MACRO IMPLICATIONS OF COVID-19

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HOW SHOULD WE THINK ABOUT A PANDEMIC IN A MACRO MODEL?

➤ Covid-19 pandemic is having a dramatic impact on the worldwide economy

➤ Governments and Central Banks have implemented a number of policies to help alleviating the adverse effects of the pandemic

➤ **Policy debate: Should policy stimulate spending? Which policies most effective?**

➤ Textbook approach:

Supply or Demand Shock?

➤ Interconnection between demand and supply makes this question **too simplistic...**

COVID MACRO: GUERRIERI–LORENZONI–STRAUB–WERNING

➤ **Multi-sector model** crucial to think about the effects of a pandemic:

pandemic = asymmetric shock to high-contact intensive sectors

➤ Key: demand is endogenous!

➤ Our take: **Keynesian supply shock** = supply shock in contact-intensive sectors that propagate to other sectors through **demand shortages**

  ➤ complementarities across sectors
  ➤ incomplete markets
  ➤ input-output linkages
  ➤ business exit cascades
  ➤ job match destruction
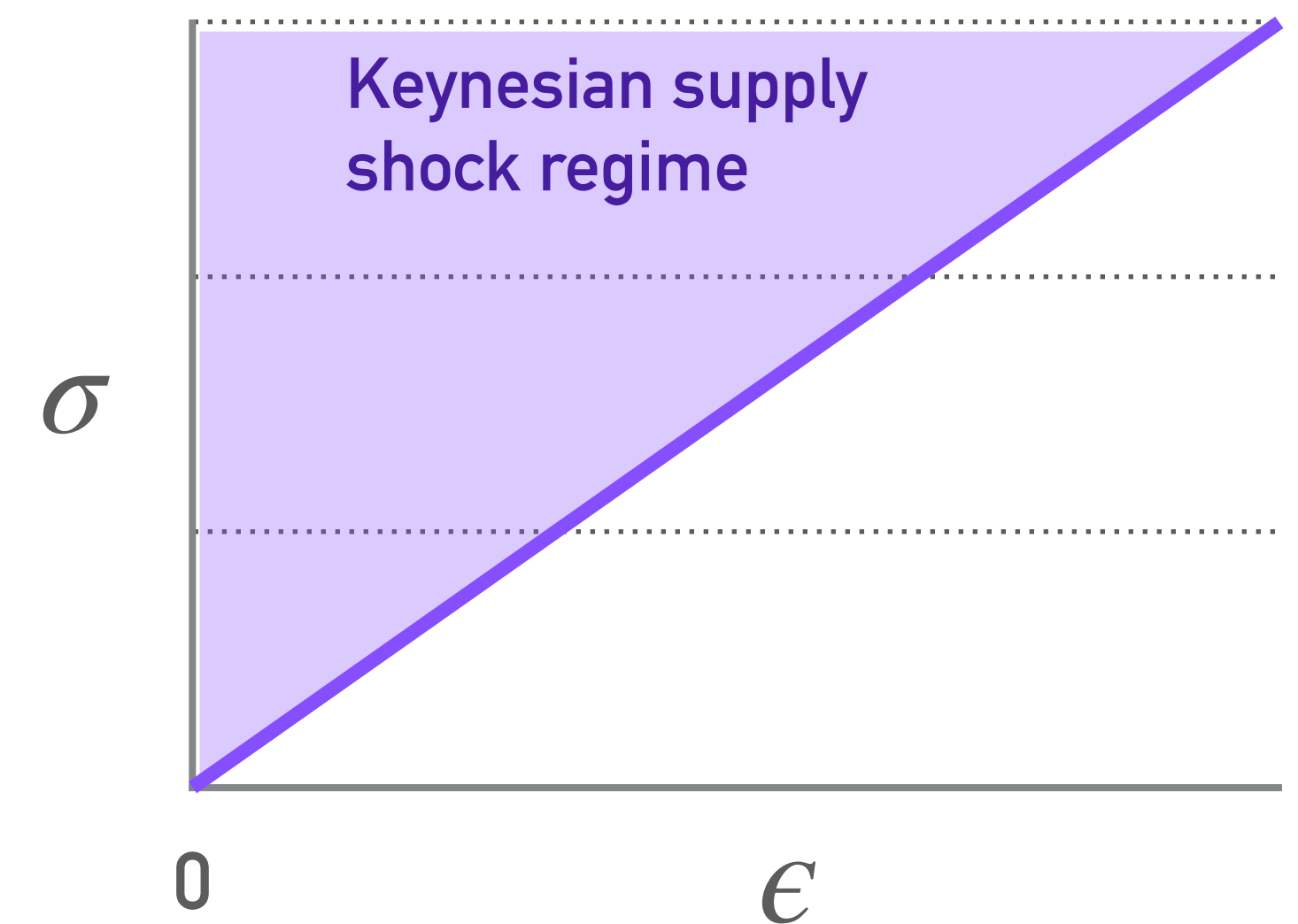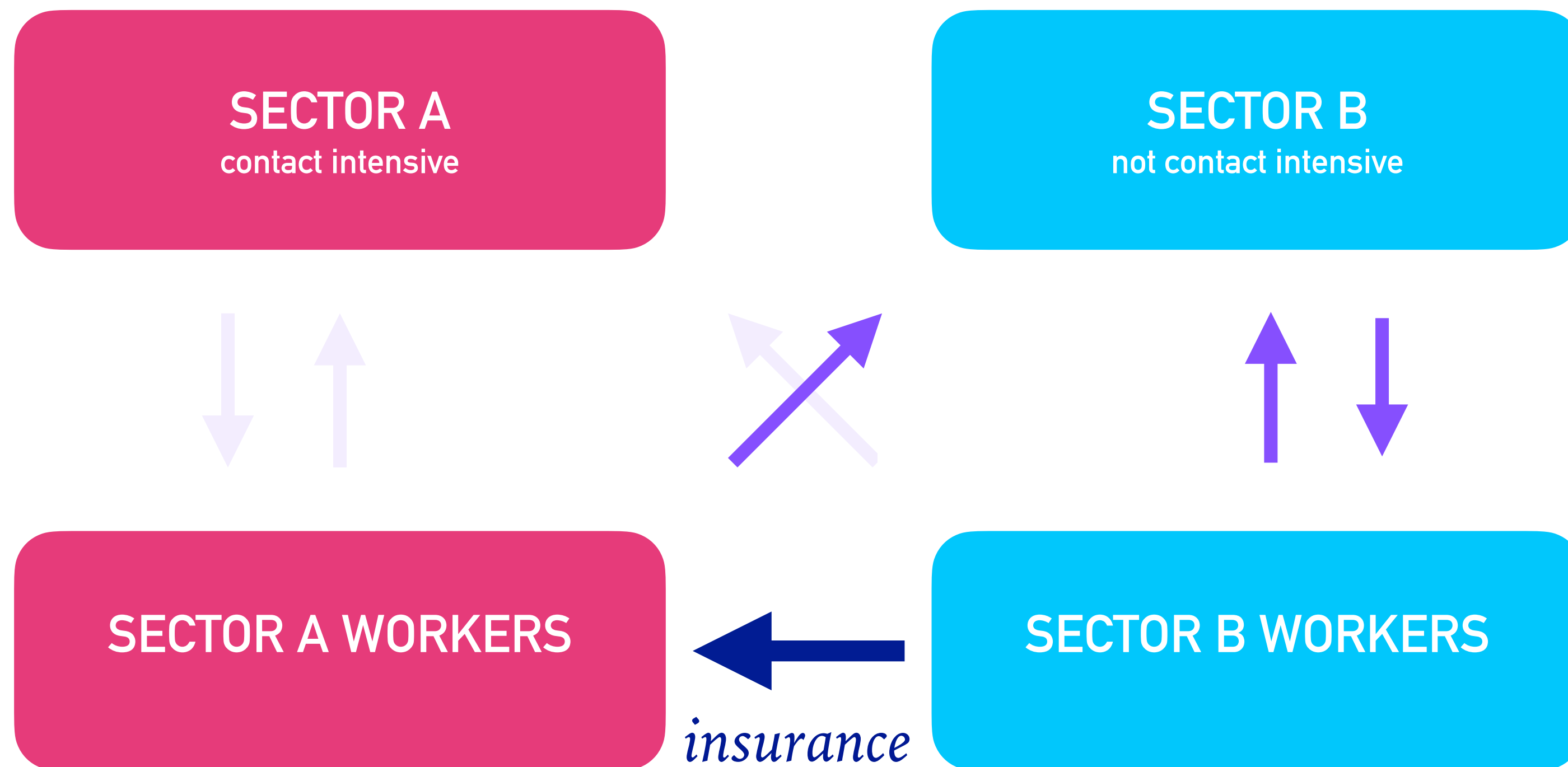
PROPAGATION

➤ 2-sector economy, **intra**temporal substitution: ϵ, **inter**temporal substitution: σ

➤ Key question: how does shock propagate from A to B ? Demand? Supply?
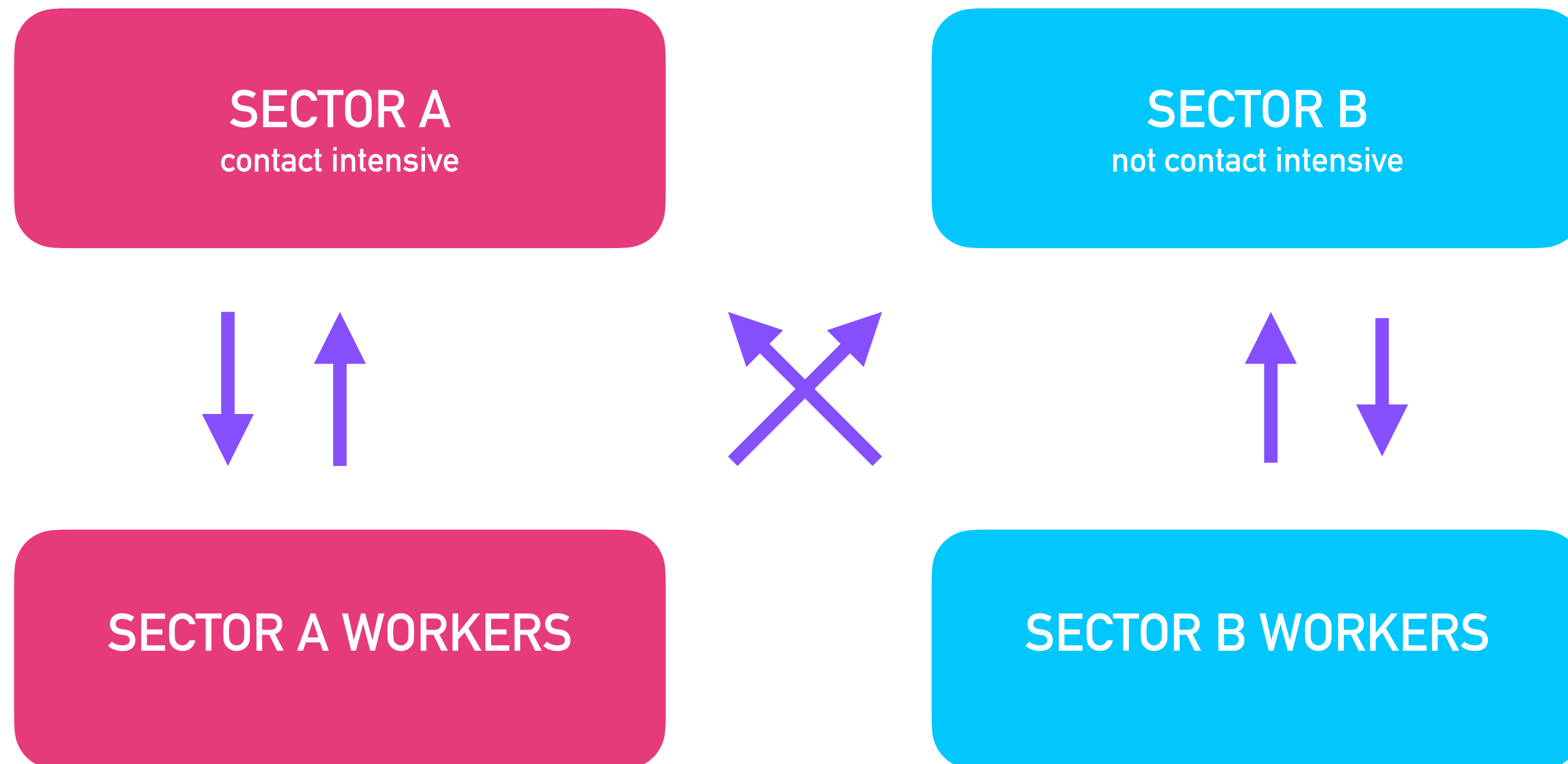
PROPAGATION WITH COMPLETE MARKETS

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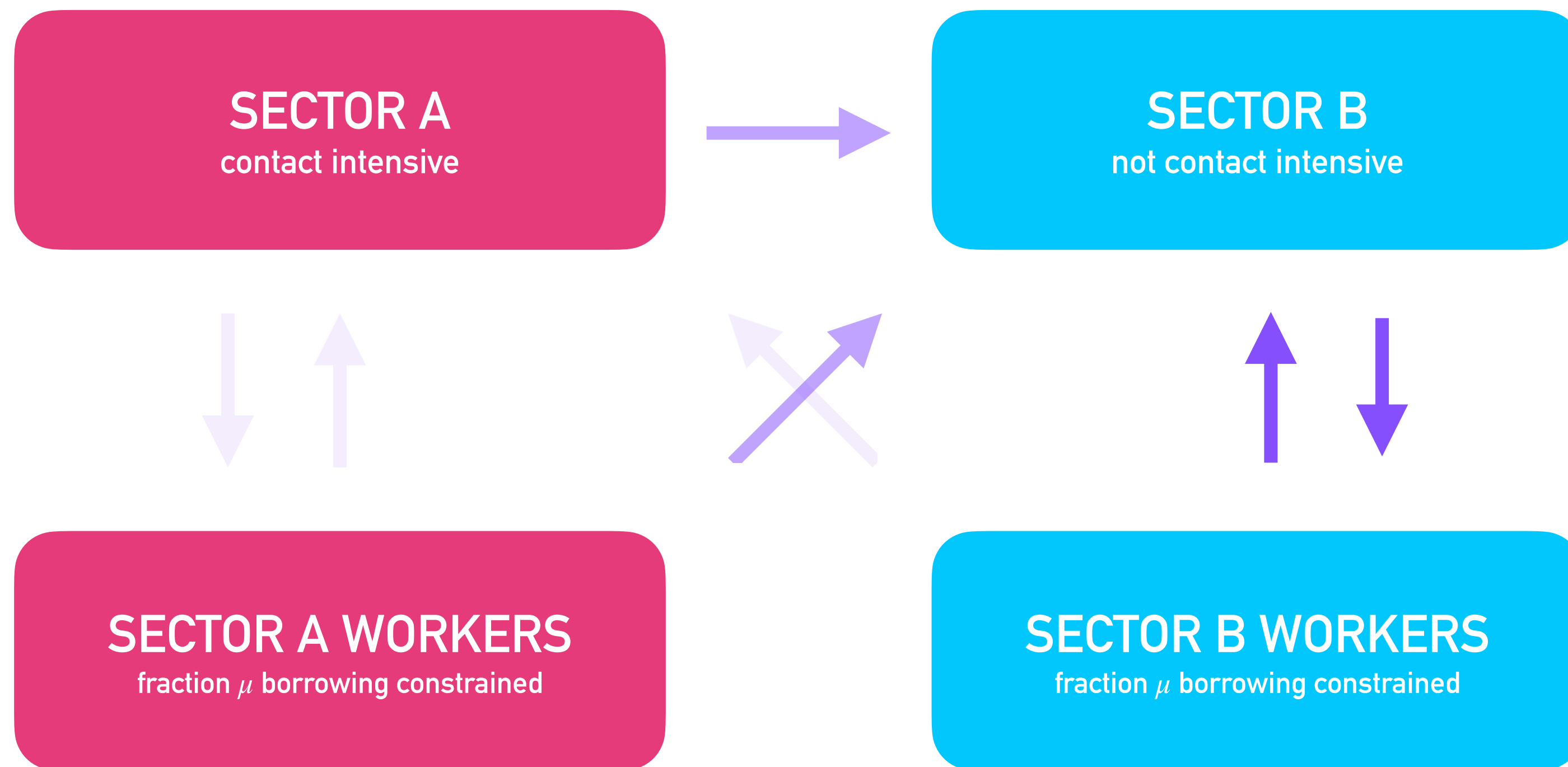
PROPAGATION WITH INCOMPLETE MARKETS

➤ Incomplete markets: fraction μ of workers are borrowing constrained

➤ + workers are specialized in their sector
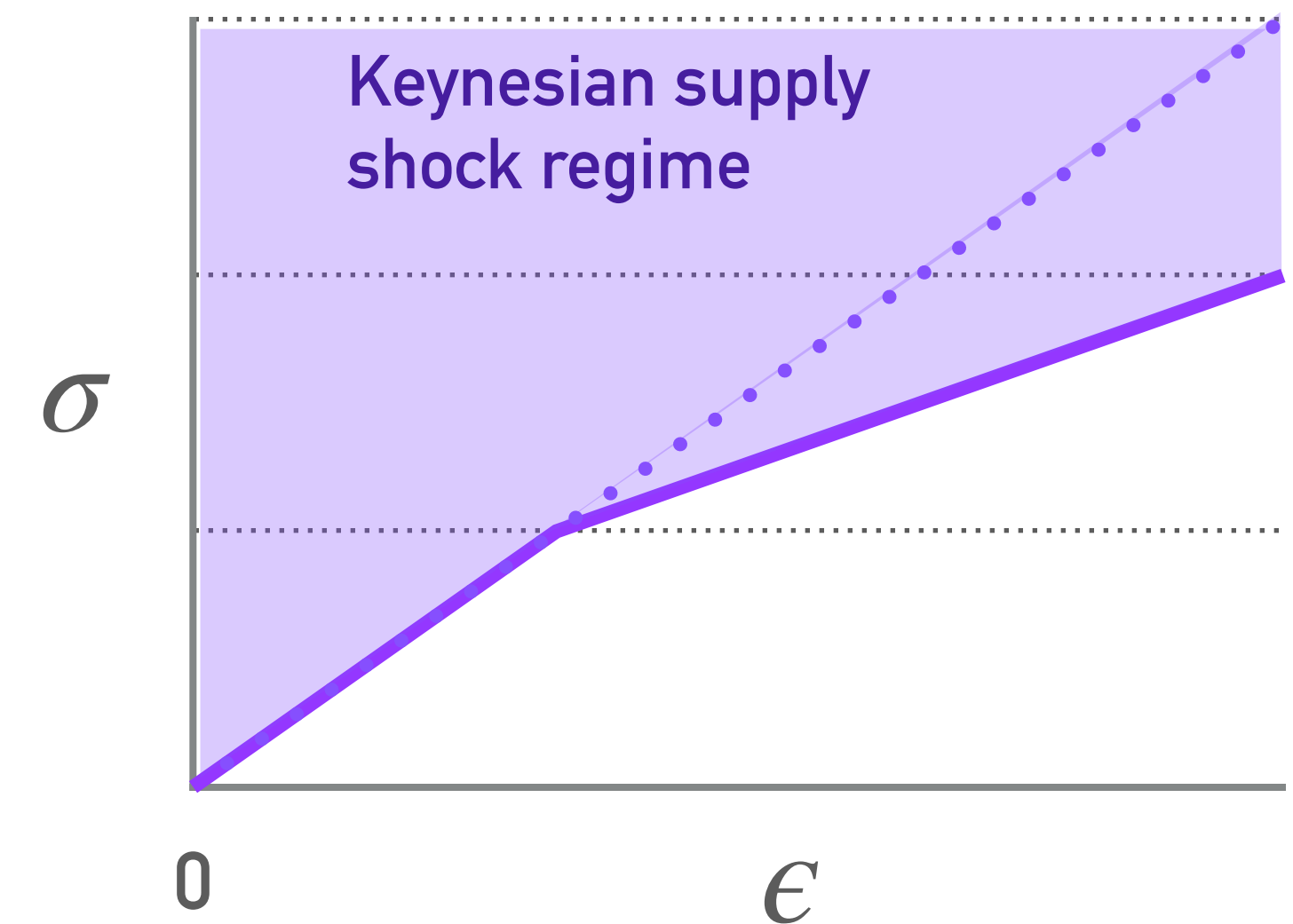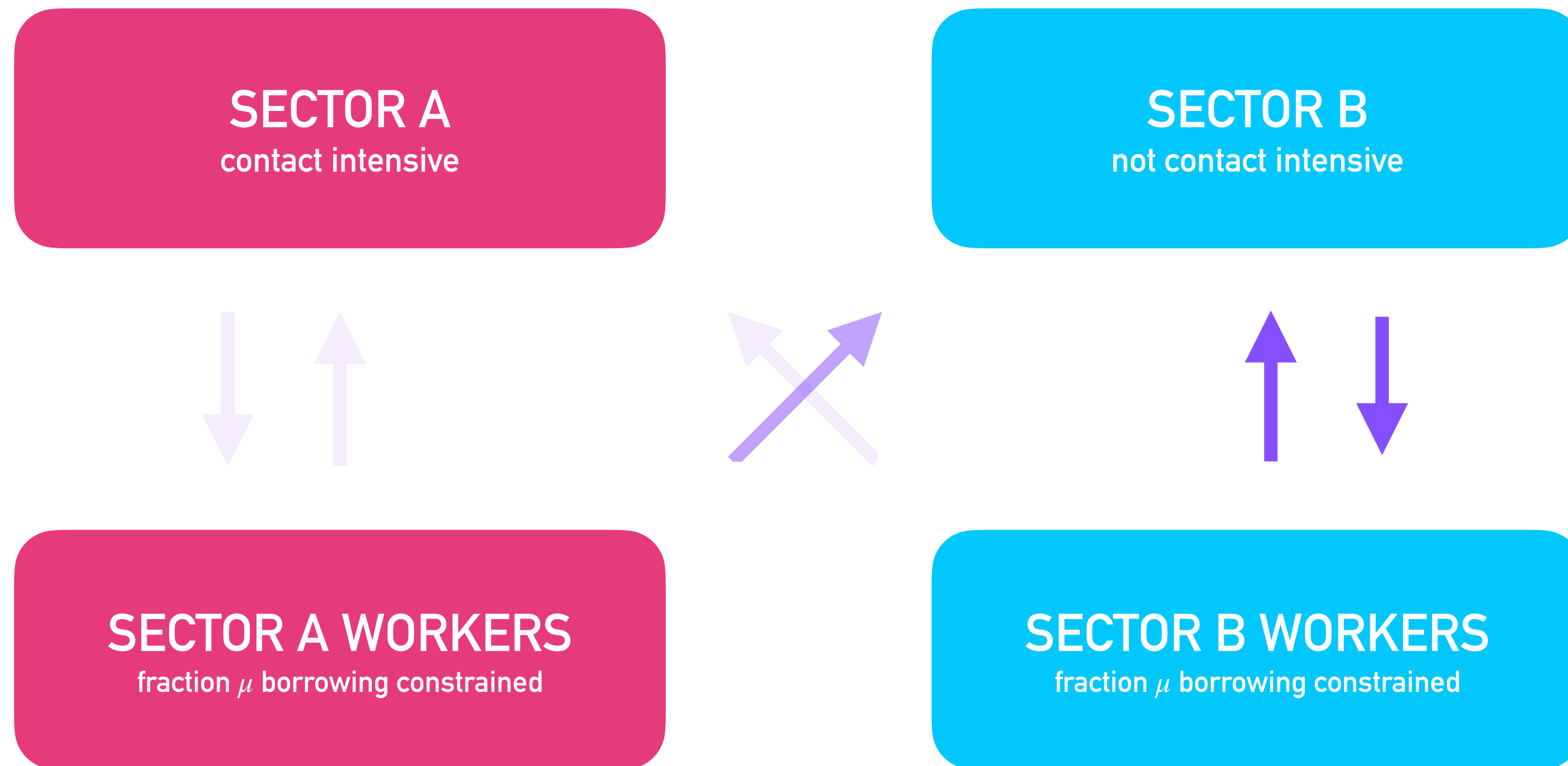
PROPAGATION WITH INCOMPLETE MARKETS AND SUPPLY CHAINS

➤ Supply chain: sector A uses intermediate goods produced in sector B

➤ Demand shocks travel from downstream to upstream
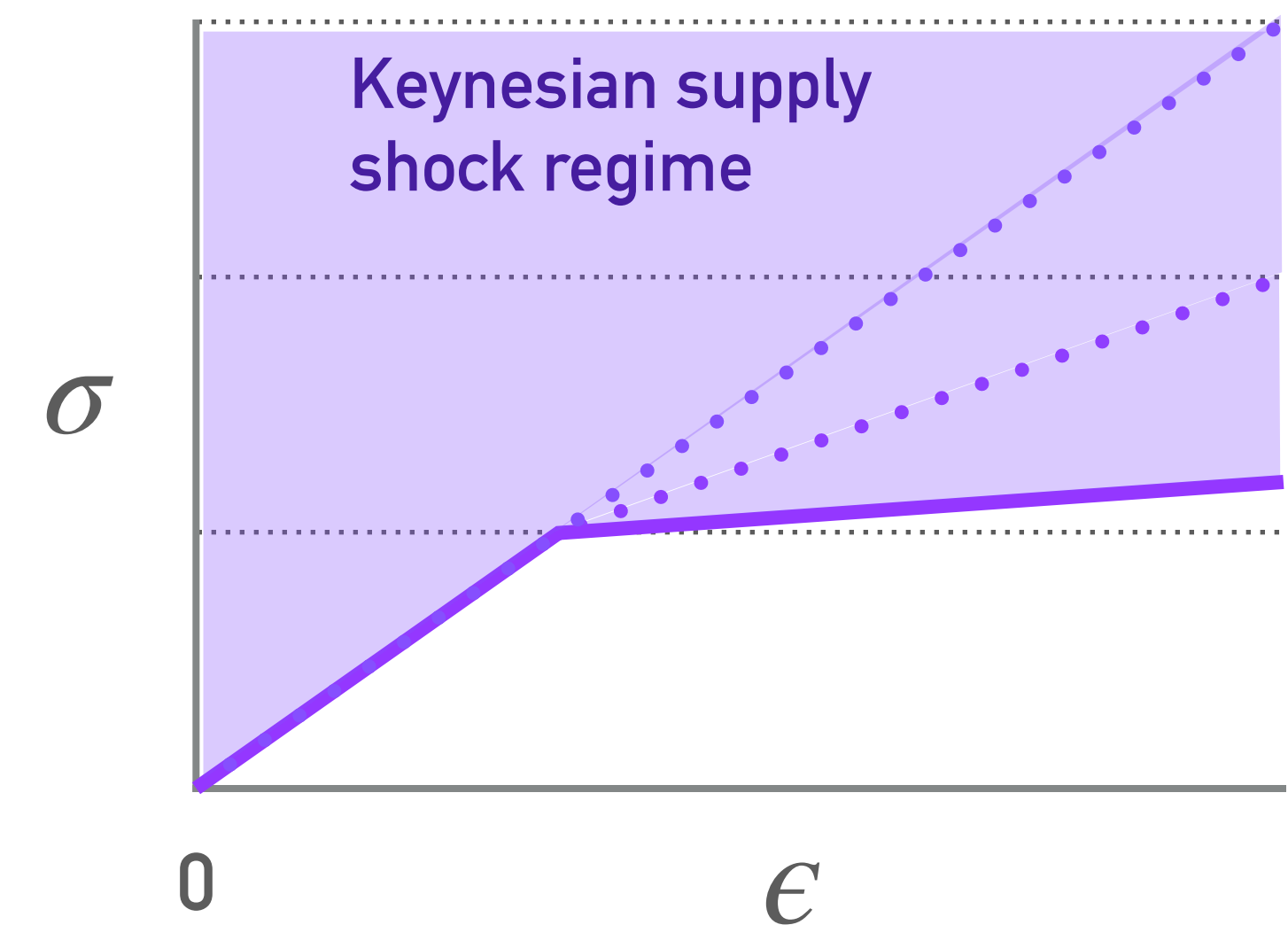
MODEL

➤ Preferences

$$\sum_{t=0}^{\infty} \beta^t U(c_{At}, c_{Bt})$$

$$U(c_{At}, c_{Bt}) = \frac{\sigma}{\sigma - 1} \left(\phi^{\frac{1}{\epsilon}} c_{At}^{\frac{\epsilon - 1}{\epsilon}} + (1 - \phi)^{\frac{1}{\epsilon}} c_{Bt}^{\frac{\epsilon - 1}{\epsilon}} \right)^{\frac{\epsilon}{\epsilon - 1} \frac{\sigma - 1}{\sigma}}$$

➤ Technology: for $j = A, B$

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

➤ Continuum of measure 1 of agents: each with labor endowment $n_{it} = \bar{n}$

➤ Fraction ϕ of workers specialized in sector A and $1 - \phi$ in sector B (immobile labor)

MODEL (CONTINUED)

➤ Agents have access to zero-net-supply one-period bonds

➤ Budget constraint

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

➤ Fraction μ face borrowing constraint

$$a_{it} \geq 0$$

➤ Limit cases:

  ➤ $\epsilon \rightarrow \infty$: one sector model
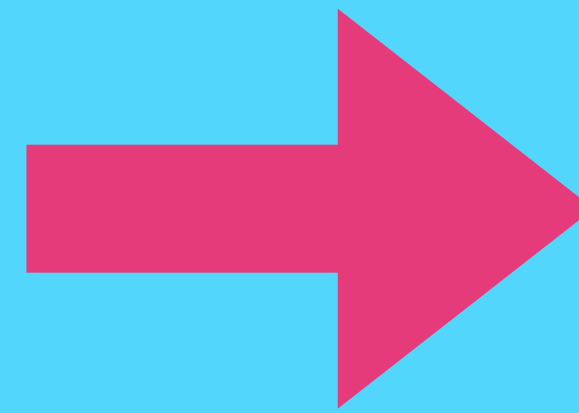
  ➤ $\mu \rightarrow 0$: complete market model

PANDEMIC SHOCK

➤ MIT shock:

  ➤ Economy in steady state (all have zero assets)

  ➤ Time 0: temporary shut down of sector A $= \phi$ workers in sector A get $n_{it} = 0$

  ➤ 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?

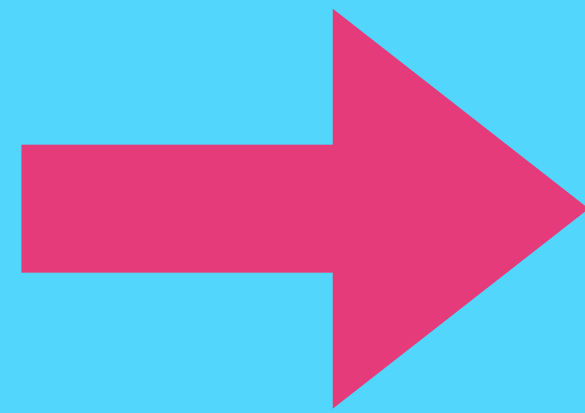> ## Result: One sector model ($\epsilon \to \infty$)
>
> ## Supply shock ➡ Excess demand

➤ Why? Temporary negative shock = good news shock

➤ Agents want to borrow! If they cannot borrow, they won't but they will not save more!

➤ Limit case: $\mu \to 1$ no excess demand

MULTIPLE SECTORS

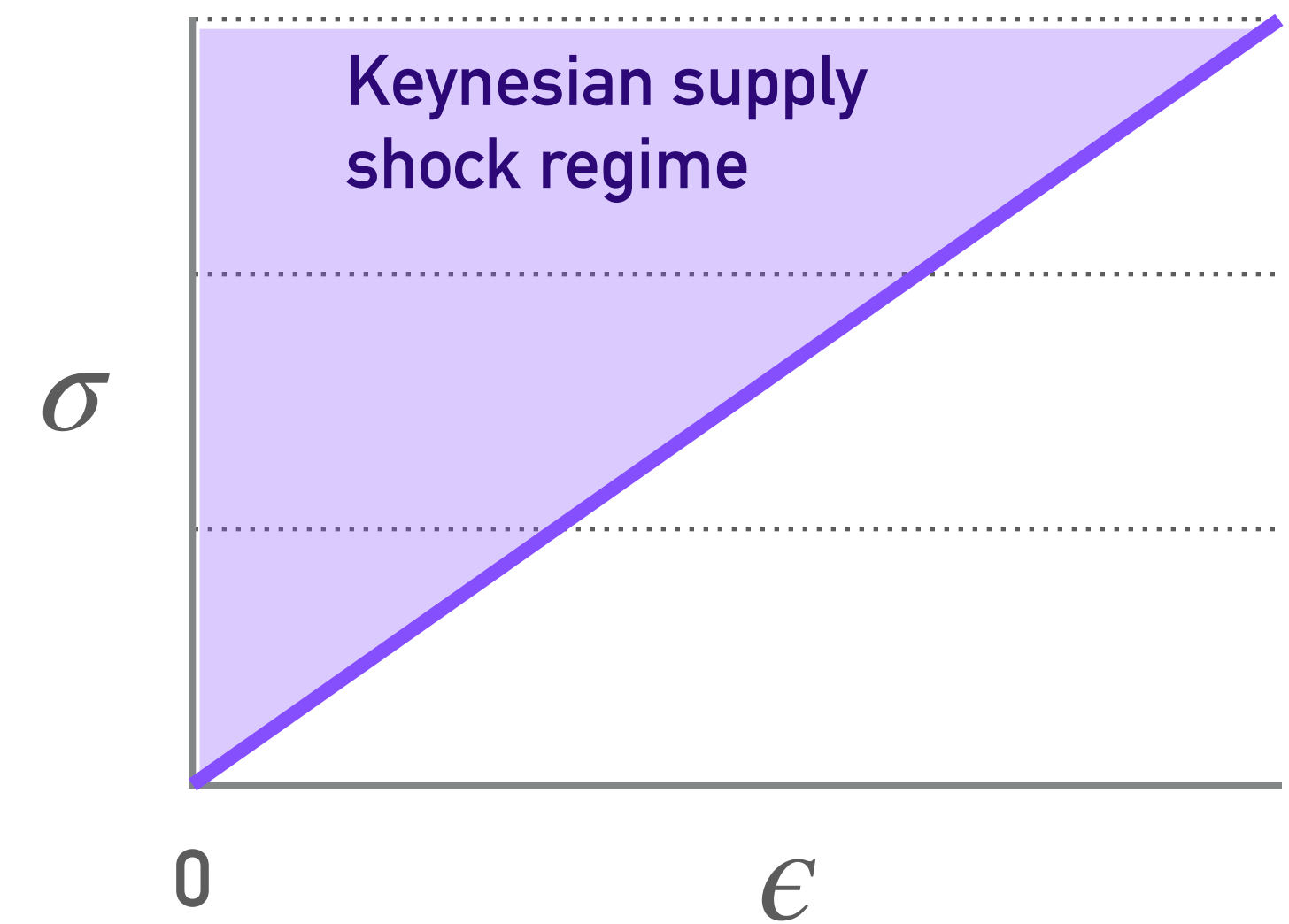## Result: Multiple sectors + Complete Markets

Supply shock ➡ Demand shortage iff $\sigma > \epsilon$

➤ Shadow price of good A spikes to infinity! 2 effects:

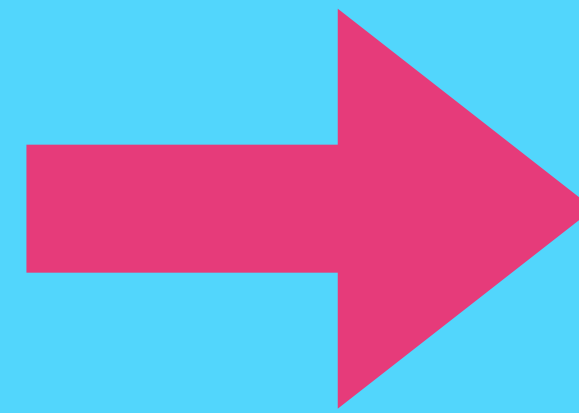1. Postpone consumption: $c_t^{-\frac{1}{\sigma}} = \beta(1 + i^*)\frac{P_t}{P_{t+1}}c_{t+1}^{-\frac{1}{\sigma}}$

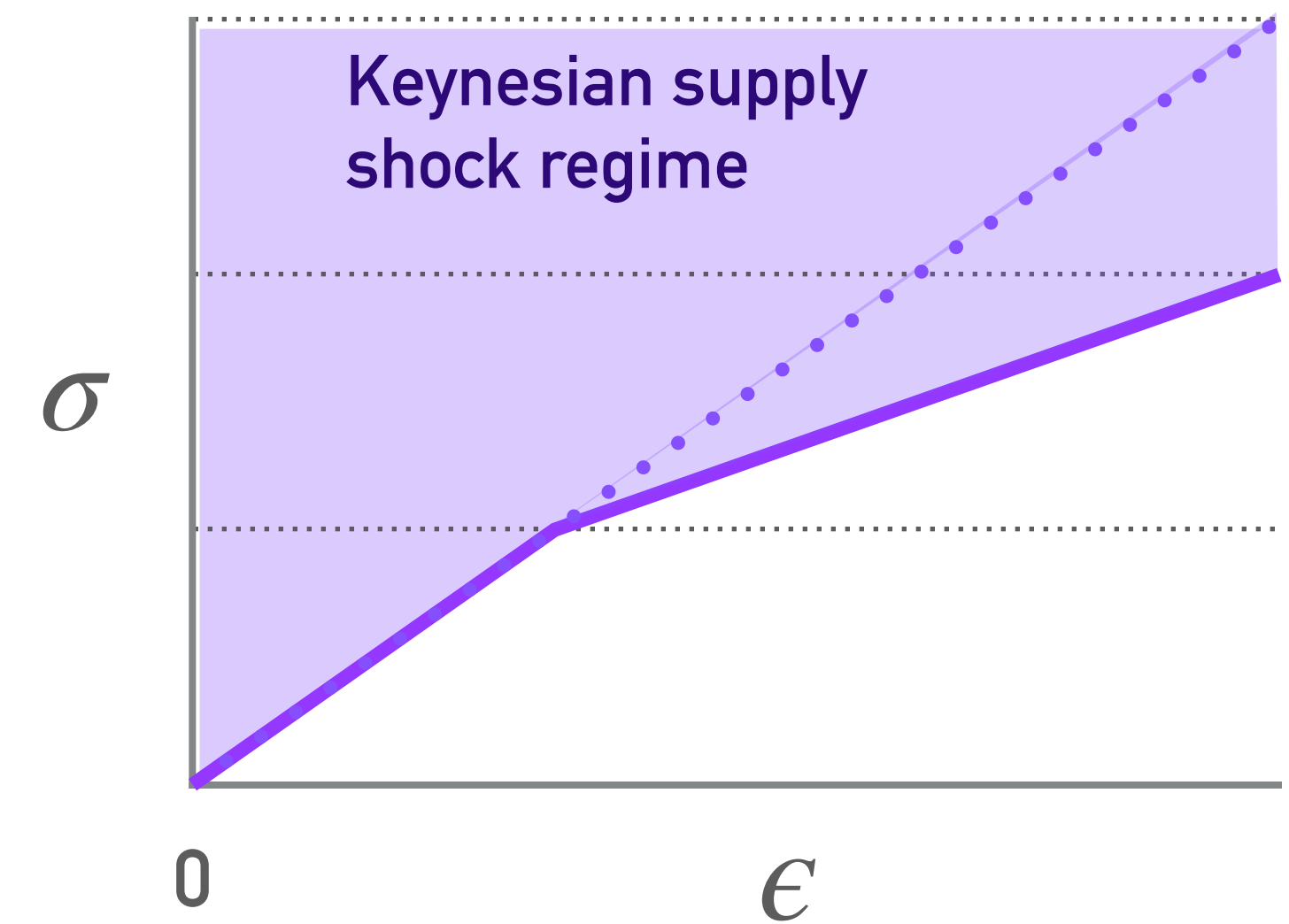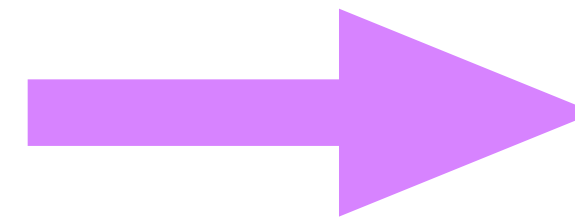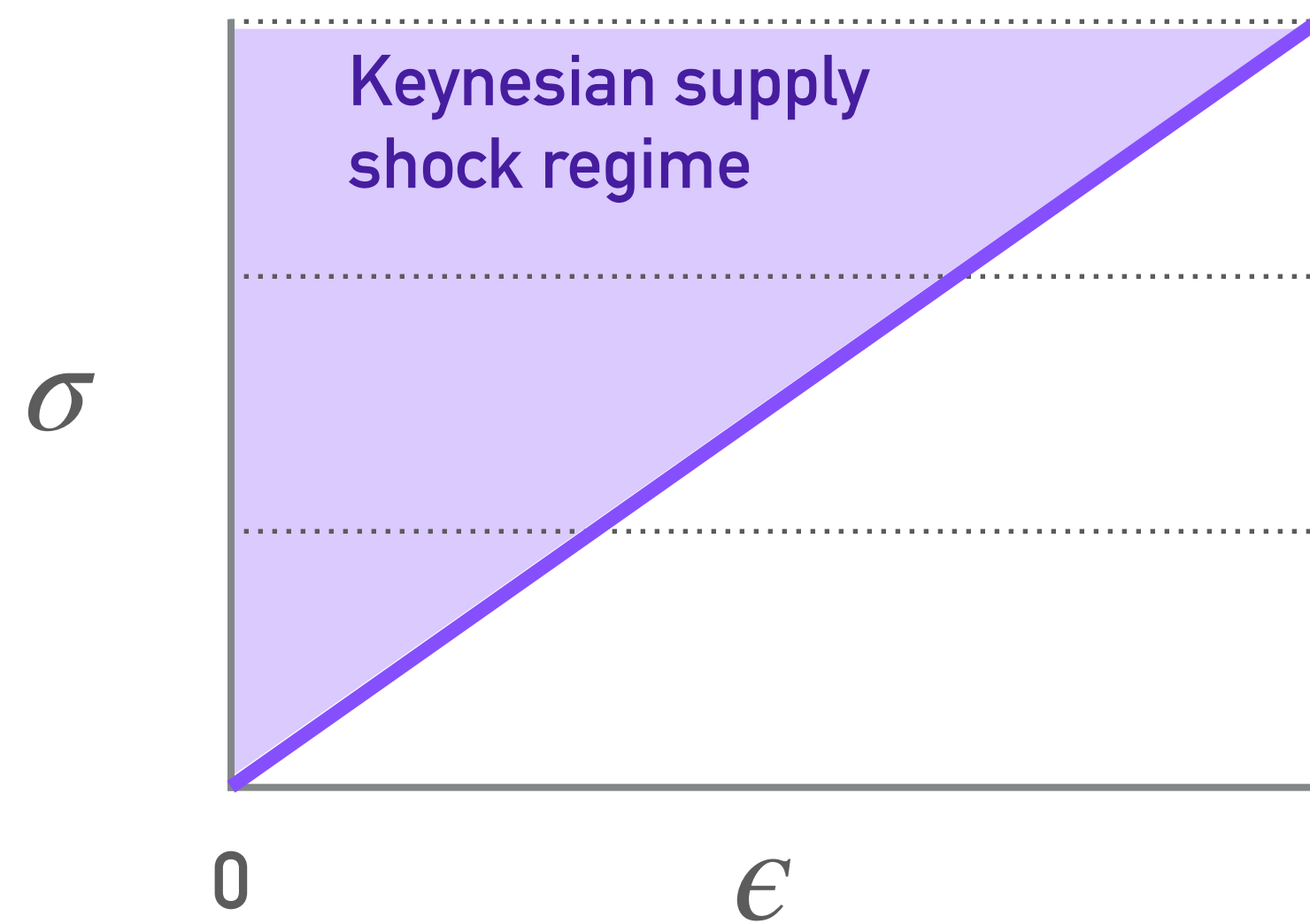2. Buy more good B: $c_{Bt} = \left(\frac{P_{Bt}}{P_t}\right)^{-\epsilon} c_t$

Keynesian supply shock regime

σ

0 ϵ

Figure 5: **Credit card spending growth across spending categories**
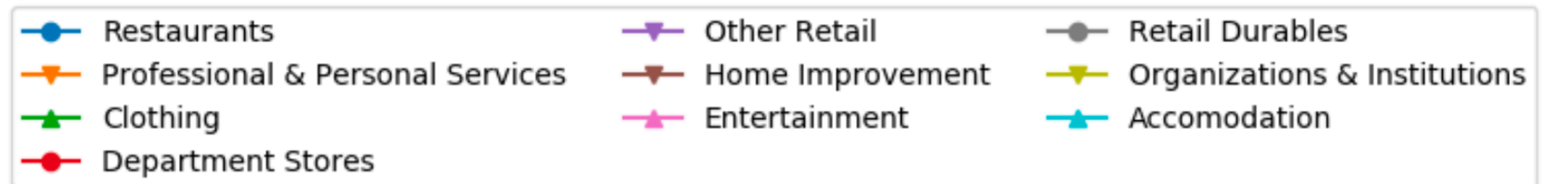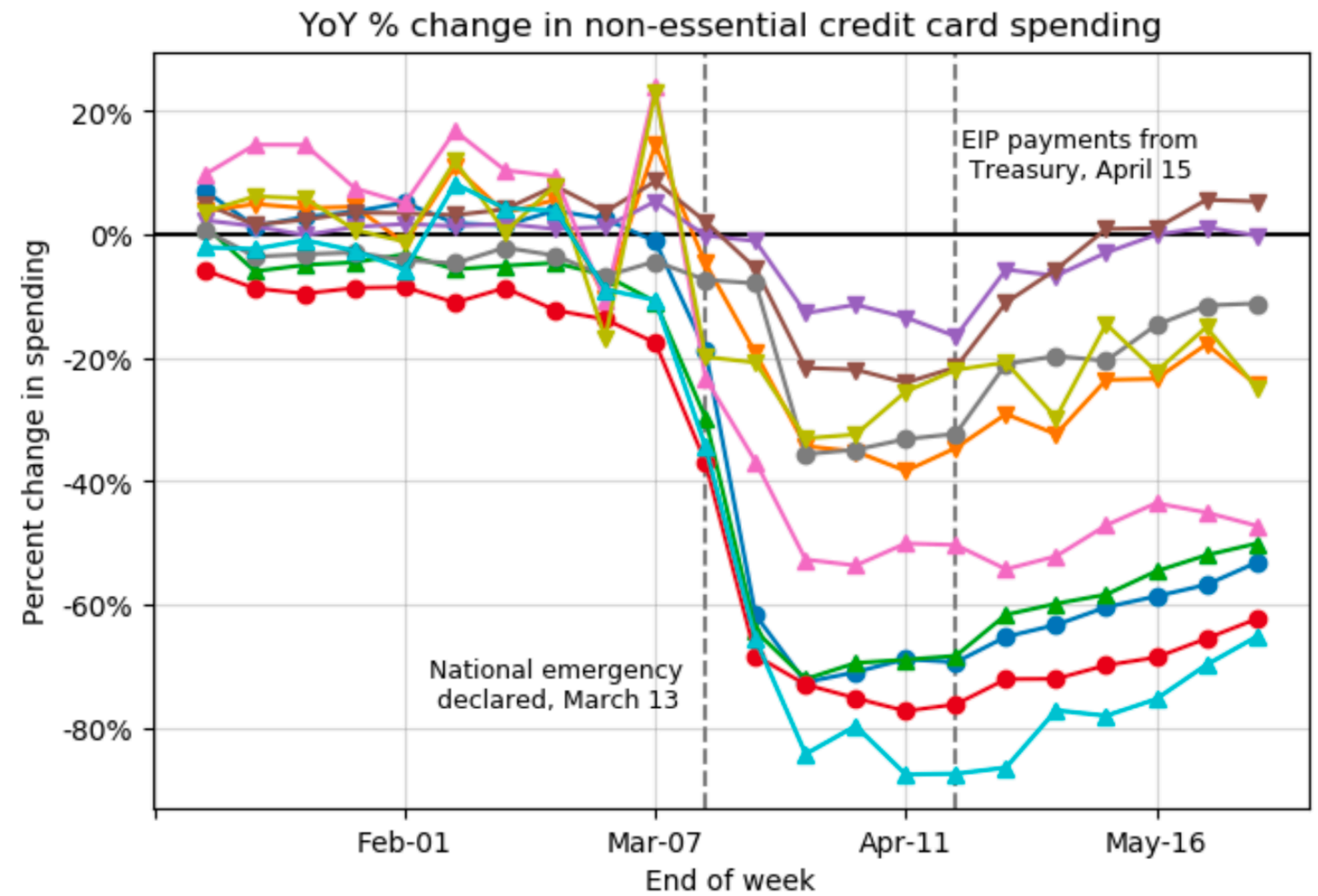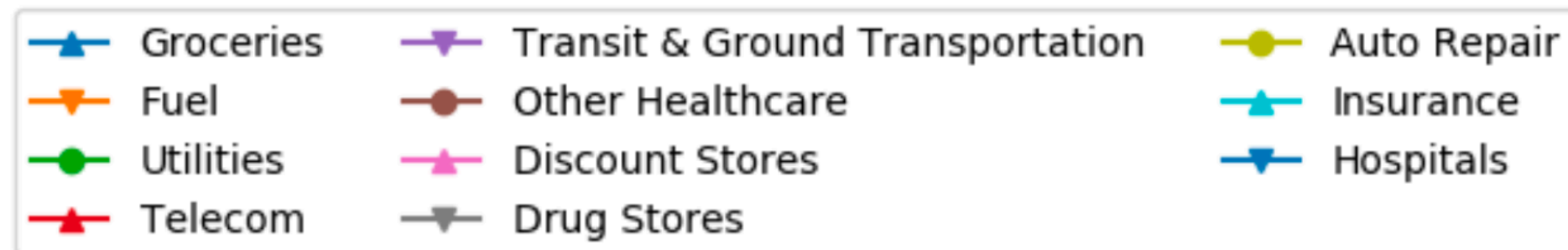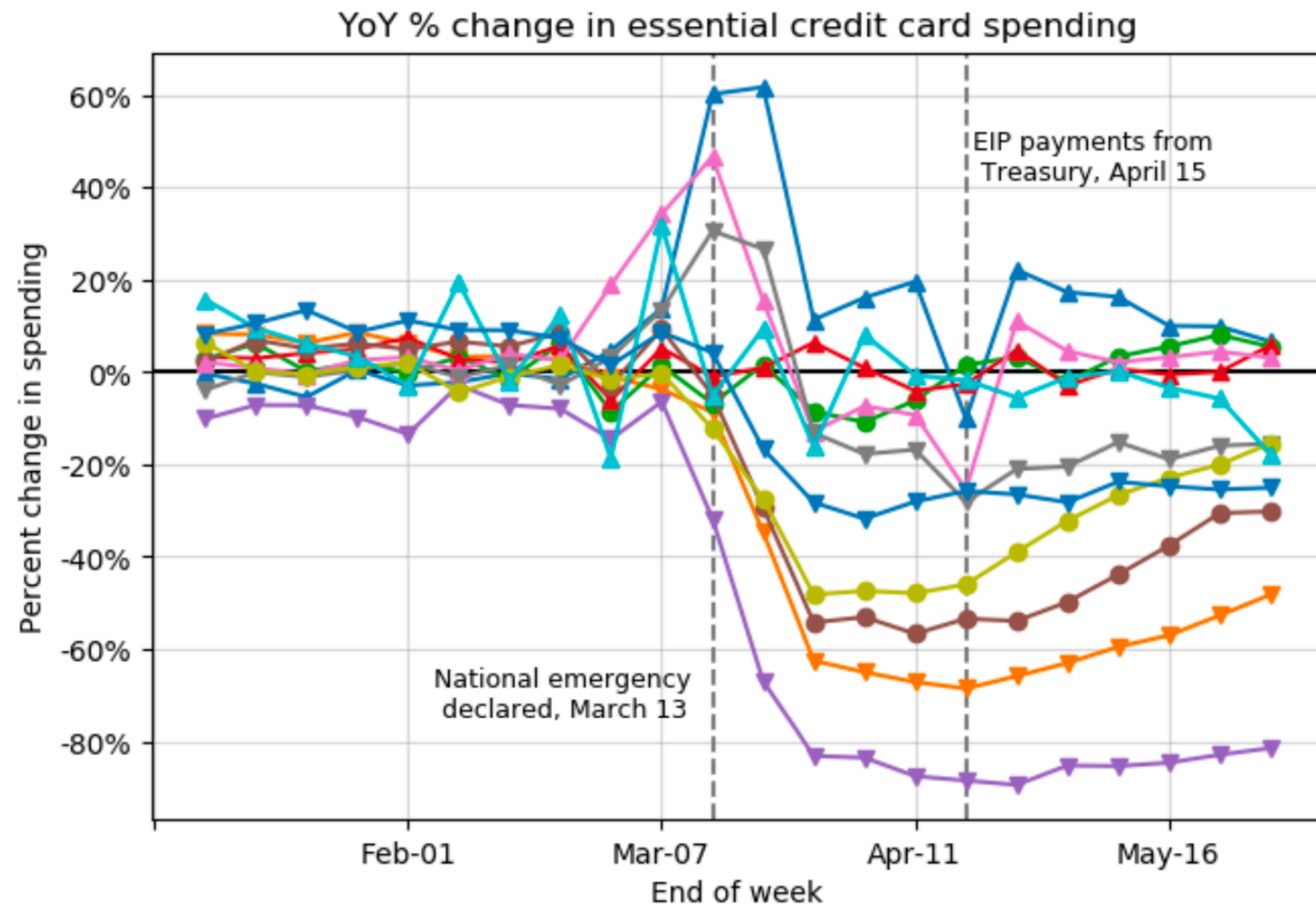
Source: Cox, Ganong, Noel, Vavra, Wong, Farrell, Greig

FISCAL POLICY: MULTIPLIER

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

➤ Consider a small increase in government purchases financed by debt and future taxes on B workers

➤ Result: fiscal multiplier on government spending = 1

➤ No 2nd round Keynesian cross operating because sector A incomes do not respond!

➤ Distributional effect as in Patterson (2019), but in reverse!

FISCAL POLICY

➤ Focus on situation with Keynesian supply shock. How does fiscal policy help?

SECTOR A
contact intensive, size ϕ

SECTOR B
not contact intensive, $1 - \phi$

SECTOR A WORKERS
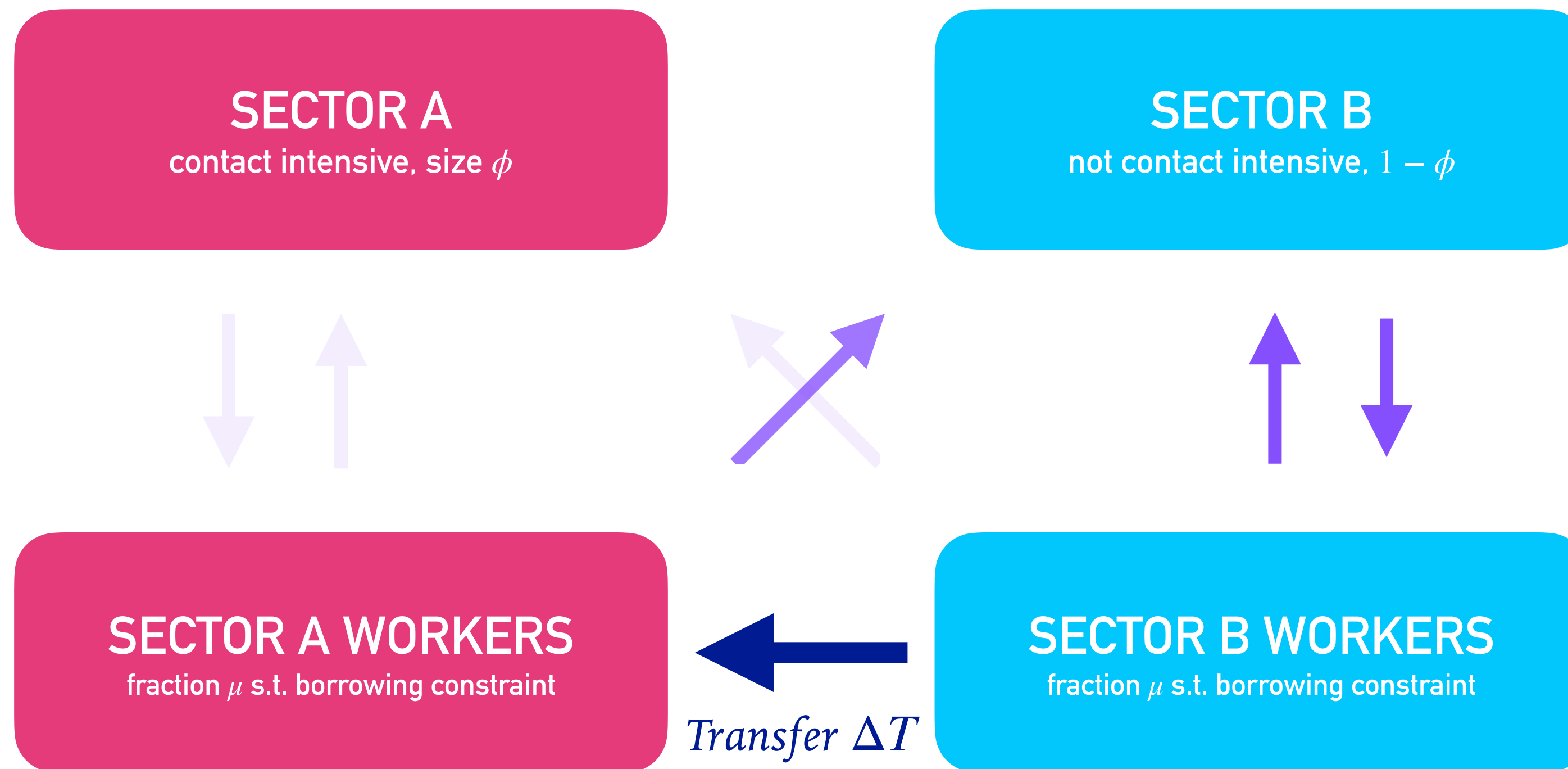fraction μ s.t. borrowing constraint

SECTOR B WORKERS
fraction μ s.t. borrowing constraint

Transfer ΔT

Multiplier less than …

$$ \ldots \neq \frac{mpc}{1 - mpc} $$

Keynesian cross is "broken"

But: **Insurance** value of transfer is **enormous** due to **asymmetry** of the shock!

FISCAL POLICY: TARGETED TRANSFERS

$$T_{A0} = \rho \bar{n}$$

➤ Fiscal transfers have two effects: stimulating demand and providing social insurance!

➤ Stimulus effect peters out before reaching full insurance…
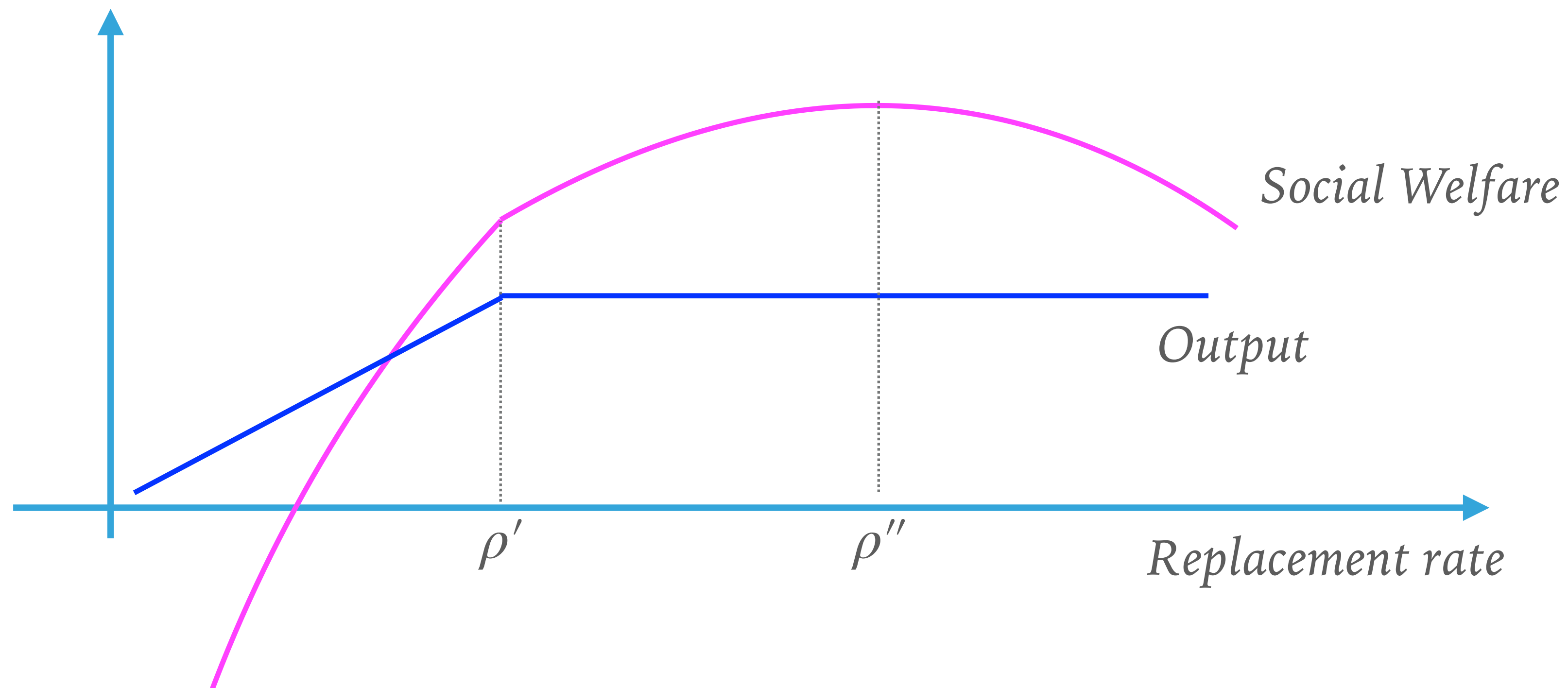
SOCIAL INSURANCE AT WORK

A. Seasonally Adjusted Spending Changes by Income Quartile

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

FISCAL POLICY AND PUBLIC HEALTH

➤ Add health dimension

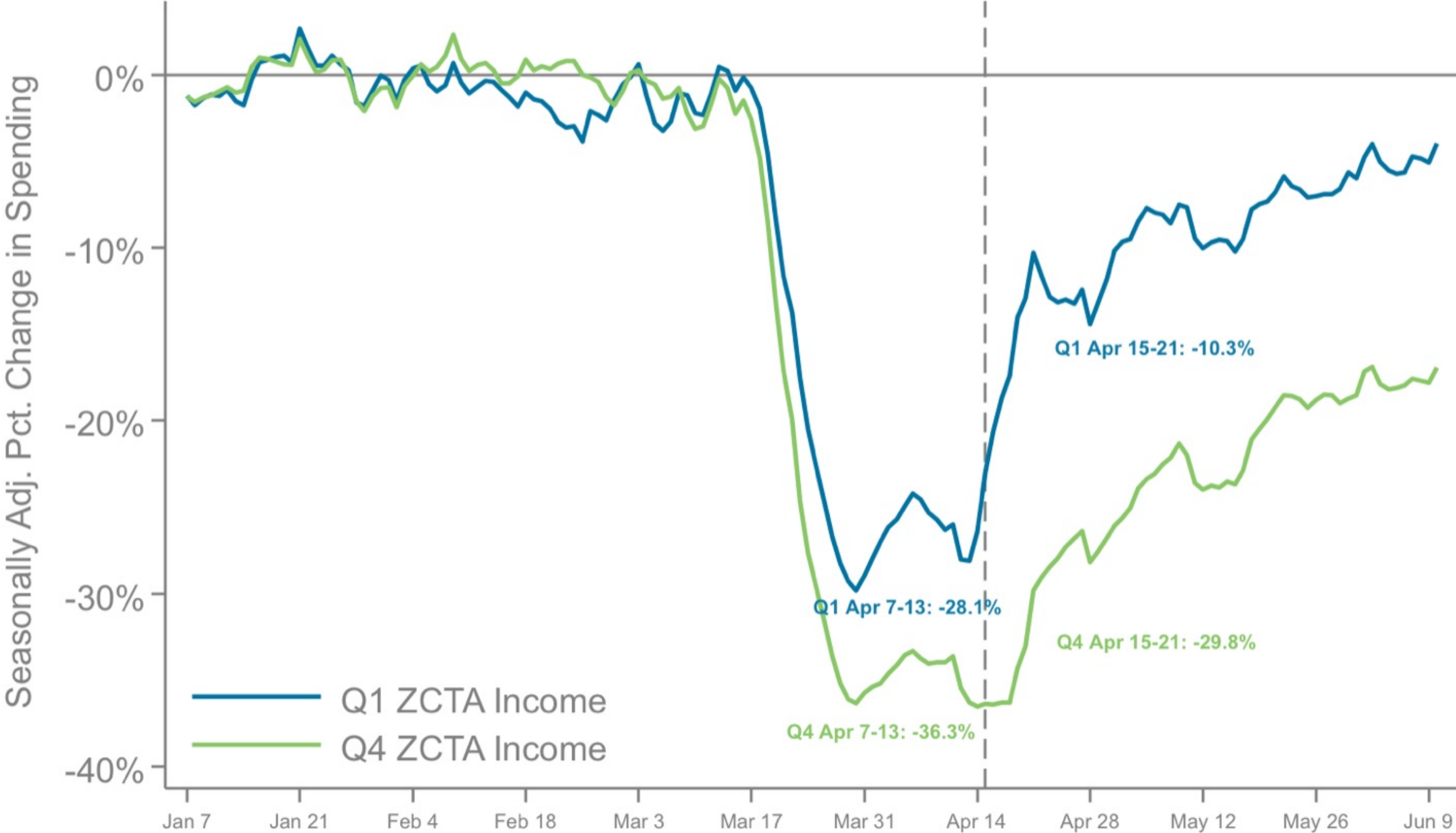$$\sum_{t=0}^{\infty} \beta^t \left(U(c_{At}, c_{Bt}) + H(c_{At}, n_{At}, Y_{At}, \xi_t) \right)$$

➤ 3 issues: demand shortage in sector B, lack of insurance, health externality

➤ What should happen to output in sector A? Trade-off between Keynesian wedge and Pigouvian externality

➤ Targeted transfers not only stimulate demand and help increase social insurance, but also help reduce the cost of public health policies and making them more desirable (complementarity)

MONETARY POLICY

➤ Similarly to government spending, monetary policy can help stimulating demand but does not help on insurance

➤ Two challenges to look at inflation:

    1. Different inflation signals from different sectors (A and B)

    2. Missing goods

➤ Inflation in some sectors is needed to get the right relative prices

➤ **Inflation as measure of cost of living ≠ Inflation as measure of slack**

➤ Monetary policy can be even bad for welfare in Woodford(2020) where agents have different spending composition in different sectors

MONETARY POLICY AND JOB/BUSINESS DESTRUCTION

➤ One drag for the recovery are the potential losses from job destructions and business exit

➤ Labor hoarding iff

$$-w + \frac{1}{R}V_1 \geq 0$$

➤ **Incentivize labor hoarding** may help both with social insurance and with a faster recovery!

➤ **Monetary policy** help in this direction by making the horizon longer (easier credit, …)

➤ More specific policies: Kurzarbeit, Cassa Integrazione, PPP, Main Street Lending

➤ Possible negative effect: slow down structural transformation…

CONCLUSIONS

➤ Keynesian Supply Shock: output should fall in some sectors, but there is demand shortage in others → economy needs policy support!

➤ Policy recommendation: promote risk sharing via targeted transfers (e.g. extending UI, targeted business support)

➤ Expansionary monetary policy beneficial, but fiscal policy in the form of targeted transfers more effective in stimulating demand

➤ Monetary policy may help in the medium run by preventing job and business destruction