# Long Run Effective Demand

## Introducing Residential Investment in a Sraffian Supermultiplier Stock-Flow Consistent Model

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# Summary

- 1. Empirical motivation
- 2. Review of the literature: demand-led growth
- 3. Stock-Flow Consistent Sraffian Supermutiplier model

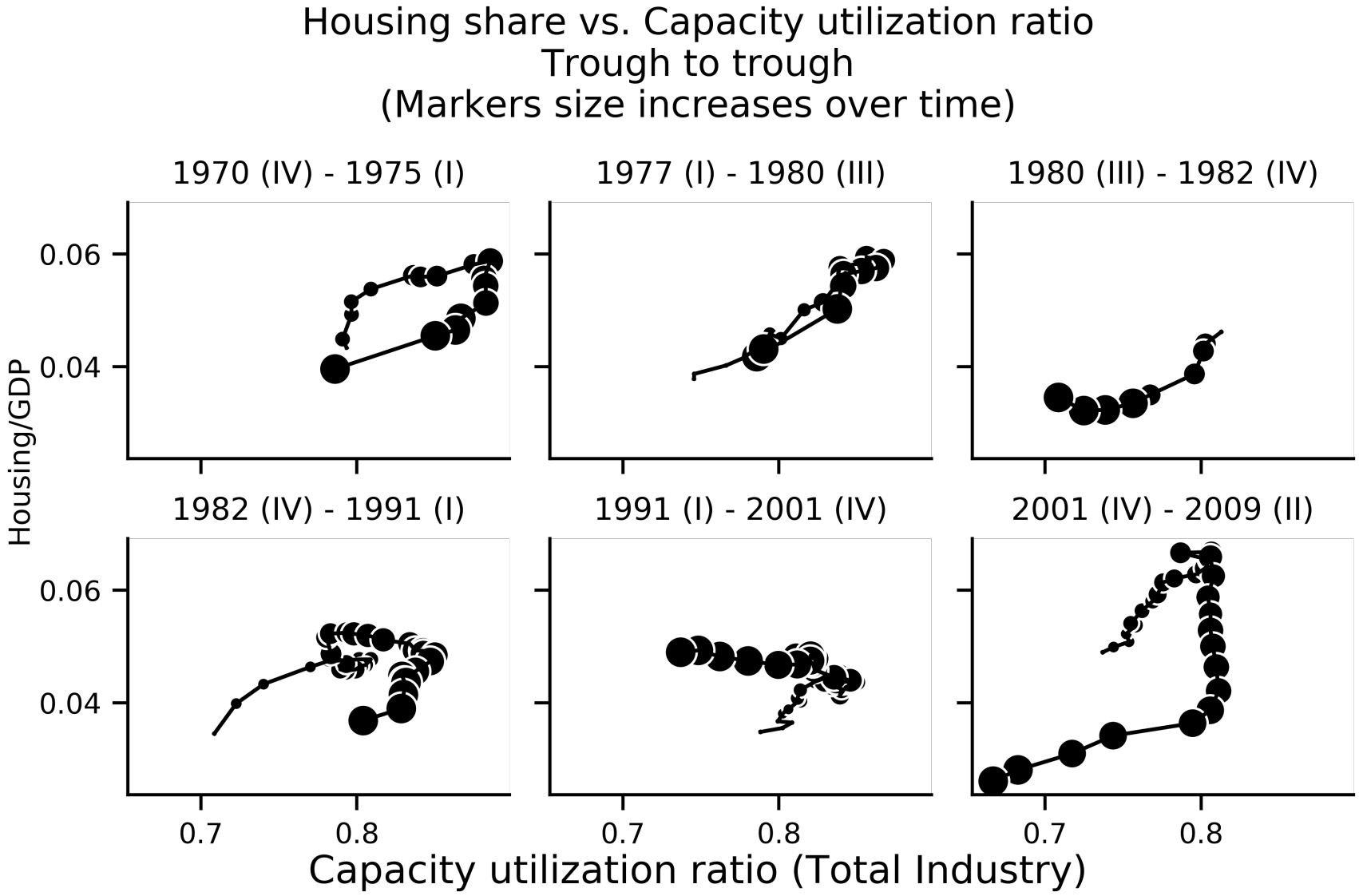
- How to include residential investment in a heterodox growth model?

# Empirical Literature

- Non-capacity creating autonomous expenditures
  - Freitas and Dweck (2013)
  - Braga (2018)
  - Girardi and Pariboni (2016, 2018)

- Residential Investment
  - Green (1997)
  - Leamer (2007)
  - Fiebiger (2018)

# Empirical motivation: U.S. Economy

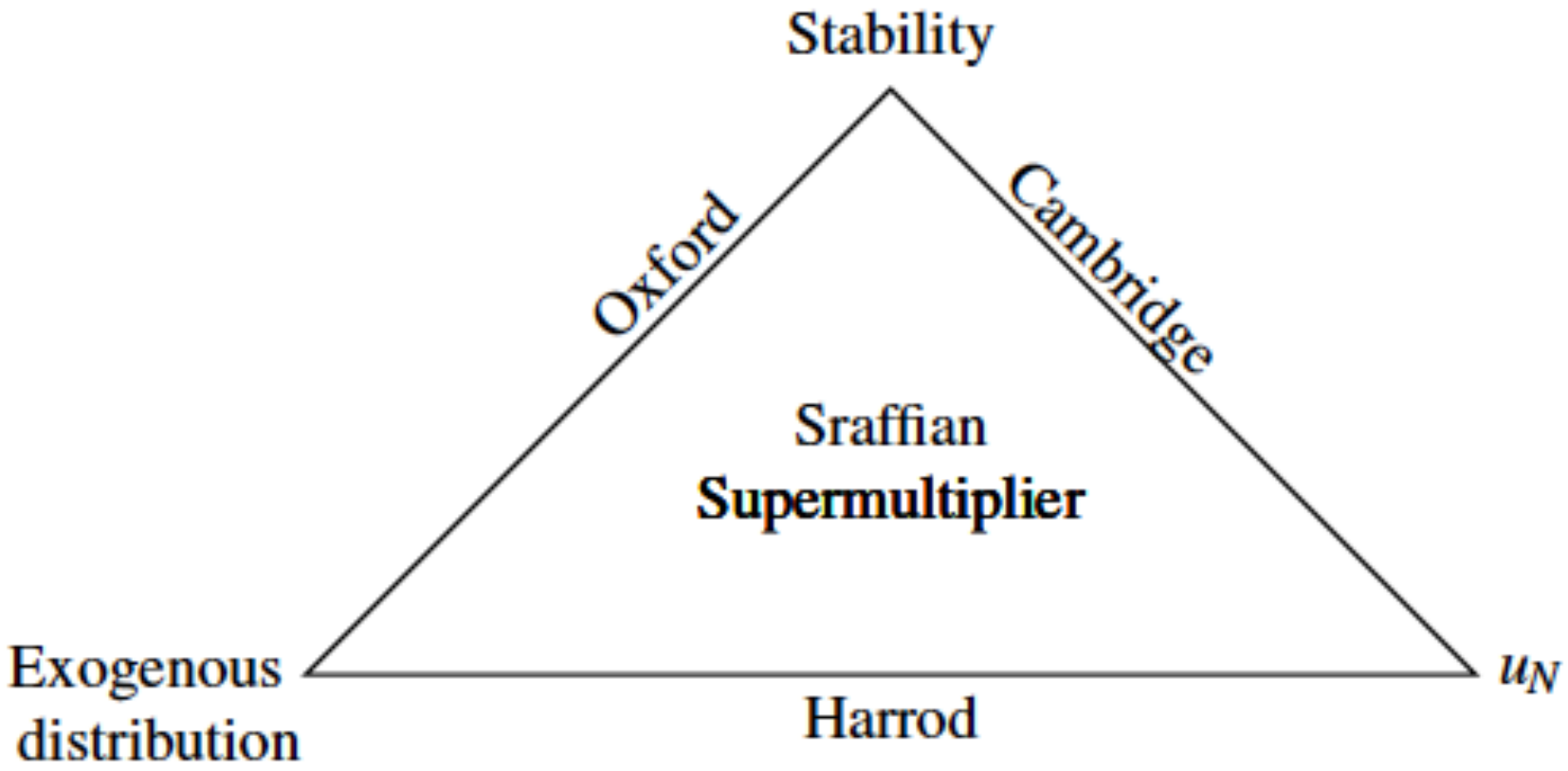


# Literature Review: Alternative Closures

- Harrod`s question: which are the conditions for a balanced growth between demand and supply?

- Heterodox alternative closures:
  - Cambridge
  - Kalecki
  - Sraffian Supermultiplier

# Literature Review: Alternative Closures

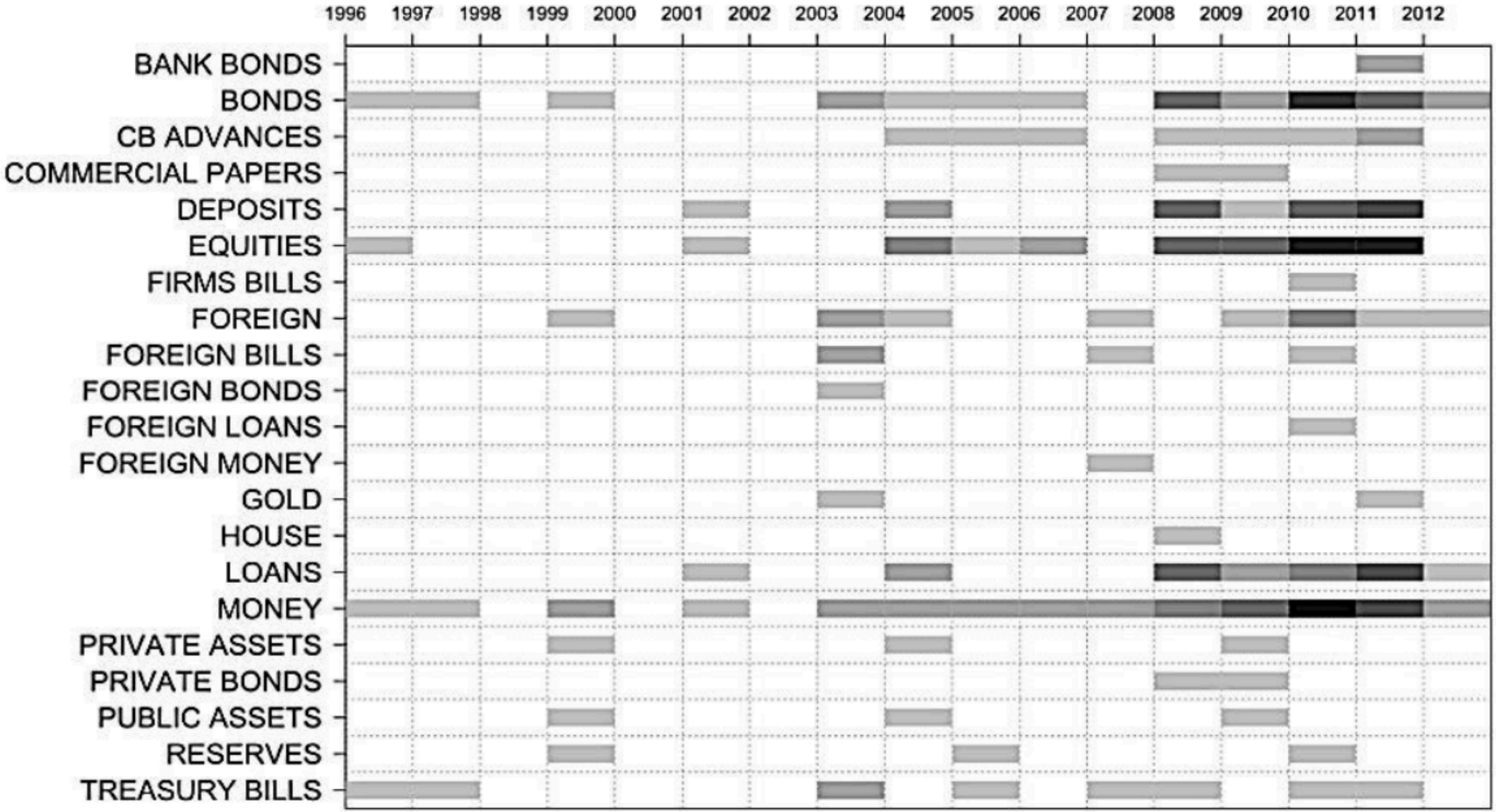



Authors` elaboration

# Literature Review: autonomous expenditures

- Hybrid neo-Kaleckian models:
  - Allain (2015): public expenditures
  - Nah and Lavoie (2017): exports

- Sraffian Supermultiplier:
  - Pariboni (2016), Mandarino, dos Santos and Macedo e Silva (ROKE, forthcoming): debt-financed consumption
  - Brochier and Macedo e Silva (2019): fully specified SSM-SFC; wealth-financed consumption




Source: Caverzasi and Godin (2015)

# SSM-SFC with Residential Investment

# Balance Sheet Matrix

| | Households | Firms | Banks | $\sum$ |
|---|---|---|---|---|
| Deposits | $+M$ | | $-M$ | 0 |
| Loans | | $-L$ | $+L$ | 0 |
| Mortgages | $-MO$ | | $+MO$ | 0 |
| $\sum$ Net financial Wealth | $V_h$ | $V_f$ | $V_b$ | 0 |
| Capital | | $+K_f$ | | $+K_f$ |
| Houses | $+K_h$ | | | $+K_h$ |
| $\sum$ Net Wealth | $NW_h$ | $NW_f$ | $NW_b$ | $+K$ |

# Transaction Flow Matrix and Flow of Funds

| | Households | | Firms | | Banks | Total |
|---|---|---|---|---|---|---|
| | Current | Capital | Current | Capital | | $\Sigma$ |
| Consumption | $-C$ | | $+C$ | | | 0 |
| Non-Residential investment | | | $+I_f$ | $-I_f$ | | 0 |
| Residential investment | | $-I_h$ | $+I_h$ | | | 0 |
| **[Product]** | | | $[Y]$ | | | $[Y]$ |
| Wages | $+W$ | | $-W$ | | | 0 |
| Profits | $+FD$ | | $-FT$ | $+FU$ | | 0 |
| Interest (deposits) | $+r_m \cdot M_{-1}$ | | | | $-r_m \cdot M_{-1}$ | 0 |
| Interest (loans) | | | $-r_l \cdot L_{-1}$ | | $+r_l \cdot L_{-1}$ | 0 |
| Interest (mortages) | $-r_{mo} \cdot MO_{-1}$ | | | | $+r_{mo} \cdot MO_{-1}$ | 0 |
| **Subtotal** | $+S_h$ | $-I_h$ | | $+NFW_f$ | $+NFW_b$ | 0 |
| Change in deposits | $-\Delta M$ | | | | $+\Delta M$ | 0 |
| Change in mortgages | | $+\Delta MO$ | | | $-\Delta MO$ | 0 |
| Change in Loans | | | | $+\Delta L$ | $-\Delta L$ | 0 |
| **Total** | 0 | 0 | 0 | 0 | 0 | 0 |

# Model Strutcture

- Leontief production function
- Output determination

$$Y = C + I_h + I_f$$

- Firms investment

$$I_f = hY$$

$$\Delta h = h_{-1}\gamma\,(u - u_n)$$

# Main Equations

- Household Expenditures
  - Induced Consumption

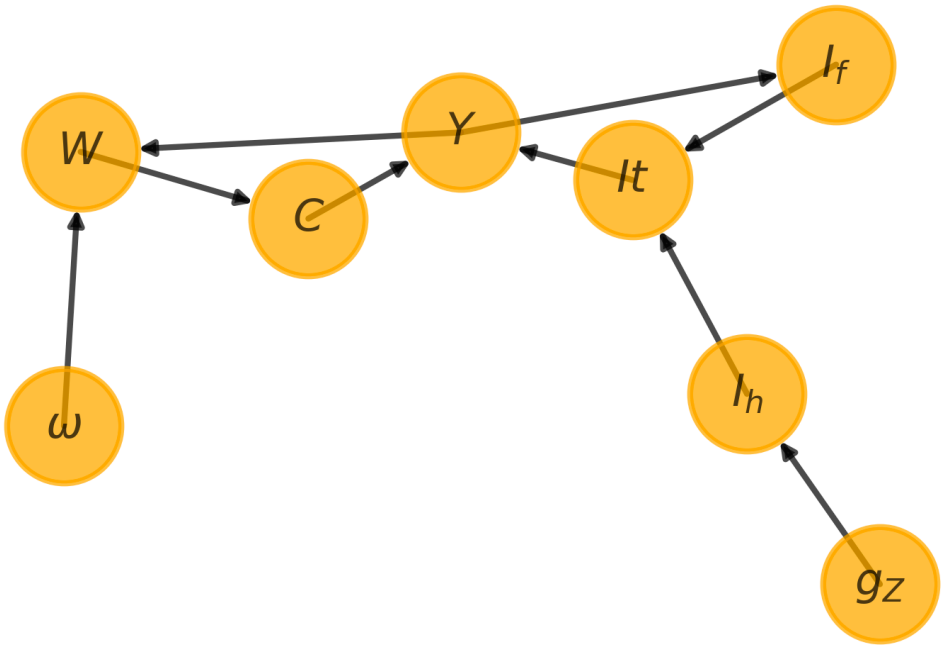
$$C = \omega Y$$

  - Autonomous residential investment

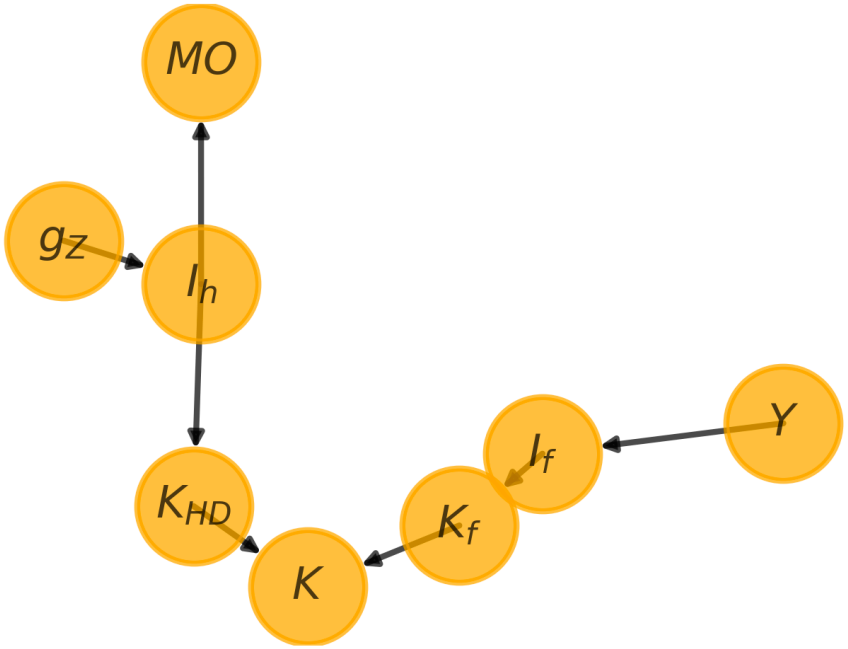
$$I_h = Z = (1+g_z)I_{h-1}$$

$$\Delta MO = I_h$$

# Model Graphs




Flows dynamics




Stocks-Flows dynamics

# Model Solution

- Outuput level

$$Y = \left( \frac{1}{1 - \omega - h} \right) I_h$$

- Out of equilibrium rate of growth

$$g = \frac{h_{-1} \cdot \gamma_u \cdot (u - \bar{u}_N)}{1 - \omega - h(t)} + \bar{g}_Z$$

- Equilibrium rate of growth

$$g = \bar{g}_Z$$

# Model Solution

- Firms investment share

$$h = \overline{g}_Z \frac{u_N}{v}$$

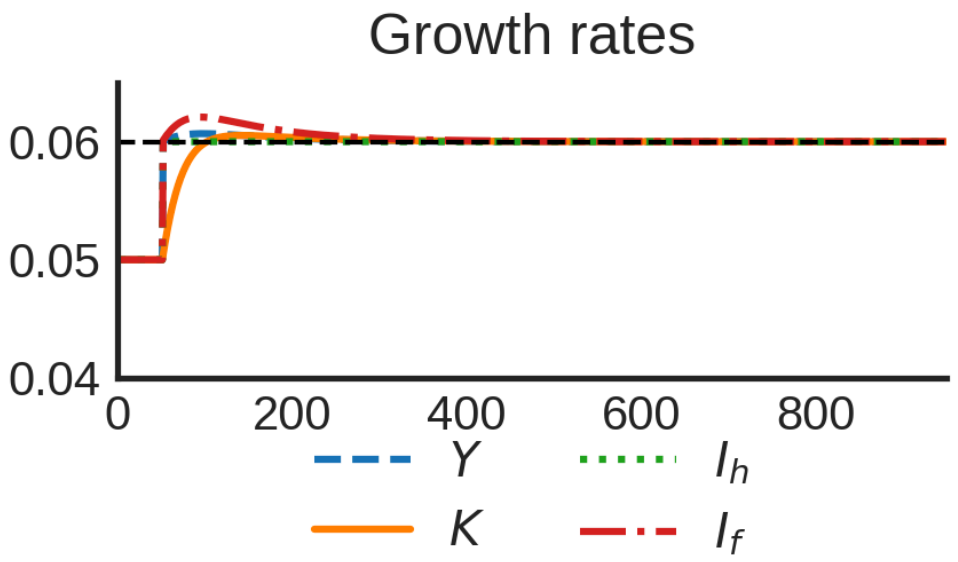
- Two types of real assets

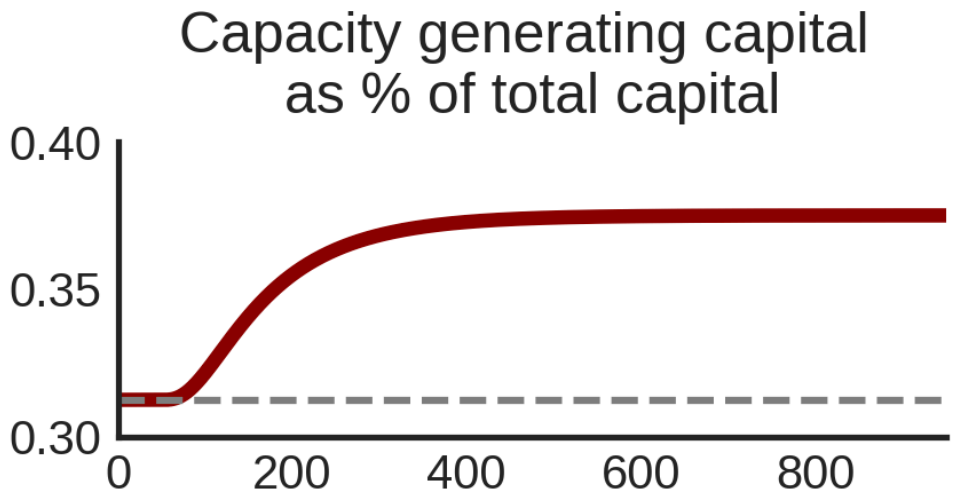
$$K = K_f + K_h$$

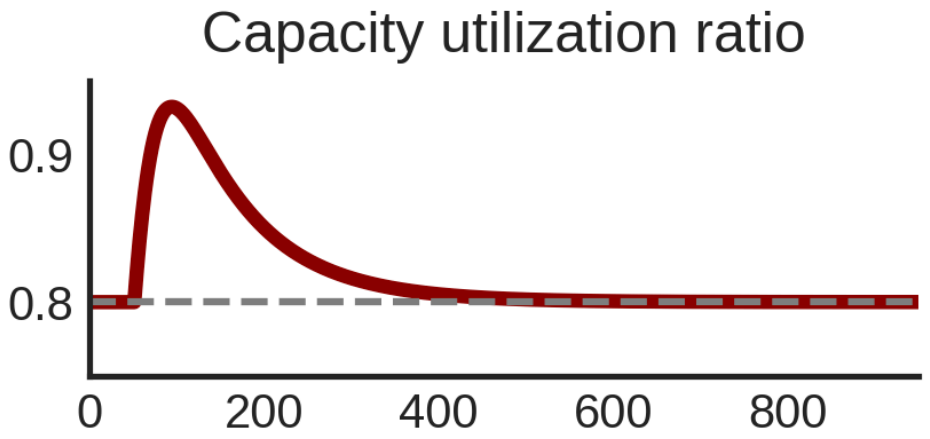
- Share of firms capital on total capital

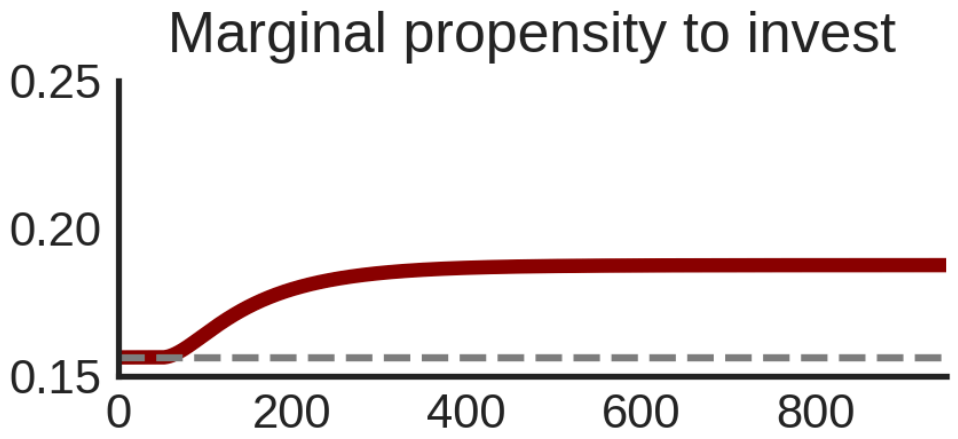
$$k = \frac{K_f}{K} = \frac{h}{(1-\omega)}$$

# Numerical Simulations: increase of $g_z$

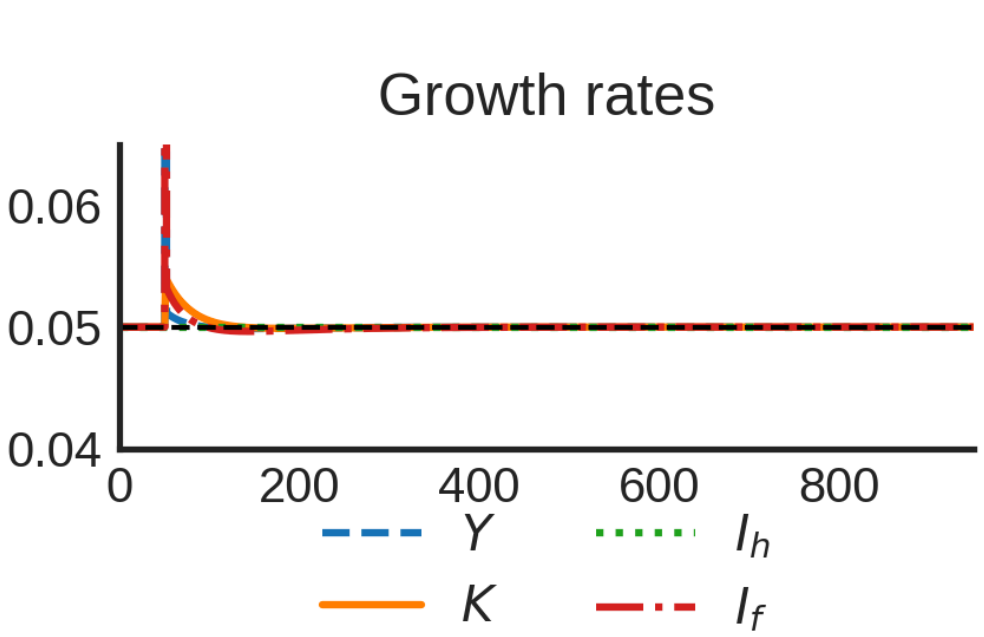


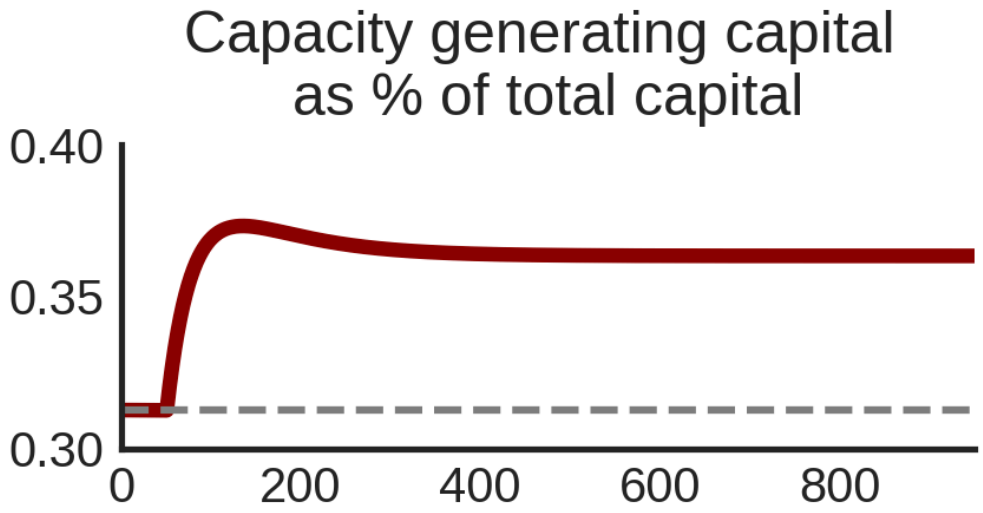



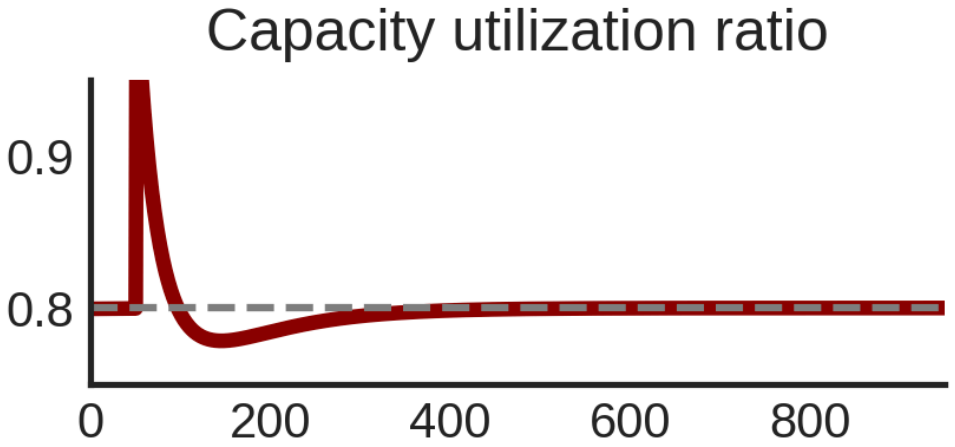



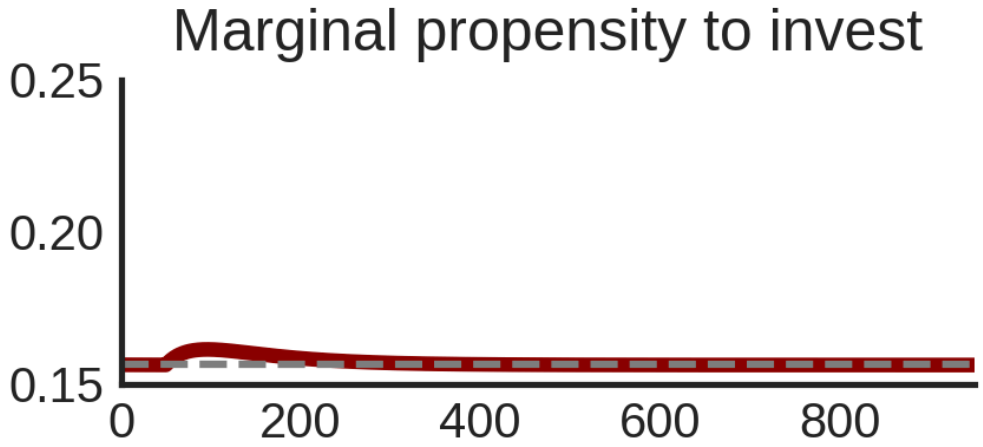



# Numerical Simulations: increase of ω



# Final Remarks

- Our model preserves Sraffian Supermultipier main results
- Increase of the wage-share does not increase long run growth rate
  - No paradox of cost
- A greater rate of growth of residential investment reduces houses share of total capital
- Further research: to investigate the determinants of residential investment

Thank You

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