Fiscal Policy in a Networked Economy

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  - Undirected Transfers (e.g. stimulus checks)
  - Targeted Transfers (e.g. extended UI benefits)
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Research question: How does the structure of interconnections between households affect fiscal policy?

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   - Key implication: targeting fiscal policy towards high-MPC households is maximally expansionary

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2. Data and Estimation
3. Empirical Results
   1. Description of multipliers with many sources of heterogeneity
   2. Implications for design of fiscal policy

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4. Government sector chooses spending and taxes/transfers

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$$\underbrace{Q_i^t}_{\text{Production}} = F_i^t\Big(\underbrace{X_i^t}_{\substack{\text{Vector of}\\ \text{Intermediates}}}, \underbrace{L_i^t}_{\substack{\text{Labor}\\ \text{Input}}}\Big)$$

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- Given prices $p^t = \{p_i^t\}_{i \in I}$, firms demand L_i^t and $X_i^t = \{X_{ij}^t\}_{j \in I}$ to maximize profits

$$(X_i^t, L_i^t) \in \arg\max_{X^t, L^t} \; p_i^t F_i^t(X^t, L^t) - p^t X^t - L^t$$

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- Government purchases (G^t) and levies lump-sum taxes/transfers (τ^t) subject to budget constraint

$$\sum_{n \in N} \mu_n \left(\tau_n^1 + \frac{\tau_n^2}{1 + r} \right) = p^1 G^1 + \frac{p^2 G^2}{1 + r}$$

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- *Rationing Equilibrium: set of prices, agent and market-level variables s.t:* ▸ Existence ▸ Prices
  1. *Households optimize subject to budget constraints and rationing*
  2. *Firms maximize profits*
  3. *First-period labor is rationed as above*
  4. *Markets clear*

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Proposition 1

Given any rationing equilibrium, the local change in equilibrium first period value added dY^1 following a fiscal shock with partial equilibrium effect on first-period value added ∂Y^1 is given by:

$$dY^1 = \left(\boldsymbol{I} - \underbrace{\hat{\boldsymbol{C}}^1}_{I \times N} \underbrace{\boldsymbol{m}}_{N \times N} \underbrace{\boldsymbol{R}^1_{\boldsymbol{L}^1}}_{N \times I} \underbrace{\hat{\boldsymbol{L}}^1}_{I \times I} \left(\boldsymbol{I} - \underbrace{\hat{\boldsymbol{X}}^1}_{I \times I} \right)^{-1} \right)^{-1} \partial Y^1$$

- Intuition: Shock → production → labor income rationed → marginal consumption → directed consumption. Repeats *ad infinitum*

▸ Comparative Statics

The Output Multiplier: Network Effects

Exact Decomposition Neutral Case Homotheticity

The many dimensions of heterogeneity can amplify shocks through three network effects:

$$1^T dY^1 = 1^T dG^1 + \frac{1}{1 - \mathbb{E}_{h*}[m_n]} \left(\underbrace{\mathbb{E}_{h*}[m_n]}_{\text{RA Keynesian effect}} + \right) + O^3(|m|)$$

- ∂h^1 = income incidence of unit magnitude shock.
- h^* = income incidence of GDP-proportional shock.
- m_n^{next} = average MPC of HHs who receive as income i's marginal spending.

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3. **Homophily Effect:** Correlation between MPC and MPCs of the household they spend on

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Network Effects: An Example

- Two households $m_H > m_L$.
  - $m_H = 0.5$
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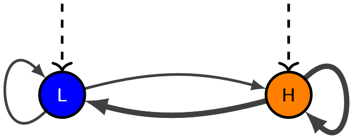
- **Case 1: Neutral incidence and network**

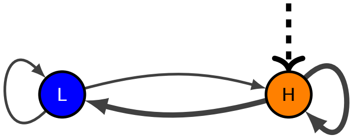


  - **As if** economy had a single household with $\overline{m} = \frac{m_L + m_H}{2}$
  - Multiplier (M) given by

$$M = \frac{1}{1 - \overline{m}} = 1.43$$

Network Effects: Case 2

- **Case 2: Heterogeneous incidence and neutral network**
  - Initial transfer directed entirely to m_H

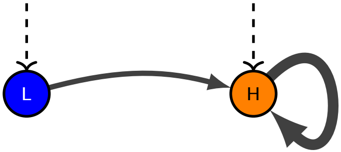


  - Initial and higher "rounds" of multiplier are different

$$M = 1 + \frac{m_H}{1 - \overline{m}} = 1.71$$

Network Effects: Case 3

- **Case 3: neutral incidence and biased network**
  - All marginal spending directed to sector employing m_H



  - Higher "rounds" of multiplier propagates at m_H

$$M = 1 + \frac{\overline{m}}{1 - m_H} = 1.60$$

  - Similar to setting in Guerreri, Lorenzoni, Straub and Werning (2020)

Network Effects: Case 4

- **Case 4: neutral incidence and homophilic network**
  - All marginal spending directed to own sector

  - Each shock propagates separately

$$M = \frac{1}{2}\left(\frac{1}{1-m_L} + \frac{1}{1-m_H}\right) = 1.56$$

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  3. Directed MPC matrix ($\widehat{\boldsymbol{C}}^1 \boldsymbol{m}$)
     - Combine estimated MPCs by demographic with consumption basket shares from CEX and cross-state flows from CFS ▸ Details
     - *Assumptions: linear Engel curves for each demographic group*

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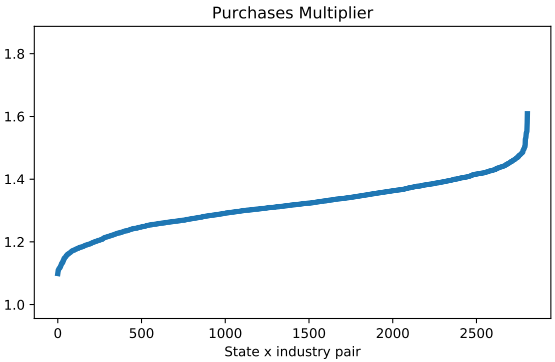

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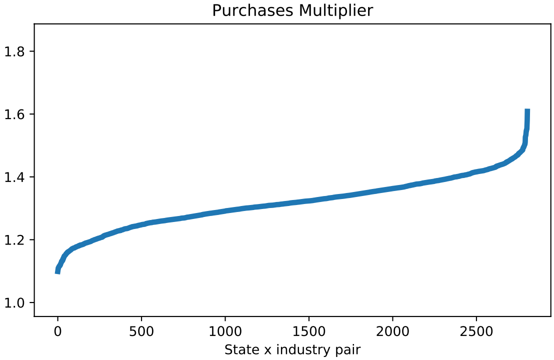

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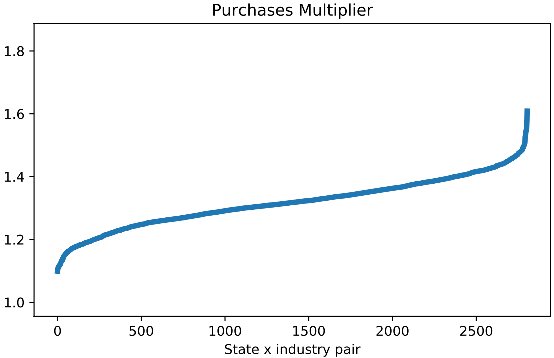

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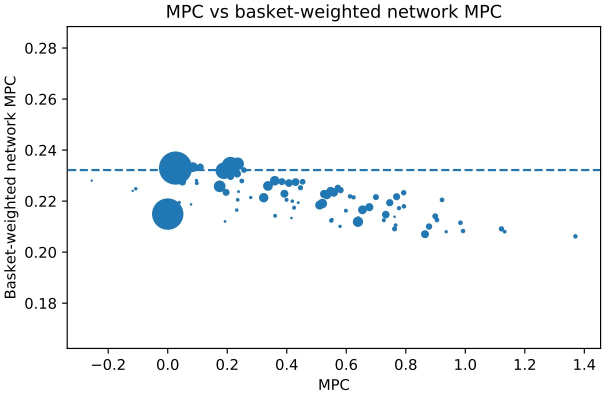
- Even larger dispersion in transfer multipliers ▸ Details

Incidence drives variation in multipliers



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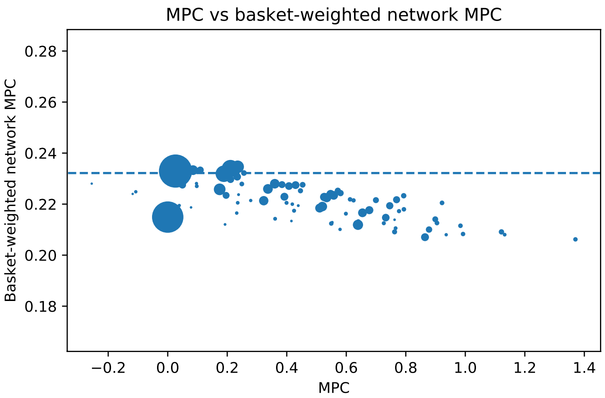

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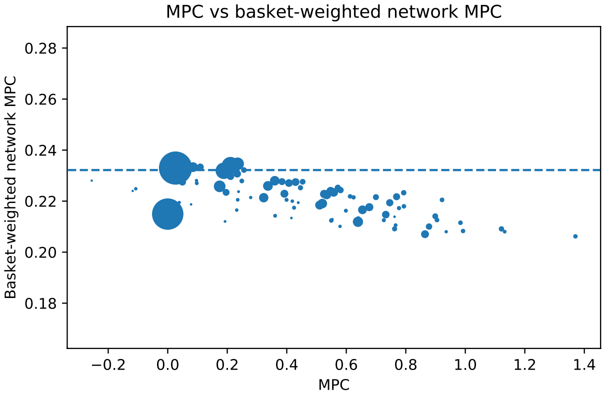

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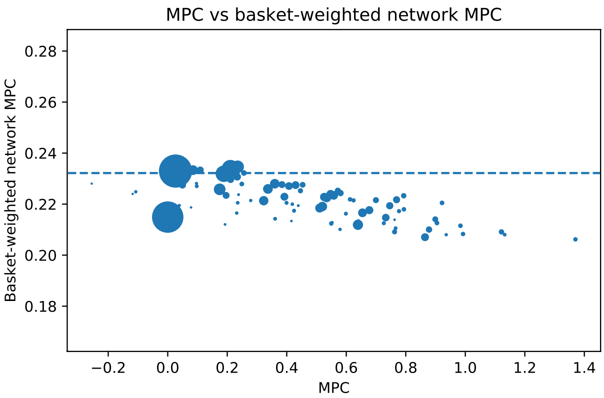

- *Observation 1:* Basket-weighted network MPCs are very similar across population
- *Observation 2:* Basket-weighted network MPCs ≈ benchmark average MPC
- → Bias and homophily terms are both close to 0. **Only incidence effect matters**

Forces behind this plot | Incidence explains all | Robustness | Unpacking Incidence Heterogeneity

Network details **do** matter for distribution of policy impacts

Figure: Change in GDP per capita from a $1 per capita transfer shock in Michigan

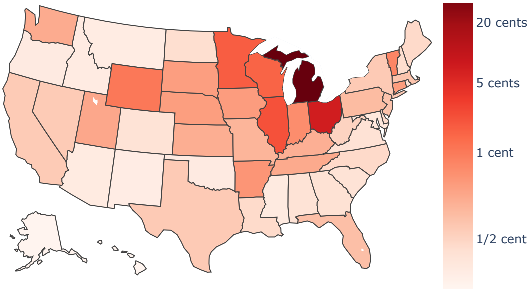

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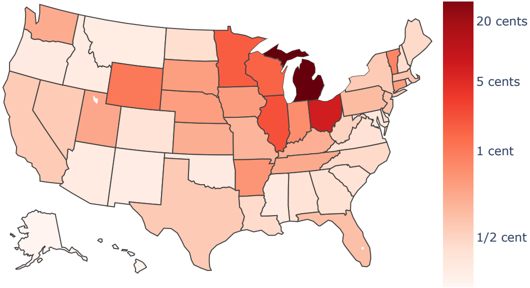
Figure: Change in GDP per capita from a $1 per capita transfer shock in Michigan



- A uniformly-distributed $1 transfer shock to MI generates 69 cents of aggregate GDP, only 29 cents of which is GDP in MI.

Outline

1. Model Setup and Multiplier
2. Data and Estimation
3. **Empirical Results**
    1. Description of multipliers with many sources of heterogeneity
    2. **Implications for design of fiscal policy** ▸ Summary

Simple MPC-targeting very effective for maximizing income

- Setting: Some amount of funds are available for fiscal spending, financing for such spending is fixed
- Question facing planner: how should they allocate funds across the economy? ▸ Details

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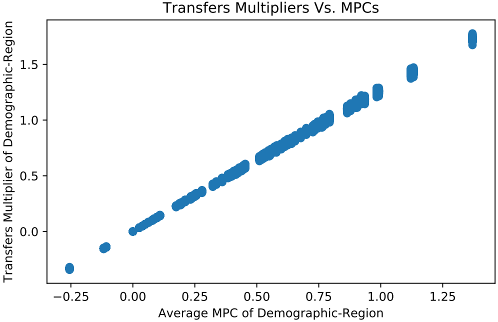

- The average MPC of the group is *very* highly correlated with multiplier for group transfer

Quantifying targetted transfers with the CARES act

Conclusion

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- Network structure matters for the *distribution* of policy impacts
- For *aggregate* policy impacts, only MPC-incidence matters.
- Given wide range of multipliers, targeting fiscal policy is important and surprisingly simple

Heterogeneous MPC-Incidence: Three amplifying forces

- A shock of a given size can load differentially onto higher- or lower-MPC households depending on industry/state shocked
- Three forces contribute positively to differences

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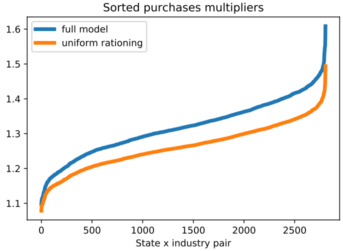
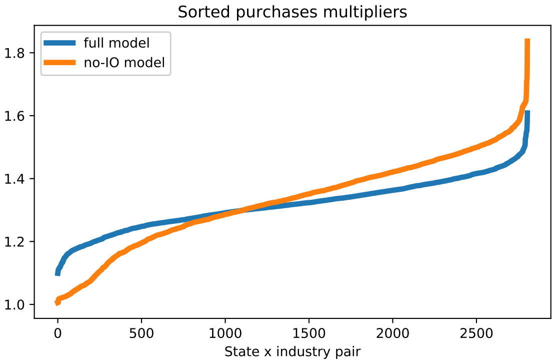
  1. Demographic composition of states and sectors
  2. Labor shares for each sector and state
  3. Covariance between worker MPCs and elasticity of income to changes in output



Heterogeneous MPC-Incidence: One dampening force

- IO linkages *narrow* the heterogeneity across sectors/states
  - Inputs dilutes the MPC of workers receiving marginal dollars



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Comparative Statics ▸ Back

- In the paper we derive a number of comparative statics results which explore how changes in the network structure affect the distribution of fiscal multipliers
- Define the matrix:

$$\mathcal{M} = \boldsymbol{C}^1_{\ell^1} \boldsymbol{I}^1_{L^1} \widehat{\boldsymbol{L}}^1 \left(\boldsymbol{I} - \widehat{\boldsymbol{X}}^1 \right)^{-1}$$

Proposition 2

Consider a change in the economy such that $\mathcal{M}$ is replaced with $\mathcal{M}' = \mathcal{M} + \varepsilon \mathcal{E}$. The effect on dY^1 of this change is given to first order in ε by:

$$\frac{d}{d\varepsilon} dY^1|_{\varepsilon=0} = (\boldsymbol{I} - \mathcal{M})^{-1} \mathcal{E} (\boldsymbol{I} - \mathcal{M})^{-1} \partial Q^1$$

where ∂Q^1 generalizes ∂Y^1 to the case with supply shocks.

- Corollaries include:
  1. Higher multipliers with higher MPCs / labor shares
  2. More dispersed multipliers with less connected IO matrix

Extension: Many Periods

- Allow set of periods $\mathcal{T}(\omega) \subseteq \mathbb{T}$ in which labor is rationed

Proposition 3

(Dynamic multipliers at the ZLB) Suppose that $r^t = \bar{r}^t$ for all $t \in T$. Then the general equilibrium effect on output dY of a partial equilibrium shock ∂Q is generically given by

$$dY^{\mathcal{T}} = \left(I - C_y^{\mathcal{T}} R_L^{\mathcal{T}} \hat{L}^{\mathcal{T}} \left(I - \hat{X}^{\mathcal{T}} \right)^{-1} \right)^{-1} \partial Y^{\mathcal{T}}$$

where $dY^{\mathcal{T}}$ and $dQ^{\mathcal{T}}$ are $\mathcal{T} \times \mathcal{I}$-length vectors, $\hat{L}^{\mathcal{T}}$ and $\hat{X}^{\mathcal{T}}$ are diagonal matrices with entries corresponding to each rationing periods, and where $C_y^{\mathcal{T}}$ is the $(\mathcal{T} \times \mathcal{I}) \times (\mathcal{T} \times N)$ matrix of intratemporal marginal propensities to consume, which maps changes in the household income distribution during rationing periods to changes in the consumption of each good during rationing periods.

- Shocks in each rationing period can influence output in other rationing periods
- Need to consider intertemporal MPCs (Auclert et al 2018)

▸ Back

Microfoundation of the Rationing Equilibrium

- More general rationing function: function of hypothetical labor supply (l_n^{*1}) and demand (L_n^{*1})

$$\ell_n^1 = R_n^S\left(\ell^{*1}, L^{*1}\right) \qquad\qquad L_i^1 = R_i^D\left(\ell^{*1}, L^{*1}\right)$$

- Our reduced form rationing function is a special case where:
  1. Rationing function satisfies free disposal and allocative efficiency (i.e. households can always work less)
  2. Interest rates are below efficient level (i.e. labor demand strictly exceeds supply)
  3. Household preferences are GHH (i.e. l_n^{*1} not a function of fiscal policy)

Back

Network Effects: Exact Decomposition in Terms of Bonacich Centralities

- Define:
  1. $\hat{m}$ – diagonal matrix of MPCs
  2. $\overline{C}^{1}_{y^1}$ – normalized spending direction matrix
  3. $\mathcal{G} \equiv I^1_{L^1}\widehat{L}^1\left(I - \widehat{X}^1\right)^{-1}\overline{C}^{1}_{y^1}$ map from household spending to others' income
  4. $b \equiv \vec{1}^T(I - \mathcal{G}\hat{m})^{-1}$ – Vector of Bonacich centralities in spending network
  5. $\left(b^{next}\right)^T = b^T\mathcal{G}$ – Average Bonacich centrality of households on whom I consume

Proposition 4

For any shock inducing a unit-magnitude labor incidence shock ∂y^1:

$$\vec{1}^T dY^1 = \underbrace{\frac{1}{1 - \mathbb{E}_{\partial y^1}[m_n]}}_{\text{Incidence multiplier}} + \underbrace{\mathbb{E}_{\partial y^1}[m_n]\left(\mathbb{E}_{\partial y^1}[b^{next}_n] - \frac{1}{1 - \mathbb{E}_{\partial y^1}[m_n]}\right)}_{\text{Biased spending direction effect}} + \underbrace{\mathbb{C}ov_{\partial y^1}[m_n, b^{next}_n]}_{\text{Homophily effect}}$$

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Estimating the Regional IO Matrix

Back

$$\underbrace{\hat{X}^1}_{(S\times I)\times(S\times I)} : \text{unit input demand of sector } i \text{ in state } s \text{ for good } j \text{ from state } k$$

- Use 2012 BEA make and use tables to construct national IO matrix
- Use 2012 CFS microdata on to compute gross trade flows between all state pairs for tradable commodities
- For nontradable sectors, we assume all production is within state
- *Key Assumption:* Input-output structure within each state is same as national IO matrix

Estimating the Rationing Matrix

Back

$$\left(R^1_{L^1}\widehat{L}^1\right)_{rn,si} = \underbrace{\mathbb{I}[r=s]}_{\substack{\text{Within}\\\text{State}}} \; \underbrace{\alpha_{ir}}_{\substack{\text{Labor Share}\\\text{of Output}}} \; \underbrace{\frac{y_{inr}}{\sum_n y_{inr}}}_{\substack{\text{Income}\\\text{Shares}}} \; \underbrace{\left(1+\xi\left(MPC_n - \overline{MPC}_{ir}\right)\right)}_{\text{Rationing on MPCs}}$$

1. Assume all labor income earned within state where production takes place ($\mathbb{I}[r=s]$)
2. Compute labor shares of output from BEA for each sector and state (α_{ri})
3. Use ACS to compute income shares of demographics in sectors and states (y_{inr})
4. Use LEHD to estimate exposure to business cycle shocks by worker demographic (ξ) (Patterson 2019)
   Figure
   - *Key Assumption:* All firms ration similarly by worker demographic

Estimating the Directed MPC Matrix

Back

$$\underbrace{\hat{\mathbf{C}}^1\mathbf{m}}_{(S\times I)\times(S\times N)} \; : \text{ demographic } n \text{ in state } s\text{'s MPC for good } i \text{ in state } r$$

$$MPC_{ri,sn} = \underbrace{MPC_n}_{\substack{\text{PSID/CEX} \\ \text{MPC}}} \times \underbrace{\alpha_{ni}}_{\substack{\text{CEX Basket} \\ \text{Share}}} \times \underbrace{\lambda_{irs}}_{\substack{\text{CFS} \\ \text{Flow}}}$$

1. Use PSID and CEX to estimate MPC_n using methodology of Blundell, Pistaferri and Prestion (2008), Guvenen and Smith (2014) and Patterson (2019) Figure Details
   - MPC for capitalists of 0.028 (Chodorow-Reich, Nenov, and Simsek 2019)
2. Use CEX to compute consumption basket shares for each demographic α_{ni} Figure
   - *Key Assumption:* Linear Engel curves for each demographic group
3. Use CFS to compute consumption trade flows across states λ_{irs}
   - Assume all non tradables consumed within state

Historical and Counterfactual Exercises

Back

- Multiplier changes over time as fundamentals of economy change

1. The role of IO linkages: An economy with no intermediate inputs has the same aggregate multipliers but more heterogeneity in spending multipliers Figure
2. The decline of the labor share: The fall in the labor share from 2000 to 2012 lead to smaller purchases multipliers Figure
3. Rising labor income inequality: Can change multipliers if it changes MPCs or shuffles workers across industries/regions

Full Statement of Planner's Problem

- Household Problem:

$$(\ell_n^2, c_n^1, c_n^2) \in \underset{\ell^2, c^1, c^2}{\arg\max}\ u_n^t(c^1, \ell_n^1) + \beta_n u_n^t(c^2, \ell^2)$$
$$\text{s.t } p^1 c^1 + \frac{p^2 c^2}{1+r} + \tau_n^1 + \frac{\tau_n^2}{1+r} = \ell_n^1 + \frac{\ell^2}{1+r} \tag{1}$$
$$\ell_n^1 - p^1 c^1 - \tau_n^1 \geqslant \underline{s}_n$$

- Social welfare for fiscal policy (G, τ):

$$W(G,\tau) \equiv \sum_{n \in N} \lambda_n \mu_n W_n(I_n^1(G,\tau), \tau_n)$$

  - $I^1(G,\tau)$: household labor income consistent with rationing equilibrium with fiscal policy given by (G,τ).

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Quantifying gains from targeting transfers: CARES Act

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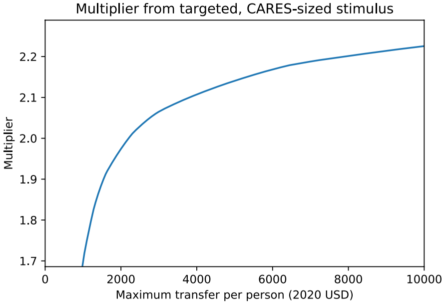
- Direct payments in CARES Act: $\approx \$1,200$ to those making less than \$75,000

Quantifying gains from targeting transfers: CARES Act

Back

- Direct payments in CARES Act: $\approx \$1,200$ to those making less than \$75,000
- In our model, increased GDP by 79 cents per dollar spent



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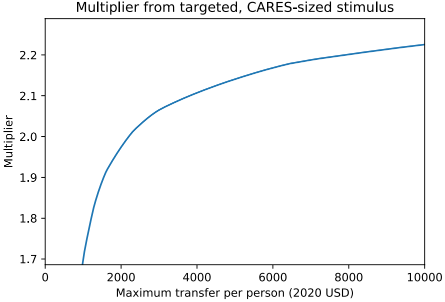

- Takeaway 1: With maximum transfer of \$1,200, income-targeting was very effective (1.79 vs. 1.8)

Quantifying gains from targeting transfers: CARES Act

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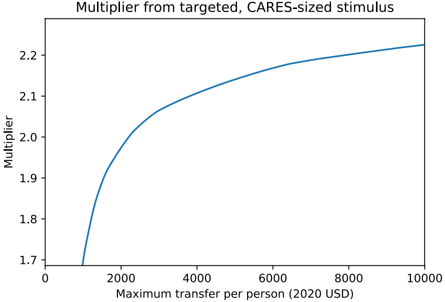

- Takeaway 1: With maximum transfer of \$1,200, income-targeting was very effective (1.79 vs. 1.8)
- Takeaway 2: Could have generated more stimulus with larger transfer to higher-MPC households (1.8 vs. 2.02)

Exploring constant consumption shares assumption

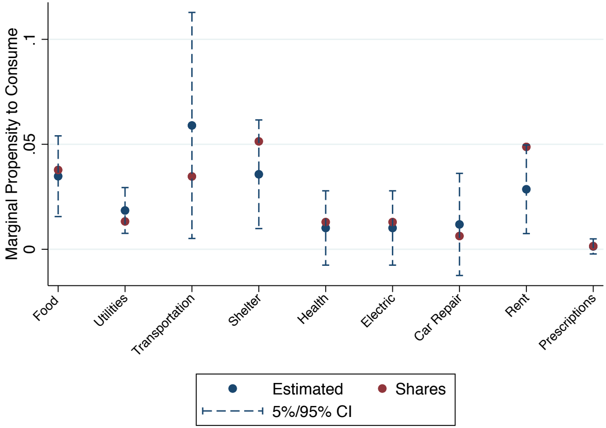

Figure: Estimated Directed MPCs Vs. CEX basket-weighted MPCs

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Substantial MPC Heterogeneity Across Demographics

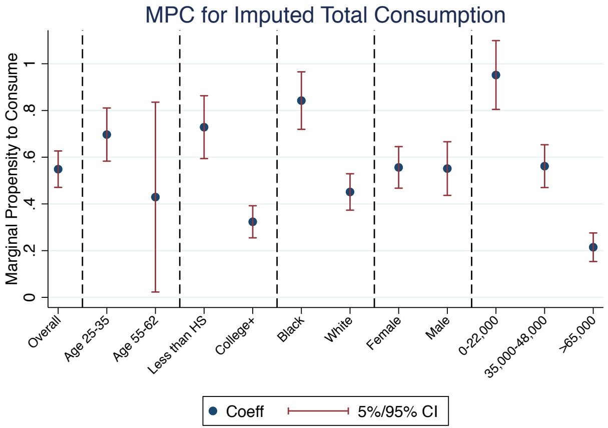

Figure: Heterogeneity in MPCs by Demographic Group (Patterson 2019)

Details of MPC Estimation

- Following Gruber (1997) use panel structure of PSID:

$$\Delta C_{it} = \sum_{x} (\beta_x \Delta E_{it} \times x_{it} + \alpha_x \times x_{it}) + \delta_{s(i)t} + \varepsilon_{it}$$

C_{it} = consumption expenditure, E_{it} = labor earnings, x = demographics, state-by-time FEs

- Instrument for income changes using unemployment shocks
- Using CEX: estimate demand for food expenditure as function of durable consumption, non-durable consumption, demographic variables and CPI prices
- Assuming monotonicity, invert to predict total consumption in the PSID using demographics and food expenditure

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Relationship between MPC and Exposure to the Business Cycle

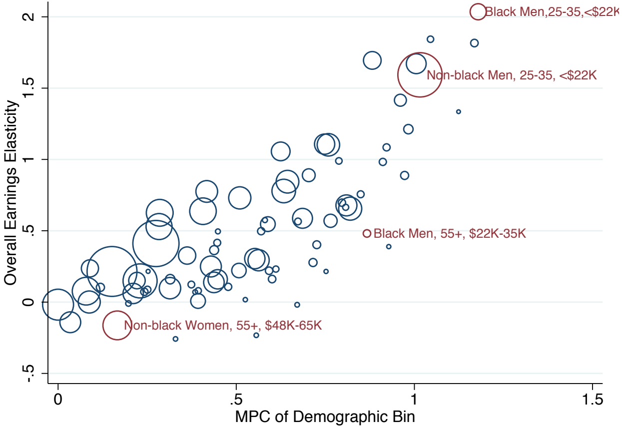

Figure: Earnings Elasticity and MPCs (Patterson 2019)

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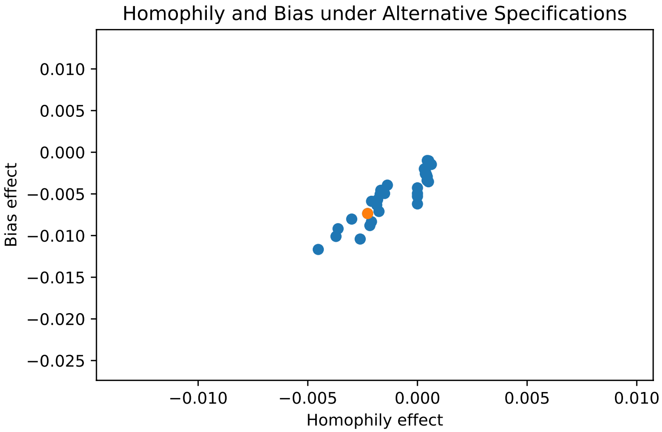
Empirical irrelevance of the bias and homophily effects is a robust feature economy



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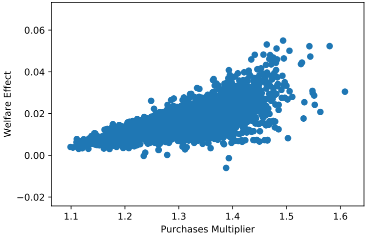
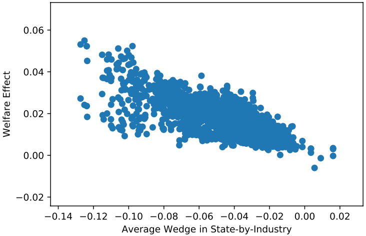
Welfare Effects from Targeted Spending in Great Recession

(a) Output Multipliers



(b) Rationing Wedges



- Welfare gain from spending one dollar in specific industry-state in Great Recession
  - Takeaway 1: Welfare gain highly correlated with output multiplier
  - Takeaway 2: Welfare gain highly correlated with size of rationing wedge

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Assumptions Linking Hours Worked to Labor Wedges

- **Rationing wedge:** wedge in the first-period intratemporal Euler equation

$$v_n^{1\prime} = \beta_n \frac{1 + r^1}{1 - \phi_n} v_n^{2\prime}(1 + \Delta_n)$$

  - Assume households within group are homogenous → adjustments on intensive margin
  - Households have slack borrowing constraints ($\phi_n = 0$)
  - Households apply zero utility discount rate to the future ($\beta_n(1 + r^1) = 1$)
  - Households have quadratic labor disutility with parameter
- *Intuition:* household working less are underemployed since wages are fixed and preferences imply no discounting

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Assumptions for Equilibrium Existence

- **Assumption 1:** For all i and z_i, production $F(X_i, L_i, z_i)$ is continuous, weakly increasing, strictly quasi-concave, and homogeneous of degree one in (X_i, L_i). Further, labor is essential in production, i.e. $F(X_i, 0, z_i) = 0$, and production is strictly increasing in labor. Finally, there exists some $\overline{p} \in \mathbb{R}_+^{\mathcal{I}^t}$ and $\{X_i, L_i\}_{i \in \mathcal{I}^t}$ s.t. for all i, $F(X_i, L_i, z_i) \geqslant 1$ and $\overline{p}X_i + L_i \leqslant \overline{p}_i$.
- **Assumption 2:** For any $\varrho, y^1, \tau, \theta$: for each good i, some household type n has $c_{ni}^t > 0$.
- **Assumption 3:** The primitives satisfy the following properties:
  1. The consumption and labor functions c_n^t and l_n^1 are continuous in r^1 and y^1.
  2. For all $n, \varrho, \tau_n, \theta_n$, $p^1 c_n^1(\varrho, y_n^1, \tau_n, \theta_n)$ is weakly increasing in y_n^1.
  3. For any p, τ, θ: there exists $\overline{y} \in \mathbb{R}_+$ and $\overline{c} < 1$ such that for all $n \in N$, $r^1 \in [\underline{r}, \overline{r}]$, and $y_n^1 > \overline{y}$, we have that $p^1 c_n^1(\varrho, y_n^1, \tau_n, \theta_n) \leqslant \overline{c} y_n^1$.
  4. Interest rates have an upper and lower bound, i.e. $r^1(Q) \in [\underline{r}, \overline{r}]$ and r is differentiable.
- **Under Assumption 1, 2 and 3, there exists a rationing equilibrium**

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Technical Conditions for "No Substitution Theorem"

- **Assumption 1:** For all i and z_i, production $F(X_i, L_i, z_i)$ is continuous, weakly increasing, strictly quasi-concave, and homogeneous of degree one in (X_i, L_i). Further, labor is essential in production, i.e. $F(X_i, 0, z_i) = 0$, and production is strictly increasing in labor. Finally, there exists some $\overline{p} \in \mathbb{R}_+^{\mathcal{I}^t}$ and $\{X_i, L_i\}_{i \in \mathcal{I}^t}$ s.t. for all i, $F(X_i, L_i, z_i) \geqslant 1$ and $\overline{p}X_i + L_i \leqslant \overline{p}_i$.
- **Assumption 2:** For any $\varrho, y^1, \tau, \theta$: for each good i, some household type n has $c_{ni}^t > 0$.
- **No Substitution Theorem:** Under Assumptions 1 and 2, for a given z^t, there exists a unique p^t consistent with rationing equilibrium, independent of demand.

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No Substitution Theorem: Intuition

- **No Substitution Theorem: Under mild assumptions, for a given z^t, there exists a unique p^t consistent with rationing equilibrium, independent of demand.**
  - *Key point: unit cost is fixed in response to demand shock and technologically determined*
  - The idea is that prices are grounded through labor costs
  - Suppose 1 industry – price pinned down by price of labor
  - Suppose another industry uses industry 1 as input – price also pinned down by labor
  - And so on...
  - Theorem shows intuition carries over to more general case

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Understanding Bias and Homophily Terms: Two Offsetting Effects

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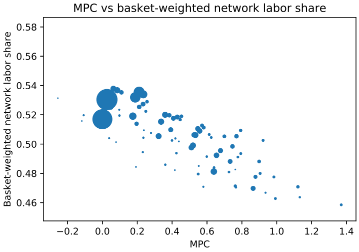

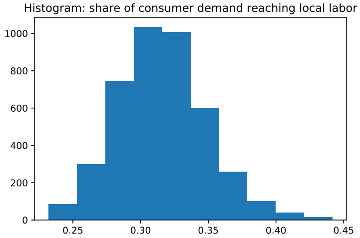

- *Empirical Fact 1:* High MPC households consume from low labor share industries, creating negative homophily (Hubmer 2019)
- *Empirical Fact 2:* Substantial fraction of demand remains local, creating positive homophily

The heterogeneity come entirely from direct incidence

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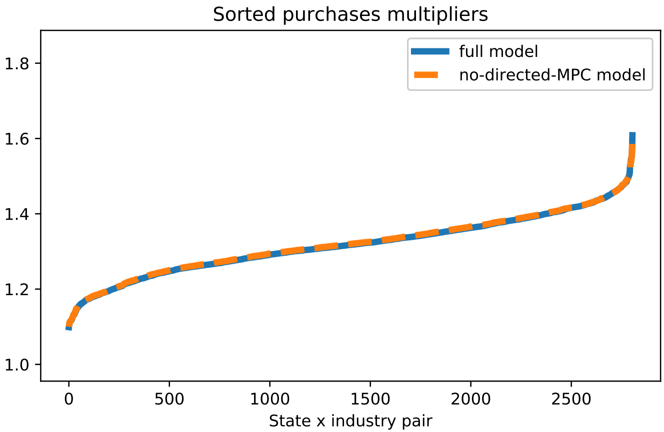
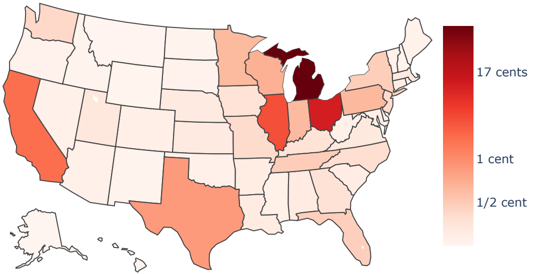


Regional Demand Linkages: Regional Spillovers

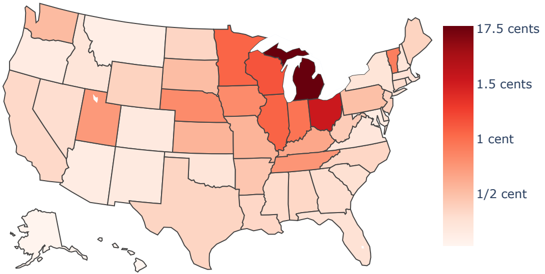
Change in GDP from $1 shock in Michigan



- About *half* of total amplification comes from cross-state spillovers (Auerbach et al. 2020)

Regional Demand Linkages: Per Capita Spending

Change in GDP / capita from $1 / capita shock in Michigan



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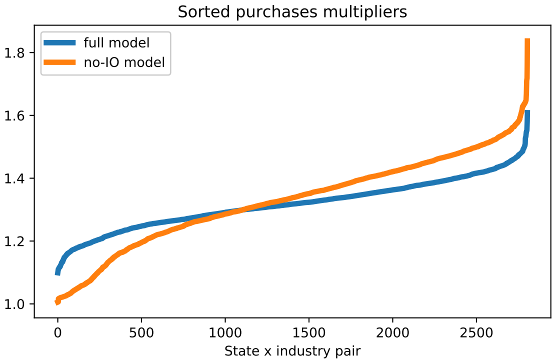
IO linkages dampen the distribution of multipliers

- IO linkages *narrow* the heterogeneity across sectors/states
    - Inputs dilutes the MPC of workers receiving marginal dollars



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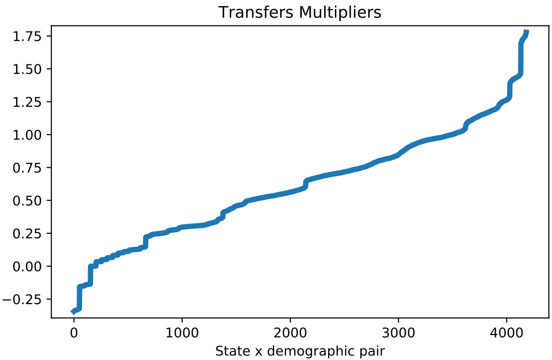
Even larger dispersion in transfer multipliers

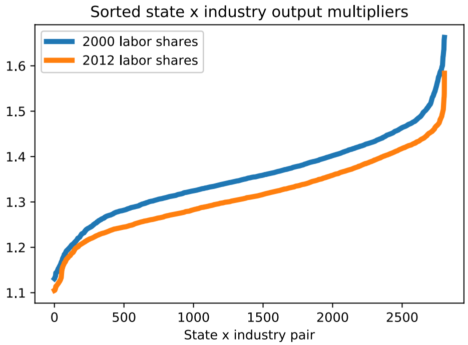
▸ Back



- Transferring $1 to all households generates 0.77 dollars of GDP per dollar spent
- Transferring $1 to highest multiplier group generates 1.78 dollars of GDP per dollar spent

Multipliers and the decline of the labor share

- Consider the decline in the labor share by industry from 2000-2012, keeping all else equal
- Assume the difference in labor income to a factor with $MPC = 0$



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Special Case with No Incidence or Bias Effect: Homotheticity

- Assume the following conditions:
  - Consumption preference and labor rationing are homothetic (i.e. marginal change is the same as the average)
  - No households are net borrowers in period 1
  - No government spending
- Then, for a GDP-proportional demand shock, the incidence and bias effects are 0
  - Each household's marginal consumption is proportional to its initial consumption → income-weighted average of marginal consumption is proportional to output.
  - Households with different consumption bundles → some households experience a greater change in income
  - Those households have different MPCs from the average → homophily possible.

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Special Case with No Network Effects

When does this collapse to classical Keynesian multiplier?

- If all industries have a common rationing-weighted average MPC, m, then

$$\vec{1}^T dY^1 = \frac{1}{1 - \mathbb{E}_{y*}[m_n]} = \frac{1}{1 - m}$$

- *No matter where the shock hits, the aggregate consumption response is the same*
- Special case of this: single good and single household

Back

Case 2: Targeting fiscal policy with localized shocks

- Planner wants to direct labor income to the most severely unemployed households

$$dW = \sum_{n \in N} \underbrace{\frac{l_n^2 - l_n^1}{l_n^2}}_{\substack{\text{Labor Wedge} \\ \text{Income}}} \times \underbrace{\left(dl_n^1\right)}_{\substack{\text{Labor Income Effect} \\ \text{of Stimulus}}}$$

- In this case, optimal to target on the *combination* of labor wedges and household MPCs
- Under some standard assumptions, the labor wedge is given by the percent change in hours of group Assumptions
- *Implication: Targeting auto industry in Great Recession improved welfare over and above the effect it had on total output*

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