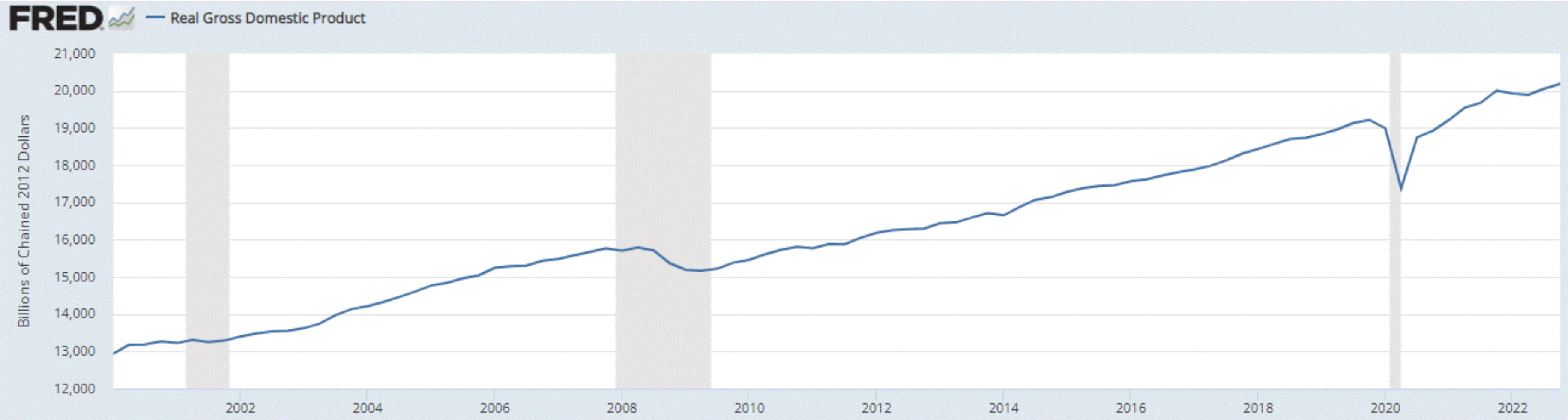
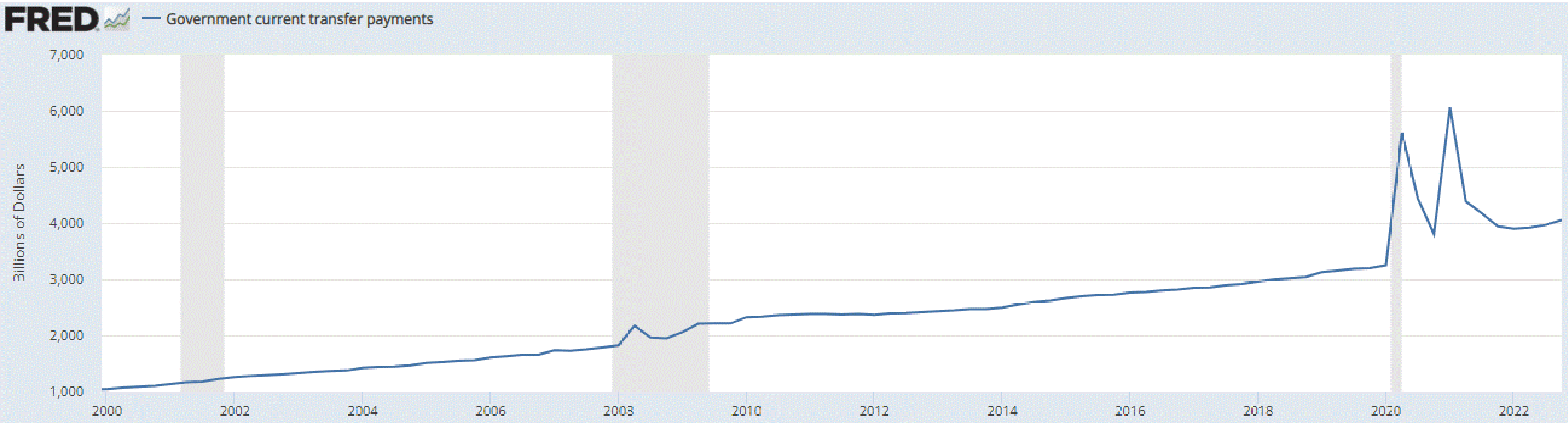
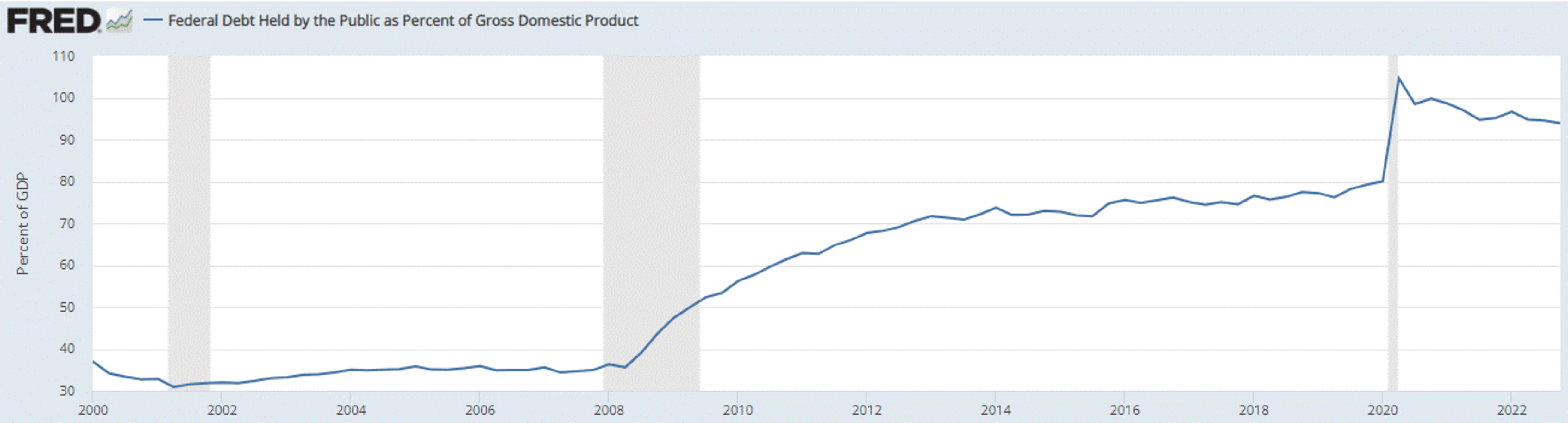
US real GDP and transfer payments





Debt-GDP ratio



Redistribution and the Monetary–Fiscal Policy Mix

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Motivation

- Two worst post-war US contractions—the Great Recession and the COVID recession
- Fiscal policy responses included significant *transfer* components
  - The American Recovery and Reinvestment (ARRA) Act of 2009
  - The Coronavirus Aid, Relief, and Economic Security (CARES) Act of 2020
- Renewed interest in *the effectiveness of transfer policies* for rebooting the economy
- Ongoing debates on the rapid increase in *public debt* and *inflationary pressures*
- The large-scale transfer programs eventually require *fiscal and/or monetary adjustments* to finance them

Questions

- Macroeconomic effects of redistribution that transfer resources from the *unconstrained* to the *constrained*
- Determinants of the transfer multiplier
- Welfare implications of such redistribution policies

This Paper

- Focus on *the source of financing*
- A transfer policy redistributes resources
  - “Ricardian” households that own government bonds
  - “hand-to-mouth” households
- Two distinct ways to finance transfers

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  - **Conventional tax financed transfers**: Under the *monetary regime*, the government raises taxes and inflation is then stabilized in the usual way by the central bank

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- Two distinct ways to finance transfers
  - **Conventional tax financed transfers**: Under the *monetary regime*, the government raises taxes and inflation is then stabilized in the usual way by the central bank
  - **Inflation tax financed transfers**: Under the *fiscal regime*, the government commits itself to no adjustments in taxes, and the central bank allows inflation to rise to stabilize the real value of debt

Preview of Results

- In an analytical two-agent model show:
    - A transfer policy generates *greater and more persistent* inflation under the fiscal regime than under the monetary regime
    - *Direct channel*
    - *Interest rate channel*: valuation effect on government debt due to changes in the real rate

Preview of Results

- In an analytical two-agent model show:
    - A transfer policy generates *greater and more persistent* inflation under the fiscal regime than under the monetary regime
    - *Direct channel*
    - *Interest rate channel*: valuation effect on government debt due to changes in the real rate
- In a quantitative two-sector TANK model applied to the COVID recession and the CARES Act show:
    - Inflation-financed transfers lead to high output and consumption multipliers
    - The welfare of both household types is higher under the fiscal regime
    - Inflation-financed transfers can lead a Pareto improvement relative to no-transfer case

Related Literature

- The fiscal-monetary interactions literature (RANK model)
  - Leeper (1991), Sims (1994), Woodford (1994), Cochrane (2001)
  - Analytical characterization in a linearized model: Bhattarai, Lee and Park (2014)
- Two-agent models (No fiscal regime)
  - Galí, López-Salido and Vallés (2007), Bilbiie (2018)
  - Transfer multipliers in a TANK model : Bilbiie et al. (2013)
- Macroeconomic effects of the COVID crisis (No fiscal regime)
  - Two-sector, two-agent model: Guerrieri, Lorenzoni, Straub and Werning (2022)
  - Effects of fiscal policy during the pandemic using a model with household heterogeneity: Faria-e-Castro (2021), Bayer, Born, Luetticke and Müller (2020)
- Fiscal regime and transfers in a TANK model (No recession and financing trade-offs)
  - Bhattarai, Lee, Park and Yang (2022), Bianchi et al. (2021)

Outline

Simple Model

- Two types of households: Ricardian (R) and Hand-To-Mouth (HTM).

- R households, of measure $1-\lambda$, choose $\{C_t^R, L_t^R, B_t^R\}$ to maximize

$$\sum_{t=0}^{\infty} \beta^t \left[\log C_t^R - \chi \frac{\left(L_t^R\right)^{1+\varphi}}{1+\varphi} \right]$$

subject to a sequence of flow budget constraints

$$C_t^R + b_t^R = R_{t-1} \frac{1}{\Pi_t} b_{t-1}^R + w_t L_t^R + \Psi_t^R - \tau_t^R,$$

where $b_t^R = \frac{B_t^R}{P_t}$ is the real value of nominal debt and $\Pi_t = \frac{P_t}{P_{t-1}}$ is inflation

Ricardian Households

- Optimality conditions:

$$\beta^{-1}\frac{C_{t+1}^R}{C_t^R}=\frac{R_t}{\Pi_{t+1}}, \qquad \text{(Euler equation)}$$

$$\chi\left(L_t^R\right)^{\varphi}C_t^R=w_t, \qquad \text{(Intra-temporal labor supply)}$$

$$\lim_{t\to\infty}\left[\beta^t\frac{1}{C_t^R}\left(\frac{B_t^R}{P_t}\right)\right]=0. \qquad \text{(Transversality condition)}$$

- The Euler equation captures the new interest rate channel
- How the TVC is satisfied will be key to distinguishing the monetary vs. fiscal regimes

Hand-to-Mouth (HTM) Households and Firms

- HTM households, of measure λ, consume government transfers, s_t^H, every period

$$C_t^H = s_t^H$$

- A representative firm in the competitive market chooses hours, L_t, to maximize profits:

$$\Psi_t = Y_t - w_t L_t,$$

  subject to the production function

$$Y_t = L_t.$$

Government

- Government budget constraint (GBC) is

$$b_t = \frac{R_{t-1}}{\Pi_t} b_{t-1} - \tau_t + s_t, \tag{GBC}$$

where $b_t = \frac{B_t}{P_t}$ is the real value of nominal debt, s_t is transfers, and τ_t is taxes

- Transfer, s_t, is exogenous and deterministic

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- Transfer, s_t, is exogenous and deterministic
- Monetary and tax policy rules are

$$\frac{R_t}{\bar{R}} = \left(\frac{\Pi_t}{\bar{\Pi}} \right)^{\phi}, \qquad \text{(Monetary policy rule)}$$

$$(\tau_t - \bar{\tau}) = \psi(b_{t-1} - \bar{b}), \qquad \text{(Tax policy rule)}$$

where ϕ and ψ are the feedback policy parameters that will govern the regimes

Aggregation and the Resource Constraint

- Combining household and government budget constraints gives:

$$(1-\lambda)C_t^R + \lambda C_t^H = Y_t$$

- Output is simply divided between the two types of households as:

$$C_t^H = \frac{1}{\lambda} s_t,$$
$$C_t^R = \frac{1}{1-\lambda} Y_t - \frac{1}{1-\lambda} s_t.$$

- Output is endogenous

Effects of Redistribution —Output and Consumption

- $s_t > \bar{s}$ until time period T; $s_t = \bar{s}$ for $t \geq T+1$
- The "transfer multipliers" (and all real variables) are independent of monetary–fiscal policy mix

$$\frac{dY(s_t)}{ds_t} = \frac{1}{1 + (1-\lambda)^{1+\varphi} \frac{\varphi}{\chi} Y_t^{-(1+\varphi)}} \in [0,1],$$

$$\frac{dC^R(s_t)}{ds_t} = \frac{1}{1-\lambda}\left[\frac{dY(s_t)}{ds_t} - 1\right] \leq 0,$$

$$\frac{dC^H(s_t)}{ds_t} = \frac{1}{\lambda}.$$

- Inflation dynamics *depend* on the monetary–fiscal policy mix

Effects of Redistribution —Inflation

- Equilibrium path $\{\Pi_t, b_t\}$ satisfies TVC and the following:

$$\left(\frac{\Pi_{t+1}}{\bar{\Pi}}\right) = \frac{C_t^R}{C_{t+1}^R}\left(\frac{\Pi_t}{\bar{\Pi}}\right)^{\phi}, \qquad \text{(How } \Pi_{t+1} \text{ depends on } \Pi_t \text{ and the real rate)}$$

$$(b_t - \bar{b}) = \left[\beta^{-1}\frac{C_t^R}{C_{t-1}^R} - \psi\right](b_{t-1} - \bar{b}) + (s_t - \bar{s}) + \bar{b}\left[\beta^{-1}\frac{C_t^R}{C_{t-1}^R} - \beta^{-1}\right], \qquad \text{(GBC: } t \geq 1\text{)}$$

$$(b_0 - \bar{b}) = \beta^{-1}\left(\frac{\bar{\Pi}}{\Pi_0} - 1\right)\bar{b} + (s_0 - \bar{s}). \qquad \text{(GBC: } t = 0\text{)}$$

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- How TVC is satisfied *depends* on the fiscal policy parameter ψ
  - When $\psi > 0$, debt dynamics satisfies the TVC regardless of the value of b_{T+1}
  - When $\psi \leq 0$, the TVC requires $b_{T+1} = \bar{b}$, which can be achieved when monetary policy allows inflation to adjust by the required amount

Effects of Redistribution Policy—Inflation: Monetary Regime

- Under the ***monetary regime,*** $\psi > 0$ ***and*** $\phi > 1$
- Inflation for $t \geq T+1$ becomes

$$\Pi_t = \bar{\Pi}, \quad \forall t \geq T+1$$

- Pin down Π_t from $t=0$ to T along the *saddle path* and derive the initial inflation:

$$\frac{\Pi_0}{\bar{\Pi}} = C^R\left(\bar{s}\right)^{\frac{1}{\phi^{T+1}}}\left[\frac{1}{C^R\left(s_T\right)C^R\left(s_{T-1}\right)\cdots C^R\left(s_0\right)}\right]^{\frac{1}{\phi}} = \prod_{t=0}^{T}\left[\frac{C^R\left(\bar{s}\right)}{C^R\left(s_t\right)}\right]^{\frac{1}{\phi}}$$

- An increase in transfers is inflationary as $C^R\left(s_t\right)$ declines below the pre-transfer level
- The effect is *transitory*

Effects of Redistribution Policy—Inflation: Fiscal Regime

- Under the ***fiscal regime,*** $\psi \leq 0$ ***and*** $\phi < 1$
- A simple case: one-time transfer increase ($s_0 > \bar{s}$ and $s_t = \bar{s}$ afterwards)

Effects of Redistribution Policy—Inflation: Fiscal Regime

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  - TVC requires $b_1 = \bar{b}$ and the GBC at $t = 1$ implies:

$$b_0 = \bar{b} - \bar{b} \left[\beta^{-1} \frac{C^R(\bar{s})}{C^R(s_0)} - \psi \right]^{-1} \left[\beta^{-1} \frac{C^R(\bar{s})}{C^R(s_0)} - \beta^{-1} \right]$$

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  - For $b_1 = \bar{b}$, Π_0 adjusts:

$$\frac{\Pi_0}{\bar{\Pi}} = \frac{1}{1 - \frac{\beta}{\bar{b}}(s_0 - \bar{s}) - \beta \left[\beta^{-1} \frac{C^R(\bar{s})}{C^R(s_0)} - \psi \right]^{-1} \left[\beta^{-1} \frac{C^R(\bar{s})}{C^R(s_0)} - \beta^{-1} \right]}$$

  - The redistribution policy is more *inflationary* under fiscal regime than monetary regime
  - The one-time transitory increase in transfers has *persistent* effects on inflation

Effects of Redistribution Policy—Inflation: Fiscal Regime

- Under the ***fiscal regime***, $\psi \leq 0$ ***and*** $\phi < 1$
- A simple case: one-time transfer increase ($s_0 > \bar{s}$ and $s_t = \bar{s}$ afterwards)
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  - The *interest rate channel* cause Π_0 to increase by *more* than it would in an analogous model with a representative household
  - This term results from increased interest payments that exert an upward pressure on b_1 which is offset by a further decrease in b_0, generated by a greater increase in Π_0

Summary so far

- More inflationary under fiscal regime than monetary regime
- Irrelevance of financing schemes for output, consumption and welfare
  - Flexible prices
    - No feedback from inflation to real variables
    - No Keynesian demand channel
  - Both types of taxes are non-distortionary
    - Lump-sum tax
    - Inflation tax
- Introduce several realistic features that break the uniformity of the two regimes in terms of the multipliers.

Outline

Quantitative Model

- A quantitative model with an application to COVID recession
  - Transfer policy, as embedded in the CARES Act
- A two-sector production structure, sticky prices, and labor taxes
  - Two distinct sectors where the two types of households work
  - Sticky prices under Calvo friction
  - Distortionary labor taxes on the Ricardian household to finance transfers
  - Three types of shocks that generate COVID recession
- Analyze how the implications of increasing transfers to HTM households, hit disproportionately in COVID recession

Ricardian Sector: Households

- Ricardian (*R*) households, of measure $1-\lambda$, solve the problem

$$\max_{\{C_t^R, L_t^R, b_t^R\}} \sum_{t=0}^{\infty} \beta^t \exp(\eta_t^{\xi}) \left[\frac{\left(C_t^R\right)^{1-\sigma}}{1-\sigma} - \chi \frac{\left(L_t^R\right)^{1+\varphi}}{1+\varphi} \right]$$

  subject to a sequence of flow budget constraints

$$C_t^R + b_t^R = R_{t-1} \frac{1}{\Pi_t^R} b_{t-1}^R + \left(1 - \tau_{L,t}^R\right) w_t^R L_t^R + \Psi_t^R$$

- η_t^{ξ} is a discount factor shock; $\tau_{L,t}^R$ is labor tax
- C_t^R is a CES aggregator of the goods produced in the two sectors

$$C_t^R = \left[(\alpha)^{\frac{1}{\varepsilon}} \left(C_{R,t}^R\right)^{\frac{\varepsilon-1}{\varepsilon}} + (1-\alpha)^{\frac{1}{\varepsilon}} \left(\exp(\zeta_{H,t}) C_{H,t}^R\right)^{\frac{\varepsilon-1}{\varepsilon}} \right]^{\frac{\varepsilon}{\varepsilon-1}}$$

  - $\zeta_{H,t}$ is a demand shock that is specific for *HTM* goods

HTM Sector: Households

- *HTM*-households' labor endowment is exogenously fixed and can change with a shock
- In each period, they consume wage income and government transfers

$$C_t^H = w_t^H \overline{L^H}(1 + \eta_t^{\xi}) + s_t^H,$$

  where η_t^{ξ} is HTM labor supply shock
- The aggregate consumption C_t^H is a CES aggregator of sector-specific goods

$$C_t^H = \left[(1-\alpha)^{\frac{1}{\varepsilon}} \left(\exp\left(\zeta_{H,t}\right) C_{H,t}^H \right)^{\frac{\varepsilon-1}{\varepsilon}} + (\alpha)^{\frac{1}{\varepsilon}} \left(C_{R,t}^H \right)^{\frac{\varepsilon-1}{\varepsilon}} \right]^{\frac{\varepsilon}{\varepsilon-1}}$$

  - $\zeta_{H,t}$ is a demand shock that is specific for *HTM* goods

Ricardian and HTM Sector: Firms

- Monopolistically competitive firms produce differentiated varieties
- The production function is linear (labor market is sector specific)
- Firms face a standard downward sloping demand curve
- Firms set prices according to the Calvo friction

Government

- The government (nominal) flow budget constraint is

$$B_t + T_t^L = R_{t-1}B_{t-1} + P_t^R s_t,$$

where T_t^L is tax revenues and s_t is exogenous and deterministic transfer

- Monetary and tax policy rules are of the feedback types given by

$$\frac{R_t}{\bar{R}} = \max\left\{\frac{1}{\bar{R}}, \left(\frac{(1-\lambda)\,\Pi_t^R + \lambda\Pi_t^H}{\bar{\Pi}}\right)^{\phi}\right\}, \quad \tau_{L,t}^R - \bar{\tau}_L^R = \psi_L(b_{t-1} - \bar{b}).$$

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  - *Monetary regime* features high enough monetary (ϕ) and tax (ψ_L) rule coefficients
  - *Fiscal regime* features low enough tax (ψ_L=0) and monetary (ϕ=0) rule coefficients

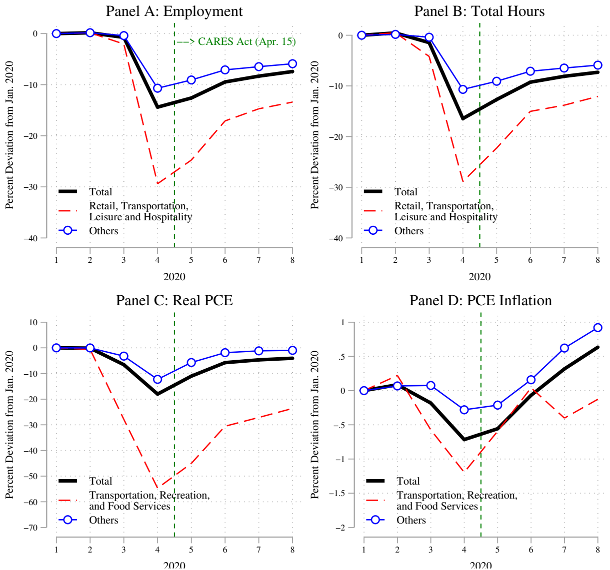
Outline

1. Simple Model
2. Quantitative Model
3. **Data and Calibration**
4. Quantitative Results
5. Conclusion

Data and Calibration

- Pick parameter values based on long-run averages or from the literature
- Calibrate the three shocks to match exactly employment and inflation dynamics during the COVID crisis (for six months)
- Decompose the U.S. economy into two sectors
  - HTM sector: transportation, recreation, and food service sector
  - Ricardian sector: the rest of the economy
- Calibrate the size of transfers using the amounts in CARES Act (3.4 percent of GDP)
  - $293 billion to provide one-time tax rebates
  - $268 billion to expand unemployment benefits
  - $150 billion in transfers to state and local governments

Sectoral Dynamics During Covid Crisis



Data and Calibration

Data and Model Moments

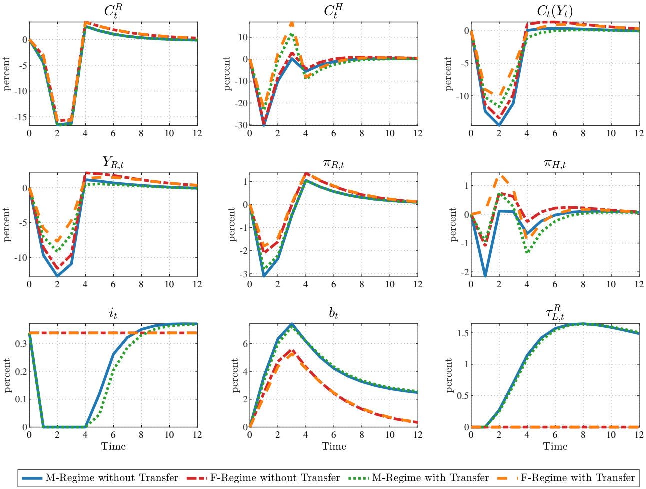
	Value	Description	Sources
Households			
β	0.9932	Time preference	2-month frequency
σ	1.0	Inverse of EIS	Gertler and Karadi (2011)
φ	0.3	Inverse of Frisch elasticity	Gertler and Karadi (2011)
χ	3.08	Labor supply disutility parameter	Steady-state $\bar{L}^R = 0.3$
λ	0.23	Fraction of HTM households	Employment share of HTM sectors
α	0.72	Consumption weight on Ricardian goods	Consumer Expenditure Surveys data
Firms			
θ	4.0	Elasticity of substitution across firms	Steady-state markup: 33% (Hall, 2018)
ε	2.0	Elasticity of substitution between Ricardian and HTM goods	Carvalho et al. (2021)
ω^R	0.75	Calvo parameter for Ricardian sector	Carvalho et al. (2021)
ω^H	0.80	Calvo parameter for HTM sector	Carvalho et al. (2021)
Government			
$\frac{\bar{b}}{6\bar{Y}}$	0.509	Steady-state debt to GDP	Data (1990Q1–2020Q1)
$\frac{\bar{T}^L}{\bar{Y}}$	0.122	Steady-state labor tax revenue to GDP	Data (1990Q1–2020Q1)
$\frac{\bar{s}}{\bar{Y}}$	0.127	Steady-state transfers to GDP	Data (1990Q1–2020Q1)
Monetary and Fiscal Policy Rules			
ϕ_π	(1.58, 0.0)	Interest rate response to inflation	Coibion and Gorodnichenko (2011)
ψ_L	(0.1, 0.0)	Labor tax rate response to debt	Bhattrai et al. (2016)
Shocks			
η_t^H	(-9%, 17%, 17%)	Size of HTM labor supply shock	Total hours for HTM sectors
η_t^ξ	(-7%, -22%, -21%)	Size of discount factor shock	Total hours excluding HTM sectors
$\zeta_{H,t}$	(-4%, -0.9%, 3%)	Size of HTM sector demand shock	PCE Inflation for HTM sectors
s_t	26.8%	Size of transfer distribution	2020 CARES Act

Outline

Dynamic Effects of Transfer Policy

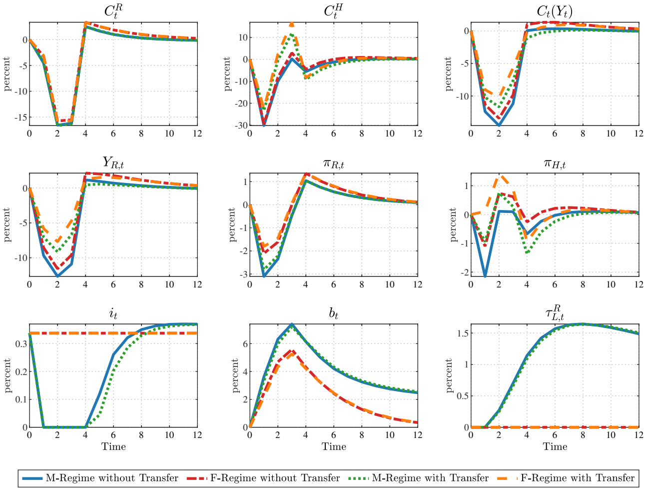
- Show how key variables evolve over time in response to the COVID shocks
- Four different scenarios
  - *Monetary regime* *with* and *without* transfers to the *HTM*-households
  - *Fiscal regime* *with* and *without* transfers to the *HTM*-households
  - Benchmark: no transfer under monetary regime (blue in the next slide)
- Duration of redistribution policy is three periods (six months), which coincides with the duration of the shocks

Redistribution Policy with Different Policy Regimes



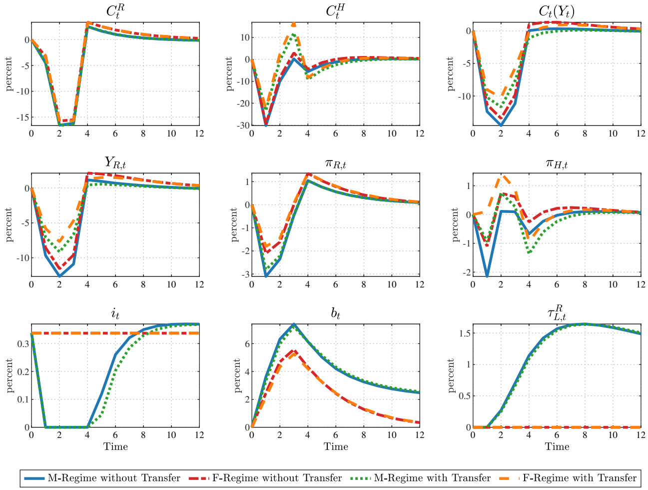
- Short-run contractions in output and consumption and a decline in inflation

Redistribution Policy with Different Policy Regimes



- Short-run contractions in output and consumption and a decline in inflation
- Smaller contractions in output and consumption of both types in the *fiscal regime* than in the *monetary regime*

Redistribution Policy with Different Policy Regimes



- Short-run contractions in output and consumption and a decline in inflation
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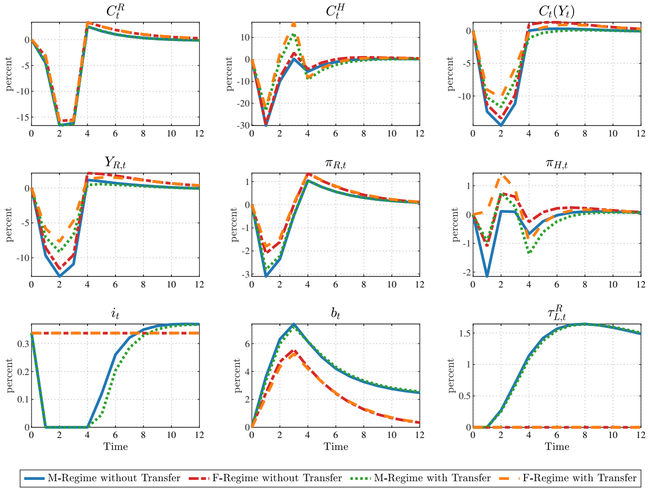
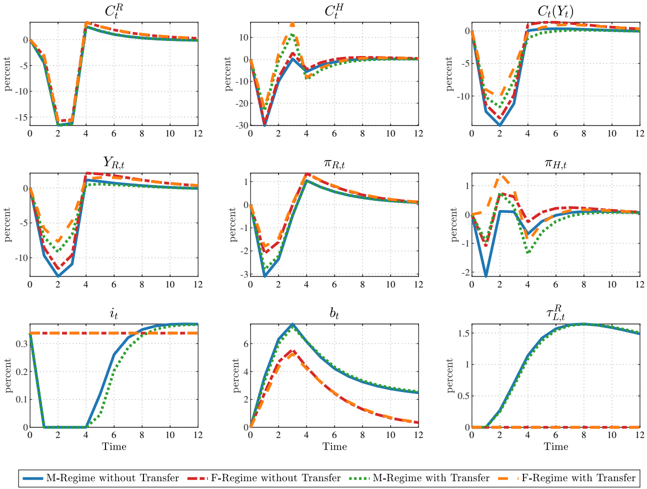
1. Strong and persistent inflation ⇒ Large expansionary effects on output due to nominal rigidities

Redistribution Policy with Different Policy Regimes



- Short-run contractions in output and consumption and a decline in inflation
- Smaller contractions in output and consumption of both types in the *fiscal regime* than in the *monetary regime*
  1. Strong and persistent inflation ⇒ Large expansionary effects on output due to nominal rigidities
  2. Binding ZLB leads to a bigger drop in the monetary regime

Redistribution Policy with Different Policy Regimes



- Short-run contractions in output and consumption and a decline in inflation
- Smaller contractions in output and consumption of both types in the *fiscal regime* than in the *monetary regime*

1. Strong and persistent inflation ⇒ Large expansionary effects on output due to nominal rigidities
2. Binding ZLB leads to a bigger drop in the monetary regime
3. The redistribution program is more inflationary in the fiscal regime

Transfer Multipliers: Definition

Back

- The transfer multiplier for output under regime $i \in \{M, F\}$ is defined as

$$\mathcal{M}_t^i(Y) = \left(\frac{\sum_{h=0}^{t} \beta^h (\tilde{Y}_h^i - Y_h^M)}{\sum_{h=0}^{t} \beta^h s_h} \right),$$

- $\tilde{Y}_h^i$ is output at horizon h under i-regime *with* transfers
- Y_h^M is output at horizon h in benchmark
- s_h is transfers at horizon h

Transfer Multipliers

Definition

	Monetary Regime				Fiscal Regime			
	$\mathcal{M}_t^M(Y)$	$\mathcal{M}_t^M(Y_R)$	$\mathcal{M}_t^M(C^R)$	$\mathcal{M}_t^M(C^H)$	$\mathcal{M}_t^F(Y)$	$\mathcal{M}_t^F(Y_R)$	$\mathcal{M}_t^F(C^R)$	$\mathcal{M}_t^F(C^H)$
Impact Multipliers	1.923	1.863	-0.119	7.828	2.949	2.726	1.166	8.788
4-Year Cumulative Multipliers	1.732	2.023	-0.116	7.409	5.552	5.429	3.078	13.652

- Multipliers computed with monetary regime and no transfers as benchmark
- Note: S.S is not the benchmark!
- Output multipliers above 1 in the monetary regime due to the binding ZLB and sticky prices

Transfer Multipliers

Definition

	Monetary Regime				Fiscal Regime			
	$\mathcal{M}_t^M(Y)$	$\mathcal{M}_t^M(Y_R)$	$\mathcal{M}_t^M(C^R)$	$\mathcal{M}_t^M(C^H)$	$\mathcal{M}_t^F(Y)$	$\mathcal{M}_t^F(Y_R)$	$\mathcal{M}_t^F(C^R)$	$\mathcal{M}_t^F(C^H)$
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- Multipliers computed with monetary regime and no transfers as benchmark
- Note: S.S is not the benchmark!
- Output multipliers above 1 in the monetary regime due to the binding ZLB and sticky prices
- Multipliers are ***even higher in the fiscal regime***
  - C^R multiplier is positive due to sticky prices and persistent inflation dynamics

Inspecting the Mechanisms

Why is the F regime so much better in this particular environment?

- Inflation is expansionary with sticky prices
- Labor taxes are distortionary
- Inflationary pressure generates little relative price distortion in a deep recession
- Decomposition of Transfer Multipliers

▸ Multipliers

Welfare Effects of Transfer Policy

Definition | Short-Run Welfare

	Monetary Regime		Fiscal Regime	
	Long-run	Short-run ($t = 4$)	Long-run	Short-run ($t = 4$)
Ricardian Household	-0.014	-1.465	0.011	-1.214
HTM Household	0.076	6.277	0.118	7.744

- % point deviation relative to the benchmark

Welfare Effects of Transfer Policy

Definition Short-Run Welfare

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- % point deviation relative to the benchmark
- Given redistribution, inflation taxes (F regime) produce better welfare outcomes than labor taxes (M regime)

Welfare Effects of Transfer Policy

Definition Short-Run Welfare

	Monetary Regime		Fiscal Regime	
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- % point deviation relative to the benchmark
- Given redistribution, inflation taxes (F regime) produce better welfare outcomes than labor taxes (M regime)
- Redistribution under F regime generates a ***Pareto improvement***

Outline

1. Simple Model
2. Quantitative Model
3. Data and Calibration
4. Quantitative Results
5. **Conclusion**

Conclusion

- How transfers are ultimately financed is key for their effectiveness
  - Inflation-financed transfers are significantly more effective than tax-financed transfers
  - The fiscal regime produces high and persistent inflation through the direct and the indirect (interest rate) channels
  - Quantitative exercise shows that inflation-financed transfers fight deflationary pressures in a COVID-recession-like environment
  - Such inflation-induced expansionary effects produce a Pareto improvement
- Future work
  - A richer form of heterogeneity across sectors as well as households
  - Long-term debt and the effects on long-term yields

Appendix

Definition: Welfare Gains

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- We define our measure of welfare gain for household of type $i \in \{R, H\}$, $\mu^i_{t,k}$, as

$$\sum_{j=0}^{t} \beta^j U\left(C^i_j, L^i_j\right) = \sum_{j=0}^{t} \beta^j U\left(\left(1 + \mu^i_{t,k}\right)\bar{C}^i, \bar{L}^i\right),$$

  where $\left\{\bar{C}^i, \bar{L}^i\right\}$ is the steady-state level of type-i household's consumption and hours, and $\{C^i_j, L^i_j\}$ are the time path of type-i household's consumption and hours

- The values in the table are the % point deviation from the welfare of the baseline model under the monetary regime without transfers.

Short-Run Welfare Gains Comparison

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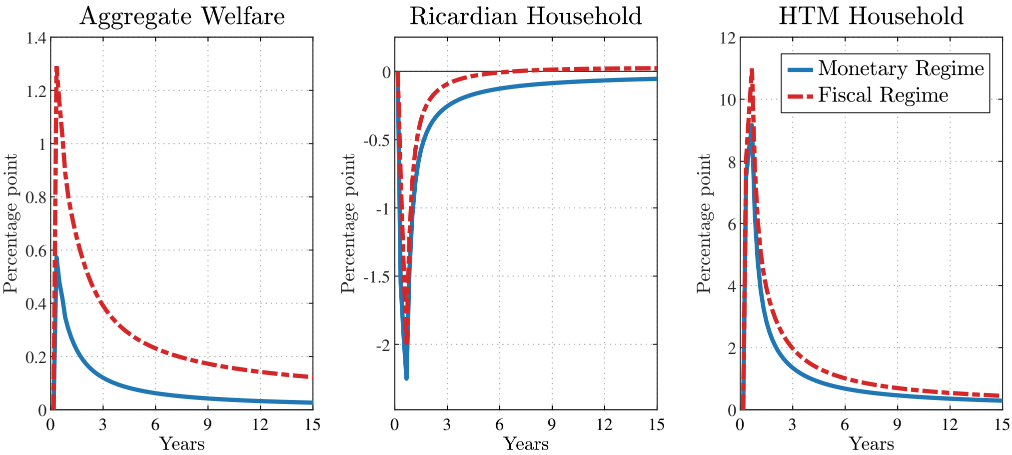

Inspecting the Mechanisms of Transfer Multipliers

The output multiplier under regime $i \in \{M, F\}$ can be decomposed as:

$$\mathcal{M}_t^i(Y) = \underbrace{\left(\frac{\sum_{h=0}^{t} \beta^h (\tilde{Y}_h^i - \tilde{Y}_{\text{no shock},h}^i)}{\sum_{h=0}^{t} \beta^h s_h} \right)}_{\text{COVID Effect with Transfer}} + \underbrace{\left(\frac{\sum_{h=0}^{t} \beta^h (\tilde{Y}_{\text{no shock},h}^i - \bar{Y})}{\sum_{h=0}^{t} \beta^h s_h} \right)}_{\text{Transfer Effect without COVID Shocks}} - \underbrace{\left(\frac{\sum_{h=0}^{t} \beta^h (Y_h^M - \bar{Y})}{\sum_{h=0}^{t} \beta^h s_h} \right)}_{\text{COVID Effect without Transfer}}$$

- The third effect is the same across regimes, while the first two are different as they compute the effect for a given regime.

Decomposition of Transfer Multipliers

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	Monetary Regime				Fiscal Regime			
	$\mathcal{M}_t^M(Y)$	$\mathcal{M}_t^M(Y_R)$	$\mathcal{M}_t^M(C^R)$	$\mathcal{M}_t^M(C^H)$	$\mathcal{M}_t^F(Y)$	$\mathcal{M}_t^F(Y_R)$	$\mathcal{M}_t^F(C^R)$	$\mathcal{M}_t^F(C^H)$
Panel A: Impact Multipliers								
Total Effect	1.923	1.863	0.119	7.828	2.949	2.726	1.166	8.788
Covid Effect with Transfer	-11.628	-7.422	-2.567	-41.289	-12.571	-8.178	-2.403	-45.856
Transfer Effect without Covid	2.670	2.464	-0.911	14.394	4.640	4.083	-0.028	19.920
Covid Effect without Transfer	-10.881	-6.821	-3.597	-34.723	-10.881	-6.821	-3.597	-34.723
Panel B: 4-Year Cumulative Multipliers								
Total Effect	1.732	2.023	-0.002	7.409	5.552	5.429	3.078	13.652
Covid Effect with Transfer	-10.954	-7.083	-7.786	-21.321	-8.340	-4.779	-5.558	-17.447
Transfer Effect without Covid	1.490	1.703	-1.107	9.991	2.696	2.805	-0.256	12.359
Covid Effect without Transfer	-11.196	-7.403	-8.891	-18.739	-11.196	-7.403	-8.891	-18.739

Transfer Multipliers without COVID Shocks

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	Monetary Regime				Fiscal Regime			
	$\mathcal{M}_t^M(Y)$	$\mathcal{M}_t^M(Y_R)$	$\mathcal{M}_t^M(C^R)$	$\mathcal{M}_t^M(C^H)$	$\mathcal{M}_t^F(Y)$	$\mathcal{M}_t^F(Y_R)$	$\mathcal{M}_t^F(C^R)$	$\mathcal{M}_t^F(C^H)$
Panel A: Without COVID shocks under sticky price								
Impact Multipliers	2.670	2.464	-0.911	14.394	4.640	4.083	-0.028	19.920
4-Year Cumulative Multiplier	1.490	1.703	-1.107	9.991	2.696	2.805	-0.256	12.359
Panel B: Without COVID shocks under flexible price								
Impact Multipliers	0.184	0.931	-0.747	3.230	0.184	0.931	-0.747	3.230
4-Year Cumulative Multiplier	-0.115	0.63	-1.095	3.094	0.184	0.931	-0.747	3.230
Panel C: Without COVID shocks under flexible price and lump-sum tax adjustment								
Impact Multipliers	0.184	0.931	-0.747	3.230	0.184	0.931	-0.747	3.230
4-Year Cumulative Multiplier	0.184	0.931	-0.747	3.230	0.184	0.931	-0.747	3.230