Computational Appendix for 'Introducing Financial Frictions and Unemployment into a Small Open Economy Model'

Lawrence J. Christiano   Mathias Trabandt   Karl Walentin

June 2011

This computational appendix contains several types of information. First, tables for prior and posterior distributions for the first and second half, respectively, of the metropolis chain of the main model specification. We also document posterior distributions of the subsample estimations used for forecast evaluation and the alternative model specifications detailed in section 5.5.7. Second, figures of the data series used for estimation. Third, prior-posterior plots of all estimated parameters. Fourth, impulse responses for the shocks not shown in the main part of the paper.

Convergence of Metropolis Chain

In Table B1 and B2 we document the posterior mean, standard deviation, 5th and 95th percentiles for the first and second half of the metropolis chain, as the simplest possible diagnostic of convergence. We note that all these moments of the posterior parameter distribution in general are unchanged to the second digit, with some minor exceptions.

	Posterior, first half				Posterior, second half			
	Mean	S.d.	5%	95%	Mean	S.d.	5%	95%
ξ_d	0.890	0.0191	0.8608	0.9223	0.884	0.0170	0.8565	0.9122
ξ_x	0.815	0.0255	0.7750	0.8563	0.817	0.0248	0.7775	0.8577
ξ_{mc}	0.875	0.0283	0.8266	0.9219	0.873	0.0207	0.8392	0.9078
ξ_{mi}	0.793	0.0377	0.7289	0.8536	0.791	0.0344	0.7338	0.8497
ξ_{mx}	0.399	0.0727	0.2805	0.5196	0.393	0.0760	0.2750	0.5233
κ_d	0.148	0.0600	0.0541	0.2414	0.148	0.0593	0.0532	0.2401
κ_x	0.508	0.0998	0.3449	0.6748	0.518	0.0973	0.3581	0.6779
κ_{mc}	0.377	0.1153	0.1875	0.5680	0.382	0.1136	0.1963	0.5704
κ_{mi}	0.413	0.1314	0.1955	0.6250	0.421	0.1271	0.2048	0.6221
κ_{mx}	0.337	0.1304	0.1231	0.5449	0.343	0.1384	0.1135	0.5521
κ_w	0.437	0.1487	0.1900	0.6794	0.432	0.1514	0.1784	0.6731
ν^j	0.464	0.2469	0.0635	0.8552	0.463	0.2432	0.0531	0.8301
σ_L	7.79	2.045	4.533	10.893	7.75	1.953	4.614	10.765
b	0.656	0.0784	0.5376	0.7843	0.662	0.0746	0.5396	0.7846
S''	2.60	0.455	1.852	3.321	2.56	0.438	1.865	3.239
σ_a	0.146	0.0486	0.0688	0.2182	0.144	0.0457	0.0692	0.2116
ρ_R	0.818	0.0230	0.7839	0.8557	0.819	0.0215	0.7834	0.8530
r_π	1.901	0.1251	1.6903	2.0997	1.917	0.1284	1.7057	2.1281
r_y	0.023	0.0085	0.0094	0.0373	0.023	0.0088	0.0083	0.0368
η_x	1.227	0.1642	1.0000	1.4644	1.237	0.1760	1.0000	1.4970
η_c	1.675	0.1985	1.3521	1.9897	1.695	0.2050	1.3735	2.0335
η_i	1.558	0.2142	1.2060	1.9043	1.534	0.2150	1.1759	1.8741
η_f	1.632	0.2230	1.2779	2.0029	1.632	0.2148	1.2726	1.9795
ϕ_s	1.104	0.0836	0.9649	1.2371	1.088	0.0868	0.9426	1.2227
μ	0.534	0.0728	0.4146	0.6513	0.521	0.0760	0.3942	0.6447
$hshare,\%$	0.392	0.0700	0.2802	0.5112	0.385	0.0688	0.2711	0.4969
$bshare$	0.924	0.0143	0.9015	0.9485	0.923	0.0154	0.8987	0.9479
$F,\%$	0.147	0.0272	0.1024	0.1915	0.147	0.0278	0.1011	0.1921
ρ_{μ_z}	0.592	0.0670	0.4825	0.7004	0.589	0.0700	0.4756	0.7046
ρ_ε	0.840	0.0489	0.7658	0.9173	0.840	0.0479	0.7660	0.9189
ρ_Υ	0.621	0.0873	0.4773	0.7625	0.628	0.0894	0.4819	0.7750
$\rho_{\zeta c}$	0.664	0.0971	0.5099	0.8239	0.662	0.0962	0.5142	0.8269
$\rho_{\zeta h}$	0.785	0.0539	0.6999	0.8729	0.787	0.0503	0.7007	0.8663
$\rho_{\tilde\phi}$	0.696	0.0525	0.6124	0.7856	0.701	0.0541	0.6064	0.7870
ρ_g	0.905	0.0432	0.8400	0.9757	0.902	0.0445	0.8364	0.9739
ρ_γ	0.821	0.0357	0.7645	0.8795	0.815	0.0384	0.7547	0.8769
a_{11}	0.941	0.0382	0.8801	1.0031	0.942	0.0393	0.8754	1.0029
a_{22}	0.109	0.1473	-0.1330	0.3551	0.102	0.1524	-0.1538	0.3469
a_{33}	0.913	0.0343	0.8595	0.9666	0.904	0.0478	0.8269	0.9687
a_{12}	0.335	0.2281	-0.0240	0.7139	0.303	0.2533	-0.1226	0.7125
a_{13}	-0.480	0.1567	-0.7386	-0.2494	-0.491	0.1467	-0.7252	-0.2507
a_{21}	0.065	0.0363	0.0081	0.1189	0.058	0.0295	0.0105	0.1080
a_{23}	-0.122	0.1254	-0.3180	0.0849	-0.102	0.1134	-0.2841	0.0846
a_{24}	0.287	0.1887	-0.0247	0.5850	0.257	0.2023	-0.0756	0.5911
a_{31}	0.014	0.0108	-0.0026	0.0331	0.016	0.0129	-0.0035	0.0389
a_{32}	0.094	0.0468	0.0165	0.1719	0.090	0.0525	0.0024	0.1738
a_{34}	0.003	0.0710	-0.1198	0.1121	0.015	0.1087	-0.1570	0.2102
c_{21}	0.155	0.0881	0.0134	0.3041	0.156	0.0935	0.0009	0.3024
c_{31}	0.141	0.0233	0.1059	0.1808	0.136	0.0269	0.0895	0.1781
c_{32}	0.048	0.0404	-0.0190	0.1140	0.054	0.0450	-0.0200	0.1290
c_{24}	0.063	0.2861	-0.3830	0.5390	0.063	0.3098	-0.4480	0.5592
c_{34}	0.061	0.0686	-0.0499	0.1716	0.078	0.0742	-0.0560	0.1910

Table B1. Main specification. Estimation results. Parameters. Values for first half (200 000 draws) and the second half (another 200 000 draws) of the metropolis chain, after 200 000 draws used for burn-in.

	Posterior, first half				Posterior, second half			
	Mean	S.d.	5%	95%	Mean	S.d.	5%	95%
$100\sigma_{\mu_z}$	0.214	0.0418	0.1455	0.2818	0.214	0.0467	0.1367	0.2896
$100\sigma_{\epsilon}$	0.468	0.0962	0.3096	0.6211	0.473	0.1024	0.3146	0.6116
$10\sigma_{\Upsilon}$	0.233	0.0497	0.1513	0.3125	0.234	0.0538	0.1527	0.3119
$10\sigma_{\zeta^c}$	0.200	0.0422	0.1310	0.2673	0.203	0.0445	0.1321	0.2701
$10\sigma_{\zeta^h}$	0.733	0.1630	0.4593	0.9865	0.725	0.1569	0.4715	0.9658
$100\sigma_{\tilde{\phi}}$	0.631	0.1108	0.4482	0.8171	0.621	0.1108	0.4353	0.8036
$100\sigma_{\varepsilon_R}$	0.121	0.0119	0.1014	0.1400	0.120	0.0120	0.1006	0.1389
$100\sigma_g$	0.682	0.0604	0.5855	0.7806	0.676	0.0598	0.5771	0.7715
$10\sigma_{\tau d}$	3.460	1.2811	1.6752	5.4867	3.064	0.9200	1.6566	4.4859
$10\sigma_{\tau x}$	3.199	0.8400	1.8464	4.5225	3.258	0.8679	1.8586	4.7003
$10\sigma_{\tau mc}$	3.534	2.0613	1.1465	5.9155	3.011	1.0720	1.4158	4.5670
$10\sigma_{\tau mi}$	0.803	0.6429	0.1500	1.3959	0.752	0.4289	0.1812	1.3798
$10\sigma_{\tau mx}$	3.989	1.1199	2.2134	5.7348	3.946	1.2687	1.8087	5.7592
$100\sigma_{\gamma}$	0.349	0.0365	0.2884	0.4059	0.352	0.0369	0.2916	0.4121
$100\sigma_{y^*}$	0.474	0.0411	0.4084	0.5424	0.479	0.0414	0.4099	0.5464
$100\sigma_{\pi^*}$	0.227	0.0207	0.1939	0.2616	0.230	0.0245	0.1895	0.2689
$1000\sigma_{R^*}$	0.498	0.0659	0.3894	0.6011	0.487	0.0728	0.3622	0.6010

Table B2. Main specification. Estimation results. Shocks.

	Full model		Employment fric.		Financial fric.		Baseline	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
ξ_d	0.912	0.021	0.860	0.012	0.820	0.037	0.847	0.029
ξ_x	0.728	0.038	0.651	0.045	0.758	0.056	0.739	0.059
ξ_{mc}	0.872	0.027	0.895	0.046	0.890	0.026	0.873	0.024
ξ_{mi}	0.767	0.032	0.738	0.032	0.769	0.033	0.750	0.034
ξ_{mx}	0.518	0.075	0.481	0.041	0.559	0.090	0.595	0.084
κ_d	0.329	0.128	0.224	0.081	0.390	0.124	0.266	0.101
κ_x	0.350	0.110	0.358	0.103	0.378	0.112	0.409	0.120
κ_{mc}	0.365	0.118	0.481	0.166	0.528	0.173	0.468	0.155
κ_{mi}	0.479	0.137	0.501	0.141	0.472	0.138	0.488	0.142
κ_{mx}	0.405	0.147	0.273	0.105	0.423	0.146	0.415	0.149
κ_w	0.431	0.149	0.461	0.132	0.474	0.146	0.517	0.142
ν^j	0.592	0.239	0.676	0.177	0.600	0.239	0.567	0.246
σ_L	8.09	1.95	8.81	2.02	1.51	0.84	1.68	1.13
b	0.635	0.085	0.668	0.063	0.619	0.083	0.642	0.073
S''	6.02	1.03	9.37	1.95	6.29	1.01	8.70	1.56
σ_a	0.199	0.074	0.172	0.064	0.204	0.066	0.173	0.065
ρ_R	0.821	0.024	0.829	0.023	0.782	0.031	0.804	0.028
r_π	1.793	0.128	1.790	0.137	1.805	0.120	1.731	0.134
r_y	0.029	0.016	-0.003	0.015	0.026	0.017	0.002	0.019
η_x	1.413	0.217	1.297	0.154	1.408	0.207	1.527	0.218
η_c	1.440	0.208	-	-	-	-	-	-
η_i	1.601	0.227	1.602	0.147	1.645	0.231	1.591	0.246
η_f	1.423	0.200	1.223	0.125	1.459	0.212	1.424	0.210
$\tilde{\phi}_s$	1.131	0.090	1.162	0.085	1.195	0.092	1.238	0.094
μ	0.492	0.070	-	-	0.443	0.070	-	-
$hshare, \%$	0.296	0.054	0.309	0.056	-	-	-	-
$bshare$	0.830	0.036	0.908	0.013	-	-	-	-
$F, \%$	0.172	0.029	0.192	0.029	-	-	-	-
ρ_{μ_z}	0.564	0.080	0.518	0.068	0.582	0.065	0.598	0.067
ρ_ε	0.850	0.058	0.923	0.034	0.888	0.049	0.891	0.043
ρ_Υ	0.843	0.076	0.828	0.057	0.845	0.075	0.808	0.061
ρ_{ζ^c}	0.706	0.086	0.646	0.086	0.666	0.091	0.679	0.090
ρ_{ζ^h}	0.872	0.035	0.867	0.042	0.386	0.063	0.406	0.068
$\rho_{\tilde{\phi}}$	0.711	0.064	0.743	0.054	0.739	0.070	0.757	0.061
ρ_g	0.818	0.070	0.822	0.069	0.867	0.061	0.888	0.056
ρ_γ	0.841	0.047	-	-	0.820	0.050	-	-

Table B3. Estimation results. Subsample 1995q1-2004q4. Various specifications. Parameters excluding VAR coefficients.

	Full model		Employment fric.		Financial fric.		Baseline	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
$100\sigma_{\mu_z}$	0.103	0.030	0.074	0.020	0.180	0.032	0.180	0.029
$100\sigma_{\epsilon}$	0.356	0.079	0.293	0.060	0.276	0.064	0.331	0.071
$10\sigma_{\Upsilon}$	0.101	0.028	0.214	0.056	0.101	0.031	0.207	0.058
$10\sigma_{\zeta^c}$	0.185	0.043	0.192	0.038	0.164	0.038	0.160	0.036
$10\sigma_{\zeta^h}$	0.656	0.161	0.515	0.105	3.489	1.587	3.237	1.805
$100\sigma_{\tilde{\phi}}$	0.556	0.127	0.456	0.103	0.505	0.137	0.460	0.127
$100\sigma_{\varepsilon_R}$	0.098	0.012	0.114	0.015	0.110	0.016	0.133	0.021
$100\sigma_g$	0.770	0.086	0.792	0.087	0.745	0.072	0.741	0.072
$10\sigma_{\tau^d}$	5.789	2.763	1.712	0.228	1.035	0.488	1.213	0.544
$10\sigma_{\tau^x}$	1.028	0.311	0.771	0.208	1.624	0.861	1.461	0.691
$10\sigma_{\tau^{m,c}}$	3.349	1.598	0.511	0.338	1.982	1.244	2.562	1.205
$10\sigma_{\tau^{m,i}}$	0.564	0.271	0.440	0.136	0.445	0.228	0.424	0.222
$10\sigma_{\tau^{m,x}}$	2.871	1.050	2.235	0.332	2.254	1.202	2.046	1.103
$100\sigma_{\gamma}$	0.230	0.035	-	-	0.236	0.037	-	-
$100\sigma_{y^*}$	0.269	0.031	0.292	0.021	0.192	0.032	0.169	0.032
$100\sigma_{\pi^*}$	0.207	0.021	0.195	0.015	0.185	0.024	0.182	0.021
$1000\sigma_{R^*}$	0.411	0.078	0.442	0.086	0.426	0.073	0.425	0.073

Table B4. Estimation results. Subsample 1995q1-2004q4. Various specifications. Shocks.

	Full model		JPT		σ no γ		ι estimated	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
ξ_d	0.884	0.018	0.853	0.018	0.862	0.018	0.888	0.024
ξ_x	0.815	0.025	0.807	0.032	0.826	0.028	0.816	0.025
ξ_{mc}	0.875	0.021	0.889	0.019	0.853	0.019	0.871	0.022
ξ_{mi}	0.792	0.037	0.781	0.029	0.969	0.008	0.789	0.031
ξ_{mx}	0.406	0.077	0.420	0.082	0.398	0.079	0.416	0.083
κ_d	0.154	0.060	0.161	0.061	0.169	0.066	0.153	0.059
κ_x	0.517	0.099	0.481	0.103	0.525	0.098	0.501	0.097
κ_{mc}	0.377	0.112	0.386	0.116	0.504	0.123	0.373	0.111
κ_{mi}	0.414	0.135	0.431	0.126	0.720	0.109	0.406	0.127
κ_{mx}	0.334	0.132	0.358	0.137	0.319	0.128	0.348	0.137
κ_w	0.431	0.151	0.502	0.156	0.495	0.155	0.428	0.149
ν^j	0.468	0.242	0.544	0.239	0.321	0.217	0.453	0.243
σ_L	7.59	1.882	8.37	1.97	9.44	2.16	7.62	1.86
b	0.662	0.073	0.516	0.084	0.564	0.071	0.656	0.074
S''	2.58	0.44	5.60	1.26	2.41	0.42	2.62	0.45
σ_a	0.147	0.047	0.142	0.052	0.162	0.060	0.144	0.045
ρ_R	0.821	0.022	0.815	0.022	0.729	0.029	0.818	0.022
r_π	1.911	0.130	1.951	0.118	1.930	0.109	1.917	0.127
r_y	0.023	0.009	0.004	0.010	-0.007	0.012	0.022	0.009
η_x	1.236	0.188	1.276	0.175	-	-	1.230	0.166
η_c	1.695	0.199	1.593	0.201	1.821	0.207	1.716	0.218
η_i	1.555	0.217	1.585	0.216	1.549	0.209	1.562	0.211
η_f	1.636	0.216	1.705	0.237	1.754	0.241	1.652	0.219
$\tilde{\phi}_s$	1.087	0.083	1.181	0.088	1.292	0.084	1.089	0.087
μ	0.530	0.073	0.128	0.041	0.220	0.040	0.514	0.076
$hshare,\%$	0.382	0.069	0.374	0.072	0.368	0.069	0.366	0.071
$bshare$	0.923	0.014	0.932	0.016	0.913	0.016	0.928	0.015
ι	-	-	-	-	-	-	0.880	0.091
$F,\%$	0.150	0.028	0.164	0.032	0.155	0.031	0.137	0.027
ρ_{μ_z}	0.586	0.069	0.618	0.069	0.627	0.069	0.593	0.068
ρ_ε	0.838	0.051	0.893	0.047	0.883	0.043	0.840	0.050
ρ_Υ	0.628	0.092	0.659	0.058	0.565	0.084	0.628	0.086
ρ_{ζ^c}	0.667	0.091	0.765	0.087	0.716	0.079	0.669	0.095
ρ_{ζ^h}	0.781	0.052	0.815	0.054	0.821	0.046	0.785	0.050
$\rho_{\tilde{\phi}}$	0.695	0.052	0.782	0.063	0.842	0.044	0.697	0.055
ρ_g	0.905	0.044	0.924	0.035	0.906	0.043	0.907	0.043
ρ_γ	0.819	0.037	-	-	-	-	0.823	0.035
ρ_σ	-	-	-	-	0.967	0.014	-	-

Table B5. Alternative specifications: Full sample, 1995q1-2010q3. Estimation results. Parameters excluding VAR coefficients. Full model for comparison only. JPT denotes a model without financial shock or financial observables. σ not γ is a model allowing for a shock to idiosyncratic uncertainty, but not for the wealth shock, ι estimated simply estimates ι.

	Full model		JPT		σ no γ		ι estimated	
	Mean	S.d.	Mean	S.d.	Mean	S.d.	Mean	S.d.
$100\sigma_{\mu_z}$	0.220	0.042	0.244	0.046	0.213	0.045	0.222	0.045
$100\sigma_{\epsilon}$	0.471	0.102	0.465	0.086	0.450	0.082	0.484	0.105
$10\sigma_{\Upsilon}$	0.233	0.055	0.613	0.165	0.255	0.063	0.235	0.050
$10\sigma_{\zeta^c}$	0.203	0.045	0.145	0.031	0.147	0.027	0.198	0.042
$10\sigma_{\zeta^h}$	0.731	0.165	0.625	0.155	0.727	0.161	0.715	0.148
$100\sigma_{\tilde{\phi}}$	0.634	0.107	0.464	0.115	0.294	0.079	0.632	0.113
$100\sigma_{\varepsilon_R}$	0.120	0.012	0.133	0.014	0.155	0.018	0.120	0.011
$100\sigma_{g}$	0.681	0.060	0.706	0.062	0.672	0.061	0.683	0.060
$10\sigma_{\tau^d}$	3.070	0.995	1.622	0.451	2.178	0.569	3.530	1.488
$10\sigma_{\tau^x}$	3.179	0.834	3.102	0.944	3.511	1.014	3.175	0.851
$10\sigma_{\tau^{m,c}}$	3.170	1.325	4.558	1.637	2.027	0.548	3.023	1.177
$10\sigma_{\tau^{m,i}}$	0.769	0.501	0.622	0.251	42.632	18.091	0.705	0.382
$10\sigma_{\tau^{m,x}}$	4.119	1.368	3.941	1.259	3.232	0.997	4.284	1.482
$100\sigma_{\gamma}$	0.350	0.037	-	-	-	-	0.343	0.034
$100\sigma_{\sigma}$	-	-	-	-	0.867	0.083	-	-
$100\sigma_{y^*}$	0.474	0.040	0.437	0.052	0.470	0.043	0.468	0.041
$100\sigma_{\pi^*}$	0.229	0.022	0.232	0.023	0.234	0.022	0.225	0.024
$1000\sigma_{R^*}$	0.500	0.066	0.517	0.072	0.526	0.071	0.494	0.071

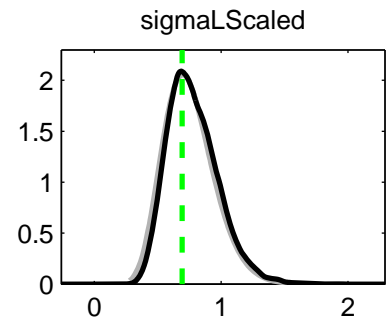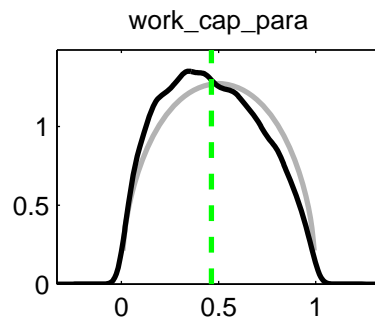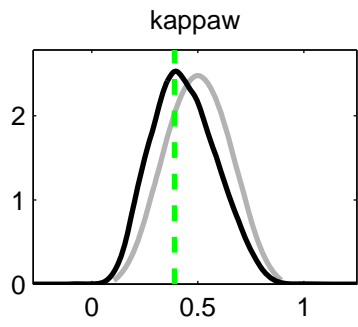Table B6. Alternative specifications: Full sample, 1995q1-2010q3. Estimation results. Shocks.
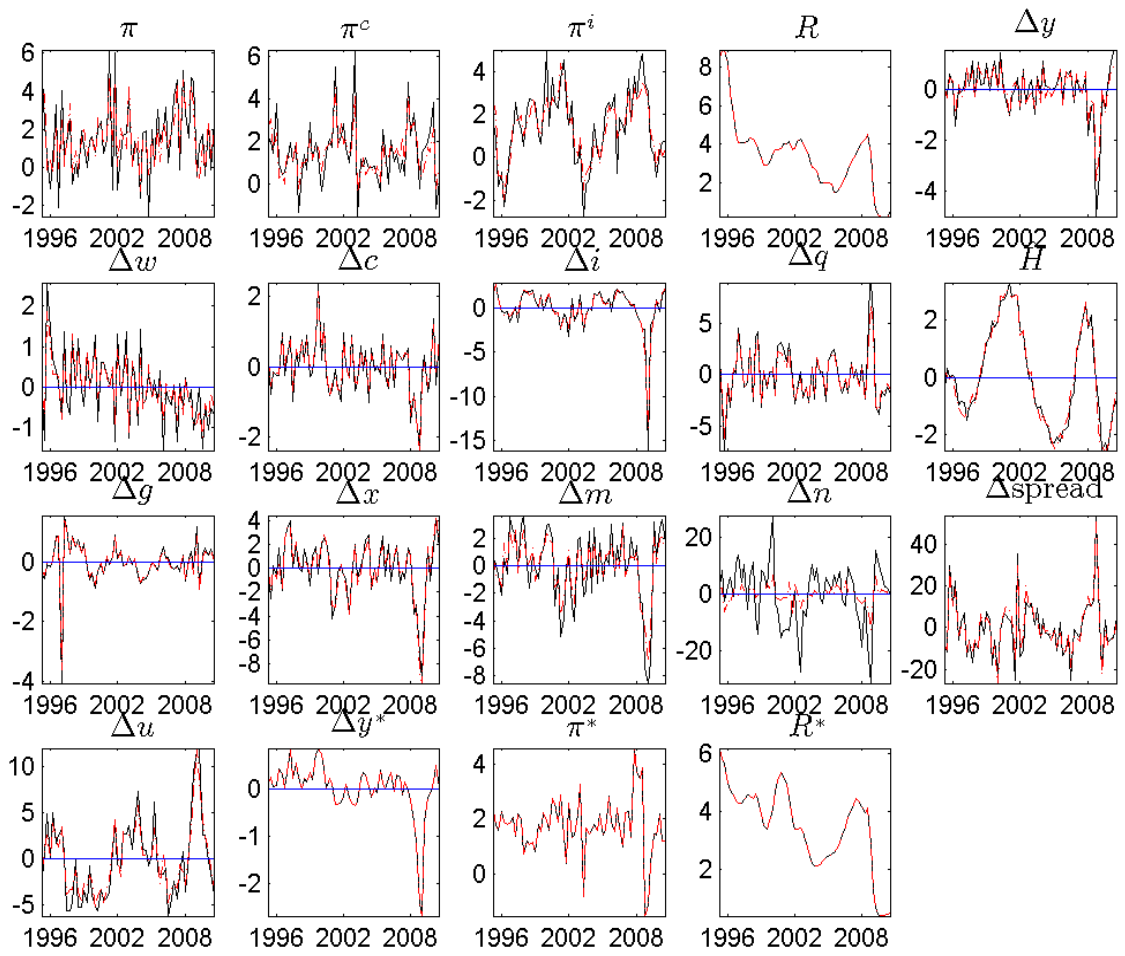
Figure B1. Data series used in estimation (solid black) and smoothed variables without measurement error (in dashed red).
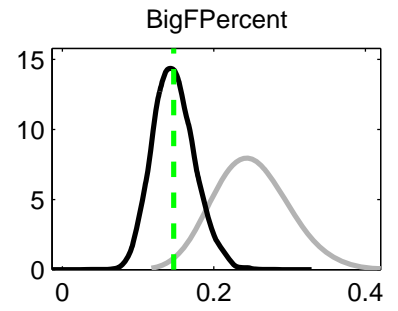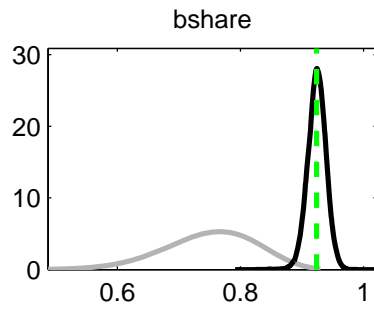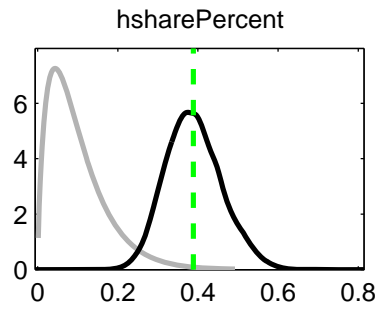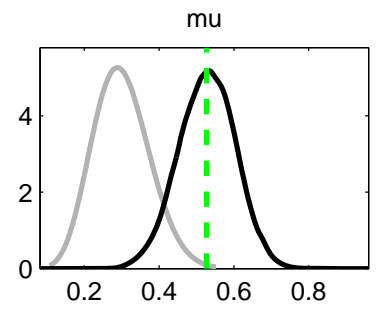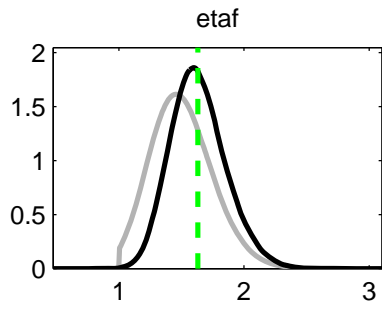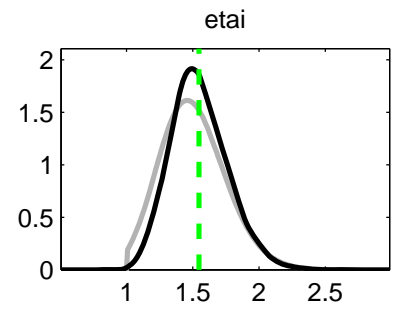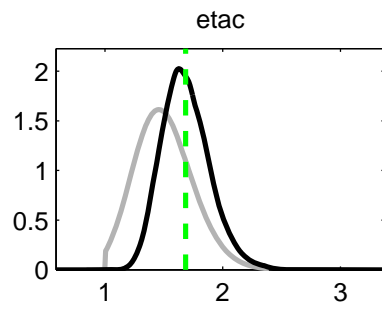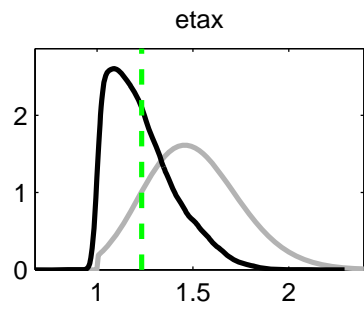
Prior-Posterior Plots for Main Specification
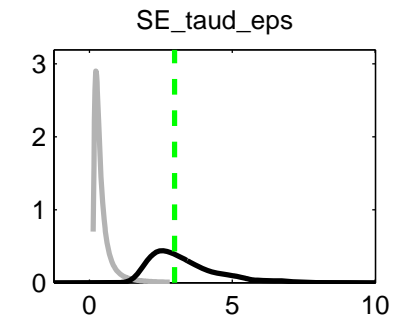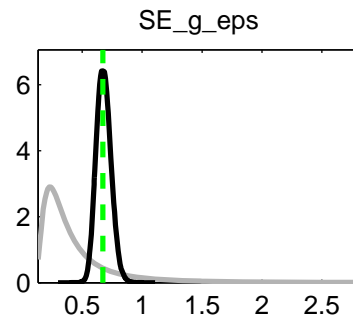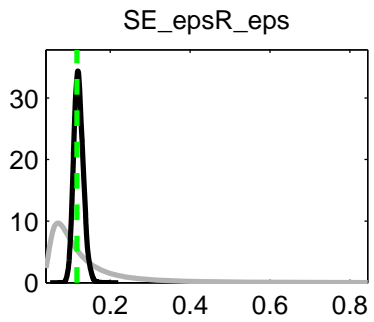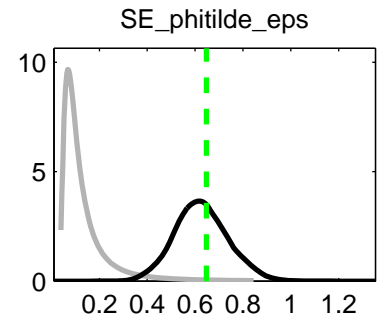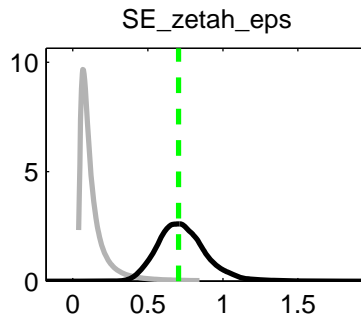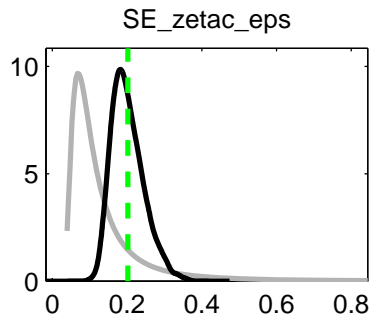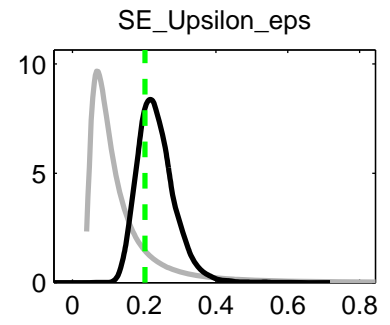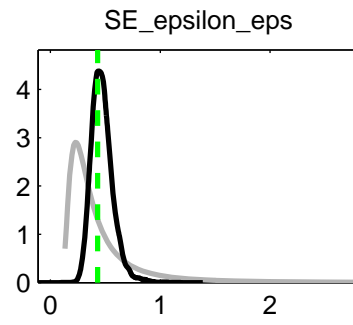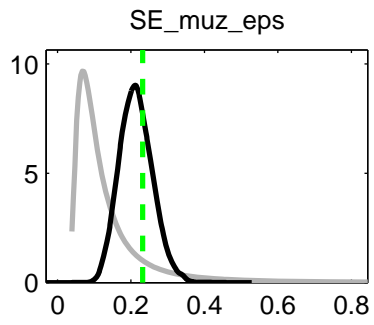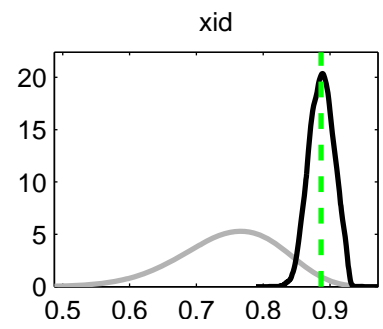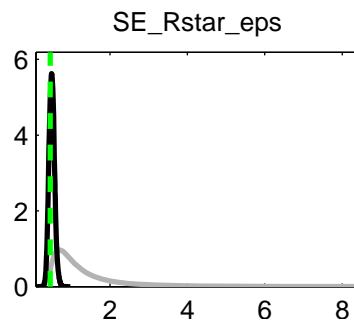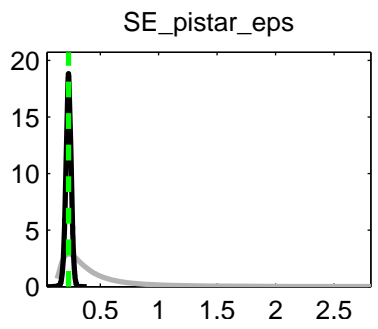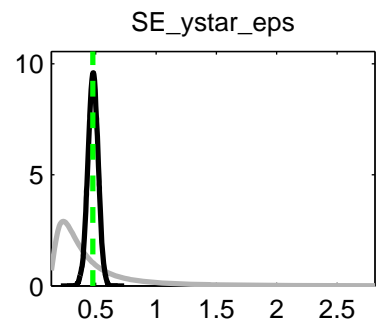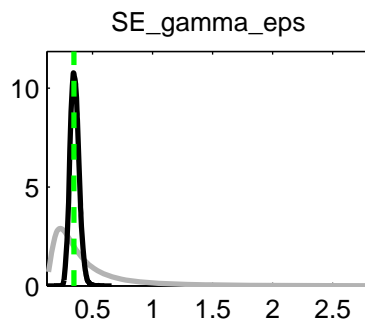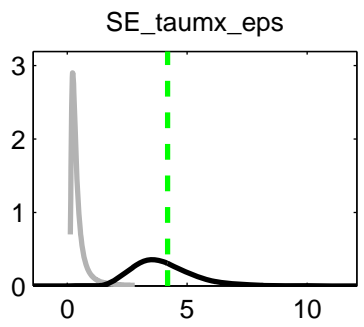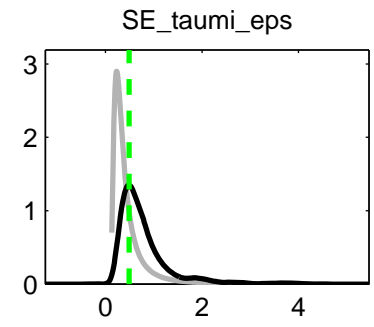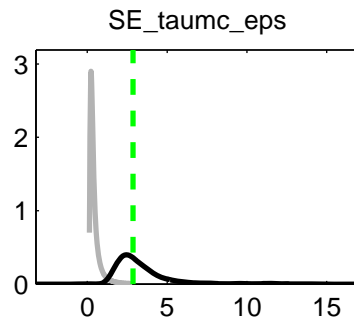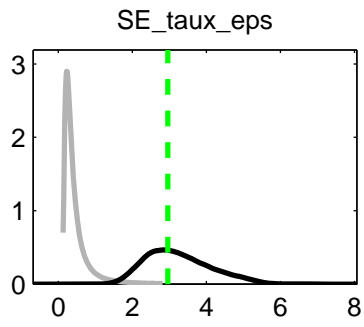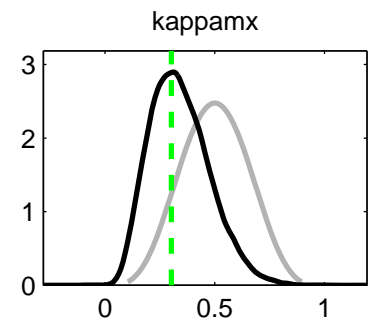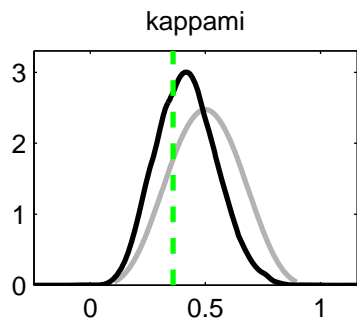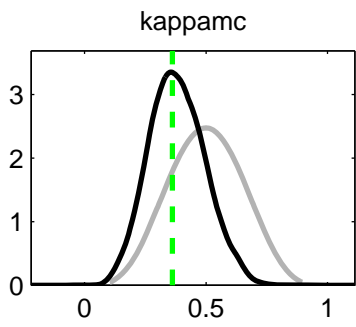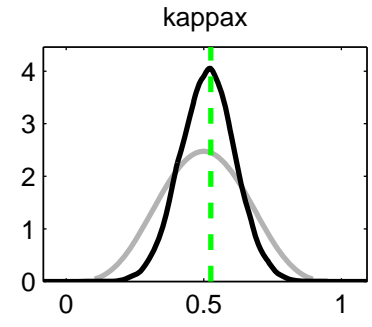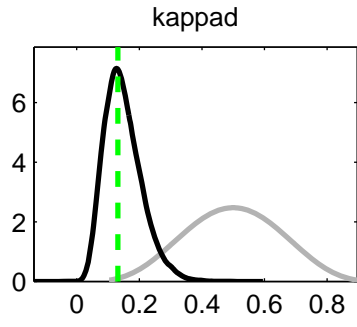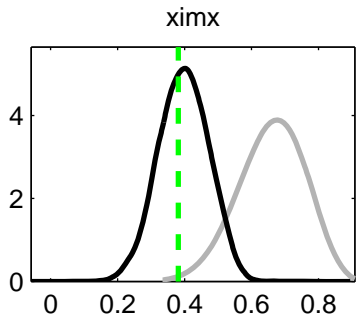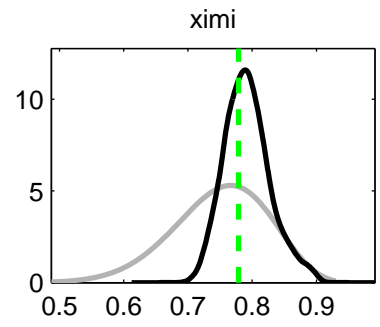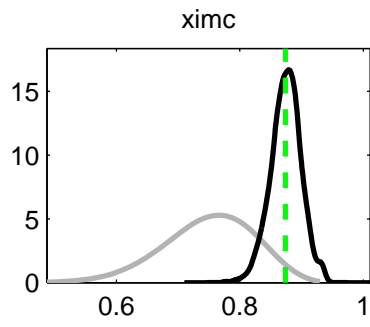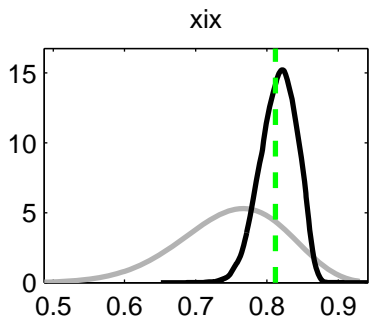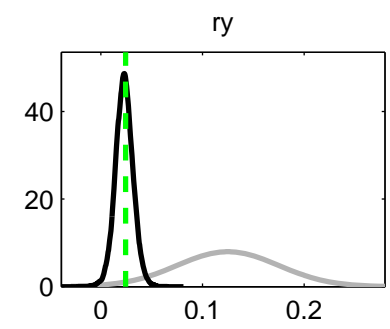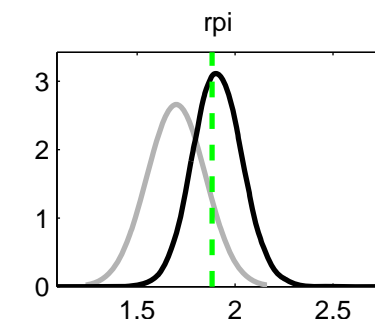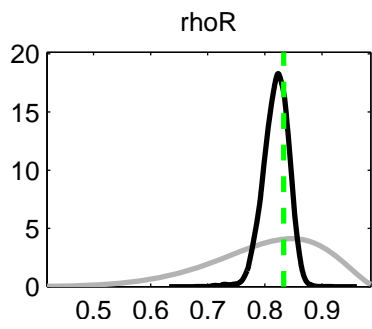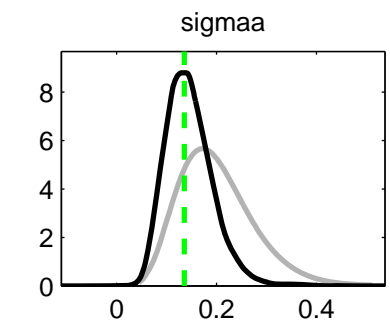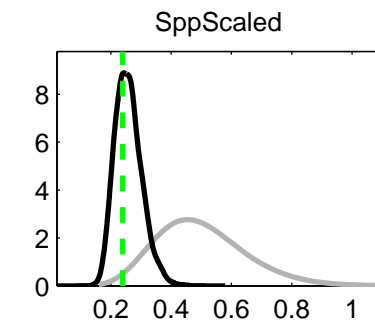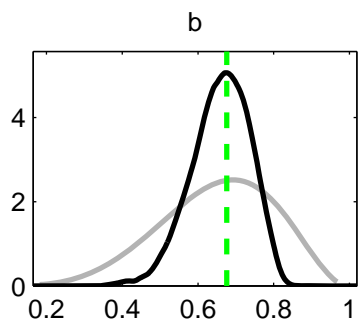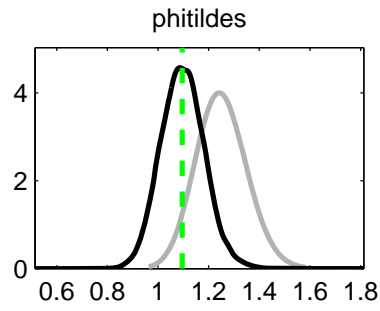
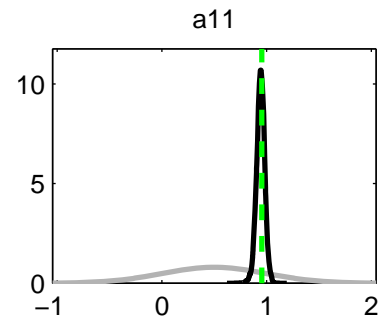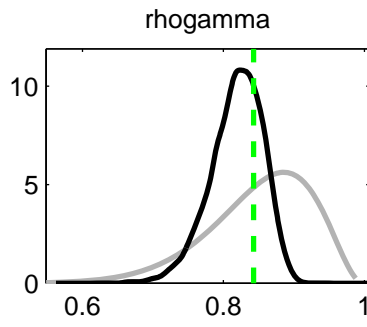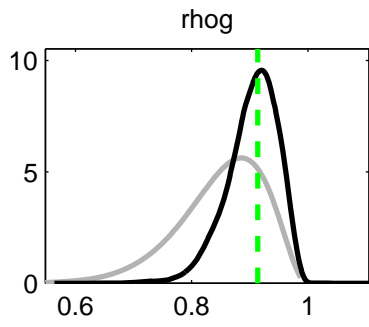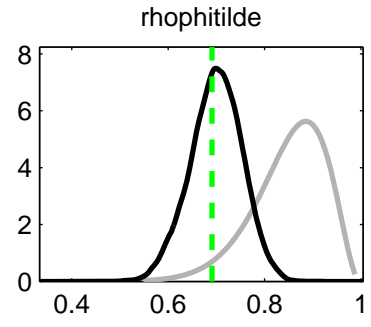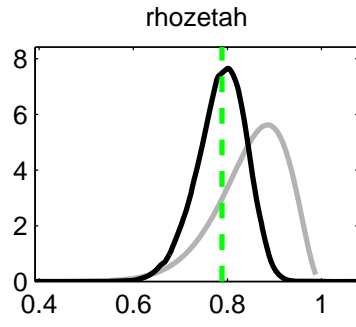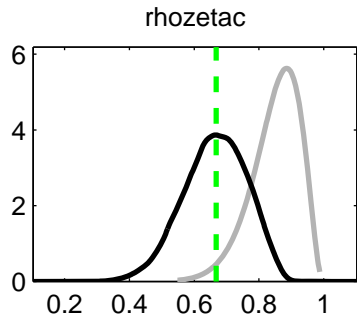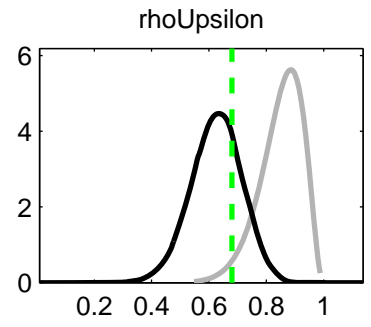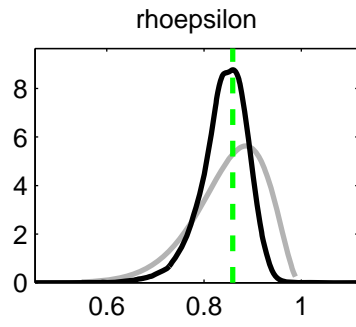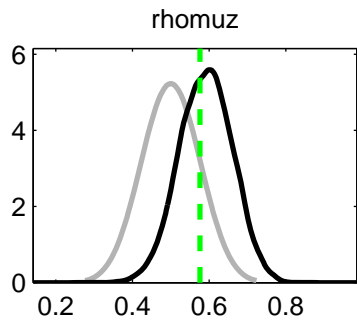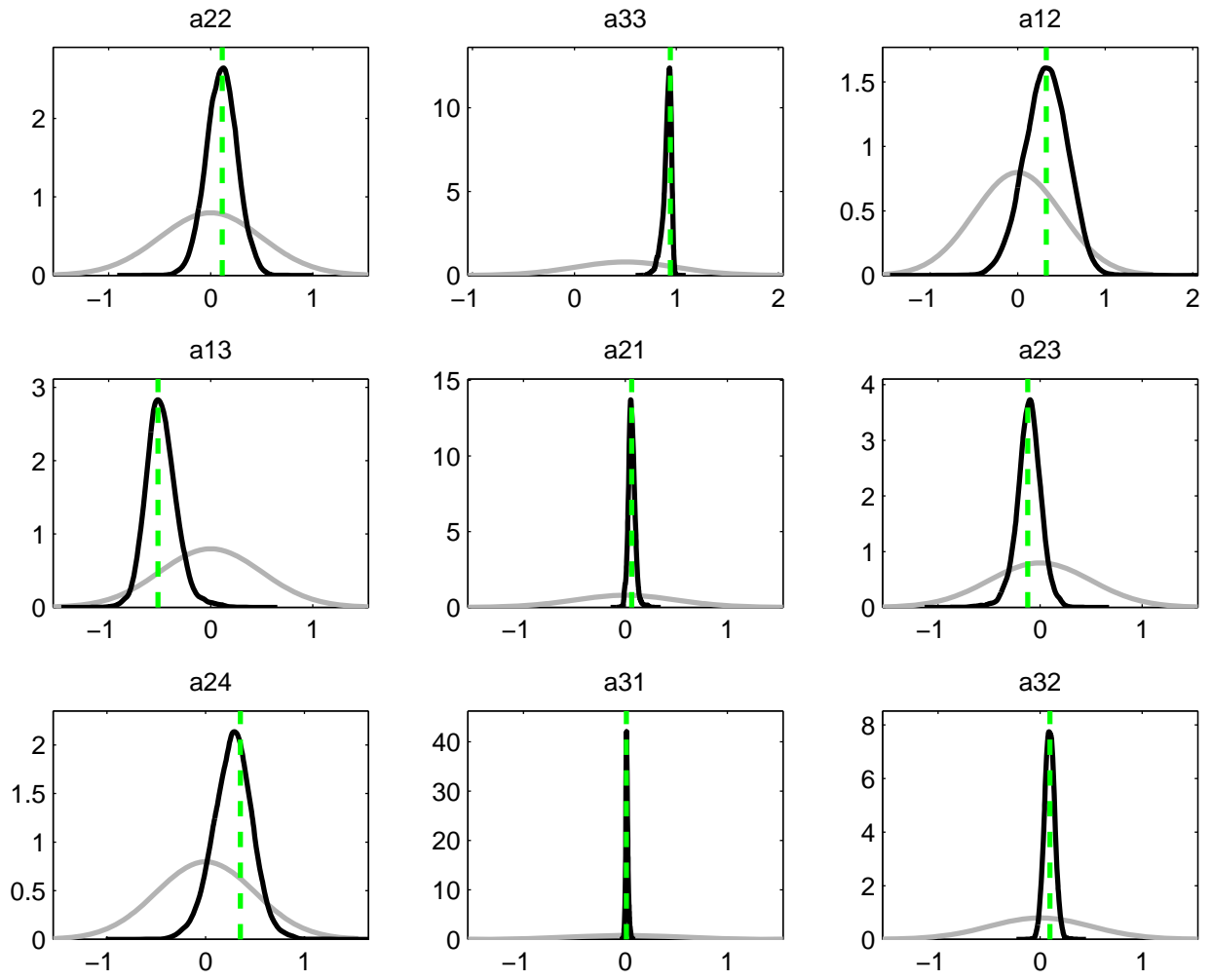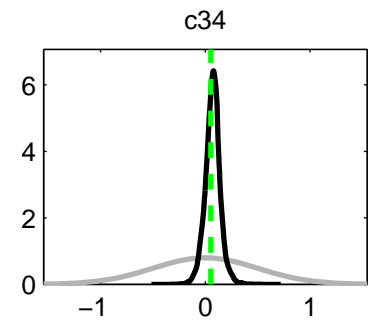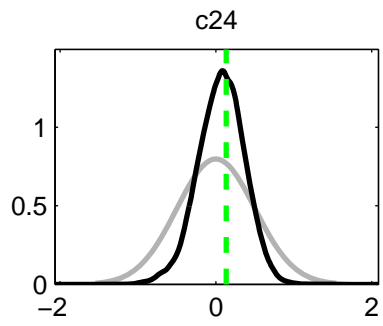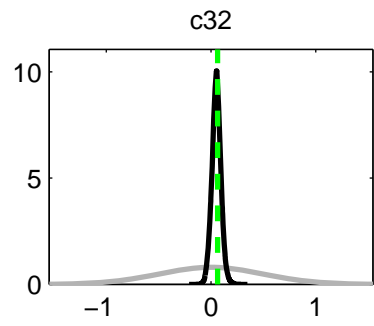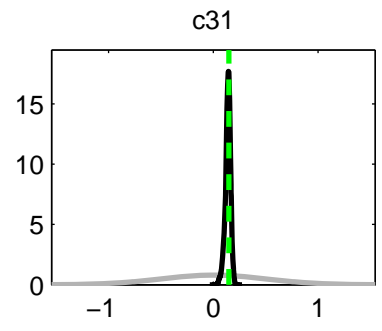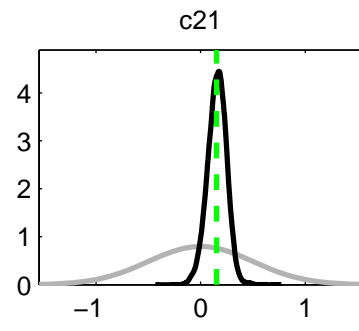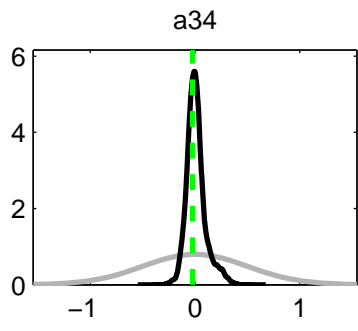# Consumption Preference Shock

Labor Preference Shock

Nom. Interest Rate (ABP)
CPI Inflation (ABP)
GDP (% dev.)
Consumption (% dev.)
Investment (% dev.)
Net Exports/Y (Lev. dev.)
Total Hours (% dev.)
Hours / Employee (% dev.)
Unempl. Rate (Lev. dev.)
Real Nash Wage (% dev.)
Shadow Wage, MPL (% dev.)
Nom. Exch. Rate (% dev.)
Net Worth (% dev.)
Spread (ABP)

Full Model
Financial Friction Model
Employment Friction Model
Baseline Model
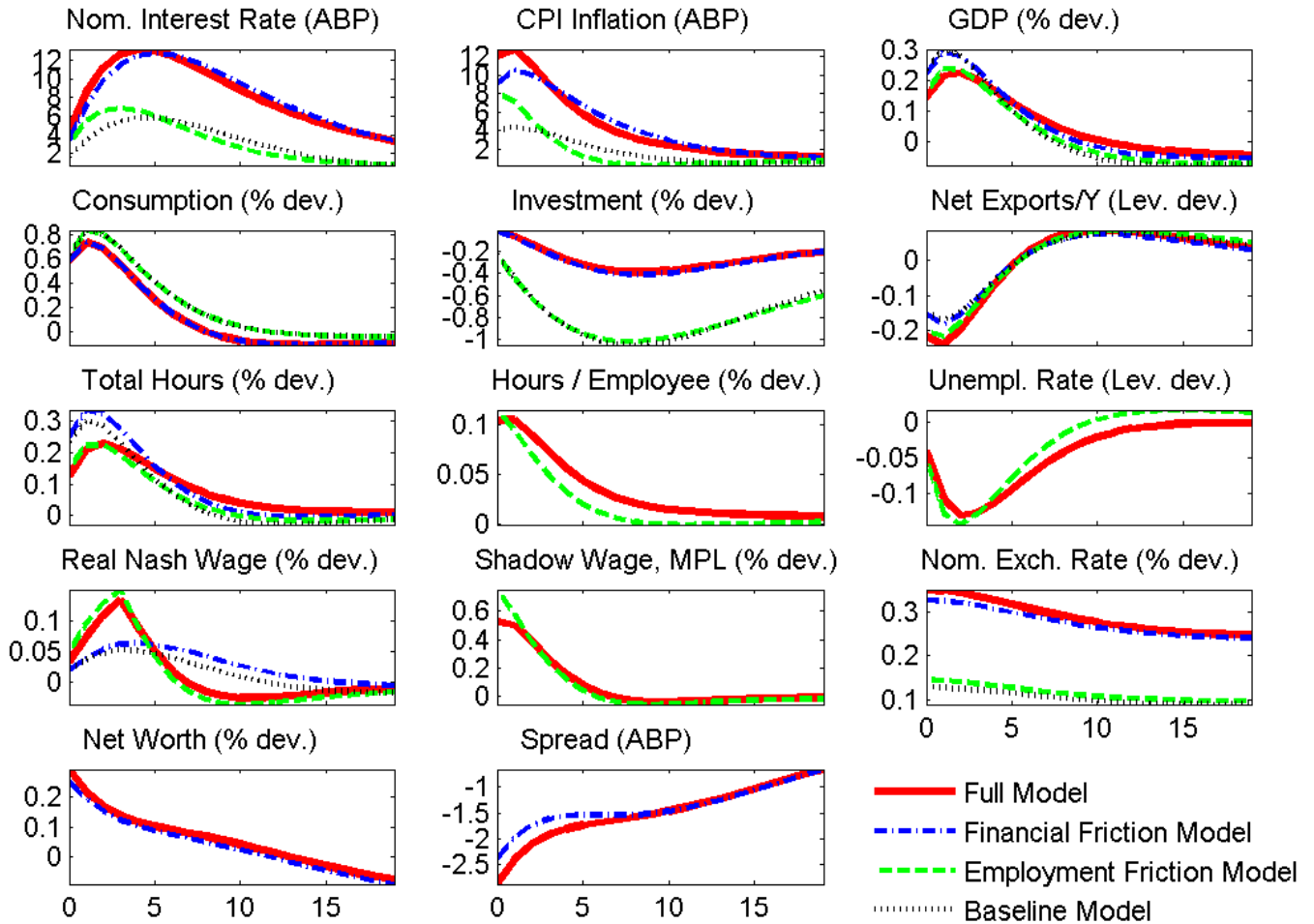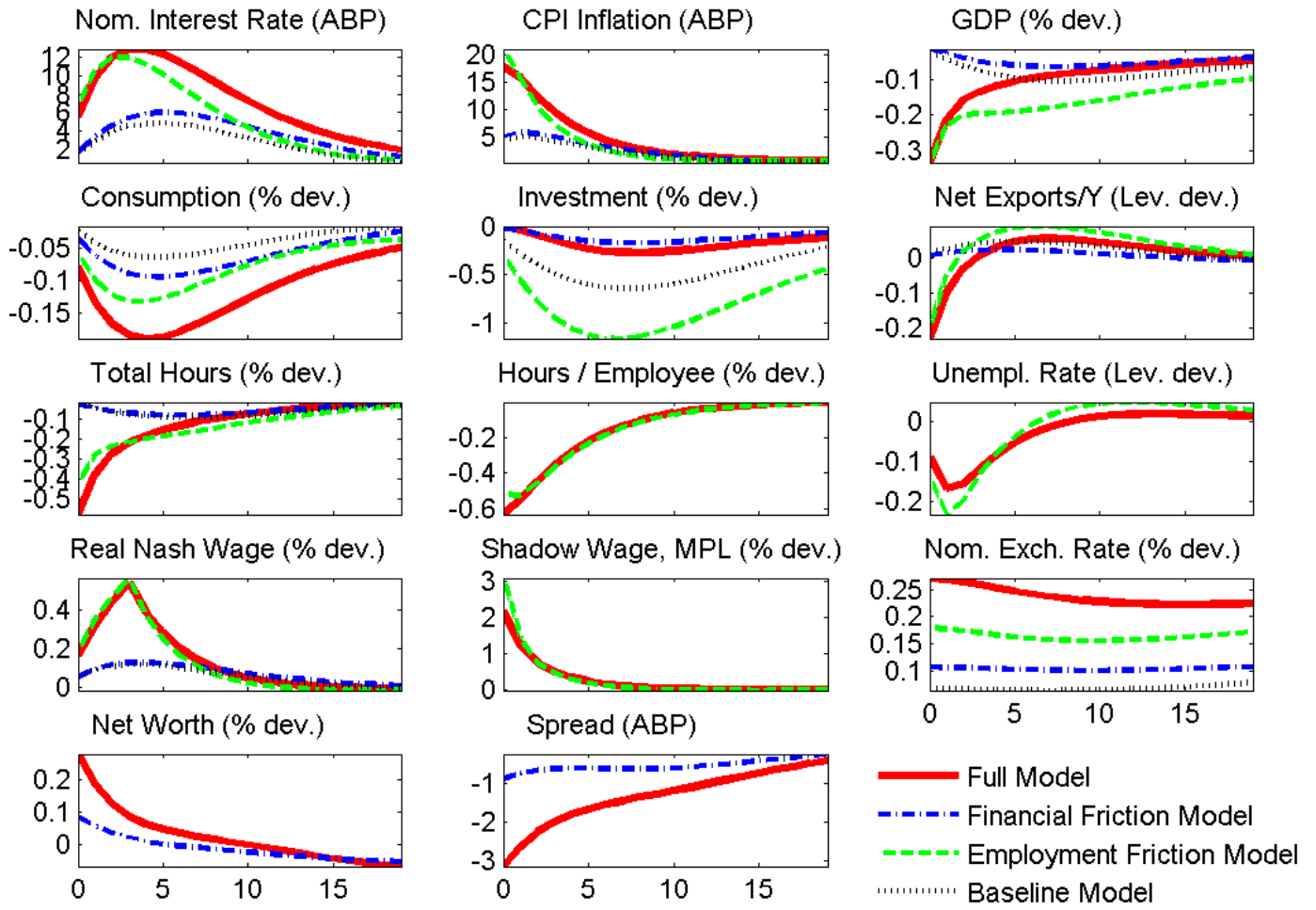
Government Consumption Shock

Nom. Interest Rate (ABP)

CPI Inflation (ABP)

GDP (% dev.)

Consumption (% dev.)

Investment (% dev.)

Net Exports/Y (Lev. dev.)

Total Hours (% dev.)

Hours / Employee (% dev.)

Unempl. Rate (Lev. dev.)

Real Nash Wage (% dev.)

Shadow Wage, MPL (% dev.)

Nom. Exch. Rate (% dev.)

Net Worth (% dev.)

Spread (ABP)

Full Model

Financial Friction Model

Employment Friction Model

Baseline Model

Domestic Markup Shock

Nom. Interest Rate (ABP)

CPI Inflation (ABP)

GDP (% dev.)

Consumption (% dev.)

Investment (% dev.)

Net Exports/Y (Lev. dev.)

Total Hours (% dev.)

Hours / Employee (% dev.)

Unempl. Rate (Lev. dev.)

Real Nash Wage (% dev.)

Shadow Wage, MPL (% dev.)

Nom. Exch. Rate (% dev.)

Net Worth (% dev.)

Spread (ABP)

—— Full Model
—·—·— Financial Friction Model
– – – Employment Friction Model
·········· Baseline Model

Import Export Markup Shock

Legend:
- **Full Model** (red solid line)
- **Financial Friction Model** (blue dash-dot line)
- **Employment Friction Model** (green dashed line)
- **Baseline Model** (black dotted line)
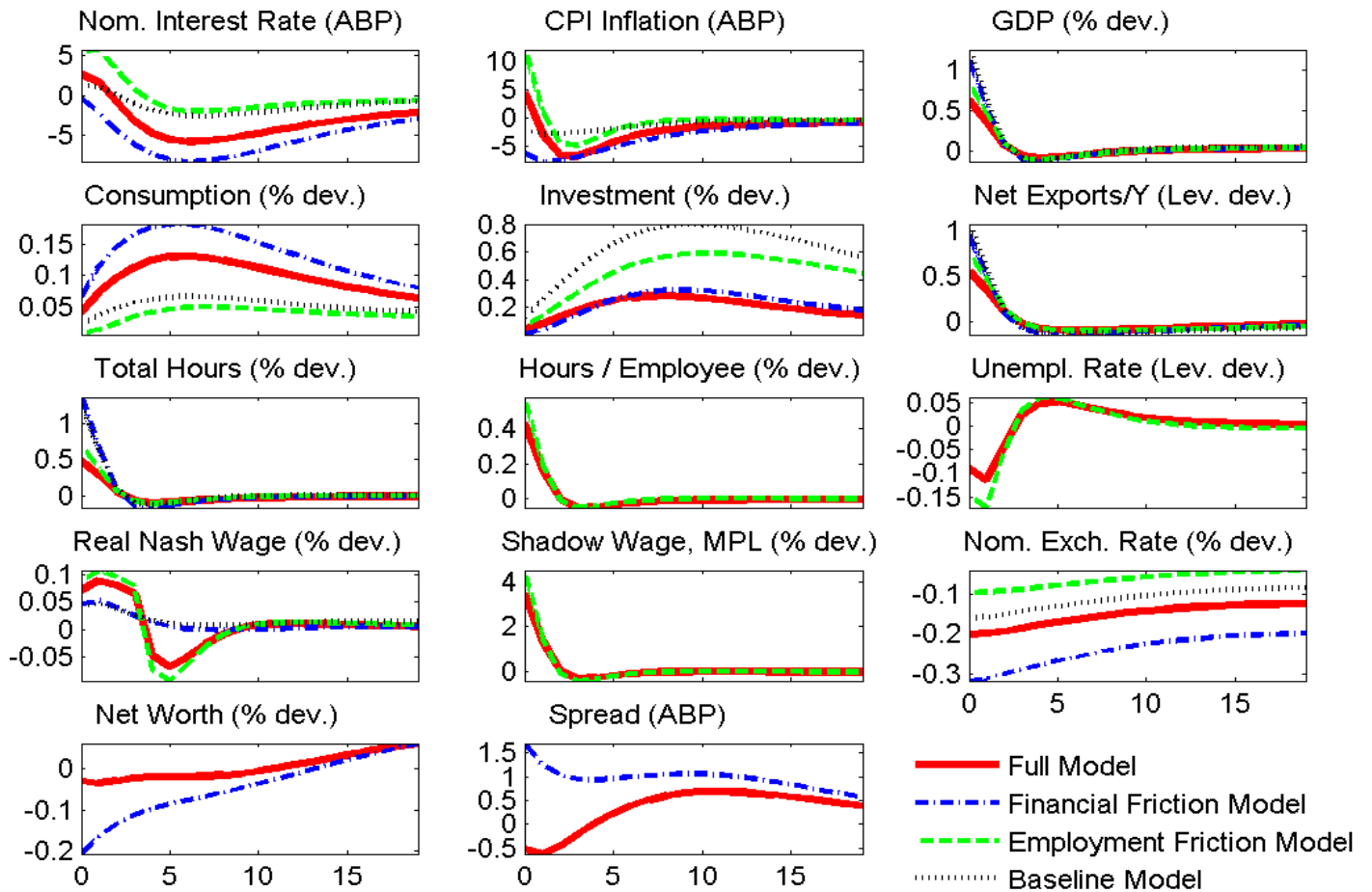
Import Consumption Markup Shock
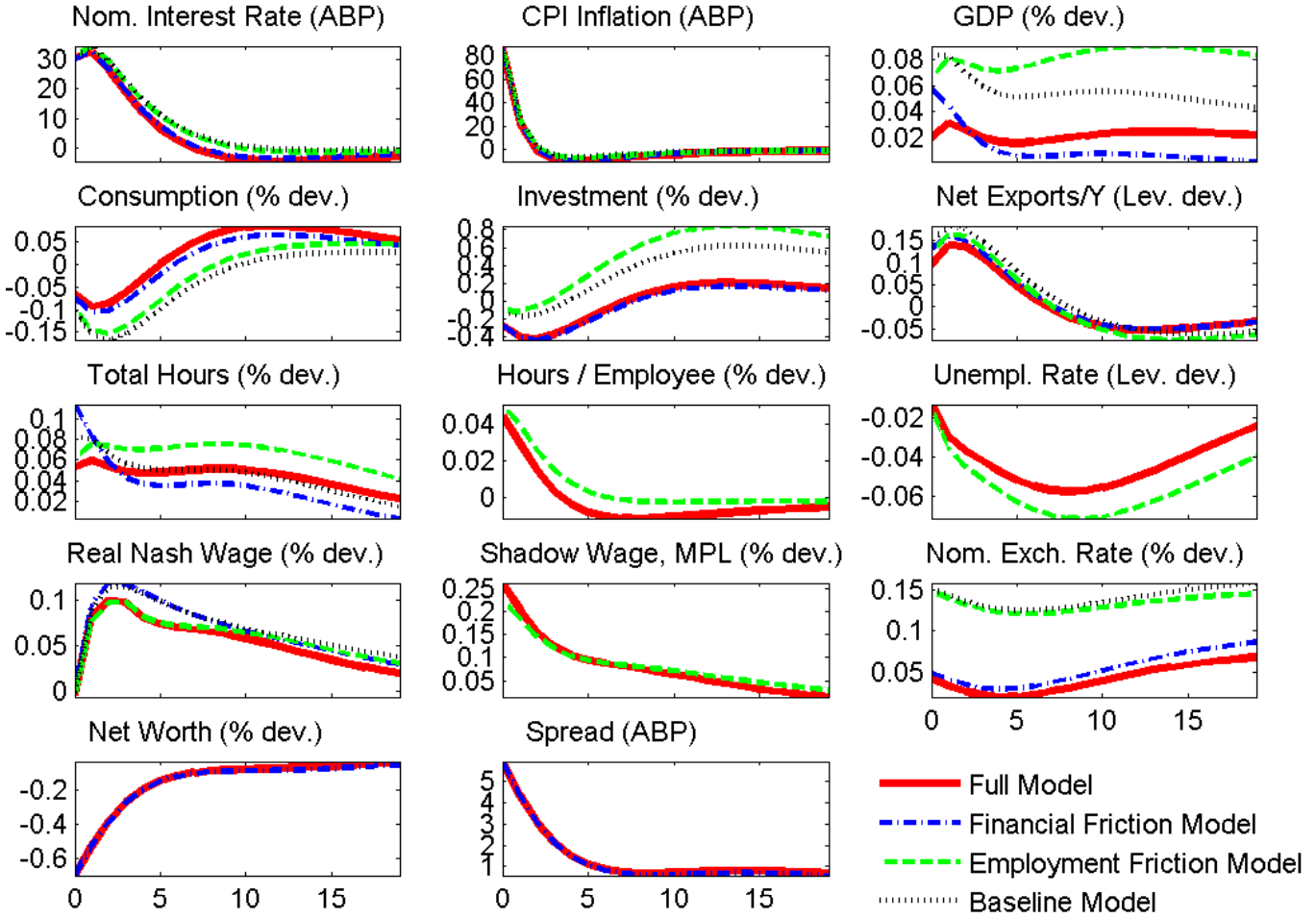
Import Investment Markup Shock

Nom. Interest Rate (ABP)
0.5
0
-0.5
-1

CPI Inflation (ABP)
1
0.5
0
-0.5

GDP (% dev.)
0.04
0.02
0
-0.02

Consumption (% dev.)
x 10⁻³
20
10
0

Investment (% dev.)
0
-0.2
-0.4

Net Exports/Y (Lev. dev.)
0.04
0.02
0

Total Hours (% dev.)
0.04
0.02
0
-0.02

Hours / Employee (% dev.)
x 10⁻³
10
5
0
-5

Unempl. Rate (Lev. dev.)
0.01
0
-0.01

Real Nash Wage (% dev.)
x 10⁻³
5
0
-5
-10
-15

Shadow Wage, MPL (% dev.)
0.08
0.06
0.04
0.02
0
-0.02

Nom. Exch. Rate (% dev.)
-0.02
-0.04

0   5   10   15

Net Worth (% dev.)
0.3
0.2
0.1
0

0   5   10   15

Spread (ABP)
0
-1
-2
-3

0   5   10   15

- Full Model
- Financial Friction Model
- Employment Friction Model
- Baseline Model

Export Markup Shock

Country Risk Premium Shock
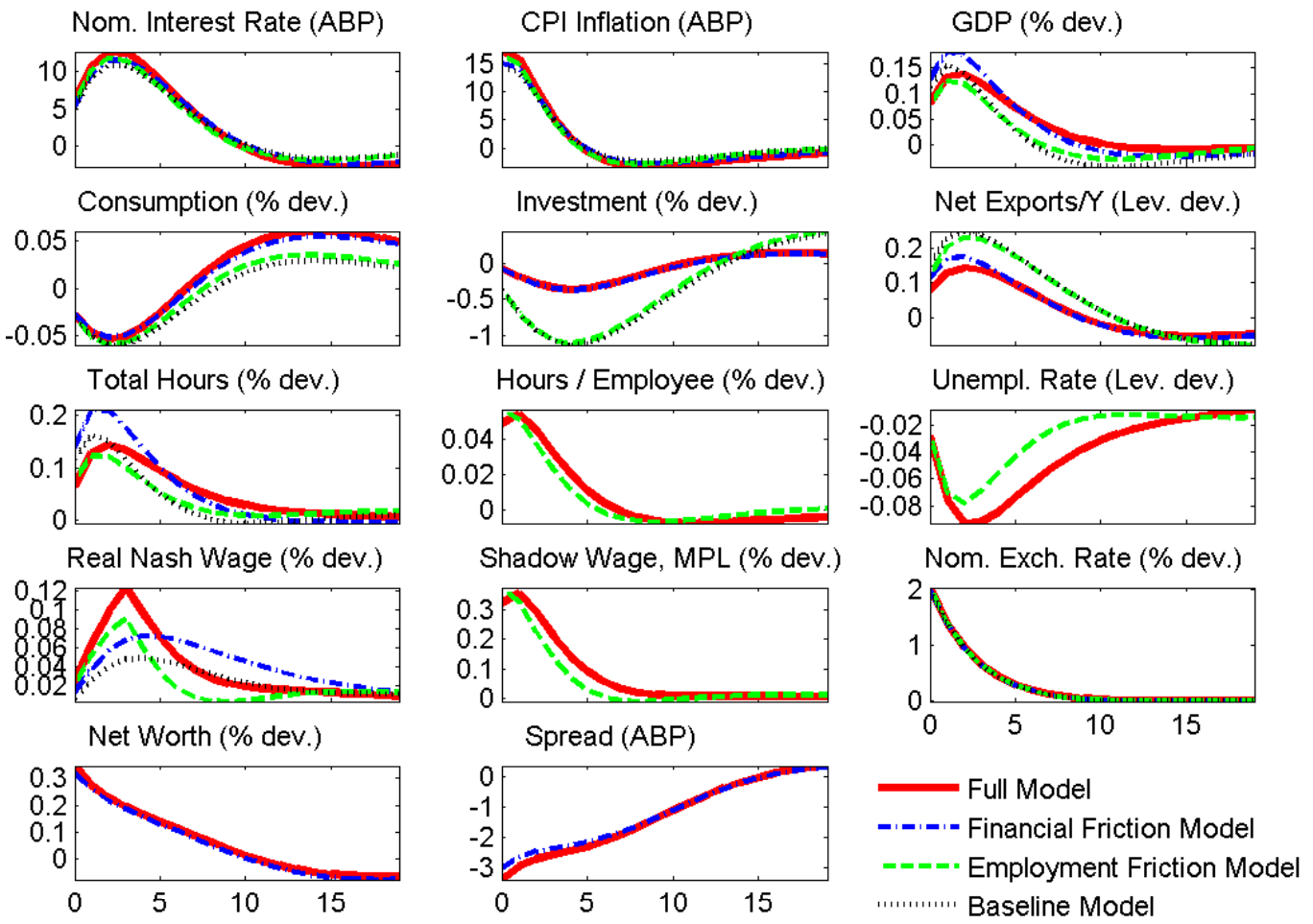
Unit-root Neutral Technology Shock

Nom. Interest Rate (ABP), CPI Inflation (ABP), GDP (% dev.), Consumption (% dev.), Investment (% dev.), Net Exports/Y (Lev. dev.), Total Hours (% dev.), Hours / Employee (% dev.), Unempl. Rate (Lev. dev.), Real Nash Wage (% dev.), Shadow Wage, MPL (% dev.), Nom. Exch. Rate (% dev.), Net Worth (% dev.), Spread (ABP)

Full Model
Financial Friction Model
Employment Friction Model
Baseline Model

Foreign Nominal Interest Rate Shock

Nom. Interest Rate (ABP)

CPI Inflation (ABP)

GDP (% dev.)

Consumption (% dev.)

Investment (% dev.)

Net Exports/Y (Lev. dev.)

Total Hours (% dev.)

Hours / Employee (% dev.)

Unempl. Rate (Lev. dev.)

Real Nash Wage (% dev.)

Shadow Wage, MPL (% dev.)

Nom. Exch. Rate (% dev.)

Net Worth (% dev.)

Spread (ABP)

- Full Model
- Financial Friction Model
- Employment Friction Model
- Baseline Model

Foreign Inflation Shock

Nom. Interest Rate (ABP)

CPI Inflation (ABP)

GDP (% dev.)

Consumption (% dev.)

Investment (% dev.)

Net Exports/Y (Lev. dev.)

Total Hours (% dev.)

Hours / Employee (% dev.)

Unempl. Rate (Lev. dev.)

Real Nash Wage (% dev.)

Shadow Wage, MPL (% dev.)

Nom. Exch. Rate (% dev.)

Net Worth (% dev.)

Spread (ABP)

— Full Model

—·— Financial Friction Model

--- Employment Friction Model

······ Baseline Model

Foreign Output Shock

Nom. Interest Rate (ABP)

CPI Inflation (ABP)

GDP (% dev.)

Consumption (% dev.)

Investment (% dev.)

Net Exports/Y (Lev. dev.)

Total Hours (% dev.)

Hours / Employee (% dev.)

Unempl. Rate (Lev. dev.)

Real Nash Wage (% dev.)

Shadow Wage, MPL (% dev.)

Nom. Exch. Rate (% dev.)

Net Worth (% dev.)

Spread (ABP)

Full Model

Financial Friction Model

Employment Friction Model

Baseline Model