ModYUK Report: USPAPER

January 27, 2011

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_;
```
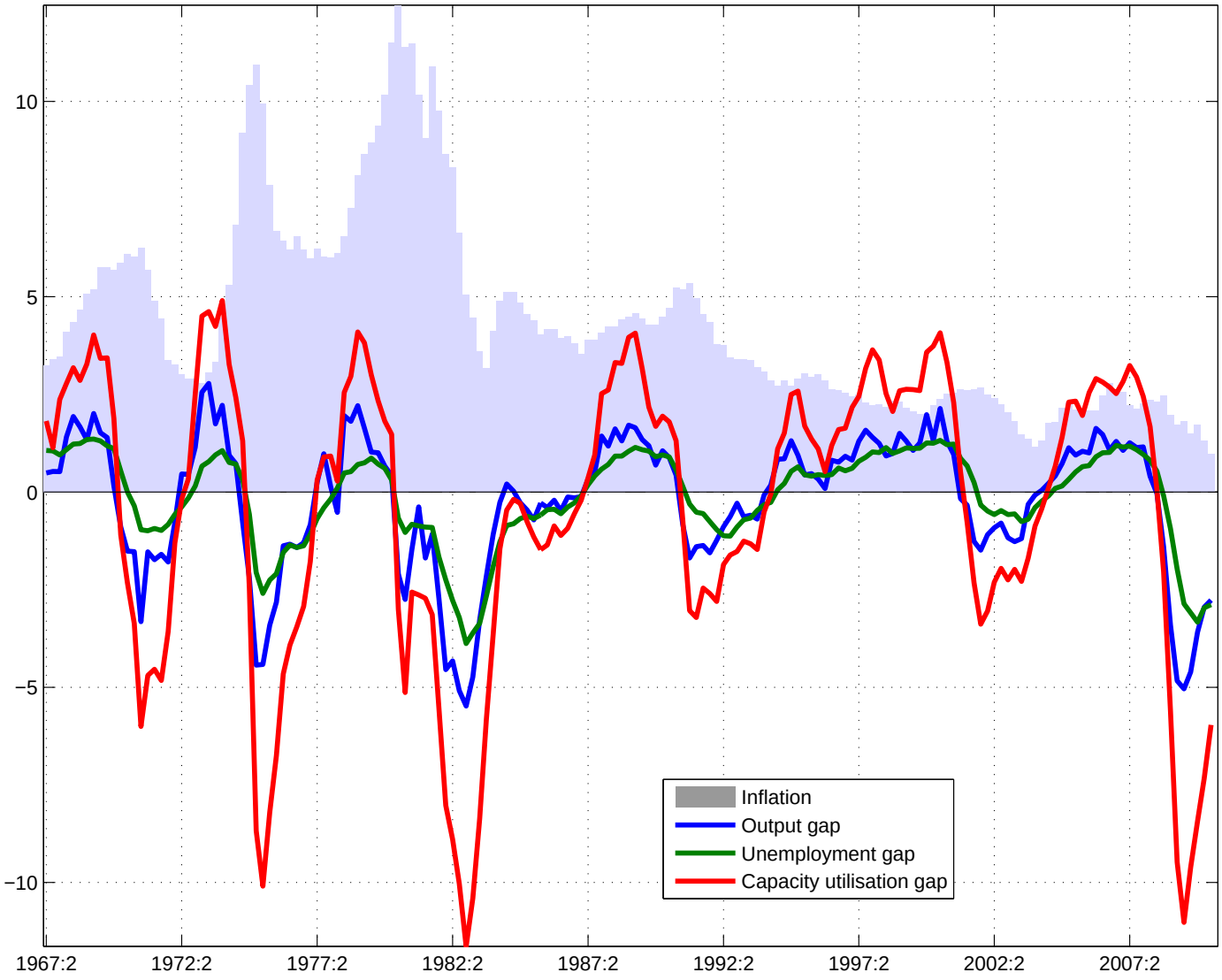
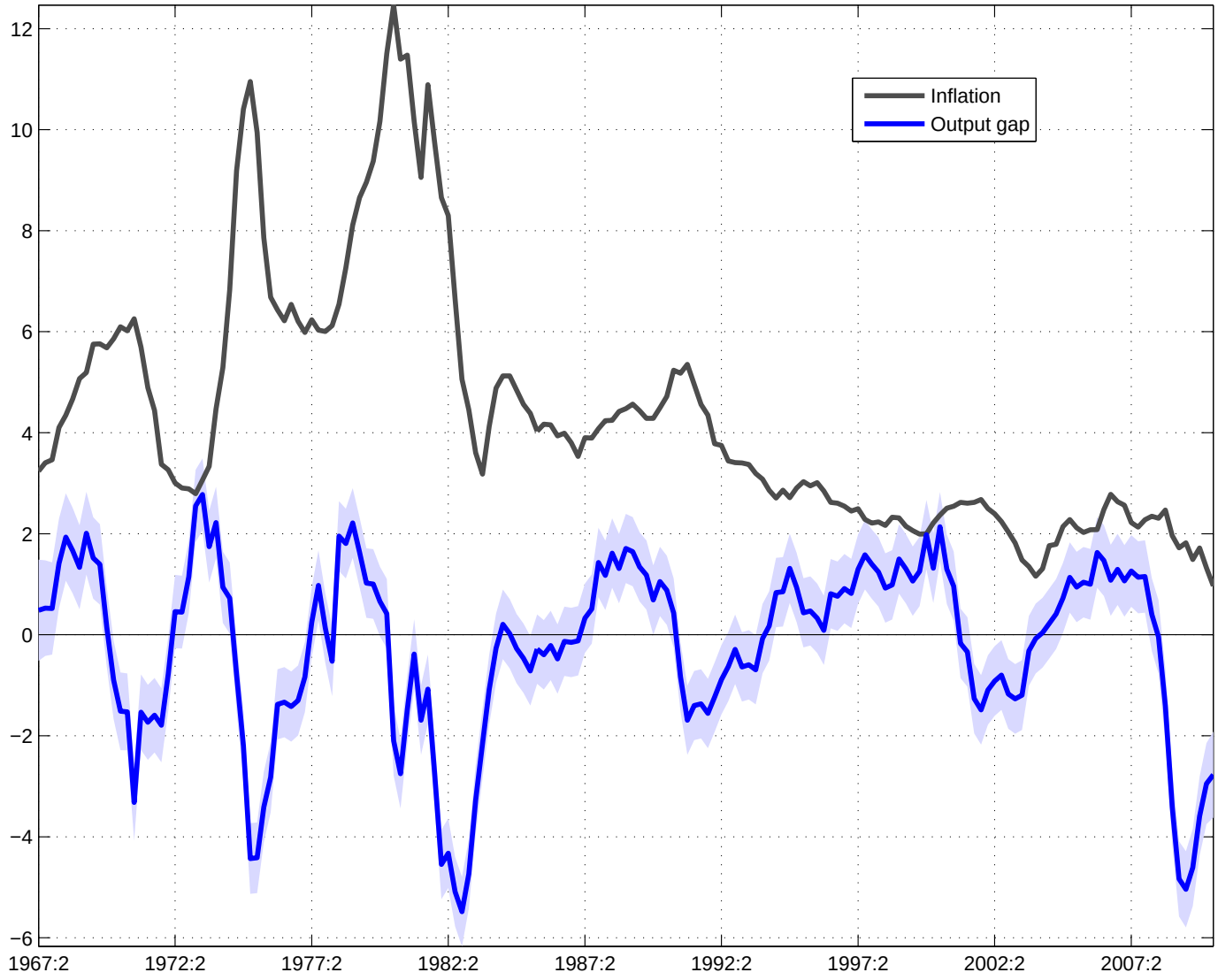
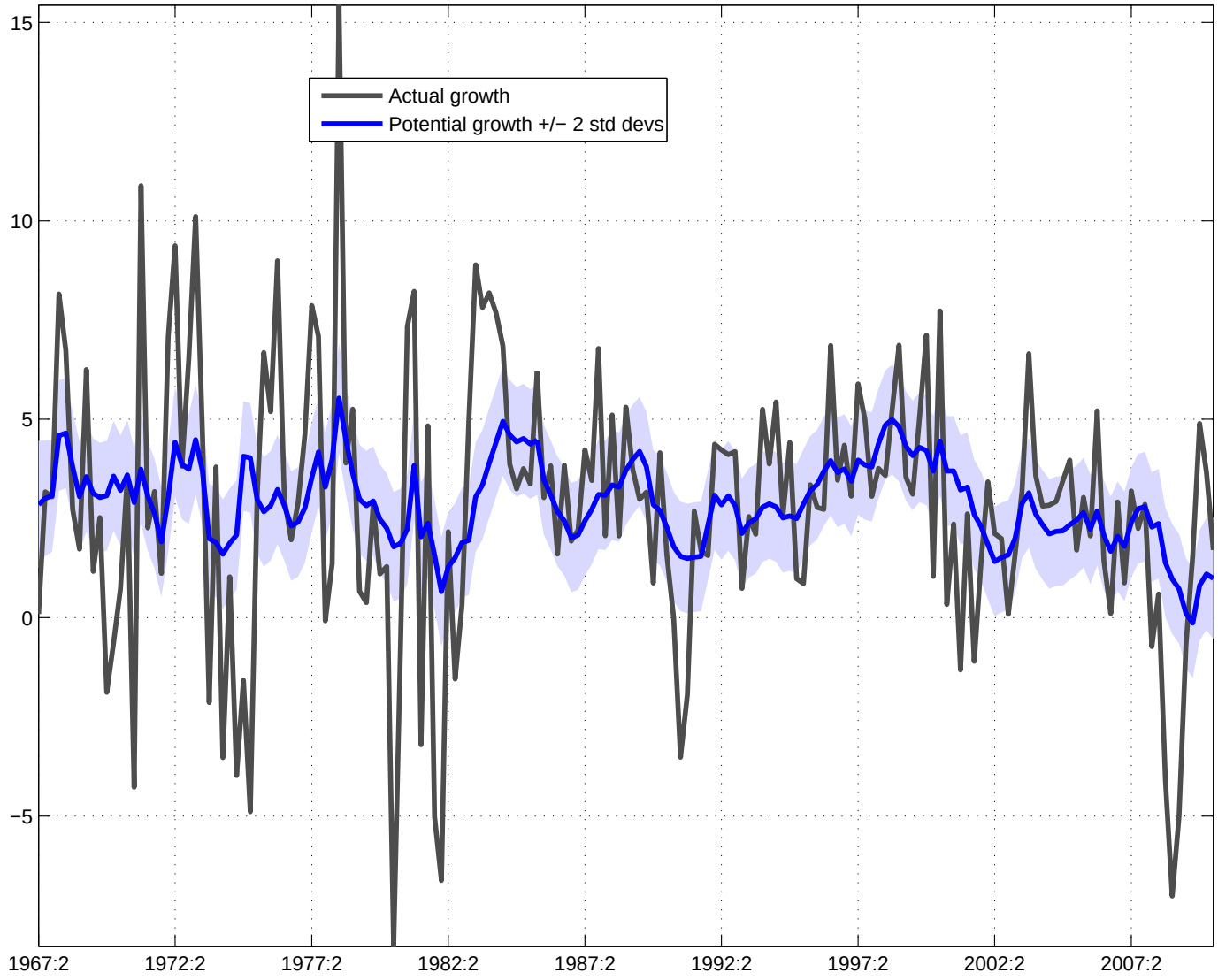

Economic activity gaps



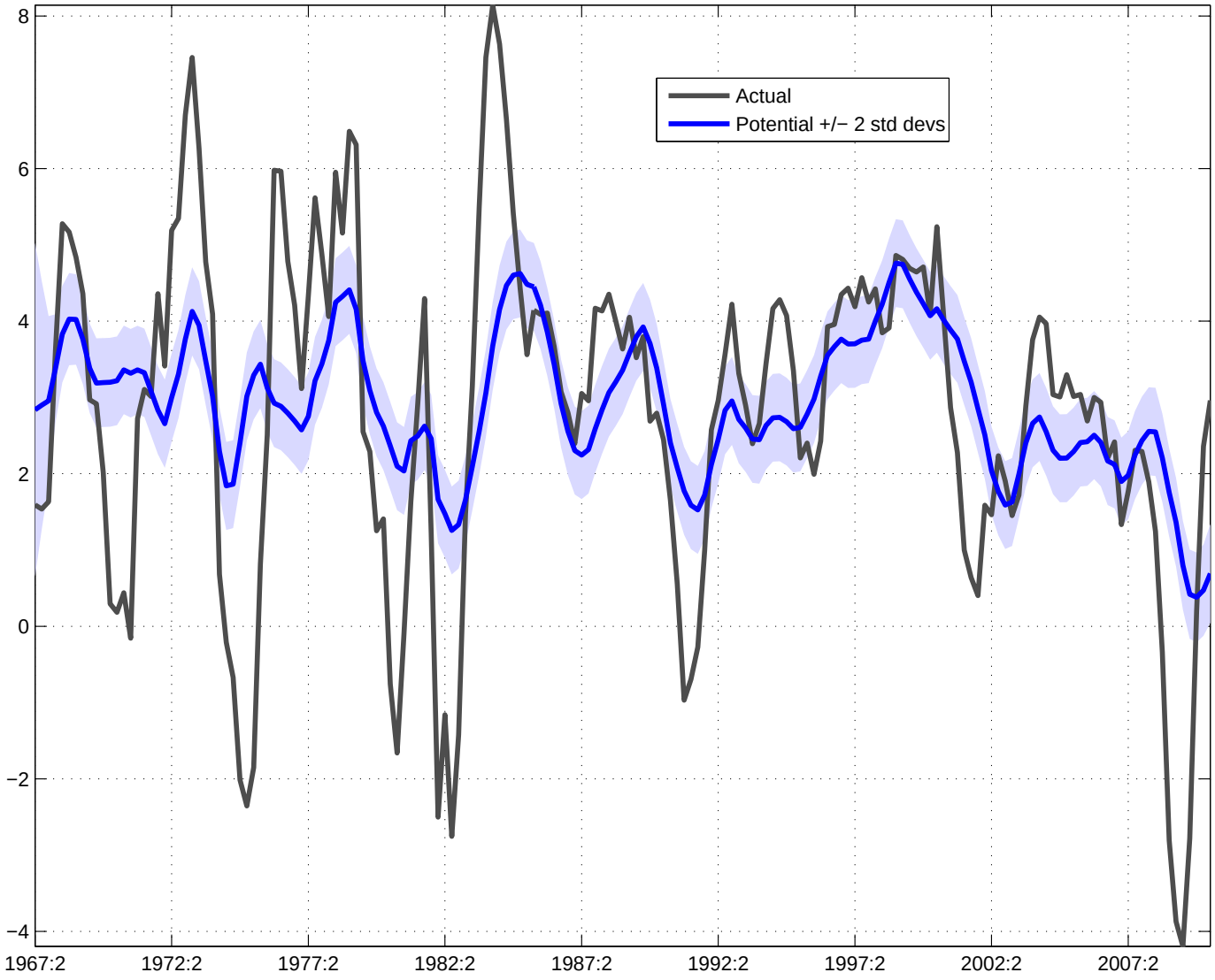
Output Gap +/- 2 std devs (w/o model or parameter uncertainty)



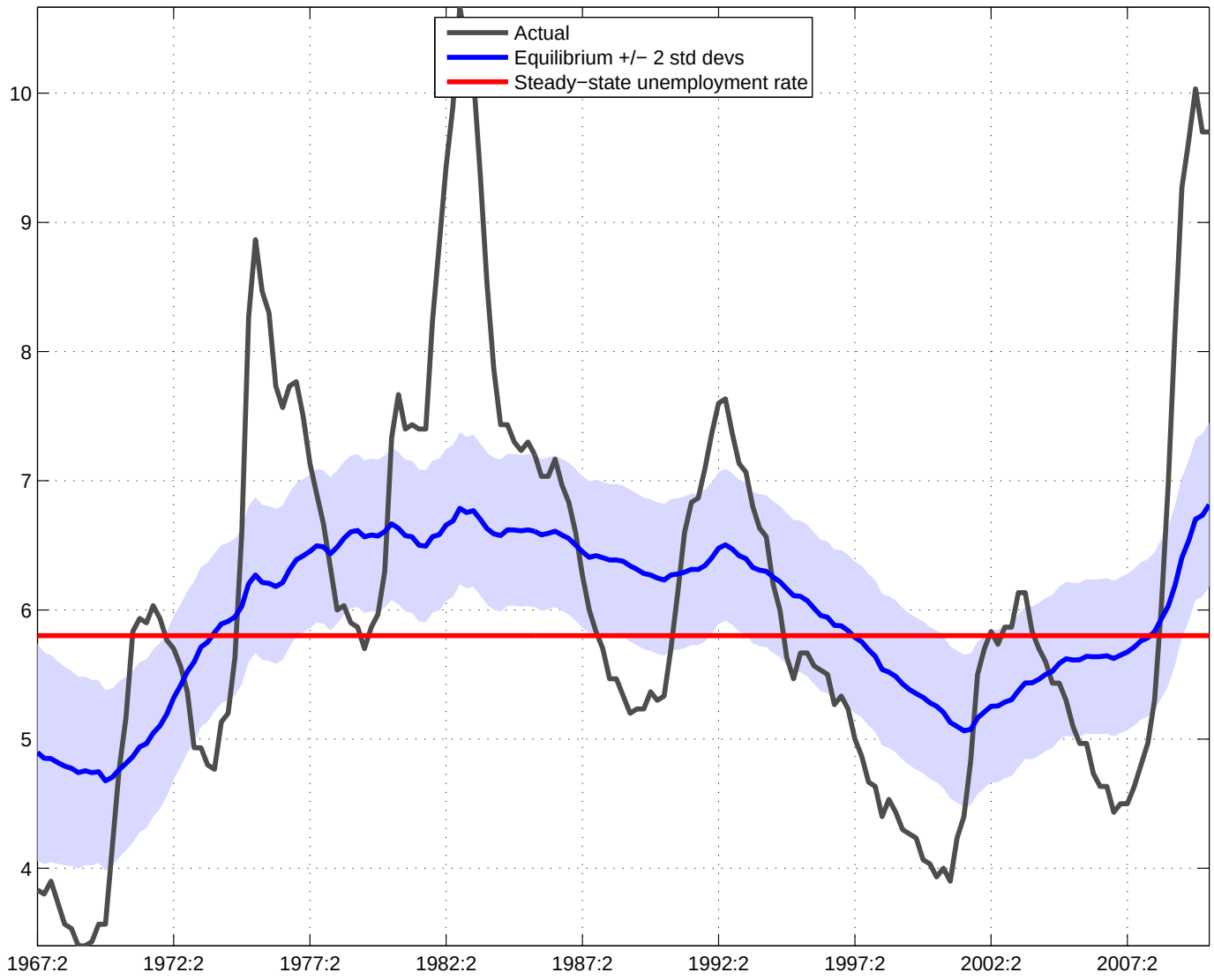
Output Growth (Q/Q Annualized) +/- 2 std devs (w/o model or parameter uncertainty)



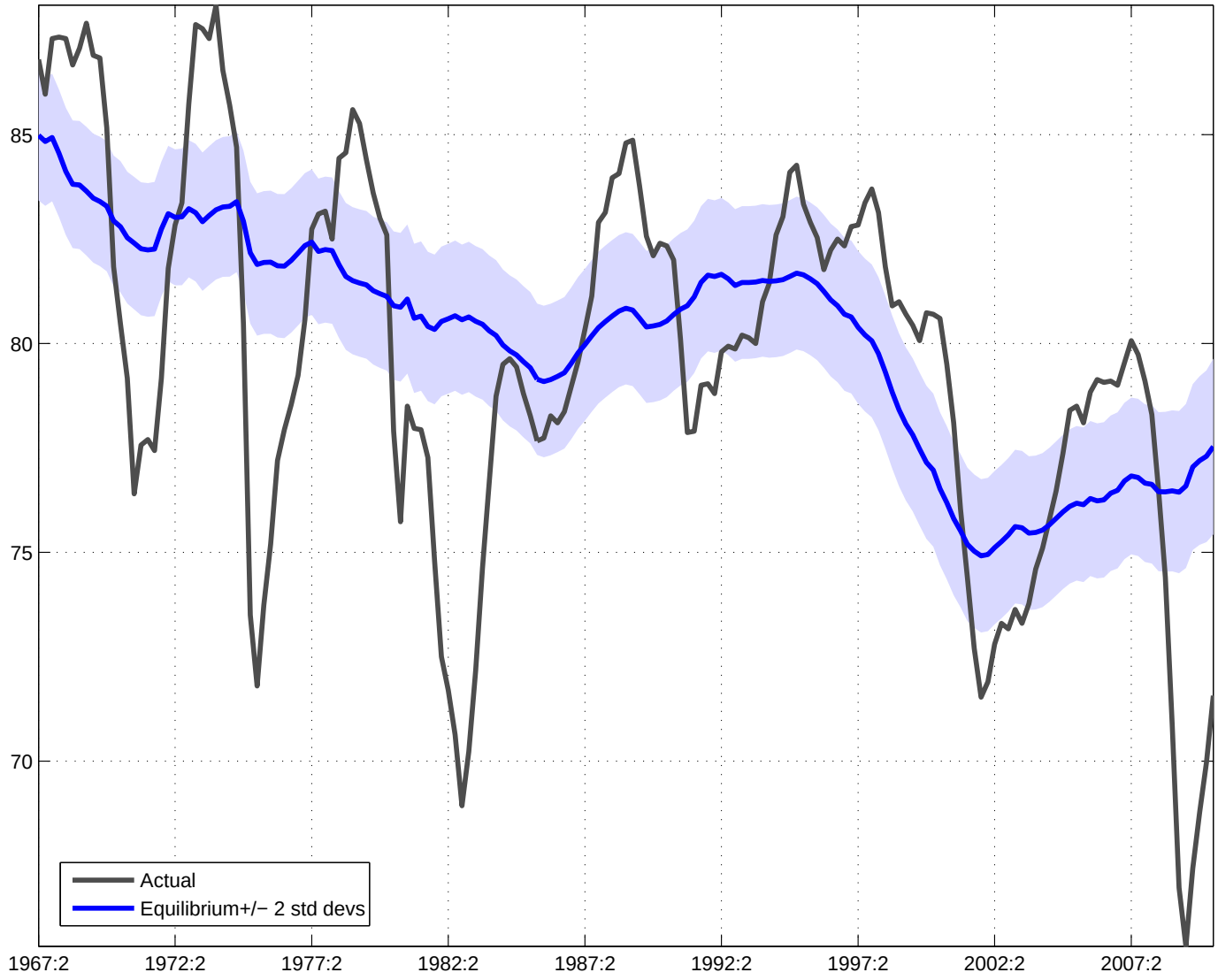
Output Growth (Y/Y) +/- 2 std devs (w/o model or parameter uncertainty)



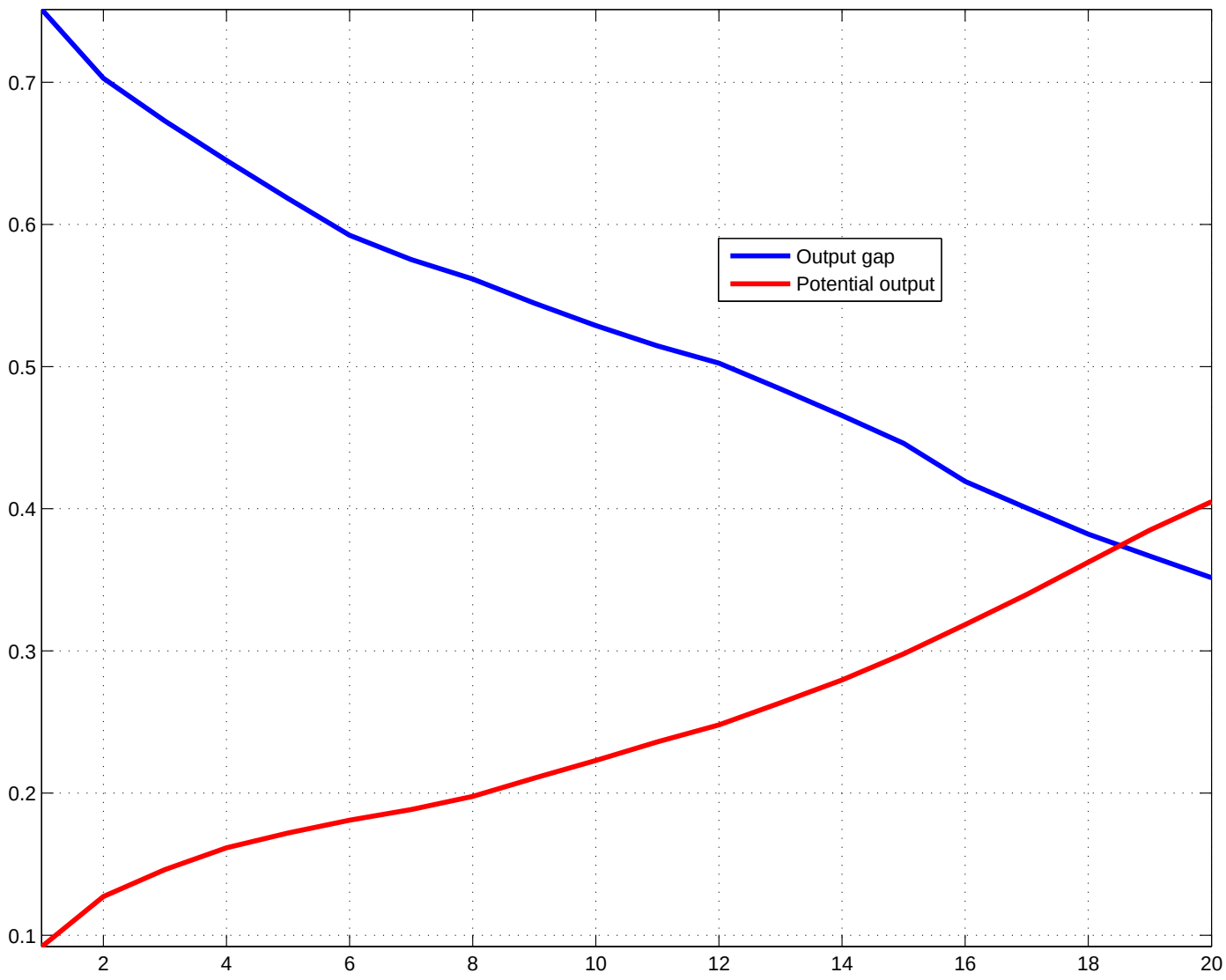
Unemployment Rate



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
growth_ss	2.140	0.300	2.143	0.041
unr_ss	5.800	0.300	5.801	0.042
lab_share	0.700	0.030	0.700	0.004
alpha	0.900	0.150	0.895	0.021
beta	0.400	0.300	0.176	0.023
omega	0.500	0.300	0.265	0.041
rho1	0.800	0.150	0.821	0.019
kappa1	0.100	0.600	0.353	0.035
phi1	0.800	0.150	0.729	0.018
phi2	0.300	0.150	0.241	0.014
tau	0.100	0.150	0.113	0.019
delta	0.500	0.150	0.496	0.021
kappa2	1.500	1.500	1.421	0.071
parhist	3.000	1.500	2.796	0.206
rho2	5.000	3.000	5.145	0.406
lambda	2.000	3.000	2.078	0.406
std_RES_Y	1.000	0.300	0.888	0.038
std_RES_G	1.000	0.300	0.921	0.041
std_RES_UNR_GAP	0.500	0.300	0.198	0.023
std_RES_UNR_BAR	0.100	0.150	0.079	0.018
std_RES_UNR_G	0.100	0.150	0.087	0.018
std_RES_CAPU_GAP	0.400	0.300	0.482	0.033
std_RES_CAPU_BAR	0.250	0.150	0.288	0.021
std_RES_CU_G	0.075	0.030	0.076	0.004
std_RES_PIE	0.500	0.300	0.554	0.030
std_RES_PIELTE	0.300	0.300	0.081	0.007
std_RES_LGDP_BAR	0.250	0.100	0.217	0.013

Calibrated Parameters

Parameter	Value
std_RES_GROWTH_BAR_	1.131

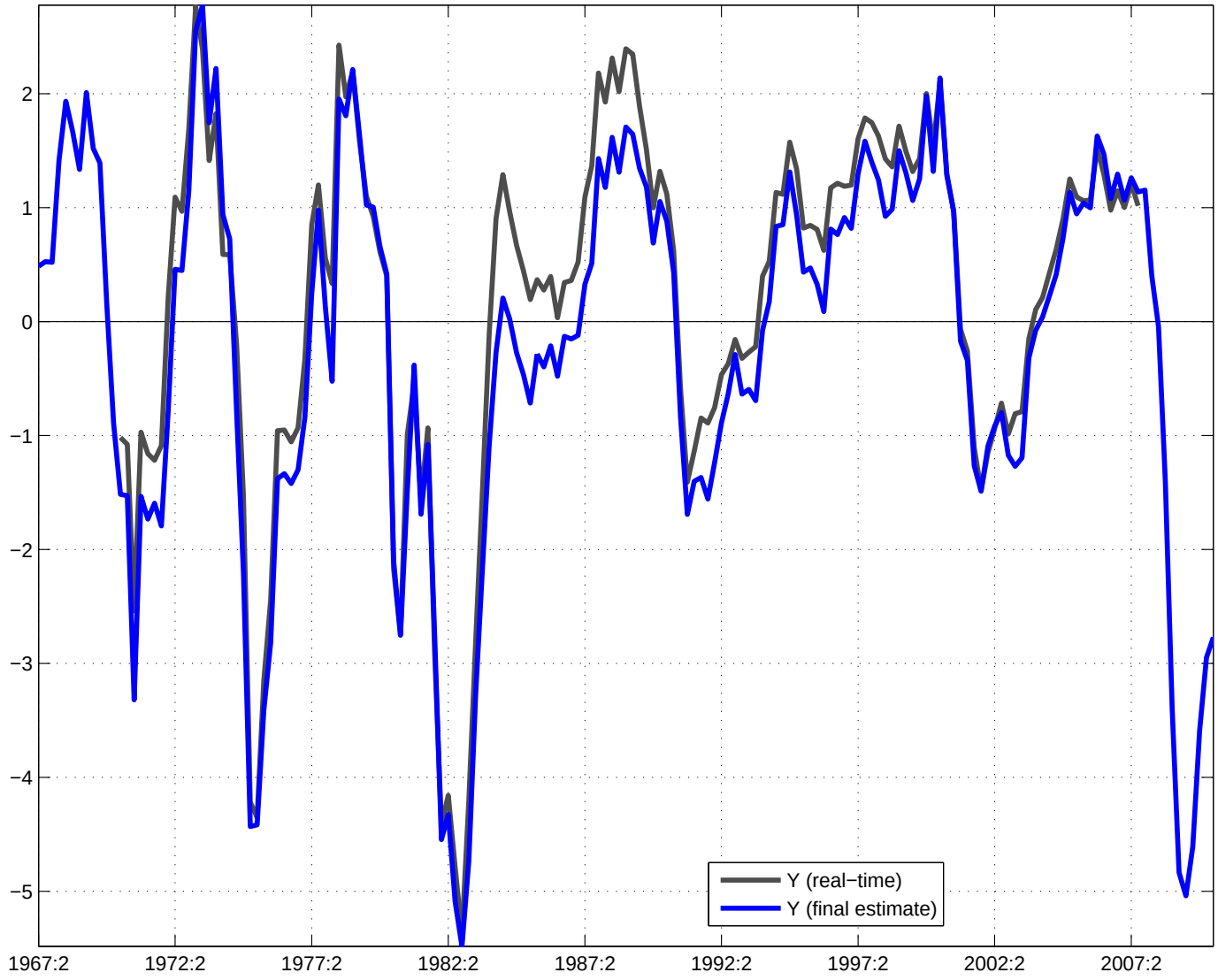
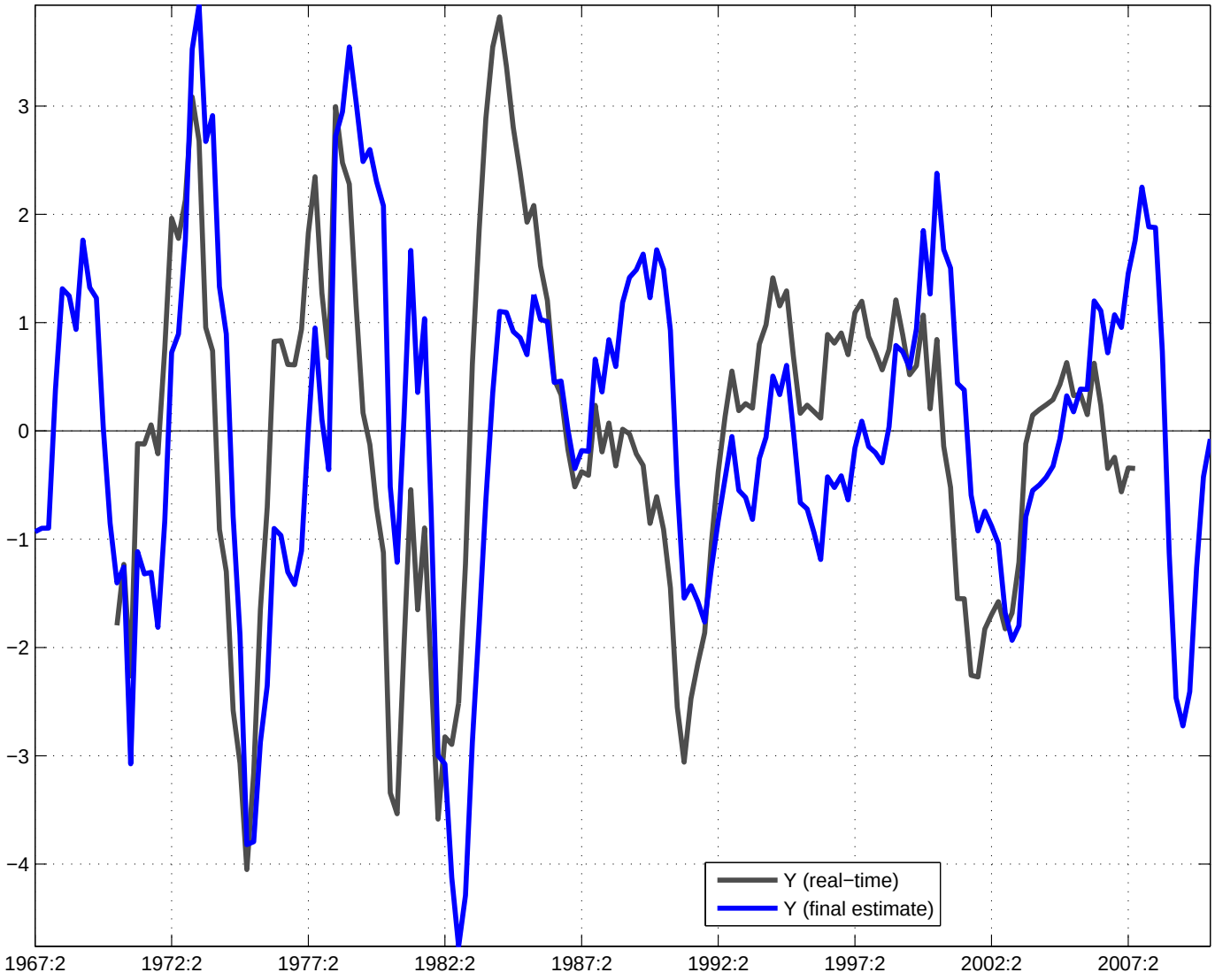
RMSEs

Parameter	1Q Ahead	4Q Ahead	8Q Ahead	12Q Ahead
GROWTH_	3.465	3.369	3.392	3.452
PIE4_	0.500	1.338	1.870	2.186
UNR_	0.286	0.944	1.417	1.517

Mean absolute revisions (according to most recent estimates)

quarter	$t-12$	$t-8$	$t-4$	t (nowcast)
Y	0.140	0.171	0.221	0.366
Y (HP)	0.173	0.333	0.751	1.242
UNR_GAP	0.115	0.134	0.156	0.178
UNR_GAP (HP)	0.086	0.176	0.390	0.634

Real-time output gap (MV)



Real-time output gap (HP)