Fiscal Policy in a Business Cycle Incomplete Market Economy[1]

Very preliminar

Luis Bettoni
Insper

Marcelo Santos
Insper

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Motivation

Accounting for income risk and distributional concerns, how should gov. set fiscal instruments to provide **insurance** and deal with **inequality**?

- Trade off: Better insurance and redistribution potentially come at the expense of **efficiency**.
- Key margin: **labor supply elasticity**.
- Do the business cycle and the labor market dynamic matter?

This paper aims to provide **quantitative** answers for these questions.

This paper

We focus on two instruments:

Government debt

Progressive tax

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- Induces higher interest rate and lower the cost of self-insurance;
- But it tends to benefit more high income agents

Progressive tax

- Reduce consumption volatility;
- Worsen labor market incentives for high productivity agents.

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Government debt

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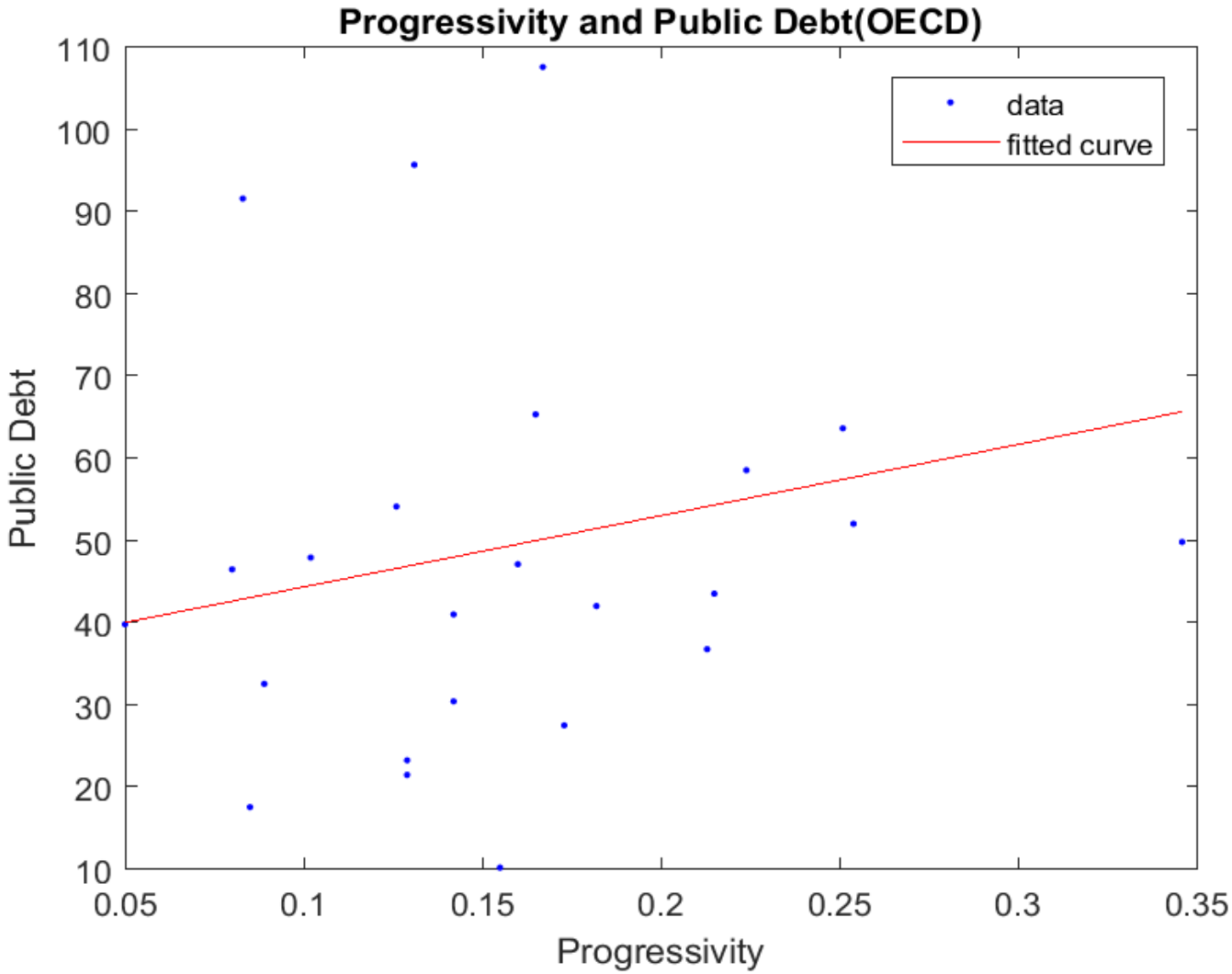
Progressive tax

- Reduce consumption volatility;
- Worsen labor market incentives for high productivity agents.

- How do they interplay?

Progressive tax and government debt seem to be correlated



What we do

- Develop model economy with infinitely lived heterogeneous agents and incomplete markets:

Ayiagari economy + business cycle + extensive margin of labor supply

- Calibrate the model to US economy

What we do

Ayiagari economy + business cycle + extensive margin of labor supply

- We quantitatively evaluate
  - the **optimal level** of debt and the progressivity in the labor income tax;
  - the **mechanism** through which these instruments interplay;
  - the role of **labor supply elasticity**;
  - the importance of the **business cycle**.

What we do

Ayiagari economy + business cycle + extensive margin of labor supply

- We quantitatively evaluate
  - the **mechanism** through which these instruments interplay;
  - the role of **labor supply elasticity**;

What we find

Extensive margin matters!

- intensive margin (traditional approach) not able to capture the positive relationship observed in the data;
- extensive margin do, but too steep
- partial time job?

Different **policy implications** for different labor markets (countries)?

Contribution

Literature

- insurance and redistributional role of public debt
  - Aiyagari and McGrattan (1998), Floden (2001), Dyrda and Pedroni (2018)
- aggregate risk and optimal debt
  - Desbonnet and Kankanamge (2016)
- OLG is important!
  - Peterman and Sager (2017)
- labor supply and business cycle with incomplete markets
  - Chang and Kim (2006); Krusell et al. (2012)

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- PD and ITP: insurance and distribution with BC + labor supply

Model economy

Preferences

Individuals maximize the **expected discounted lifetime utility**:

$$U = \max_{\{c,h\}_{t=0}^{\infty}} : \mathbb{E}\left[\sum_{t=0}^{\infty} \beta^t u(c,h)\right],$$

with

$$u(c,h) = \frac{c^{1-\sigma}}{1-\sigma} - \rho \frac{h^{1+\frac{1}{\eta}}}{1+\frac{1}{\eta}}$$

Labor supply and earnings

- A worker who supplies h_t hours earns $w_t h_t e^{s_t}$
  - w_t: market wage rate for an efficiency unit of labor
  - s_t: represents the worker's productivity
- s evolves according to: $s_t = \varphi_s s_{t-1} + \varepsilon_t$, with $\varepsilon_t \sim N(0, \sigma_\varepsilon^2)$.
- We consider **two versions** of the model:
  - One in which labor supply is indivisible: h_t can take either zero or $\bar{h}$.
  - One with only intensive margin: $h_t \in [0, 1]$

Production

- **Cobb-Douglas** production function with constant returns to scale,

$$Y_t = z_t K_t^{\alpha} N_t^{1-\alpha},$$

  - K: aggregate capital
  - N: aggregate efficient units of labor
  - z_t: aggregate productivity with $P_z(z', z)$

- Firm's **FOCs** entails that,

$$w_t = (1-\alpha) z_t K_t^{\alpha} N_t^{-\alpha},$$

$$r_t = \alpha z_t K_t^{\alpha-1} N_t^{1-\alpha} - \delta,$$

  where δ is the depreciation rate

Recursive formulation of individuals problem

working

$$V_e(\omega) = \max_{c,a' \geq 0} : [U(c,h) + \beta \mathbb{E}_{z'} \mathbb{E}_{s'} \max\{V_e(\omega'), V_n(\omega')\}]$$

where $\omega = (a, s; z, \lambda)$ subject to:

$$c + a' = [1 + r(1 - \tau_k)]a + whe^s - T(whe^s) + \epsilon$$

not working

$$V_n(\omega) = \max_{c,a' \geq 0} : [U(c,0) + \beta \mathbb{E}_{z'} \mathbb{E}_{s'} \max\{V_n(\omega'), V_e(\omega')\}]$$

subject to:

$$c + a' = [1 + r(1 - \tau_k)]a + \epsilon$$

Quantitative analysis

Calibration

Parameter	Value	Source/Target
β	0.98	$K/Y = 2.8$
σ	2.00	Micro evidence
η	0.50	Micro evidence
ρ	43	Average Employment Rate
φ_s	0.948	Chang and Kim (2006)
σ_ε	0.26	Chang and Kim (2006)
δ	0.05	Average I/Y
α	0.36	NIPA
τ_k	0.25	Fuster et. al (2007)
ζ	0.09	Average tax rates
$P_z(z', z)$	-	Chang and Kim (2006)

Planner's Program

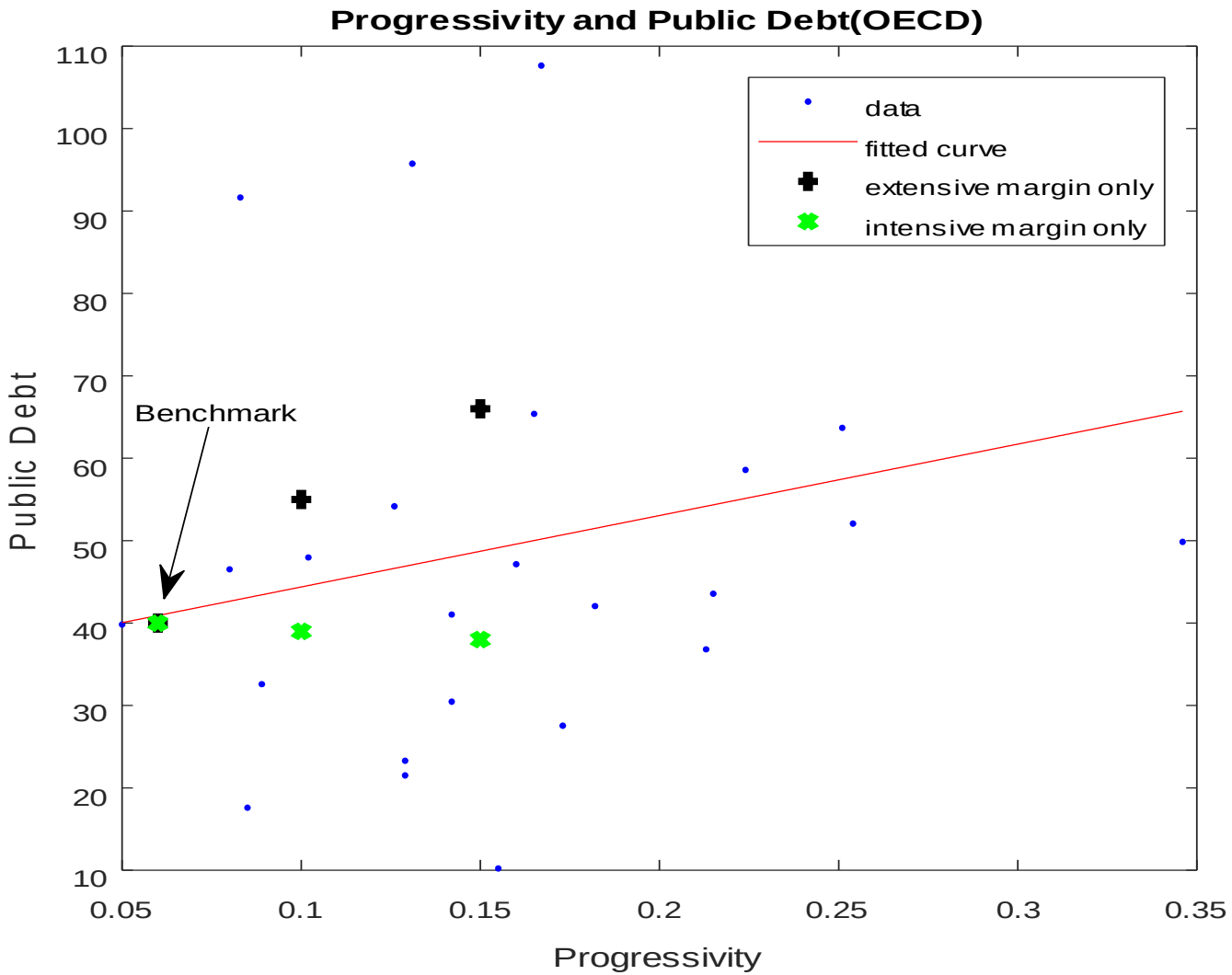
The Objective: Utilitarian social welfare function

Planner maximizes **'ex-ante' lifetime utility** of an agent born into the equilibrium implied by the optimal policy.

Instruments

- public debt, B;
- labor income taxation: $T(y) = y - \varrho y^{1-\zeta}$

Results


Progressivity and Public Debt(OECD)
data
fitted curve
extensive margin only
intensive margin only
Benchmark
Public Debt
Progressivity
110
100
90
80
70
60
50
40
30
20
10
0.05
0.1
0.15
0.2
0.25
0.3
0.35

Next steps

- Model **partial time** job;
- match **income distribution**;

Next steps

- Model **partial time** job;
- match **income distribution**;
- compute the **optimal** fiscal policy;
- consider an **OLG** economy;
- investigate the role of **business cycle**.