Web Appendix to the paper
The Predictive Power of Google Searches in Forecasting US Unemployment

Francesco D'Amuri
Bank of Italy
and IZA

Juri Marcucci
Bank of Italy

April 29, 2017

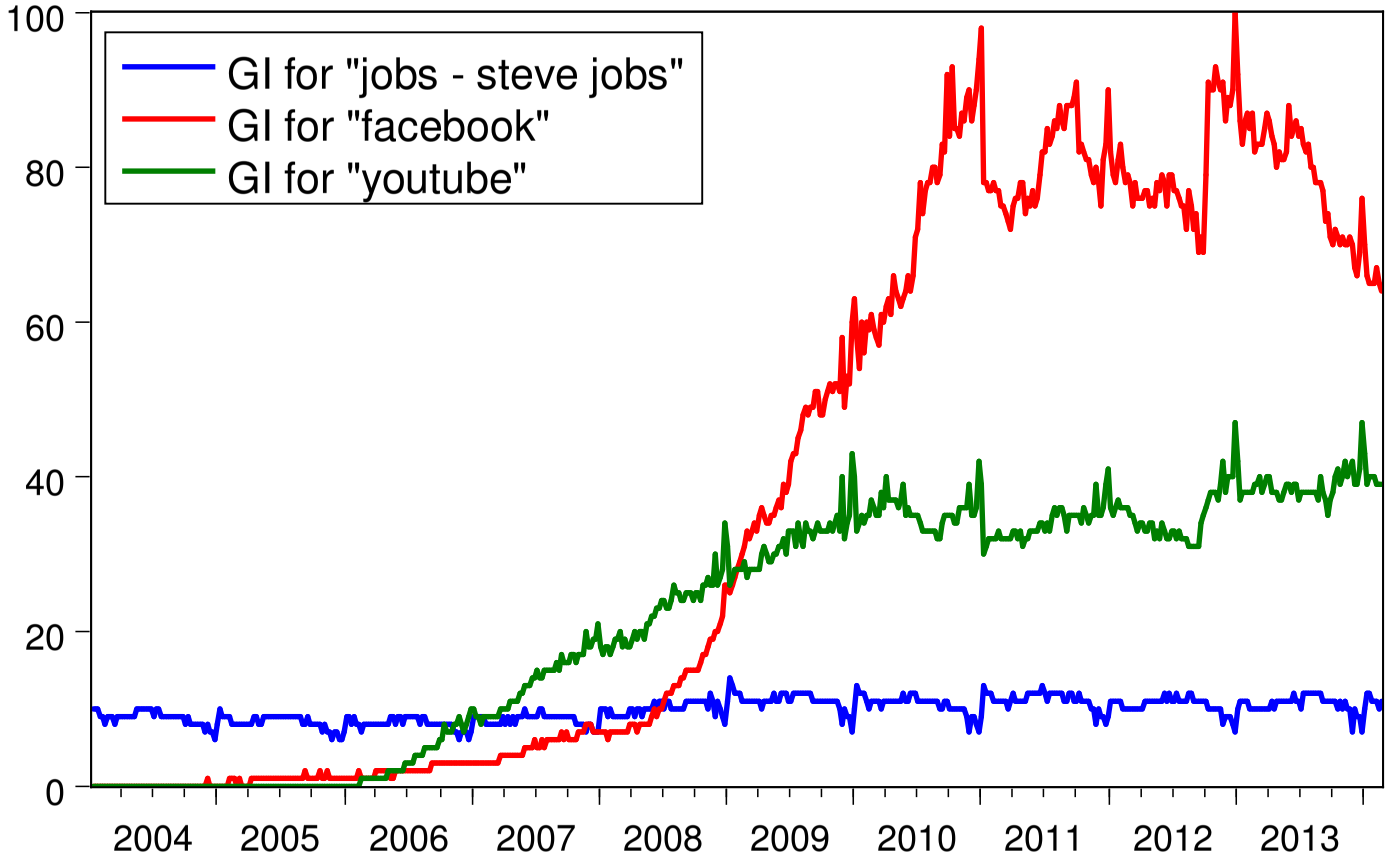
Contents

List of Figures

List of Tables

1 Additional Tables and Figures: federal level

Figure A.1: Relative incidence of keyword searches through Google



Notes: The figure depicts the relative incidence of the web searches for the keyword 'jobs' adopted to construct our preferred Google index along with more popular 'facebook' and 'youtube' keywords over the relevant sample 2004.1-2014.2.

Figure A.2: Exact timing of monthly US Unemployment rate calculation

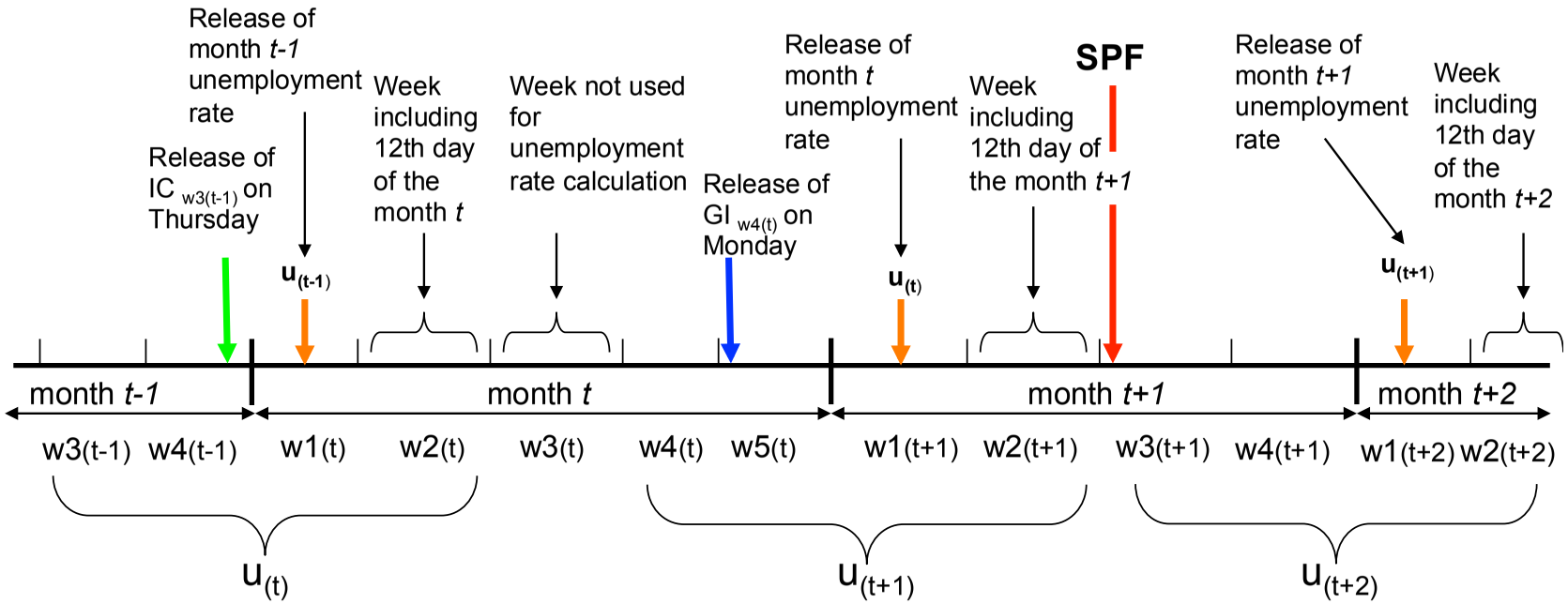
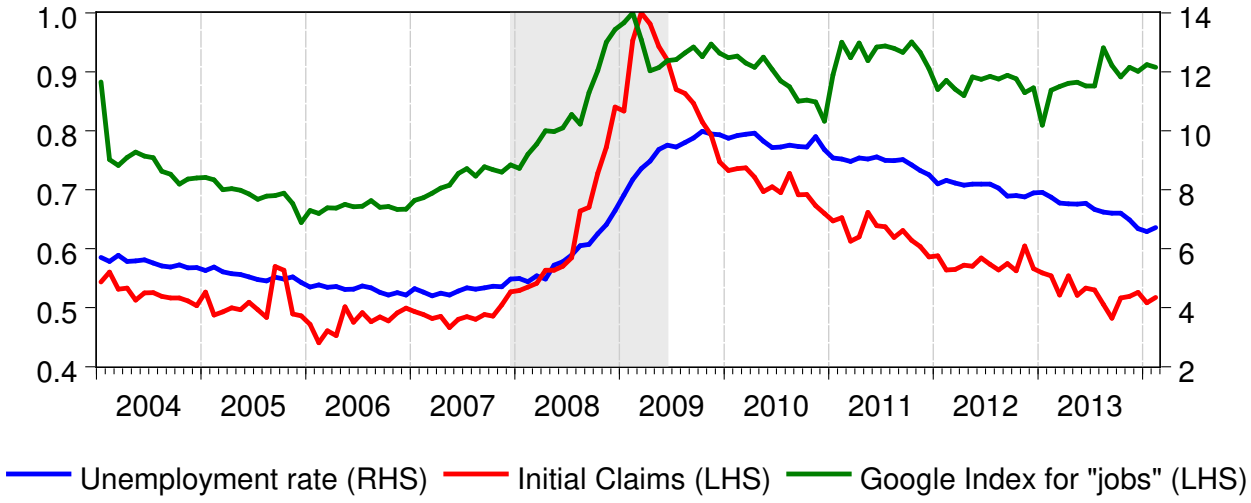
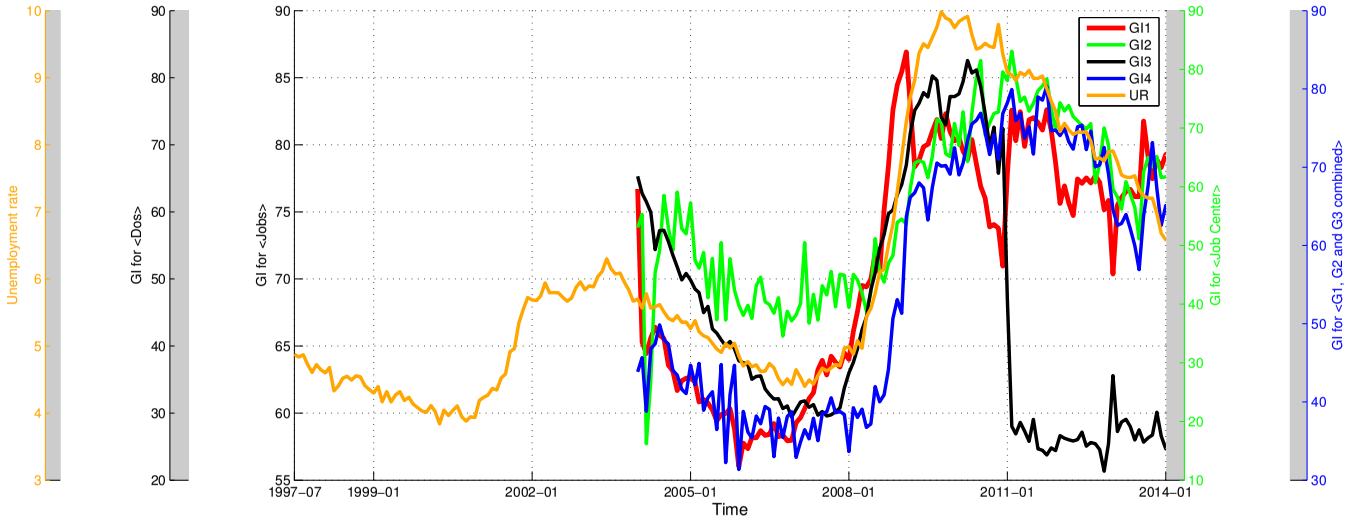


Figure A.3: US Unemployment rate, Initial claims and Google Index



Notes: Shaded areas identify NBER recessions. The Initial claims are monthly averages re-based on their maximum over the sample 2004.1-2014.2. The Google Index is the monthly average of Google 'jobs' searches rebased on their weekly maximum value over the sample 2004.1-2014.2.

Figure A.4: Different GIs related to unemployment and the Unemployment rate



Notes: The figure depicts all the Google indices used in the paper and the unemployment rate. Sample: 1997.7-2014.2 for the unemployment rate and 2004.1-2014.2 for the GIs. $G1$, $G2$, $G3$, and $G4$ are the monthly averages of the weekly Google indexes for keywords 'jobs', 'job center', 'dos' (the false index) and the combination of 'collect unemployment', 'jobs' and 'job center'.

Table a.1: Descriptive statistics: 2004.1-2014.2

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	
u_t	6.886	6.765	9.983	4.398	1.913	0.183	1.474	12.514	0.002***
IC_t	1550.5	1455.0	2615.0	1152.0	327.8	1.408	4.390	50.129	0.000***
$IC_{W1,t}$	387.5	359.0	670.0	282.0	83.1	1.437	4.603	55.038	0.000***
$IC_{W2,t}$	386.5	361.5	655.0	289.0	82.8	1.382	4.404	48.834	0.000***
$IC_{W3,t}$	388.2	363.0	659.0	294.0	80.8	1.376	4.401	48.449	0.000***
$IC_{W4,t}$	388.4	364.0	650.0	283.0	84.9	1.323	4.108	41.825	0.000***
EEM_t	51.8	53.2	62.1	25.5	6.8	-1.841	6.985	149.621	0.000***
$EENM_t$	51.0	52.8	60.2	31.5	5.6	-1.492	5.117	68.025	0.000***
CE_t	-19.4	-22.1	11.4	-46.1	18.8	0.157	1.570	10.897	0.004***
CE_t^{6M}	-6.7	-3.7	6.2	-40.2	8.8	-1.659	5.616	90.739	0.000***
EPU_t	119.9	110.7	245.1	57.2	42.6	0.407	2.208	6.555	0.037**
$G1_t$	71.3	74.9	86.9	56.0	8.9	-0.202	1.510	12.111	0.002***
$G1_{W1,t}$	70.2	73.0	97.1	56.1	9.2	0.176	2.259	3.389	0.184
$G1_{W2,t}$	70.8	73.2	90.9	57.3	8.8	0.026	1.720	8.272	0.016**
$G1_{W3,t}$	72.0	74.2	90.2	55.6	9.4	-0.093	1.616	9.909	0.007***
$G1_{W4,t}$	71.9	75.5	90.4	54.9	9.4	-0.158	1.612	10.303	0.006***
$G2_t$	41.8	55.2	81.9	4.1	24.5	-0.453	1.501	12.909	0.002***
$G2_{W1,t}$	47.2	54.6	80.4	13.4	19.0	-0.648	2.007	9.545	0.008***
$G2_{W2,t}$	46.8	50.9	81.0	12.8	18.8	-0.238	1.720	7.850	0.020**
$G2_{W3,t}$	49.6	57.0	90.2	13.8	20.4	-0.383	1.892	6.803	0.033**
$G2_{W4,t}$	49.4	58.3	78.3	12.7	19.7	-0.762	2.047	11.715	0.003***
$G3_t$	56.2	56.4	83.1	16.2	14.2	-0.072	2.076	4.446	0.108
$G3_{W1,t}$	56.5	56.4	90.2	19.8	14.8	-0.111	2.150	3.890	0.143
$G3_{W2,t}$	55.6	53.0	85.9	27.3	14.4	0.154	1.981	5.710	0.058*
$G3_{W3,t}$	57.3	58.0	91.5	25.4	15.1	0.011	1.961	5.490	0.064*
$G3_{W4,t}$	57.6	58.3	93.8	22.6	15.8	-0.020	2.302	2.489	0.288
$G4_t$	44.3	37.4	82.6	21.3	18.8	0.689	2.051	14.238	0.001***
$G4_{W1,t}$	44.3	37.7	86.8	20.3	19.1	0.687	2.087	13.831	0.001***
$G4_{W2,t}$	44.3	36.4	83.1	21.0	19.1	0.693	2.030	14.543	0.001***
$G4_{W3,t}$	44.3	37.7	86.8	20.3	19.1	0.687	2.087	13.831	0.001***
$G4_{W4,t}$	44.3	36.4	83.1	21.0	19.1	0.693	2.030	14.543	0.001***

Notes: u_t is the US monthly unemployment rate in levels. IC indicates the monthly initial claims, while $G1$, $G2$, $G3$, and $G4$ are the monthly averages of the weekly Google indexes for keywords 'jobs', 'job center', 'dos' (the false index) and the combination of 'collect unemployment', 'jobs' and 'job center' used as leading indicators. EEM_t and $EENM_t$ are the employment expectations for the manufacturing and non-manufacturing sector, respectively, from the Institute for Supply Management (ISM). CE_t and CE_t^{6M} are respectively the actual and for six-months hence consumer employment expectations from the US Consumer Confidence survey of the Conference Board. The actual consumer employment expectations are the difference between those who respond 'jobs hard to get' and 'jobs plentiful'. The six-month in advance consumer expectations on unemployment are given by the difference between the percentage of consumers saying there will be 'fewer jobs' and that one saying there will be 'more jobs' six months from now. EPU_t is the Economic Policy Uncertainty index by Baker, Bloom, and Davis (2016). The subscripts Wj indicate the j^{th} week. ***, ** and * indicate rejection of the null of normality at 1, 5 and 10%, respectively.

Table a.2: Correlations: sample 2004.1-2014.2

	u_t	IC_t	$IC_{W1,t}$	$IC_{W2,t}$	$IC_{W3,t}$	$IC_{W4,t}$	EEM_t	$EENM_t$	CE_t	CE_t^{6M}	$G1_t$	$G1_{W1,t}$	$G1_{W2,t}$	$G1_{W3,t}$	$G1_{W4,t}$
u_t	1														
IC_t	0.64	1													
$IC_{W1,t}$	0.65	0.99	1												
$IC_{W2,t}$	0.64	0.99	0.99	1											
$IC_{W3,t}$	0.63	0.99	0.96	0.97	1										
$IC_{W4,t}$	0.63	0.99	0.97	0.97	0.98	1									
EEM_t	0.22	-0.51	-0.48	-0.48	-0.52	-0.52	1								
$EENM_t$	-0.14	-0.78	-0.76	-0.75	-0.77	-0.79	0.80	1							
CE_t	-0.96	-0.68	-0.68	-0.67	-0.67	-0.67	-0.10	0.23	1						
CE_t^{6M}	0.15	-0.40	-0.37	-0.40	-0.40	-0.40	0.72	0.67	0.04	1					
$G1_t$	0.80	0.61	0.59	0.58	0.60	0.62	-0.08	-0.30	-0.88	-0.15	1				
$G1_{W1,t}$	0.70	0.53	0.51	0.50	0.54	0.54	-0.07	-0.25	-0.77	-0.13	0.87	1			
$G1_{W2,t}$	0.74	0.52	0.52	0.51	0.49	0.53	-0.02	-0.21	-0.79	-0.07	0.88	0.58	1		
$G1_{W3,t}$	0.77	0.60	0.58	0.57	0.60	0.62	-0.09	-0.31	-0.86	-0.16	0.97	0.81	0.85	1	
$G1_{W4,t}$	0.76	0.60	0.58	0.58	0.60	0.62	-0.14	-0.34	-0.84	-0.20	0.97	0.86	0.81	0.93	1

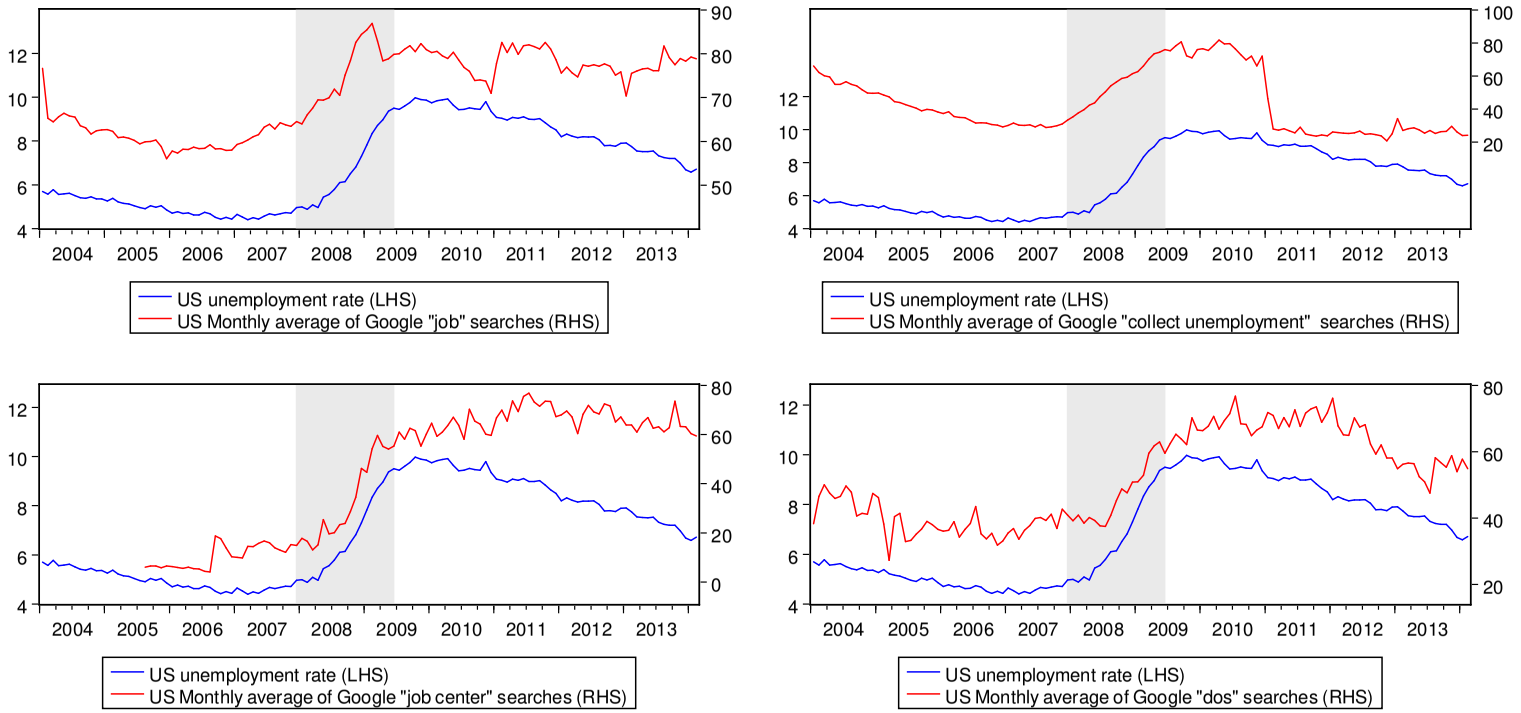
Notes: u_t is the US monthly unemployment rate in levels. IC and $G1$ are the monthly average of initial claims and the monthly average of Google index used as leading indicators. The first subscript wj indicates the j^{th} week.

Table a.3: Correlations: sample 2004.1-2014.2

	u_t	$G1_t$	$G1_{W1,t}$	$G1_{W2,t}$	$G1_{W3,t}$	$G1_{W4,t}$	EPU_t	$h1^{JLN}$	$h3^{JLN}$	$h12^{JLN}$	OV_t
u_t	1	0.87	0.71	0.71	0.86	0.85	0.78	0.10	0.08	0.01	0.11
$G1_t$	0.87	1	0.74	0.73	0.98	0.98	0.78	0.22	0.21	0.16	-0.03
$G1_{W1,t}$	0.71	0.74	1	0.86	0.77	0.79	0.62	0.20	0.19	0.15	-0.03
$G1_{W2,t}$	0.71	0.73	0.86	1	0.77	0.76	0.65	0.19	0.18	0.14	-0.07
$G1_{W3,t}$	0.86	0.98	0.77	0.77	1	0.97	0.77	0.24	0.23	0.18	-0.04
$G1_{W4,t}$	0.85	0.98	0.79	0.76	0.97	1	0.78	0.27	0.25	0.21	-0.02
EPU_t	0.78	0.78	0.62	0.65	0.77	0.78	1	0.19	0.18	0.13	0.07
$h1^{JLN}$	0.10	0.22	0.20	0.19	0.24	0.27	0.19	1	1.00	0.98	0.34
$h3^{JLN}$	0.08	0.21	0.19	0.18	0.23	0.25	0.18	1.00	1	0.99	0.34
$h12^{JLN}$	0.01	0.16	0.15	0.14	0.18	0.21	0.13	0.98	0.99	1	0.34
OV_t	0.11	-0.03	-0.03	-0.07	-0.04	-0.02	0.07	0.34	0.34	0.34	1

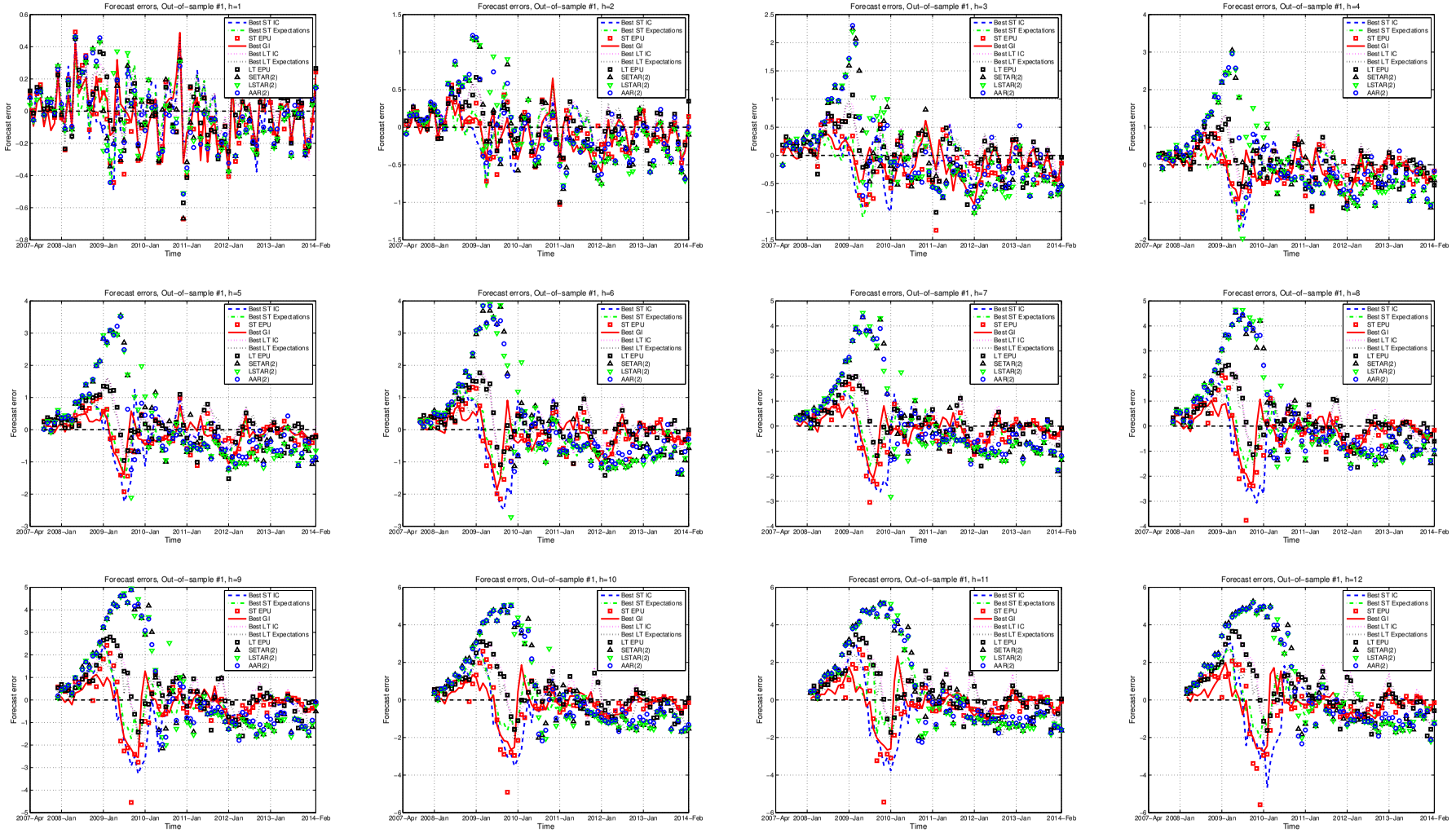
Notes: u_t is the US monthly unemployment rate in levels. $G1$ is the monthly average of the Google index used as a leading indicator. The first subscript wj indicates the j^{th} week. EPU_t is the Economic Policy Uncertainty index by Baker, Bloom and Davis (2016). hj^{JLN} with $j = 1, 3, 12$ is the j-th month-ahead uncertainty index by Jurado, Ludvigson, and Ng (2015). OV_t is the macro uncertainty index by Orlik and Veldkamp (2014).

Figure A.5: US Unemployment rate and Google indexes: Short sample 2004.1-2014.2



Notes: Shaded areas identify NBER recessions. The Google index is the monthly average of weekly Google searches. In particular, $G1$, $G2$, $G3$, and $G4$ are the monthly averages of the weekly Google indexes for keywords 'jobs', 'job center', 'dos' (the false index) and the combination of 'collect unemployment', 'jobs' and 'job center' used as leading indicators. All Google indexes are rebased. Sample: 2004.1-2014.2.

Figure A.6: Forecast errors across forecast horizons



Notes: In this figure we compare the h-step-ahead forecast errors (h=1,2,...,12) generated by our best model in each category (IC short and long sample, Expectations short and long sample, Google models and non-linear ones). The out-of-sample period is 2007.3-2014.2. SETAR, LSTAR and AAR are the corresponding non-linear models estimated over the long sample with two lags.

1.1 Raw Google Indexes

Table a.4: Descriptive statistics for the Google indexes 'jobs' downloaded from different IP addresses and over different days: short sample 2004.1-2014.2

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	
$G1_t^{IP1,day\ 1}$	71.2	74.6	86.9	56.5	8.9	-0.190	1.509	12.032	0.002***
$G1_{W1,t}^{IP1,day\ 1}$	70.1	71.1	98.1	56.0	9.3	0.259	2.493	2.650	0.266
$G1_{W2,t}^{IP1,day\ 1}$	70.7	72.9	89.0	57.1	8.8	0.012	1.663	9.015	0.011**
$G1_{W3,t}^{IP1,day\ 1}$	72.1	74.7	90.5	54.9	9.4	-0.084	1.644	9.492	0.009***
$G1_{W4,t}^{IP1,day\ 1}$	71.8	75.8	88.9	55.5	9.5	-0.159	1.578	10.791	0.005***
$G1_t^{IP1,day\ 2}$	70.8	74.4	86.0	56.0	8.8	-0.203	1.504	12.214	0.002***
$G1_{W1,t}^{IP1,day\ 2}$	69.8	72.4	95.6	55.7	9.1	0.150	2.199	3.686	0.158
$G1_{W2,t}^{IP1,day\ 2}$	70.4	72.1	90.7	56.3	8.8	0.023	1.709	8.412	0.015**
$G1_{W3,t}^{IP1,day\ 2}$	71.5	73.6	92.0	56.2	9.4	-0.057	1.657	9.235	0.010***
$G1_{W4,t}^{IP1,day\ 2}$	71.3	75.1	88.3	55.9	9.3	-0.179	1.570	11.040	0.004***
$G1_t^{IP1,day\ 3}$	72.0	75.6	87.4	57.2	9.0	-0.189	1.502	12.142	0.002***
$G1_{W1,t}^{IP1,day\ 3}$	70.9	74.1	99.2	55.6	9.4	0.208	2.438	2.470	0.291
$G1_{W2,t}^{IP1,day\ 3}$	71.5	73.6	90.9	57.7	8.9	0.037	1.713	8.383	0.015**
$G1_{W3,t}^{IP1,day\ 3}$	72.8	74.5	90.3	57.7	9.6	-0.041	1.612	9.833	0.007***
$G1_{W4,t}^{IP1,day\ 3}$	72.6	75.9	90.7	54.4	9.5	-0.157	1.613	10.280	0.006***
$G1_t^{IP1,day\ 4}$	71.6	74.9	88.2	55.9	8.9	-0.199	1.525	11.864	0.003***
$G1_{W1,t}^{IP1,day\ 4}$	70.4	73.0	97.1	56.2	9.3	0.177	2.262	3.375	0.185
$G1_{W2,t}^{IP1,day\ 4}$	71.1	73.0	91.5	56.9	9.1	0.003	1.691	8.643	0.013**
$G1_{W3,t}^{IP1,day\ 4}$	72.5	74.8	89.4	55.5	9.4	-0.089	1.637	9.598	0.008***
$G1_{W4,t}^{IP1,day\ 4}$	72.2	75.7	90.4	56.5	9.4	-0.163	1.611	10.355	0.006***
$G1_t^{IP1,day\ 5}$	72.0	75.4	89.0	56.5	9.0	-0.191	1.526	11.783	0.003***
$G1_{W1,t}^{IP1,day\ 5}$	70.9	73.6	97.8	56.3	9.3	0.160	2.227	3.529	0.171
$G1_{W2,t}^{IP1,day\ 5}$	71.5	73.6	91.4	57.4	9.0	0.016	1.718	8.297	0.016**
$G1_{W3,t}^{IP1,day\ 5}$	72.9	75.3	90.3	55.4	9.5	-0.091	1.621	9.836	0.007***
$G1_{W4,t}^{IP1,day\ 5}$	72.6	76.0	90.5	56.2	9.4	-0.155	1.616	10.229	0.006***
$G1_t^{IP1,day\ 6}$	70.7	74.1	86.8	55.6	8.8	-0.195	1.525	11.841	0.003***
$G1_{W1,t}^{IP1,day\ 6}$	69.7	71.9	98.2	55.3	9.2	0.283	2.600	2.424	0.298
$G1_{W2,t}^{IP1,day\ 6}$	70.2	72.4	88.7	56.5	8.7	0.010	1.667	8.963	0.011**
$G1_{W3,t}^{IP1,day\ 6}$	71.3	73.4	91.0	55.4	9.4	-0.085	1.684	8.948	0.011**
$G1_{W4,t}^{IP1,day\ 6}$	71.4	74.3	90.0	53.1	9.4	-0.138	1.684	9.186	0.010**
$G1_t^{IP1,day\ 7}$	71.6	74.8	87.3	56.4	9.0	-0.199	1.519	11.957	0.003***
$G1_{W1,t}^{IP1,day\ 7}$	70.6	73.4	95.5	56.4	9.1	0.088	2.039	4.811	0.090*
$G1_{W2,t}^{IP1,day\ 7}$	71.0	73.3	91.4	56.6	8.9	0.047	1.770	7.678	0.022**
$G1_{W3,t}^{IP1,day\ 7}$	72.3	73.4	89.7	56.3	9.5	-0.103	1.605	10.109	0.006***
$G1_{W4,t}^{IP1,day\ 7}$	72.2	75.1	90.2	54.0	9.6	-0.153	1.601	10.426	0.005***
$G1_t^{IP1,day\ 8}$	71.2	75.1	85.5	55.9	8.9	-0.215	1.496	12.440	0.002***
$G1_{W1,t}^{IP1,day\ 8}$	70.2	71.1	97.0	56.1	9.3	0.182	2.211	3.808	0.149
$G1_{W2,t}^{IP1,day\ 8}$	70.7	72.5	91.8	57.1	8.9	0.019	1.740	8.016	0.018**
$G1_{W3,t}^{IP1,day\ 8}$	72.0	73.8	90.3	54.7	9.4	-0.117	1.634	9.763	0.008***
$G1_{W4,t}^{IP1,day\ 8}$	71.7	75.2	91.3	56.2	9.5	-0.141	1.635	9.875	0.007***

(Continued on next page)

Table a.4 – continued

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	
$G1_{t}^{IP1,day\ 9}$	72.2	76.2	88.0	57.3	9.0	-0.209	1.511	12.157	0.002***
$G1_{W1,t}^{IP1,day\ 9}$	71.1	74.0	96.9	55.9	9.4	0.121	2.169	3.775	0.151
$G1_{W2,t}^{IP1,day\ 9}$	71.6	73.7	91.1	57.8	9.0	-0.013	1.654	9.138	0.010**
$G1_{W3,t}^{IP1,day\ 9}$	72.9	74.8	89.6	55.8	9.5	-0.100	1.633	9.703	0.008***
$G1_{W4,t}^{IP1,day\ 9}$	72.8	76.1	93.8	55.2	9.5	-0.143	1.672	9.372	0.009***
$G1_{t}^{IP1,day\ 10}$	70.2	73.7	85.1	55.4	8.8	-0.196	1.506	12.124	0.002***
$G1_{W1,t}^{IP1,day\ 10}$	69.2	71.7	95.8	55.3	9.2	0.230	2.435	2.675	0.263
$G1_{W2,t}^{IP1,day\ 10}$	69.7	72.0	90.0	56.4	8.6	0.046	1.716	8.352	0.015**
$G1_{W3,t}^{IP1,day\ 10}$	71.0	73.4	91.3	54.7	9.4	-0.058	1.672	9.032	0.011**
$G1_{W4,t}^{IP1,day\ 10}$	70.9	74.4	89.1	53.5	9.4	-0.154	1.627	10.062	0.007***
$G1_{t}^{IP1,day\ 11}$	71.6	74.8	87.7	56.4	9.0	-0.186	1.516	11.895	0.003***
$G1_{W1,t}^{IP1,day\ 11}$	70.6	72.5	100.9	56.1	9.5	0.320	2.718	2.469	0.291
$G1_{W2,t}^{IP1,day\ 11}$	71.1	72.9	89.2	57.7	8.9	-0.010	1.665	8.984	0.011**
$G1_{W3,t}^{IP1,day\ 11}$	72.4	74.6	91.0	54.4	9.5	-0.066	1.631	9.614	0.008***
$G1_{W4,t}^{IP1,day\ 11}$	72.2	75.5	90.4	56.8	9.3	-0.147	1.595	10.470	0.005***
$G1_{t}^{IP1,day\ 12}$	71.7	75.1	87.1	56.1	9.0	-0.201	1.515	12.036	0.002***
$G1_{W1,t}^{IP1,day\ 12}$	70.4	72.8	97.9	56.2	9.2	0.179	2.252	3.467	0.177
$G1_{W2,t}^{IP1,day\ 12}$	71.1	73.4	90.9	57.2	9.0	0.044	1.722	8.271	0.016**
$G1_{W3,t}^{IP1,day\ 12}$	72.5	74.1	90.0	55.5	9.6	-0.099	1.600	10.159	0.006***
$G1_{W4,t}^{IP1,day\ 12}$	72.4	75.3	92.0	56.2	9.6	-0.140	1.617	10.122	0.006***
$G1_{t}^{IP2,day\ 1}$	70.8	74.4	86.0	56.0	8.8	-0.203	1.504	12.214	0.002***
$G1_{W1,t}^{IP2,day\ 1}$	69.8	72.4	95.6	55.7	9.1	0.150	2.199	3.686	0.158
$G1_{W2,t}^{IP2,day\ 1}$	70.4	72.1	90.7	56.3	8.8	0.023	1.709	8.412	0.015**
$G1_{W3,t}^{IP2,day\ 1}$	71.5	73.6	92.0	56.2	9.4	-0.057	1.657	9.235	0.010***
$G1_{W4,t}^{IP2,day\ 1}$	71.3	75.1	88.3	55.9	9.3	-0.179	1.570	11.040	0.004***
$G1_{t}^{IP2,day\ 2}$	72.0	75.6	87.4	57.2	9.0	-0.189	1.502	12.142	0.002***
$G1_{W1,t}^{IP2,day\ 2}$	70.9	74.1	99.2	55.6	9.4	0.208	2.438	2.470	0.291
$G1_{W2,t}^{IP2,day\ 2}$	71.5	73.6	90.9	57.7	8.9	0.037	1.713	8.383	0.015**
$G1_{W3,t}^{IP2,day\ 2}$	72.8	74.5	90.3	57.7	9.6	-0.041	1.612	9.833	0.007***
$G1_{W4,t}^{IP2,day\ 2}$	72.6	75.9	90.7	54.4	9.5	-0.157	1.613	10.280	0.006***
$G1_{t}^{IP2,day\ 3}$	72.0	75.4	89.0	56.5	9.0	-0.191	1.526	11.783	0.003***
$G1_{W1,t}^{IP2,day\ 3}$	70.9	73.6	97.8	56.3	9.3	0.160	2.227	3.529	0.171
$G1_{W2,t}^{IP2,day\ 3}$	71.5	73.6	91.4	57.4	9.0	0.016	1.718	8.297	0.016**
$G1_{W3,t}^{IP2,day\ 3}$	72.9	75.3	90.3	55.4	9.5	-0.091	1.621	9.836	0.007***
$G1_{W4,t}^{IP2,day\ 3}$	72.6	76.0	90.5	56.2	9.4	-0.155	1.616	10.229	0.006***
$G1_{t}^{IP2,day\ 4}$	70.7	74.1	86.8	55.6	8.8	-0.195	1.525	11.841	0.003***
$G1_{W1,t}^{IP2,day\ 4}$	69.7	71.9	98.2	55.3	9.2	0.283	2.600	2.424	0.298
$G1_{W2,t}^{IP2,day\ 4}$	70.2	72.4	88.7	56.5	8.7	0.010	1.667	8.963	0.011**
$G1_{W3,t}^{IP2,day\ 4}$	71.3	73.4	91.0	55.4	9.4	-0.085	1.684	8.948	0.011**
$G1_{W4,t}^{IP2,day\ 4}$	71.4	74.3	90.0	53.1	9.4	-0.138	1.684	9.186	0.010**
$G1_{t}^{IP2,day\ 5}$	71.6	74.8	87.3	56.4	9.0	-0.199	1.519	11.957	0.003***
$G1_{W1,t}^{IP2,day\ 5}$	70.6	73.4	95.5	56.4	9.1	0.088	2.039	4.811	0.090*
$G1_{W2,t}^{IP2,day\ 5}$	71.0	73.3	91.4	56.6	8.9	0.047	1.770	7.678	0.022**
$G1_{W3,t}^{IP2,day\ 5}$	72.3	73.4	89.7	56.3	9.5	-0.103	1.605	10.109	0.006***
$G1_{W4,t}^{IP2,day\ 5}$	72.2	75.1	90.2	54.0	9.6	-0.153	1.601	10.426	0.005***

(Continued on next page)

Table a.4 – continued

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	
$G1_t^{IP2,day\ 6}$	70.9	74.3	86.1	55.2	8.9	-0.206	1.505	12.223	0.002***
$G1_{W1,t}^{IP2,day\ 6}$	69.8	71.7	96.9	55.2	9.3	0.235	2.424	2.783	0.249
$G1_{W2,t}^{IP2,day\ 6}$	70.5	72.5	91.6	56.6	8.9	0.045	1.776	7.593	0.022**
$G1_{W3,t}^{IP2,day\ 6}$	71.6	73.9	91.5	54.5	9.4	-0.095	1.646	9.510	0.009***
$G1_{W4,t}^{IP2,day\ 6}$	71.4	74.9	90.1	53.8	9.5	-0.179	1.613	10.430	0.005***
$G1_t^{IP2,day\ 7}$	72.2	76.2	88.0	57.3	9.0	-0.209	1.511	12.157	0.002***
$G1_{W1,t}^{IP2,day\ 7}$	71.1	74.0	96.9	55.9	9.4	0.121	2.169	3.775	0.151
$G1_{W2,t}^{IP2,day\ 7}$	71.6	73.7	91.1	57.8	9.0	-0.013	1.654	9.138	0.010**
$G1_{W3,t}^{IP2,day\ 7}$	72.9	74.8	89.6	55.8	9.5	-0.100	1.633	9.703	0.008***
$G1_{W4,t}^{IP2,day\ 7}$	72.8	76.1	93.8	55.2	9.5	-0.143	1.672	9.372	0.009***
$G1_t^{IP2,day\ 8}$	70.2	73.7	85.1	55.4	8.8	-0.196	1.506	12.124	0.002***
$G1_{W1,t}^{IP2,day\ 8}$	69.2	71.7	95.8	55.3	9.2	0.230	2.435	2.675	0.263
$G1_{W2,t}^{IP2,day\ 8}$	69.7	72.0	90.0	56.4	8.6	0.046	1.716	8.352	0.015**
$G1_{W3,t}^{IP2,day\ 8}$	71.0	73.4	91.3	54.7	9.4	-0.058	1.672	9.032	0.011**
$G1_{W4,t}^{IP2,day\ 8}$	70.9	74.4	89.1	53.5	9.4	-0.154	1.627	10.062	0.007***
$G1_t^{IP2,day\ 9}$	70.9	74.3	86.1	55.2	8.9	-0.206	1.505	12.223	0.002***
$G1_{W1,t}^{IP2,day\ 9}$	69.8	71.7	96.9	55.2	9.3	0.235	2.424	2.783	0.249
$G1_{W2,t}^{IP2,day\ 9}$	70.5	72.5	91.6	56.6	8.9	0.045	1.776	7.593	0.022**
$G1_{W3,t}^{IP2,day\ 9}$	71.6	73.9	91.5	54.5	9.4	-0.095	1.646	9.510	0.009***
$G1_{W4,t}^{IP2,day\ 9}$	71.4	74.9	90.1	53.8	9.5	-0.179	1.613	10.430	0.005***
$G1_t^{IP2,day\ 10}$	70.3	74.0	84.8	55.4	8.8	-0.208	1.512	12.128	0.002***
$G1_{W1,t}^{IP2,day\ 10}$	69.3	71.5	94.1	54.8	9.0	0.127	2.181	3.710	0.156
$G1_{W2,t}^{IP2,day\ 10}$	69.7	71.8	88.9	56.0	8.8	0.000	1.652	9.159	0.010**
$G1_{W3,t}^{IP2,day\ 10}$	71.1	72.9	91.0	55.9	9.4	-0.062	1.674	9.022	0.011**
$G1_{W4,t}^{IP2,day\ 10}$	70.9	74.5	90.6	55.4	9.3	-0.162	1.604	10.445	0.005***
$G1_t^{IP2,day\ 11}$	71.7	75.1	87.1	56.1	9.0	-0.201	1.515	12.036	0.002***
$G1_{W1,t}^{IP2,day\ 11}$	70.4	72.8	97.9	56.2	9.2	0.179	2.252	3.467	0.177
$G1_{W2,t}^{IP2,day\ 11}$	71.1	73.4	90.9	57.2	9.0	0.044	1.722	8.271	0.016**
$G1_{W3,t}^{IP2,day\ 11}$	72.5	74.1	90.0	55.5	9.6	-0.099	1.600	10.159	0.006***
$G1_{W4,t}^{IP2,day\ 11}$	72.4	75.3	92.0	56.2	9.6	-0.140	1.617	10.122	0.006***
$G1_t^{IP2,day\ 12}$	70.6	74.3	86.3	54.8	8.8	-0.205	1.545	11.619	0.003***
$G1_{W1,t}^{IP2,day\ 12}$	69.4	70.3	95.5	53.6	9.2	0.128	2.160	3.889	0.143
$G1_{W2,t}^{IP2,day\ 12}$	70.0	72.2	89.9	56.3	8.7	-0.002	1.702	8.493	0.014**
$G1_{W3,t}^{IP2,day\ 12}$	71.3	73.6	89.8	54.6	9.2	-0.089	1.679	9.031	0.011**
$G1_{W4,t}^{IP2,day\ 12}$	71.3	75.1	89.1	54.7	9.3	-0.175	1.611	10.434	0.005***

Notes: The table shows the descriptive statistics for the monthly and weekly Google indexes for the keyword 'jobs', downloaded over two different IP addresses (IP1 and IP2) and across 12 different days. The subscripts Wj indicate the j^{th} week. ***, ** and * indicate rejection of the null of normality at 1, 5 and 10%, respectively.

Table a.5: Correlations between GIs monthly averages: sample 2004.1-2014.2

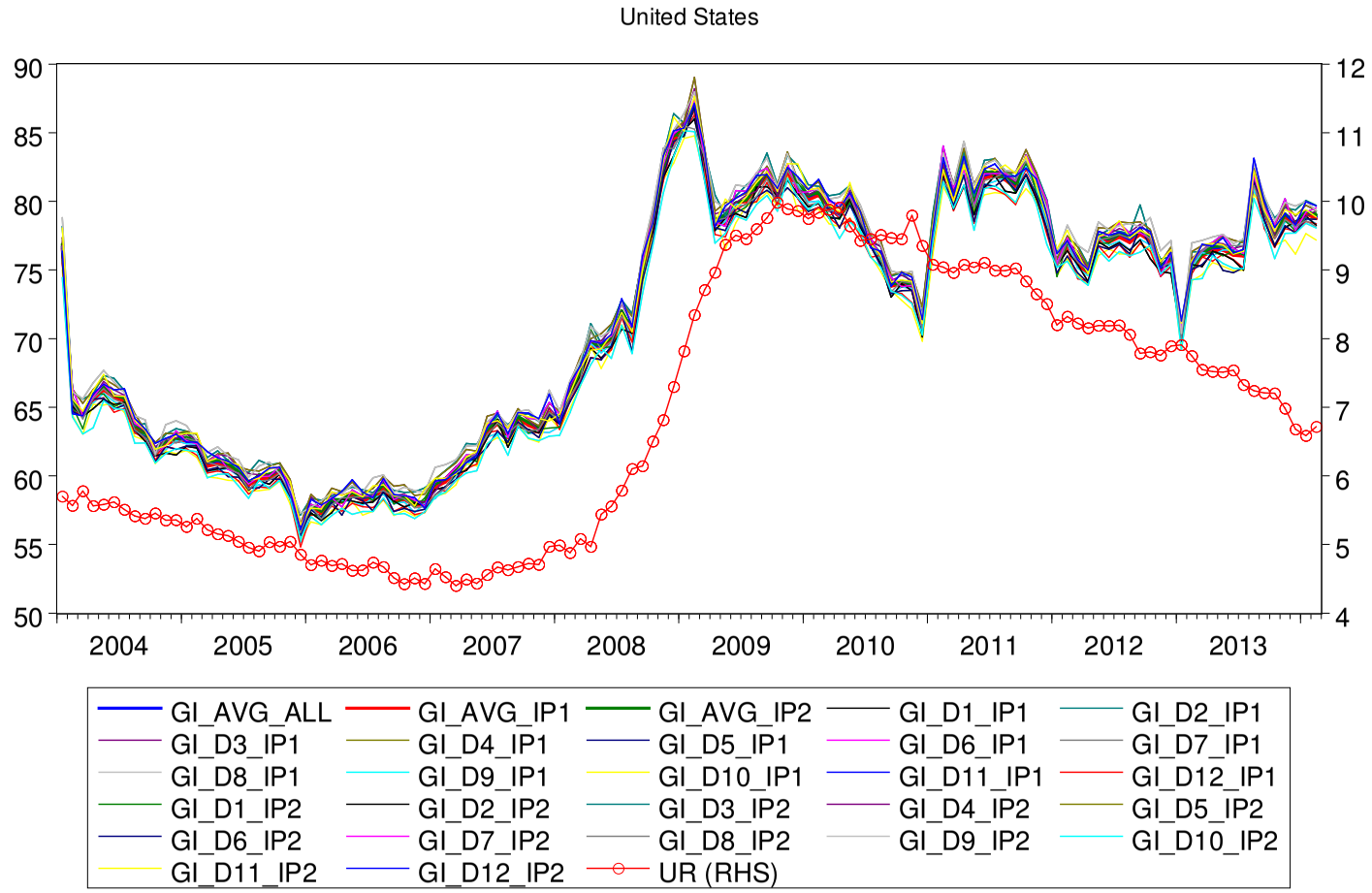
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	$G1_t^{Avg}$	1													
2	$G1_t^{Avg-IP1}$	1.000	1												
3	$G1_t^{Avg-IP2}$	1.000	1.000	1											
4	$G1_t^{IP2,day\ 1}$	0.999	0.999	0.999	1										
5	$G1_t^{IP2,day\ 2}$	0.999	0.999	0.999	0.998	1									
6	$G1_t^{IP2,day\ 3}$	1.000	0.999	1.000	0.999	0.998	1								
7	$G1_t^{IP2,day\ 4}$	0.999	0.999	0.999	0.998	0.998	0.998	1							
8	$G1_t^{IP2,day\ 5}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	1						
9	$G1_t^{IP2,day\ 6}$	0.999	0.999	0.999	0.999	0.998	0.999	0.998	0.998	1					
10	$G1_t^{IP2,day\ 7}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	0.998	0.998	1				
11	$G1_t^{IP2,day\ 8}$	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1			
12	$G1_t^{IP2,day\ 9}$	0.999	0.999	0.999	0.999	0.998	0.999	0.998	0.998	1.000	0.998	0.998	1		
13	$G1_t^{IP2,day\ 10}$	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1	
14	$G1_t^{IP2,day\ 11}$	0.999	0.999	0.999	0.999	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1
15	$G1_t^{IP2,day\ 12}$	0.999	0.999	0.999	0.998	0.998	0.999	0.999	0.999	0.999	0.998	0.998	0.999	0.998	0.999
16	$G1_t^{IP1day\ 1}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
17	$G1_t^{IP1day\ 2}$	0.999	0.999	0.999	1.000	0.998	0.999	0.998	0.998	0.999	0.998	0.998	0.999	0.998	0.999
18	$G1_t^{IP1day\ 3}$	0.999	0.999	0.999	0.998	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
19	$G1_t^{IP1day\ 4}$	1.000	0.999	1.000	0.999	0.998	1.000	0.999	0.999	0.999	0.999	0.998	0.999	0.998	0.999
20	$G1_t^{IP1day\ 5}$	1.000	0.999	1.000	0.999	0.998	1.000	0.998	0.999	0.999	0.999	0.998	0.999	0.998	0.999
21	$G1_t^{IP1day\ 6}$	0.999	0.999	0.999	0.998	0.998	0.998	1.000	0.998	0.998	0.998	0.998	0.998	0.998	0.998
22	$G1_t^{IP1day\ 7}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	1.000	0.998	0.998	0.998	0.998	0.998	0.998
23	$G1_t^{IP1day\ 8}$	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.998	0.999	0.998	0.998
24	$G1_t^{IP1day\ 9}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	0.998	0.998	1.000	0.998	0.998	0.998	0.998
25	$G1_t^{IP1day\ 10}$	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1.000	0.998	0.998	0.998
26	$G1_t^{IP1day\ 11}$	0.999	0.999	0.999	0.998	0.998	0.999	0.998	0.998	0.999	0.998	0.998	0.999	0.997	0.998
27	$G1_t^{IP1day\ 12}$	0.999	0.999	0.999	0.999	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1.000
28	UR	0.872	0.872	0.872	0.872	0.870	0.872	0.871	0.869	0.872	0.868	0.876	0.872	0.873	0.871

Table a.5 – continued

		15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	$GI1_t^{Avg}$														
2	$GI1_t^{Avg-IP1}$														
3	$GI1_t^{Avg-IP2}$														
4	$GI1_t^{IP2,day\ 1}$														
5	$GI1_t^{IP2,day\ 2}$														
6	$GI1_t^{IP2,day\ 3}$														
7	$GI1_t^{IP2,day\ 4}$														
8	$GI1_t^{IP2,day\ 5}$														
9	$GI1_t^{IP2,day\ 6}$														
10	$GI1_t^{IP2,day\ 7}$														
11	$GI1_t^{IP2,day\ 8}$														
12	$GI1_t^{IP2,day\ 9}$														
13	$GI1_t^{IP2,day\ 10}$														
14	$GI1_t^{IP2,day\ 11}$														
15	$GI1_t^{IP2,day\ 12}$	1													
16	$GI1_t^{IP1day\ 1}$	0.998	1												
17	$GI1_t^{IP1day\ 2}$	0.998	0.998	1											
18	$GI1_t^{IP1day\ 3}$	0.998	0.998	0.998	1										
19	$GI1_t^{IP1day\ 4}$	0.999	0.999	0.999	0.998	1									
20	$GI1_t^{IP1day\ 5}$	0.999	0.999	0.999	0.998	1.000	1								
21	$GI1_t^{IP1day\ 6}$	0.999	0.998	0.998	0.998	0.999	0.998	1							
22	$GI1_t^{IP1day\ 7}$	0.999	0.998	0.998	0.998	0.999	0.999	0.998	1						
23	$GI1_t^{IP1day\ 8}$	0.998	0.998	0.998	0.998	0.999	0.998	0.998	0.998	1					
24	$GI1_t^{IP1day\ 9}$	0.998	0.998	0.998	0.998	0.999	0.999	0.998	0.998	0.998	1				
25	$GI1_t^{IP1day\ 10}$	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	1			
26	$GI1_t^{IP1day\ 11}$	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.998	0.998	0.998	0.998	1		
27	$GI1_t^{IP1day\ 12}$	0.999	0.998	0.999	0.998	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.998	1	
28	UR	0.869	0.873	0.872	0.870	0.870	0.872	0.871	0.869	0.871	0.868	0.876	0.872	0.871	1

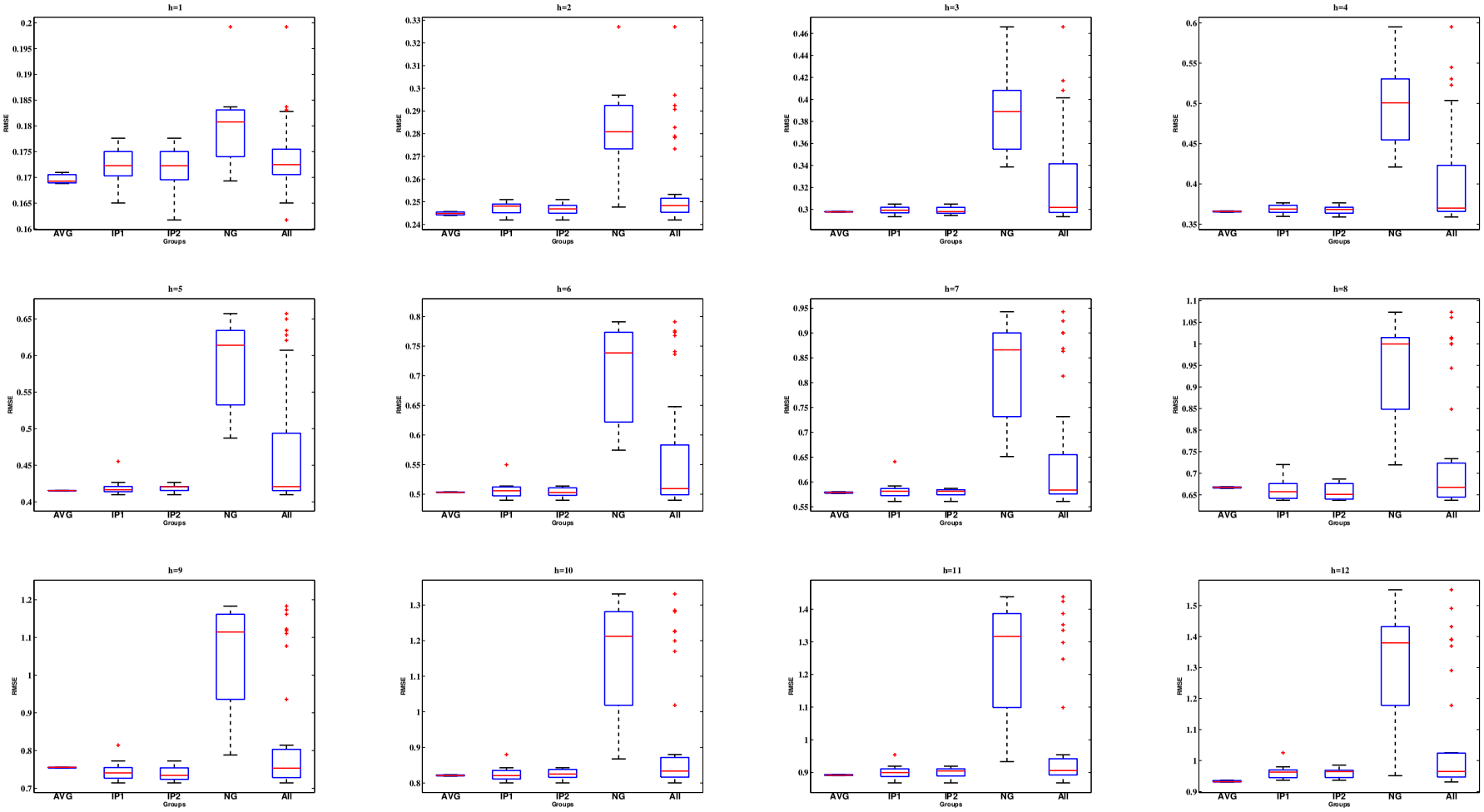
Notes: Correlation between the monthly averages of different Google indexes downloaded across different IPs and over different days.

Figure A.7: Google indexes 'jobs' for the US across IPs and days of download



Notes: The figure depicts the Google indexes for the United States across IPs and different days of download along with the monthly unemployment rate.

Figure A.8: Relative forecasting performance across Google indexes downloaded in different days and from different IPs (monthly averages)



Notes: The figure depicts the dispersion of RMSE at each forecast horizon h across different groups of forecasts: 1) the first group AVG contains the overall average across GI and the average across each IP address; 2) the second group IP1 contains the MSE of the 12 GI downloaded from the first IP address (IP1); 3) the third group IP2 contains the MSE of the 12 GI downloaded from the second IP address (IP2); the fourth group NG contains all the non-Google models (using both IC and Expectations); 5) the fifth group ALL contains all the MSEs in the previous four groups.

Table a.6: Average in-sample Bayesian Information Criteria for each model at each forecast horizon. Rolling scheme. Direct forecasts. GI for "jobs" ($G1$).

x_{it}	h=1	h=2	h=3	h=4	h=5	h=6	h=7	h=8	h=9	h=10	h=11	h=12
$AR(p) - SS$	-3.64	-2.99	-2.55	-2.27	-2.13	-1.93	-1.77	-1.60	-1.44	-1.30	-1.15	-1.01
IC_t	-3.72	-3.13	-2.75	-2.45	-2.31	-2.12	-1.97	-1.83	-1.67	-1.55	-1.39	-1.31
$IC_{W1,t}$	-3.73	-3.09	-2.66	-2.39	-2.28	-2.10	-1.97	-1.83	-1.66	-1.55	-1.40	-1.34
$IC_{W2,t}$	-3.65	-3.01	-2.64	-2.39	-2.26	-2.08	-1.93	-1.76	-1.61	-1.49	-1.34	-1.25
$IC_{W3,t}$	-3.68	-3.06	-2.73	-2.43	-2.31	-2.10	-1.96	-1.80	-1.64	-1.54	-1.40	-1.26
$IC_{W4,t}$	-3.75	-3.33	-2.96	-2.57	-2.40	-2.21	-2.06	-1.91	-1.78	-1.68	-1.46	-1.32
EEM_t	-3.69	-3.14	-2.78	-2.57	-2.43	-2.24	-2.11	-1.98	-1.76	-1.59	-1.47	-1.38
$EENM_t$	-3.70	-3.21	-2.85	-2.61	-2.54	-2.30	-2.18	-1.98	-1.88	-1.81	-1.68	-1.55
CE_t	-3.71	-3.18	-2.84	-2.52	-2.41	-2.28	-2.18	-2.09	-1.93	-1.76	-1.56	-1.38
CE_t^{6M}	-3.70	-3.14	-2.79	-2.57	-2.43	-2.31	-2.18	-2.05	-1.93	-1.81	-1.64	-1.49
EPU_t	-3.59	-3.01	-2.69	-2.49	-2.36	-2.10	-1.94	-1.77	-1.62	-1.47	-1.33	-1.25
$G1_t$	-3.80	-3.29	-3.10	-2.77	-2.63	-2.45	-2.27	-2.17	-2.02	-1.91	-1.72	-1.60
$G1_{W1,t}$	-3.67	-3.15	-2.81	-2.59	-2.49	-2.26	-2.11	-2.02	-1.89	-1.79	-1.64	-1.47
$G1_{W2,t}$	-3.71	-3.01	-2.65	-2.39	-2.34	-2.18	-2.08	-1.93	-1.75	-1.65	-1.53	-1.44
$G1_{W3,t}$	-3.74	-3.28	-3.00	-2.71	-2.51	-2.28	-2.16	-2.04	-1.91	-1.74	-1.56	-1.45
$G1_{W4,t}$	-3.72	-3.25	-2.97	-2.68	-2.58	-2.37	-2.24	-2.12	-1.96	-1.85	-1.71	-1.54
$AR(p) - LS$	-3.78	-3.01	-2.41	-1.99	-1.68	-1.37	-1.11	-0.85	-0.63	-0.43	-0.26	-0.09
$IC_t - LS$	-3.89	-3.20	-2.55	-2.09	-1.76	-1.46	-1.17	-0.91	-0.67	-0.46	-0.27	-0.11
$IC_{W1,t} - LS$	-3.89	-3.13	-2.48	-2.05	-1.74	-1.42	-1.15	-0.89	-0.65	-0.45	-0.27	-0.10
$IC_{W2,t} - LS$	-3.85	-3.11	-2.47	-2.04	-1.71	-1.40	-1.13	-0.87	-0.64	-0.43	-0.25	-0.09
$IC_{W3,t} - LS$	-3.84	-3.12	-2.48	-2.03	-1.72	-1.41	-1.13	-0.88	-0.65	-0.44	-0.26	-0.09
$IC_{W4,t} - LS$	-3.93	-3.33	-2.63	-2.13	-1.81	-1.48	-1.19	-0.91	-0.67	-0.46	-0.27	-0.10
$EEM_t - LS$	-3.87	-3.20	-2.55	-2.13	-1.79	-1.46	-1.17	-0.89	-0.65	-0.44	-0.26	-0.09
$EENM_t - LS$	-3.91	-3.29	-2.66	-2.26	-1.95	-1.61	-1.31	-1.02	-0.78	-0.58	-0.40	-0.21
$CE_t - LS$	-3.78	-3.05	-2.45	-2.00	-1.69	-1.38	-1.11	-0.86	-0.64	-0.43	-0.25	-0.09
$CE_t^{6M} - LS$	-3.89	-3.22	-2.61	-2.23	-1.95	-1.69	-1.45	-1.22	-1.00	-0.78	-0.59	-0.41
EPU_t	-3.84	-3.13	-2.53	-2.10	-1.78	-1.47	-1.20	-0.91	-0.68	-0.47	-0.29	-0.13
$SETAR(2) - LS$	-595.64	-478.91	-386.83	-313.17	-260.91	-211.35	-170.97	-134.43	-105.13	-77.59	-57.64	-35.44
$LSTAR(2) - LS$	-591.24	-477.77	-385.96	-311.30	-260.36	-211.63	-170.73	-134.54	-105.74	-78.17	-57.89	-35.74
$AAR(2) - LS$	-537.57	-431.99	-343.00	-271.66	-216.36	-164.30	-123.83	-85.44	-56.00	-28.77	-9.08	11.62

Notes: Short in-sample: 2004.2-2007.2. Long in-sample (LS): 1997.7 - 2007.2.

Table a.7: Transition matrix by internet job search activity, various years

Year	Status in T	Internet job search	Status in T+1			Status in T+12		
			E	U	I	E	U	I
1998	Employed (E)	No	95.8	1.6	2.6	92.8	1.7	5.5
1998	Employed (E)	Yes	95.5	2.1	2.3	93.3	1.9	4.8
1998	Unemployed (U)	No	26.6	45.1	28.3	59.4	15.5	25.1
1998	Unemployed (U)	Yes	23.5	62.2	14.3	71.0	12.1	16.9
1998	Inactive (I)	No	7.4	4.1	88.5	22.2	3.5	74.3
1998	Inactive (I)	Yes	10.2	5.7	84.1	36.5	7.0	56.5
2000	Employed (E)	No	95.1	1.1	3.8	91.1	2.6	6.3
2000	Employed (E)	Yes	95.3	1.4	3.3	91.4	3.1	5.5
2000	Unemployed (U)	No	39.6	33.5	26.8	55.8	20.3	23.9
2000	Unemployed (U)	Yes	34.7	45.1	20.1	62.4	21.2	16.4
2000	Inactive (I)	No	9.3	3.5	87.2	22.5	4.0	73.5
2000	Inactive (I)	Yes	17.5	8.4	74.1	33.2	5.8	61.0
2001	Employed (E)	No	96.5	1.2	2.4	91.7	2.6	5.7
2001	Employed (E)	Yes	95.4	2.5	2.1	91.2	3.8	5.0
2001	Unemployed (U)	No	28.4	45.4	26.2	52.4	20.9	26.7
2001	Unemployed (U)	Yes	27.3	56.9	15.8	64.9	18.9	16.2
2001	Inactive (I)	No	7.2	3.5	89.3	21.0	3.8	75.1
2001	Inactive (I)	Yes	12.1	17.2	70.7	36.3	8.2	55.5
2003	Employed (E)	No	96.6	1.1	2.3	92.5	2.1	5.4
2003	Employed (E)	Yes	96.0	2.2	1.8	91.9	2.9	5.2
2003	Unemployed (U)	No	23.4	50.0	26.6	53.3	17.3	29.4
2003	Unemployed (U)	Yes	20.8	63.6	15.6	62.4	19.2	18.4
2003	Inactive (I)	No	7.1	3.3	89.6	20.8	3.8	75.4
2003	Inactive (I)	Yes	8.6	10.9	80.5	32.5	8.4	59.1
2011	Employed (E)	No	95.8	1.3	2.8	91.9	3.1	5.0
2011	Employed (E)	Yes	96.5	1.9	1.6	92.3	3.7	4.0
2011	Unemployed (U)	No	18.4	58.1	23.5	42.7	29.9	27.4
2011	Unemployed (U)	Yes	16.2	70.3	13.6	50.1	33.1	16.8
2011	Inactive (I)	No	5.8	5.1	89.1	18.2	7.0	74.8
2011	Inactive (I)	Yes	8.6	15.4	76.0	25.4	15.3	59.3
2012	Employed (E)	No	96.5	1.2	2.3	91.9	2.7	5.4
2012	Employed (E)	Yes	97.2	1.4	1.4	92.9	3.6	3.5
2012	Unemployed (U)	No	16.8	57.1	26.1	43.0	27.4	29.6
2012	Unemployed (U)	Yes	16.6	65.9	17.5	44.4	29.5	26.1
2012	Inactive (I)	No	5.1	4.1	90.8	16.3	4.3	79.4
2012	Inactive (I)	Yes	5.1	12.6	82.3	23.8	8.6	67.6
2013	Employed (E)	No	95.5	1.3	3.2	92.3	2.4	5.2
2013	Employed (E)	Yes	94.1	2.2	3.7	89.4	4.0	6.6
2013	Unemployed (U)	No	21.5	52.5	26.0	49.2	24.3	26.4
2013	Unemployed (U)	Yes	23.4	60.1	16.6	49.1	25.9	25.0
2013	Inactive (I)	No	6.4	4.5	89.1	17.2	5.4	77.5
2013	Inactive (I)	Yes	8.9	14.6	76.4	34.2	7.7	58.1
2015	Employed (E)	No	95.8	1.0	3.2	92.7	2.0	5.3
2015	Employed (E)	Yes	95.2	2.1	2.7	92.9	2.6	4.4
2015	Unemployed (U)	No	27.7	45.4	26.9	54.1	19.6	26.3
2015	Unemployed (U)	Yes	19.0	61.2	19.8	53.2	23.3	23.5
2015	Inactive (I)	No	6.9	3.1	89.9	19.9	4.2	75.9
2015	Inactive (I)	Yes	10.2	10.9	78.9	30.4	8.0	61.6

Notes: Transition probabilities estimated from the IPUMS-Current Population Survey data panel (King et al., 2010). Results for all the years in which an Internet and Computer Use Supplement is present in the CPS survey are reported in table a.7 of the online appendix.

2 Additional Tables and Figures: state level

Table b.1: State abbreviations and correlation between G1 and the unemployment rate

#	State	Abbr.	Corr.$(U_t, G1_t)$	#	State	Abbr.	Corr.$(U_t, G1_t)$
0	United States	USA	0.78	26	Missouri	MO	0.86
1	Alabama	AL	0.84	27	Montana	MT	0.61
2	Alaska	AK	0.35	28	Nebraska	NE	0.85
3	Arizona	AZ	0.88	29	Nevada	NV	0.80
4	Arkansas	AR	0.78	30	New Hampshire	NH	0.76
5	California	CA	0.39	31	New Jersey	NJ	0.86
6	Colorado	CO	0.73	32	New Mexico	NM	0.65
7	Connecticut	CT	0.86	33	New York	NY	0.86
8	Delaware	DE	0.88	34	North Carolina	NC	-0.12
9	District of Columbia	DC	0.80	35	North Dakota	ND	0.84
10	Florida	FL	0.76	36	Ohio	OH	0.78
11	Georgia	GA	0.87	37	Oklahoma	OK	0.72
12	Hawaii	HI	0.82	38	Oregon	OR	0.87
13	idaho	ID	0.79	39	Pennsylvania	PA	0.89
14	Illinois	IL	0.84	40	Rhode Island	RI	0.82
15	Indiana	IN	0.68	41	South Carolina	SC	0.67
16	Iowa	IA	0.80	42	South Dakota	SD	0.85
17	Kansas	KS	0.82	43	Tennessee	TN	0.77
18	Kentucky	KY	0.62	44	Texas	TX	0.84
19	Louisiana	LA	0.77	45	Utah	UT	0.16
20	Maine	ME	0.87	46	Vermont	VT	0.01
21	Maryland	MD	0.79	47	Virginia	VA	0.82
22	Massachusetts	MA	0.81	48	Washington	WA	0.78
23	Michigan	MI	0.81	49	West Virginia	WV	0.79
24	Minnesota	MN	0.78	50	Wisconsin	WI	0.71
25	Mississippi	MS	0.88	51	Wyoming	WY	0.70

Table b.2: Descriptive statistics of the unemployment rate for each single US state

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	Obs.
ur_{USA}	6.886	6.765	9.983	4.398	1.913	0.183	1.474	12.514***	122
ur_{AL}	6.168	6.277	10.399	3.227	2.308	0.297	1.763	9.567***	122
ur_{AK}	6.995	6.944	8.166	5.931	0.623	0.201	1.908	6.887**	122
ur_{AZ}	6.946	7.655	10.760	3.452	2.455	0.056	1.468	11.989***	122
ur_{AR}	6.524	6.939	8.097	4.929	1.202	-0.036	1.183	16.810***	122
ur_{CA}	8.393	8.345	12.399	4.820	2.795	0.132	1.411	13.181***	122
ur_{CO}	6.380	6.126	9.069	3.511	1.814	0.044	1.527	11.071***	122
ur_{CT}	6.696	7.018	9.457	4.316	1.879	0.063	1.298	14.801***	122
ur_{DE}	5.695	6.181	8.402	3.368	1.828	-0.012	1.262	15.356***	122
ur_{DC}	6.998	6.795	11.435	3.271	2.916	0.176	1.492	12.194***	122
ur_{FL}	7.253	7.502	10.400	4.327	2.264	0.043	1.293	14.849***	122
ur_{GA}	4.574	4.712	7.059	2.282	1.698	0.104	1.398	13.270***	122
ur_{HI}	5.702	5.694	8.821	2.685	2.100	0.054	1.529	11.062***	122
ur_{ID}	7.654	8.267	11.364	4.429	2.153	0.007	1.533	10.946***	122
ur_{IL}	7.078	6.860	10.779	4.501	2.076	0.338	1.657	11.483***	122
ur_{IN}	4.862	4.663	6.396	3.625	0.939	0.371	1.715	11.187***	122
ur_{IA}	5.539	5.559	7.528	3.983	1.055	0.255	1.922	7.237**	122
ur_{KS}	7.635	7.880	10.699	5.288	1.842	0.261	1.557	11.970***	122
ur_{KY}	5.805	5.741	11.199	3.632	1.536	0.713	4.393	20.193***	122
ur_{LA}	6.221	6.393	8.420	4.446	1.444	0.144	1.355	14.173***	122
ur_{ME}	5.594	5.860	8.026	3.257	1.674	0.008	1.303	14.635***	122
ur_{MD}	6.233	6.680	8.708	4.450	1.405	0.195	1.593	10.834***	122
ur_{MA}	9.032	8.723	14.171	6.669	2.349	0.866	2.501	16.521***	122
ur_{MI}	5.535	5.134	8.344	3.922	1.284	0.722	2.272	13.286***	122
ur_{MN}	8.227	8.067	10.968	5.591	1.666	0.182	1.618	10.377***	122
ur_{MS}	6.756	6.331	9.632	4.622	1.658	0.517	1.831	12.381***	122
ur_{MO}	4.985	5.276	6.799	3.109	1.299	-0.040	1.396	13.114***	122
ur_{MT}	3.876	3.948	4.868	2.774	0.613	-0.129	2.009	5.336*	122
ur_{NE}	8.492	8.870	13.950	4.161	3.760	0.106	1.353	14.022***	122
ur_{NV}	4.718	4.878	6.713	3.410	1.076	0.225	1.579	11.292***	122
ur_{NH}	6.927	7.099	9.734	4.162	2.235	0.022	1.186	16.728***	122
ur_{NJ}	5.947	5.925	8.038	3.425	1.516	-0.297	1.733	9.950***	122
ur_{NM}	6.675	6.794	8.876	4.295	1.672	-0.061	1.289	14.965***	122
ur_{NY}	7.520	7.218	11.298	4.574	2.393	0.166	1.369	14.089***	122
ur_{NC}	3.344	3.306	4.203	2.610	0.373	0.415	2.535	4.602	122
ur_{ND}	7.315	7.257	10.628	5.306	1.697	0.655	2.134	12.533***	122
ur_{OH}	5.174	5.169	7.191	3.266	1.059	0.333	2.198	5.522*	122
ur_{OK}	7.846	7.584	11.624	5.004	2.084	0.236	1.743	9.158**	122
ur_{OR}	6.438	6.433	8.691	4.200	1.571	-0.024	1.307	14.581***	122
ur_{PA}	8.206	9.233	11.900	4.795	2.721	-0.059	1.288	14.965***	122
ur_{RI}	8.140	7.182	11.858	5.456	2.072	0.443	1.756	11.859***	122
ur_{SC}	3.924	3.787	5.322	2.634	0.798	0.256	1.870	7.824**	122
ur_{SD}	7.369	7.810	11.029	4.394	2.037	0.192	1.626	10.344***	122
ur_{TN}	6.230	6.157	8.256	4.252	1.314	0.145	1.755	8.300**	122
ur_{TX}	5.032	4.706	8.378	2.426	1.879	0.397	1.914	9.194**	122
ur_{UT}	4.732	4.335	7.250	3.342	1.133	0.737	2.257	13.860***	122
ur_{VT}	4.922	5.091	7.415	2.879	1.557	0.136	1.441	12.726***	122
ur_{VA}	7.010	6.718	10.229	4.394	1.911	0.260	1.622	11.032***	122
ur_{WA}	6.069	5.840	8.509	3.935	1.576	0.215	1.497	12.417***	122
ur_{WV}	6.253	6.248	9.176	4.273	1.561	0.431	1.813	10.944***	122
ur_{WI}	4.617	4.241	7.550	2.632	1.485	0.465	1.967	9.821***	122
ur_{WY}	7.880	7.633	10.429	5.398	1.737	0.010	1.549	10.701***	122

Notes: The subscript indicates the state. Short sample: 2004.1-2014.2. ***, ** and * indicate rejection at 1, 5 and 10%, respectively.

Table b.3: Descriptive statistics of Initial Claims for each single US state - Short sample

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	Obs.
IC_{USA}	1550.5	1455.0	2615.0	1152.0	327.8	1.408	4.390	50.1***	122
IC_{AL}	23.4	20.7	46.0	15.1	6.3	1.597	5.309	78.9***	122
IC_{AK}	7.8	7.3	10.8	5.8	1.5	0.392	1.751	11.1***	122
IC_{AZ}	20.7	20.0	39.8	11.0	6.2	0.849	3.383	15.4***	122
IC_{AR}	17.2	15.8	33.6	11.8	4.2	1.804	6.228	119.2***	122
IC_{CA}	223.8	220.9	328.0	145.3	51.2	0.273	1.798	8.9**	122
IC_{CO}	13.3	13.0	24.5	8.4	3.9	0.755	2.799	11.8***	122
IC_{CT}	19.4	18.5	29.3	14.8	3.6	1.105	3.495	26.1***	122
IC_{DE}	4.5	4.4	6.4	2.9	0.7	0.458	2.946	4.3	122
IC_{DC}	60.6	57.1	116.8	32.8	21.0	0.662	2.441	10.5***	122
IC_{FL}	48.6	43.1	97.9	32.6	15.3	1.095	3.389	25.2***	122
IC_{GA}	6.7	7.0	10.8	3.8	2.1	0.190	1.812	7.9**	122
IC_{HI}	9.7	8.9	16.1	5.4	2.7	0.773	2.471	13.6***	122
IC_{ID}	62.1	58.1	112.5	48.3	13.1	2.159	7.402	193.2***	122
IC_{IL}	33.9	30.8	82.1	22.0	10.4	2.269	8.597	263.9***	122
IC_{IN}	16.3	14.0	39.5	10.5	6.4	2.086	6.718	158.7***	122
IC_{IA}	13.1	11.9	27.9	8.3	4.1	1.771	5.634	99.0***	122
IC_{KS}	25.0	23.0	56.8	15.6	7.5	1.982	7.382	177.5***	122
IC_{KY}	16.7	13.7	154.4	7.5	17.5	6.584	48.420	11368.2***	122
IC_{LA}	6.4	6.1	10.2	4.6	1.3	0.747	2.733	11.7***	122
IC_{ME}	21.9	22.3	34.0	13.9	5.4	0.349	1.902	8.6**	122
IC_{MD}	32.1	30.9	52.3	23.6	4.6	1.705	6.741	130.2***	122
IC_{MA}	70.6	67.0	145.2	40.8	19.9	1.623	6.197	105.5***	122
IC_{MI}	24.0	22.0	41.6	18.3	5.3	1.810	5.560	99.9***	122
IC_{MN}	13.1	12.2	53.3	8.8	5.1	5.393	39.141	7231.0***	122
IC_{MS}	33.2	30.6	52.0	24.3	6.6	1.143	3.574	28.2***	122
IC_{MO}	5.4	5.3	9.1	3.2	1.5	0.612	2.319	10.0***	122
IC_{MT}	6.7	6.4	9.8	4.6	1.3	0.362	2.133	6.5**	122
IC_{NE}	15.7	15.2	29.8	8.6	5.0	0.831	2.956	14.0***	122
IC_{NV}	5.1	4.4	9.3	3.3	1.6	0.809	2.496	14.6***	122
IC_{NH}	46.6	44.3	118.9	36.9	8.8	4.924	39.012	7085.5***	122
IC_{NJ}	5.7	5.4	10.6	3.4	1.4	0.670	3.107	9.2**	122
IC_{NM}	95.2	93.5	150.5	69.4	16.8	0.681	3.107	9.5***	122
IC_{NY}	56.5	52.5	125.1	20.0	17.1	1.468	6.493	105.8***	122
IC_{NC}	2.2	2.0	4.9	1.2	0.7	1.816	6.335	123.6***	122
IC_{ND}	56.1	51.9	109.9	37.3	14.5	2.145	7.312	188.1***	122
IC_{OH}	10.4	9.4	19.7	6.6	3.2	1.017	3.196	21.2***	122
IC_{OK}	31.7	29.1	60.3	22.0	8.0	1.323	4.389	45.4***	122
IC_{OR}	100.4	94.8	160.8	80.8	18.9	1.658	5.231	81.2***	122
IC_{PA}	6.9	6.7	14.6	4.9	1.2	2.474	15.052	862.8***	122
IC_{RI}	25.5	23.8	54.3	16.7	6.7	2.117	7.670	202.0***	122
IC_{SC}	1.7	1.5	3.3	1.2	0.4	1.638	5.512	86.6***	122
IC_{SD}	28.8	27.2	64.9	18.8	8.0	2.108	8.076	221.3***	122
IC_{TN}	69.6	69.3	120.0	48.0	14.7	0.857	4.032	20.4***	122
IC_{TX}	7.6	7.4	15.8	4.1	2.7	0.703	2.746	10.4***	122
IC_{UT}	3.6	3.4	6.4	2.4	0.7	1.397	5.098	62.0***	122
IC_{VT}	25.5	23.4	46.0	16.7	6.3	1.340	4.386	46.3***	122
IC_{VA}	40.8	38.3	68.1	28.9	8.8	1.021	3.471	22.3***	122
IC_{WA}	6.7	6.4	11.3	4.6	1.4	1.240	4.128	37.7***	122
IC_{WV}	54.0	48.8	98.2	36.0	13.7	1.850	5.836	110.4***	122
IC_{WI}	2.1	2.1	4.2	1.2	0.7	0.898	3.131	16.5***	122
IC_{WY}	2.2	1.7	4.3	1.0	1.1	0.444	1.504	15.4***	122

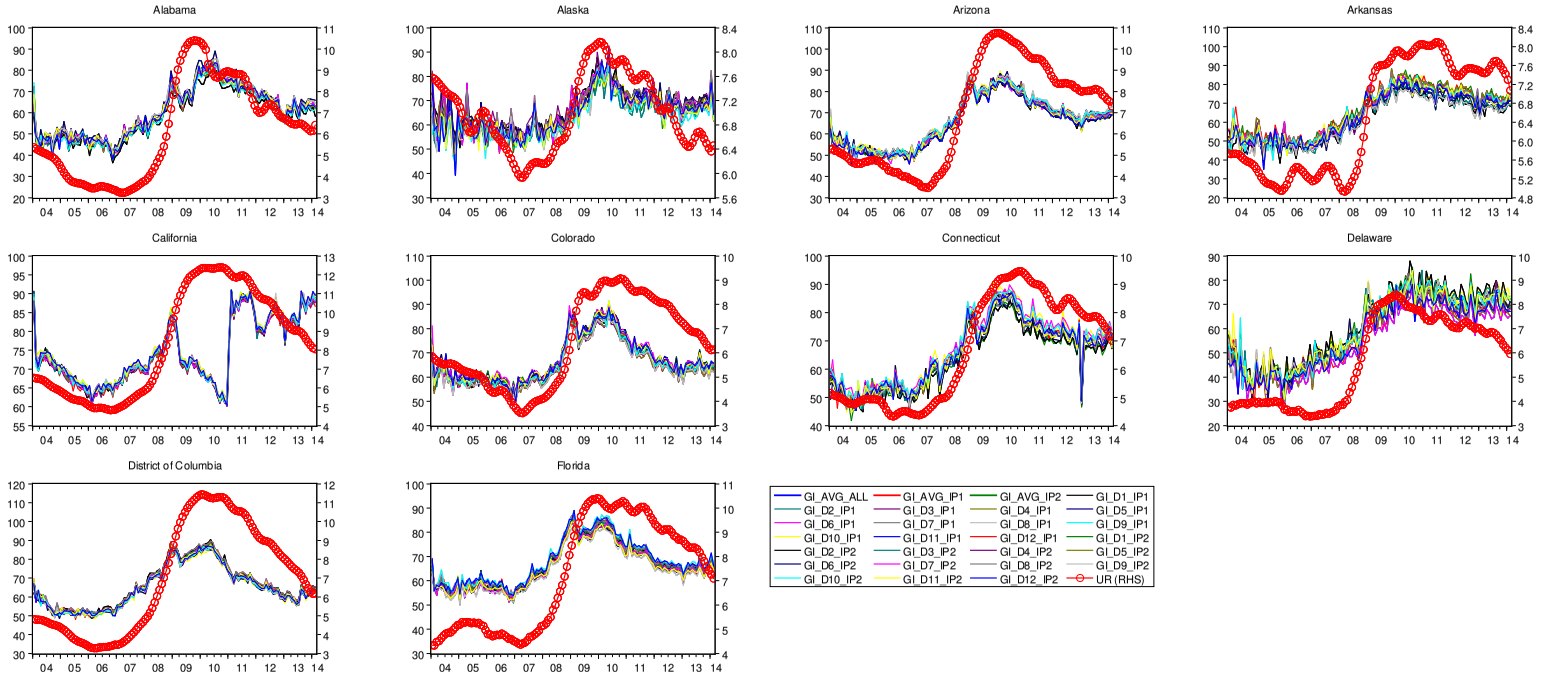
Notes: The subscript indicates each state. The sample is 2004.1-2014.2. ***, ** and * indicate rejection at 1, 5 and 10%, respectively.

Table b.4: Descriptive statistics of Google index for each single US state - Short sample

	Mean	Median	Max	Min	Std. Dev.	Skew.	Kurt.	Jarque-Bera	Obs.
GI_{USA}	71.3	74.9	86.9	56.0	8.9	-0.202	1.510	12.1***	122
GI_{AL}	60.2	61.4	83.0	39.4	11.8	0.154	1.804	7.8**	122
GI_{AK}	64.9	65.3	86.8	47.9	7.7	0.330	2.653	2.8	122
GI_{AZ}	65.9	67.7	86.5	48.1	11.7	0.090	1.749	8.1**	122
GI_{AR}	63.8	68.3	81.9	42.5	12.3	-0.125	1.431	12.8***	122
GI_{CA}	74.5	72.0	90.8	60.9	8.6	0.387	1.824	10.1***	122
GI_{CO}	66.3	64.0	87.7	51.0	9.1	0.767	2.464	13.4***	122
GI_{CT}	65.5	68.9	86.2	47.9	11.7	0.033	1.687	8.8**	122
GI_{DE}	58.8	64.0	80.3	33.3	14.1	-0.226	1.488	12.7***	122
GI_{DC}	65.3	63.7	87.8	50.2	11.4	0.434	2.012	8.8**	122
GI_{FL}	66.4	64.9	85.2	52.7	9.1	0.473	2.063	9.0**	122
GI_{GA}	65.0	68.9	89.0	36.4	15.6	-0.148	1.461	12.5***	122
GI_{HI}	65.9	69.5	87.0	45.4	12.4	-0.158	1.552	11.2***	122
GI_{ID}	69.5	68.3	89.9	55.0	9.0	0.491	2.260	7.7**	122
GI_{IL}	62.6	65.1	87.4	45.9	11.0	0.180	1.786	8.2**	122
GI_{IN}	66.3	68.6	87.0	50.5	10.5	0.188	1.743	8.8**	122
GI_{IA}	62.5	63.0	85.5	44.2	11.8	0.285	1.911	7.7**	122
GI_{KS}	62.7	66.0	84.7	42.8	12.4	0.046	1.552	10.7***	122
GI_{KY}	55.5	54.7	83.5	37.3	11.5	0.431	2.179	7.2**	122
GI_{LA}	66.5	69.6	83.7	45.5	10.7	-0.179	1.673	9.6***	122
GI_{ME}	62.5	63.5	88.3	44.3	12.1	0.250	1.838	8.1**	122
GI_{MD}	70.4	70.5	88.5	55.0	9.1	0.271	1.964	7.0**	122
GI_{MA}	68.5	65.6	89.4	56.7	8.7	0.870	2.581	16.3***	122
GI_{MI}	67.2	66.2	91.0	53.1	10.3	0.612	2.351	9.8***	122
GI_{MN}	59.7	61.5	83.9	36.4	13.8	-0.022	1.557	10.6***	122
GI_{MS}	65.5	63.5	88.6	49.8	10.8	0.508	2.018	10.1***	122
GI_{MO}	60.8	65.9	86.6	37.7	12.6	-0.130	1.654	9.6***	122
GI_{MT}	63.3	63.7	83.6	44.6	10.6	0.195	1.697	9.4***	122
GI_{NE}	66.1	66.9	87.0	41.1	13.1	-0.161	1.688	9.3***	122
GI_{NV}	64.8	68.3	83.1	41.9	11.9	-0.224	1.588	11.2***	122
GI_{NH}	66.3	65.5	88.4	50.1	10.4	0.484	2.095	8.9**	122
GI_{NJ}	64.0	66.9	86.4	40.6	13.8	-0.059	1.294	14.9***	122
GI_{NM}	72.6	71.1	90.0	60.3	8.2	0.681	2.372	11.4***	122
GI_{NY}	67.5	68.5	88.2	50.2	11.0	0.210	1.798	8.2**	122
GI_{NC}	63.6	60.3	86.6	35.9	12.1	0.193	1.765	8.5**	122
GI_{ND}	69.3	70.4	88.5	53.8	10.1	0.224	1.819	8.1**	122
GI_{OH}	63.5	63.3	87.5	45.1	12.8	0.192	1.586	10.9***	122
GI_{OK}	68.7	67.2	90.9	34.7	12.7	-0.308	2.734	2.3	122
GI_{OR}	69.3	73.1	89.8	52.0	11.1	0.049	1.580	10.3***	122
GI_{PA}	66.6	72.0	85.6	42.2	14.0	-0.319	1.462	14.1***	122
GI_{RI}	62.2	61.8	88.3	41.8	10.9	0.329	2.067	6.6**	122
GI_{SC}	62.0	64.4	88.9	37.6	13.4	-0.018	1.622	9.7***	122
GI_{SD}	63.7	63.9	88.1	46.4	11.7	0.197	1.797	8.1**	122
GI_{TN}	68.7	68.9	89.3	53.3	9.7	0.475	2.378	6.5**	122
GI_{TX}	62.1	62.8	87.6	44.1	12.8	0.256	1.779	8.9**	122
GI_{UT}	59.6	55.9	85.2	37.9	13.0	0.368	1.793	10.2***	122
GI_{VT}	63.8	61.4	93.9	37.4	14.7	0.191	2.156	4.4	122
GI_{VA}	66.9	66.3	92.5	51.9	10.4	0.550	2.296	8.7**	122
GI_{WA}	63.7	65.9	87.2	41.0	13.3	-0.030	1.370	13.5***	122
GI_{WV}	66.5	65.2	85.6	51.4	10.3	0.340	1.743	10.4***	122
GI_{WI}	60.3	61.6	80.0	42.2	10.9	-0.003	1.612	9.8***	122
GI_{WY}	61.4	58.7	90.3	47.3	9.8	0.619	2.218	10.9***	122

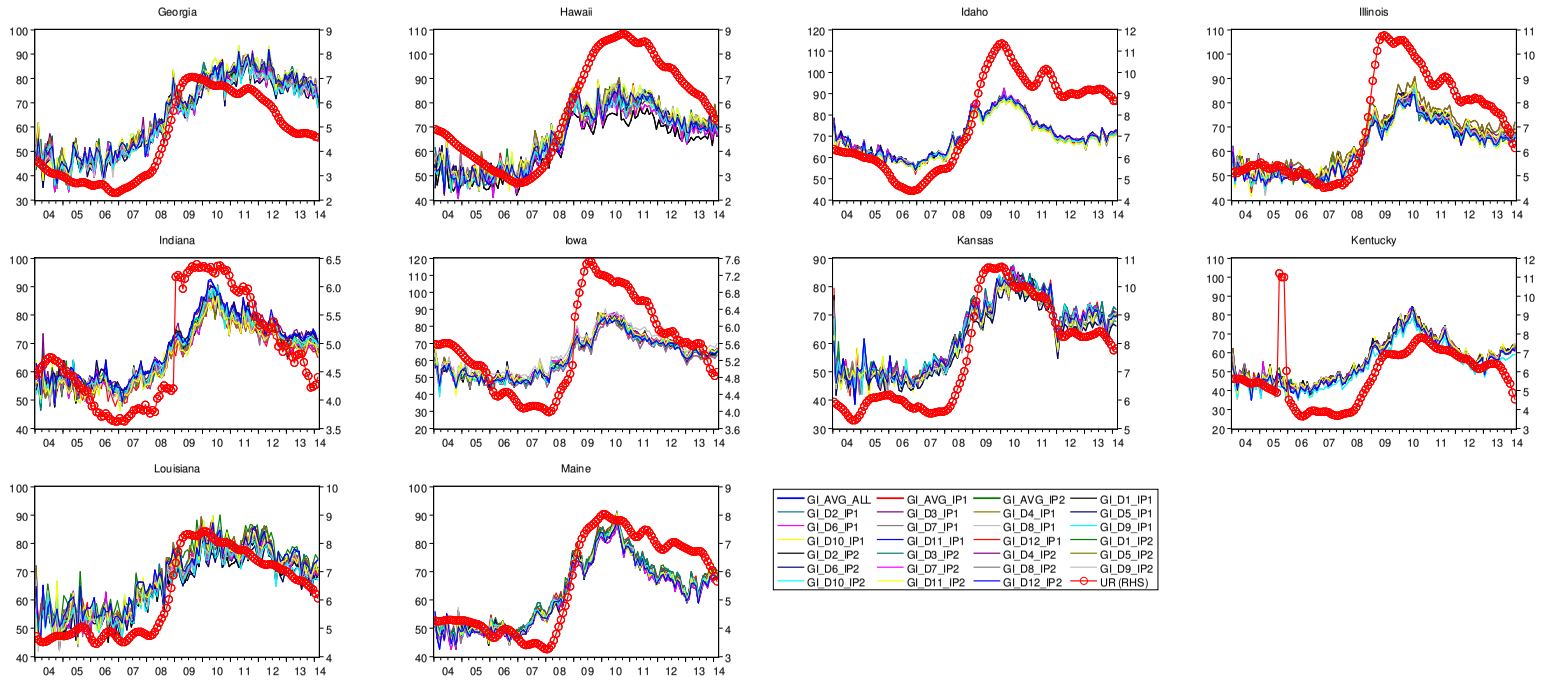
Notes: The subscript indicates the state. The sample is 2004.1-2014.2. ***, ** and * indicate rejection at 1, 5 and 10%, respectively.

Figure B.1: Google Indexes across IP and states (AL to FL)



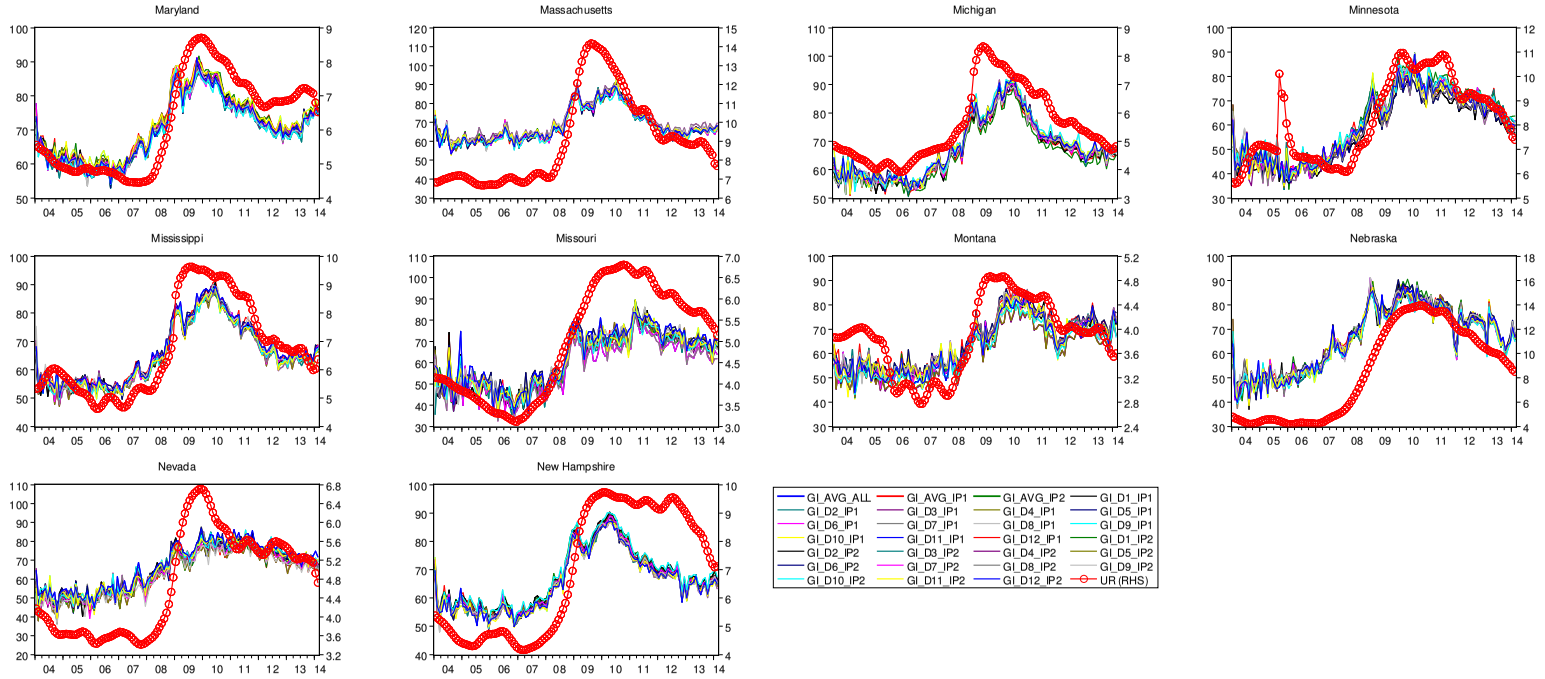
Notes: The figure depicts the Google indexes downloaded across two different IP addresses and over twelve days (LHS) along with each state unemployment rate (RHS).

Figure B.2: Google Indexes across IP and states (GA to ME)



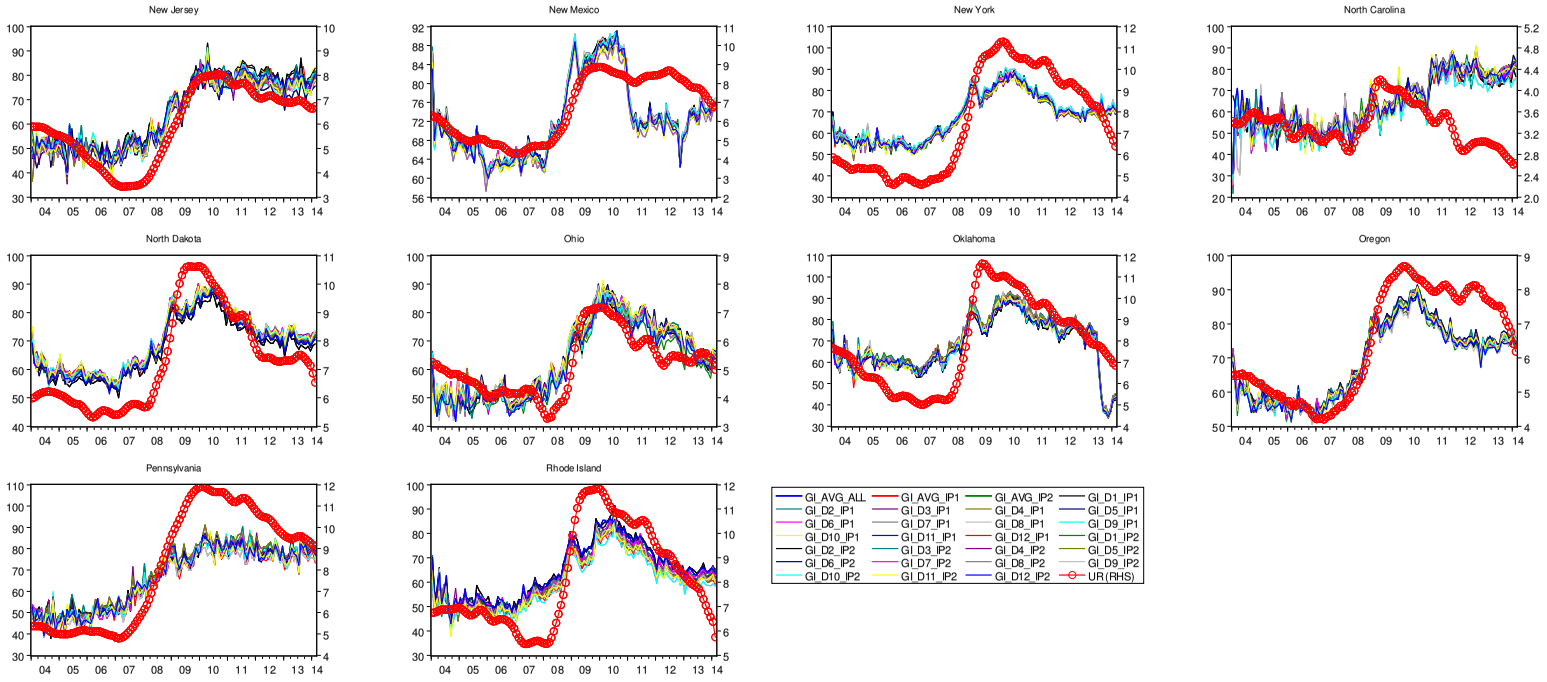
Notes: The figure depicts the Google indexes downloaded across two different IP addresses and over twelve days (LHS) along with each state unemployment rate (RHS).

Figure B.3: Google Indexes across IP and states (MD to NH)



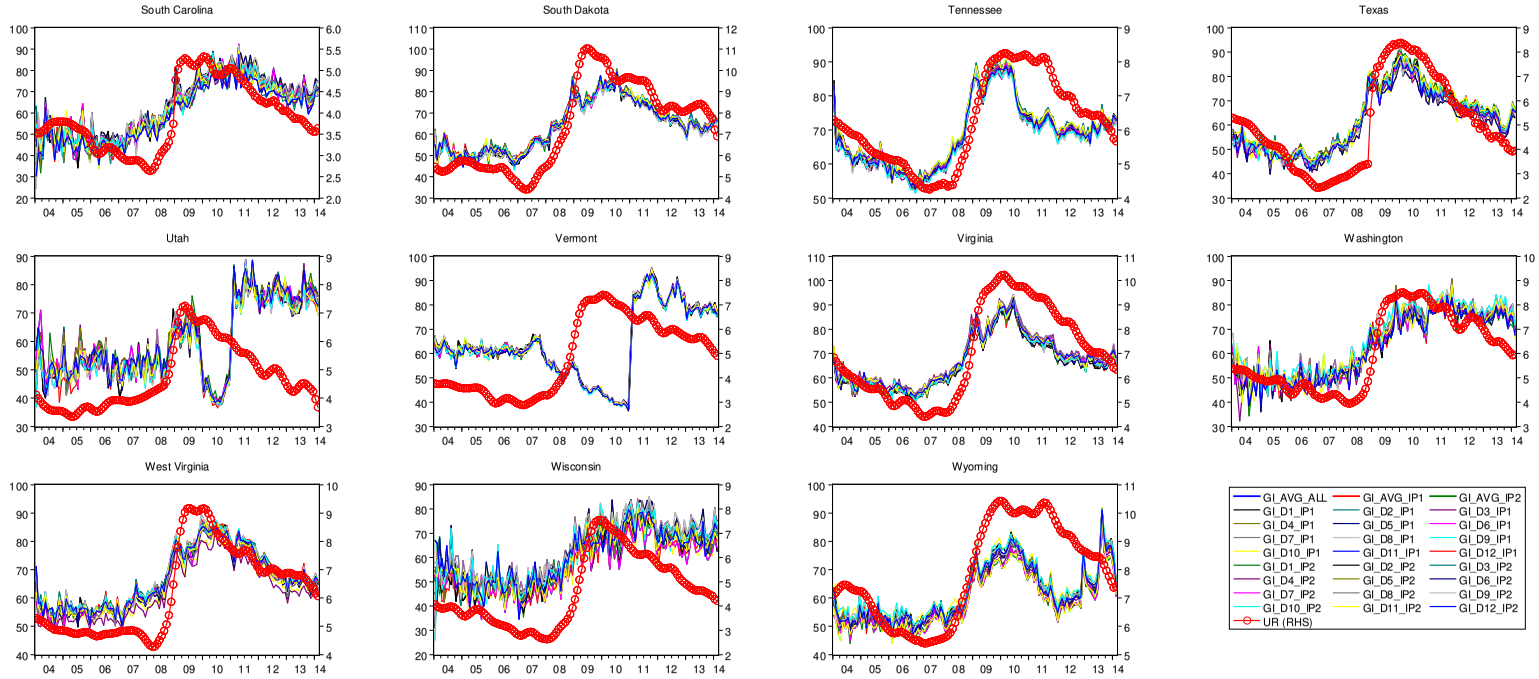
Notes: The figure depicts the Google indexes downloaded across two different IP addresses and over twelve days (LHS) along with each state unemployment rate (RHS).

Figure B.4: Google Indexes across IP and states (NJ to RI)



Notes: The figure depicts the Google indexes downloaded across two different IP addresses and over twelve days (LHS) along with each state unemployment rate (RHS).

Figure B.5: Google Indexes across IP and states (SC to WY)



Notes: The figure depicts the Google indexes downloaded across two different IP addresses and over twelve days (LHS) along with each state unemployment rate (RHS).

Table b.5: Incidence of internet job search among the unemployed and Correlation between the unemployment rate and G1

	Corr $(U_t, G1_t)$	Corr $(U_t, G1_{t-1})$	Corr $(U_t, G1_{t-2})$	Corr $(U_t, G1_{t-3})$
Share of unempl. using the internet	0.640	0.847*	0.929*	0.920*
	(0.469)	(0.500)	(0.523)	(0.533)
Constant	0.558***	0.467***	0.433***	0.442***
	(0.132)	(0.141)	(0.147)	(0.150)
Observations	51	51	51	51
R-squared	0.037	0.055	0.060	0.057

Notes: Results of an OLS regression of the state-specific correlation between the unemployment rate and the G1 on the share of the unemployed that are actually using the internet for their job search, as estimated from the 2011 July Supplement of the Current Population Survey. Standard error in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table b.6: Out-of-sample RMSFEs comparison across states.

State	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI
	h=1			h=2			h=3			h=4			h=5			h=6		
AL	0.45	0.99	0.90	0.63	0.97	0.94	0.87	0.94	0.90	0.91	0.93	0.85	1.06	0.93**	0.82	1.18	0.93**	0.76
AK	0.05	1.04++	1.00	0.10	1.03	1.00	0.15	0.98	1.02	0.21	0.98	1.01	0.25	0.98	1.00	0.28	0.97	0.99
AZ	0.10	1.00	0.93**	0.16	0.98	0.96	0.22	0.95	0.98	0.28	0.94	0.96	0.32	0.91*	0.95	0.36	0.89**	0.92
AR	0.05	0.93	0.93*	0.09	1.00	0.94*	0.14	0.99	0.93	0.18	1.00	0.92	0.25	0.97	0.94	0.30	0.94	0.94
CA	0.05	0.99	1.00	0.11	0.96	0.99	0.19	0.94	0.95	0.27	0.94	0.89	0.36	0.93	0.82	0.40	0.89*	0.79
CO	0.05	0.99	0.96	0.08	0.98	0.93	0.14	0.98	0.91	0.20	0.95	0.90	0.25	0.92	0.89	0.30	0.89**	0.87
CT	0.06	1.00	1.00	0.10	1.01	0.98	0.16	1.01	0.95	0.22	1.00	0.93*	0.29	1.01	0.90	0.35	0.89**	0.85*
DE	0.13	0.98	1.02	0.20	0.97	1.02	0.27	0.98	0.99	0.31	0.98	0.99	0.34	0.98	0.97	0.36	0.96	0.96
DC	0.05	0.95	0.91	0.10	0.94	0.95	0.16	0.95	0.92	0.23	0.96	0.87	0.32	0.97	0.84	0.38	0.98	0.75*
FL	0.15	0.98	0.95	0.24	0.94	0.90*	0.35	0.90**	0.87**	0.41	0.85**	0.81*	0.48	0.78**	0.75*	0.50	0.74**	0.71**
GA	0.04	1.05	0.98	0.08	1.05	0.99	0.14	1.01	0.98	0.21	0.98	1.00	0.29	0.91	0.93	0.36	0.89	0.91
HI	0.05	0.99	0.96*	0.09	0.95	0.98	0.14	0.94	0.99	0.19	0.94	1.00	0.23	0.96	1.02	0.25	0.97	1.05
ID	0.07	0.98	1.05	0.16	0.94	1.07	0.27	0.92*	1.05	0.41	0.89**	1.04	0.54	0.86**	1.00	0.66	0.81*	0.90
IL	0.18	0.97	1.04	0.28	0.90	1.03	0.38	0.90	1.01	0.50	0.85*	1.01	0.59	0.80*	1.00	0.64	0.76*	0.99
IN	0.24	0.84**	1.01	0.30	0.83	1.03++	0.33	0.81*	1.01	0.36	0.74*	1.05	0.39	0.69**	1.05	0.43	0.68*	1.03
IA	0.15	1.03	0.92	0.23	0.96	0.96	0.29	0.98	0.96	0.34	1.00	1.01	0.38	0.87	1.05	0.42	0.76	1.03
KS	0.05	0.98	1.00	0.12	0.99	1.00	0.21	0.97	1.00	0.31	0.96	0.99	0.40	0.97	1.00	0.49	0.97*	1.02
KY	0.10	0.89	0.86	0.16	0.83	0.85	0.23	0.84	0.89	0.32	0.82	0.87	0.43	0.75*	0.84*	0.52	0.72**	0.85**
LA	0.04	1.02	1.01	0.08	1.03	0.98	0.11	1.01	0.97	0.14	1.02	0.96	0.17	1.01	0.96**	0.19	1.01	0.96**
ME	0.06	1.01	1.00	0.11	1.00	1.00	0.17	1.00	1.02	0.23	1.00	1.03	0.28	0.96	1.03	0.32	0.93	1.01
MD	0.08	0.96	0.88	0.12	1.03	0.84	0.16	1.01	0.86	0.21	1.02	0.91*	0.26	1.02	0.95	0.29	0.96	0.97
MA	0.09	0.97	0.99	0.17	0.98	0.98	0.26	1.05	0.98	0.37	1.04+	0.97	0.48	1.04	0.96	0.59	1.04++	0.96
MI	0.13	0.95	0.95	0.23	0.89	0.92	0.33	0.82	0.93	0.42	0.78	0.99	0.49	0.75	0.97	0.55	0.74	0.98
MN	0.08	0.94*	0.99	0.18	0.93*	1.01	0.30	0.94	1.00	0.45	0.91	1.01	0.64	0.88*	1.00	0.80	0.90	0.97
MS	0.25	0.89*	0.92	0.40	0.85	0.94	0.53	0.84	0.95	0.61	0.84	0.96	0.69	0.78	0.95	0.76	0.79*	0.96
MO	0.04	0.91**	0.99	0.07	0.91**	0.95	0.11	0.90**	0.98	0.15	0.87**	1.00	0.17	0.85***	1.01	0.19	0.85***	1.04
MT	0.03	0.98	0.90	0.06	0.96	0.97	0.10	0.97*	0.95	0.14	0.97	0.95	0.17	0.96	0.97	0.20	0.97	0.98
NE	0.07	0.95	1.04	0.14	0.99	1.02	0.22	0.91***	1.01	0.31	0.88***	0.99	0.38	0.86***	0.99	0.44	0.87***	0.97*

(Continued on next page)

Table b.6 – continued

	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI
	h=1			h=2			h=3			h=4			h=5			h=6		
NV	0.07	0.97*	0.99	0.10	0.89*	0.96	0.15	0.89**	0.94*	0.21	0.88**	0.90**	0.26	0.86*	0.90**	0.29	0.87**	0.88
NH	0.06	1.02	1.02	0.12	1.02	1.03	0.20	1.01	1.09	0.29	1.01	1.11	0.35	1.02	1.15	0.39	1.00	1.09
NJ	0.05	0.93*	0.96	0.09	0.88*	1.00	0.13	0.85	0.99	0.19	0.88	0.99	0.22	0.87	1.00	0.23	0.89	1.00
NM	0.08	0.99	1.08+	0.16	1.01	1.08++	0.25	0.98	1.08	0.31	0.98	1.03	0.38	0.99	1.03	0.42	0.99	1.03+++
NY	0.14	0.92*	1.02	0.23	0.91	1.02	0.33	0.96	0.97	0.40	0.90	0.94	0.45	0.90	0.93*	0.48	0.81	0.90**
NC	0.03	0.91	0.83	0.07	0.89*	0.80	0.13	0.89*	0.70	0.18	0.92*	0.68	0.24	0.93*	0.67	0.28	0.94**	0.65
ND	0.09	0.91	0.97	0.14	0.91*	0.87	0.22	0.92**	0.94	0.29	0.92**	0.95	0.39	0.93**	0.93	0.48	0.93	0.97
OH	0.14	0.95	0.98	0.23	0.93	0.97	0.32	0.89	0.98	0.39	0.80	0.96	0.44	0.71	0.89	0.48	0.69	0.93
OK	0.05	0.99	1.05	0.11	1.03	1.00	0.18	1.02	0.95	0.26	0.98	0.99	0.34	0.95	0.96	0.40	0.93	0.96*
OR	0.13	0.99	1.06	0.20	0.98	1.03	0.27	0.96	0.99	0.35	0.94*	0.99	0.43	0.89**	0.98	0.45	0.89***	0.98
PA	0.05	1.01	1.01	0.11	1.01	0.99	0.19	1.02	0.97	0.27	0.99	0.97	0.34	0.98	0.97	0.39	0.98	0.99
RI	0.09	0.99	1.01	0.15	0.97	0.99	0.22	0.97	1.00	0.30	0.93	0.99	0.37	0.91*	0.97	0.44	0.89*	0.96
SC	0.12	0.88**	0.96	0.19	0.91	1.11	0.24	0.82*	1.03	0.29	0.76*	1.03	0.32	0.68	1.01	0.34	0.65	0.95
SD	0.25	0.94	0.89	0.42	0.94	0.81	0.58	0.91	0.73	0.72	0.91	0.65	0.82	0.91*	0.62	0.88	0.93*	0.61
TN	0.12	0.98	1.00	0.20	0.91*	1.01	0.28	0.86**	0.97	0.34	0.81***	0.95	0.39	0.79***	0.94	0.43	0.84***	0.93
TX	0.29	0.62**	0.72**	0.42	0.53**	0.76*	0.59	0.44***	0.71**	0.68	0.48**	0.74*	0.77	0.53**	0.79**	0.84	0.53**	0.78**
UT	0.08	0.99	0.99	0.12	1.00	0.98	0.16	0.99	0.98	0.22	0.99	1.00	0.28	0.99	1.01	0.34	0.97	0.95
VT	0.04	1.03	1.09	0.08	1.01	1.17	0.13	0.99	1.26	0.17	0.93	1.30	0.21	0.81*	1.24	0.25	0.81*	1.15
VA	0.05	0.95	1.01	0.10	0.92*	1.03	0.16	0.93*	0.99	0.22	0.92*	0.98	0.28	0.94	0.98	0.32	0.94	0.94
WA	0.05	0.98	1.01	0.11	0.92	0.97	0.19	0.89	0.94	0.28	0.87	0.93	0.36	0.82	0.92	0.41	0.90	0.96
WV	0.05	0.94	1.02	0.11	0.91	1.00	0.18	0.86	1.01	0.24	0.84	0.98	0.30	0.85*	0.97	0.35	0.87	0.96
WI	0.04	0.95	1.01	0.07	0.99	1.00	0.12	0.96	1.01	0.19	0.99	0.98	0.25	0.98	0.96	0.31	0.97	0.93
WY	0.07	1.03	1.01	0.15	1.05	1.01	0.25	1.01	1.02	0.36	1.00	1.04	0.46	0.97	0.99	0.55	0.96	0.98

(Continued on next page)

Table b.6 – continued

	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI
	h=7			h=8			h=9			h=10			h=11			h=12		
AL	1.02	0.92	0.87	1.06	0.93	0.86	1.08	0.91	0.85	1.44	0.94	0.65	1.47	0.95	0.67	1.47	0.95	0.71
AK	0.30	0.94	0.97	0.31	0.97	0.96	0.32	0.98	0.98	0.33	0.98	0.99	0.35	0.95	0.98	0.38	0.93	0.96*
AZ	0.39	0.90**	0.88	0.40	0.91**	0.86	0.40	0.94	0.81	0.40	0.96	0.79	0.41	0.96	0.77	0.42	0.96	0.76*
AR	0.31	0.88	0.91	0.31	0.88	0.90	0.31	0.88	0.87	0.32	0.87	0.85	0.33	0.82*	0.86*	0.34	0.79**	0.86**
CA	0.42	0.90*	0.75	0.44	0.89*	0.72*	0.44	0.89	0.71**	0.43	0.86	0.69**	0.44	0.83	0.70**	0.47	0.83**	0.75**
CO	0.35	0.78**	0.82	0.41	0.69***	0.78*	0.39	0.75***	0.86	0.40	0.74***	0.90	0.40	0.78***	0.86**	0.41	0.77***	0.90***
CT	0.39	0.84*	0.83**	0.43	0.87	0.84**	0.44	0.89	0.80***	0.45	0.87	0.80**	0.44	0.91	0.89**	0.44	0.90	0.92
DE	0.35	0.94	0.93	0.33	0.91	0.92	0.31	0.98	0.92	0.32	0.98	0.90	0.35	0.96	0.91	0.37	0.94	0.92
DC	0.40	0.99	0.73*	0.42	1.01	0.66*	0.42	0.99	0.68*	0.46	0.99	0.66*	0.49	0.99	0.62*	0.52	1.01	0.62**
FL	0.52	0.77*	0.68**	0.48	0.82	0.67**	0.44	0.86	0.63**	0.43	0.88	0.62**	0.44	0.89	0.62**	0.48	0.89	0.65**
GA	0.43	0.84**	0.95	0.47	0.80**	0.96	0.51	0.75***	0.92**	0.52	0.73***	0.89**	0.54	0.71*	0.82**	0.56	0.67***	0.78***
HI	0.26	0.98	1.05	0.24	1.00	1.06	0.23	1.03	1.02	0.22	1.04	1.01	0.22	1.02	0.98	0.25	1.00	0.96
ID	0.74	0.75*	0.84*	0.79	0.63**	0.77**	0.82	0.55**	0.61**	0.76	0.51**	0.74**	0.73	0.47***	0.72**	0.68	0.47***	0.68**
IL	0.67	0.74*	0.97	0.68	0.76*	0.97**	0.66	0.79	0.97*	0.65	0.83	0.97	0.64	0.85	0.97	0.65	0.86	0.98
IN	0.47	0.63***	1.04	0.50	0.60***	1.03	0.53	0.57***	1.04	0.54	0.51***	0.94	0.56	0.51***	0.93	0.58	0.49***	0.90
IA	0.44	0.67	1.04	0.47	0.67	1.03	0.48	0.63*	1.04	0.51	0.61**	1.05	0.53	0.60**	1.04	0.55	0.59**	1.01
KS	0.56	0.96***	0.97	0.59	0.95***	0.94	0.65	0.95*	0.94	0.66	0.97*	0.96	0.69	0.97***	0.95	0.72	0.97***	0.94
KY	0.60	0.67***	0.82**	0.69	0.66***	0.80***	0.73	0.73***	0.78***	0.76	0.81***	0.80***	0.77	0.87*	0.83**	0.76	0.79**	0.83
LA	0.21	1.05	0.99	0.22	1.06	0.99	0.23	1.05+	1.02	0.24	1.04	1.02	0.26	1.05	1.03	0.28	1.07	1.00
ME	0.33	0.88	0.99	0.33	0.89	0.96	0.32	0.90	0.95	0.31	0.95	0.97	0.30	0.94**	0.97	0.29	0.91**	0.94*
MD	0.32	0.89**	0.97	0.32	0.86**	0.96	0.32	0.83*	0.93*	0.33	0.95	0.95	0.34	0.95	0.96	0.36	0.95	0.93
MA	0.67	1.02	0.96	0.71	1.01	0.97	0.75	1.00	0.91	0.78	1.01	0.94	0.84	1.01+	0.92	0.90	0.96	0.91
MI	0.60	0.74	1.00	0.64	0.72	1.02	0.67	0.70	1.03	0.70	0.70	1.02	0.73	0.71*	0.92	0.75	0.73**	0.88
MN	0.90	0.83**	0.93	1.01	0.77***	0.90	1.03	0.76***	0.87	1.04	0.75***	0.85	1.07	0.75***	0.83	1.10	0.73***	0.83
MS	0.82	0.77**	0.98	0.87	0.78**	0.99	0.91	0.78**	0.99	0.94	0.78**	0.99	0.95	0.74**	0.97	1.00	0.69***	0.96
MO	0.19	0.81***	1.06	0.17	0.79***	1.13+	0.16	0.78***	1.12	0.15	0.77***	1.13	0.14	0.78*	1.11	0.15	0.82**	1.06
MT	0.22	0.97	0.96	0.22	0.97	0.98	0.23	0.99	0.99	0.24	0.99	0.99	0.24	1.00	0.99	0.25	1.00	0.98
NE	0.47	0.87***	0.96*	0.47	0.88**	0.97	0.45	0.90**	0.96	0.44	0.93	0.97	0.43	0.90**	0.98	0.44	0.89**	0.99

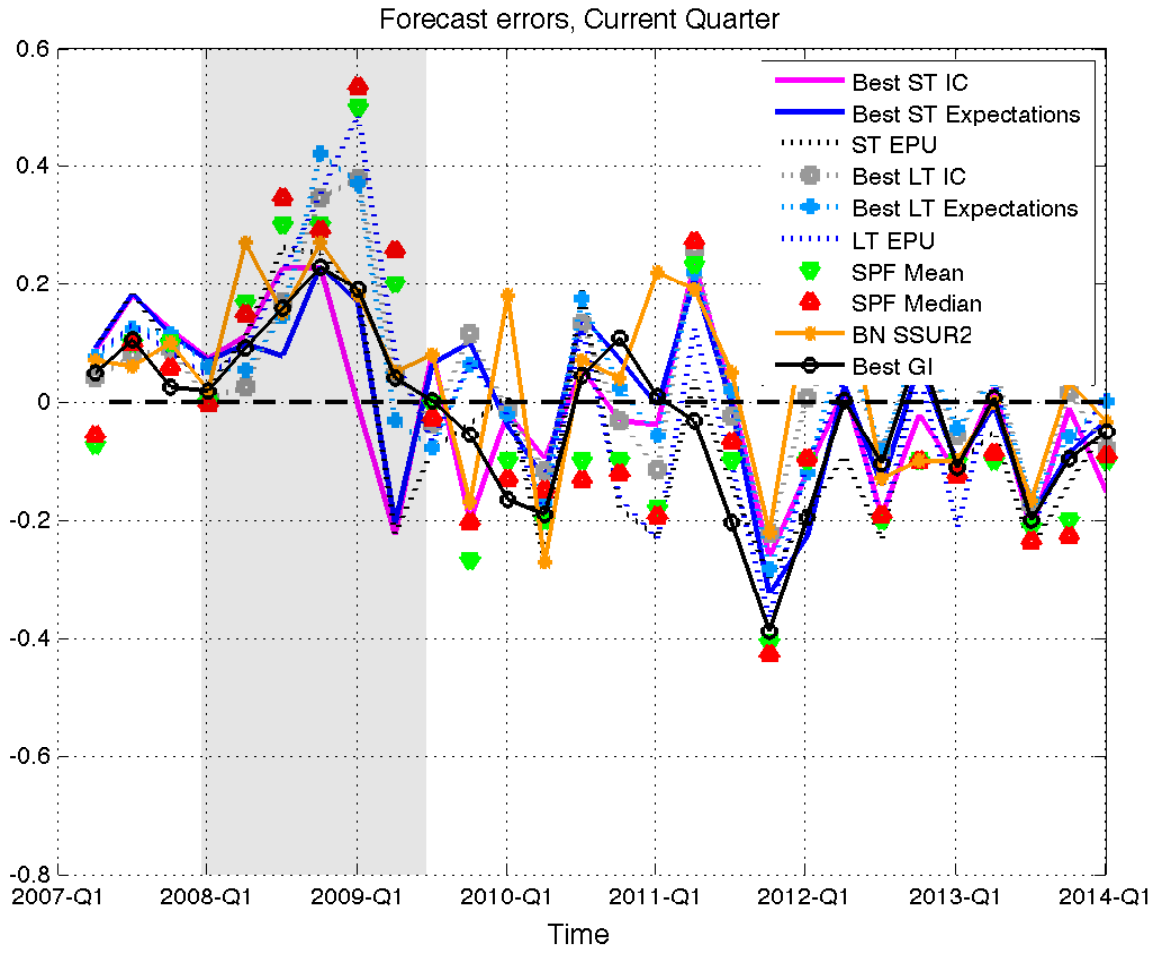
(Continued on next page)

Table b.6 – continued

	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI	AR	IC	GI
	h=7			h=8			h=9			h=10			h=11			h=12		
NV	0.32	0.86**	0.83	0.34	0.87*	0.77	0.33	0.85*	0.74	0.34	0.86*	0.68	0.36	0.87**	0.66	0.37	0.81***	0.66*
NH	0.44	1.00	0.98	0.49	1.04	1.00	0.55	1.06++	0.94	0.60	1.07	0.90	0.65	1.08	0.95	0.71	0.93	0.83
NJ	0.23	0.86	1.00	0.20	0.86*	0.98	0.18	0.86**	0.97	0.18	0.83***	1.00	0.20	0.81	1.01	0.23	0.81	1.04
NM	0.45	0.99	1.01	0.48	1.00	0.96	0.50	0.99	0.91	0.52	0.97	0.86	0.55	0.91	0.85	0.58	0.91	0.86*
NY	0.50	0.81	0.87***	0.52	0.85	0.85***	0.54	0.90	0.83***	0.57	0.91	0.83*	0.61	0.90	0.83*	0.64	0.91**	0.81*
NC	0.32	0.94***	0.62	0.33	0.95**	0.58	0.34	0.94***	0.61*	0.35	0.94***	0.60*	0.38	0.89*	0.60*	0.39	0.86**	0.64**
ND	0.54	0.94	1.00	0.58	0.90**	0.99	0.62	0.90**	0.97	0.66	0.91**	0.95	0.68	0.94*	0.92*	0.70	0.94**	0.91*
OH	0.50	0.71	0.93	0.47	0.75	0.94	0.46	0.78	0.94	0.44	0.84	0.93	0.43	0.87	0.92	0.42	0.90	0.83
OK	0.45	0.91	0.96	0.48	0.86	0.96	0.50	0.80	0.96	0.51	0.94	0.96	0.51	0.94	0.95	0.51	0.94	0.96
OR	0.46	0.90**	0.97	0.46	0.90***	0.98	0.46	0.93**	0.96	0.47	0.93	0.93	0.48	0.93	0.88**	0.50	0.90	0.82**
PA	0.41	0.98	0.95	0.44	0.98**	0.95	0.47	0.98*	0.94	0.50	0.99	0.93	0.53	0.99	0.92	0.56	0.99	0.92
RI	0.51	0.91	0.89	0.56	0.96	0.83*	0.60	0.98	0.86	0.66	0.95	0.93	0.70	0.88	0.97	0.75	0.86*	0.96
SC	0.35	0.62	0.94	0.36	0.60	0.83	0.34	0.63*	0.88	0.33	0.59*	0.94	0.34	0.60**	0.90	0.38	0.52***	0.93
SD	0.89	0.90*	0.66	0.72	0.85	0.89	0.74	0.87	0.95	0.78	0.88	0.96*	0.81	0.93	1.00	0.85	0.87**	0.98*
TN	0.43	0.90	0.89	0.44	0.95	0.82*	0.45	0.97	0.75**	0.46	1.00	0.70**	0.48	1.00	0.64**	0.51	0.99	0.61**
TX	0.87	0.55**	0.79*	0.91	0.56***	0.79*	0.93	0.58***	0.79**	0.97	0.59***	0.80**	0.99	0.60***	0.81**	1.03	0.61***	0.82***
UT	0.39	0.96	0.91	0.44	0.93	0.99	0.48	0.84	0.91	0.50	0.76	1.02	0.51	0.76	1.06	0.51	0.81*	1.03
VT	0.26	0.88	1.46	0.27	0.91	1.40	0.27	0.95	1.38	0.27	0.96	1.40	0.27	0.97	1.21	0.28	0.93	1.09
VA	0.35	0.94	0.86**	0.38	0.89	0.75***	0.40	0.90	0.68***	0.41	0.92	0.63***	0.44	0.91	0.63***	0.45	0.90	0.66***
WA	0.50	0.84	0.94	0.52	0.89	0.91	0.49	0.89	0.86	0.48	0.92	0.95	0.50	0.97	0.92	0.50	0.95	0.87**
WV	0.38	0.86	0.96	0.41	0.93	0.92	0.44	0.94	0.89	0.46	0.94	0.88	0.47	0.93	0.88	0.48	0.92	0.88
WI	0.36	0.97	0.93	0.41	1.02	0.94	0.44	1.02	0.94	0.44	1.01	0.90**	0.43	1.06	0.89**	0.42	1.02	0.89
WY	0.62	0.95	0.86	0.64	0.96	0.78	0.64	0.97	0.77	0.63	0.97	0.78	0.65	0.97	0.80	0.70	0.95**	0.76

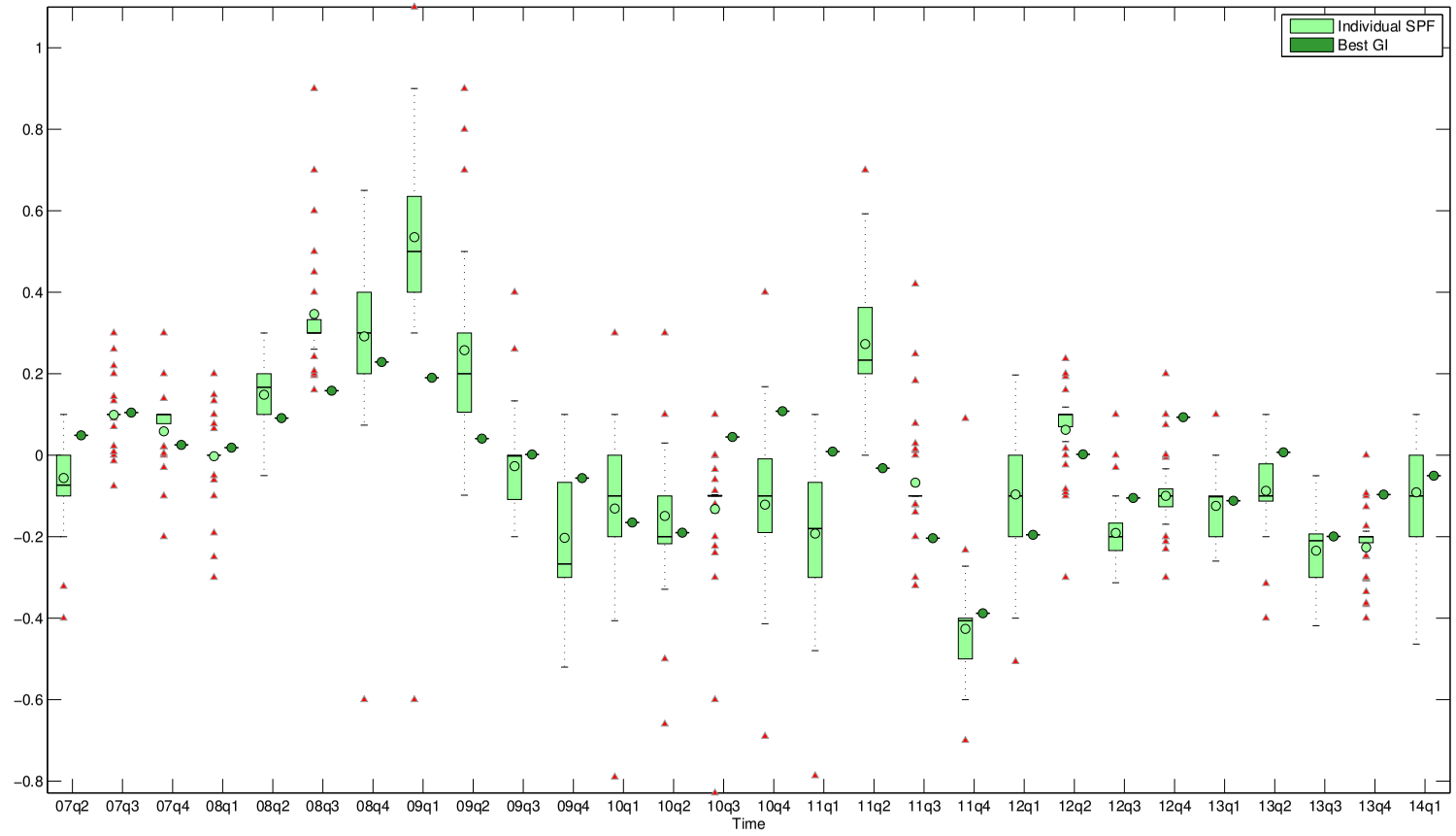
Notes: Comparison across states. For G1, the Table reports the RMSFE for the benchmark $AR(p)$ model where p is selected recursively by the BIC, the ratio of the RMSFE of best Non-Google model over the RMSFE of the benchmark, and the ratio of the RMSFE of the best Google model over the RMSFE of the benchmark. Therefore, for the ratios of RMSFE, a number below 1 indicates that the model is beating the benchmark, while a number above 1 means that the benchmark outperforms. *, **, and *** indicate that the DM test for the null hypothesis of equal forecast accuracy between the benchmark AR model and the AR model with the leading indicator (IC for non-Google models and GI for Google models) is positive (i.e. the benchmark model has a higher RMSFE) and significant at 10, 5 and 1%, respectively. +, ++, and +++ indicate that the DM test is significant but negative (i.e. the benchmark model has a lower RMSFE and thus it beats the competitor) at 10, 5 and 1%, respectively.

Figure B.6: Forecast errors from quarterly forecasts: comparison with the Survey of Professional Forecasters



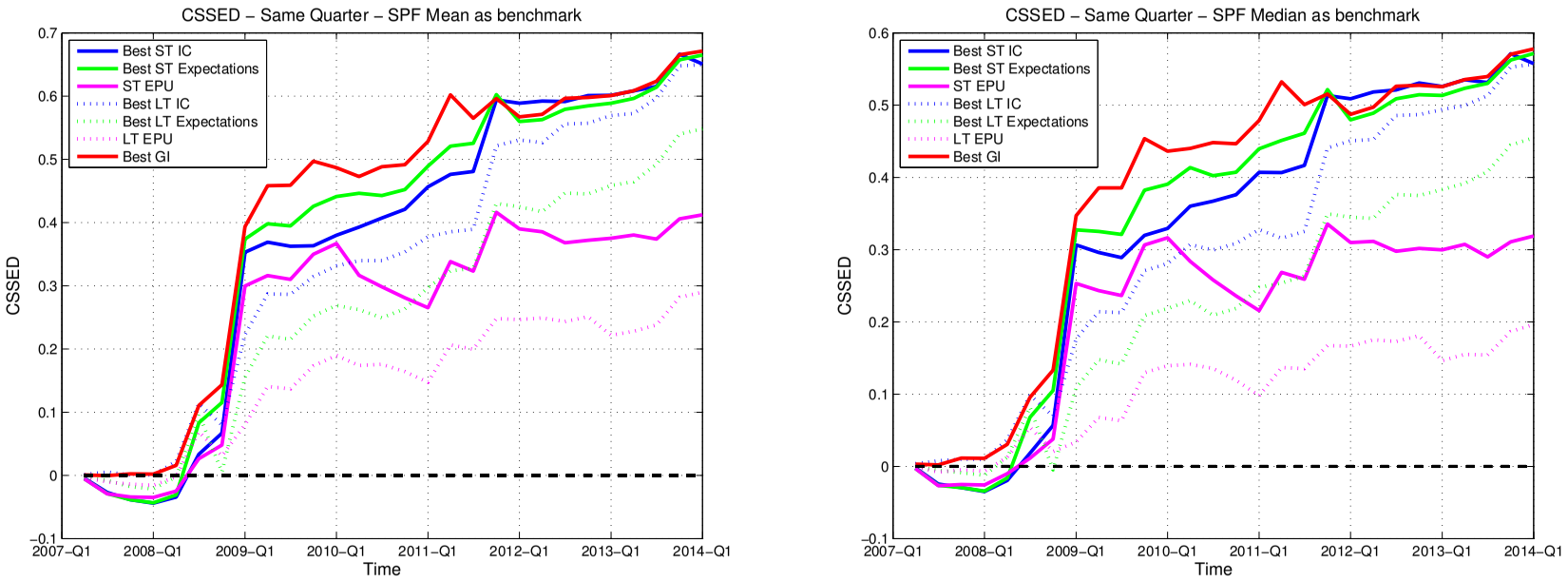
Notes: In this figure we compare the SPF forecasts for the same quarter with the quarterly forecasts generated from our best models within each group, computed as the average of the realized unemployment rate in the first month of the quarter and the one-month and two-month-ahead forecasts generated right before the 15th of the second month of each quarter. SPF^{mean} is the mean of the SPF forecasts, while SPF^{median} is their median. Best ST IC is the best model estimated over the short sample with the IC as leading indicator. Best ST Expectations is the best model estimated over the short sample using the expectations from the surveys. Best LT IC and Best LT Expectations are the same best models estimated over the long sample. BN SSUR2 is the Barnichon and Nekarda's (2012) steady-state unemployment rate model with two states estimated over a fifteen-year rolling window. Best GI is the best model using the Google index over the short sample.

Figure B.7: Comparison of forecast errors for the same quarter for individual SPF forecasters versus best model using Google



Notes: In this figure we compare the forecast errors for each individual professional forecaster surveyed by the SPF for the same quarter unemployment rate. For each quarter between 2007Q2 and 2014Q1 the box-plot of the distribution of the individual forecast errors are depicted in light green. The triangles indicate outliers, the rectangle indicates the interquartile range, the circle is the mean, the median is the black bar. The dark green circle is the forecast error from the best Google model.

Figure B.8: CSSED Comparison with SPF

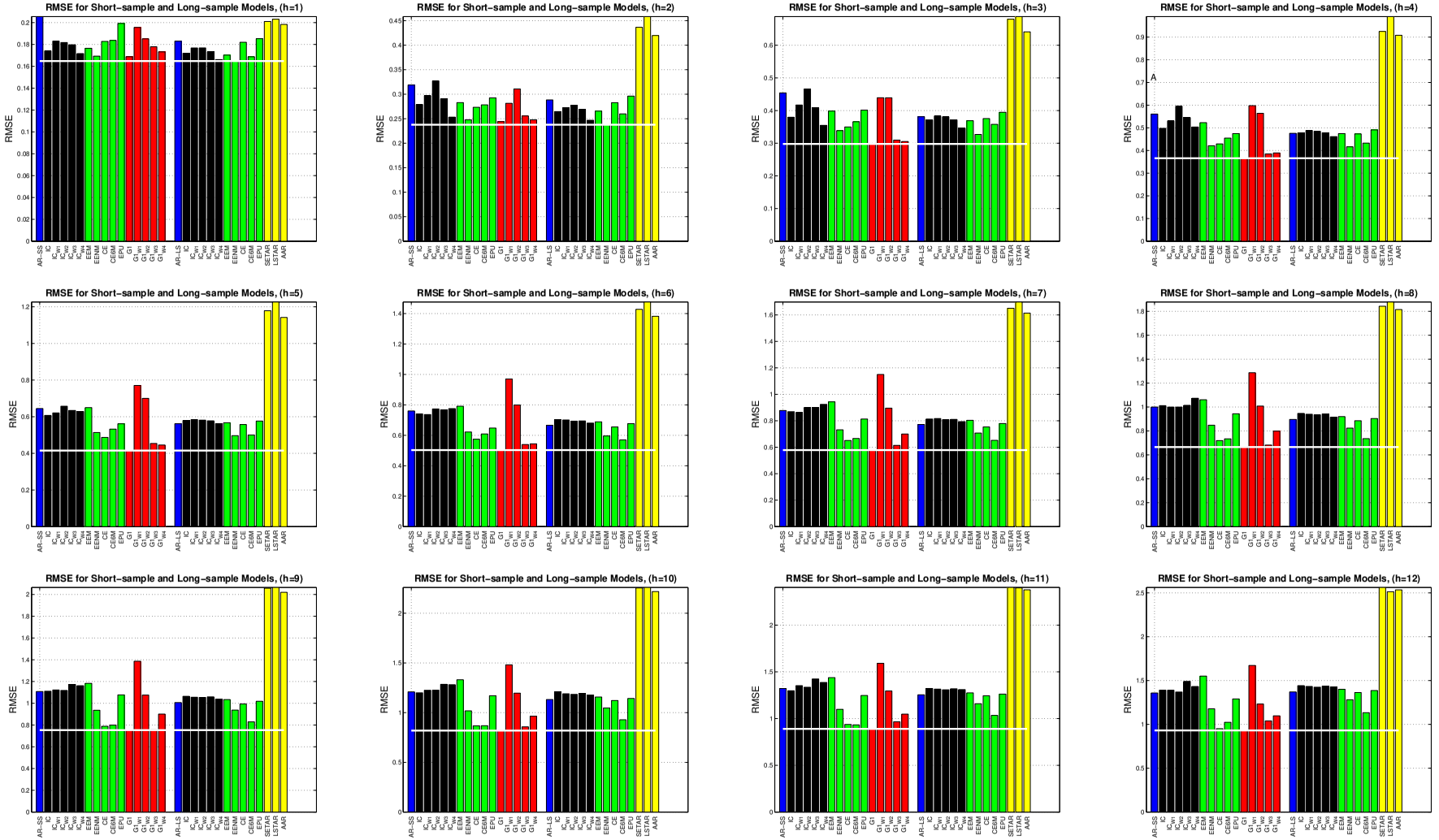


Notes: For each forecast horizon the graphs show the Cumulative Sum of Squared forecast Error differences (CSSED) computed as

$$CSSED_{m,\tau} = \sum_{\tau=R}^{T} (\hat{e}^2_{bm,\tau} - \hat{e}^2_{m,\tau})$$

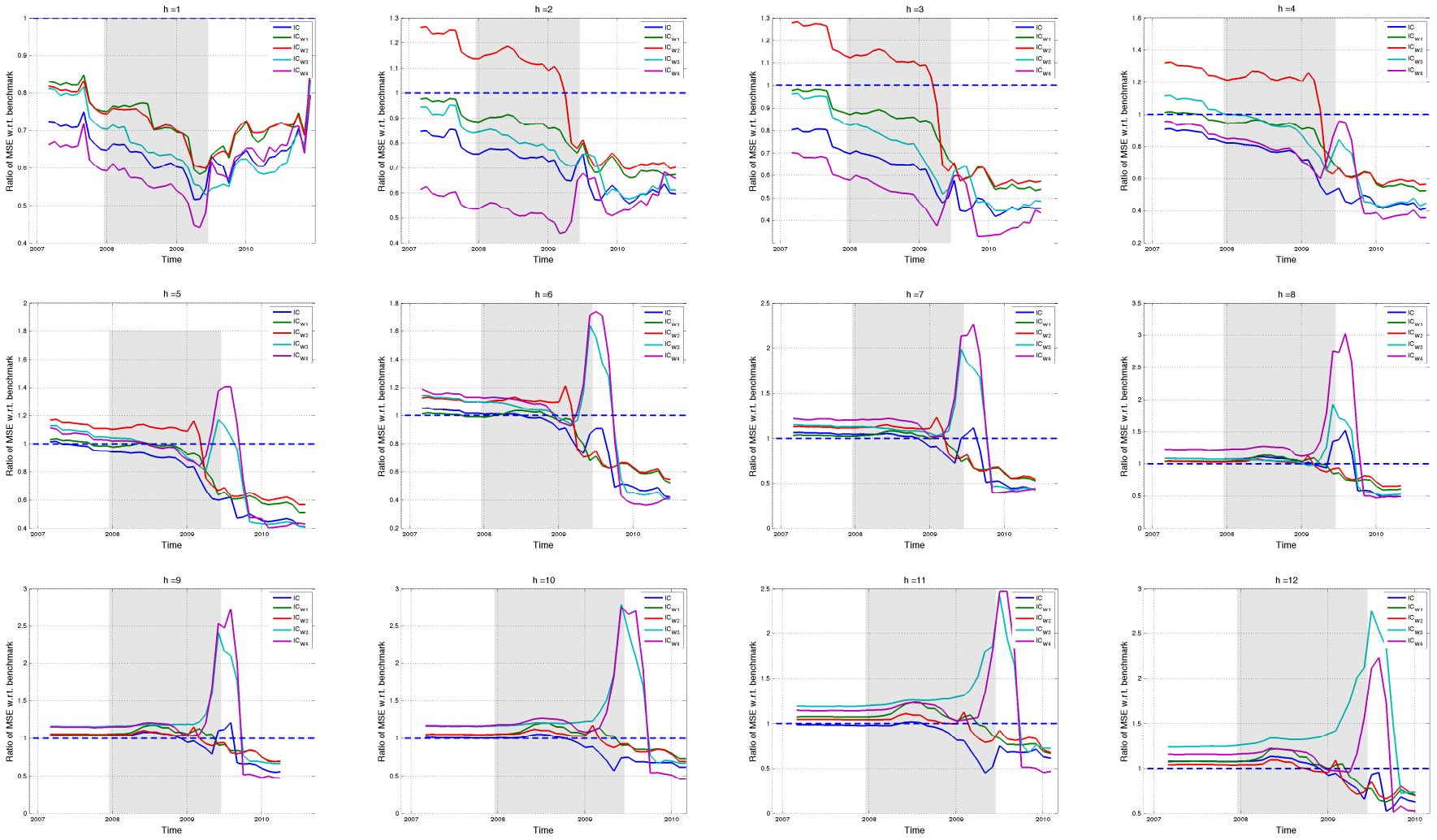
where $\hat{e}^2_{bm,\tau}$ denotes the squared forecast error of the mean SPF (left panel) or the median SPF (right panel) and $\hat{e}^2_{m,\tau}$ denotes the alternative model, which can be either the best model using IC estimated over the short sample (Best ST IC) or the long sample (Best LT IC), the best model using Expectations estimated over the short sample (Best ST Expectations) or the long sample (Best LT Expectations), the best model using GI (Best GI), and the Barnichon and Nekarda's (2012) SSUR2 model. R and T indicate the beginning and the end of the forecast evaluation sample, respectively. Values above zero indicate that the alternative model outperform the benchmark. Each graph plots the evolution of the CSSED for each forecast horizon.

Figure B.9: RMSFE Comparison: Short sample vs Long sample



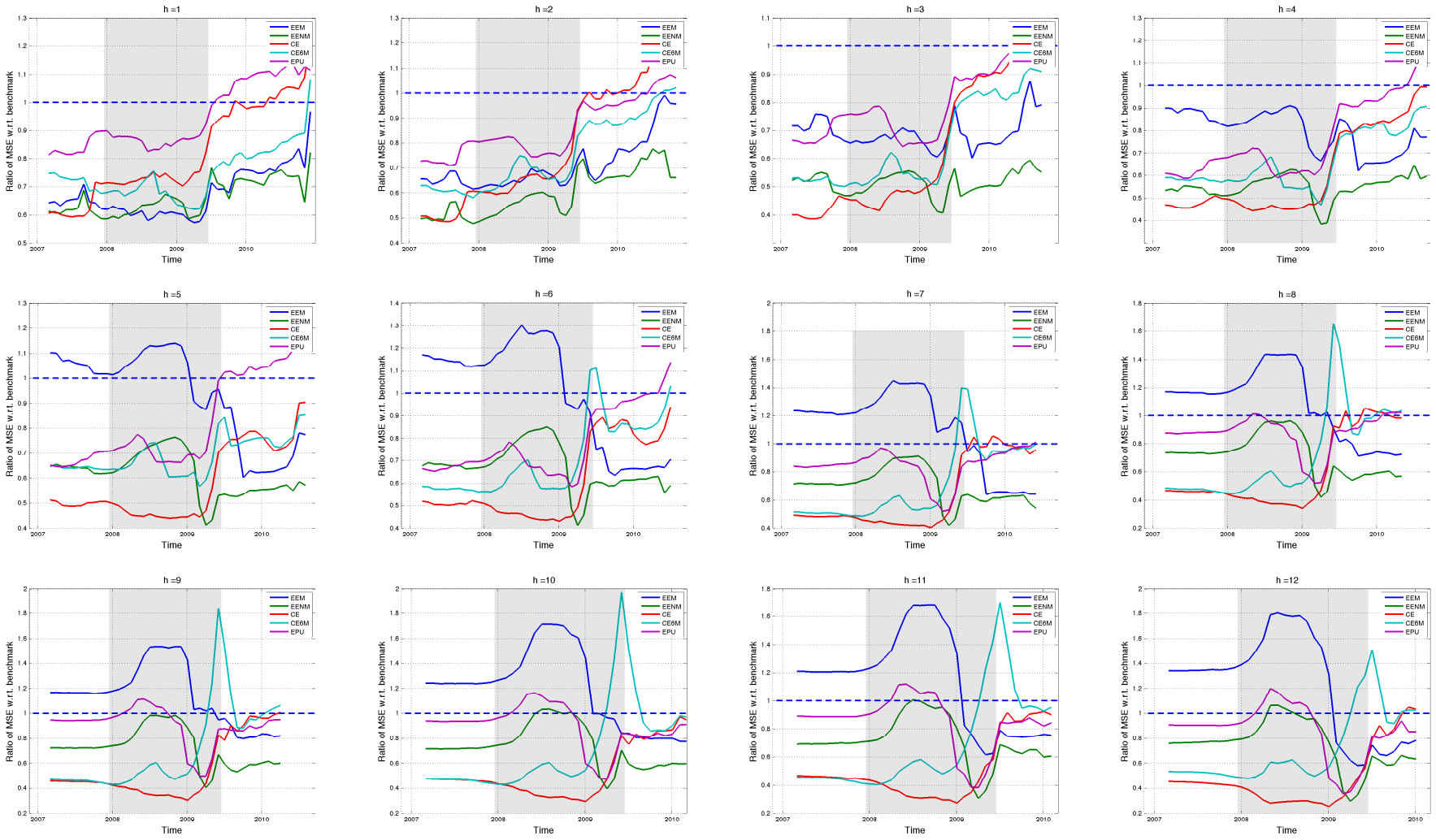
Notes: For each forecast horizon the graphs show the RMSEFs of the competing models on the x axis estimated over the short sample (left histogram) and over the long sample (right histogram). The white horizontal line indicates the lowest RMSFE across the samples. The $AR(p)$ benchmarks are represented by blue bars; models using IC by black bars; models using Expectations by green bars, models using Google Index for 'jobs' by red bars.

Figure B.10: Ratios of RMSFEs for models with IC w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



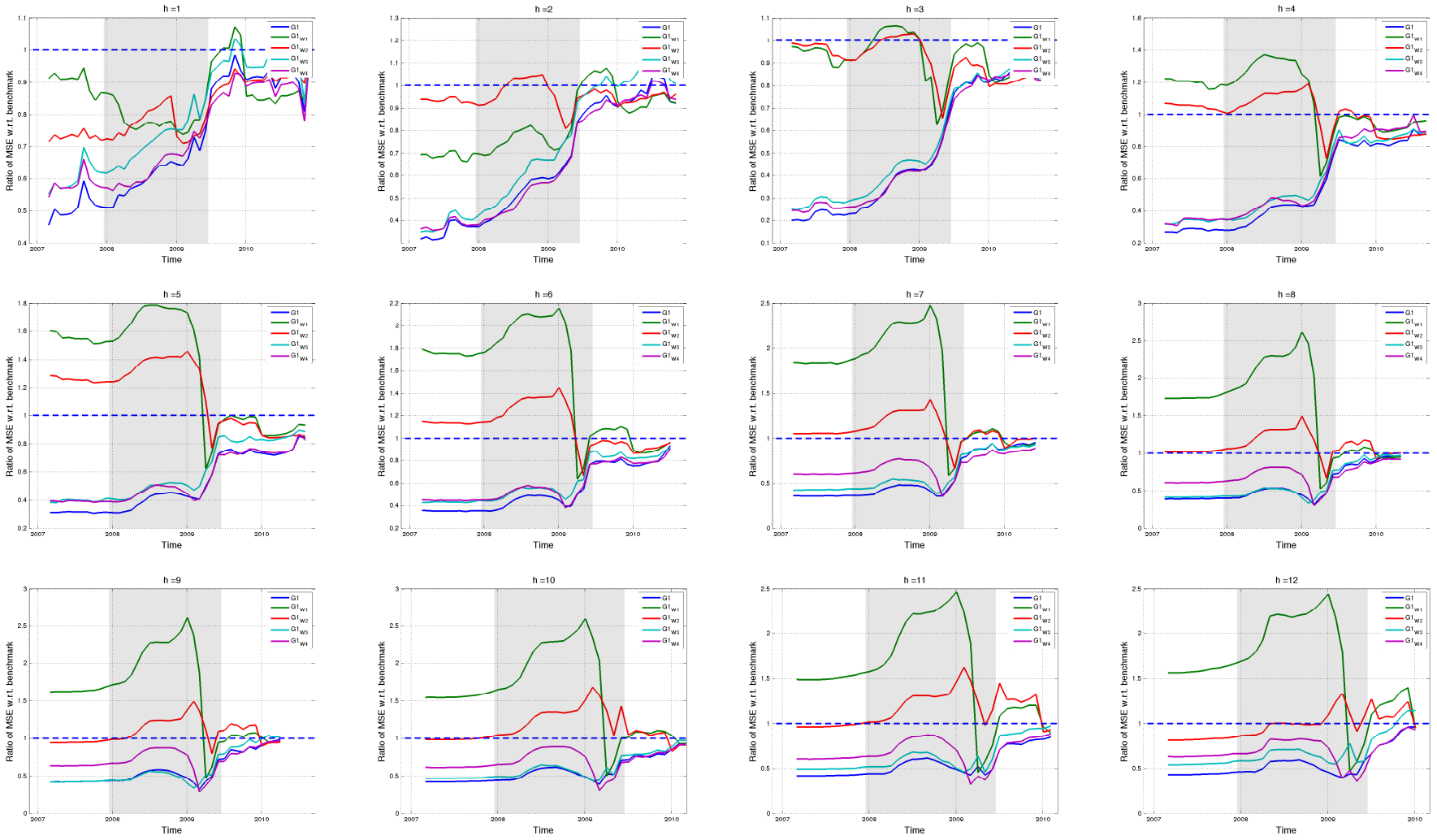
Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using IC with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.

Figure B.11: Ratios of RMSFEs for models with Expectations w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



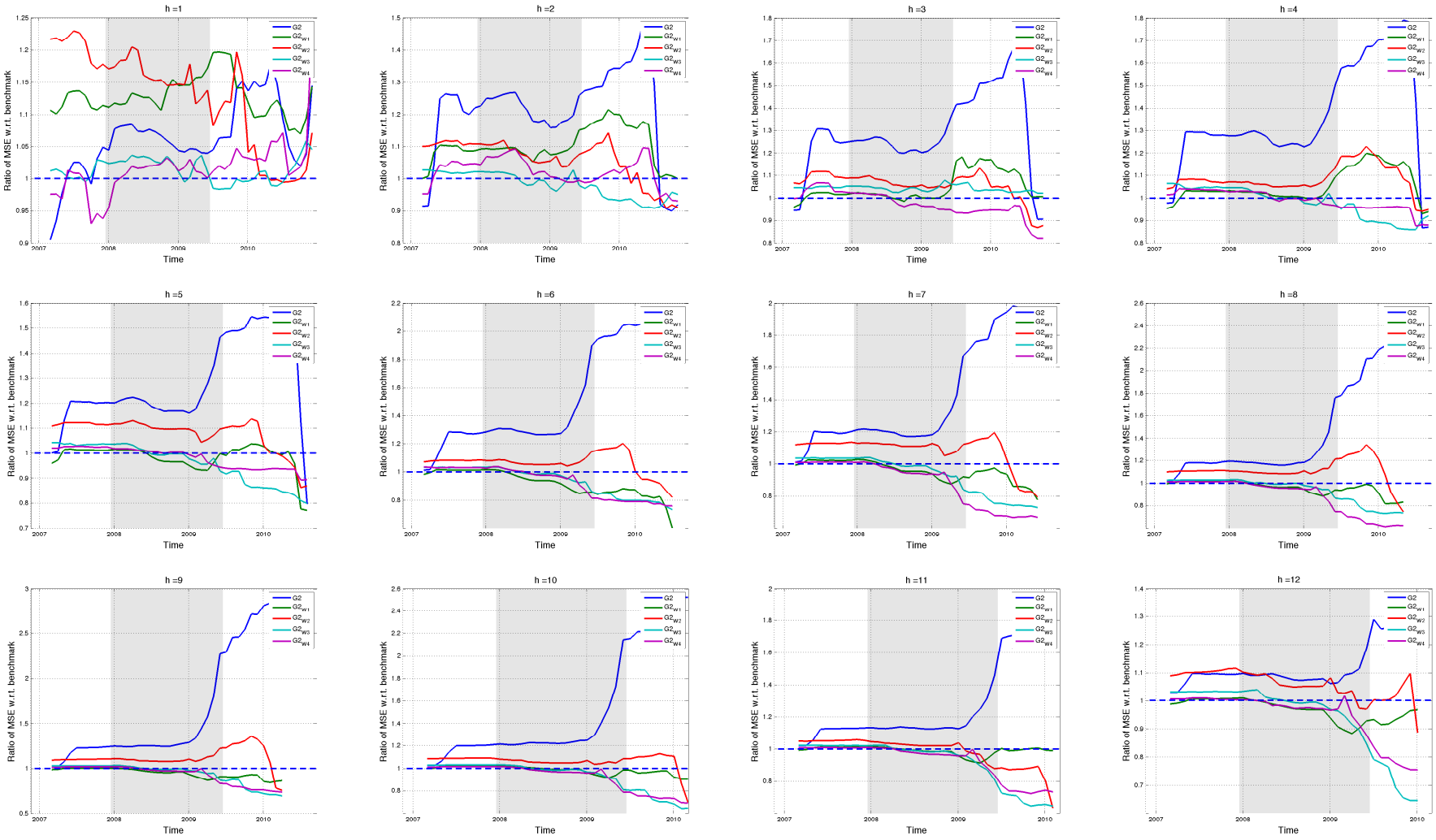
Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using Expectations with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.

Figure B.12: Ratios of RMSFEs for models with $G1$ w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



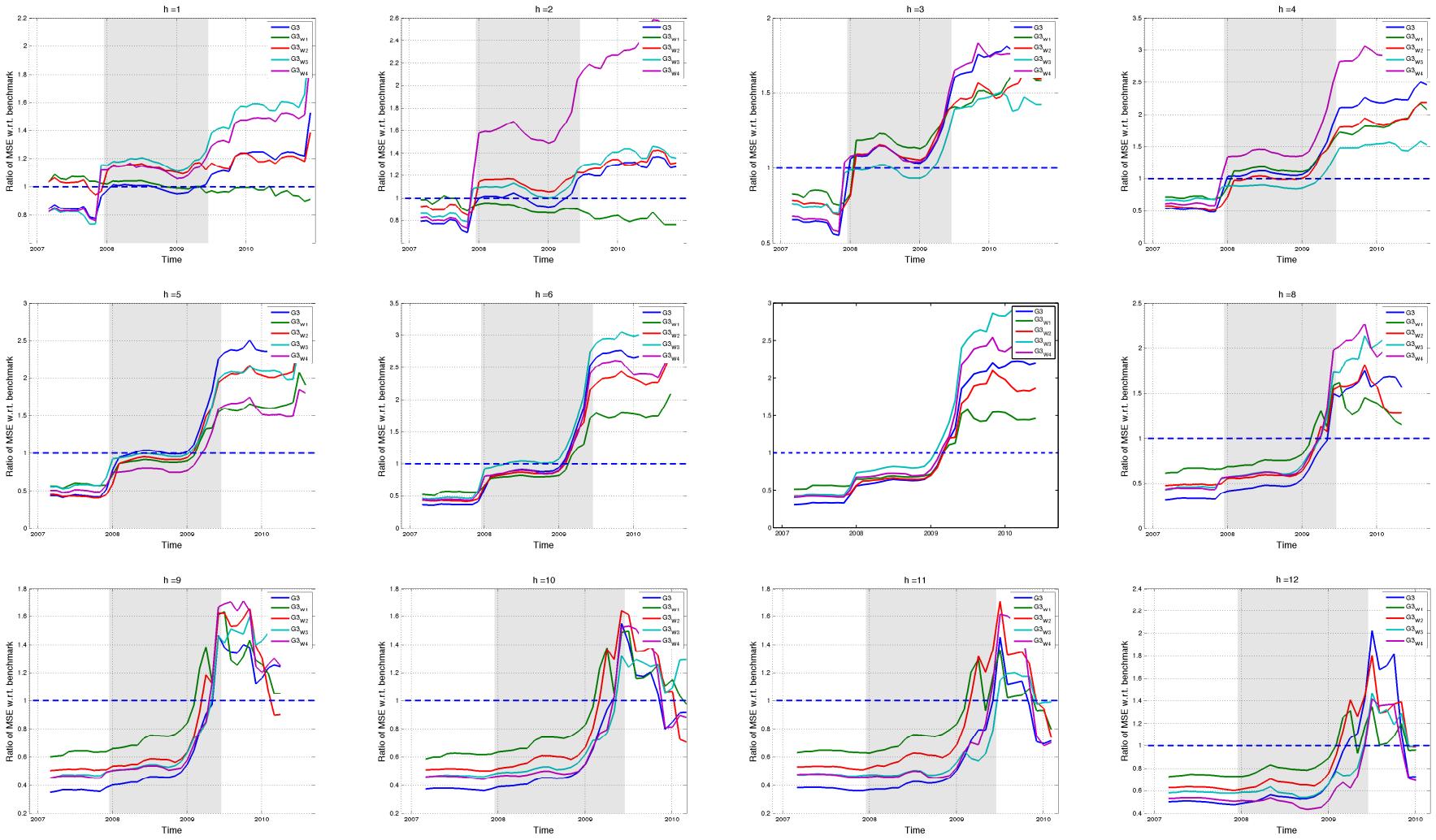
Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using $G1$ with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.

Figure B.13: Ratios of RMSFEs for models with $G2$ w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



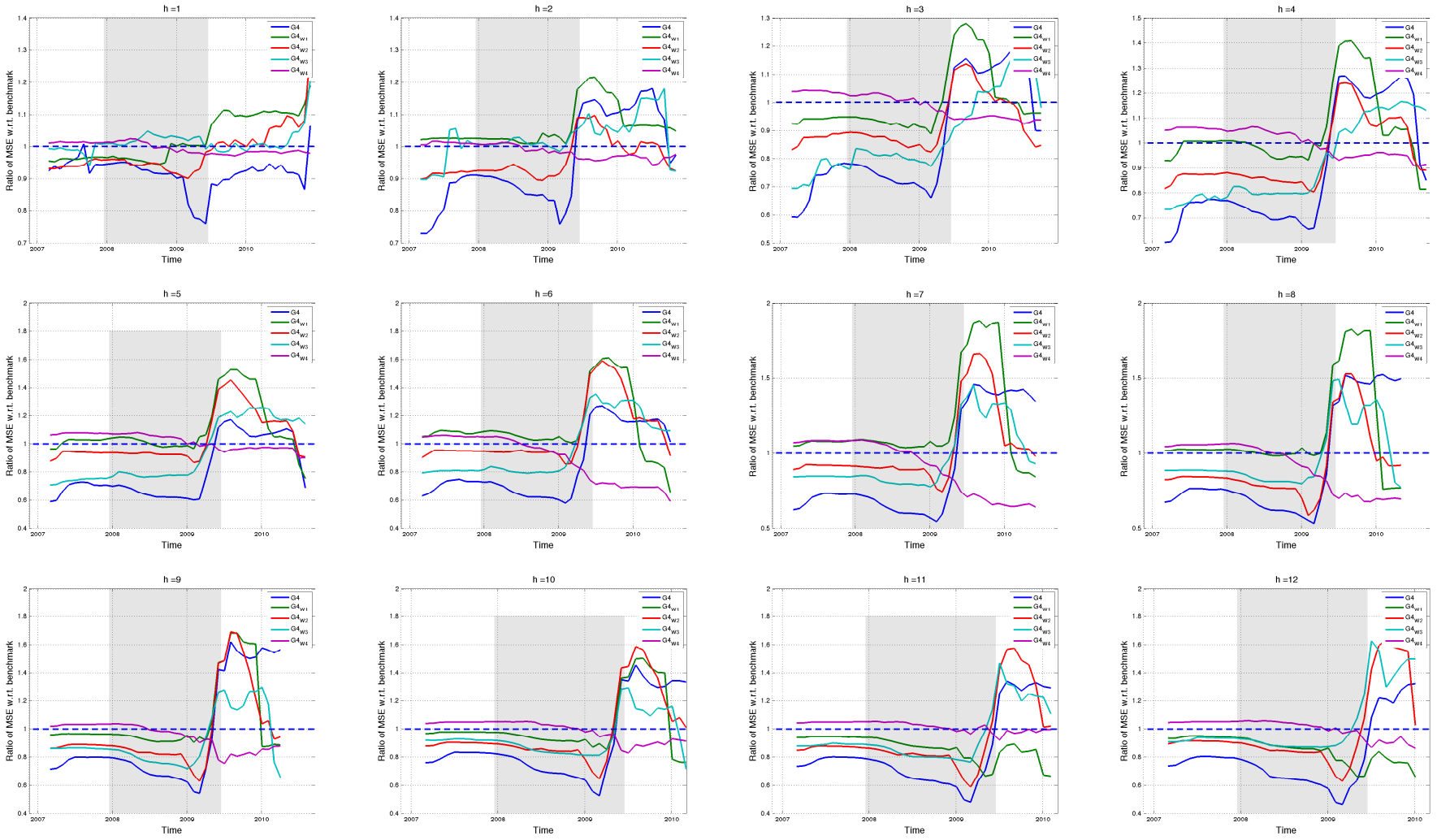
Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using $G2$ with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.

Figure B.14: Ratios of RMSFEs for models with $G3$ w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using $G3$ with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.

Figure B.15: Ratios of RMSFEs for models with $G4$ w.r.t. Benchmark over rolling out-of-samples ($R = 37$)



Notes: For each forecast horizon the graphs show the ratios of RMSEFs of the competing models using $G4$ with respect to the benchmar $AR(p)$ estimated over the short sample. Numbers below 1 indicate that the competing model beats the benchmark, while numbers above 1 mean that the benchmark outperforms.