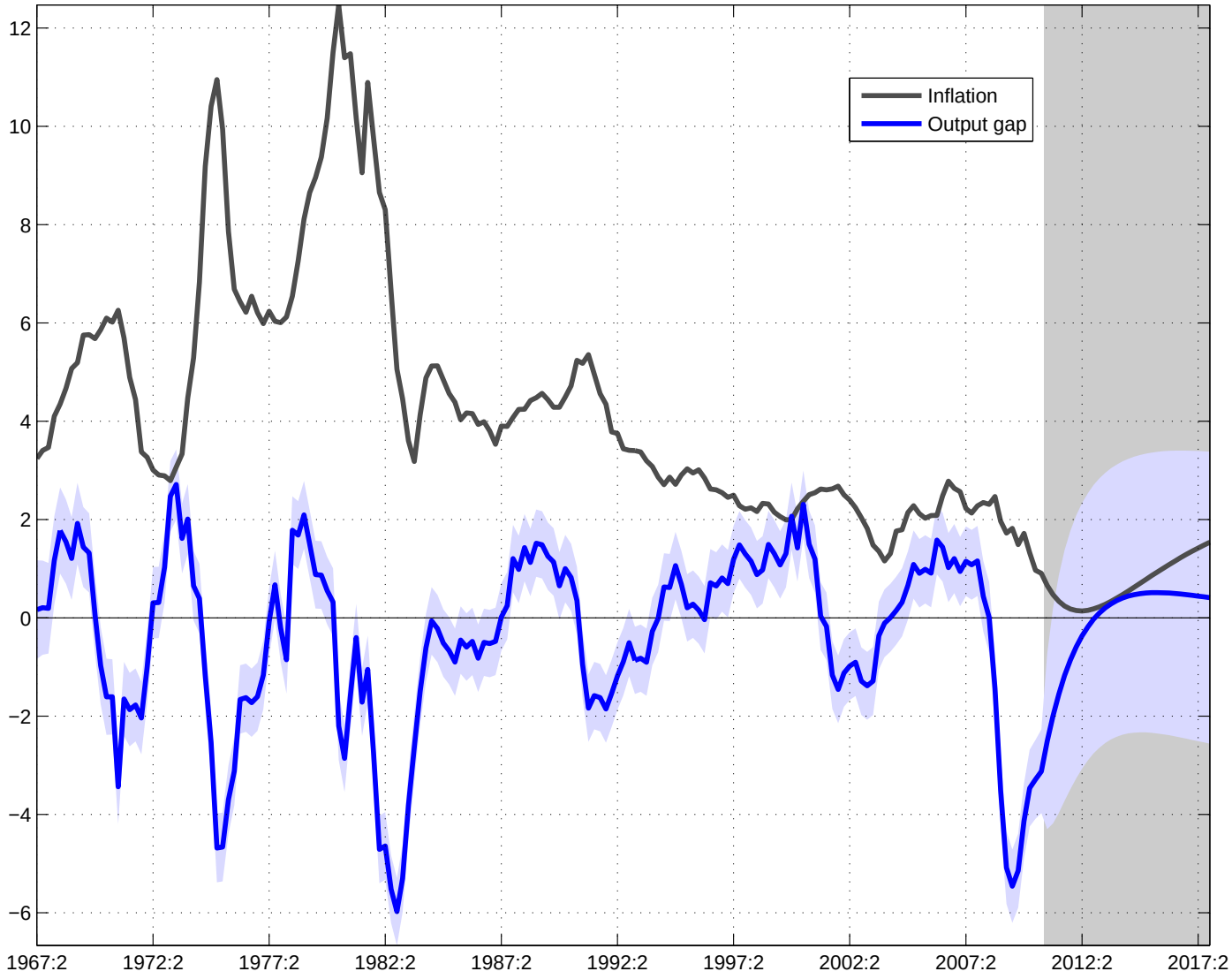
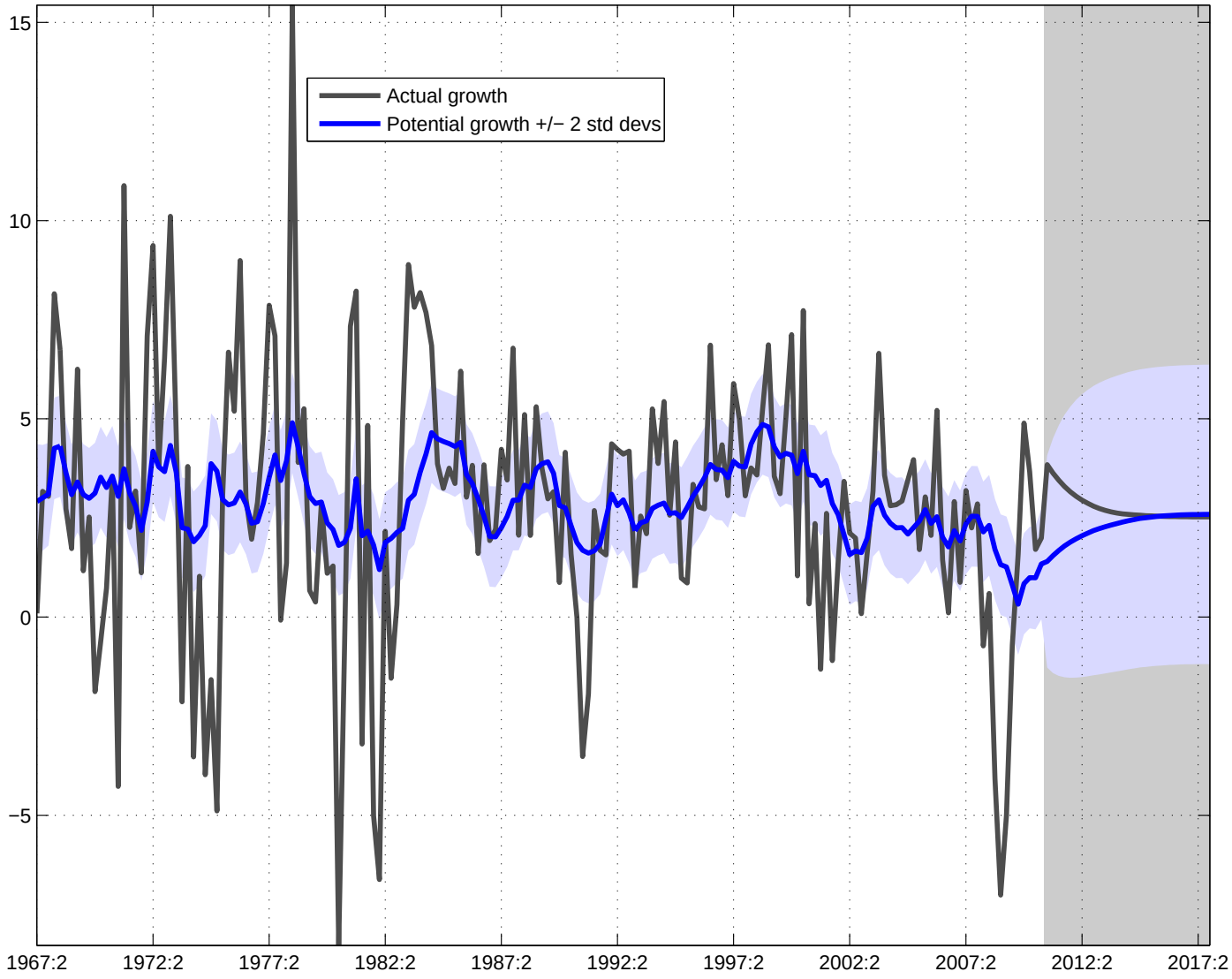

Economic activity gaps



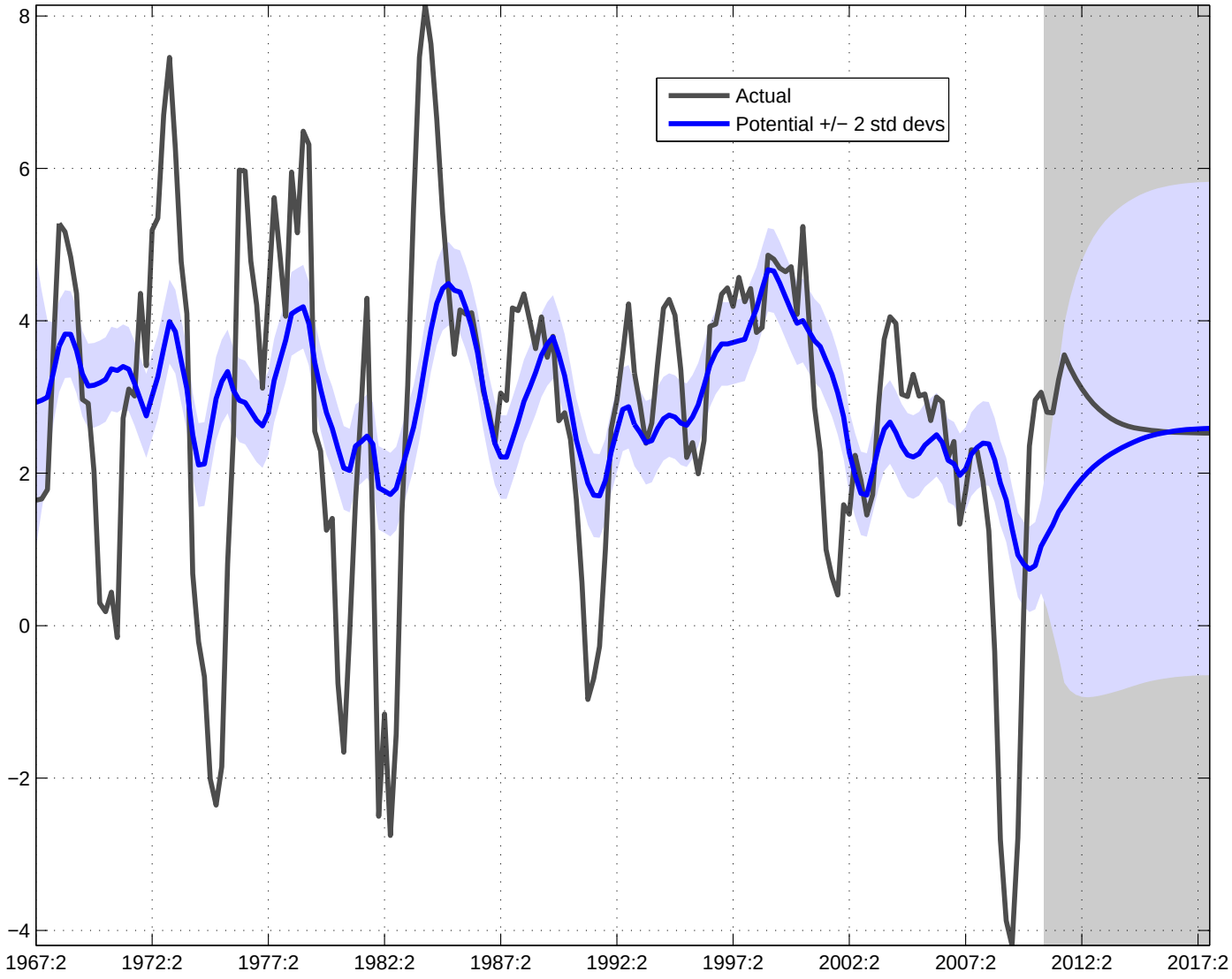
Output Gap +/- 2 std devs (w/o model or parameter uncertainty)



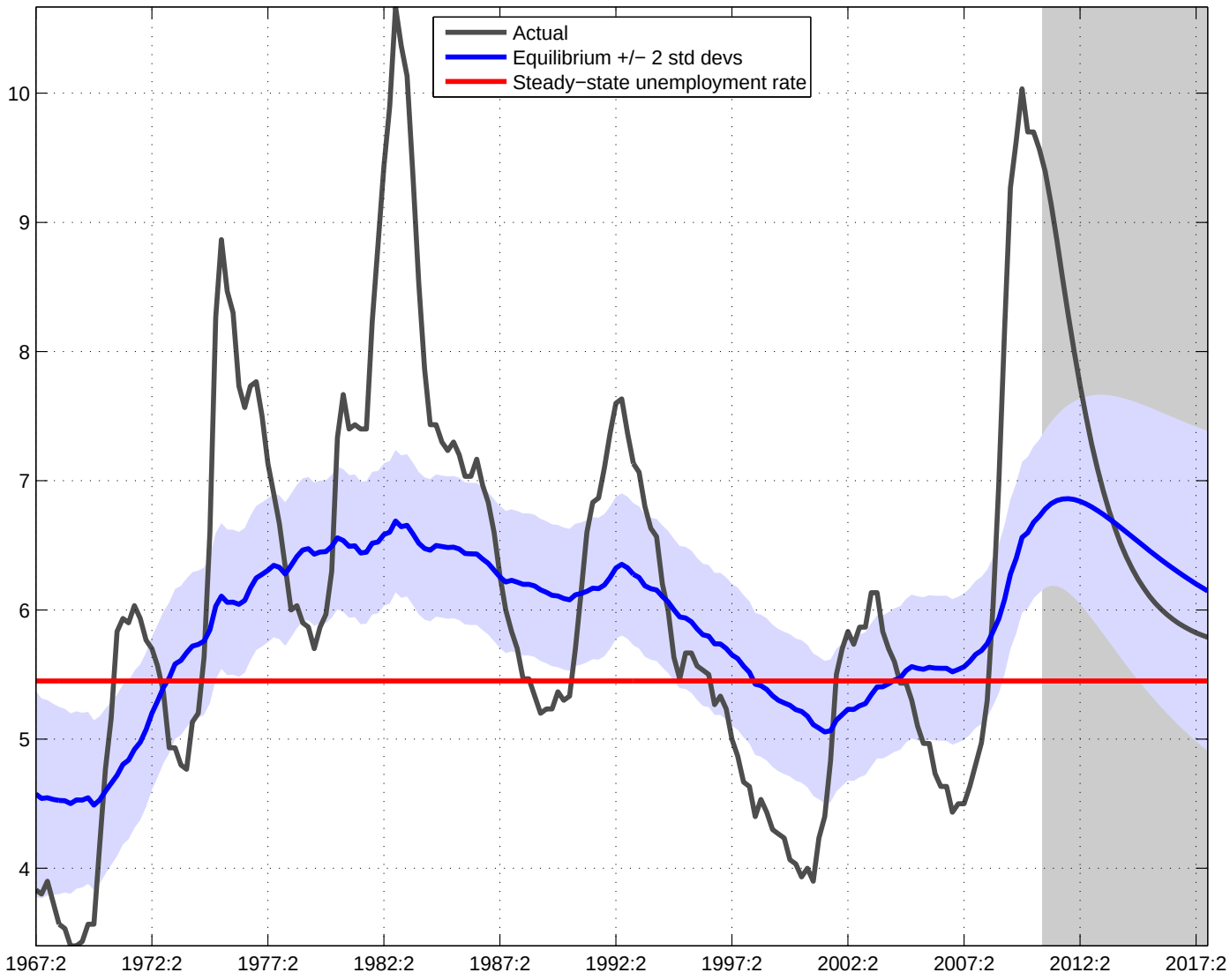
Output Growth (Q/Q Annualized) +/- 2 std devs (w/o model or parameter uncertainty)



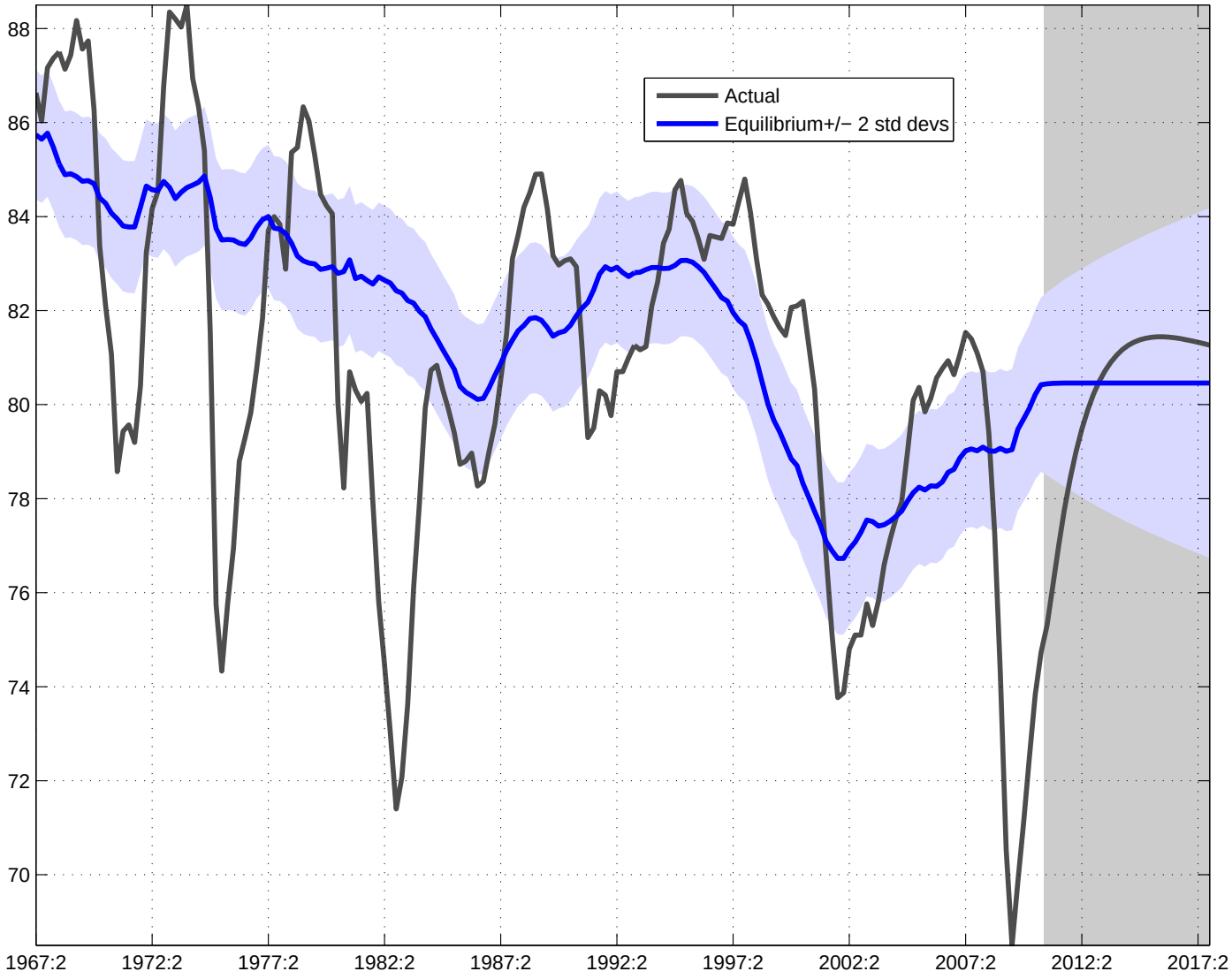
Output Growth (Y/Y) +/- 2 std devs (w/o model or parameter uncertainty)



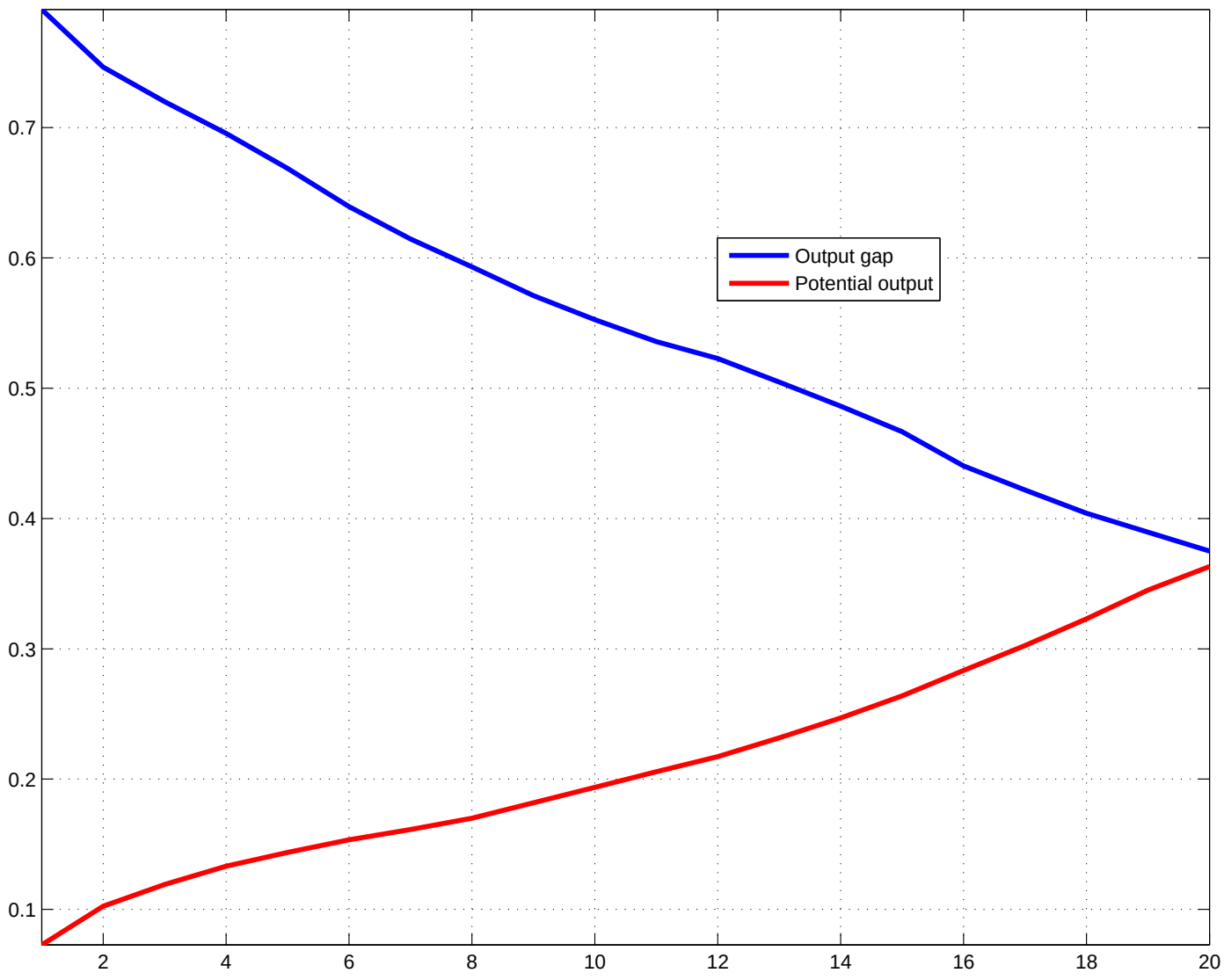
Unemployment Rate



Equilibrium Capacity Utilization +/- 2 std devs (w/o model or parameter uncertainty)



Relative Variances of Potential Growth and Changes in the Output Gap at Different Horizons



Regularized Maximum Likelihood

Parameter	Prior		Posterior	
	Mode	Dispersion	Mode	Dispersion
alpha	0.900	0.158	0.894	0.024
beta	0.400	0.316	0.149	0.022
omega	0.500	0.316	0.213	0.039
rho1	0.800	0.158	0.832	0.020
kappa1	0.100	0.632	0.361	0.035
phi1	0.800	0.158	0.709	0.019
phi2	0.300	0.158	0.236	0.014
tau	0.100	0.158	0.119	0.022
delta	0.500	0.158	0.494	0.024
kappa2	1.500	1.581	1.229	0.062
parhist	3.000	1.581	2.695	0.231
rho2	5.000	3.162	5.135	0.459
lambda	2.000	3.162	2.107	0.448
std_RES_Y	1.000	0.316	0.819	0.041
std_RES_G	1.000	0.316	0.795	0.045
std_RES_UNR_GAP	0.500	0.316	0.190	0.025
std_RES_UNR_BAR	0.100	0.158	0.073	0.020
std_RES_UNR_G	0.100	0.158	0.083	0.019
std_RES_CAPU_GAP	0.400	0.316	0.428	0.036
std_RES_CAPU_BAR	0.250	0.158	0.267	0.023
std_RES_CU_G	0.075	0.032	0.068	0.005
std_RES_PIE	0.500	0.316	0.519	0.030
std_RES_PIELTE	0.300	0.316	0.075	0.008
std_RES_LGDP_BAR	0.250	0.079	0.199	0.011

Calibrated Parameters

Parameter	Value
lab_share	0.700
growth_ss	2.500
unr_ss	5.450
std_RES_GROWTH_BAR_	0.996

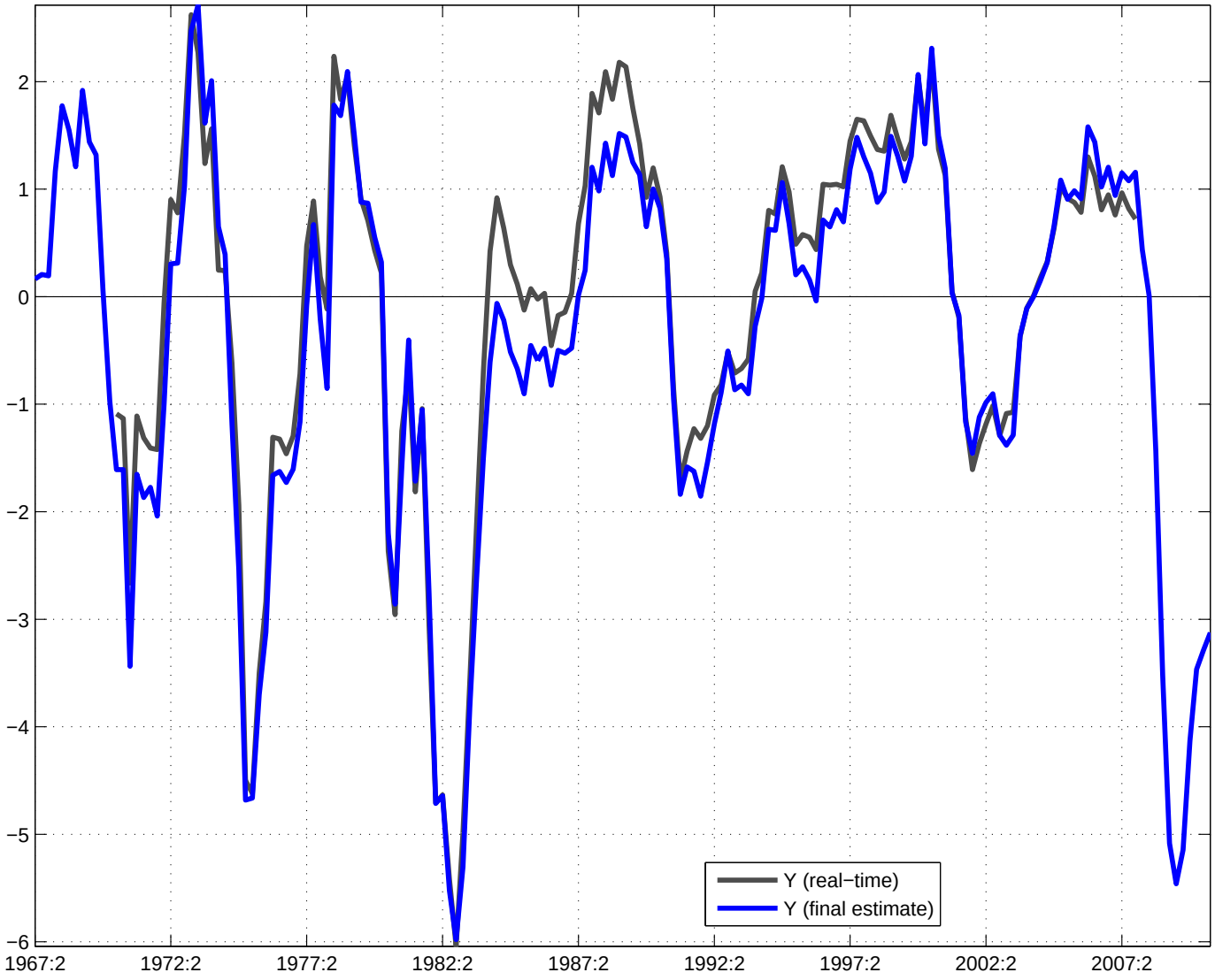
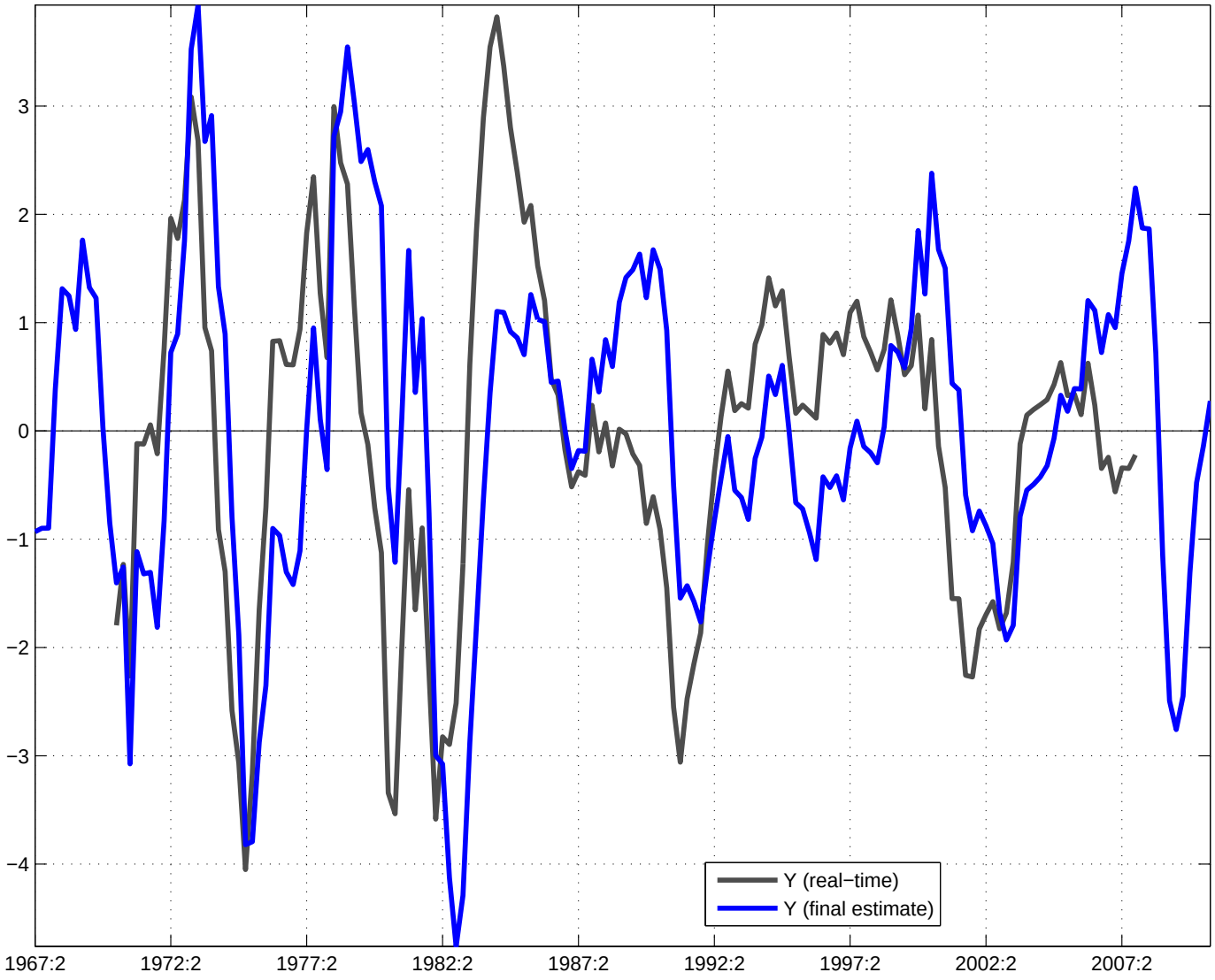
RMSEs

Parameter	1Q Ahead	4Q Ahead	8Q Ahead	12Q Ahead
GROWTH_	3.452	3.329	3.347	3.406
PIE4_	0.504	1.368	1.950	2.331
UNR_	0.284	0.953	1.463	1.583

Mean absolute revisions (according to most recent estimates)

quarter	$t-12$	$t-8$	$t-4$	t (nowcast)
`Y`	0.137	0.160	0.197	0.313
`Y (HP)`	0.172	0.333	0.754	1.250
`UNR_GAP`	0.106	0.122	0.141	0.161
`UNR_GAP (HP)`	0.087	0.176	0.393	0.640

Real-time output gap (MV)



Real-time output gap (HP)