Asset Purchases and Default-Inflation Risks in Noisy Financial Markets

Gaetano Gaballo
HEC Paris and CEPR

Carlo Galli
UC3M

Bank of Finland - CEPR
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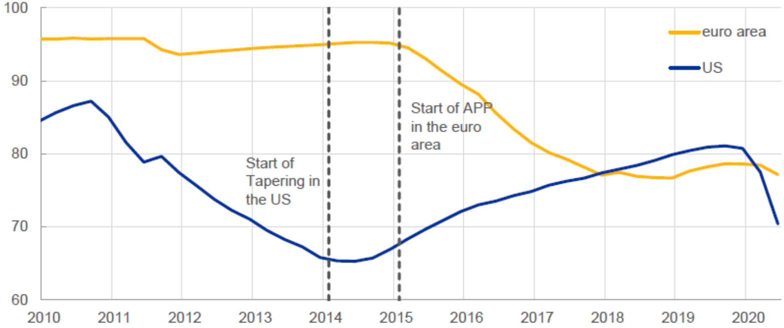
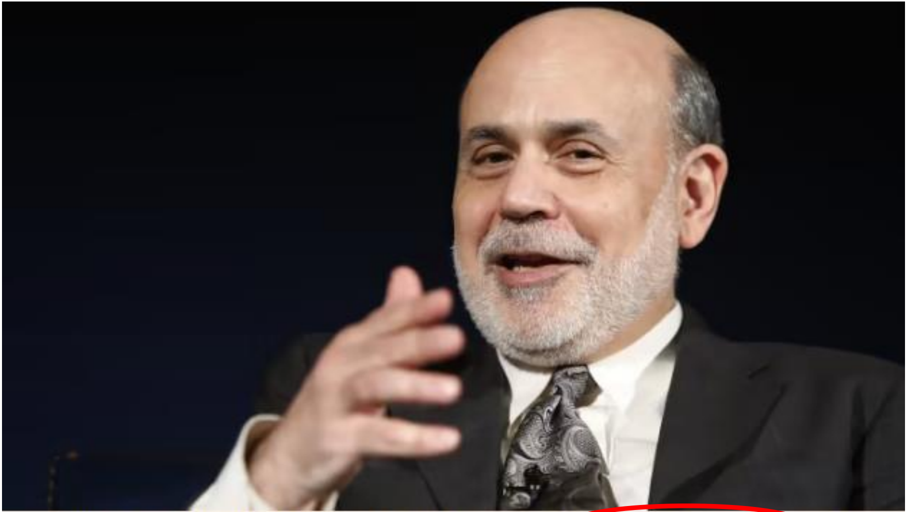
Largest part of sovereign debt held outside of central banks, supporting price discovery

Developments in the bond free float (percent)



Sources: SHS, ECB, ECB Calculations.

Asset Purchases



Ben Bernanke, former US Fed chairman: 'The problem with QE is it works in practice, but it doesn't work in theory.' © Reuters

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in practice and in theory

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Q: **does APs work through GE fiscal-like redistributions?**

$\rightarrow$ from households to fiscal authorities?
$\rightarrow$ across households: from high MPC to low MPC?
$\rightarrow$ from unconstrained firms/banks to constrained ones?

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A: **APs effective as it exploits narrow financial markets imperfections.**

Literature

- Irrelevance results under complete info & frictionless markets
  - Wallace (1981), Backus Kehoe (1989)
- Information frictions
  - Mussa (1981), Jeanne Svensson (2007), Bhattarai et al. (2015), Iovino Sergeyev (2021)
- Market segmentation
  - Curdia Woodford (2011), Gertler Karadi (2015), Gabaix Maggiori (2015), Vayanos Vila (2021)
  - Chen et al. (2012), Reis (2017), Auclert (2019), Sterk Tenreyro (2018), Cui Sterk (2021)

Basic Model

- High/low inflation (U.S.) or repayment/default (periph. EU) state

$$\theta = \begin{cases} \theta^H & \text{w.p.} \quad q \\ \theta^L & \text{w.p.} \quad 1-q \end{cases}$$

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- Our Target: see how α impacts $E[R\theta]$.

Market Clearing and Market Signal

- Agent i's policy is:

$$b_i = 1 \qquad \text{if and only if} \qquad R\,E[\,\theta\,|\,x_i,\, R,\, y] > 1$$

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- Bond market clearing

$$\underbrace{\Phi\left(\frac{\theta - \widehat{x}(R,\alpha)}{\sigma_x}\right)}_{\substack{\text{private demand } \int b_i\, di \\ P(x_i > \widehat{x}(R,\alpha))}} = \underbrace{(1-\alpha)S}_{\substack{\text{net supply} \\ b - b_{cb}}}$$

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- Solving for the cutoff signal

$$\widehat{x}(R,\alpha) = \overbrace{\theta - \sigma_x \Phi^{-1}\left(S(1-\alpha)\right)}^{z := \boldsymbol{Z(\theta,S,\alpha)}}$$

market/price signal ⇔ marginal agent's signal

A θ-lottery would be publicly-evaluated according to

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Public Evaluations and Average Bond Returns

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The average bond returns obtain as

$$E\left[R^*\theta\right] = E\left[\frac{1}{E[\theta|y,z]}E[\theta|y,z]\right] = \mathbf{1}$$

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The average market bond returns obtain as

$$E\left[R\theta\right] \quad = \quad E\left[\frac{1}{E[\theta|x=z,y,z]}E[\theta|y,z]\right] \neq \mathbf{1}$$

which generically DOES NOT necessarily equal one!

Wegde Ratio without AP

Let us define the ***wedge ratio*** as

$$\Delta(y, z, \alpha) = \frac{\int_{\Theta} \theta f_{\Theta|Y,Z}(\theta|y, z) d\theta}{\int_{\Theta} \theta f_{\Theta|X,Y,Z}(\theta|x = z, y, z) d\theta}$$

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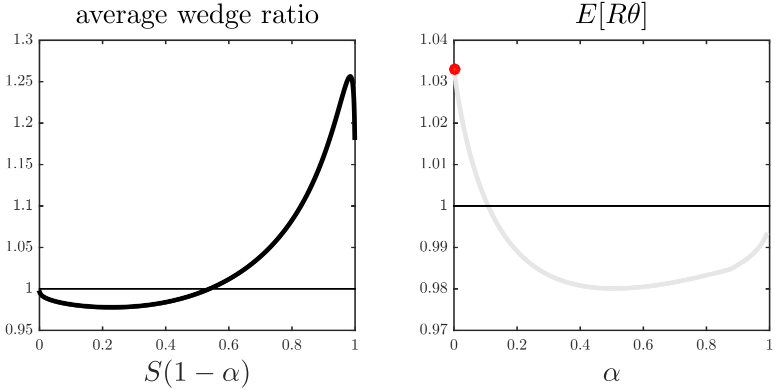
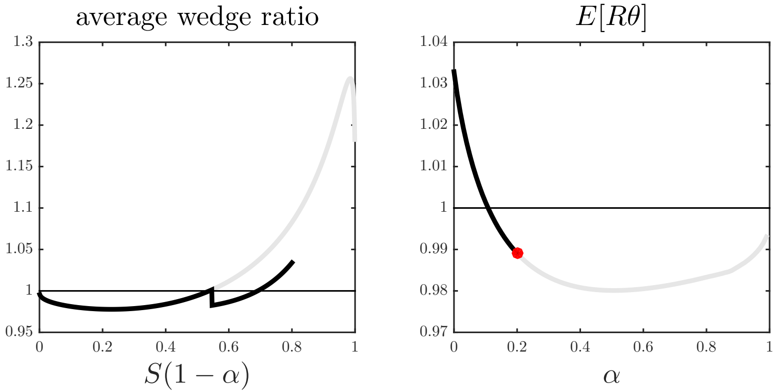
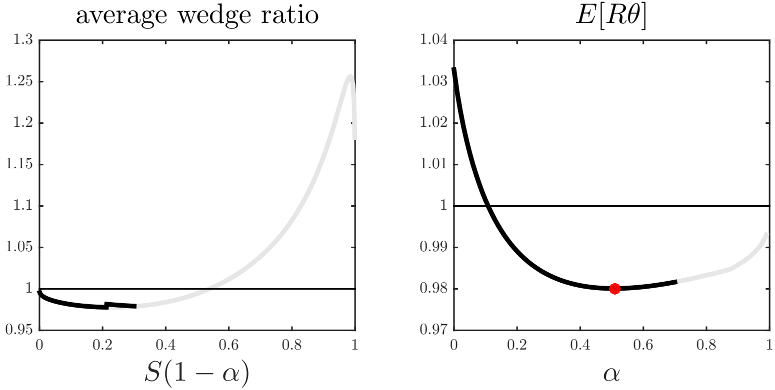
Wegde Ratio without AP α=0



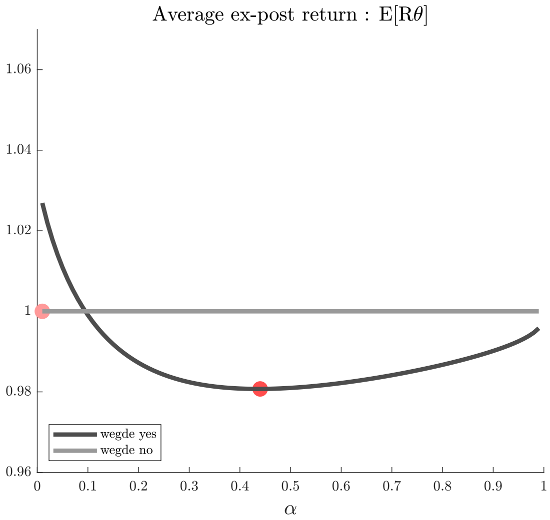
Wegde Ratio without AP α=0.2



Wegde Ratio without AP α=0.7



State-dependency of AP



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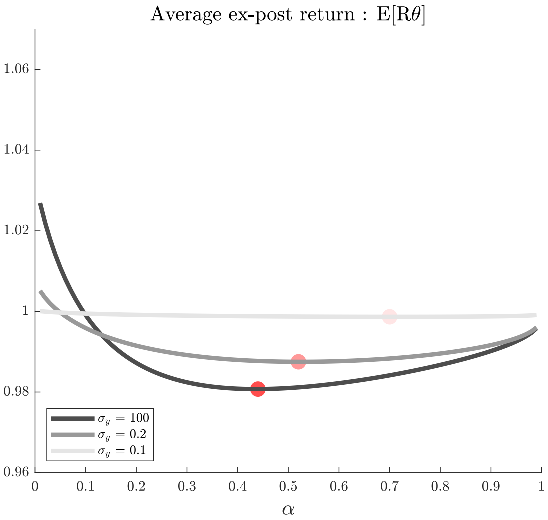

More public uncertainty: requires less AP but AP is more effective.

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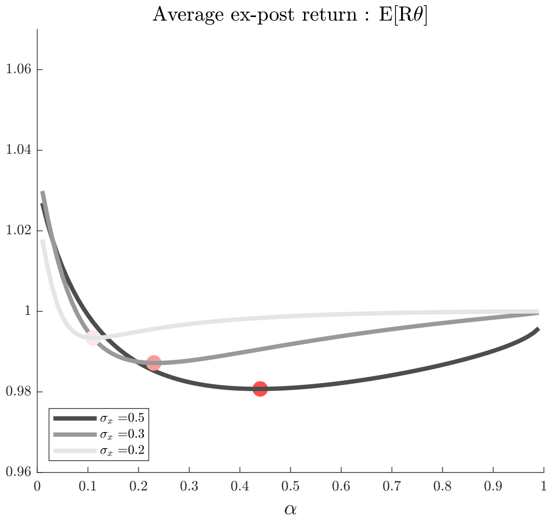
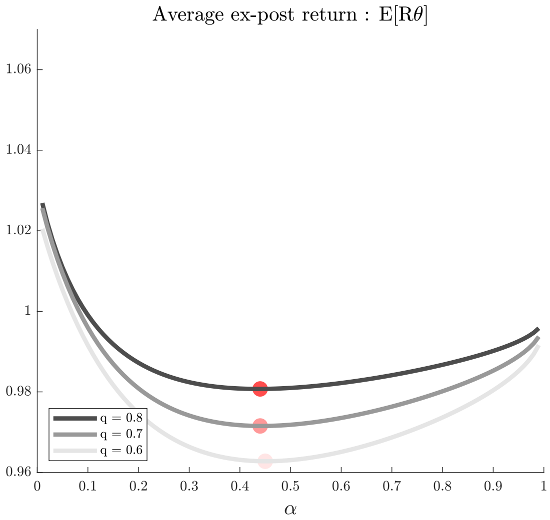


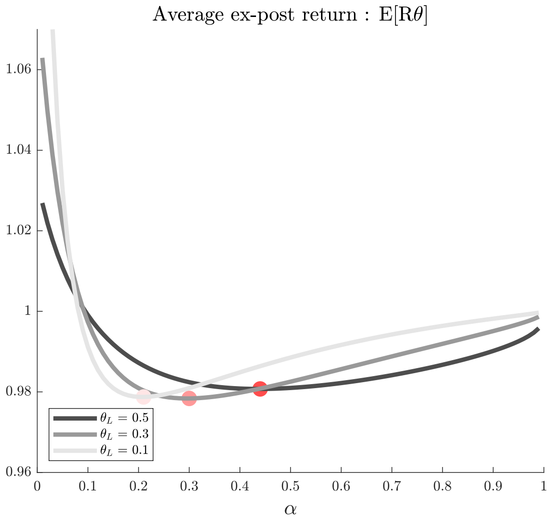
More private uncertainty: requires more AP and AP is more effective.

State-dependency of AP



More likely crisis: AP is more effective.

State-dependency of AP



Larger distress: requires less AP.

Conclusions

- A non-neutral asset price mechanism where APs
  - APs changes the conditional distribution of market wedges
- We capture two essential features of many applied models:
  - (belief) heterogeneity
  - limits to individual arbitrage
- APs larger impact with larger losses, uncertainty or info heterogeneity
- Many possible applications (stay tuned...)
  - fiscal-monetary interactions and APs of defaultable debt
  - endogenous govt default
  - monetary policy with sticky prices

Thanks for your attention!

Neutrality

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$$\max_{\{c_i, b_i\}} \mathbb{E}[u(c_i)|\Omega_i] \quad \text{s.t.} \quad c_i = b_i R\theta + (1-b_i)1 + \tau$$

where $b_i \in \mathbb{R}$ and

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where $b_i \in \mathbb{R}$ and R is the price at which market clears

$$\int b_i di + b_{cb} = S \tag{1}$$

where $\tau = b_{cb}(R\theta - 1)$ are profits from AP by a public authority.

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- If, for $b_{cb} = 0$, $(\{b_i^*\}_{(0,1)}, \hat{R})$ exits such that

  $$\mathbb{E}\left[u'\Big(b_i^*\hat{R}\theta + (1-b_i^*)1\Big)(\hat{R}\theta - 1)|\Omega_i\right] = 0 \tag{2}$$

  for any i and (1) holds at $\hat{R}$,

Neutrality

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$$\max_{\{c_i, b_i\}} \mathbb{E}[u(c_i)|\Omega_i] \quad \text{s.t.} \quad c_i = b_i R\theta + (1-b_i)1 + \tau$$

where $b_i \in \mathbb{R}$ and R is the price at which market clears

$$\int b_i di + b_{cb} = S \tag{1}$$

where $\tau = b_{cb}(R\theta - 1)$ are profits from AP by a public authority.

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- then for $b_{cb} > 0$, a $b_i^\star(b_{cb}) = b_i^* - b_{cb}$ exists so that

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- $\Rightarrow$ $\hat{R}$ does not move, Ω_i does not move even if $R \in \Omega_i$.

Extension:
APs and Fiscal-Monetary Interactions
(sketch)

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We write a model of monetary fiscal interactions.

- The government is impatient.
- Agents can invest in bonds, money or storage; the y consume the period after.
- The central bank can invest either in bonds or storage.

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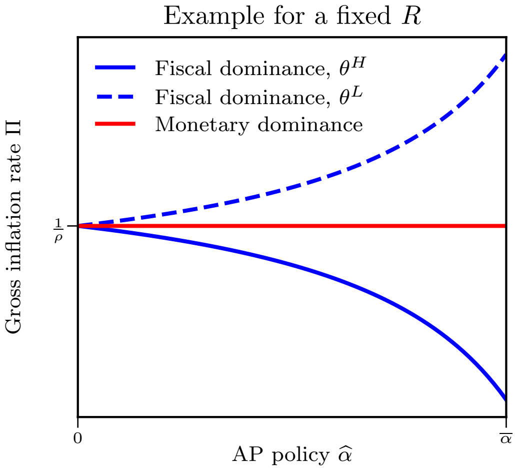
→ It obtains as

$$\frac{1}{\Pi} = \frac{1-\alpha}{1-\alpha R\theta},$$

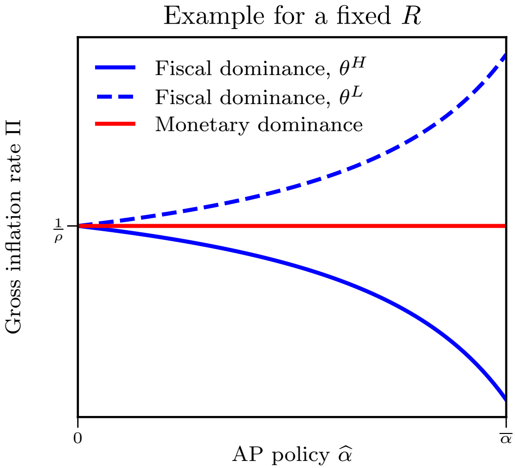
a non-linear function of R.

With monetary dominance instead

$$\frac{1}{\Pi} = 1.$$


Example for a fixed R
Fiscal dominance, θ^H
Fiscal dominance, θ^L
Monetary dominance
Gross inflation rate Π
$\frac{1}{\rho}$
0
$\overline{\alpha}$
AP policy $\widehat{\alpha}$

Fiscal vs Monetary Dominance



Average Real Rates