

Measuring Labor Demand and Supply Shocks during COVID-19

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COVID-19 fall in hours: Labor supply or demand?

Reduction in hours worked in a given **sector** due to:

1. **Supply** ← Household behavior

- Increase in health risk
- Policy
 - Containment and mitigation measures (lockdowns)
 - CARES act

2. **Demand** ← Firm behavior

- Demand shortages (GLSW 2020; Baqaee and Farhi 2020)
 - Increase in Health risk
 - Complementarities across sectors (input-output — preferences)
 - Aggregate demand
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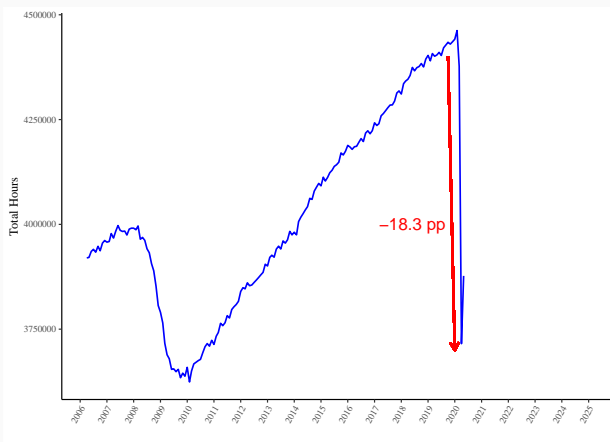
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This paper

1. How much of the drop in hours worked is explained by shifts in labor supply and demand?
2. How does that vary across sectors?



Approach:

Measure monthly **labor** demand and supply shocks w/ econometric model

- Using monthly hours and real wage per hour (CES from BLS)
- Estimate Bayesian SVAR ($\Delta h_t, \Delta w_t$) with informative prior (Baumeister & Hamilton, 2015, 2018, 2019)
 - Accounts for estimation uncertainty + uncertainty about the underlying structure of the economy
 - Prior beliefs are explicitly acknowledged: labor supply & demand elasticity estimates from literature

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Approach:

- Identification of relative size of demand and supply shocks driven by:

▶ intuition

- Changes in hours and wages per hour
 - Ratio of labor demand and supply elasticities (prior: ratio= 1)
- Analysis by
 1. Sector (NAICS-2 and -3 ▶ NAICS 3 results)
 2. Occupational category (production vs. non-production)

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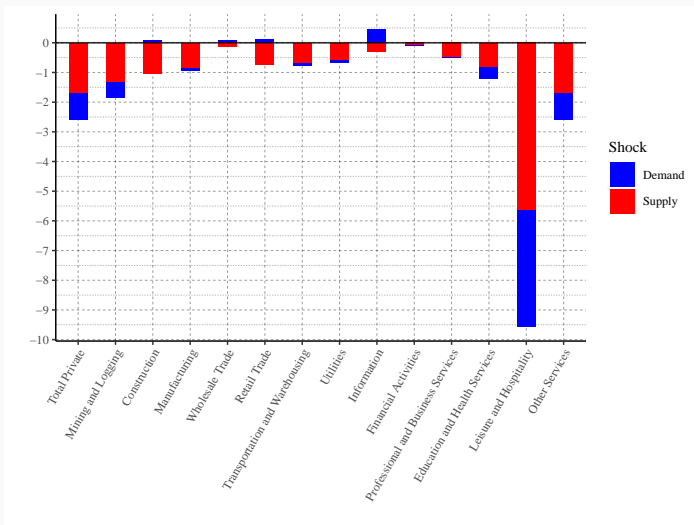
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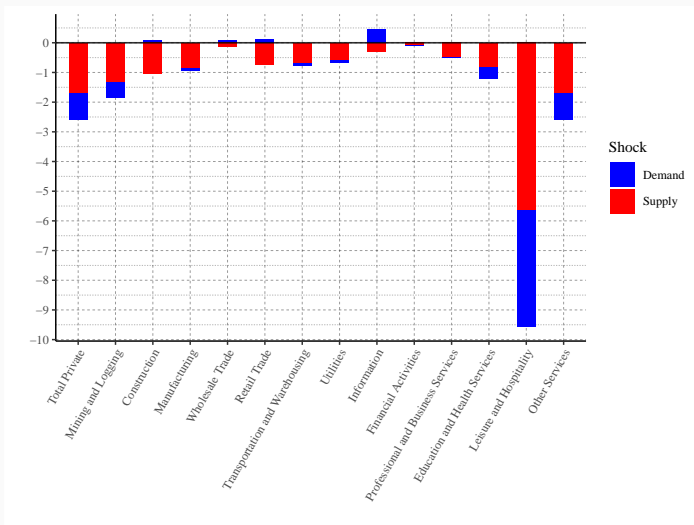
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Shock decomposition, March 2020



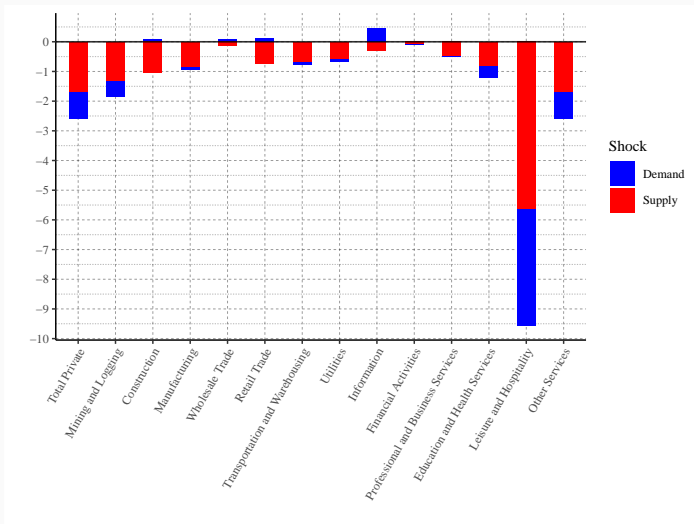
- Total private: -2.59 pp, supply accounts for 64.8%

Shock decomposition, March 2020



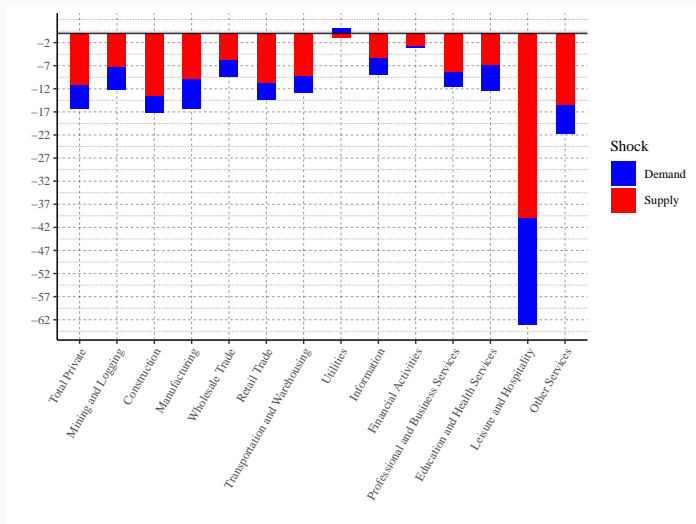
- Leisure and Hosp. most negatively affected sector (59% supply)

Shock decomposition, March 2020



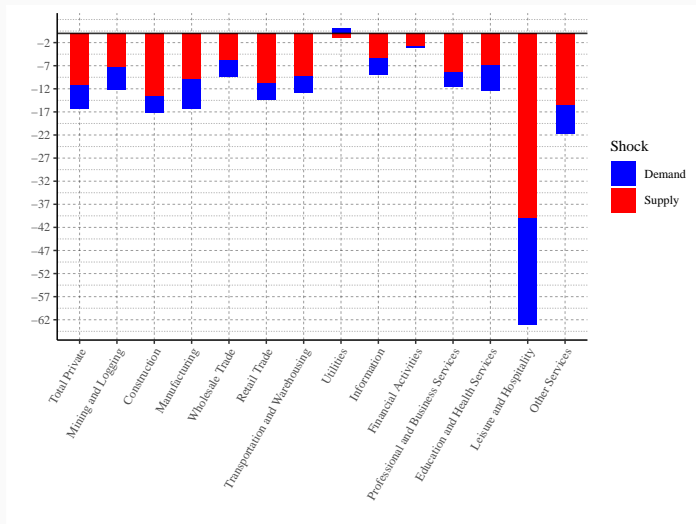
- Positive demand shocks: Information and Retail Trade

Shock decomposition, April 2020



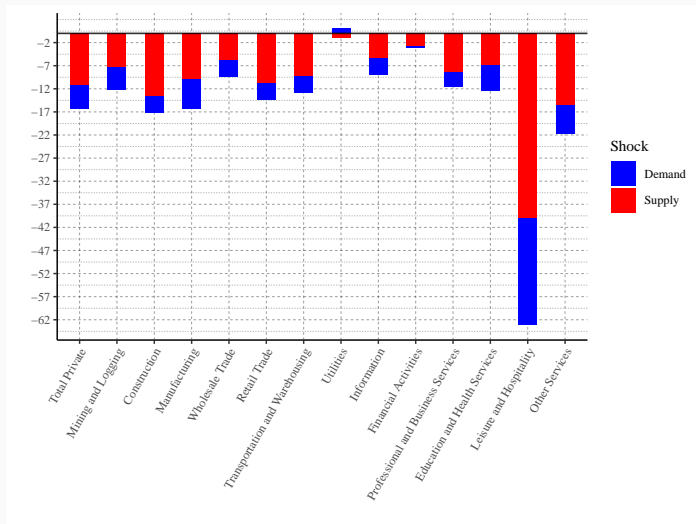
- Combined effect: -16.24 pp, supply accounted for 68.8%

Shock decomposition, April 2020



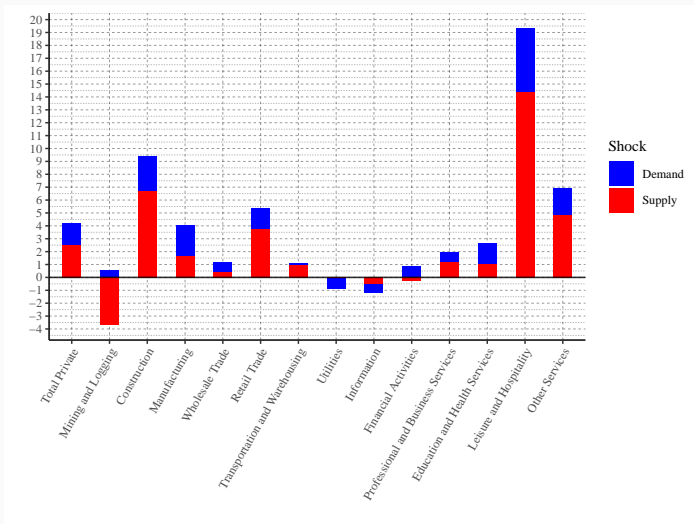
- Least-affected sectors: Utilities (+0.09 pp) and Financial Activities (-3.06 pp)

Shock decomposition, April 2020



- Sectors where demand was relevant: Manufacturing (40%), Information (40%), Education and Health Services (45%)

Shock decomposition, May 2020



- Sectors that showed strongest recovery were the ones most hit in April

1. Validation

- Supply shocks correlate strongly with measures of telework [▶ scatter](#)
- No correlation for “normal” months [▶ scatter](#)
- Low correlation w/ demand shocks [▶ scatter](#)

2. Composition effects

- Results robust to using production only employees [▶ decomposition](#)

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Conclusion

- Supply accounts for 2/3 of 16.24 pp drop in the growth rate of hours worked in April 2020
- Large negative demand & supply shocks in March and April
- Heterogeneity across sectors:
 1. Leisure and Hospitality: -63.18 pp in April, 63% supply
 2. Utilities, Information, Financial Activities least affected
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Why does this decomposition matter?

1. The need of useful moments and parameters to calibrate models

- How large were the shifts in labor supply and demand during COVID-19?
- We provide sectoral labor elasticities (multisector models are key to model COVID-19)

2. Policy guidance

- Labor **supply** shocks more closely related w/ state of **public health**
 - Persistence linked to that of public health crisis
 - Policy recommendation: **Social insurance**
- Labor **demand** shocks more closely related w/ state of the **economy**
 - Potentially more persistent (job destruction, business exit)
 - Policy recommendation: **Targeted stimulus**

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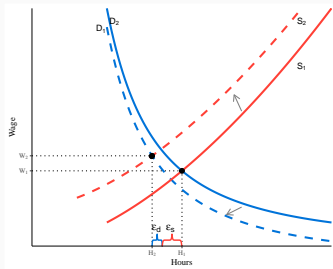
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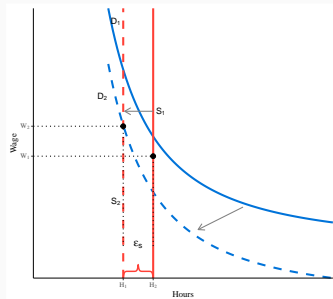
Appendix

Identification - Hours Decomposition

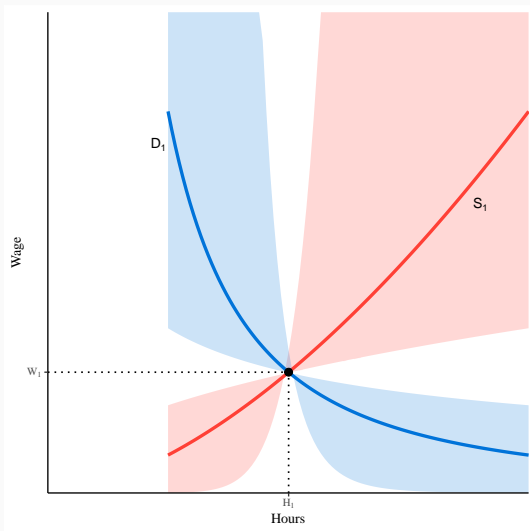
(a) Depends on new wage-hours locus



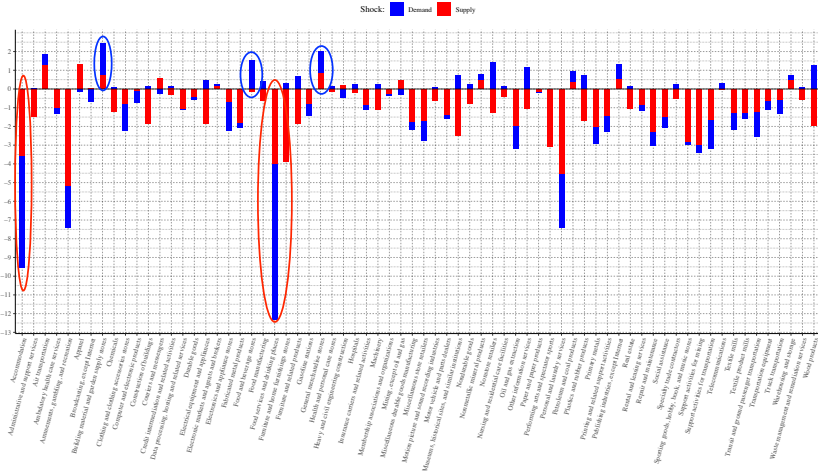
(b) Depends on relative labor elasticities



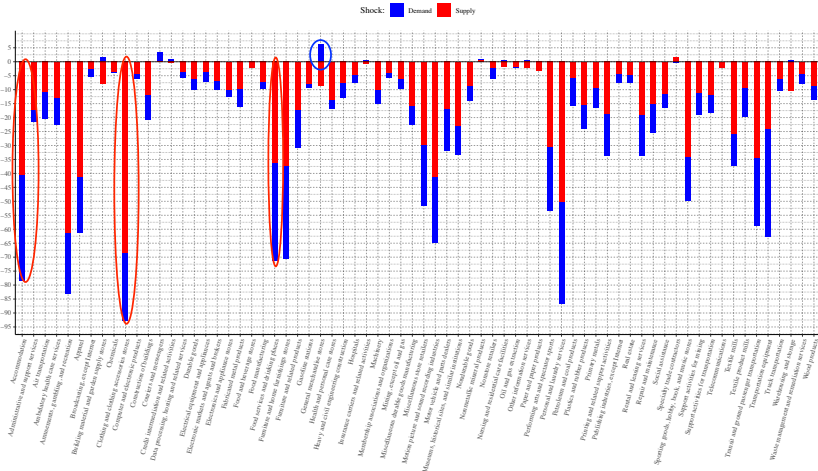
Identification - Prior



Shock Decomposition NAICS-3, March 2020

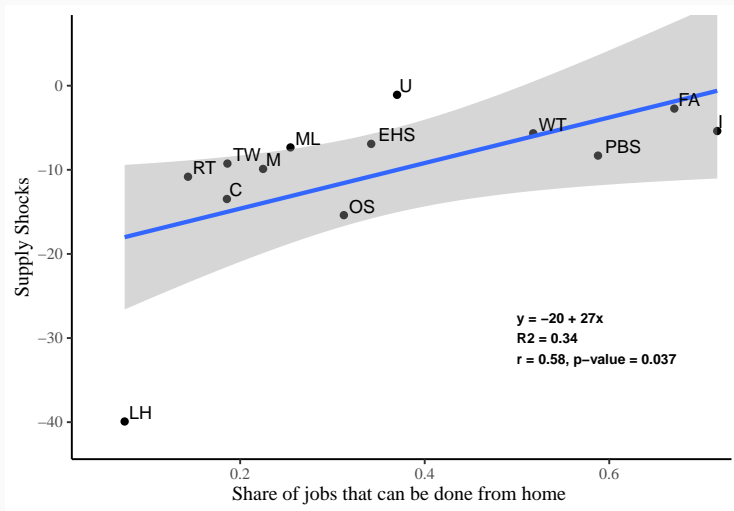


Shock Decomposition NAICS-3, April 2020

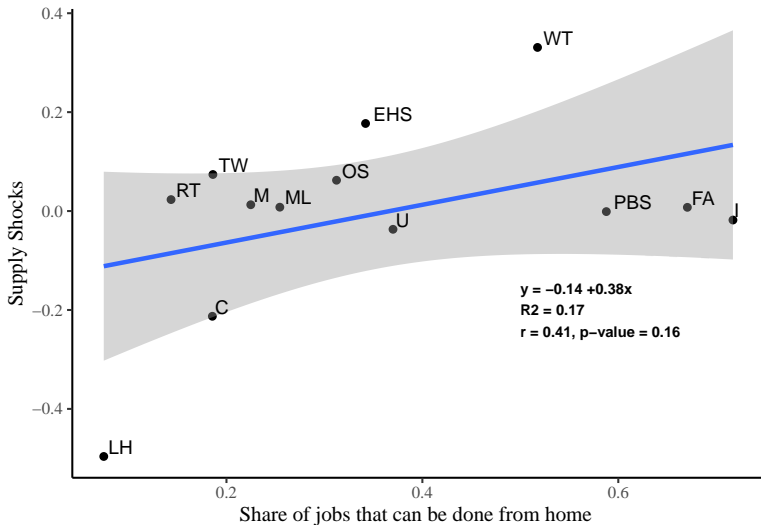


Estimated Supply Shocks vs. Telework Measure, April 2020

Telework measure from Dingel & Neiman (2020)

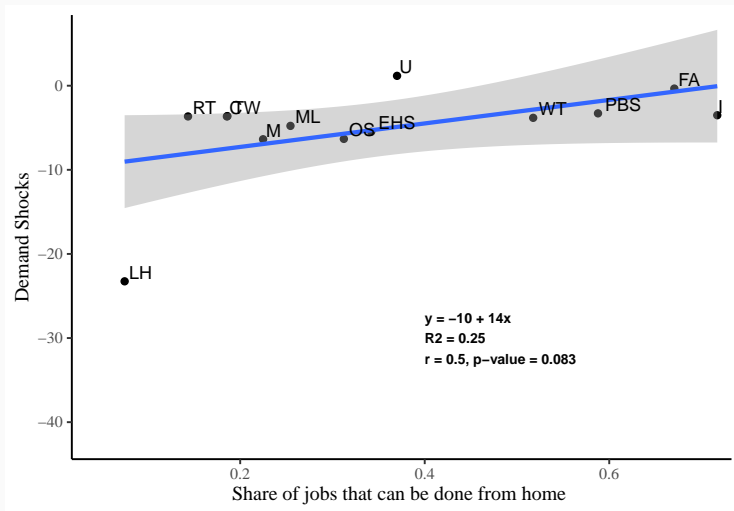


Estimated Supply Shocks vs. Telework Measure, April 2019



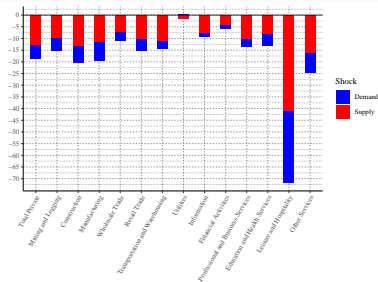
Estimated Demand Shocks vs. Telework Measure, April 2020

Telework measure from Dingel & Neiman (2020)

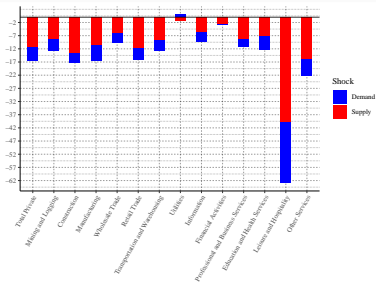


Production Only Employees, April 2020

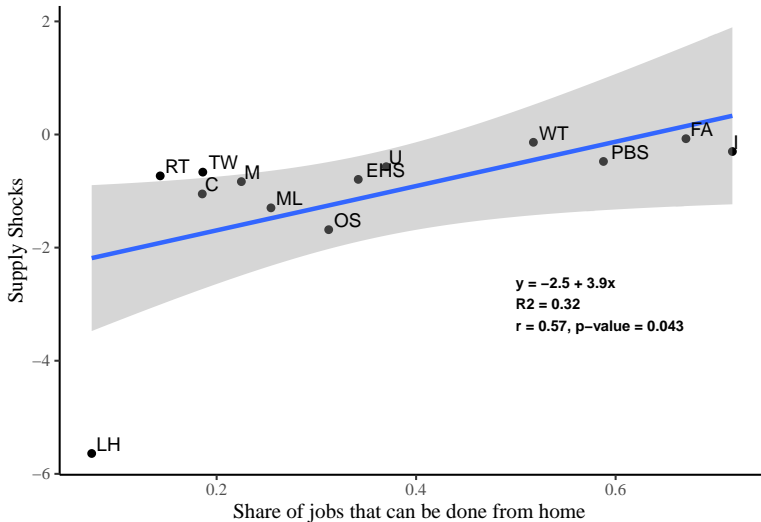
(a) Production Only Employees



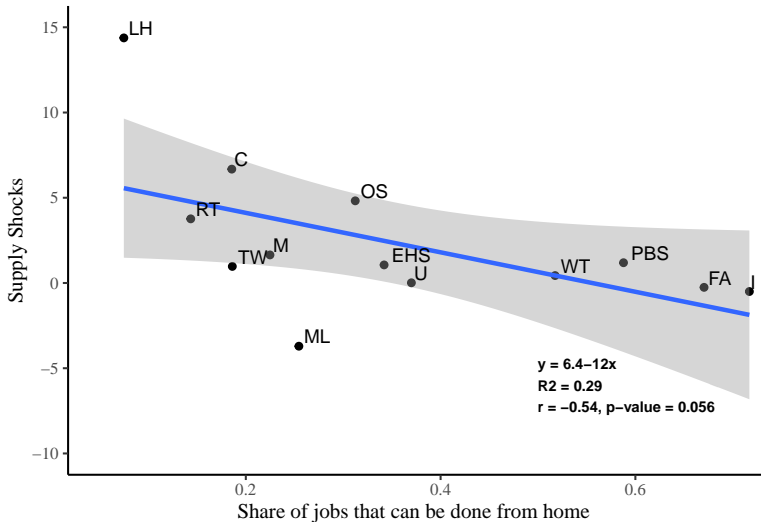
(b) All Employees



Estimated Shocks vs. Telework Measure, March 2020

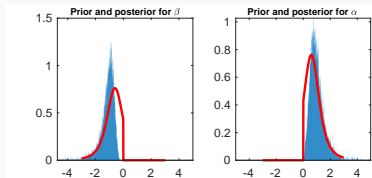


Estimated Shocks vs. Telework Measure, May 2020

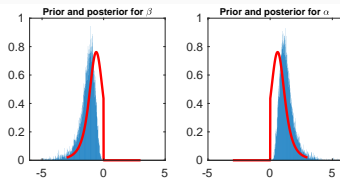


Prior and posterior distribution of labor demand and supply elasticities by sector (1/4)

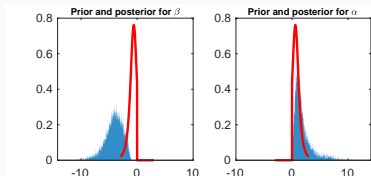
(a) Total Private



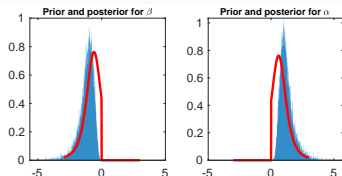
(b) Mining and Logging



(c) Construction

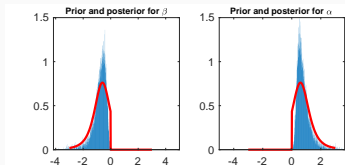


(d) Manufacturing

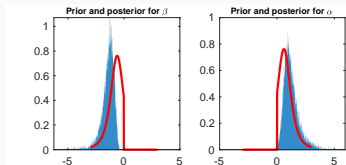


Prior and posterior distribution of labor demand and supply elasticities by sector (2/4)

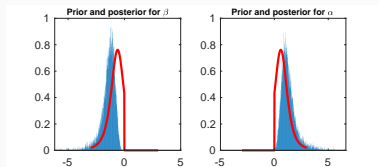
(a) Wholesale Trade



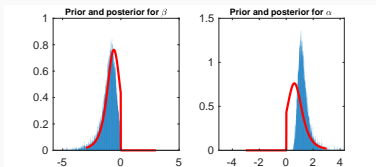
(b) Retail Trade



(c) Transportation and Warehousing

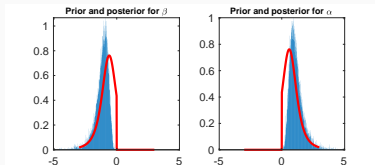


(d) Utilities

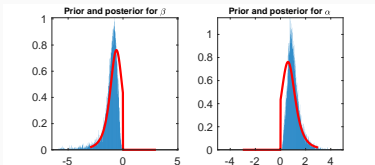


Prior and posterior distribution of labor demand and supply elasticities by sector (3/4)

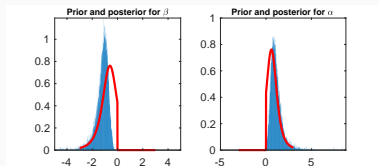
(a) Information



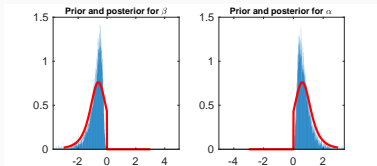
(b) Financial Activities



(c) Professional and Business Services

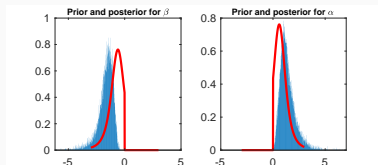


(d) Education and Health Services

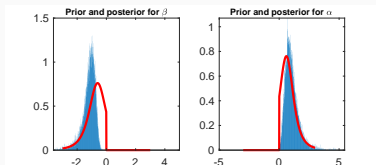


Prior and posterior distribution of labor demand and supply elasticities by sector (4/4)

(a) Leisure and Hospitality



(b) Other Services



Posterior Estimates

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

Shock Decomposition, 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]