

Finance in Montana

William Igoe

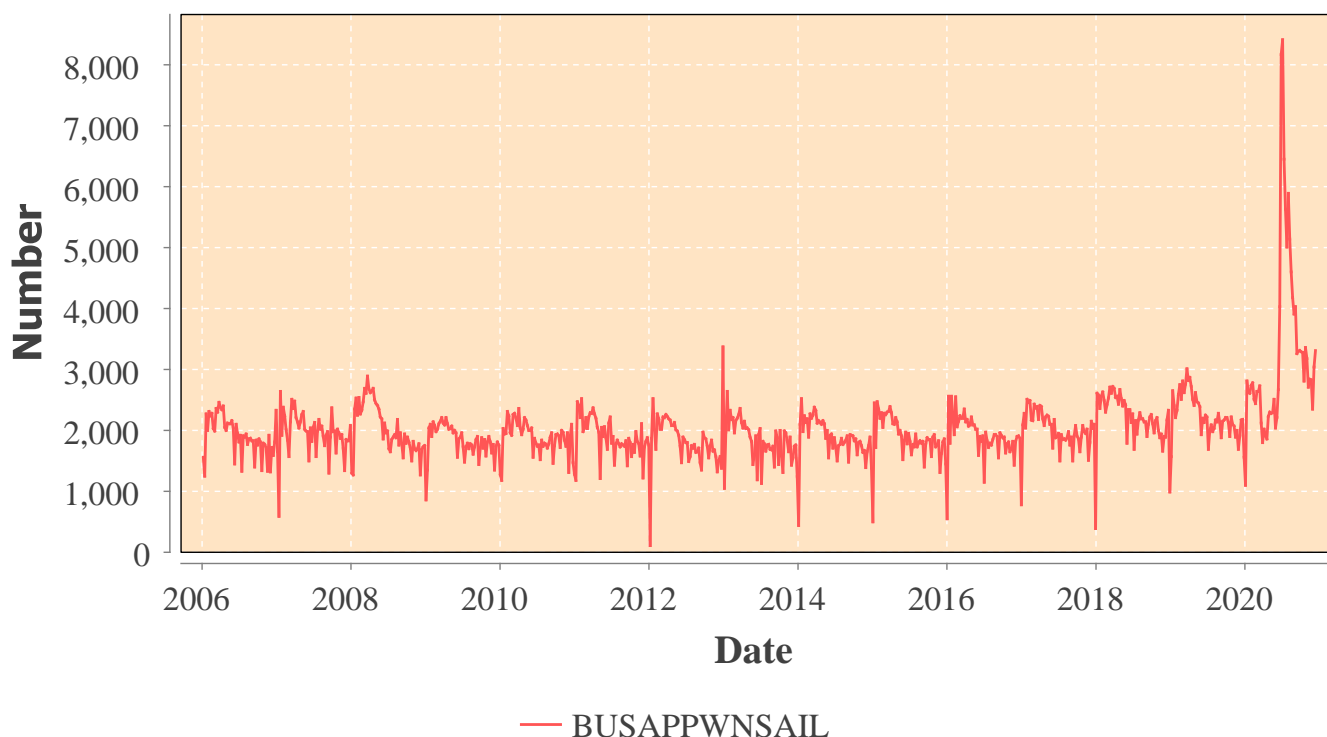
Dec 21 2020



Lords of the Levee -- A New Century Thanks to the Federal Reserve

Who knew a global pandemic would be such a remarkable business opportunity? Clearly, people in Illinois made the effort to legitimize and then apply their businesses for the fabled Paycheck Protection Program (PPP). While we might accept the rapid rise in [business applications](#), "the core business applications series that correspond to a subset of all applications for an Employer Identification Number (EIN)", as legitimate, a true Chicagoan suspects otherwise. More likely, we are seeing creative accounting and other such themes at play. The ghost of Paddy Bauler whispers, "Chicago ain't ready for reform". There is strong evidence that rest of the United States enjoys Chicago's tradition for boodle as well.

Business Applications for Illinois



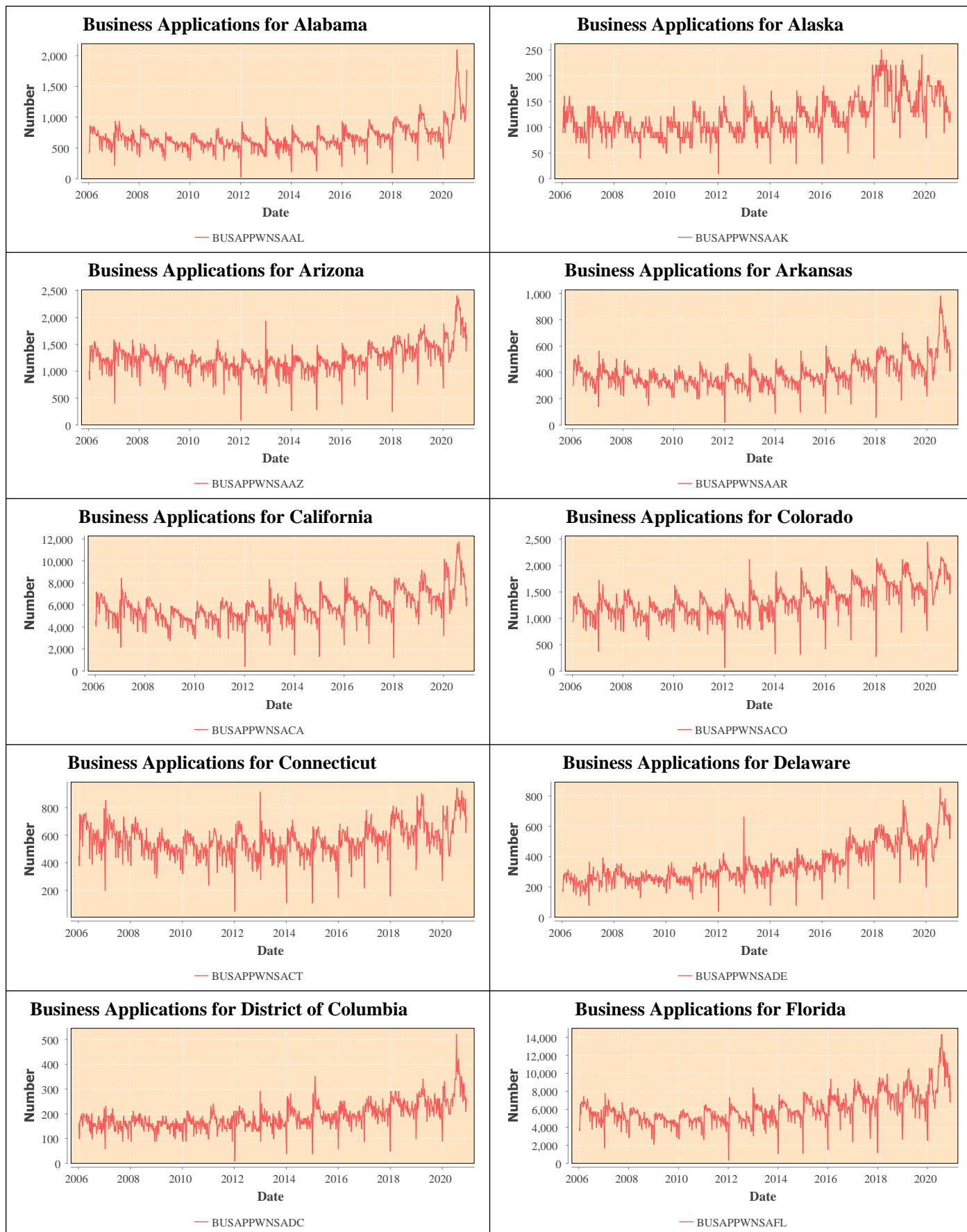
I also included two groups of regressions for all states which report business applications (South Dakota does not). The data is quarterly and I regress business applications against 45-50 other quarterly data series. The programs select three variables which minimize the sum of squared errors. Each state is unique and thus different variables selected. It is interesting to pursue the results before making rash (as I did) conclusions. All data series are 'log-differenced' to ensure stationarity. The coefficient are elasticities of percent changes.

The second group of regressions employs [Zellner's Seemingly Unrelated Regressions](#) to draw out more efficient regression coefficients. I run 49 regressions simultaneously to incorporate the

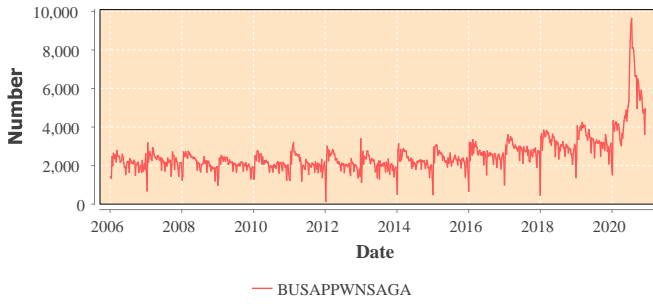
correlation and interplay of regression residuals.

Stay healthy and enjoy your Holiday Season!

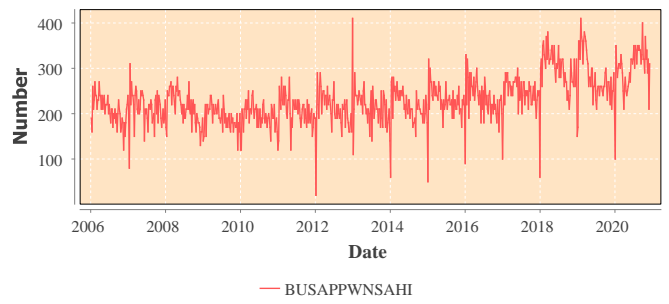
Graph of Business Applications by State



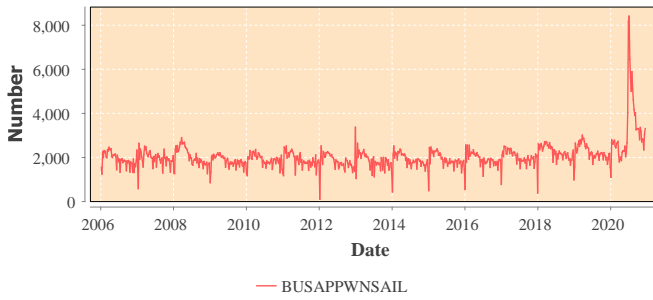
Business Applications for Georgia



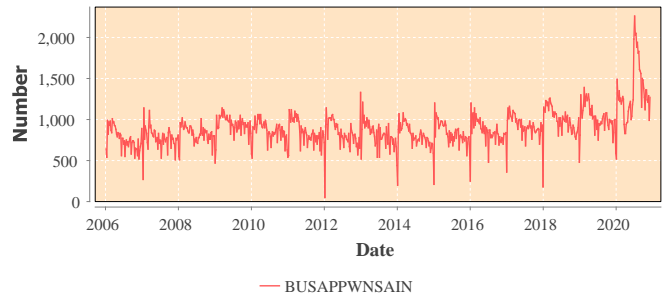
Business Applications for Hawaii



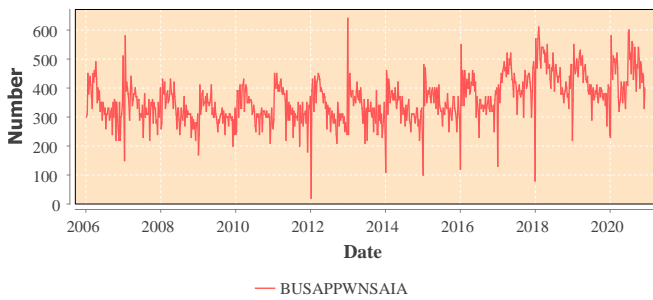
Business Applications for Illinois



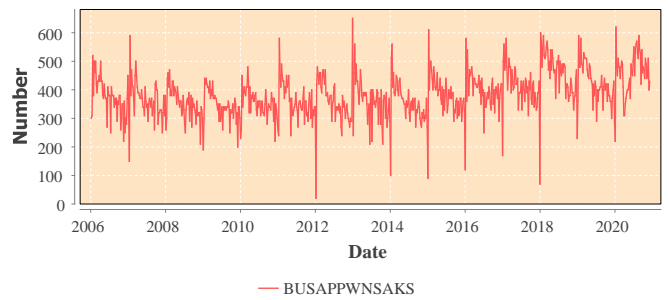
Business Applications for Indiana



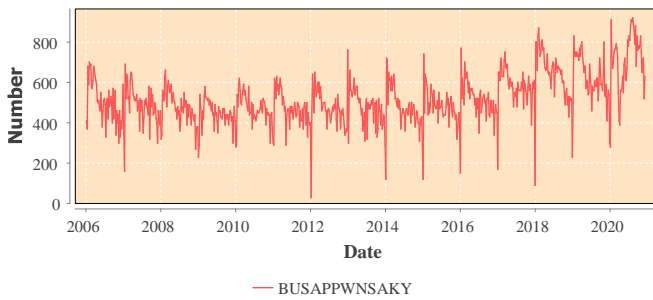
Business Applications for Iowa



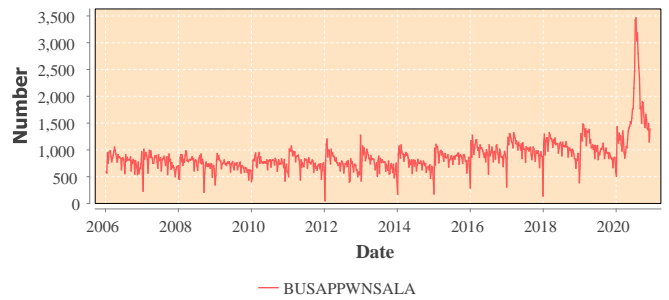
Business Applications for Kansas



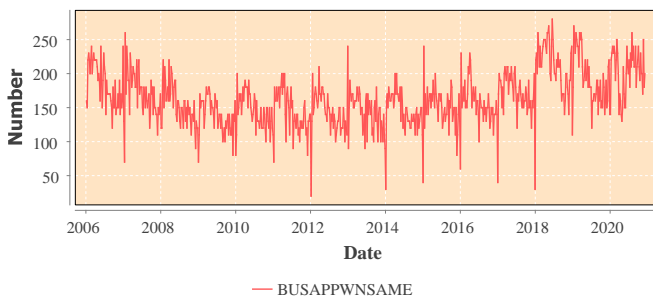
Business Applications for Kentucky



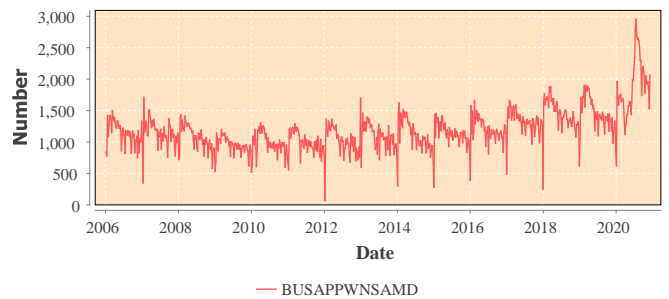
Business Applications for Louisiana



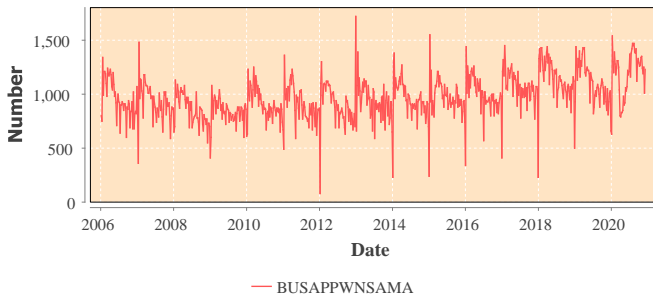
Business Applications for Maine



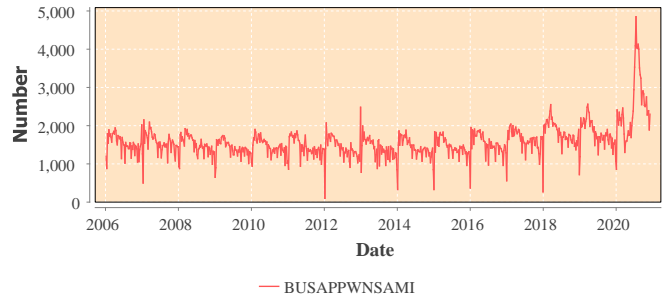
Business Applications for Maryland



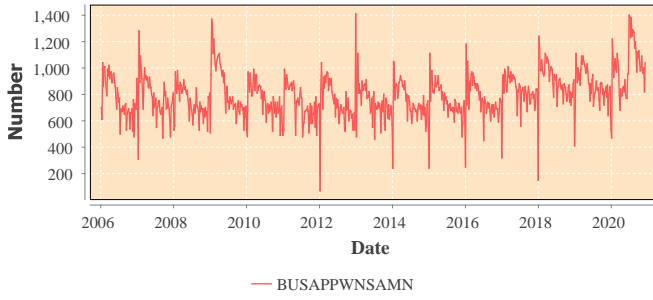
Business Applications for Massachusetts



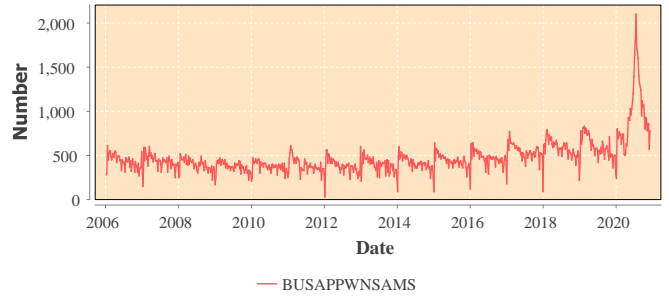
Business Applications for Michigan



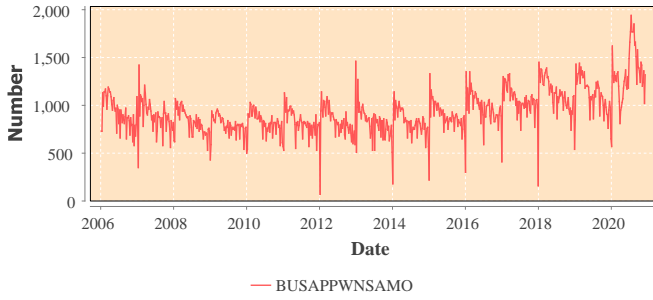
Business Applications for Minnesota



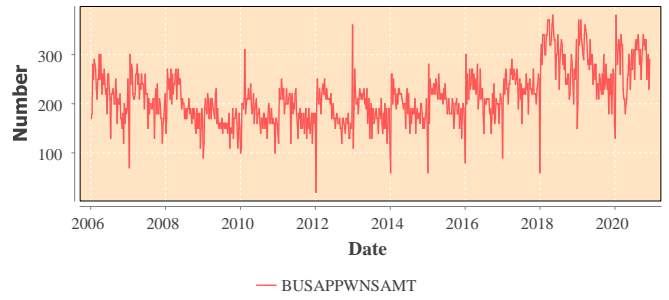
Business Applications for Mississippi



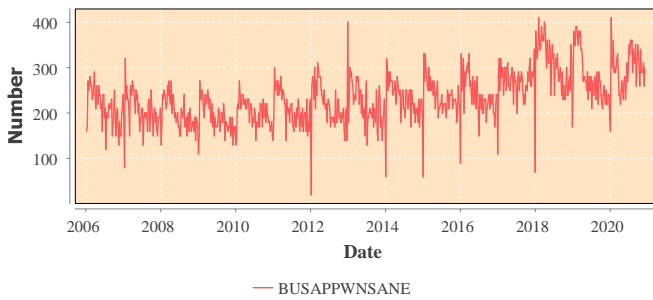
Business Applications for Missouri



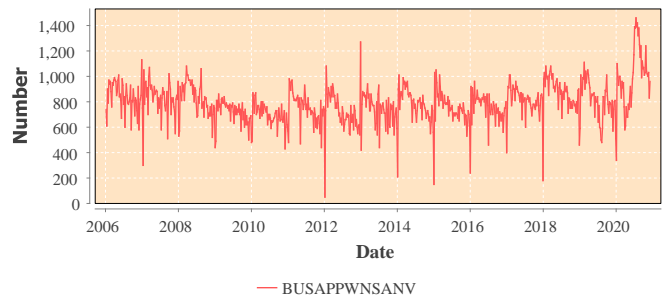
Business Applications for Montana



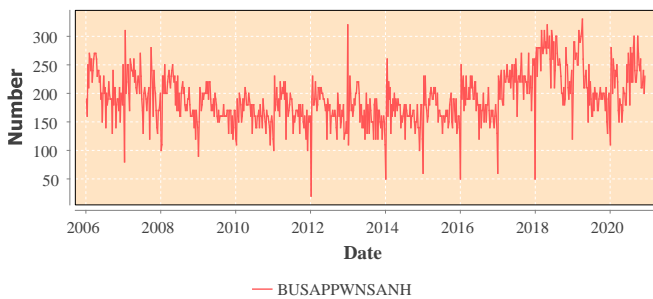
Business Applications for Nebraska



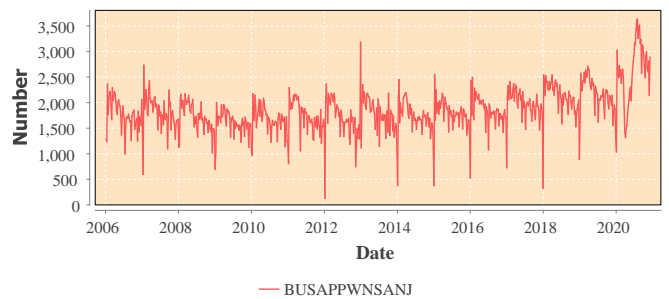
Business Applications for Nevada



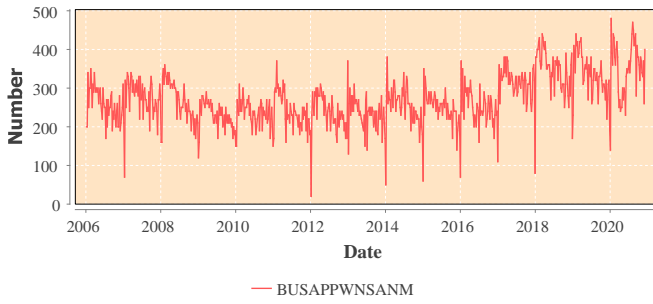
Business Applications for New Hampshire



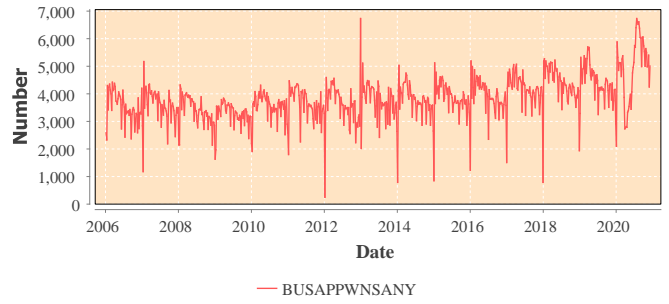
Business Applications for New Jersey



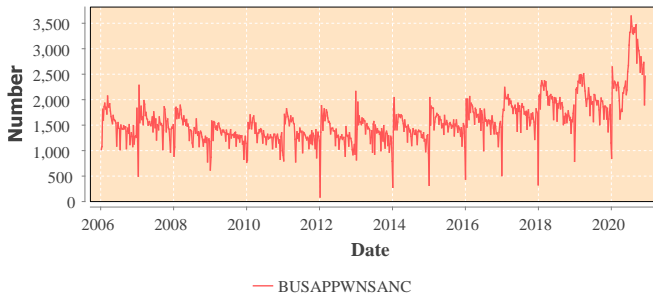
Business Applications for New Mexico



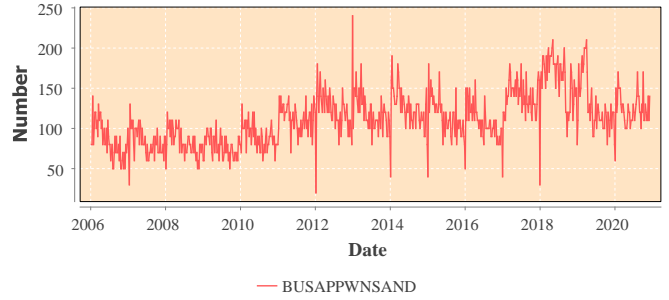
Business Applications for New York



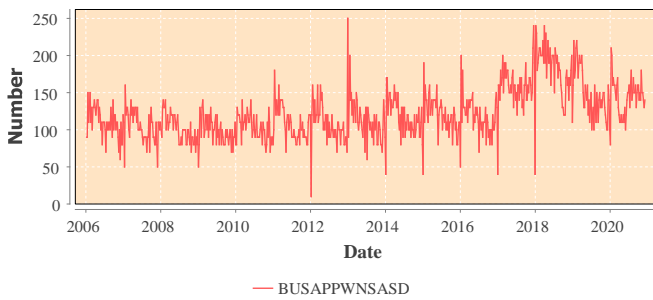
Business Applications for North Carolina



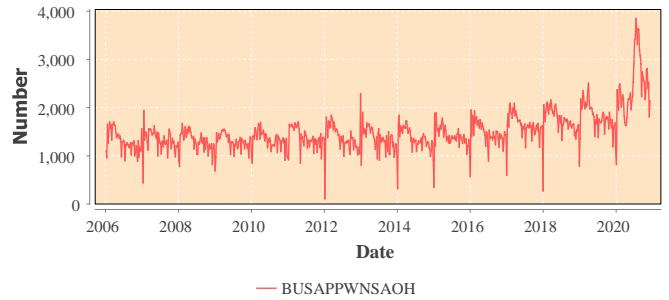
Business Applications for North Dakota



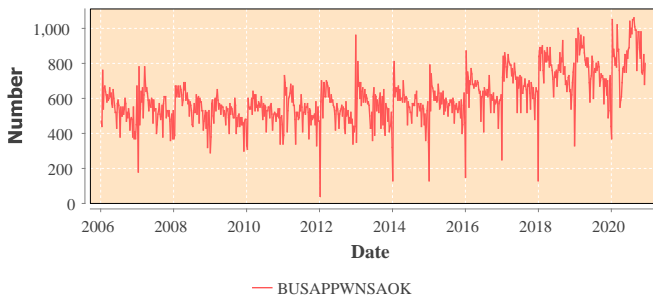
Business Applications for South Dakota



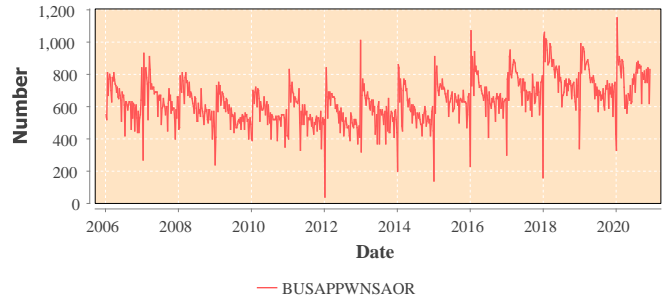
Business Applications for Ohio



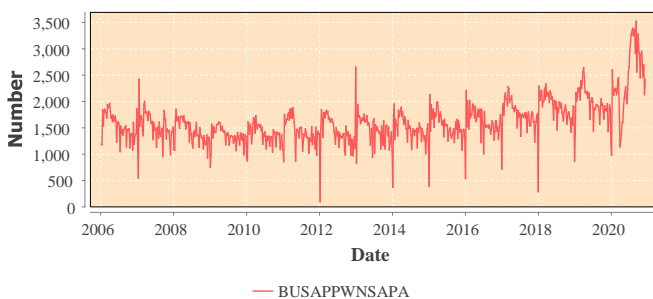
Business Applications for Oklahoma



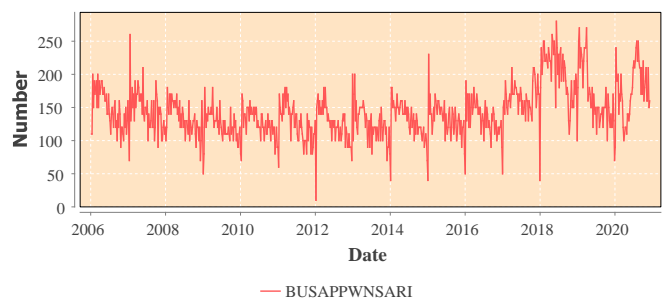
Business Applications for Oregon

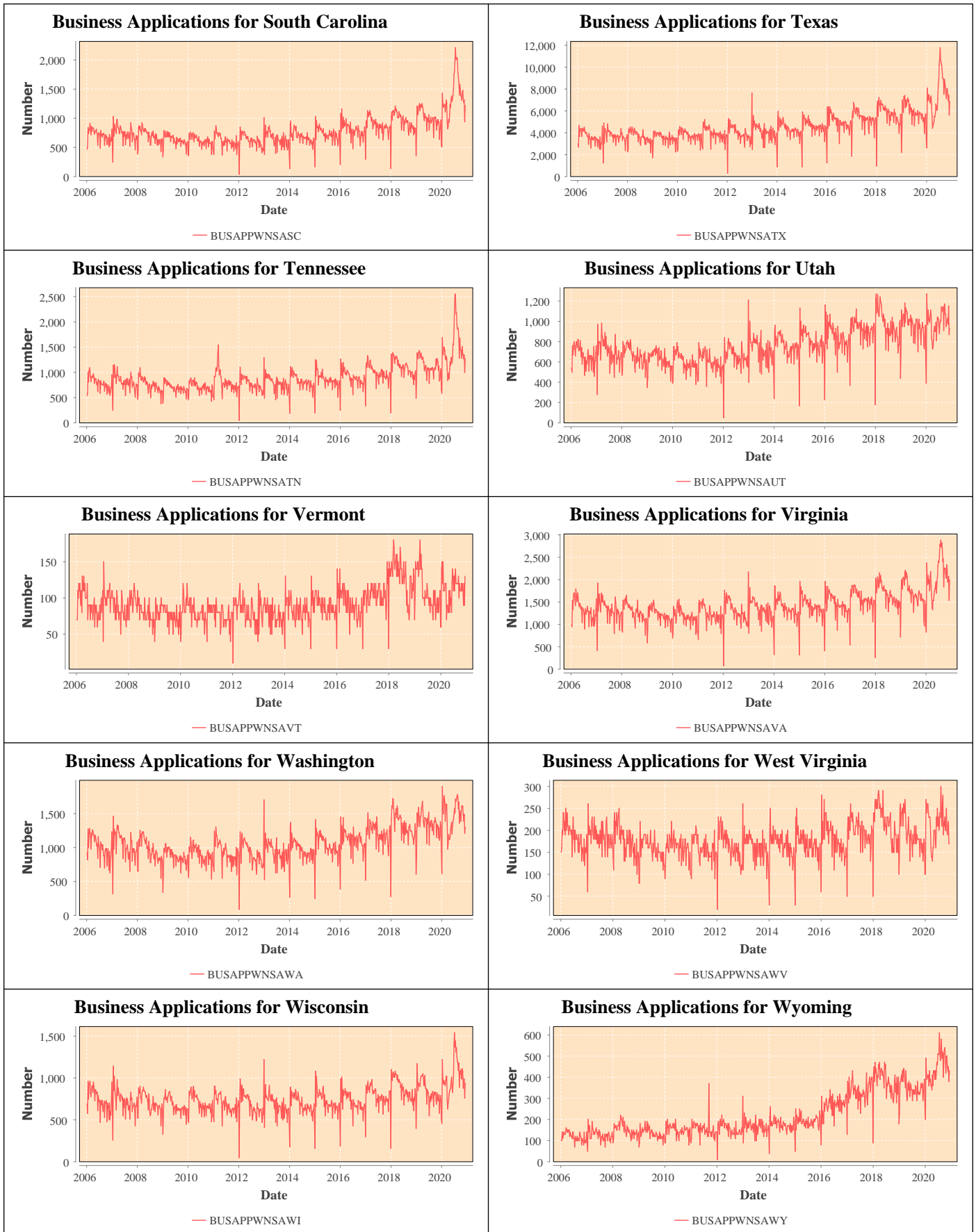


Business Applications for Pennsylvania



Business Applications for Rhode Island





Seemingly Unrelated Regressions

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
BUSAPPSAAL_LogDiff	OLS	OLS	SUR	SUR	Efficiency	Business Applications for

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
OLS DW:	2.674	2.674	2.674	2.674	2.674	2.674
Dates	2005-04-01	2014-10-01	39			
BUSAPPSACO_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Colorado
Constant	0.0016	0.0061	0.0011	0.0001	54.286	Constant
COOTOT_LogDiff	0.379	0.296	0.496	0.0032	91.79	Total Personal Income in Colorado
SBF8QSACO_LogDiff	0.55	0.105	0.536	0.0009	116.303	Spliced Business Formations within 8 Quarters for Colorado
COWHEA_LogDiff	0.325	0.331	0.242	0.0029	114.946	Health Care and Social Assistance Wages and Salaries in Colorado
OLS RSquare:	0.499	0.499	0.499	0.499	0.499	0.499
OLS DW:	2.084	2.084	2.084	2.084	2.084	2.084
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAFL_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Florida
Constant	0.0073	0.0032	0.0073	0.0001	43.506	Constant
FLWFIN_LogDiff	0.314	0.126	0.314	0.001	127.118	Finance and Insurance Wages and Salaries in Florida
HPBUSAPPSAFL_LogDiff	0.397	0.129	0.401	0.0009	135.881	High-Propensity Business Applications for Florida
SBF8QSAFL_LogDiff	0.378	0.118	0.375	0.0008	147.465	Spliced Business Formations within 8 Quarters for Florida
OLS RSquare:	0.764	0.764	0.764	0.764	0.764	0.764
OLS DW:	2.52	2.52	2.52	2.52	2.52	2.52
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAHI_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Hawaii
Constant	0.0049	0.0067	0.007	0.0001	62.272	Constant
H1OTOT_LogDiff	0.443	0.468	0.407	0.0045	104.108	Total Personal Income in Hawaii
HPBUSAPPSAHI_LogDiff	0.662	0.083	0.656	0.0007	127.502	High-Propensity Business Applications for Hawaii
H1OOTH_LogDiff	-0.121	0.372	-0.313	0.0026	142.483	Other Labor Income in Hawaii

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
OLS RSquare:	0.743	0.743	0.743	0.743	0.743	0.743
OLS DW:	2.122	2.122	2.122	2.122	2.122	2.122
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAIA_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Iowa
Constant	-0.0083	0.0065	-0.0054	0.0001	50.937	Constant
IAOTOT_LogDiff	0.868	0.353	0.597	0.0035	101.701	Total Personal Income in Iowa
HPBUSAPPSAIA_LogDiff	0.631	0.123	0.617	0.001	120.772	High-Propensity Business Applications for Iowa
IARETAILNQGSP_LogDiff	1.09	0.488	1.053	0.0037	131.296	Gross Domestic Product by Industry: Private Industries: Retail Trade for Iowa
OLS RSquare:	0.533	0.533	0.533	0.533	0.533	0.533
OLS DW:	2.544	2.544	2.544	2.544	2.544	2.544
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAKS_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Kansas
Constant	-0.0015	0.0051	-0.0007	0.0001	43.645	Constant
KSWFIN_LogDiff	0.304	0.172	0.281	0.0018	96.289	Finance and Insurance Wages and Salaries in Kansas
KSTRANSWARERQGSP_LogDiff	0.282	0.152	0.245	0.0015	104.428	Real Gross Domestic Product by Industry: Private Industries: Transportation and Warehousing for Kansas
HPBUSAPPSAKS_LogDiff	0.398	0.107	0.474	0.001	105.567	High-Propensity Business Applications for Kansas
OLS RSquare:	0.332	0.332	0.332	0.332	0.332	0.332
OLS DW:	2.924	2.924	2.924	2.924	2.924	2.924
Dates	2005-04-01	2014-10-01	39			
BUSAPPSALA_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Louisiana
Constant	0.0017	0.0045	0.0007	0.0001	42.993	Constant
BF8QSALA_LogDiff	0.175	0.081	0.149	0.0009	88.362	Business Formations within 8 Quarters for Louisiana
LAWADM_LogDiff	0.405	0.114	0.452	0.0014	82.679	Administrative and Waste

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
						Services Wages and Salaries in Louisiana
HPBUSAPPSALA_LogDiff	0.399	0.081	0.391	0.001	84.899	High-Propensity Business Applications for Louisiana
OLS RSquare:	0.85	0.85	0.85	0.85	0.85	0.85
OLS DW:	2.232	2.232	2.232	2.232	2.232	2.232
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAME_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Maine
Constant	-0.0026	0.0057	-0.0033	0.0001	47.57	Constant
MEWADM_LogDiff	0.466	0.236	0.475	0.0019	125.17	Administrative and Waste Services Wages and Salaries in Maine
HPBUSAPPSAME_LogDiff	0.614	0.072	0.634	0.0006	110.486	High-Propensity Business Applications for Maine
MEEPLA_LogDiff	-0.477	0.564	-0.354	0.0048	116.959	Earnings by Place of Work in Maine
OLS RSquare:	0.682	0.682	0.682	0.682	0.682	0.682
OLS DW:	2.614	2.614	2.614	2.614	2.614	2.614
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAMD_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Maryland
Constant	0.0004	0.0049	0.0015	0.0001	43.492	Constant
MDWADM_LogDiff	0.428	0.3	0.406	0.003	99.327	Administrative and Waste Services Wages and Salaries in Maryland
HPBUSAPPSAMD_LogDiff	0.454	0.091	0.477	0.0009	100.725	High-Propensity Business Applications for Maryland
MDRETAILNQGSP_LogDiff	0.268	0.384	0.061	0.0038	101.882	Gross Domestic Product by Industry: Private Industries: Retail Trade for Maryland
OLS RSquare:	0.577	0.577	0.577	0.577	0.577	0.577
OLS DW:	2.401	2.401	2.401	2.401	2.401	2.401
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAMA_LogDiff	OLS Beta	OLS Std	SUR Beta	SUR Std	Efficiency Gain	Business Applications for Massachusetts

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
		Error		Error		
Constant	-0.0014	0.005	-0.0009	0.0001	52.495	Constant
MAOTOT_LogDiff	0.584	0.465	0.319	0.0041	113.425	Total Personal Income in Massachusetts
HPBUSAPPSAMA_LogDiff	0.606	0.107	0.62	0.0007	143.284	High-Propensity Business Applications for Massachusetts
MAEPLA_LogDiff	-0.092	0.53	0.161	0.0036	145.295	Earnings by Place of Work in Massachusetts
OLS RSquare:	0.572	0.572	0.572	0.572	0.572	0.572
OLS DW:	2.431	2.431	2.431	2.431	2.431	2.431
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAMI_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Michigan
Constant	-0	0.0046	0.0014	0.0001	44.572	Constant
MIOTOT_LogDiff	0.627	0.303	0.414	0.0031	98.165	Total Personal Income in Michigan
SBF8QSAMI_LogDiff	0.448	0.094	0.5	0.0008	116.738	Spliced Business Formations within 8 Quarters for Michigan
MIEADJ_LogDiff	0.23	0.161	0.288	0.0014	116.915	Residence Adjustment in Michigan
OLS RSquare:	0.526	0.526	0.526	0.526	0.526	0.526
OLS DW:	2.574	2.574	2.574	2.574	2.574	2.574
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAMN_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Minnesota
Constant	0.011	0.0044	0.011	0.0001	40.747	Constant
HPBUSAPPSAMN_LogDiff	0.751	0.119	0.734	0.001	114.765	High-Propensity Business Applications for Minnesota
SBF8QSAMN_LogDiff	0.325	0.104	0.331	0.0009	120.181	Spliced Business Formations within 8 Quarters for Minnesota
MNUR_Quarterly_LogDiff	0.198	0.079	0.206	0.0007	112.57	Unemployment Rate in Minnesota
OLS RSquare:	0.813	0.813	0.813	0.813	0.813	0.813
OLS DW:	2.528	2.528	2.528	2.528	2.528	2.528
Dates	2005-04-01	2014-10-01	39			

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
OLS DW:	2.895	2.895	2.895	2.895	2.895	2.895
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANV_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Nevada
Constant	0.0044	0.0052	0.0038	0.0001	42.999	Constant
BF8QSANV_LogDiff	0.098	0.104	0.024	0.001	104.043	Business Formations within 8 Quarters for Nevada
NVWADM_LogDiff	0.291	0.208	0.345	0.0022	92.729	Administrative and Waste Services Wages and Salaries in Nevada
HPBUSAPPSANV_LogDiff	0.453	0.124	0.498	0.0013	98.563	High-Propensity Business Applications for Nevada
OLS RSquare:	0.449	0.449	0.449	0.449	0.449	0.449
OLS DW:	1.851	1.851	1.851	1.851	1.851	1.851
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANH_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for New Hampshire
Constant	0.003	0.0041	0.0026	0.0001	40.753	Constant
NHTRANSWARERQGSP_LogDiff	0.279	0.152	0.309	0.0013	113.971	Real Gross Domestic Product by Industry: Private Industries: Transportation and Warehousing for New Hampshire
HPBUSAPPSANH_LogDiff	0.314	0.083	0.317	0.0007	113.797	High-Propensity Business Applications for New Hampshire
SBF8QSANH_LogDiff	0.269	0.065	0.234	0.0005	122.365	Spliced Business Formations within 8 Quarters for New Hampshire
OLS RSquare:	0.649	0.649	0.649	0.649	0.649	0.649
OLS DW:	2.314	2.314	2.314	2.314	2.314	2.314
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANJ_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for New Jersey
Constant	-0.0015	0.0036	0	0.0001	47.694	Constant
NJOTOT_LogDiff	0.351	0.238	0.242	0.0028	84.966	Total Personal Income in New Jersey

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
HPBUSAPPSANJ_LogDiff	0.364	0.071	0.398	0.0007	100.232	High-Propensity Business Applications for New Jersey
NJRETAILNQGSP_LogDiff	0.872	0.225	0.759	0.0021	106.721	Gross Domestic Product by Industry: Private Industries: Retail Trade for New Jersey
OLS RSquare:	0.65	0.65	0.65	0.65	0.65	0.65
OLS DW:	2.527	2.527	2.527	2.527	2.527	2.527
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANM_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for New Mexico
Constant	0.003	0.0055	0.0036	0.0001	43.328	Constant
NMWFIN_LogDiff	0.274	0.243	0.184	0.0019	125.996	Finance and Insurance Wages and Salaries in New Mexico
NMTRANSWARERQGSP_LogDiff	0.476	0.21	0.566	0.002	107.406	Real Gross Domestic Product by Industry: Private Industries: Transportation and Warehousing for New Mexico
HPBUSAPPSANM_LogDiff	0.637	0.081	0.629	0.0007	112.17	High-Propensity Business Applications for New Mexico
OLS RSquare:	0.7	0.7	0.7	0.7	0.7	0.7
OLS DW:	2.208	2.208	2.208	2.208	2.208	2.208
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANY_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for New York
Constant	0.0044	0.0022	0.0045	0	46.129	Constant
NYTOT_LogDiff	0.274	0.115	0.226	0.0012	99.794	Total Personal Income in New York
HPBUSAPPSANY_LogDiff	0.53	0.119	0.563	0.0011	111.855	High-Propensity Business Applications for New York
SBF8QSANY_LogDiff	0.447	0.118	0.393	0.001	117.537	Spliced Business Formations within 8 Quarters for New York
OLS RSquare:	0.869	0.869	0.869	0.869	0.869	0.869
OLS DW:	2.32	2.32	2.32	2.32	2.32	2.32
Dates	2005-04-01	2014-10-01	39			
BUSAPPSANC_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for North Carolina

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
OLS DW:	2.795	2.795	2.795	2.795	2.795	2.795
Dates	2005-04-01	2014-10-01	39			
BUSAPPSATX_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Texas
Constant	0.0023	0.0047	0.0008	0.0001	56.968	Constant
TXOTOT_LogDiff	0.688	0.207	0.616	0.0021	96.581	Total Personal Income in Texas
SBF8QSATX_LogDiff	0.711	0.084	0.694	0.0008	108.958	Spliced Business Formations within 8 Quarters for Texas
TXWACC_LogDiff	-0.119	0.294	0.057	0.0024	121.152	Accommodation and Food Services Wages and Salaries in Texas
OLS RSquare:	0.754	0.754	0.754	0.754	0.754	0.754
OLS DW:	2.149	2.149	2.149	2.149	2.149	2.149
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAUT_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Utah
Constant	0.0008	0.0072	0.0006	0.0001	51.535	Constant
UTOTOT_LogDiff	0.439	0.365	0.377	0.0035	104.766	Total Personal Income in Utah
UTWFIN_LogDiff	0.39	0.222	0.468	0.0014	155.776	Finance and Insurance Wages and Salaries in Utah
HPBUSAPPSAUT_LogDiff	0.407	0.09	0.407	0.0007	129.183	High-Propensity Business Applications for Utah
OLS RSquare:	0.605	0.605	0.605	0.605	0.605	0.605
OLS DW:	2.556	2.556	2.556	2.556	2.556	2.556
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAVT_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Vermont
Constant	0.0005	0.0066	-0.0006	0.0001	49.24	Constant
VTOTOT_LogDiff	0.034	0.472	0.204	0.0051	92.128	Total Personal Income in Vermont
VTWFIN_LogDiff	0.289	0.131	0.243	0.001	125.559	Finance and Insurance Wages and Salaries in Vermont
HPBUSAPPSAVT_LogDiff	0.443	0.085	0.474	0.0007	129.467	High-Propensity Business Applications for Vermont

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
OLS RSquare:	0.516	0.516	0.516	0.516	0.516	0.516
OLS DW:	2.435	2.435	2.435	2.435	2.435	2.435
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAWA_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Washington
Constant	0.0069	0.0032	0.007	0.0001	42.26	Constant
WATRANSWARERQGSP_LogDiff	0.254	0.165	0.127	0.0017	95.577	Real Gross Domestic Product by Industry: Private Industries: Transportation and Warehousing for Washington
HPBUSAPPSAWA_LogDiff	0.554	0.095	0.559	0.0009	102.49	High-Propensity Business Applications for Washington
SBF8QSAWA_LogDiff	0.283	0.101	0.242	0.0009	105.926	Spliced Business Formations within 8 Quarters for Washington
OLS RSquare:	0.827	0.827	0.827	0.827	0.827	0.827
OLS DW:	2.068	2.068	2.068	2.068	2.068	2.068
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAWV_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for West Virginia
Constant	0.0044	0.0064	0.0039	0.0002	40.487	Constant
WVIBTEIOA_LogDiff	-0.019	0.011	-0.0098	0.0001	103.559	Income (Loss) before Income Taxes and Extraordinary Items and Other Adjustments for Commercial Banks in West Virginia
WVTRANSWARERQGSP_LogDiff	0.508	0.362	0.264	0.0035	103.628	Real Gross Domestic Product by Industry: Private Industries: Transportation and Warehousing for West Virginia
HPBUSAPPSAWV_LogDiff	0.576	0.116	0.566	0.0012	96.283	High-Propensity Business Applications for West Virginia
OLS RSquare:	0.416	0.416	0.416	0.416	0.416	0.416
OLS DW:	2.458	2.458	2.458	2.458	2.458	2.458
Dates	2005-04-01	2014-10-01	39			
BUSAPPSAWI_LogDiff	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Business Applications for Wisconsin

	OLS Beta	OLS Std Error	SUR Beta	SUR Std Error	Efficiency Gain	Long Name
Constant	-0.0002	0.0055	0.0023	0.0001	49.198	Constant
WIOTOT_LogDiff	0.46	0.415	0.153	0.0041	101.297	Total Personal Income in Wisconsin
HPBUSAPPSAWI_LogDiff	0.451	0.098	0.505	0.0009	111.841	High-Propensity Business Applications for Wisconsin
WIWOTH_LogDiff	-0.249	0.443	-0.157	0.0038	115.411	Other Services (Except Public Administration) Wages and Salaries in Wisconsin
OLS RSquare:	0.484	0.484	0.484	0.484	0.484	0.484
OLS DW:	2.882	2.882	2.882	2.882	2.882	2.882
Dates	2005-04-01	2014-10-01	39			