

Forecasting Inflation in Open Economies: What Can a NOEM Model Do? *Supplementary Materials**

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Abstract

This Online Appendix reports detailed results on the inflation forecasting horserace conducted by Duncan and Martínez-García (2022). The tables of results found here complement the evidence and are explained/contextualized in that paper. The dataset that we use here is exactly the same covering a sample of 18 countries (Australia, Austria, Belgium, Canada, France, Germany, Greece, Italy, Japan, South Korea, Netherlands, Portugal, Spain, Sweden, Switzerland, Taiwan, United Kingdom, and the United States) over the 1980:Q1-2016:Q4 period, obtained from the Federal Reserve Bank of Dallas' Database of Global Economic Indicators (DGEI; Grossman et al. (2014)).

JEL Classification: E31, F41, F42, F47.

Keywords: Inflation Forecasting, New Open Economy Macro model, Open-Economy Phillips Curves.

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Table A1 - One-Quarter Ahead RMSPE of the NOEM-BVAR Model Relative to Competing Models

	M ₁ /M ₂ RAR or DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC-FD	M ₉ BVAR4	M ₁₀ BVAR2-COM
Australia	0.838	0.778	0.912	0.915	0.803	0.939	0.808	0.912	0.881
Austria	0.918	0.794	1.006	1.003	0.864	0.942	0.854	1.002	1.009
Belgium	0.893	0.706	0.882	0.901	0.879	0.870	0.801	0.888	0.879
Canada	0.951	0.938	0.998	1.001	0.868	0.963	0.844	0.964	0.939
France	1.066	0.909	0.979	1.005	1.032	0.952	0.973	0.982	1.060
Germany	0.984	0.966	1.007	1.008	0.852	0.951	0.884	0.941	0.948
Greece	1.071	1.013	0.956	0.965	0.991	0.928	1.055	0.974	1.031
Italy	1.114	0.966	1.077	1.076	1.061	1.046	1.076	1.118	1.133
Japan	0.945	0.884	1.002	1.006	0.817	1.009	0.840	0.967	0.963
Korea	0.988	0.970	1.017	1.026	0.947	1.029	0.971	1.038	1.008
Netherlands	1.018	1.024	1.038	1.039	0.825	0.970	0.950	0.991	0.999
Portugal	1.050	1.053	0.974	0.977	0.983	0.945	0.995	0.961	1.026
Spain	0.958	0.854	0.915	0.925	0.968	0.949	0.895	0.963	1.000
Sweden	0.922	0.828	0.958	0.960	0.922	1.002	0.864	0.971	0.956
Switzerland	0.910	0.790	0.923	0.928	0.926	0.949	0.831	0.917	0.944
Taiwan	0.951	0.914	0.946	0.951	0.778	0.933	0.818	0.958	0.972
United Kingdom	0.908	0.836	0.978	0.979	0.896	0.897	0.850	0.884	0.864
United States	0.959	0.902	1.014	1.015	0.836	0.970	0.783	0.966	1.000
Mean	0.969	0.896	0.977	0.982	0.903	0.958	0.894	0.967	0.979
Median	0.955	0.905	0.979	0.990	0.888	0.950	0.859	0.965	0.986
#<1	13	15	11	9	16	14	16	15	11
#pv<.1	4	7	4	4	10	2	10	2	4

Notes: Columns report the ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of standard forecasting models. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. Values in bold indicate that the null hypothesis of equal predictive accuracy is rejected at 10% level using the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model *à la* Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, BVAR2 is the bivariate Bayesian VAR(2), TVP is the time-varying parameter specification, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR4 is the 4-variable Bayesian VAR(2), and BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes.

Table A2 - Two-Quarter Ahead RMSPE of the NOEM-BVAR Model Relative to Competing Models

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
Australia	0.966	0.937	0.963	0.912	0.935	0.859	1.009	0.836	0.988	0.995
Austria	1.079	1.068	0.932	1.073	1.073	0.890	1.057	0.893	1.056	1.086
Belgium	0.940	0.878	0.784	0.927	0.940	0.841	1.043	0.769	0.987	0.896
Canada	0.961	0.986	1.069	1.029	1.007	0.799	0.919	0.809	0.950	0.968
France	1.062	1.044	0.983	0.974	1.012	0.996	1.023	0.943	1.024	1.066
Germany	1.020	1.039	0.990	1.043	1.033	0.833	0.977	0.904	1.004	1.011
Greece	1.012	1.005	1.020	0.879	0.913	1.009	0.878	0.944	0.948	0.989
Italy	1.024	1.011	0.940	0.939	0.970	0.981	1.006	0.918	0.946	1.000
Japan	1.053	1.063	0.942	1.055	1.045	0.818	1.088	0.938	1.097	1.066
Korea	1.070	1.051	1.102	1.063	1.078	1.015	1.069	0.961	1.132	1.043
Netherlands	0.991	1.013	0.996	1.021	1.006	0.805	0.933	0.950	0.967	0.976
Portugal	1.041	1.067	1.040	0.910	0.928	0.970	0.924	0.988	0.897	1.019
Spain	0.984	0.955	0.949	0.915	0.959	0.927	0.956	0.868	0.942	0.990
Sweden	1.009	1.023	0.948	0.994	1.002	0.911	1.076	0.822	1.049	1.026
Switzerland	0.935	0.932	0.940	0.958	0.960	0.854	0.920	0.819	0.889	0.931
Taiwan	0.956	0.987	0.883	0.995	0.968	0.713	0.938	0.757	0.970	0.999
United Kingdom	1.020	1.015	1.029	1.037	1.027	0.877	0.986	0.903	0.945	0.951
United States	0.964	0.963	0.953	1.010	1.004	0.747	0.950	0.722	0.981	1.024
Mean	1.005	1.002	0.970	0.985	0.992	0.904	0.986	0.875	0.987	1.002
Median	1.010	1.012	0.958	0.995	1.003	0.901	0.982	0.898	0.975	1.000
#<1	8	7	13	10	8	12	10	18	12	9
#pv<.1	2	2	2	2	0	12	5	7	1	2

Notes: Columns report the ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of standard forecasting models. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. Values in bold indicate that the null hypothesis of equal predictive accuracy is rejected at 10% level using the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, BVAR2 is the bivariate Bayesian VAR(2), TVP is the time-varying parameter specification, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR4 is the 4-variable Bayesian VAR(2), and BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes. .

Table A3 - Four-Quarter Ahead RMSPE of the NOEM-BVAR Model Relative to Competing Models

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
Australia	1.037	1.070	1.165	1.091	1.029	0.876	0.975	0.854	0.959	1.012
Austria	1.224	1.213	1.074	1.293	1.152	0.903	1.139	0.925	1.052	1.128
Belgium	1.106	1.067	0.992	1.176	1.050	0.868	1.340	0.829	1.037	1.027
Canada	1.035	1.137	1.052	1.053	1.029	0.820	0.972	0.878	1.019	1.021
France	0.995	1.018	1.043	0.985	1.000	0.885	0.934	0.880	0.964	0.981
Germany	1.091	1.100	0.989	1.082	1.080	0.930	1.047	0.835	0.994	1.050
Greece	0.925	1.003	1.093	0.891	0.929	0.947	0.995	0.979	1.111	1.025
Italy	0.970	0.987	0.983	0.926	0.960	0.898	0.923	0.885	0.952	0.956
Japan	1.084	1.043	0.917	1.044	0.987	0.782	1.072	0.798	0.988	0.981
Korea	1.171	1.114	1.305	1.078	1.158	1.174	1.163	0.898	1.179	1.167
Netherlands	1.160	1.171	1.117	1.142	1.064	0.887	1.141	1.006	1.081	1.060
Portugal	0.897	0.911	0.933	0.704	0.813	0.894	0.802	0.851	0.867	0.903
Spain	0.956	0.983	1.015	0.971	0.979	0.870	0.935	0.902	0.964	0.974
Sweden	1.038	1.075	1.016	1.019	1.034	0.905	1.205	0.876	1.048	1.039
Switzerland	0.891	0.962	1.029	0.981	0.937	0.808	0.868	0.807	0.914	0.948
Taiwan	1.129	1.151	1.000	1.100	1.101	0.789	1.195	0.773	1.159	1.107
United Kingdom	1.161	1.182	1.253	1.135	1.119	0.952	1.125	0.949	1.079	1.057
United States	1.060	1.109	1.056	1.100	1.017	0.797	1.058	0.877	1.011	1.016
Mean	1.052	1.072	1.057	1.043	1.024	0.903	1.049	0.878	1.021	1.025
Median	1.049	1.072	1.036	1.066	1.029	0.891	1.052	0.877	1.015	1.023
#<1	6	4	5	6	6	13	8	17	8	6
#pv<.1	1	1	1	1	1	11	2	8	1	1

Notes: Columns report the ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of standard forecasting models. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. Values in bold indicate that the null hypothesis of equal predictive accuracy is rejected at 10% level using the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, BVAR2 is the bivariate Bayesian VAR(2), TVP is the time-varying parameter specification, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR4 is the 4-variable Bayesian VAR(2), and BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes. .

Table A4 - Twelve-Quarter Ahead RMSPE of the NOEM-BVAR Model Relative to Competing Models

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
Australia	0.798	1.008	1.039	1.078	0.977	0.872	0.893	0.800	0.972	0.996
Austria	1.058	1.145	1.003	1.227	0.973	0.881	1.048	0.911	0.968	0.978
Belgium	1.100	1.179	0.991	1.137	1.007	0.862	1.135	0.911	0.859	0.999
Canada	1.015	1.150	1.206	1.204	1.024	0.913	1.124	0.618	0.962	1.029
France	0.891	1.015	0.958	1.042	0.969	0.804	1.046	0.769	0.977	0.979
Germany	0.976	1.062	0.980	1.098	0.925	0.846	1.033	0.738	0.914	0.947
Greece	0.724	1.040	1.045	0.980	1.052	0.960	1.282	1.005	1.074	1.048
Italy	0.843	0.890	0.923	0.828	0.937	0.821	0.906	0.680	0.907	0.931
Japan	1.199	1.209	1.148	1.214	0.998	0.943	1.295	0.924	0.979	0.983
Korea	0.761	0.745	1.025	0.734	0.869	0.920	0.907	0.699	0.926	0.974
Netherlands	1.234	1.263	1.085	1.220	0.991	0.910	1.224	1.008	1.017	1.018
Portugal	0.806	0.966	1.111	0.826	1.000	0.903	0.903	0.862	0.997	1.003
Spain	0.796	0.961	0.898	0.955	0.966	0.853	0.904	0.894	0.967	0.973
Sweden	0.744	0.977	1.058	1.019	1.003	0.878	0.762	0.890	0.912	0.982
Switzerland	0.711	0.826	1.045	0.839	0.908	0.850	0.804	0.910	0.886	0.936
Taiwan	1.057	1.054	0.981	1.028	1.062	0.910	1.086	0.848	1.061	1.075
United Kingdom	1.016	1.049	0.911	1.087	0.930	0.889	1.055	0.796	0.951	0.946
United States	1.063	1.103	1.071	1.113	0.958	0.882	1.133	0.952	0.986	0.980
Mean	0.933	1.036	1.027	1.035	0.975	0.883	1.030	0.845	0.962	0.988
Median	0.934	1.045	1.032	1.060	0.975	0.879	1.047	0.876	0.968	0.981
#<1	10	6	7	6	12	14	7	16	15	13
#pv<.1	3	1	0	1	1	13	1	0	3	1

Notes: Columns report the ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of standard forecasting models. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. Values in bold indicate that the null hypothesis of equal predictive accuracy is rejected at 10% level using the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, BVAR2 is the bivariate Bayesian VAR(2), TVP is the time-varying parameter specification, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR4 is the 4-variable Bayesian VAR(2), and BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes. .

Table A5 - Directional Accuracy: Success Ratio of One-Quarter-Ahead Forecasts

	M ₀	M ₁ /M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	NOEM-BVAR	RAR or DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
Australia	0.74 *	0.61 *	0.52	0.65 *	0.63 *	0.43	0.63 *	0.50	0.57	0.59 *
Austria	0.59 *	0.61 *	0.65 *	0.61 *	0.61 *	0.59	0.50	0.50	0.54	0.59
Belgium	0.61 *	0.59 *	0.61 *	0.67 *	0.65 *	0.54	0.65 *	0.59	0.65 *	0.59 *
Canada	0.76 *	0.70 *	0.72 *	0.76 *	0.80 *	0.63 *	0.65 *	0.67 *	0.74 *	0.72 *
France	0.57 †	0.59	0.61 *	0.59 *	0.59 *	0.54	0.52	0.54	0.57	0.57
Germany	0.65 *	0.70 *	0.67 *	0.78 *	0.80 *	0.52	0.72 *	0.57	0.67 *	0.67 *
Greece	0.57	0.52	0.57	0.50	0.54	0.46	0.59	0.61 *	0.57	0.59
Italy	0.52 †	0.61 *	0.52	0.61 *	0.61 *	0.57	0.46	0.63 *	0.57	0.67 *
Japan	0.63 †	0.63 *	0.65 *	0.61 *	0.61 *	0.52	0.61 *	0.54	0.65 *	0.63 *
Korea	0.50	0.65 *	0.70 *	0.59 *	0.61 *	0.46	0.54	0.65 *	0.59 *	0.63 *
Netherlands	0.70 *	0.78 *	0.63 *	0.80 *	0.83 *	0.52	0.70 *	0.74 *	0.67 *	0.76 *
Portugal	0.59 *	0.63 *	0.61 *	0.52	0.59 *	0.50	0.46	0.50	0.46	0.63 *
Spain	0.67 *	0.54	0.54	0.57 *	0.57 *	0.52	0.50 †	0.52	0.54	0.59 *
Sweden	0.63 *	0.61 *	0.59 *	0.54	0.54	0.52	0.65 *	0.57	0.67 *	0.67 *
Switzerland	0.67 *	0.52	0.65 *	0.61 *	0.61 *	0.48	0.65 †	0.43	0.61 *	0.61 *
Taiwan	0.72 *	0.80 *	0.72 *	0.80 *	0.80 *	0.70 *	0.80 *	0.65 *	0.76 *	0.76 *
United Kingdom	0.57	0.57 *	0.59 *	0.54	0.57	0.52	0.50	0.54	0.50	0.50
United States	0.61 *	0.50	0.61 *	0.63 *	0.65 *	0.52	0.54	0.48	0.52	0.59 *
Mean	0.63	0.62	0.62	0.63	0.64	0.53	0.59	0.57	0.60	0.63
Median	0.62	0.61	0.61	0.61	0.61	0.52	0.60	0.55	0.58	0.62
#>0.5	17	17	18	17	18	13	13	13	16	17
StatSignif/Total	0.80	0.72	0.78	0.78	0.83	0.11	0.50	0.33	0.50	0.78

Notes: Columns report the ratio of success in directional accuracy. Values in bold (*) indicate that the null hypothesis of no dependence between sign(forecast change) and sign(actual change) is rejected at 10% level using the Pesaran and Timmermann (2009) test. A "†" symbol at the right of each value indicates that the test statistic is undefined due to the presence of many forecasts in one direction. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. #SS/(Total - #UC) represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A6 - Directional Accuracy: Success Ratio of Two-Quarter-Ahead Forecasts

	M ₀ NOEM-BVAR	M ₁ RAR	M ₂ DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC-FD	M ₉ BVAR4	M ₁₀ BVAR2-COM
Australia	0.58	0.60 *	0.67 *	0.67 *	0.64 *	0.67 *	0.53	0.67 *	0.49	0.67 *	0.67 *
Austria	0.64 *	0.76 *	0.71 *	0.76 *	0.80 *	0.82 *	0.60 *	0.69 *	0.58	0.69 *	0.71 *
Belgium	0.62 *	0.69 *	0.58	0.62 *	0.67 *	0.67 *	0.56	0.69 *	0.58	0.67 *	0.62 *
Canada	0.84 *	0.73 *	0.73 *	0.69 *	0.78 *	0.80 *	0.62 *	0.73 *	0.56	0.69 *	0.76 *
France	0.58 *	0.62 *	0.64 *	0.69 *	0.69 *	0.69 *	0.53	0.56	0.67 *	0.60 *	0.58
Germany	0.73 *	0.73 *	0.71 *	0.69 *	0.78 *	0.80 *	0.58 *	0.64 *	0.62 *	0.64 *	0.69 *
Greece	0.56	0.53	0.53	0.62 *	0.53	0.51	0.47	0.53	0.47	0.60 *	0.60 *
Italy	0.60 *	0.62 *	0.58 *	0.47	0.53	0.53	0.44	0.49	0.40	0.56	0.56
Japan	0.67 *	0.69 *	0.71 *	0.60 *	0.73 *	0.71 *	0.64 *	0.80 *	0.67 *	0.64 *	0.71 *
Korea	0.53	0.60 *	0.60 *	0.64 *	0.60 *	0.58	0.51	0.64 *	0.49	0.62 *	0.60 *
Netherlands	0.64 *	0.84 *	0.76 *	0.71 *	0.71 *	0.71 *	0.44	0.69 *	0.69 *	0.78 *	0.78 *
Portugal	0.64 *	0.69 *	0.67 *	0.69 *	0.58	0.58	0.51	0.42	0.47	0.31	0.56
Spain	0.64 *	0.62 *	0.62 *	0.58 *	0.71 *	0.71 *	0.62 *	0.60 *	0.51	0.60	0.62 *
Sweden	0.69 *	0.69 *	0.73 *	0.58	0.71 *	0.71 *	0.60 *	0.78 *	0.60	0.78 *	0.76 *
Switzerland	0.69 *	0.62 *	0.62 *	0.60 *	0.71 *	0.71 *	0.53	0.67 *	0.53	0.60 *	0.64 *
Taiwan	0.73 *	0.82 *	0.80 *	0.64 *	0.80 *	0.80 *	0.56 *	0.76 *	0.60 *	0.71 *	0.71 *
United Kingdom	0.60 *	0.60 *	0.62 *	0.62 *	0.69 *	0.71 *	0.62 *	0.51	0.60 *	0.51	0.51
United States	0.69 *	0.62 *	0.60 *	0.64 *	0.62 *	0.62 *	0.62 *	0.64 *	0.62 *	0.60 *	0.60 *
Mean	0.65	0.67	0.66	0.64	0.68	0.69	0.56	0.64	0.56	0.63	0.65
Median	0.64	0.66	0.66	0.64	0.70	0.71	0.56	0.66	0.58	0.63	0.63
#>0.5	18	18	18	17	18	18	15	16	13	17	18
StatSignif/Total	0.83	0.94	0.89	0.89	0.83	0.78	0.50	0.72	0.39	0.78	0.78

Notes: Columns report the ratio of success in directional accuracy. Values in bold (*) indicate that the null hypothesis of no dependence between sign(forecast change) and sign(actual change) is rejected at 10% level using the Pesaran and Timmermann (2009) test. A "+" symbol at the right of each value indicates that the test statistic is undefined due to the presence of many forecasts in one direction. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. #SS/(Total - #UC) represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A7 - Directional Accuracy: Success Ratio of Four-Quarter-Ahead Forecasts

	M ₀ NOEM-BVAR	M ₁ RAR	M ₂ DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC-FD	M ₉ BVAR4	M ₁₀ BVAR2-COM
Australia	0.58 *	0.60 *	0.63 *	0.77 *	0.72 *	0.72 *	0.51	0.72 *	0.56	0.70 *	0.63 *
Austria	0.60 *	0.70 *	0.74 *	0.63 *	0.70 *	0.72 *	0.53	0.74 *	0.67 *	0.65 *	0.67 *
Belgium	0.70 *	0.65 *	0.67 *	0.60 *	0.72 *	0.74 *	0.58 *	0.67 *	0.60 *	0.63 *	0.60
Canada	0.67 *	0.65 *	0.74 *	0.72 *	0.67 *	0.72 *	0.56	0.70 *	0.56	0.63 *	0.56
France	0.65 *	0.53	0.53	0.60 *	0.56	0.58 *	0.53	0.47	0.47	0.53	0.60 *
Germany	0.58 *	0.63 *	0.63 *	0.58	0.65 *	0.63 *	0.49	0.70 *	0.63 *	0.65 *	0.63 *
Greece	0.67 *	0.42 †	0.67 *	0.63 *	0.53	0.51	0.56	0.67 *	0.67 *	0.79 *	0.65 *
Italy	0.56	0.58 *	0.58 *	0.49	0.56 *	0.56 *	0.63 *	0.49	0.49	0.53	0.53
Japan	0.84 *	0.79 *	0.77 *	0.67 *	0.81 *	0.84 *	0.56	0.79 *	0.53	0.72 *	0.81 *
Korea	0.53 †	0.60 *	0.60 *	0.67 *	0.58 *	0.60 *	0.58	0.60 *	0.60 *	0.60 *	0.60 *
Netherlands	0.63 *	0.77 *	0.72 *	0.67 *	0.79 *	0.70 *	0.63 *	0.77 *	0.65 *	0.77 *	0.72 *
Portugal	0.72 *	0.65 †	0.72 *	0.72 *	0.63 *	0.63 *	0.40	0.51	0.49	0.53	0.53 †
Spain	0.70 *	0.53 *	0.60 *	0.60	0.70 *	0.72 *	0.56	0.53 *	0.58	0.53	0.67 *
Sweden	0.65 *	0.67 †	0.70 *	0.49	0.67 *	0.72 *	0.49	0.65 *	0.53	0.65 *	0.74 *
Switzerland	0.63 *	0.63 *	0.67 *	0.65 *	0.70 *	0.67 *	0.51	0.58	0.53	0.60 *	0.60 *
Taiwan	0.81 *	0.79 *	0.77 *	0.79 *	0.72 *	0.79 *	0.67 *	0.81 *	0.60 *	0.74 *	0.77 *
United Kingdom	0.53 †	0.77 *	0.70 *	0.74 *	0.67 *	0.65 *	0.56 *	0.70 *	0.53	0.65 *	0.67 *
United States	0.65 *	0.72 *	0.74 *	0.79 *	0.79 *	0.72 *	0.51	0.74 *	0.67 *	0.65 *	0.65 *
Mean	0.65	0.65	0.68	0.66	0.68	0.68	0.55	0.66	0.58	0.64	0.65
Median	0.65	0.65	0.69	0.66	0.69	0.71	0.56	0.69	0.57	0.65	0.64
#>0.5	18	17	18	16	18	18	15	16	15	18	18
StatSignif/Total	0.94	0.93	0.94	0.78	0.89	0.94	0.28	0.78	0.44	0.78	0.82

Notes: Columns report the ratio of success in directional accuracy. Values in bold (*) indicate that the null hypothesis of no dependence between sign(forecast change) and sign(actual change) is rejected at 10% level using the Pesaran and Timmermann (2009) test. A "†" symbol at the right of each value indicates that the test statistic is undefined due to the presence of many forecasts in one direction. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. #SS/(Total - #UC) represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

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Table A8 - Directional Accuracy: Success Ratio of Twelve-Quarter-Ahead Forecasts

	M ₀	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	NOEM-BVAR	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
Australia	0.51 †	0.63 *	0.69 *	0.69 *	0.69 *	0.71 *	0.49	0.74 *	0.57	0.60 *	0.63 *
Austria	0.71 *	0.57 *	0.66 *	0.60	0.71 *	0.69 *	0.60	0.69 *	0.69 *	0.66	0.69 *
Belgium	0.66 *	0.71 *	0.80 *	0.69 *	0.83 *	0.80 *	0.43	0.74 *	0.54	0.46 †	0.77 *
Canada	0.66 †	0.51 *	0.57 *	0.74 *	0.60 *	0.51	0.63	0.57 *	0.51	0.60	0.66 *
France	0.80 †	0.51 *	0.63 *	0.66 *	0.74 *	0.80 *	0.77 *	0.69 *	0.77 *	0.77 *	0.83 *
Germany	0.63 †	0.63 *	0.71 *	0.57	0.66 *	0.57 *	0.57	0.66 *	0.57	0.74 *	0.77 *
Greece	0.77 *	0.43 †	0.69 *	0.60 *	0.51	0.60 †	0.63	0.74 *	0.60	0.60 †	0.60 †
Italy	0.77 †	0.46 †	0.54 †	0.51	0.43 *	0.63 *	0.63	0.54 *	0.66	0.71 *	0.71 *
Japan	0.74 *	0.69 *	0.71 *	0.80 *	0.80 *	0.71 *	0.51	0.83 *	0.57	0.63 *	0.66 *
Korea	0.63 †	0.51 †	0.51 †	0.66 *	0.49 †	0.49 *	0.60	0.57 *	0.43	0.51 *	0.57 *
Netherlands	0.57 †	0.71 *	0.74 *	0.69 *	0.69 *	0.66 *	0.54	0.74 *	0.77 *	0.71 *	0.71 *
Portugal	0.74 *	0.40 †	0.49 *	0.57	0.46	0.63 †	0.63	0.66 *	0.63 †	0.63 †	0.66 †
Spain	0.77 *	0.40 *	0.63 *	0.57	0.63 *	0.89 *	0.69	0.46	0.69	0.89 *	0.89 *
Sweden	0.71 *	0.51 *	0.60 *	0.66 *	0.66 *	0.80 *	0.66 *	0.66 *	0.49	0.63 *	0.77 *
Switzerland	0.71 †	0.46 *	0.60 *	0.80 *	0.63 *	0.51 †	0.54	0.57 †	0.66 *	0.57 *	0.71 *
Taiwan	0.69 *	0.74 *	0.69 *	0.63 *	0.69 *	0.54	0.57	0.74 *	0.63 *	0.74 *	0.80 *
United Kingdom	0.71 †	0.66 *	0.66 *	0.57	0.63	0.63 *	0.57	0.60 *	0.60	0.69 †	0.69 †
United States	0.80 *	0.63 *	0.66 *	0.74 *	0.66 *	0.57 *	0.60	0.66 *	0.71 *	0.83 *	0.80 *
Mean	0.70	0.57	0.64	0.65	0.64	0.65	0.59	0.66	0.62	0.67	0.72
Median	0.71	0.54	0.66	0.66	0.66	0.63	0.60	0.66	0.61	0.64	0.71
#>0.5	18	13	17	18	15	17	16	17	16	17	18
StatSignif/Total	1.00	1.00	1.00	0.67	0.82	0.87	0.11	0.94	0.35	0.86	1.00

Notes: Columns report the ratio of success in directional accuracy. Values in bold (*) indicate that the null hypothesis of no dependence between sign(forecast change) and sign(actual change) is rejected at 10% level using the Pesaran and Timmermann (2009) test. A "†" symbol at the right of each value indicates that the test statistic is undefined due to the presence of many forecasts in one direction. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. #SS/(Total - #UC) represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A9. RMSPE of the NOEM-BVAR Model Relative to Competing Models Using a Deterministic Trend Filter (Averages of Groups of Models)

	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead			
Mean	0.969	0.969	0.969
Median	0.953	0.951	0.952
#<1	12	12	12
#pv<.1	4	4	4
Two-quarter ahead			
Mean	0.993	0.978	0.987
Median	0.996	0.978	0.989
#<1	9	11	10
#pv<.1	3	3	3
Four-quarter ahead			
Mean	1.041	1.009	1.028
Median	1.032	0.990	1.015
#<1	7	10	8
#pv<.1	3	3	3
Twelve-quarter ahead			
Mean	0.985	0.960	0.975
Median	0.990	0.971	0.983
#<1	9	12	10
#pv<.1	3	2	3
Averages (all horizons)			
Mean	0.997	0.979	0.990
Median	0.993	0.972	0.985
#<1	9	11	10
#pv<.1	3	3	3

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources.

Table A10 - RMSPE of the NOEM-BVAR Model Relative to Competing Models Using a Deterministic Trend Filter (Summary by Forecasting Model)

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
One-quarter ahead										
Mean	0.990	0.990	0.915	0.996	1.001	0.922	0.977	0.914	0.986	0.999
Median	0.961	0.961	0.899	1.001	1.008	0.885	0.969	0.869	0.979	0.989
#<1	12	12	14	9	8	14	12	14	13	10
#pv<.1	3	3	6	2	2	10	1	9	2	4
Two-quarter ahead										
Mean	1.021	1.018	0.986	1.001	1.008	0.923	1.003	0.888	1.004	1.018
Median	1.028	1.019	0.983	1.010	1.006	0.927	1.002	0.917	0.983	1.010
#<1	7	7	11	8	8	11	9	18	11	5
#pv<.1	2	2	1	1	1	10	4	5	1	2
Four-quarter ahead										
Mean	1.067	1.088	1.073	1.058	1.040	0.919	1.067	0.891	1.037	1.041
Median	1.061	1.078	1.050	1.078	1.040	0.888	1.030	0.883	1.024	1.023
#<1	6	5	6	6	7	12	8	16	8	6
#pv<.1	1	1	1	1	1	10	2	8	1	1
Twelve-quarter ahead										
Mean	0.936	1.039	1.030	1.039	0.979	0.887	1.034	0.849	0.966	0.991
Median	0.936	1.057	1.027	1.058	0.977	0.887	1.048	0.882	0.972	0.981
#<1	10	6	7	5	12	14	7	16	14	12
#pv<.1	3	1	0	1	1	12	1	1	3	2
Averages (all horizons)										
Mean	1.003	1.034	1.001	1.024	1.007	0.913	1.020	0.886	0.998	1.012
Median	0.997	1.029	0.990	1.037	1.008	0.897	1.012	0.888	0.989	1.001
#<1	9	8	10	7	9	13	9	16	12	8
#pv<.1	2	2	2	1	1	11	2	6	2	2

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model *à la* Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A11 - Directional Accuracy: Success Ratios Using a Deterministic Trend Filter (Averages of Groups of Models)

	NOEM-BVAR	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead				
Mean	0.617	0.611	0.599	0.606
Median	0.609	0.594	0.587	0.591
#>0.5	18	17	15	16
StatSignif/Total	0.80	0.67	0.53	0.61
Two-quarter ahead				
Mean	0.642	0.649	0.619	0.637
Median	0.633	0.654	0.625	0.642
#>0.5	18	17	16	17
StatSignif/Total	0.89	0.81	0.67	0.75
Four-quarter ahead				
Mean	0.654	0.648	0.632	0.642
Median	0.651	0.659	0.637	0.650
#>0.5	18	17	17	17
StatSignif/Total	0.94	0.79	0.71	0.76
Twelve-quarter ahead				
Mean	0.698	0.624	0.664	0.640
Median	0.714	0.624	0.657	0.637
#>0.5	18	16	17	16
StatSignif/Total	0.89	0.74	0.79	0.76
Averages (all horizons)				
Mean	0.653	0.633	0.629	0.631
Median	0.652	0.633	0.626	0.630
#>0.5	18	17	16	17
StatSignif/Total	0.88	0.75	0.67	0.72

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources.

Table A12 - Directional Accuracy: Success Ratios Using a Deterministic Trend Filter (Summary by Forecasting Model)

	M ₀ NOEM- BVAR	M ₁ RAR	M ₂ DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC- FD	M ₉ BVAR4	M ₁₀ BVAR2- COM
One-quarter ahead											
Mean	0.617	0.620	0.620	0.620	0.633	0.645	0.530	0.593	0.569	0.603	0.630
Median	0.609	0.609	0.609	0.609	0.609	0.609	0.522	0.598	0.554	0.576	0.620
#>0.5	18	17	17	18	17	18	13	13	13	16	17
StatSignif/Total	0.80	0.80	0.72	0.78	0.78	0.83	0.11	0.50	0.33	0.50	0.78
Two-quarter ahead											
Mean	0.642	0.672	0.660	0.640	0.683	0.685	0.556	0.640	0.563	0.626	0.648
Median	0.633	0.656	0.656	0.644	0.700	0.711	0.556	0.656	0.578	0.633	0.633
#>0.5	18	18	18	17	18	18	15	16	13	17	18
StatSignif/Total	0.89	0.94	0.89	0.89	0.83	0.78	0.50	0.72	0.39	0.78	0.78
Four-quarter ahead											
Mean	0.654	0.650	0.678	0.658	0.677	0.680	0.548	0.659	0.578	0.643	0.649
Median	0.651	0.651	0.686	0.663	0.686	0.709	0.558	0.686	0.570	0.651	0.640
#>0.5	18	17	18	16	18	18	15	16	15	18	18
StatSignif/Total	0.94	0.93	0.94	0.78	0.89	0.94	0.28	0.78	0.44	0.78	0.82
Twelve-quarter ahead											
Mean	0.698	0.565	0.643	0.652	0.638	0.652	0.592	0.659	0.616	0.665	0.717
Median	0.714	0.543	0.657	0.657	0.657	0.629	0.600	0.657	0.614	0.643	0.714
#>0.5	18	13	17	18	15	17	16	17	16	17	18
StatSignif/Total	0.89	1.00	1.00	0.67	0.82	0.87	0.11	0.94	0.35	0.86	1.00
Averages (all horizons)											
Mean	0.653	0.627	0.650	0.642	0.658	0.666	0.556	0.638	0.581	0.634	0.661
Median	0.652	0.615	0.652	0.643	0.663	0.664	0.559	0.649	0.579	0.626	0.652
#>0.5	18	16	18	17	17	18	15	16	14	17	18
StatSignif/Total	0.88	0.92	0.89	0.78	0.83	0.86	0.25	0.74	0.38	0.73	0.84

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A13 - RMSPE of the NOEM-BVAR Model Relative to Competing Models Using a First-Difference Filter (Averages of Groups of Models)

	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead			
Mean	0.942	0.942	0.942
Median	0.938	0.937	0.938
#<1	14	16	14
#pv<.1	6	6	6
Two-quarter ahead			
Mean	0.964	0.951	0.959
Median	0.965	0.956	0.961
#<1	11	14	12
#pv<.1	4	4	4
Four-quarter ahead			
Mean	1.008	0.977	0.996
Median	1.011	0.974	0.996
#<1	8	11	9
#pv<.1	4	4	4
Twelve-quarter ahead			
Mean	0.981	0.956	0.971
Median	0.987	0.972	0.981
#<1	9	13	11
#pv<.1	3	1	2
Averages (all horizons)			
Mean	0.974	0.957	0.967
Median	0.975	0.960	0.969
#<1	10	13	12
#pv<.1	4	4	4

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources.

Table A14 - RMSPE of the NOEM-BVAR Model Relative to Competing Models Using a First-Difference Filter (Summary by Forecasting Model)

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
One-quarter ahead										
Mean	0.962	0.962	0.889	0.970	0.975	0.896	0.951	0.887	0.959	0.971
Median	0.952	0.952	0.898	0.968	0.973	0.885	0.957	0.857	0.956	0.979
#<1	13	13	16	12	11	16	16	16	16	14
#pv<.1	5	5	9	3	2	12	6	11	4	4
Two-quarter ahead										
Mean	0.993	0.991	0.959	0.974	0.981	0.888	0.975	0.864	0.976	0.991
Median	0.982	0.994	0.959	0.982	0.999	0.876	0.972	0.876	0.983	0.992
#<1	10	9	13	11	9	14	11	18	13	13
#pv<.1	1	2	4	2	2	13	5	7	3	2
Four-quarter ahead										
Mean	1.035	1.055	1.040	1.027	1.008	0.884	1.032	0.864	1.004	1.009
Median	1.046	1.047	1.042	1.040	1.015	0.877	1.031	0.868	0.990	1.006
#<1	7	6	7	7	8	13	8	18	9	8
#pv<.1	1	1	1	2	3	13	3	10	1	2
Twelve-quarter ahead										
Mean	0.933	1.036	1.026	1.035	0.975	0.883	1.029	0.845	0.962	0.987
Median	0.939	1.037	1.023	1.058	0.977	0.886	1.052	0.883	0.968	0.984
#<1	10	6	7	6	12	14	7	17	14	12
#pv<.1	3	1	0	1	1	13	1	0	2	2
Averages (all horizons)										
Mean	0.981	1.011	0.979	1.002	0.985	0.888	0.997	0.865	0.975	0.989
Median	0.980	1.008	0.981	1.012	0.991	0.881	1.003	0.871	0.974	0.990
#<1	10	9	11	9	10	14	11	17	13	12
#pv<.1	3	2	4	2	2	13	4	7	3	3

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model *à la* Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A15 - Directional Accuracy: Success Ratios Using a First-Difference Filter (Averages of Groups of Models)

	NOEM-BVAR	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead				
Mean	0.622	0.611	0.599	0.606
Median	0.609	0.594	0.587	0.591
#>0.5	17	17	15	16
StatSignif/Total	0.94	0.69	0.53	0.63
Two-quarter ahead				
Mean	0.663	0.649	0.619	0.637
Median	0.656	0.654	0.625	0.642
#>0.5	18	17	16	17
StatSignif/Total	0.94	0.81	0.67	0.75
Four-quarter ahead				
Mean	0.668	0.648	0.632	0.642
Median	0.651	0.659	0.637	0.650
#>0.5	18	17	17	17
StatSignif/Total	0.94	0.79	0.71	0.76
Twelve-quarter ahead				
Mean	0.697	0.624	0.664	0.640
Median	0.686	0.624	0.657	0.637
#>0.5	18	16	17	16
StatSignif/Total	1.00	0.74	0.79	0.76
Averages (all horizons)				
Mean	0.662	0.633	0.629	0.631
Median	0.650	0.633	0.626	0.630
#>0.5	18	17	16	17
StatSignif/Total	0.95	0.76	0.67	0.72

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources.

Table A16 - Directional Accuracy: Success Ratios Using a First-Difference Filter (Summary by Forecasting Model)

	M ₀ NOEM- BVAR	M ₁ RAR	M ₂ DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC- FD	M ₉ BVAR4	M ₁₀ BVAR2- COM
One-quarter ahead											
Mean	0.622	0.620	0.620	0.620	0.633	0.645	0.530	0.593	0.569	0.603	0.630
Median	0.609	0.609	0.609	0.609	0.609	0.609	0.522	0.598	0.554	0.576	0.620
#>0.5	17	17	17	18	17	18	13	13	13	16	17
StatSignif/Total	0.94	0.94	0.72	0.78	0.78	0.83	0.11	0.50	0.33	0.50	0.78
Two-quarter ahead											
Mean	0.663	0.672	0.660	0.640	0.683	0.685	0.556	0.640	0.563	0.626	0.648
Median	0.656	0.656	0.656	0.644	0.700	0.711	0.556	0.656	0.578	0.633	0.633
#>0.5	18	18	18	17	18	18	15	16	13	17	18
StatSignif/Total	0.94	0.94	0.89	0.89	0.83	0.78	0.50	0.72	0.39	0.78	0.78
Four-quarter ahead											
Mean	0.668	0.650	0.678	0.658	0.677	0.680	0.548	0.659	0.578	0.643	0.649
Median	0.651	0.651	0.686	0.663	0.686	0.709	0.558	0.686	0.570	0.651	0.640
#>0.5	18	17	18	16	18	18	15	16	15	18	18
StatSignif/Total	0.94	0.93	0.94	0.78	0.89	0.94	0.28	0.78	0.44	0.78	0.82
Twelve-quarter ahead											
Mean	0.697	0.565	0.643	0.652	0.638	0.652	0.592	0.659	0.616	0.665	0.717
Median	0.686	0.543	0.657	0.657	0.657	0.629	0.600	0.657	0.614	0.643	0.714
#>0.5	18	13	17	18	15	17	16	17	16	17	18
StatSignif/Total	1.00	1.00	1.00	0.67	0.82	0.87	0.11	0.94	0.35	0.86	1.00
Averages (all horizons)											
Mean	0.662	0.627	0.650	0.642	0.658	0.666	0.556	0.638	0.581	0.634	0.661
Median	0.650	0.615	0.652	0.643	0.663	0.664	0.559	0.649	0.579	0.626	0.652
#>0.5	18	16	18	17	17	18	15	16	14	17	18
StatSignif/Total	0.95	0.95	0.89	0.78	0.83	0.86	0.25	0.74	0.38	0.73	0.84

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A17 - RMSPE of the NOEM-BVAR Model with Flat Priors Relative to Competing Models (Averages of Groups of Models)

	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead			
Mean	0.986	0.985	0.986
Median	0.968	0.959	0.964
#<1	12	12	12
#pv<.1	3	5	4
Two-quarter ahead			
Mean	0.979	0.969	0.975
Median	0.958	0.960	0.959
#<1	11	12	11
#pv<.1	4	4	4
Four-quarter ahead			
Mean	1.019	0.996	1.010
Median	0.997	0.985	0.992
#<1	9	9	9
#pv<.1	4	4	4
Twelve-quarter ahead			
Mean	0.979	0.961	0.972
Median	0.954	0.957	0.956
#<1	10	11	10
#pv<.1	3	4	4
Averages (all horizons)			
Mean	0.991	0.978	0.986
Median	0.969	0.965	0.968
#<1	10	11	10
#pv<.1	4	4	4

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources.

Table A18 - RMSPE of the NOEM-BVAR Model with Flat Priors Relative to Competing Models (Summary by Forecasting Model)

	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈	M ₉	M ₁₀
	RAR	DAR	RW-AO	FAR	BVAR2	TVP	APC	APC-FD	BVAR4	BVAR2-COM
One-quarter ahead										
Mean	1.005	1.005	0.929	1.017	1.027	0.936	0.997	0.927	1.000	1.016
Median	0.988	0.988	0.939	0.973	0.991	0.928	0.961	0.897	0.991	0.987
#<1	10	10	14	11	9	15	12	14	10	11
#pv<.1	1	1	4	2	3	8	5	8	4	2
Two-quarter ahead										
Mean	1.004	1.001	0.970	0.986	1.013	0.903	0.986	0.874	1.017	1.001
Median	0.972	0.971	0.953	0.954	1.014	0.883	0.961	0.871	1.022	0.986
#<1	11	12	10	12	8	11	12	16	7	11
#pv<.1	4	2	5	3	2	9	5	8	2	2
Four-quarter ahead										
Mean	1.038	1.058	1.046	1.030	1.044	0.896	1.034	0.866	1.074	1.012
Median	1.003	1.044	0.999	1.024	1.051	0.859	1.034	0.841	1.086	0.977
#<1	9	8	9	8	8	13	7	13	7	10
#pv<.1	2	3	2	4	3	9	4	8	2	3
Twelve-quarter ahead										
Mean	0.922	1.016	1.007	1.020	1.027	0.881	1.011	0.823	1.041	0.971
Median	0.971	0.999	0.942	0.989	1.011	0.815	1.049	0.803	1.043	0.934
#<1	10	9	11	9	9	11	8	14	9	11
#pv<.1	5	1	1	3	3	7	3	6	2	5
Averages (all horizons)										
Mean	0.992	1.020	0.988	1.013	1.028	0.904	1.007	0.872	1.033	1.000
Median	0.983	1.000	0.958	0.985	1.017	0.871	1.001	0.853	1.036	0.971
#<1	10	10	11	10	9	13	10	14	8	11
#pv<.1	3	2	3	3	3	8	4	8	3	3

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model *à la* Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A19 - Directional Accuracy: Success Ratios (Averages of Groups of Models - Flat Priors)

	NOEM-BVAR	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead				
Mean	0.639	0.613	0.600	0.608
Median	0.630	0.598	0.592	0.596
#>0.5	18	17	15	16
StatSignif/Total	0.94	0.69	0.53	0.63
Two-quarter ahead				
Mean	0.642	0.650	0.626	0.640
Median	0.667	0.654	0.633	0.646
#>0.5	18	17	16	17
StatSignif/Total	0.94	0.81	0.67	0.75
Four-quarter ahead				
Mean	0.664	0.647	0.637	0.643
Median	0.651	0.655	0.642	0.650
#>0.5	18	17	17	17
StatSignif/Total	1.00	0.79	0.71	0.76
Twelve-quarter ahead				
Mean	0.737	0.620	0.662	0.637
Median	0.743	0.626	0.664	0.641
#>0.5	18	16	17	16
StatSignif/Total	1.00	0.74	0.79	0.76
Averages (all horizons)				
Mean	0.670	0.632	0.631	0.632
Median	0.673	0.633	0.633	0.633
#>0.5	18	17	16	16
StatSignif/Total	0.97	0.76	0.67	0.72

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources.

Table A20 - Directional Accuracy: Success Ratios (Summary by Forecasting Model - Flat Priors)

	M ₀ NOEM- BVAR	M ₁ RAR	M ₂ DAR	M ₃ RW-AO	M ₄ FAR	M ₅ BVAR2	M ₆ TVP	M ₇ APC	M ₈ APC- FD	M ₉ BVAR4	M ₁₀ BVAR2- COM
One-quarter ahead											
Mean	0.639	0.620	0.620	0.620	0.633	0.658	0.530	0.593	0.569	0.607	0.630
Median	0.630	0.609	0.609	0.609	0.609	0.630	0.522	0.598	0.554	0.598	0.620
#>0.5	18	17	17	18	17	18	13	13	13	17	17
StatSignif/Total	0.94	0.94	0.72	0.78	0.78	0.83	0.11	0.50	0.33	0.50	0.78
Two-quarter ahead											
Mean	0.642	0.672	0.660	0.640	0.683	0.688	0.556	0.640	0.563	0.652	0.648
Median	0.667	0.656	0.656	0.644	0.700	0.711	0.556	0.656	0.578	0.667	0.633
#>0.5	18	18	18	17	18	17	15	16	13	17	18
StatSignif/Total	0.94	0.94	0.89	0.89	0.83	0.78	0.50	0.72	0.39	0.78	0.78
Four-quarter ahead											
Mean	0.664	0.650	0.678	0.658	0.677	0.671	0.548	0.659	0.578	0.661	0.649
Median	0.651	0.651	0.686	0.663	0.686	0.686	0.558	0.686	0.570	0.674	0.640
#>0.5	18	17	18	16	18	17	15	16	15	18	18
StatSignif/Total	1.00	0.93	0.94	0.78	0.89	0.94	0.28	0.78	0.44	0.78	0.82
Twelve-quarter ahead											
Mean	0.737	0.565	0.643	0.652	0.638	0.629	0.592	0.659	0.616	0.654	0.717
Median	0.743	0.543	0.657	0.657	0.657	0.643	0.600	0.657	0.614	0.671	0.714
#>0.5	18	13	17	18	15	16	16	17	16	17	18
StatSignif/Total	1.00	1.00	1.00	0.67	0.82	0.87	0.11	0.94	0.35	0.86	1.00
Averages (all horizons)											
Mean	0.670	0.627	0.650	0.642	0.658	0.661	0.556	0.638	0.581	0.644	0.661
Median	0.673	0.615	0.652	0.643	0.663	0.668	0.559	0.649	0.579	0.653	0.652
#>0.5	18	16	18	17	17	17	15	16	14	17	18
StatSignif/Total	0.97	0.96	0.89	0.78	0.83	0.86	0.25	0.74	0.38	0.73	0.84

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources. RAR and DAR denote AR(2) model using the iterative and direct methods to forecast, RW-AO is the random walk model à la Atkeson and Ohanian (2001), FAR is the Factor-Augmented AR(2) model, APC is the Augmented Phillips Curve, APC-FD is an Augmented Phillips Curve in first differences, BVAR2 is the bivariate Bayesian VAR(2), BVAR4 is the 4-variable Bayesian VAR(2), BVAR2-COM is the bivariate Bayesian VAR(2) with commodity price indexes, and TVP is the time-varying parameter specification.

Table A21 - RMSPE of the NOEM-BVAR Model Extended with Commodity Prices Relative to Competing Models and Success Ratios (Averages of Groups of Models/Countries)

	RMSPE -- Purely statistical models (Average of M1 - M6)	RMSPE -- Theoretically based models (Average of M7-M10)	RMSPE -- All models (Averages of M1-M10)	Directional Accuracy -- NOEM-BVAR
One-quarter ahead				
Mean	1.820	1.827	1.823	0.55
Median	1.816	1.828	1.820	0.52
#<1	1	0	1	...
#pv<.1	0	0	0	...
#>0.5	...	...	...	13
StatSignif/Total	...	...	...	0.35
Two-quarter ahead				
Mean	1.602	1.569	1.589	0.56
Median	1.539	1.549	1.543	0.57
#<1	1	1	1	...
#pv<.1	0	0	0	...
#>0.5	...	...	...	13
StatSignif/Total	...	...	...	0.33
Four-quarter ahead				
Mean	1.353	1.305	1.334	0.60
Median	1.182	1.141	1.165	0.59
#<1	1	2	2	...
#pv<.1	1	1	1	...
#>0.5	...	...	...	16
StatSignif/Total	...	...	...	0.53
Twelve-quarter ahead				
Mean	1.037	1.005	1.024	0.68
Median	0.994	0.972	0.986	0.66
#<1	9	11	10	...
#pv<.1	2	1	2	...
#>0.5	...	...	...	18
StatSignif/Total	...	...	...	0.64
Averages (all horizons)				
Mean	1.453	1.427	1.443	0.60
Median	1.383	1.372	1.379	0.58
#<1	3	4	3	...
#pv<.1	1	0	1	...
#>0.5	...	...	...	15
StatSignif/Total	...	...	...	0.46

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. Rows for means and medians for the last column report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources.

**Table A22 - RMSPE of the NOEM-BVAR Model Relative to Competing Models
Increasing the Number of Predictions (Averages of Groups of Models)**

	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead			
Mean	0.966	0.954	0.961
Median	0.962	0.950	0.957
#<1	12	14	12
#pv<.1	5	7	6
Two-quarter ahead			
Mean	0.989	0.965	0.980
Median	0.988	0.959	0.976
#<1	9	13	11
#pv<.1	3	5	4
Four-quarter ahead			
Mean	1.030	0.985	1.012
Median	1.022	1.003	1.014
#<1	7	10	8
#pv<.1	3	4	3
Twelve-quarter ahead			
Mean	1.023	0.966	1.000
Median	1.047	0.981	1.021
#<1	7	12	9
#pv<.1	3	3	3
Averages (all horizons)			
Mean	1.002	0.968	0.988
Median	1.005	0.973	0.992
#<1	9	12	10
#pv<.1	4	5	4

Notes: Rows for means and medians report the average/median ratio of root mean squared prediction error (RMSPE) from the NOEM-BVAR model relative to the RMSPE of competing forecasting models calculated over the 18 countries. Values less than one imply that the NOEM-BVAR model has a lower RMSPE than does the competitive benchmark. The row #<1 reports the number of economies that show relative RMSPE lower than 1 for a particular model. The row #pv<.1 reports the number of economies that show a p-value lower than 0.1 for the null of equal predictive accuracy measured by the RMSPEs of the NOEM-BVAR and the alternative model. We use the Diebold-Mariano-West statistic or the adjusted Clark-West statistic when models are nested. See Table 1 for the data sources.

Table A23 - Directional Accuracy: Success Ratios Increasing the Number of Predictions (Averages of Groups of Models)

	NOEM-BVAR	Purely statistical models (Average of M1 - M6)	Theoretically based models (Average of M7- M10)	All models (Averages of M1-M10)
One-quarter ahead				
Mean	0.633	0.628	0.613	0.622
Median	0.621	0.625	0.617	0.622
#>0.5	17	17	18	17
StatSignif/Total	0.89	0.79	0.76	0.78
Two-quarter ahead				
Mean	0.653	0.643	0.634	0.639
Median	0.646	0.658	0.648	0.654
#>0.5	18	17	17	17
StatSignif/Total	0.94	0.80	0.78	0.79
Four-quarter ahead				
Mean	0.633	0.650	0.634	0.644
Median	0.635	0.655	0.651	0.653
#>0.5	18	17	17	17
StatSignif/Total	0.94	0.84	0.78	0.82
Twelve-quarter ahead				
Mean	0.648	0.625	0.636	0.629
Median	0.664	0.627	0.639	0.632
#>0.5	18	17	17	17
StatSignif/Total	1.00	0.81	0.83	0.82
Averages (all horizons)				
Mean	0.642	0.636	0.629	0.633
Median	0.641	0.641	0.639	0.640
#>0.5	18	17	17	17
StatSignif/Total	0.94	0.81	0.79	0.80

Notes: Rows for means and medians report the average and median ratio of success in directional accuracy over the 18 countries. The row #>0.5 reports the number of economies that show a success ratio higher than 0.5 for a particular model. StatSignif/Total represents the ratio of the number of statistically significant cases as a share of the total number of cases net of the number of undefined cases. See Table 1 for the data sources.

References

- Duncan, R. and E. Martínez-García (2022). Forecasting Inflation in Open Economies: What Can a NOEM Model Do? Federal Reserve Bank of Dallas *Globalization and Monetary Policy Institute Working Paper No. 235*. April 2015 (Revised: December 2022). <https://doi.org/10.24149/gwp235r1>.
- Grossman, V., A. Mack, and E. Martínez-García (2014). A New Database of Global Economic Indicators. *The Journal of Economic and Social Measurement* 39(3), 163–197. <https://www.doi.org/10.3233/JEM-140391>. The database can be accessed at: <https://www.dallasfed.org/institute/dgei>.