

MACROECONOMIC IMPLICATIONS OF COVID-19: CAN NEGATIVE SUPPLY SHOCKS CAUSE DEMAND SHORTAGES?

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CONTEXT

- COVID-19 pandemic: deep impact on the macroeconomy
- Governments and Central Banks: bold policies to help economy
- Active debate: should policy "stimulate" spending?
- Textbook approach:

Is the pandemic a supply or a demand shock?

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Our Approach: Demand is Endogenous to Supply Shock Examine this relationship and policy

COVID shock...

- Asymmetric Shock: only in contact-intensive sectors
- Gains from Trade: health risk inhibits trading between buyers & sellers

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- "Keynesian Supply Shock"

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A negative supply shock that causes demand shortages

	Complete Markets	Incomplete Markets
One Sector	NO (Standard)	
Multiple Sectors		

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SECTORAL SHOCK: COMPLETE MARKETS



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SECTOR A: HIGH CONTACT INTENSIVE

SECTOR B: LOW CONTACT INTENSIVE



SECTOR B

WORKERS

SECTOR A Workers



PREFERENCES AND TECHNOLOGY

Preferences

$$\sum_{t=0}^{\infty} \beta^{t} U(c_{At}, c_{Bt})$$
$$U\left(c_{At}, c_{Bt}\right) = \frac{\sigma}{\sigma - 1} \left(\phi^{\frac{1}{e}} c_{At}^{\frac{e-1}{e}} + (1 - \phi)^{\frac{1}{e}} c_{Bt}^{\frac{e-1}{e}}\right)^{\frac{e}{e-1}\frac{\sigma-1}{\sigma}}$$

$$Y_{jt} = N_{jt}$$

• Each worker with labor endowment $n_{it} = \bar{n}$

- Specialized labor, with fraction
 - $\bullet \phi$ in sector A
 - ▶ 1ϕ in sector *B*

MARKETS

- Agents have access to zero-net-supply one-period bonds
- Budget constraint

 $p_{At}c_{iAt} + p_{Bt}c_{iBt} + a_{it} \le w_t n_{it} + (1 + i_{t-1})a_{1t-1}$

Fraction μ face borrowing constraint

 $a_{it} \ge 0$

- Limit cases...
 - $\epsilon \to \infty$ one sector model
 - $\mu \rightarrow 0$ complete markets in aggregate (Gorman)

MIT shock...

- Time 0: shutdown of sector A (fraction ϕ of workers get $n_{i0} = 0$)
- Time 1,2,3,...: back to normal (flexible price allocation)
- Assume...
 - 1. Downward rigid nominal wages
 - 2. Central Bank keeps interest rate unchanged

Question: at time 0, is there excess demand or insufficient demand?

PERFECT SUBSTITUTES

Proposition: One sector ($\epsilon \rightarrow \infty$) Negative Supply Shock

Higher natural rate + Excess demand

PERFECT SUBSTITUTES



Why?

- temporary negative supply shock = good news shock
- agents want to borrow (not save!), but they might not be able to...
- Limit case: $\mu \rightarrow 1$ and no excess demand

CONSUMPTION FUNCTIONS: ONE SECTOR, COMPLETE MARKETS



Proposition. Multiple Sectors + Complete Markets

Negative Supply Shock



Lower natural rate + Deficient demand





CONSUMPTION FUNCTIONS: MULTI SECTOR, COMPLETE MARKETS



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Proposition. Multiple Sectors + Incomplete Markets

Negative Supply Shock



Lower natural rate + Deficient demand

 $\sigma > (1 - \omega)\epsilon + \omega$



Complete markets



Incomplete markets (CES)

Proposition. Multiple Sectors + Incomplete Markets

Negative Supply Shock



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Complete markets



Incomplete markets (CES) Incomplete markets (local CES)

CONSUMPTION FUNCTIONS: MULTI SECTOR, INCOMPLETE MARKETS



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Input-output...

- usual story: make supply shock greater
- here: demand effect...

$$Y_A = F(X, N_A)$$
$$Y_B = C_B + X$$

- Result: Keynesian Supply Shock more likely
- Intuition: similar to higher hand-to-mouth consumption
- Demand shocks: from downstream to upstream!

MOBILITY

- Allow fraction of workers to move
- Result...
 - natural output falls by less
 - actual output also falls by less (income)
 - gap grows!

- Mobility...
 - good for economy
 - but increases demand deficiency

FISCAL POLICY

$G_t + \phi T_{At} + (1 - \phi) T_{Bt} + (1 + r_{t-1}) D_{t-1} = D_t$

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Proposition. Fiscal Policy

 $Y_{B0} = G_0 + \mu \phi T_{A0} + \text{constant}$

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- Spending multiplier = 1
- > Transfer multiplier = μ < 1
- No 2nd round Keynesian Cross operating! Multipliers not $1/(1 - \overline{mpc})$

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FISCAL POLICY: SOCIAL INSURANCE

- Social Insurance: low multipliers, yet optimal!
- Transfer to A, with equal taxes on A and B in future t=1,2,...

 $T_{A0}=
hoar{n}\geq 0$ (replacement rate ho)

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Full insurance $\rho^* = 1$ optimal for Utilitarian

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replacement less than 100% maximizes stimulus but 100% optimal for insurance

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EXTENSIONS

$$V_0 = \max\{-w + \frac{1}{R}V_1, 0\}$$

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JOB DESTRUCTION AND SLOW RECOVERIES

- If job losses not temporary: persistence and amplification
- Suppose vacancies
 - do not come back at t=1
 - come back at t=2 for free
- Result...
 - Affect t=1 productivity...
 - ... affects t=1 income...
 - ... which feeds back into demand at t=1 and t=0

BUSINESS EXIT CASCADES

- Lack of demand can cause some non-affected businesses to shut down (if they can't cover fixed costs)
- Set of goods falls beyond initial shock
- Complementarities + incomplete markets: amplification!



DISCUSSION & EVIDENCE

EVIDENCE FOR KSS FORCES AT WORK

Consumption drop



From Cox, Farrell, Ganong, Grieg, Noel, Vavra, Wong (2020)

COMPLEMENTARITIES

Evidence suggesting complementarities main force:



From Cox, Farrell, Ganong, Grieg, Noel, Vavra, Wong (2020)

EVIDENCE FOR KSS FORCES AT WORK

Broad contraction in most sectors



From Brinca, Duarte, Faria e Castro (2020)

EVIDENCE FOR KSS FORCES AT WORK

Spillover to low income spending





Chetty, Friedman, Hendren, Stepner, Opportunity Insights Team (2000)

SOCIAL INSURANCE AT WORK

Unemployment insurance

A. Seasonally Adjusted Spending Changes by Income Quartile



Chetty, Friedman, Hendren, Stepner, Opportunity Insights Team (2000)

EVIDENCE FOR KSS FORCES AT WORK

CPI down



ASIDE ON INFLATION

- Two different ways to look at inflation:
 - 1. measure of slack: prices go down for traded goods reflecting lack of demand
 - 2. **cost of living**: welfare-based CPI goes up (Jaravel-O'Connell)
- Alternative intuition for result: expected deflation and intertemporal substitution drive spending down

MEASURABLE PARTIAL EQUILIBRIUM RESPONSES

A condition for KSS in terms of measurable objects

$$(1-\mu)MPC^{S,U} + \mu MPC^{S,C} > \left[\frac{\Delta c_B}{\Delta c_A}\right]^{shutdown}$$

Quantity on RHS also a type of cross-goods MPC: if you save x on hotels because hotels are closed, how much do you spend on other stuff?

- Stronger complementarities if we consider input-output linkages across sectors
- Incentivizing labor hoarding achieves two objectives:
 - 1. Provide social insurance
 - 2. Preserves job match value
- Endogenous business exit generates cascade effects



CONCLUSIONS

- KSS = asymmetric supply shocks that generate demand shortages in the rest of the economy
- KSS are more plausible when sectors are more complementary (through preferences or input-output linkages) and when markets are more incomplete
- Policy recommendation: targeted transfers!
- Tentative reading of real time evidence: CARES Act has been successful and we need caution in reducing social insurance going forward

THANK YOU!

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