Supplemental Appendix to: An Assessment of the Marginal Predictive Content of Business Conditions and Economic Uncertainty Indexes*

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Abstract

This appendix contains additional tables and figures that are discussed in the main paper.

Keywords: Latent factor, business conditions index, macroeconomic uncertainty measure, principal components analysis, least absolute shrinkage operator, high dimensional data, big data.

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Table 1: Comparison of the Predictive Accuracy of AR(SIC) + EUI + BCI Models with AR(SIC) + BCI Models*

		Factor Extraction Method used to Construct Business Conditions Indexes									
	Target Variable	PCA	Lasso	LPCA	AP	GP1	GP2	GF1	GF2	EPCA	JLN
	RPI	0.928	0.934	0.936	0.955	0.926	0.948	0.941	0.933	0.962	**0.924**
	INDPRO	0.924	0.927	**0.879**	0.921	0.916	0.937	0.928	0.906	0.921	0.945
	UNRATE	0.903	0.89	0.89	0.928	0.889	**0.876**	0.881	0.903	0.946	0.931
	CLAIMS	0.892	0.858	**0.849**	0.927	0.933	0.9	0.886	0.897	0.851	0.936
h=1	HOUST	0.976	**0.920**	0.927	0.988	0.927	0.966	0.966	0.951	0.971	0.972
	PERMIT	0.963	**0.898**	**0.898**	0.95 **	0.922	0.974	0.944	0.975	0.944	0.968 *
	RCON	0.766	**0.672**	0.719	0.804	0.696	0.793	0.761	0.846	0.737	0.764
	MTS	0.914	**0.797**	0.832	0.923	0.844	0.905	0.948	0.963	0.911	0.851
	M2	0.909	0.876	0.887	0.92	**0.855**	0.918	0.899	0.934	0.916	0.94
	R10	1.009	0.957	0.959	0.971	**0.948 ***	0.974	0.985	0.969	1.008 *	0.989
	PPI	1.005 *	0.939	**0.937**	0.966	0.942	0.977	0.97	0.973	1.009 *	0.975
	CPI	1.014	0.977	0.984	1.011	**0.973**	0.993	0.99	1.003	1.015	0.985
	PCECI	1.009	**0.964**	0.971	1.002	0.965	0.992	0.985	0.976	0.997	0.986
	S&P500	0.93	**0.885**	0.895	0.931	0.895	0.915	0.91	0.935	0.941	0.938
	RPI	0.947	0.971 **	0.964	0.975	0.973	**0.932**	0.988	0.941	0.978	0.947
	INDPRO	0.881	0.945	0.898	0.941	0.964	**0.824**	0.99	0.836	0.945	0.948
	UNRATE	0.806	0.935	0.877	0.889	0.935	**0.794**	0.991	0.819	0.908	0.916
	CLAIMS	0.774	0.861	0.812	0.794 *	0.961	**0.747**	0.995	0.779	0.864	0.877
h=3	HOUST	0.896	0.823 **	0.905	0.941	0.877	**0.843**	0.984	0.871	0.96	0.927
	PERMIT	0.929	0.792 **	0.927	0.981	**0.860**	0.813 **	1.003	0.861	0.98	0.964
	RCON	0.737	0.909	0.842	0.807	0.862	0.726	0.975	**0.679**	0.811	0.812
	MTS	0.834	0.947	0.907	0.909	0.92	0.828	0.99	**0.823**	0.914	0.908
	M2	0.921	0.967	0.966	0.949	0.958 *	0.886	0.962	**0.883**	0.971	0.954
	R10	0.95	0.965	0.956	0.995	0.977	0.95 *	0.952	**0.936**	0.964	0.986
	PPI	0.928	0.945 *	0.938 *	0.934	0.943	0.923	0.955	**0.906**	0.961	0.966 *
	CPI	0.968	0.951	0.944 *	0.971 *	0.945	0.963	**0.921**	0.929 *	0.987	0.972 **
	PCECI	0.968	0.949 *	0.944 *	0.962 **	0.95	0.955	**0.935**	0.936	0.989	0.97 **
	S&P500	0.965	0.954	0.95	1.002	0.955	0.947	0.959	0.951	0.985	**0.944**
	RPI	1.001	0.966	0.969	0.99	0.982	0.987	0.988	0.969 *	0.969	**0.964**
	INDPRO	0.981 **	0.924	0.948	0.982 *	0.947 *	0.946	0.966	0.966	0.963	**0.920**
	UNRATE	0.925	0.974	0.989	0.96	0.987	**0.877**	0.989	0.978	0.979	0.929
	CLAIMS	0.924	0.974	0.976	0.932	0.982	**0.877**	0.979	0.944	0.964	0.942
h=6	HOUST	0.909 *	0.884	**0.875**	0.908	0.854 **	0.874 ***	0.931	0.993	0.929	0.982
	PERMIT	0.9 *	0.83	0.813 *	0.983	**0.828**	0.845 ***	0.95	0.97	0.981	1.001 *
	RCON	0.981 *	0.885	0.898	0.954	0.978 *	0.918	0.987 *	0.964	0.935	**0.811**
	MTS	0.987 *	0.953	0.954	0.953	0.966	0.942	0.968	0.952	0.956	**0.900**
	M2	0.979 *	0.94	**0.932**	0.957	0.97 *	0.962	0.972	0.954	0.959	0.958
	R10	1.005	**0.962**	0.975	0.983	0.973	0.973	0.969	0.98	0.985	0.984
	PPI	0.986	0.964 **	0.962 ***	0.985 *	0.966 *	0.986	**0.924**	0.976 *	0.981 **	0.98 **
	CPI	0.99	0.967	0.968 *	0.989	0.964 *	0.968	**0.860**	0.972 *	0.983	0.98
	PCECI	0.992	0.967	0.97 *	0.996	0.985	0.977	**0.882**	0.971 **	0.984	0.98
	S&P500	0.999	0.966	0.965	1.008	0.945	1.004	**0.803**	0.981	1.005	0.974
	RPI	0.982	**0.875**	0.878	0.972	0.977	0.997	0.96	0.949	0.907 *	0.995 ***
	INDPRO	0.961	**0.850**	0.904	0.958 *	0.968	0.976	0.911	0.993	0.853 **	0.987 ***
	UNRATE	0.967	**0.830**	0.861	0.971	0.985 *	0.966	0.965	0.986	0.902 *	0.972 ***
	CLAIMS	0.983	**0.869**	0.87	0.948	0.992	0.971	0.98	0.968	0.917	0.983 ***
h=12	HOUST	**0.791**	0.895	0.889	0.885	0.926	0.976	0.919	0.959	0.902 *	0.993 ***
	PERMIT	**0.780**	0.817	0.808	0.912	0.877	0.954 *	0.96 **	0.94 ***	0.934 ***	0.982 ***
	RCON	0.957	0.844	0.846	0.876	0.986	0.89	0.98	0.976	**0.793**	0.961 ***
	MTS	0.949	0.813	0.81	0.937	0.98	0.949 *	0.966	0.986	**0.754**	0.98 ***
	M2	0.976 *	0.907 **	**0.905**	0.979	0.972 *	0.956 **	0.951	0.969	0.909	0.987 ***
	R10	0.996 **	0.949	0.949	0.987	0.965	1.022 *	**0.893**	0.979	0.963	0.995 ***
	PPI	0.985	0.972	0.966	0.985	0.953	0.972	**0.910**	0.968	0.97	0.979 ***
	CPI	0.986	0.973	0.965	0.988	0.956	0.99	**0.909**	0.965	0.974	0.984 ***
	PCECI	0.99	0.973	0.968	0.991	0.955	0.994	**0.906**	0.968	0.964	0.981 ***
	S&P500	0.99	0.981	0.967	0.982	0.943	0.979	**0.775**	0.947	0.947 **	1.006 ***

* Notes: See notes to Table 2 in the main paper. Tabulated entries are relative mean squared forecast error (MSFEs) for our 14 target variables, and for forecast horizons of h=1,3,6, and 12 months ahead. The benchmark model is AR(SIC) model augmented with business conditions indexes (BCIs). The benchmark model is in the denominator of the reported statistics, so that entries less than unity indicate that our more complex models which include economic uncertainty indexes (EUIs) and business conditions indexes (BCIs) have lower MSFEs. The forecast period is 2004:6-2021:6, and all models are estimated anew prior to the construction of each forecast. Entries in bold denote method with lowest relative MSFE for a given target variable and forecast horizon. Starred entries indicate rejection of the null hypothesis of equal conditional predictive ability using the ? (?) conditional predictive accuracy test. Significance levels for the test include "$***$" for $p < 0.01$, "$**$" for $p < 0.05$, "$*$" for $p < 0.1$.

Table 2: Comparison of the Predictive Accuracy of AR(SIC) + EUI + BCI Models with AR(SIC) + EUI Models*

		Factor Extraction Method used to Construct Business Conditions Indexes									
	Target Variable	PCA	Lasso	LPCA	AP	GP1	GP2	GF1	GF2	EPCA	JLN
	RPI	0.752 *	0.851	0.834	0.806	0.83	0.763	0.826 **	0.752 *	**0.677 ***	0.779
	INDPRO	0.662 *	0.624 **	0.967	0.651 *	0.734 **	0.684 *	0.65 **	0.703	0.608 **	**0.559**
	UNRATE	0.54 **	**0.521 *****	0.534 *	0.541	0.533 **	0.546 *	0.535 *	0.632	0.523 **	0.566 *
	CLAIMS	0.517	0.595	0.582	0.651 *	0.671	0.573	0.511 *	0.502	**0.5 ***	0.659
h=1	HOUST	0.618 ***	0.554 ***	0.553 ***	0.558 ***	0.604 ***	0.594 ***	0.737 **	0.609 ***	**0.51 *****	0.668 ***
	PERMIT	0.684 ***	0.881	0.87	0.72 **	0.94	0.7 **	0.77 *	0.785 *	**0.661 *****	0.847 **
	RCON	0.573 **	0.985	0.981	0.729 **	0.984	0.729 **	0.982	0.9 *	**0.517 ****	0.892 ***
	MTS	0.514 **	0.909 *	0.899 *	0.534 *	0.716 **	0.517 **	0.793 *	0.732 **	**0.512 ****	0.68
	M2	0.759 ***	0.788 *	0.764 **	0.756 ***	0.892	**0.754 ****	0.898 *	0.766 **	0.755 **	0.985
	R10	0.866	**0.855**	0.917	0.902	0.872	0.881	0.94	0.934	0.865	0.887
	PPI	0.74 *	0.986	0.986	0.925	0.978	0.748 **	0.955	0.835	**0.729 ***	0.818
	CPI	0.818 *	0.9	0.901	0.765 **	0.95	0.768 *	0.882 *	0.857 *	**0.659 *****	0.935
	PCECI	0.769 **	0.822 ***	0.822 ***	0.856 *	0.707 **	0.76 ***	0.833 *	0.816 **	**0.654 *****	0.936
	S&P500	0.846	0.995	0.98	0.89	0.996	0.843 **	0.942	0.944	**0.749**	0.951
	RPI	0.83 **	0.849 **	0.841 **	0.814 **	0.842 **	0.844 **	0.852 *	0.838 **	**0.719 ****	0.91
	INDPRO	0.836 **	**0.69**	0.958	0.788 *	0.896 *	0.766 *	0.757	0.886 *	0.785 *	0.897
	UNRATE	0.75	**0.603**	0.692	0.739 *	0.693	0.716	0.675	0.855	0.646	0.743
	CLAIMS	0.831	0.849	0.803	0.843	0.848	0.786	0.753 *	0.768	**0.675**	0.88 *
h=3	HOUST	0.642 ***	0.707 **	0.649 ***	0.616 **	0.719 ***	0.702 ***	0.704 ***	0.724 ***	**0.527 *****	0.703 ***
	PERMIT	**0.714 *****	0.867 **	0.83 **	0.754 ***	0.898 **	0.737	0.737 ***	0.772 **	0.719 ***	0.864 *
	RCON	0.866	0.933	0.881	0.83	0.871	0.734	0.949	0.797	**0.563**	0.932
	MTS	0.899	0.963	0.972	**0.773**	0.903	0.813	0.891	0.913 *	0.816	0.953
	M2	0.847	0.842 *	0.846 *	0.854	0.946	**0.789**	0.945 *	0.837	0.817	0.989
	R10	0.894	**0.855 ****	0.992	0.958	0.929	0.915 *	0.916	0.991	0.902	0.926
	PPI	**0.859 *****	1.012	1.013	0.984	0.992	0.901 **	0.984	0.939	0.868 **	0.933 **
	CPI	0.866	0.959	0.956 *	0.904	0.978	0.903	0.936 ***	0.929 *	**0.842 ***	0.968
	PCECI	0.87 *	0.956	0.955	0.901 **	0.885	0.911	0.929	0.915	**0.819 ***	0.973
	S&P500	0.815	1.001	0.96	0.874 *	1.007	0.846	0.969	0.934	**0.761 ***	0.978
	RPI	0.877 *	0.865 *	0.875 *	0.856	0.851 **	0.905	0.864 **	0.879 *	**0.787 ***	0.963
	INDPRO	0.828 *	**0.68 ***	0.992 **	0.783	0.8	0.834	0.832	0.96	0.768 **	0.905
	UNRATE	0.843	**0.663**	0.846	0.821	0.811	0.797	0.879	0.934	0.746	0.926
	CLAIMS	0.875	0.897	0.904	0.885	0.895	0.861	0.868	0.862	**0.822**	0.972
h=6	HOUST	0.597 ***	0.665 ***	0.651 ***	0.59 **	0.804 ***	0.705 *	0.693 ***	0.681 ***	**0.565 *****	0.728 **
	PERMIT	**0.624 *****	0.683 **	0.668 **	0.708 *	0.881 **	0.819	0.698 **	0.766 **	0.665 ***	0.889 *
	RCON	0.75	0.814	0.86	0.779	0.87	0.783	0.865	0.781	**0.58**	0.93
	MTS	0.864 *	0.986	0.986	0.86 *	0.872	0.876	0.912	0.894	**0.825**	0.978
	M2	0.872	0.939	0.939	0.885	0.998	0.888	0.952	0.904	**0.871 ****	0.99
	R10	0.947	**0.903**	0.991	0.967	0.962	0.932	0.928	0.995	0.946	0.984
	PPI	0.863 **	0.997	0.997	0.973	1.008	0.918 *	0.989	0.91	**0.861 ****	0.924
	CPI	0.883 ***	0.94	0.938	0.95	0.98	0.87	0.93	0.919	**0.835 ***	0.967
	PCECI	0.875 **	0.981	0.98	0.913	0.873	0.908	0.937 *	0.912	**0.841 ***	0.966 *
	S&P500	0.844	0.984	0.973	0.897	0.981	0.914	0.995	0.965	**0.784**	0.936
	RPI	0.877	0.833	0.83	0.88	0.839	0.877	0.831	0.881	**0.745 ***	0.995 ***
	INDPRO	0.854	**0.632**	0.988	0.713 *	0.819	0.781	0.87	0.973	0.68 *	0.926 ***
	UNRATE	0.858	**0.682**	0.827	0.781	0.799	0.866	0.914	0.959	0.684	0.976 ***
	CLAIMS	0.889	0.849	0.849	0.816	0.871	0.906	0.862	0.881	**0.808**	0.95 ***
h=12	HOUST	0.554	0.615	0.607 **	0.559 *	0.892	0.627	0.775	0.651 ***	**0.549 ****	0.792 ***
	PERMIT	0.584	0.565	0.557 **	0.575	0.899 **	0.844	0.716	0.735 ***	**0.541 ****	0.894 ***
	RCON	0.825	0.813	0.813	0.674	0.805	0.821	0.8	0.751	**0.602**	0.937 ***
	MTS	0.86	0.976	0.976	0.74	0.832	0.869	0.984	0.972	**0.694**	0.983 ***
	M2	0.959 **	0.942 **	0.943	0.943	1.003 **	0.981 **	0.934	0.933	**0.889**	0.97 ***
	R10	0.933 **	**0.866**	0.981	0.971	0.95	0.915 *	0.967	0.996	0.929	0.99 ***
	PPI	0.9	0.995	0.995	0.981	0.989	0.933	0.988	0.916	**0.89**	0.968 ***
	CPI	0.905	0.98	0.979	0.884	0.987	0.888	0.972	0.964	**0.873**	0.982 ***
	PCECI	0.905	0.998	0.997	0.911	0.896	0.894	0.95	0.94	**0.882**	0.987 ***
	S&P500	0.881	0.947	0.946 *	0.929	0.908	0.957	0.953	0.906	**0.793 *****	0.98 ***

* Notes: See notes to Table 1. In this table, the benchmark model is AR(SIC) model augmented with economic uncertainty indexes (EUIs). However, the alternative forecasting model is AR(SIC) includes economic uncertainty indexes (EUIs) and business conditions indexes (BCIs) together.

Table 3: Comparison of the Predictive Accuracy of AR(SIC) + EUI Models with AR(SIC) + BCI Models*

		Factor Extraction Method used to Construct Business Conditions Indexes									
	Target Variable	PCA	Lasso	LPCA	AP	GP1	GP2	GF1	GF2	EPCA	JLN
	RPI	1.234	**1.098**	1.123	1.184	1.115	1.243	1.139	1.241 *	1.421 **	1.186
	INDPRO	1.395 *	1.485 **	**0.91**	1.414 *	1.247	1.371 *	1.429 **	1.289	1.514 **	1.692
	UNRATE	1.508 *	1.56 **	1.521	1.56	1.494 *	1.558 *	1.589	**1.265**	1.622 *	1.645
	CLAIMS	1.726	1.443	1.457	1.425	**1.39**	1.572	1.74	1.816	1.808	1.421
h=1	HOUST	1.58 ***	1.661 ***	1.678 ***	1.771 ***	1.536 ***	1.627 ***	**1.31 ****	1.561 ***	1.784 ***	1.455 ***
	PERMIT	1.408 ***	1.019	1.033	1.32 **	**0.981**	1.391 **	1.226	1.243	1.428 ***	1.143 *
	RCON	1.338	**0.683**	0.733	1.104	0.708	1.089	0.776	0.94	1.397 *	0.857
	MTS	1.625 **	**0.877**	0.926	1.584 *	1.178	1.656 *	1.195	1.316 *	1.629 **	1.252
	M2	1.198	1.112	1.16	1.217	0.959	1.217	1.002	1.219	1.214	**0.954**
	R10	1.165	1.118	1.046	1.077	1.087	1.106	1.048	**1.038**	1.165	1.115
	PPI	1.358 *	0.953	**0.95**	1.045	0.963	1.306 *	1.016	1.166	1.383 *	1.193
	CPI	1.24 *	1.087	1.092	1.321 **	**1.025**	1.294 *	1.122	1.171 *	1.54 ***	1.053
	PCECI	1.312 ***	1.172 **	1.181 **	1.17 **	1.366 **	1.305 ***	1.182	1.195 *	1.524 ***	**1.053**
	S&P500	1.099	**0.89**	0.914	1.047	0.899	1.086	0.966	0.991	1.257	0.987
	RPI	1.141 *	1.144 *	1.146 **	1.198 **	1.156 **	1.104	1.16 *	1.123	1.36 **	**1.04**
	INDPRO	1.054	1.369	**0.938**	1.194	1.076 **	1.077	1.307	0.943	1.204 **	1.056
	UNRATE	1.075	1.551	1.268 *	1.203 **	1.349 *	1.108	1.467	**0.958**	1.406	1.233
	CLAIMS	**0.932**	1.014	1.011	0.942	1.132	0.95	1.321	1.013	1.28	0.997
h=3	HOUST	1.396 **	**1.164**	1.394 ***	1.527 **	1.221	1.202	1.397 ***	1.203	1.51 ***	1.319 *
	PERMIT	1.303 **	**0.913**	1.116	1.301 *	0.958	1.104	1.361 ***	1.115	1.363 ***	1.115
	RCON	**0.851**	0.974	0.956	0.973	0.989	0.989	1.028	0.852	1.44	0.871
	MTS	0.928	0.984	0.932	1.176	1.02	1.019	1.111	**0.902**	1.121	0.953
	M2	1.087	1.149	1.141	1.111	1.012	1.123	1.018	1.054	1.188	**0.965**
	R10	1.063	1.129 *	0.964	1.038	1.052	1.039	1.039	**0.944**	1.069	1.065
	PPI	1.08	0.934 ***	**0.926 *****	0.95	0.951	1.025	0.97	0.966	1.107 *	1.036
	CPI	1.118	0.991	0.988	1.073	**0.966**	1.066	0.984	1	1.172	1.004
	PCECI	1.113	0.993	**0.989**	1.068	1.073	1.047	1.007	1.023	1.207 *	0.997
	S&P500	1.185	0.953	0.99	1.147 *	**0.948**	1.12	0.99	1.018	1.294 *	0.965
	RPI	1.148 **	1.116 *	1.106 *	1.155	1.154 **	1.081	1.144	1.1	1.231	**0.997**
	INDPRO	1.183 *	1.362 **	**0.951**	1.245	1.183	1.124	1.16	1.017	1.259 *	1.005
	UNRATE	1.09	1.468	1.168	1.168	1.22	1.102	1.125	1.045	1.311	**1.004**
	CLAIMS	1.056	1.086	1.08	1.059	1.097	1.021	1.128	1.085	1.168	**0.969**
h=6	HOUST	1.566 ***	1.324	1.337	1.551 *	**1.005 ***	1.252	1.343 *	1.447 **	1.711 ***	1.351 *
	PERMIT	1.481 ***	1.214	1.21	1.363 *	**0.912**	1.104	1.362 **	1.245	1.498 ***	1.126
	RCON	1.311	1.086	1.043	1.223	1.121	1.172	1.141	1.23	1.603	**0.873**
	MTS	1.144 *	0.969	0.968	1.108	1.103	1.073	1.06	1.075	1.165	**0.912**
	M2	1.123	1	0.989	1.08	0.967 **	1.091	1.021	1.051	1.103 **	**0.961**
	R10	1.061	1.06 *	**0.972**	1.021	1.007	1.047	1.045	0.983	1.053	1
	PPI	1.14 *	0.963 **	0.961 **	1.01	0.955 *	1.073	**0.935**	1.068	1.138 *	1.062
	CPI	1.119 ***	1.023	1.022	1.043	0.976	1.116	**0.925**	1.052 *	1.174	1.014
	PCECI	1.132 *	0.981	0.981	1.091	1.127	1.078	**0.941**	1.055	1.169 *	1.014
	S&P500	1.179	0.977	0.983	1.121	0.966	1.096	**0.809**	1.013	1.275	1.039
	RPI	1.119	1.054	1.057	1.102	1.167	1.142	1.154	1.075 *	1.215 **	**0.999 *****
	INDPRO	1.134	1.367	**0.911**	1.356 **	1.157	1.239	1.046	1.021	1.262 **	1.067 ***
	UNRATE	1.137 *	1.223	1.041	1.251	1.225	1.135	1.056	1.027	1.322	**0.998 *****
	CLAIMS	1.106	**1.022**	1.025	1.183	1.139	1.089	1.136	1.098	1.135	1.036 ***
h=12	HOUST	1.667	1.43	1.459	1.59	**0.766**	1.571	1.186	1.467	1.7 ***	1.258 ***
	PERMIT	1.575	1.414	1.443	1.563	**0.816 ***	1.131	1.339 **	1.272 **	1.67 **	1.107 ***
	RCON	1.133	1.035	1.042	1.363	1.221	1.115	1.224	1.296	1.32	**1.033 *****
	MTS	1.113	**0.823**	0.828	1.287	1.161	1.116	0.982	1.014	1.093	1 ***
	M2	1.024	**0.954**	0.957 *	1.04	0.959 **	0.988 **	1.019	1.038	1.022	1.018 ***
	R10	1.079 *	1.095	0.964	1.014	1.005	1.102 ***	**0.926**	0.982	1.039	1.006 ***
	PPI	1.098 **	0.961 **	0.966 *	1.002 *	0.948 *	1.049	**0.921**	1.055	1.091 *	1.015 ***
	CPI	1.098	0.977	0.981	1.115	0.95	1.113	**0.935**	1	1.116	1.001 ***
	PCECI	1.099	0.963	0.965	1.089	1.055 *	1.11	**0.953**	1.028	1.095	0.993 ***
	S&P500	1.123	1.01	1.015 **	1.059	0.994	1.043	**0.813**	1.048	1.202 **	1.027 ***

* Notes: See notes to Table 1. In this table, the benchmark model is AR(SIC) model augmented with business conditions indexes (BCIs). However, the alternative forecasting model is AR(SIC) model includes economic uncertainty indexes (EUIs).

Table 4: Top 3 "MSFE-Best" Factor Extraction Methods IV*

Comparison of AR(SIC) + EUI + BCI Models with AR(SIC) + BCI Models

Target Variable	Rank	h=1	h=3	h=6	h=12
RPI	1	JLN	GP2	JLN	Lasso
	2	GP1	GF2	Lasso	LPCA
	3	PCA	PCA	LPCA	EPCA *
INDPRO	1	LPCA	GP2	JLN	Lasso
	2	GF2	GF2	Lasso	EPCA **
	3	GP1	PCA	GP2	LPCA
UNRATE	1	GP2	GP2	GP2	Lasso
	2	GF1	PCA	PCA	LPCA
	3	GP1	GF2	JLN	EPCA *
CLAIMS	1	LPCA	GP2	GP2	Lasso
	2	EPCA	PCA	PCA	LPCA
	3	Lasso	GF2	AP	EPCA
HOUST	1	Lasso	Lasso **	GP1 **	PCA
	2	LPCA	GP2	GP2 ***	AP
	3	GP1	GF2	LPCA	LPCA
PERMIT	1	Lasso	Lasso **	LPCA *	PCA
	2	LPCA	GP2 **	GP1	LPCA
	3	GP1	GP1	Lasso	Lasso
RCON	1	Lasso	GF2	JLN	EPCA
	2	GP1	GP2	Lasso	Lasso
	3	LPCA	PCA	LPCA	LPCA
MTS	1	Lasso	GF2	JLN	EPCA
	2	LPCA	GP2	GP2	LPCA
	3	GP1	PCA	GF2	Lasso
M2	1	GP1	GF2	LPCA	LPCA
	2	Lasso	GP2	Lasso	Lasso **
	3	LPCA	PCA	GF2	EPCA
R10	1	GP1 *	GF2	Lasso	GF1
	2	Lasso	PCA	GF1	Lasso
	3	LPCA	GP2 *	GP1	LPCA
PPI	1	LPCA	GF2	GF1	GF1
	2	Lasso	GP2	LPCA ***	GP1
	3	GP1	PCA	Lasso **	LPCA
CPI	1	GP1	GF1	GF1	GF1
	2	Lasso	GF2 *	GP1 *	GP1
	3	LPCA	LPCA *	Lasso	LPCA
PCECI	1	Lasso	GF1	GF1	GF1
	2	GP1	GF2	Lasso	GP1
	3	LPCA	LPCA *	LPCA *	EPCA
S&P500	1	Lasso	JLN	GF1	GF1
	2	LPCA	GP2	GP1	GP1
	3	GP1	LPCA	LPCA	GF2

* Notes: See notes to Table 3. Entries in this table are the top 3 "MSFE-best" forecasting models, selected by comparing forecasts from benchmark AR(SIC)+BCI model with AR(SIC)+EUI+BCI models. For each of these models, the associated factor extraction method used when constructing the EUIs and BCIs is also given. Starred entries indicate rejection of the null hypothesis of equal conditional predictive ability, and indicate that our alternative models that include EUIs and BCIs are yield more accurate predictions than AR(SIC)+BCI benchmark model, using the ? (?) conditional predictive accuracy test. Significance levels for the test include "$***$" for $p < 0.01$, "$**$" for $p < 0.05$, "$*$" for $p < 0.1$.

Table 5: Top 3 "MSFE-Best" Factor Extraction Methods V*

Comparison of AR(SIC) + EUI + BCI Models with AR(SIC) + EUI Models

Target Variable	Rank	h=1	h=3	h=6	h=12
RPI	1	EPCA *	EPCA **	EPCA *	EPCA *
	2	PCA *	AP **	GP1 **	Lasso
	3	GF2 *	PCA **	AP	LPCA
INDPRO	1	JLN	Lasso	Lasso *	Lasso
	2	EPCA **	GF1	EPCA **	EPCA **
	3	Lasso **	GP2 *	AP	AP *
UNRATE	1	Lasso ***	Lasso	Lasso	Lasso
	2	EPCA **	EPCA	EPCA	EPCA *
	3	GP1 **	GF1	GP1	AP
CLAIMS	1	EPCA *	EPCA	EPCA	AP
	2	GF2	GF1 *	PCA	EPCA
	3	GF1 *	GF2	GF2	Lasso
HOUST	1	EPCA ***	EPCA ***	EPCA ***	EPCA *
	2	LPCA ***	AP **	AP **	AP
	3	Lasso ***	PCA ***	PCA ***	PCA
PERMIT	1	EPCA ***	PCA ***	EPCA **	EPCA ***
	2	PCA ***	EPCA ***	PCA ***	LPCA
	3	GP2 **	GP2	LPCA **	Lasso
RCON	1	EPCA **	EPCA	EPCA	EPCA
	2	PCA **	GP2	PCA	AP
	3	AP **	GF2	AP	GF2
MTS	1	EPCA **	AP	EPCA	EPCA
	2	PCA **	GP2	AP *	AP
	3	GP2 **	EPCA	PCA *	GP1
M2	1	GP2 **	GP2	EPCA **	EPCA
	2	EPCA **	EPCA	PCA	PCA *
	3	AP ***	GF2	GP2	GF1
R10	1	Lasso	Lasso **	Lasso	Lasso
	2	EPCA	PCA	GF1	GP2 *
	3	PCA	EPCA	GP2	EPCA
PPI	1	EPCA *	PCA ***	EPCA **	EPCA
	2	PCA *	EPCA **	PCA *	PCA
	3	GP2 **	GP2 **	GF2	GF2
CPI	1	EPCA ***	EPCA *	EPCA *	EPCA
	2	AP **	PCA	GP2	AP
	3	GP2 *	GP2	PCA ***	GP2
PCECI	1	EPCA ***	EPCA *	EPCA *	EPCA
	2	GP1 **	PCA *	GP1	GP1
	3	GP2 ***	GP1	PCA *	GP2
S&P500	1	EPCA	EPCA *	EPCA	EPCA **
	2	GP2 **	PCA	PCA	PCA
	3	PCA	GP2	AP	GF2

* Notes: See notes to Table 4. This table lists the top 3 factor extraction methods used in our "MSFE-best" forecasting models, when comparing benchmark AR(SIC)+EUI model with alternative AR(SIC)+EUI+BCI model.

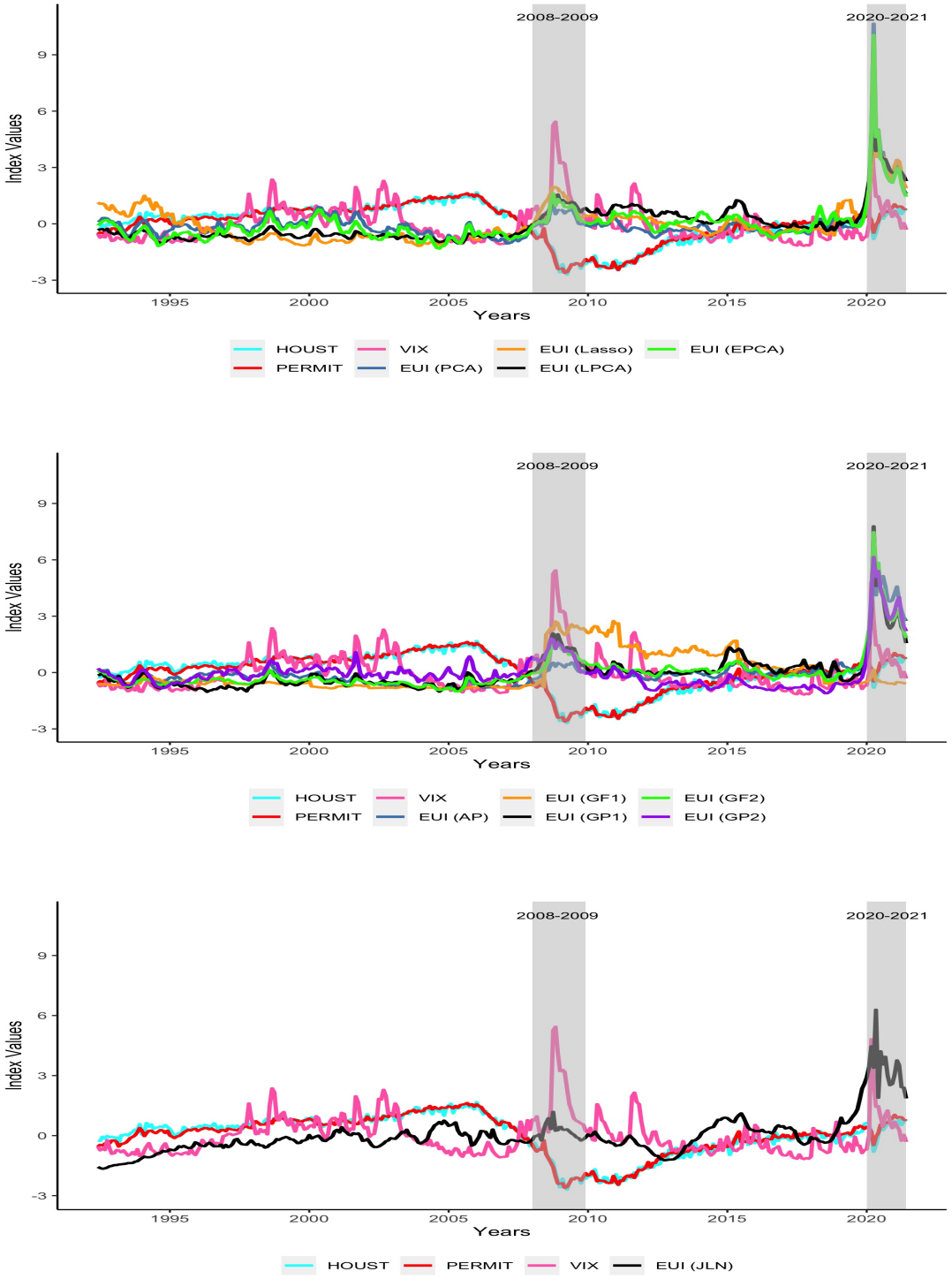
Table 6: Top 3 "MSFE-Best" Factor Extraction Methods VI*

Comparison of AR(SIC) + EUI Models with AR(SIC) + BCI Models

Target Variable	Rank	h=1	h=3	h=6	h=12
RPI	1	Lasso	JLN	JLN	JLN ***
	2	GP1	GP2	GP2	Lasso
	3	LPCA	GF2	GF2	LPCA
INDPRO	1	LPCA	LPCA	LPCA	LPCA
	2	GP1	GF2	JLN	GF2
	3	GF2	PCA	GF2	GF1
UNRATE	1	GF2	GF2	JLN	JLN ***
	2	GP1	PCA	GF2	GF2
	3	PCA *	GP2	PCA	LPCA
CLAIMS	1	GP1	PCA	JLN	Lasso
	2	JLN	AP	GP2	LPCA
	3	AP	GP2	PCA	JLN ***
HOUST	1	GF1 **	Lasso	GP1 *	GP1
	2	JLN ***	GP2	GP2	GF1
	3	GP1 ***	GF2	Lasso	JLN ***
PERMIT	1	GP1	Lasso	GP1	GP1 *
	2	Lasso	GP1	GP2	JLN ***
	3	LPCA	GP2	JLN	GP2
RCON	1	Lasso	PCA	JLN	JLN ***
	2	GP1	GF2	LPCA	Lasso
	3	LPCA	JLN	Lasso	LPCA
MTS	1	Lasso	GF2	JLN	Lasso
	2	LPCA	PCA	LPCA	LPCA
	3	GP1	LPCA	Lasso	GF1
M2	1	JLN	JLN	JLN	Lasso
	2	GP1	GP1	GP1 **	LPCA *
	3	GF1	GF1	LPCA	GP1 **
R10	1	GF2	GF2	LPCA	GF1
	2	LPCA	LPCA	GF2	LPCA
	3	GF1	AP	JLN	GF2
PPI	1	LPCA	LPCA ***	GF1	GF1
	2	Lasso	Lasso ***	GP1 *	GP1 *
	3	GP1	AP	LPCA **	Lasso **
CPI	1	GP1	GP1	GF1	GF1
	2	JLN	GF1	GP1	GP1
	3	Lasso	LPCA	JLN	Lasso
PCECI	1	JLN	LPCA	GF1	GF1
	2	AP **	Lasso	Lasso	Lasso
	3	Lasso **	JLN	LPCA	LPCA
S&P500	1	Lasso	GP1	GF1	GF1
	2	GP1	Lasso	GP1	GP1
	3	LPCA	JLN	Lasso	Lasso

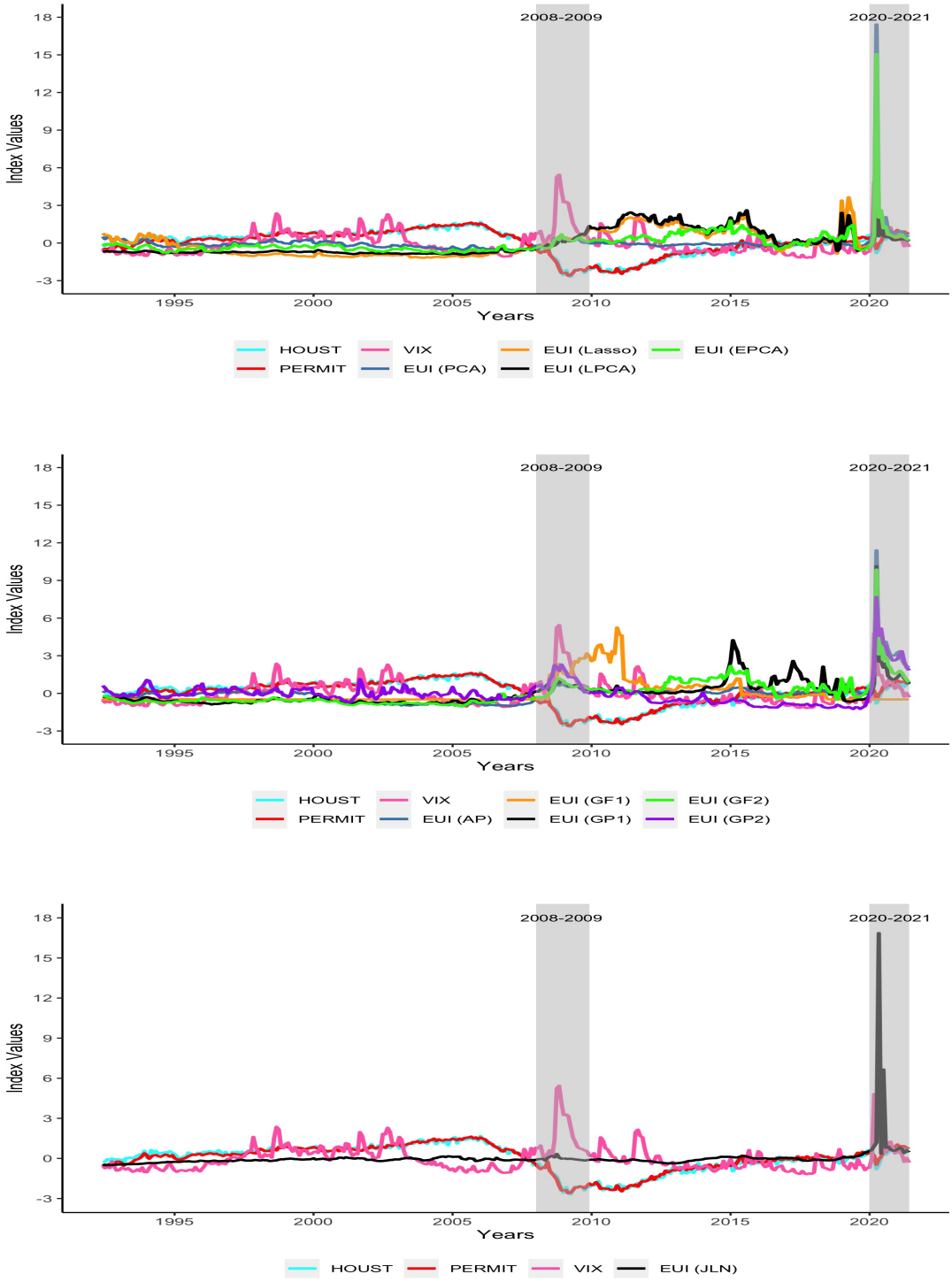
* Notes: See notes to Table 4. This table lists the top 3 factor extraction methods used in our "MSFE-best" forecasting models, when comparing benchmark AR(SIC)+BCI model with alternative AR(SIC)+EUI model.

Figure 1: Plots of Housing Starts and Permits, Various Economic Uncertainty Indexes, and the VIX (Forecasting Horizon, h=3)*



*Notes: See notes to Table 3 in the main paper. The above three figures include various plots of our economic uncertainty indexes (EUIs), HOUST, PERMIT, and the VIX, which is also compared with the EUIs proposed in ? (?). All EUI plots depict real-time measures constructed for the period 1992:6-2021:6, and updated prior to the construction of each new forecast reported on in Tables 3-9 in the main paper and Tables 1-6 in the supplemental appendix.

Figure 2: Plots of Housing Starts and Permits, Various Economic Uncertainty Indexes, and the VIX (Forecasting Horizon, h=6)*



*Notes: See notes to Figure 1.