

Online Appendix for “Measuring Labor Supply and Demand Shocks during COVID-19”

Pedro Brinca*

Joao B. Duarte[†]

Miguel Faria-e-Castro[‡]

June 2021

Contents

B Tables **1**

C Additional Figures **9**

A Additional Tables

Table A.1: Descriptive statistics of hours and real wage growth rates by BLS 2-digit sector

		March	April	Mean	SD	Min	Max
Construction	hours	−0.94	−17.10	−0.08	1.78	−17.10	2.84
	wages	0.50	0.90	0.07	0.42	−1.24	2.39
Education and Health Services	hours	−1.02	−12.19	0.11	0.99	−12.19	0.91
	wages	0.65	2.01	0.06	0.39	−0.91	2.48
Financial Activities	hours	−0.03	−3.01	0.03	0.44	−3.01	1.06
	wages	0.28	2.49	0.12	0.44	−1.49	2.49
Information	hours	0.14	−8.93	−0.09	0.90	−8.93	2.17
	wages	1.02	1.95	0.15	0.57	−1.33	1.95
Leisure and Hospitality	hours	−9.41	−63.03	−0.29	4.94	−63.03	1.92
	wages	0.61	7.22	0.12	0.66	−1.17	7.22
Manufacturing	hours	−1.00	−16.29	−0.15	1.38	−16.29	1.06

*Nova School of Business and Economics. Email: pedro.brinca@novasbe.pt.

[†]Nova School of Business and Economics. Email: joao.duarte@novasbe.pt.

[‡]Federal Reserve Bank of St. Louis. Email: miguel.fariaecastro@stls.frb.org.

Table A.1: Descriptive statistics of hours and real wage growth rates by BLS 2-digit sector

		March	April	Mean	SD	Min	Max
	wages	0.73	3.58	0.05	0.51	-0.99	3.58
Mining and Logging	hours	-1.87	-12.09	-0.01	1.82	-12.09	3.96
	wages	0.45	1.55	0.11	1.07	-5.73	5.56
Other Services	hours	-2.53	-21.65	-0.09	1.72	-21.65	1.32
	wages	0.71	7.26	0.12	0.66	-0.87	7.26
Professional and Business Services	hours	-0.37	-11.46	0.07	1.01	-11.46	1.55
	wages	0.60	4.32	0.10	0.52	-0.82	4.32
Retail Trade	hours	-0.61	-14.48	-0.09	1.26	-14.48	1.38
	wages	1.02	5.08	0.05	0.61	-1.28	5.08
Total Private	hours	-1.54	-16.17	-0.03	1.30	-16.17	0.79
	wages	0.90	5.43	0.09	0.54	-0.80	5.43
Transportation and Warehousing	hours	-0.65	-12.73	0.07	1.13	-12.73	1.34
	wages	0.51	3.91	0.04	0.49	-1.58	3.91
Utilities	hours	-0.65	0.10	0.02	1.01	-3.95	4.95
	wages	0.61	2.39	0.09	0.89	-2.90	2.86
Wholesale Trade	hours	-0.05	-9.45	-0.03	0.83	-9.45	0.86
	wages	0.41	2.56	0.06	0.55	-1.30	2.81

Table A.2: Quantiles for the posterior distributions of labor demand and supply elasticities

Sector	β^l (demand)			α^l (supply)		
	p5	p50	p95	p5	p50	p95
Mining and Logging	-3.4985	-1.4533	-0.57036	0.51094	1.3784	3.331
Utilities	-2.7957	-1.0508	-0.2748	0.72259	1.3686	2.6255
Construction	-14.443	-4.4111	-0.70444	0.45431	2.3951	16.097
Manufacturing	-3.813	-1.4151	-0.45704	0.8067	1.8056	3.8972
Wholesale Trade	-1.9119	-0.74404	-0.21297	0.25625	0.73813	1.7147
Retail Trade	-4.6419	-2.4711	-1.2466	0.32368	1.2577	3.7929
Transportation and Warehousing	-2.2208	-1.2205	-0.67791	0.2437	0.95951	2.4964
Information	-2.0643	-0.90012	-0.34388	0.32847	0.92223	2.1588
Financial Activities	-2.1287	-1.0533	-0.49371	0.26154	0.93418	2.3441
Professional and Business Services	-2.9516	-1.4611	-0.72686	0.34512	1.1377	2.9259
Education and Health Services	-2.2529	-1.0778	-0.47521	0.3506	1.0614	2.5915
Leisure and Hospitality	-4.4276	-1.9899	-0.84574	0.45443	1.4753	4.1884
Other Services	-2.9106	-1.4046	-0.63227	0.42351	1.193	2.8501
Total Private	-2.6593	-1.1375	-0.40432	0.53653	1.2244	2.6541

Table A.3: Median and 95% credible interval of the effects of demand and supply shocks on the growth rate of hours, March 2020

Sector	Demand			Supply			Difference 68% Credible Interval
	50p	2.5p	97.5p	50p	2.5p	97.5p	
Total Private	-0.57	-1.33	-0.03	-1.43	-1.99	-0.67	[-1.557, -0.068]
Mining and Logging	-0.59	-1.53	0.00	-1.41	-2.28	-0.50	[-1.605, 0.079]
Construction	-0.00	-0.70	0.27	-1.36	-1.79	-0.68	[-1.702, -0.816]
Manufacturing	-0.12	-0.69	0.20	-0.93	-1.38	-0.35	[-1.223, -0.258]
Wholesale Trade	0.03	-0.17	0.14	-0.24	-0.42	-0.05	[-0.410, -0.095]
Retail Trade	0.02	-0.37	0.28	-0.88	-1.16	-0.50	[-1.194, -0.525]
Transportation and Warehousing	-0.39	-0.89	-0.01	-0.70	-1.12	-0.22	[-0.753, 0.185]
Utilities	-0.34	-0.87	0.05	-0.65	-1.04	-0.12	[-0.762, 0.230]
Information	0.18	-0.00	0.32	-0.36	-0.51	-0.18	[-0.673, -0.377]
Financial Activities	-0.10	-0.23	0.03	-0.16	-0.29	-0.04	[-0.185, 0.059]
Professional and Business Services	-0.17	-0.52	0.01	-0.66	-0.92	-0.31	[-0.744, -0.162]
Education and Health Services	-0.60	-1.30	-0.03	-0.92	-1.50	-0.23	[-1.107, 0.535]
Leisure and Hospitality	-4.76	-8.94	-0.93	-6.70	-10.54	-2.53	[-6.275, 2.823]
Other Services	-1.18	-2.33	-0.19	-2.00	-3.00	-0.85	[-1.984, 0.431]

Table A.4: Median and 95% credible interval of the effects of demand and supply shocks on the growth rate of hours, April 2020

Sector	Demand			Supply			Difference 68% Credible Interval
	50p	2.5p	97.5p	50p	2.5p	97.5p	
Total Private	-5.06	-11.28	-0.31	-11.18	-15.94	-4.97	[-12.204, 0.5492]
Mining and Logging	-4.78	-9.50	-0.84	-7.34	-11.32	-2.62	[-8.076, 2.293]
Construction	-3.65	-12.78	-0.32	-13.47	-16.82	-4.33	[-14.443, -0.375]
Manufacturing	-6.36	-12.93	-1.14	-9.89	-15.13	-3.32	[-10.365, 3.447]
Wholesale Trade	-3.82	-8.23	-0.37	-5.66	-9.10	-1.25	[-6.556, 3.101]
Retail Trade	-3.65	-9.25	-0.04	-10.82	-14.43	-5.23	[-12.276, -0.285]
Transport. & Warehousing	-3.61	-9.06	-0.01	-9.26	-12.85	-3.81	[-9.090, 0.655]
Utilities	1.17	0.41	1.49	-1.08	-1.40	-0.32	[-2.467, -1.416]
Information	-3.51	-6.95	-0.63	-5.39	-8.26	-1.95	[-5.545, 1.967]
Financial Activities	-0.34	-2.00	0.52	-2.72	-3.59	-1.05	[-3.241, -0.610]
Prof. and Business Services	-3.29	-8.05	-0.15	-8.31	-11.44	-3.53	[-9.086, -0.780]
Education and Health	-5.47	-10.77	-0.63	-6.92	-11.76	-1.62	[-8.005, 5.076]
Leisure and Hospitality	-23.26	-46.70	-3.63	-39.92	-59.55	-16.47	[-38.955, 9.722]
Other Services	-6.32	-14.23	-0.48	-15.39	-21.24	-7.47	[-16.701, -0.876]

Table A.5: Median and 95% credible interval of the effects of demand and supply shocks on the growth rate of hours, May 2020

Sector	Demand			Supply			Difference 68% Credible Interval
	50p	2.5p	97.5p	50p	2.5p	97.5p	
Total Private	1.68	-0.38	4.37	2.50	-0.19	4.57	[-1.999, 3.353]
Mining and Logging	0.57	-1.28	2.00	-3.71	-5.24	-1.86	[-5.764, -2.548]
Construction	2.71	0.04	8.33	6.68	1.07	9.38	[-2.033, 7.448]
Manufacturing	2.40	-0.61	5.67	1.65	-1.63	4.67	[-4.330, 2.678]
Wholesale Trade	0.72	-0.45	2.07	0.44	-0.91	1.62	[-1.741, 1.077]
Retail Trade	1.56	-0.38	4.40	3.76	0.93	5.70	[-0.715, 4.615]
Transport. & Warehousing	0.12	-1.13	1.53	0.97	-0.44	2.21	[-0.517, 2.079]
Utilities	-0.92	-1.30	-0.55	0.01	-0.36	0.38	[0.570, 1.230]
Information	-0.66	-1.76	0.31	-0.50	-1.46	0.59	[-0.864, 1.271]
Financial Activities	0.85	0.24	1.38	-0.26	-0.79	0.36	[-1.657, -0.523]
Prof. and Business Services	0.72	-0.66	2.58	1.19	-0.67	2.59	[-1.433, 2.115]
Education and Health Services	1.59	-0.03	3.30	1.06	-0.66	2.68	[-2.490, 1.461]
Leisure and Hospitality	4.97	-2.50	14.92	14.38	4.43	21.85	[-0.933, 18.138]
Other Services	2.12	-0.46	5.82	4.82	1.13	7.40	[-1.080, 5.908]

Table A.6: Median and 95% credible interval of the effects of demand and supply shocks on the growth rate of hours using production and nonsupervisory employees only, March 2020

Sector	Demand			Supply		
	Median	2.5p	97.5p	Median	2.5p	97.5p
Total Private	-0.43	-1.17	0.02	-1.48	-1.94	-0.74
Mining and Logging	-0.37	-1.16	0.19	-1.33	-1.96	-0.57
Construction	0.64	0.13	0.96	-1.18	-1.51	-0.66
Manufacturing	-0.04	-0.53	0.19	-0.98	-1.25	-0.49
Wholesale Trade	-0.03	-0.30	0.11	-0.65	-0.81	-0.39
Retail Trade	0.24	-0.13	0.41	-0.64	-0.81	-0.27
Transportation and Warehousing	-0.92	-1.41	-0.31	-0.49	-1.11	-0.01
Utilities	-0.19	-0.67	0.14	-0.67	-1.01	-0.19
Information	0.31	0.13	0.41	-0.40	-0.51	-0.23
Financial Activities	-0.18	-0.54	0.03	-0.53	-0.75	-0.18
Professional and Business Services	-0.20	-0.63	0.03	-1.02	-1.27	-0.59
Education and Health Services	-0.40	-0.93	0.03	-0.81	-1.24	-0.28
Leisure and Hospitality	-6.44	-10.69	-2.04	-5.06	-9.47	-0.82
Other Services	-0.90	-2.25	-0.04	-1.97	-2.82	-0.61

Notes: The data sample for production and nonsupervisory employees we use to estimate our SVAR starts in 1984. Production and nonsupervisory employees CES series code for real wages is 32 and for aggregate weekly hours is 81.

Table A.7: Median and 95% credible interval of the effects of demand and supply shocks on the growth rate of hours using production and nonsupervisory employees only, April 2020

Sector	Demand			Supply		
	Median	2.5p	97.5p	Median	2.5p	97.5p
Total Private	-5.98	-12.99	-0.50	-12.62	-18.09	-5.61
Mining and Logging	-5.43	-11.91	-0.85	-9.68	-14.26	-3.18
Construction	-6.93	-19.39	-0.67	-13.20	-19.46	-0.75
Manufacturing	-8.42	-16.14	-2.19	-11.23	-17.45	-3.52
Wholesale Trade	-4.07	-8.16	-0.33	-6.90	-10.63	-2.81
Retail Trade	-4.91	-12.75	-0.52	-10.18	-14.57	-2.34
Transportation and Warehousing	-3.52	-9.54	0.21	-10.92	-14.65	-4.91
Utilities	0.16	-0.87	0.70	-1.46	-2.00	-0.43
Information	-1.85	-6.01	0.80	-7.31	-9.96	-3.16
Financial Activities	-2.14	-5.03	-0.20	-3.91	-5.85	-1.02
Professional and Business Services	-3.05	-7.91	0.01	-10.27	-13.32	-5.41
Education and Health Services	-5.54	-10.75	-0.60	-7.75	-12.69	-2.54
Leisure and Hospitality	-30.65	-58.66	-7.44	-41.02	-64.23	-13.03
Other Services	-8.69	-20.02	-0.95	-16.03	-23.77	-4.69

Notes: The data sample for production and nonsupervisory employees we use to estimate our SVAR starts in 1984. Production and nonsupervisory employees CES series code for real wages is 32 and for aggregate weekly hours is 81.

B Additional Figures

Figure B.1: Prior and posterior distribution of labor demand and supply elasticities by sector

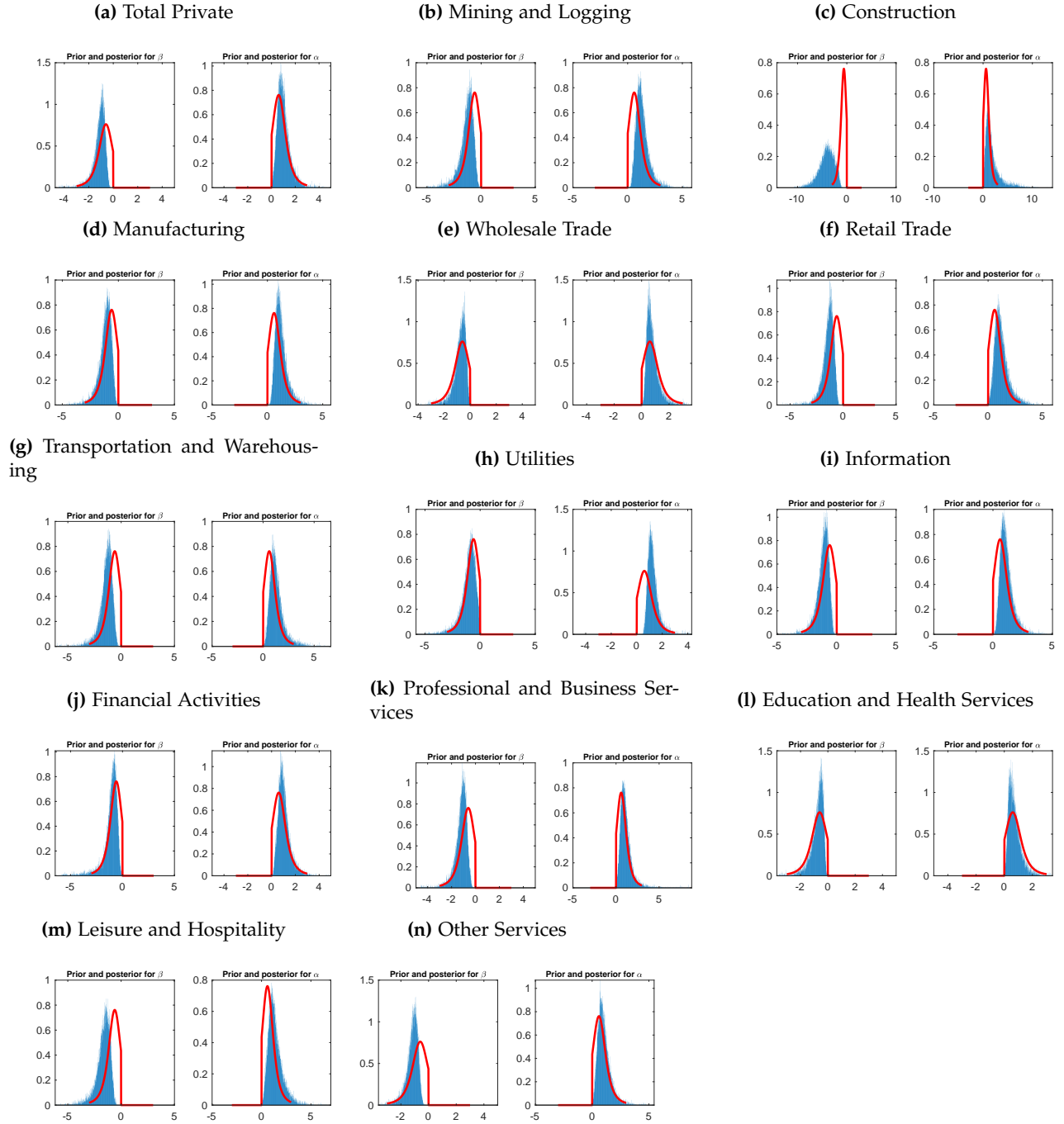


Figure B.2: Impulse response functions by sector with 95% credible bands

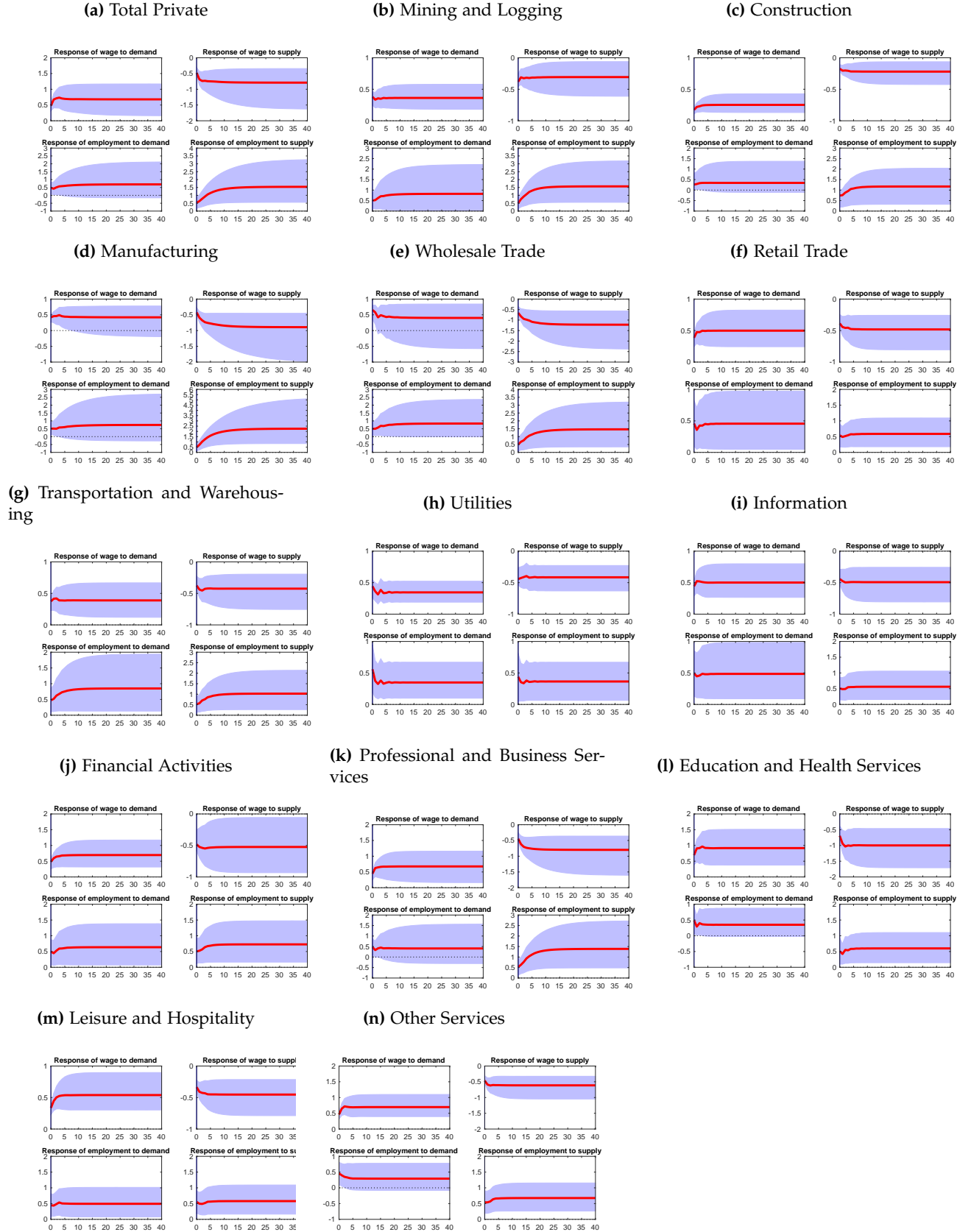


Figure B.3: Historical decomposition of the growth rate of hours by sector, excluding March, April and May 2020

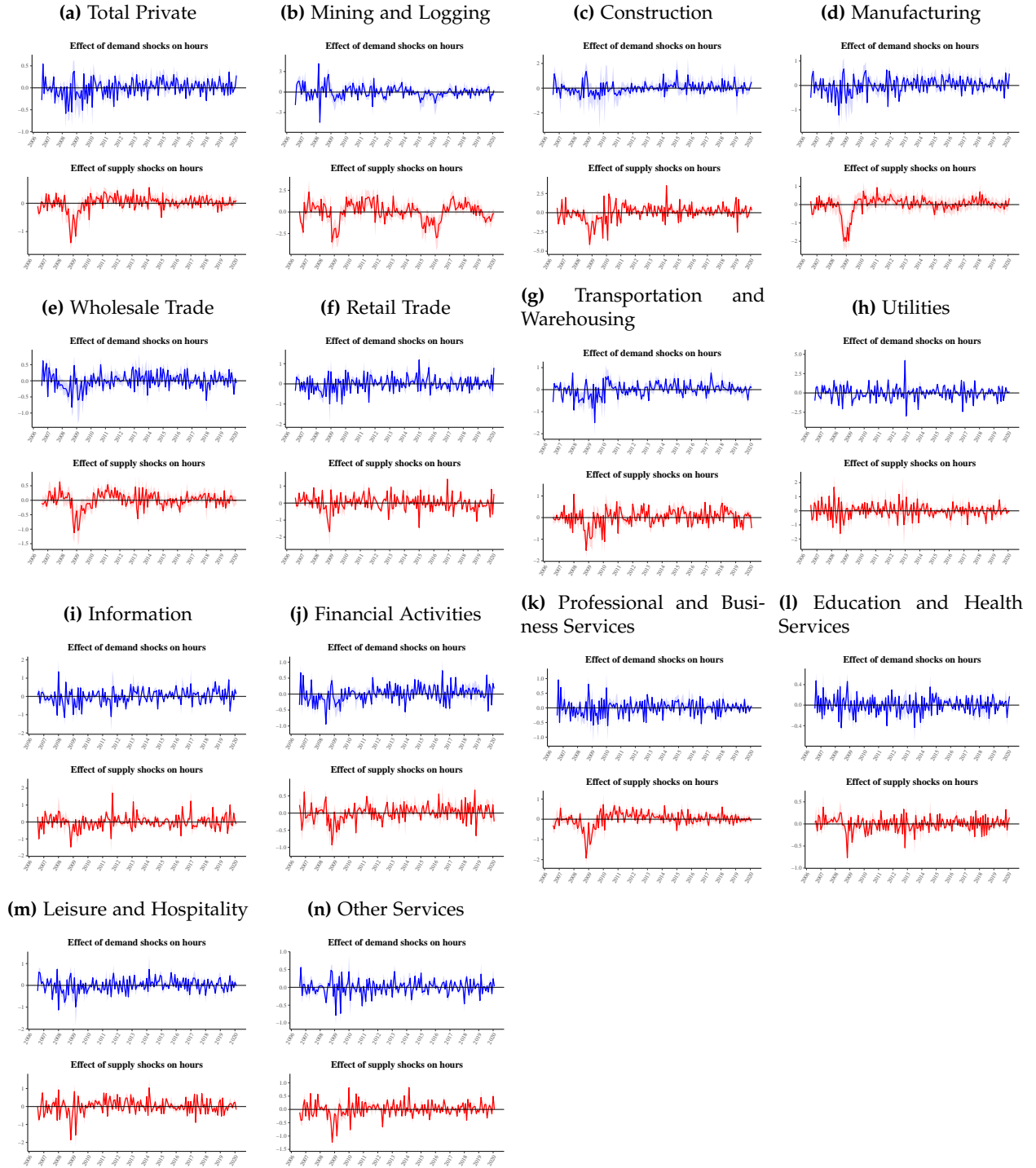


Figure B.4: Historical decomposition of the growth rate of hours by sector, full sample

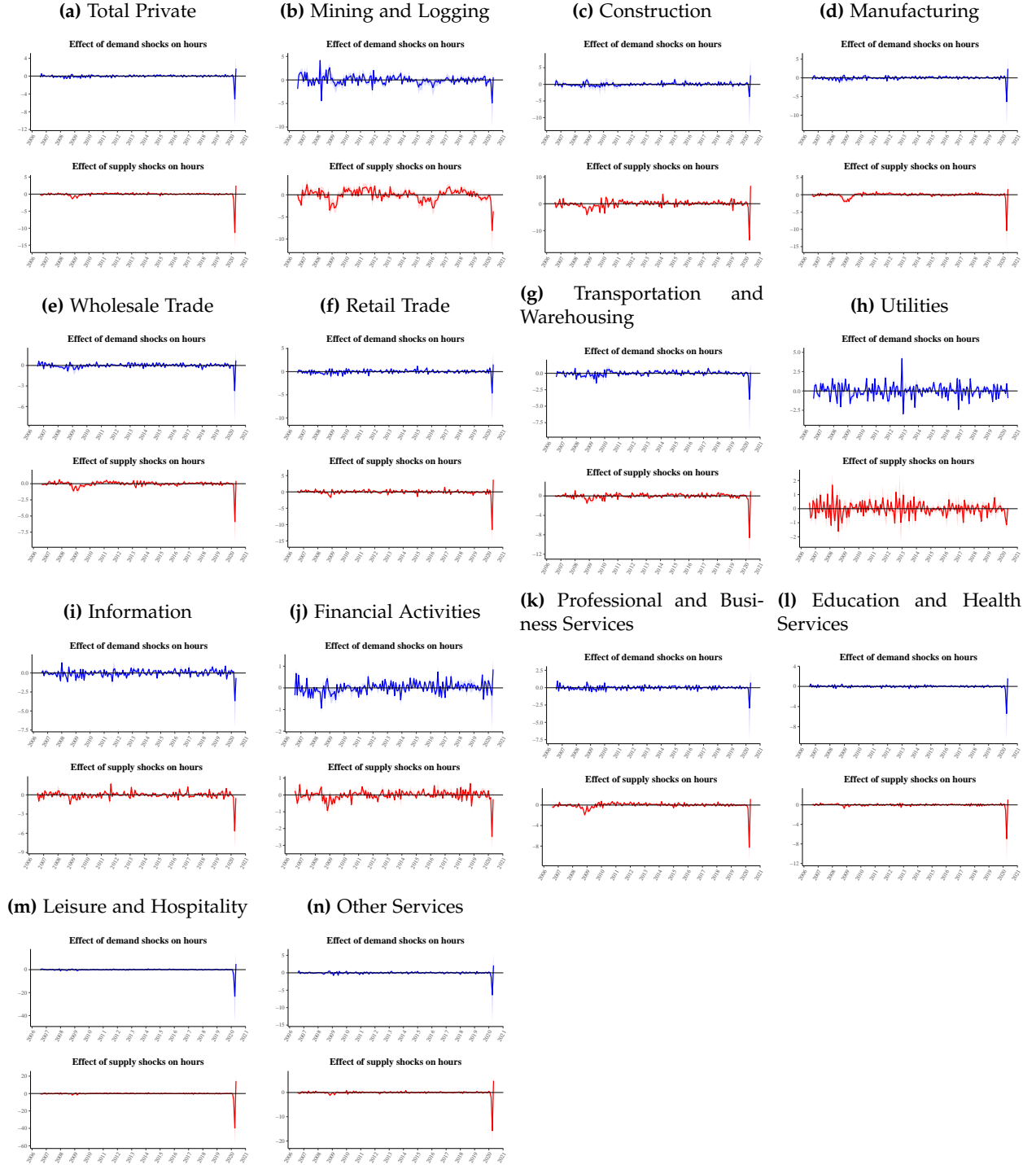


Figure B.5: Historical decomposition of the growth rate of hours across sectors, March 2019

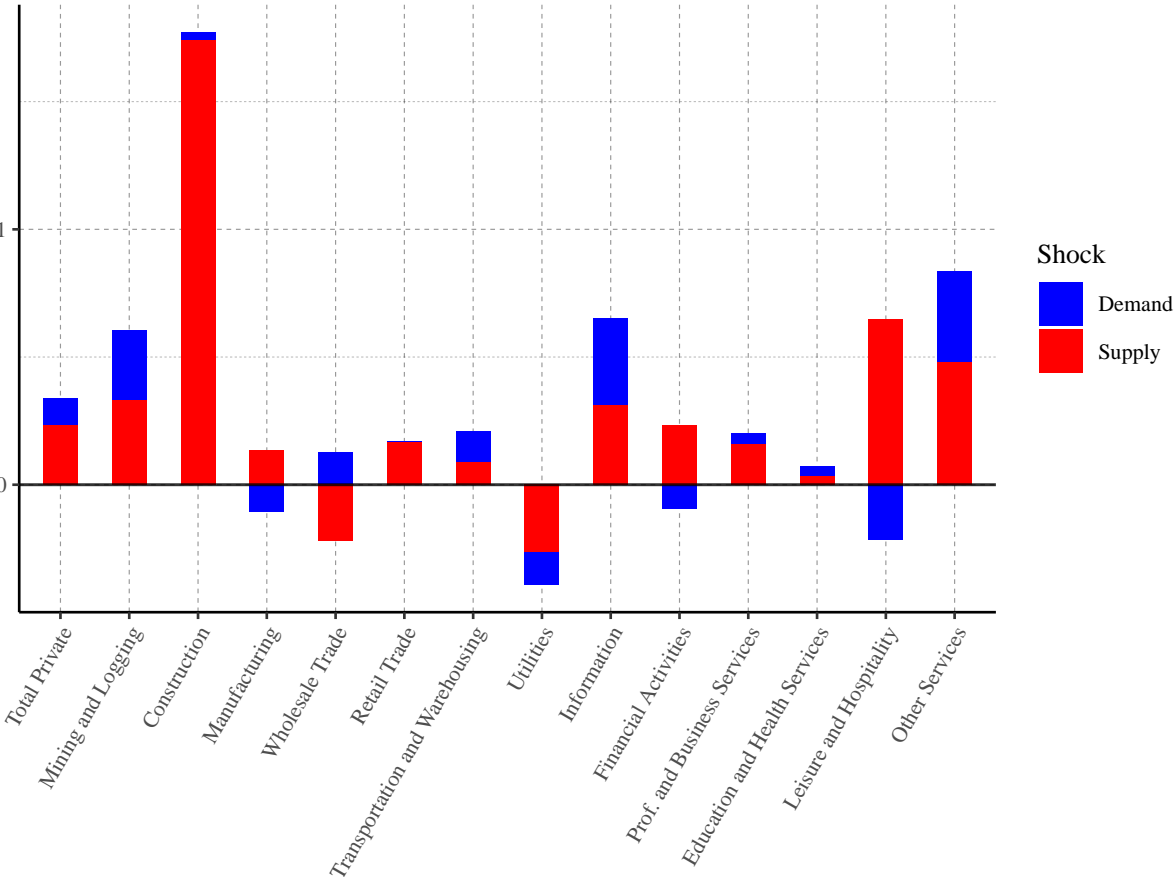
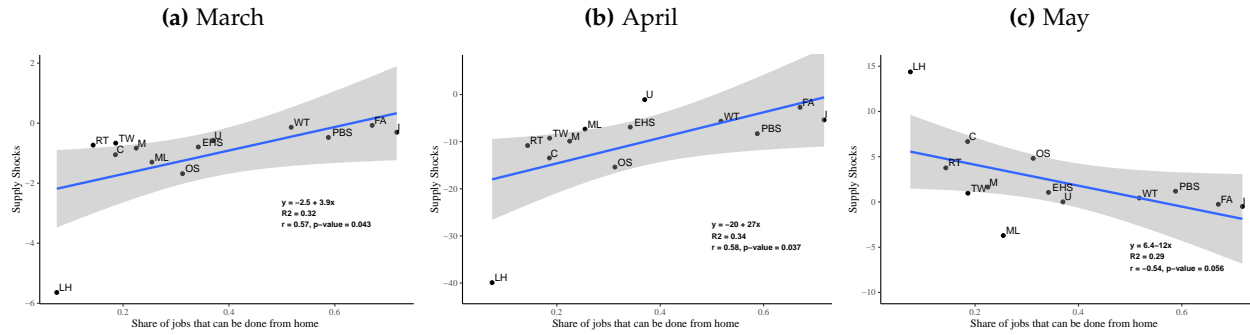
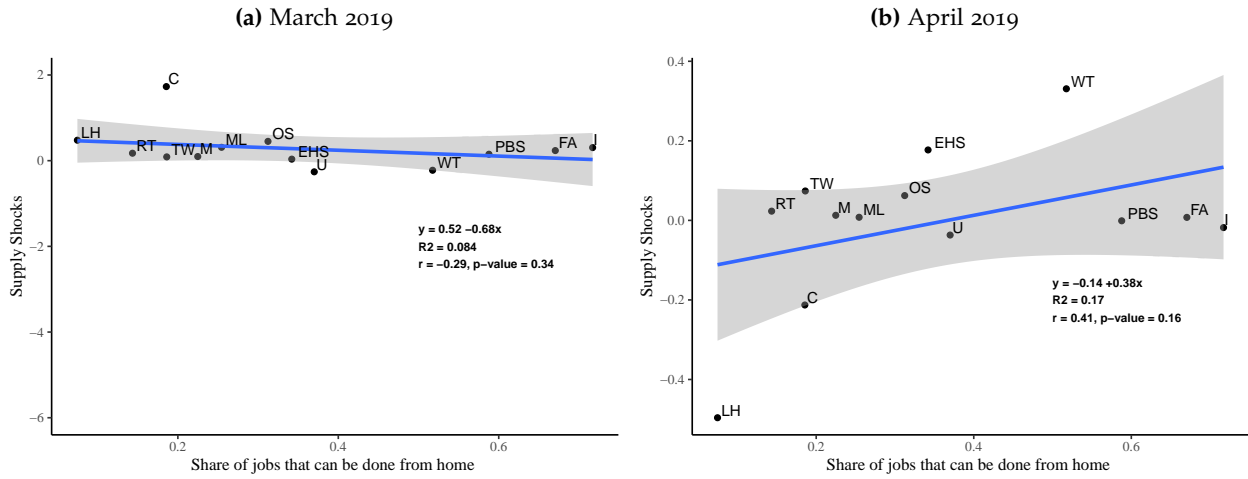


Figure B.6: Correlation between sectoral supply shocks the sectoral share of jobs that can be done at home



ML: Mining and logging; C: Construction; M: Manufacturing; WT: Wholesale trade; RT: Retail trade; TW: Transportation and warehousing; U: Utilities; I: Information; FA: Financial activities; PBS: Professional and business services; EHS: Education and health services; LH: Leisure and hospitality; OS: Other services. Grey bands represent 95% confidence intervals.

Figure B.7: Supply Shocks in 2019 vs. Share of jobs that can be done from home



ML: Mining and logging; **C:** Construction; **M:** Manufacturing; **WT:** Wholesale trade; **RT:** Retail trade; **TW:** Transportation and warehousing; **U:** Utilities; **I:** Information; **FA:** Financial activities; **PBS:** Professional and business services; **EHS:** Education and health services; **LH:** Leisure and hospitality; **OS:** Other services. Grey bands represent 95% confidence intervals.