Measuring Labor Demand and Supply Shocks during COVID-19

Pedro Brinca
Nova SBE

Joao B. Duarte
Nova SBE

Miguel Faria-e-Castro
FRB St. Louis

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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
   - Supply chain disruptions
   - Policy (closures/monetary/fiscal policy)

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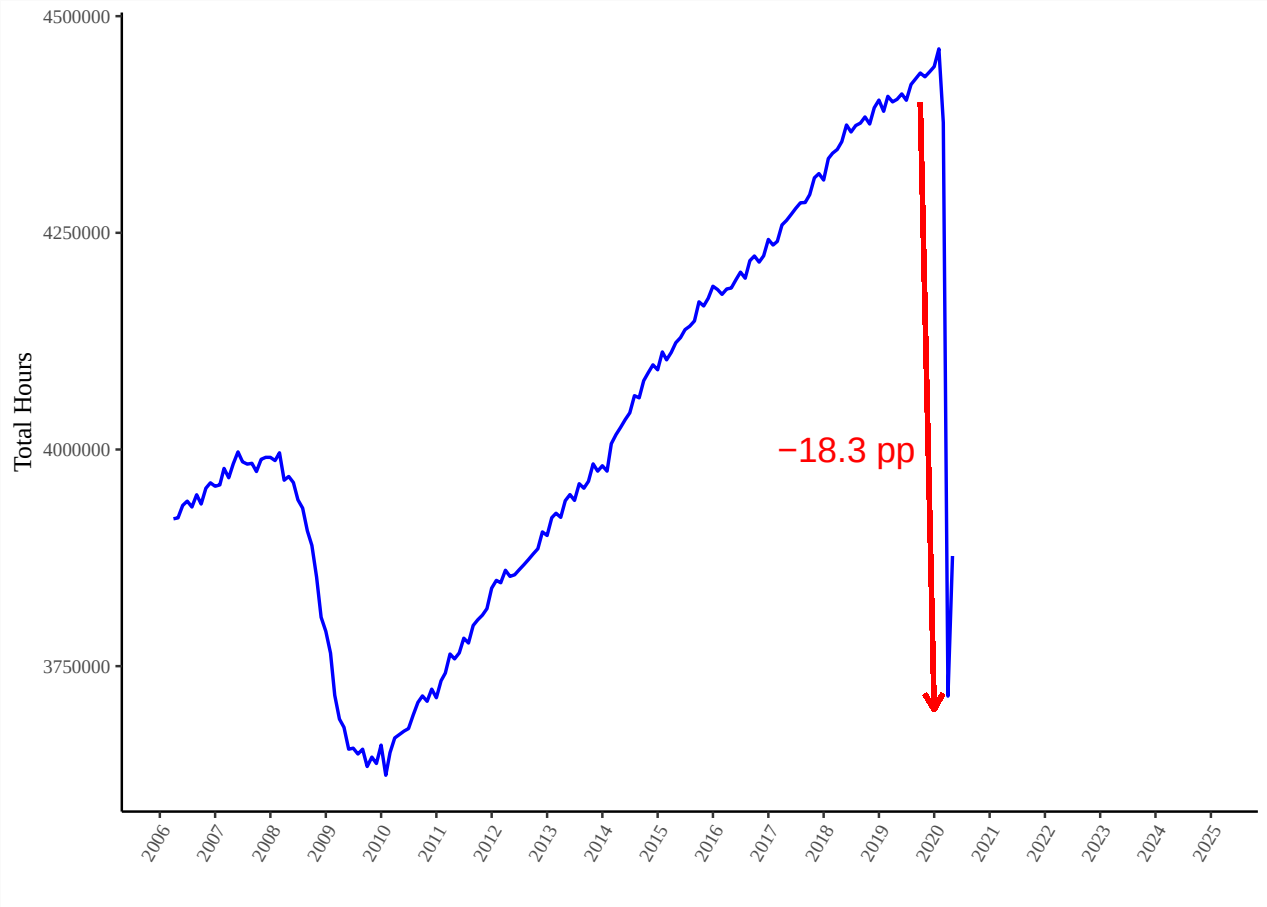
This paper

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?



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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 (Δh_t, Δw_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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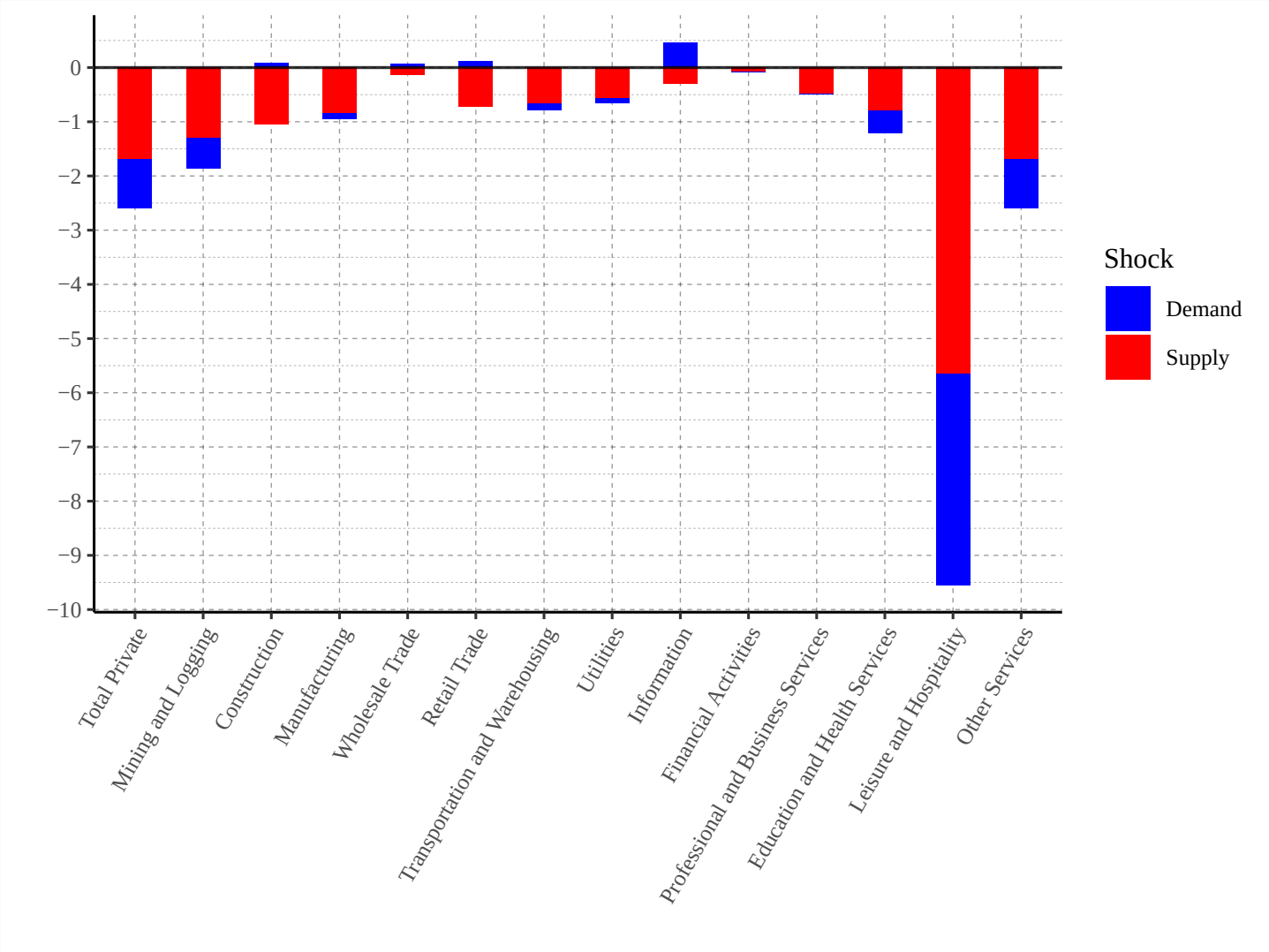
Shock decomposition, March 2020



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

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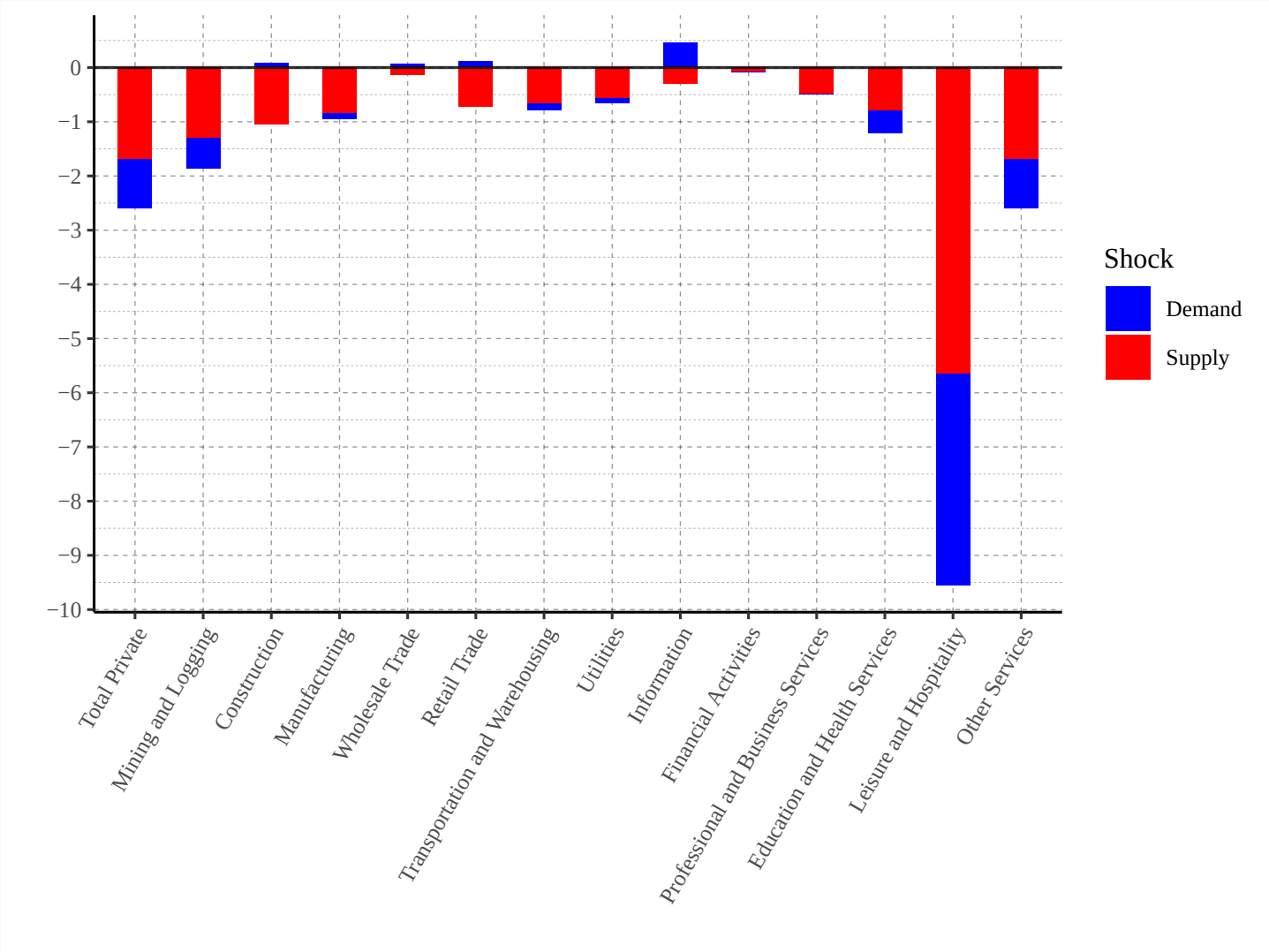

- Leisure and Hosp. most negatively affected sector (59% supply)

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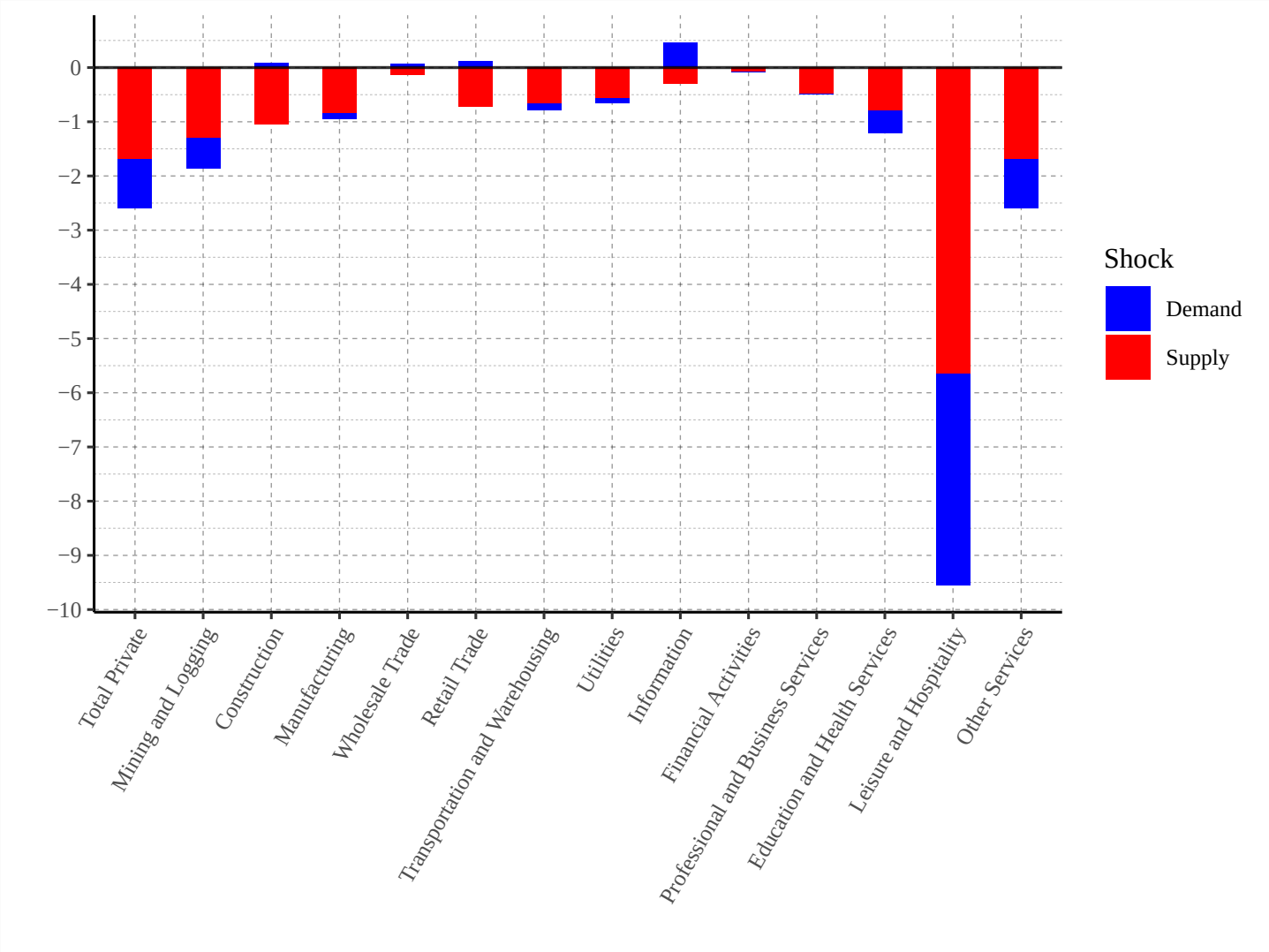
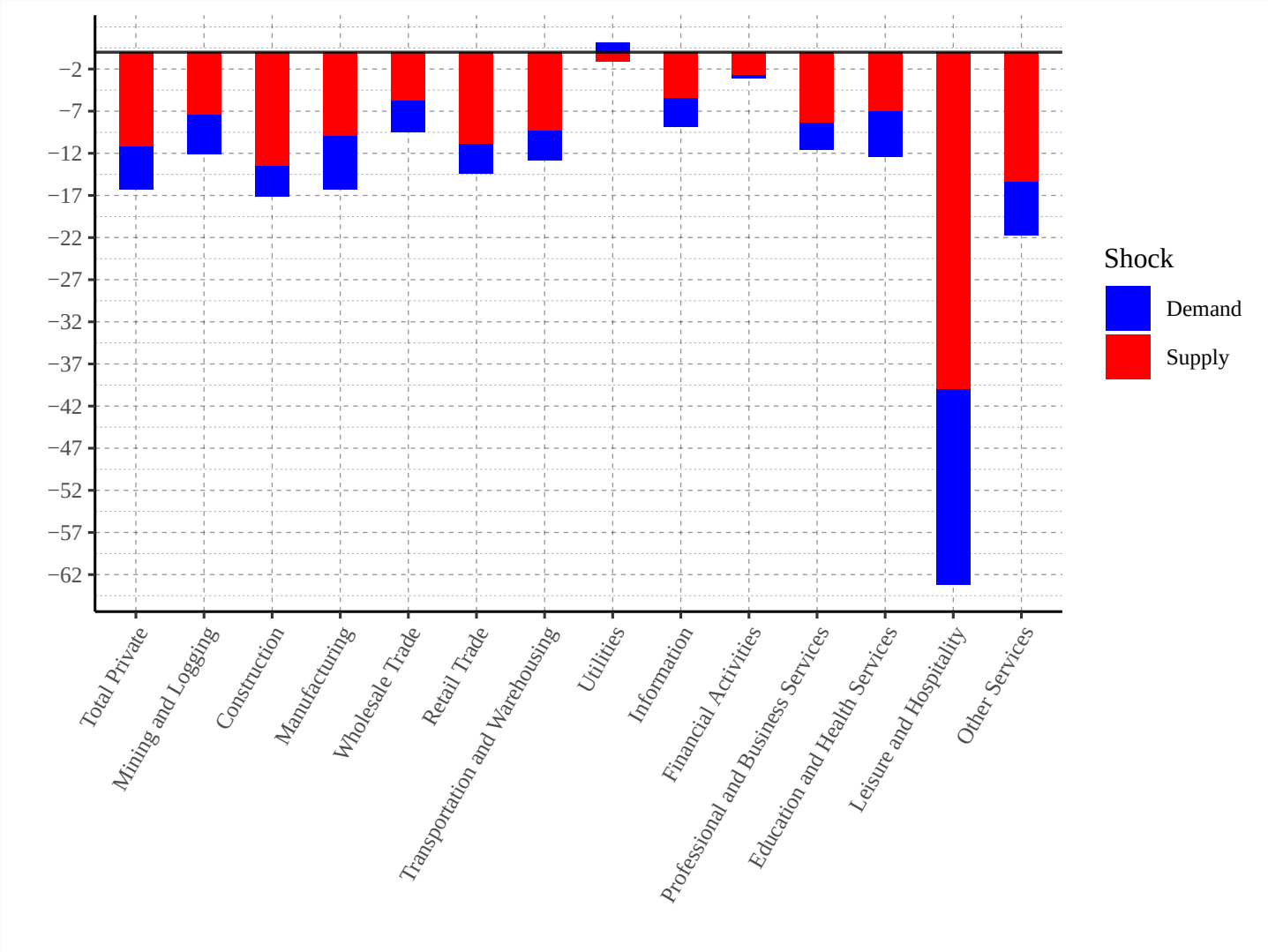


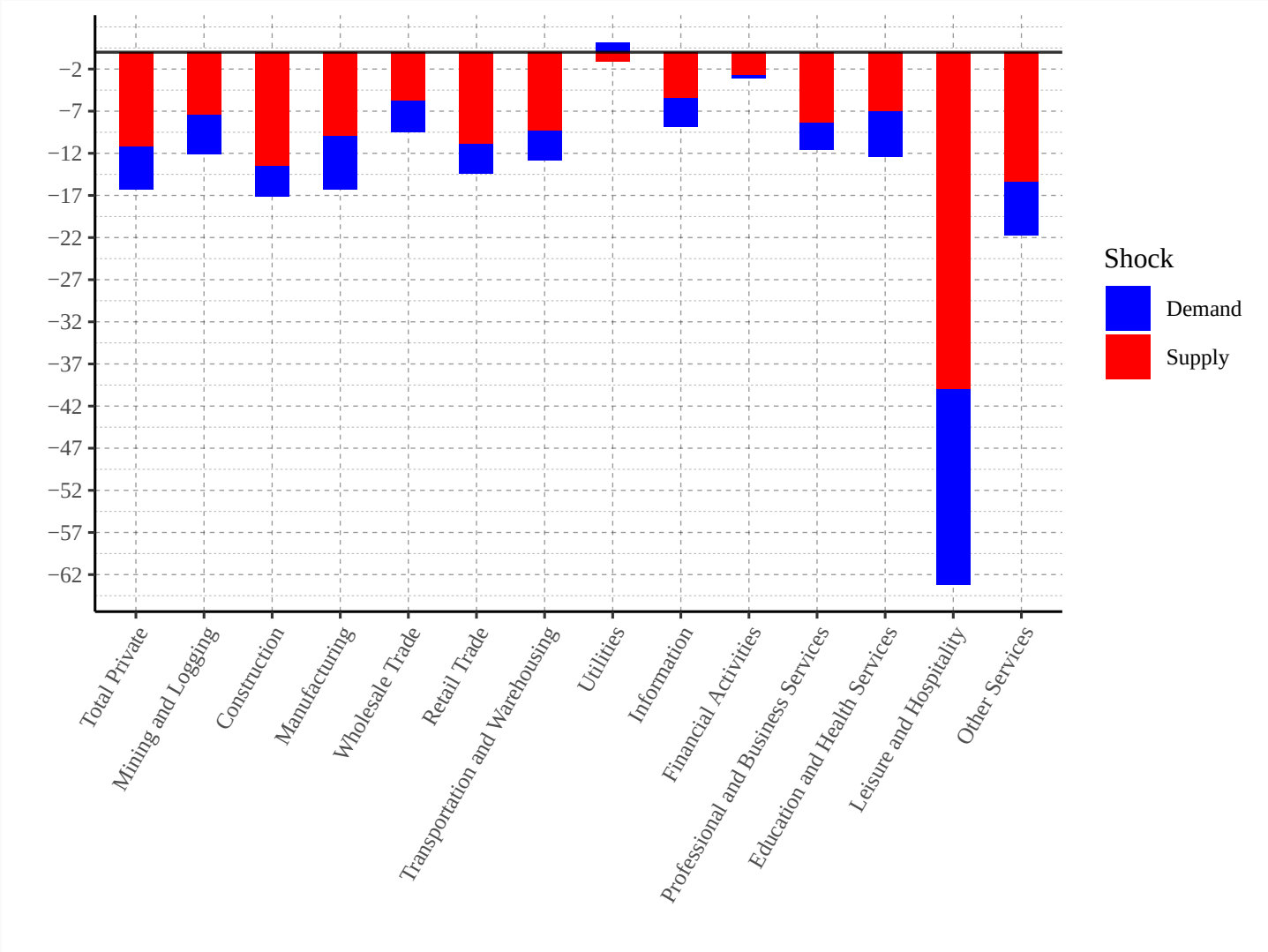
- Positive demand shocks: Information and Retail Trade

Shock decomposition, April 2020



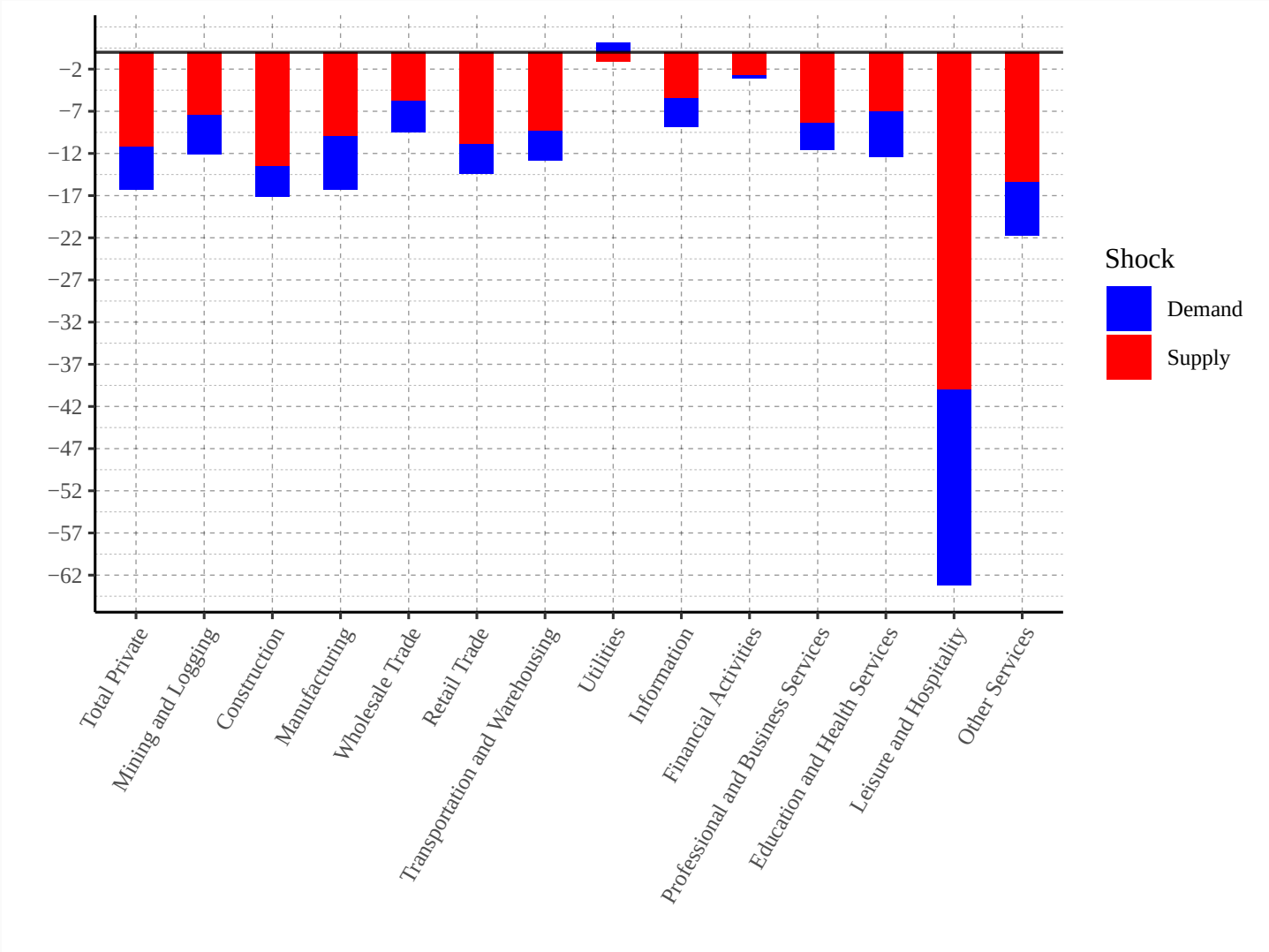
- Combined effect: −16.24 pp, supply accounted for 68.8%

Shock decomposition, April 2020



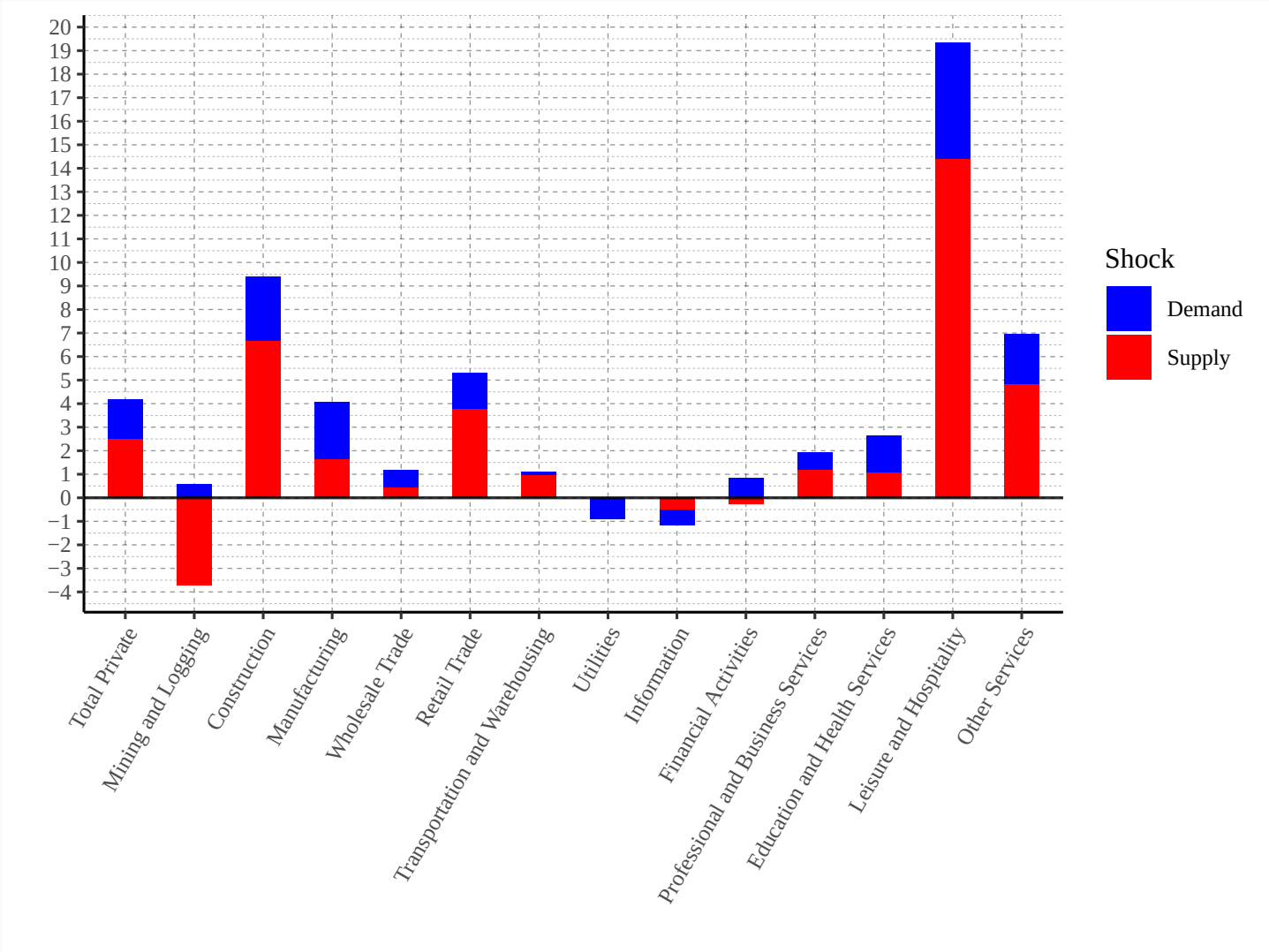
- Least-affected sectors: Utilities (+0.09 pp) and Financial Activities (−3.06 pp)

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

Robustness

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
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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**
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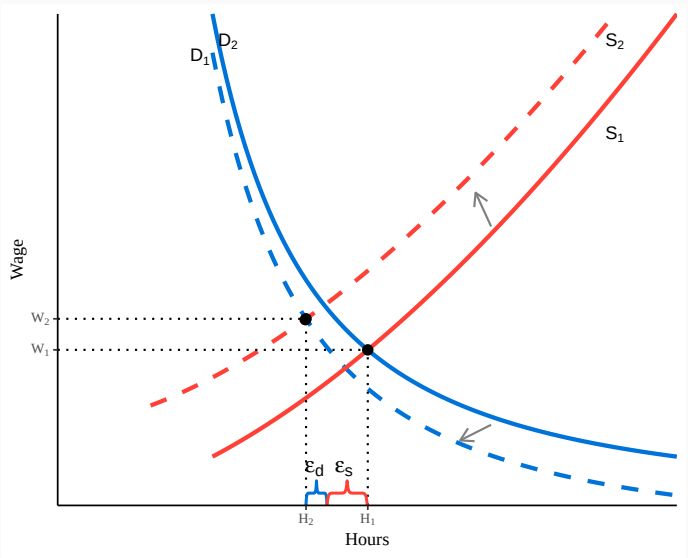
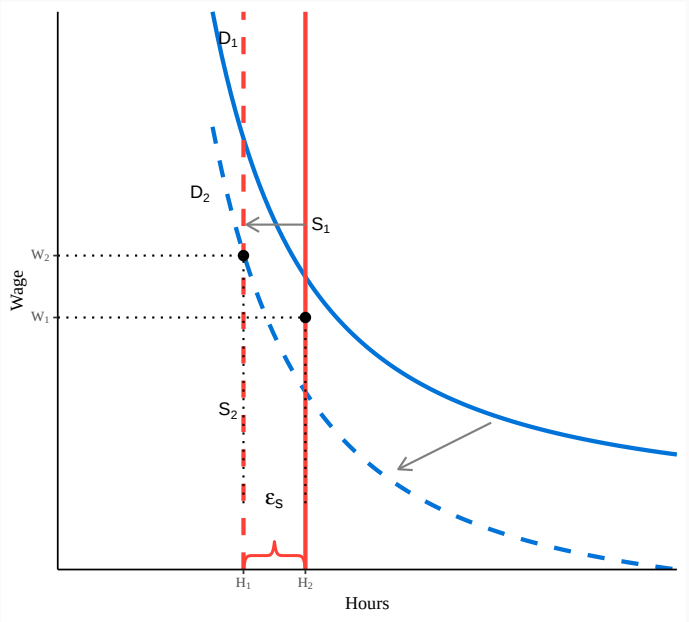
Appendix

Identification - Hours Decomposition

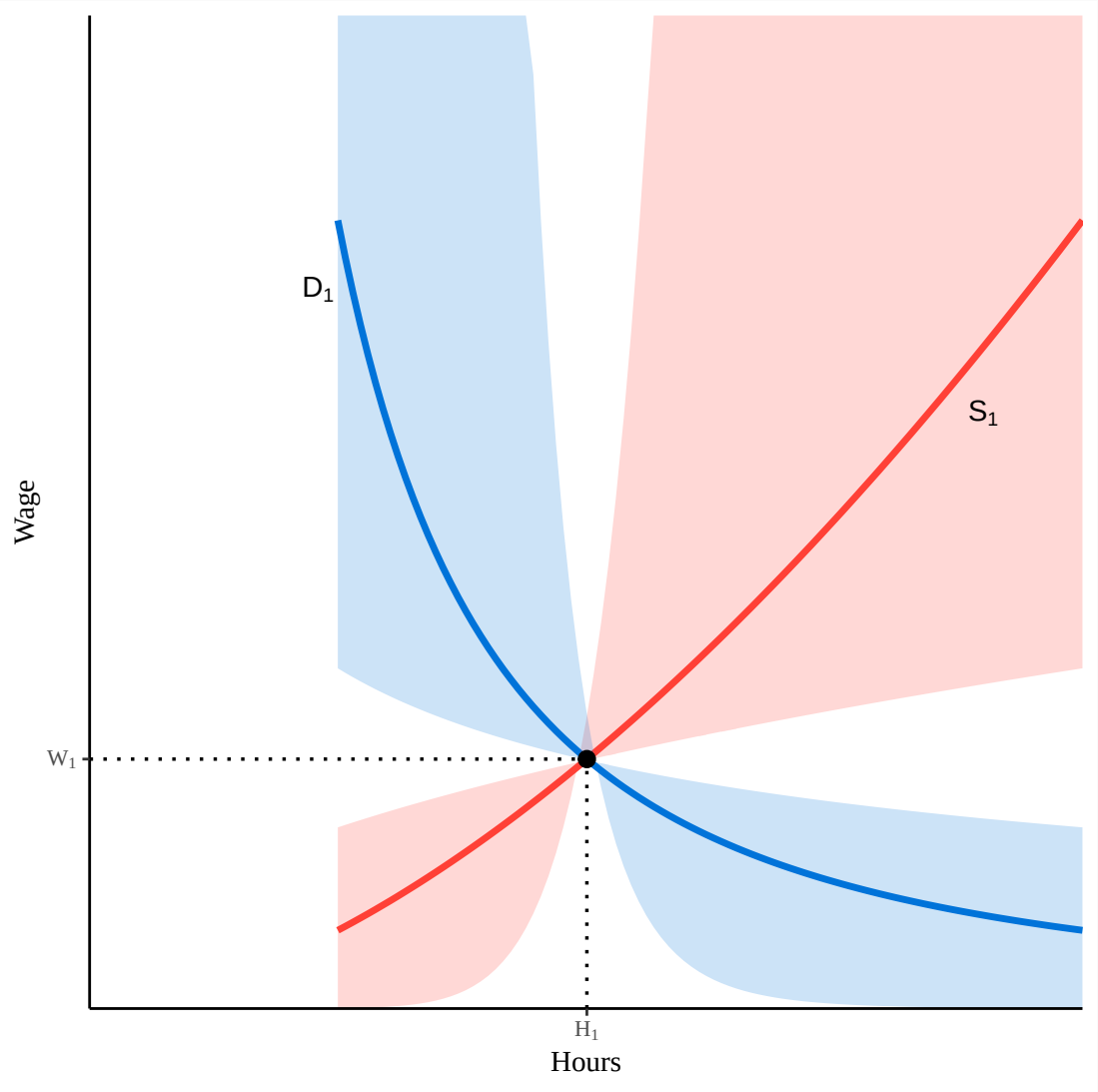
(a) Depends on new wage-hours locus



(b) Depends on relative labor elasticities



Identification - Prior



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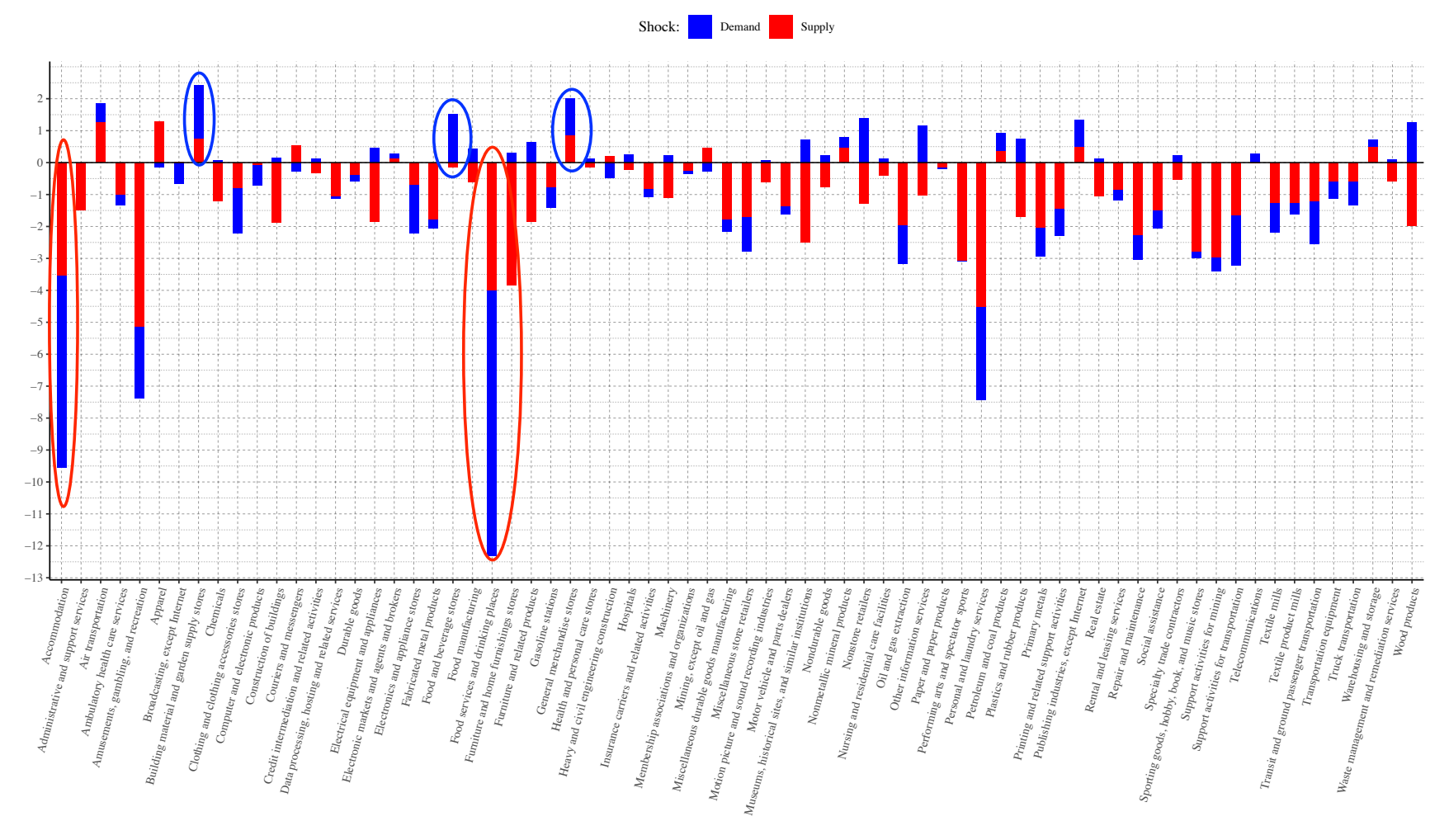
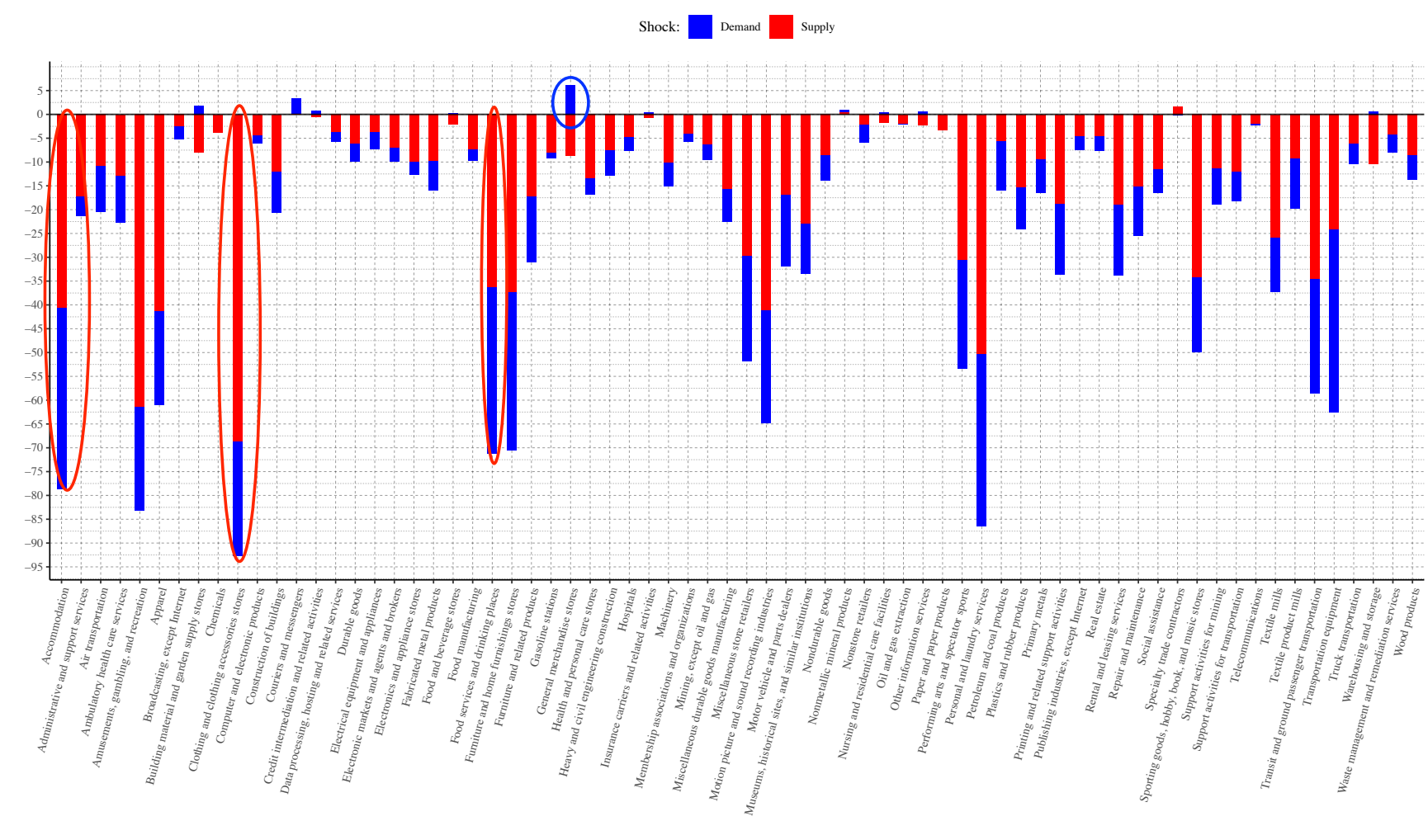
Shock Decomposition NAICS-3, March 2020

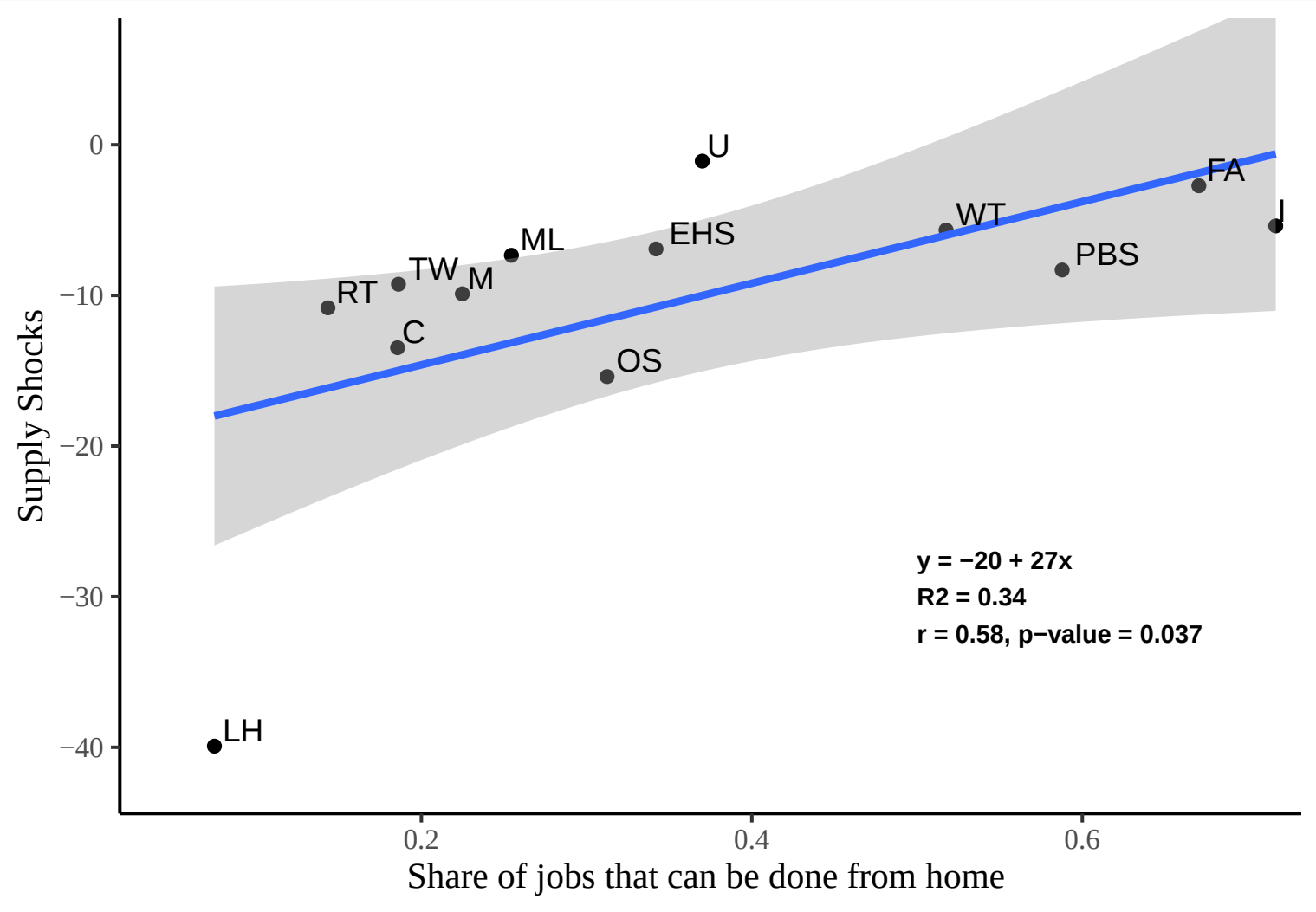


Shock Decomposition NAICS-3, April 2020



Estimated Supply Shocks vs. Telework Measure, April 2020

Telework measure from Dingel & Neiman (2020)



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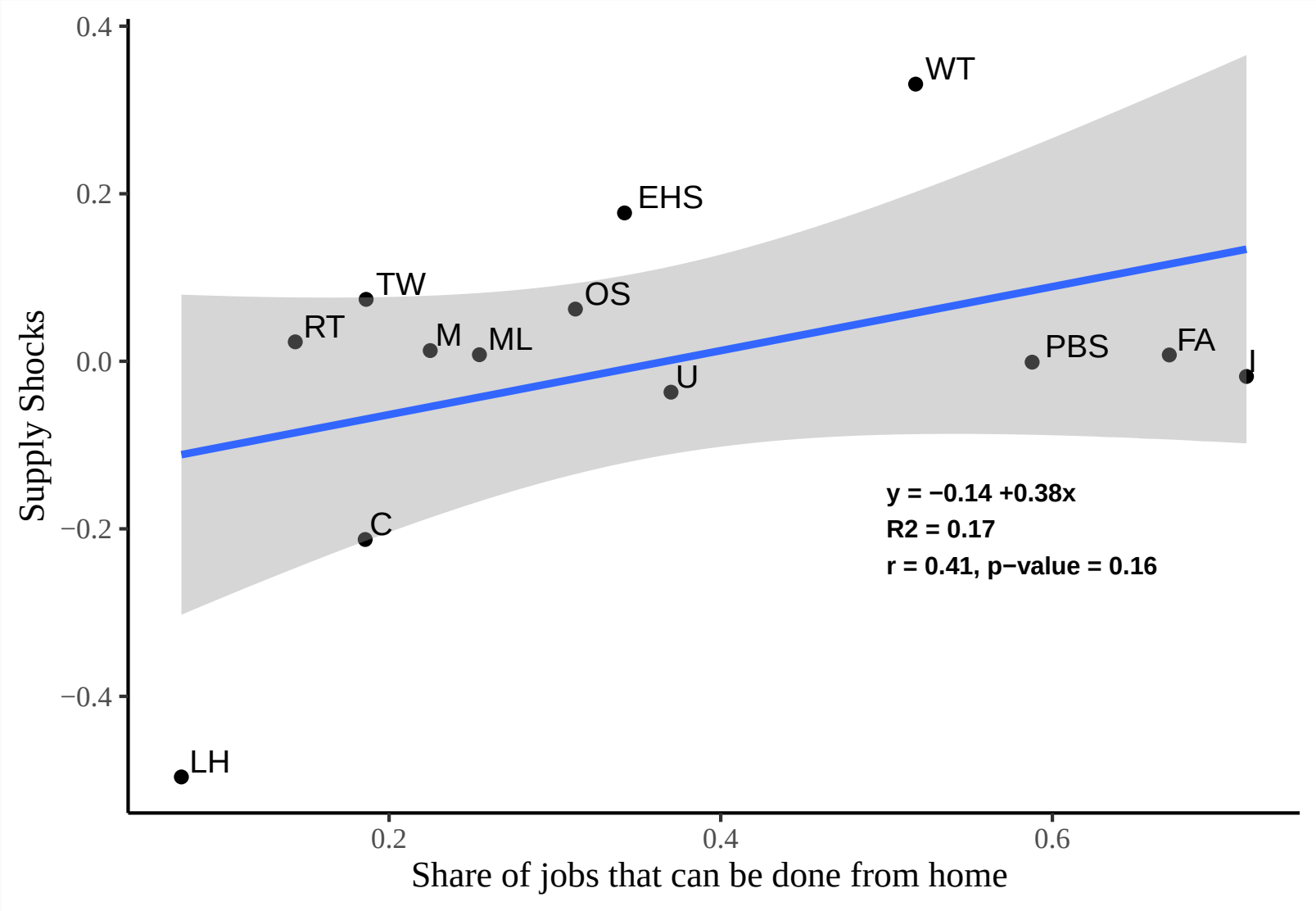
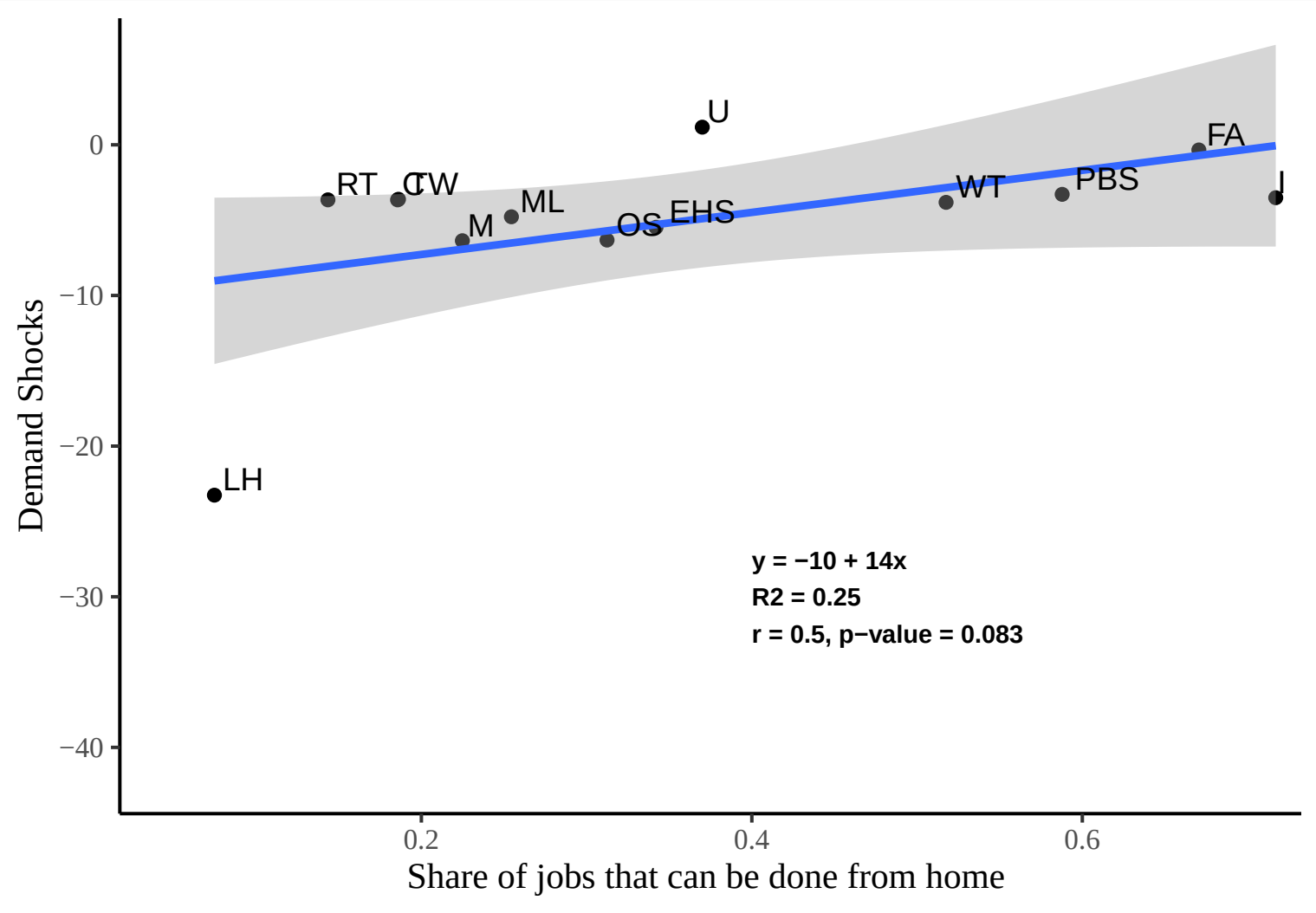


Back

Estimated Demand Shocks vs. Telework Measure, April 2020

Telework measure from Dingel & Neiman (2020)



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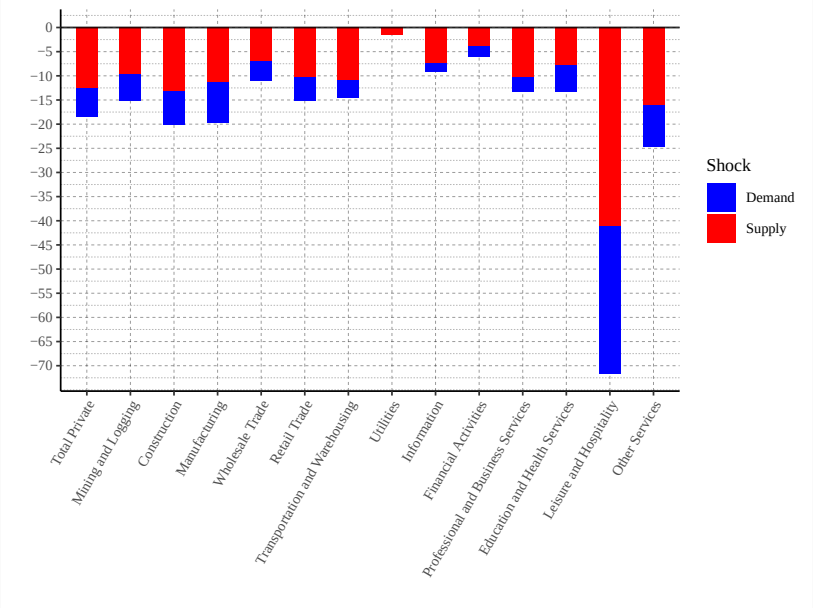
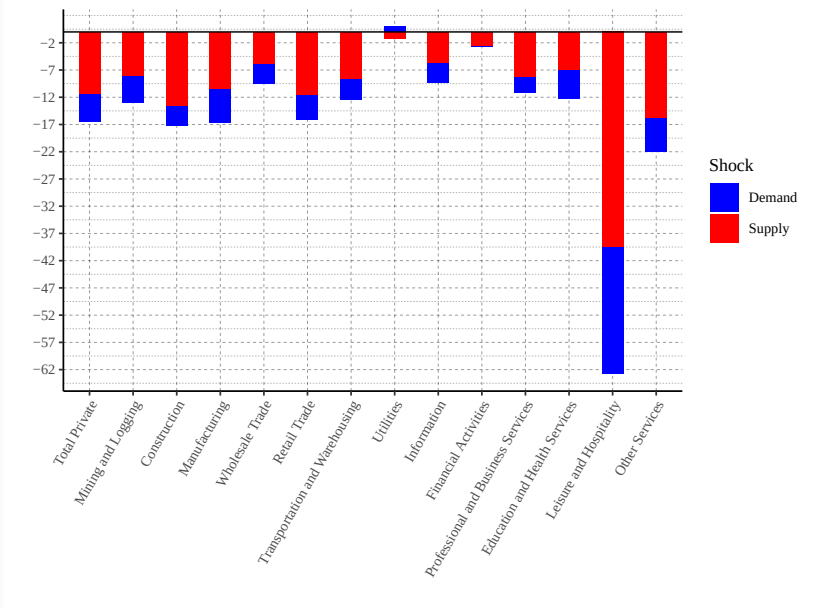
Production Only Employees, April 2020

(a) Production Only Employees



(b) All Employees



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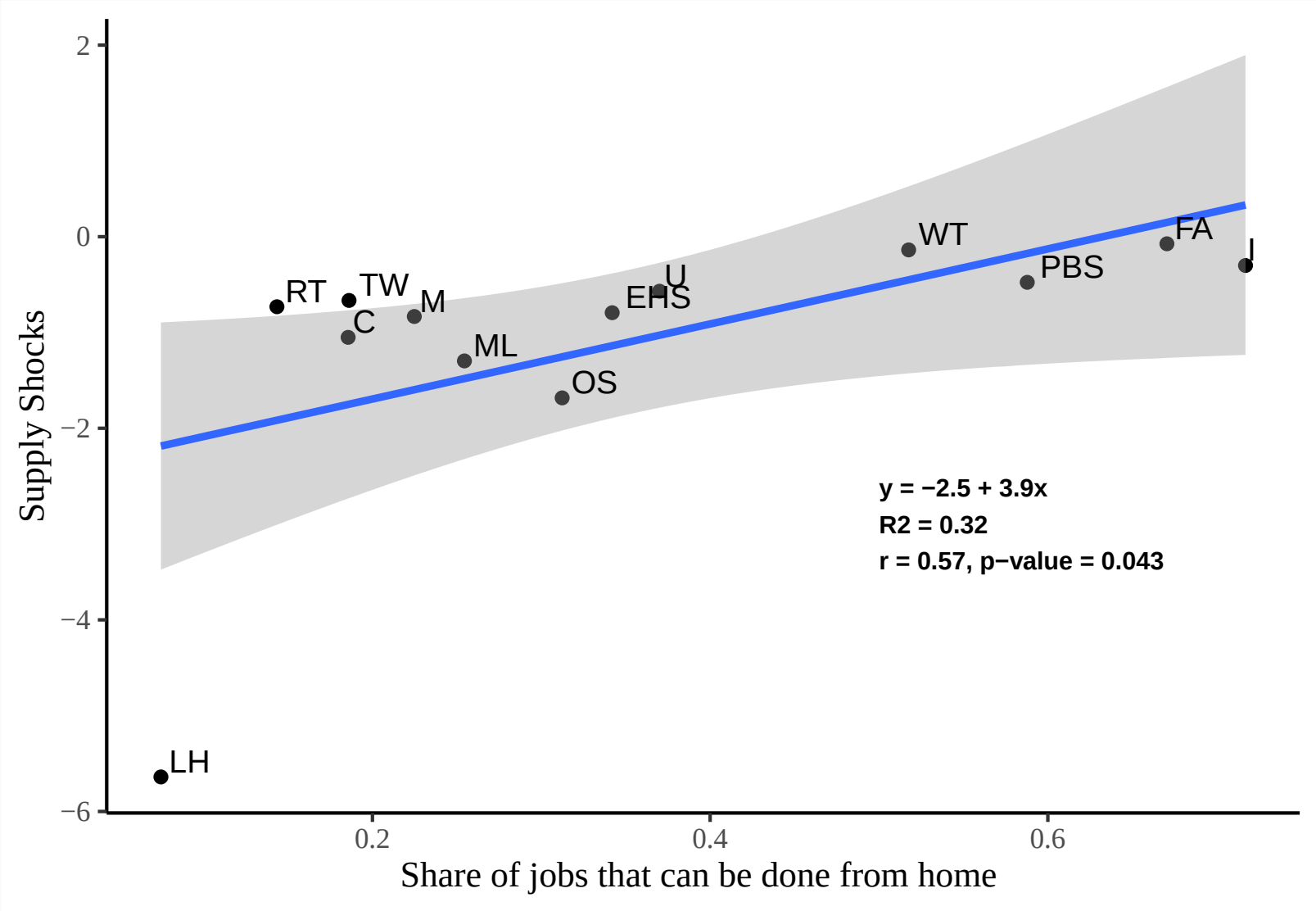

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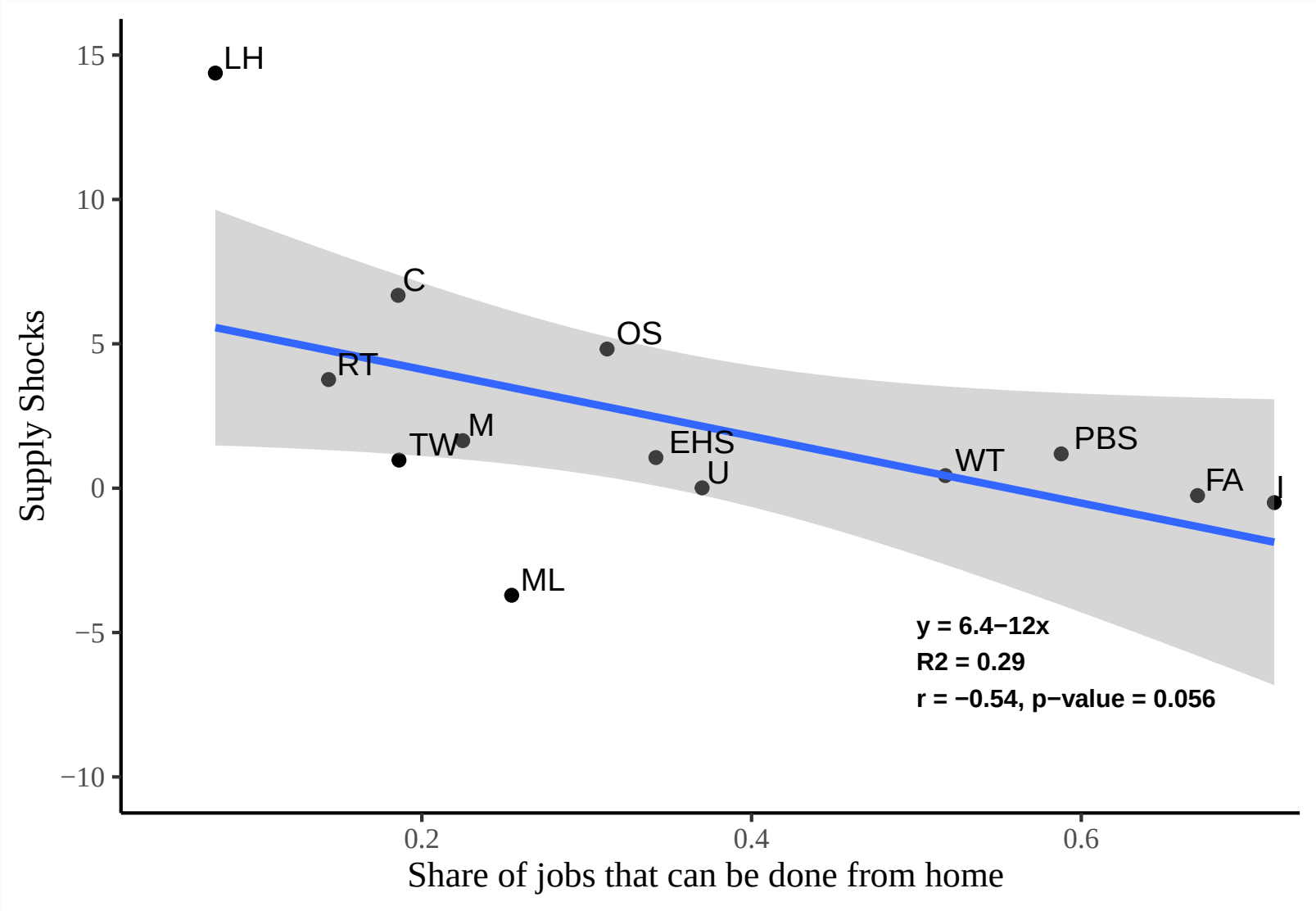
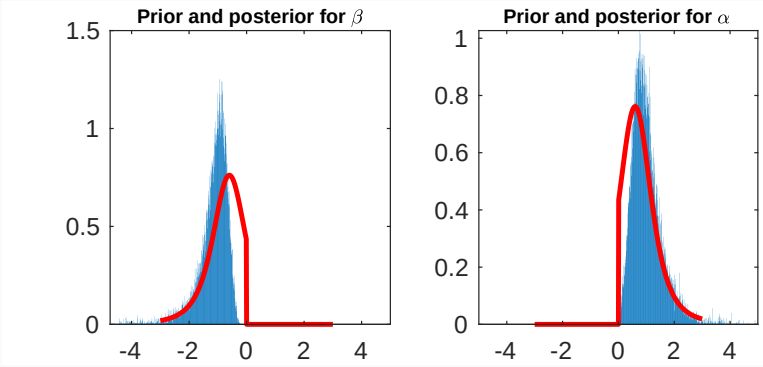


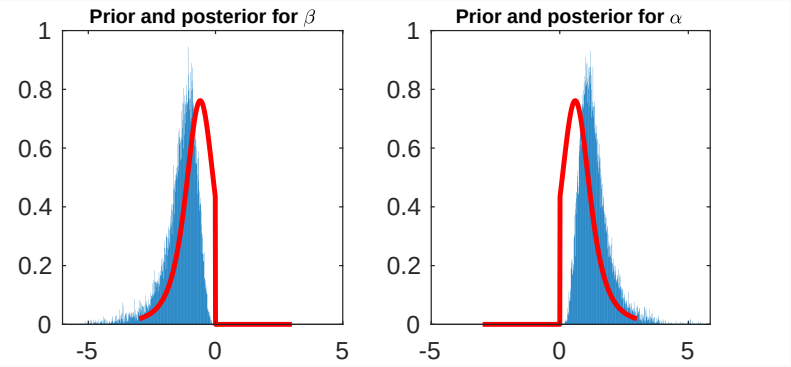
Back

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

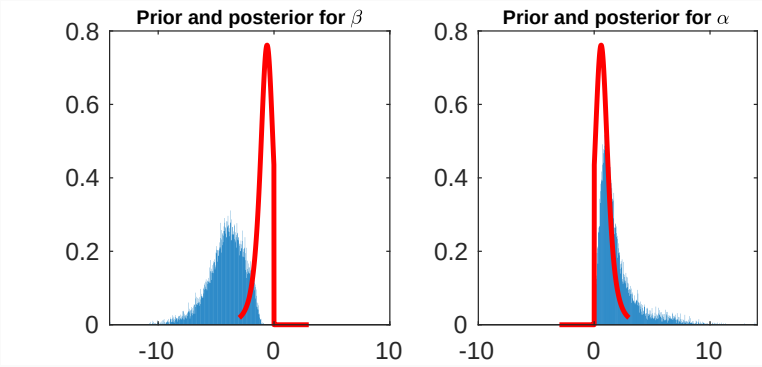
(a) Total Private



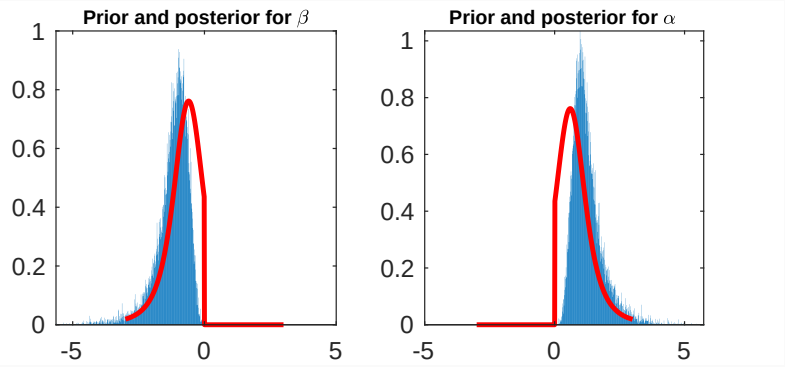
(b) Mining and Logging



(c) Construction

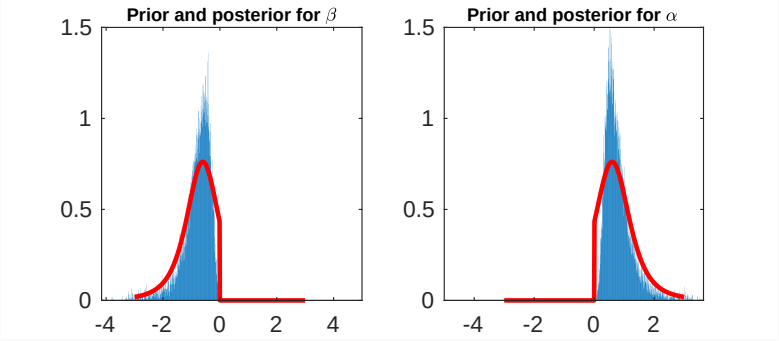


(d) Manufacturing

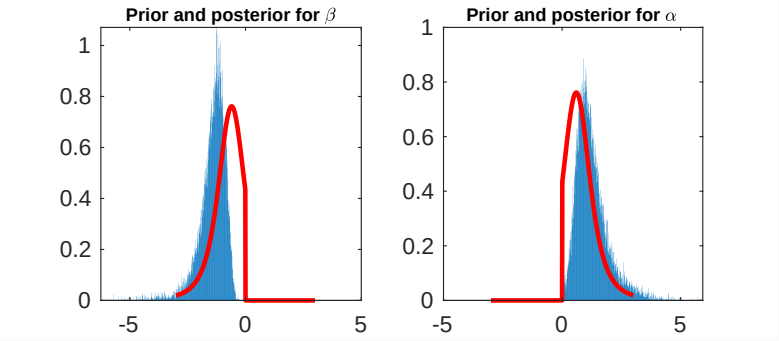


Prior and posterior distribution of labor demand and supply elasticities by sector (2/4)

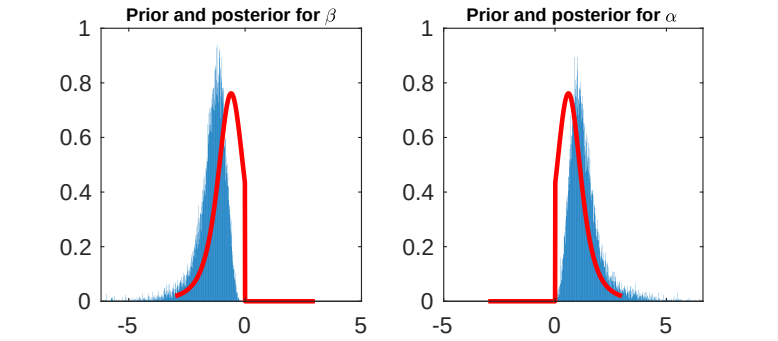
(a) Wholesale Trade



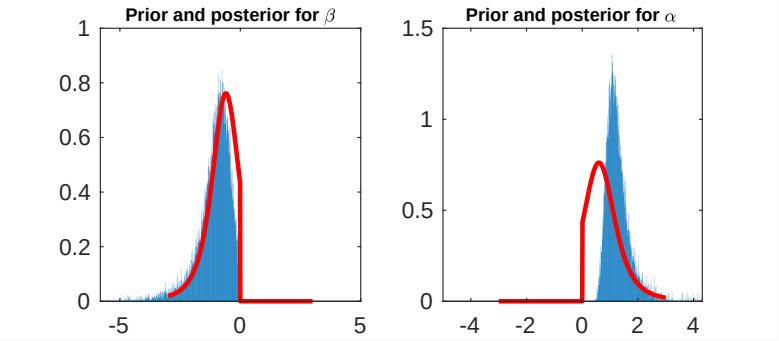
(b) Retail Trade



(c) Transportation and Warehousing

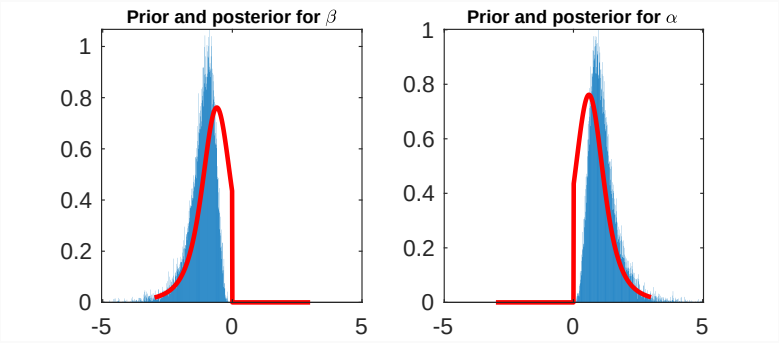


(d) Utilities

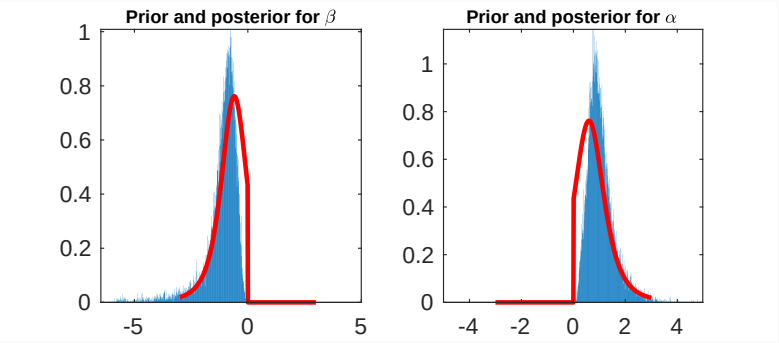


Prior and posterior distribution of labor demand and supply elasticities by sector (3/4)

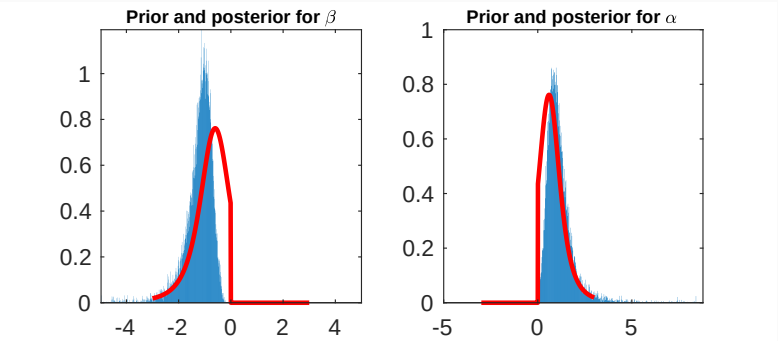
(a) Information



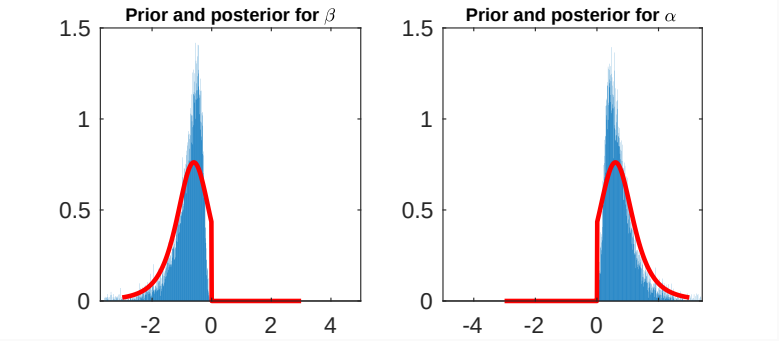
(b) Financial Activities



(c) Professional and Business Services



(d) Education and Health Services



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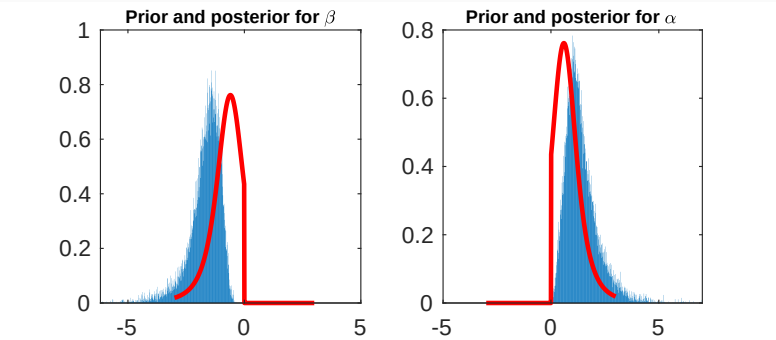
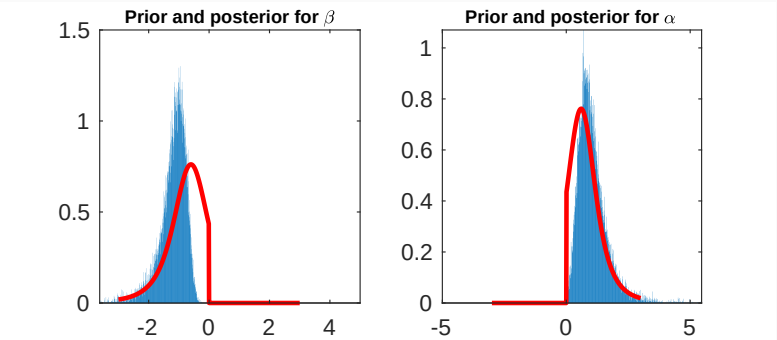


(b) Other Services



Posterior Estimates

	β^l (demand)			α^l (supply)		
Sector	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

	Demand			Supply			Difference 68% Credible Interval
Sector	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]