# Switching-Track after the Great Recession

by Francesca Vinci and Omar Licandro

Discussed by

Mathieu Taschereau-Dumouchel

Cornell University

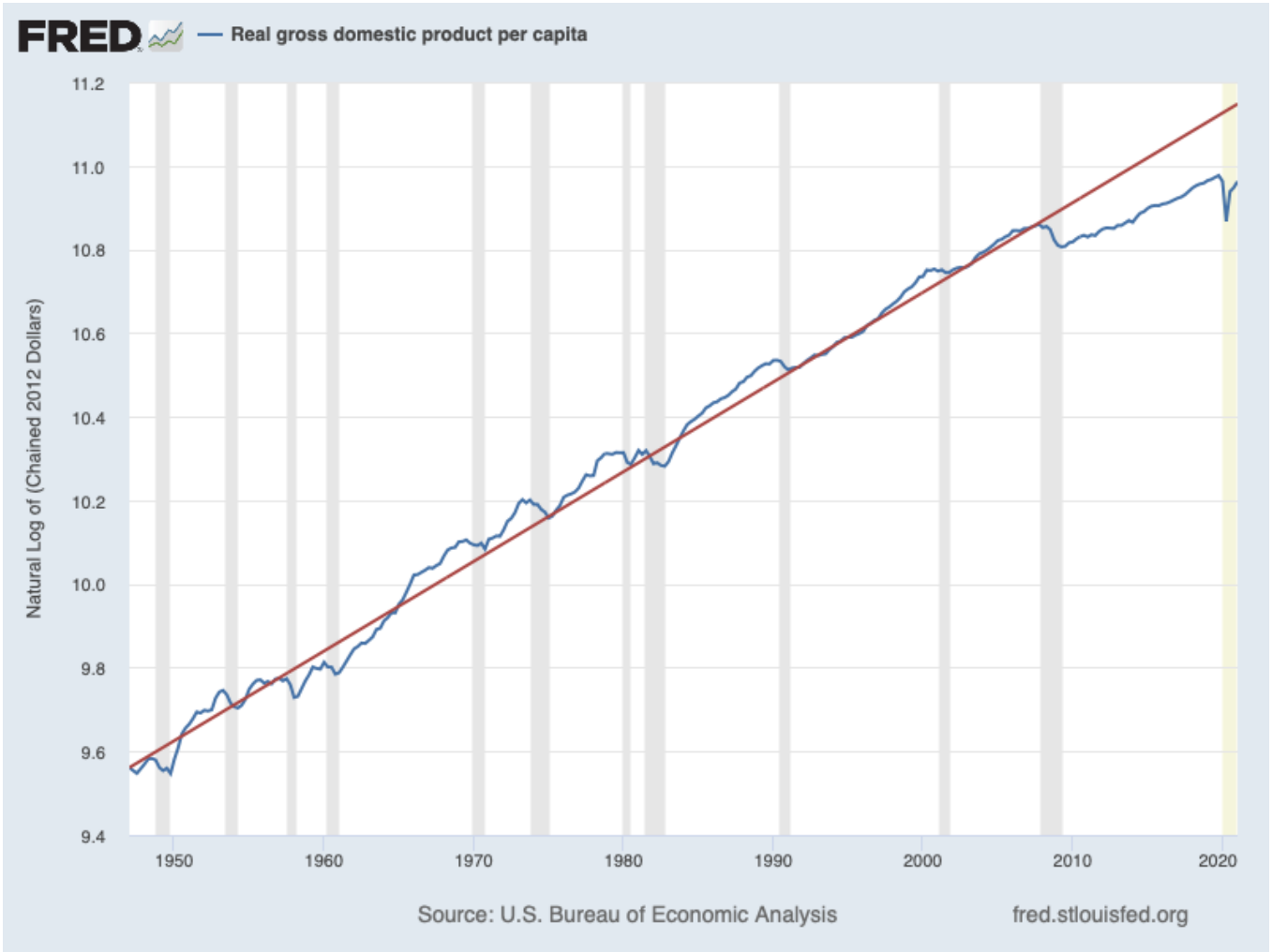
Bank of Canada Monetary Policy Workshop

# Introduction

- Outline for this discussion
  1. Data: A change in steady-state after the Great Recession?
  2. Overview of the model
  3. Comments and suggestions

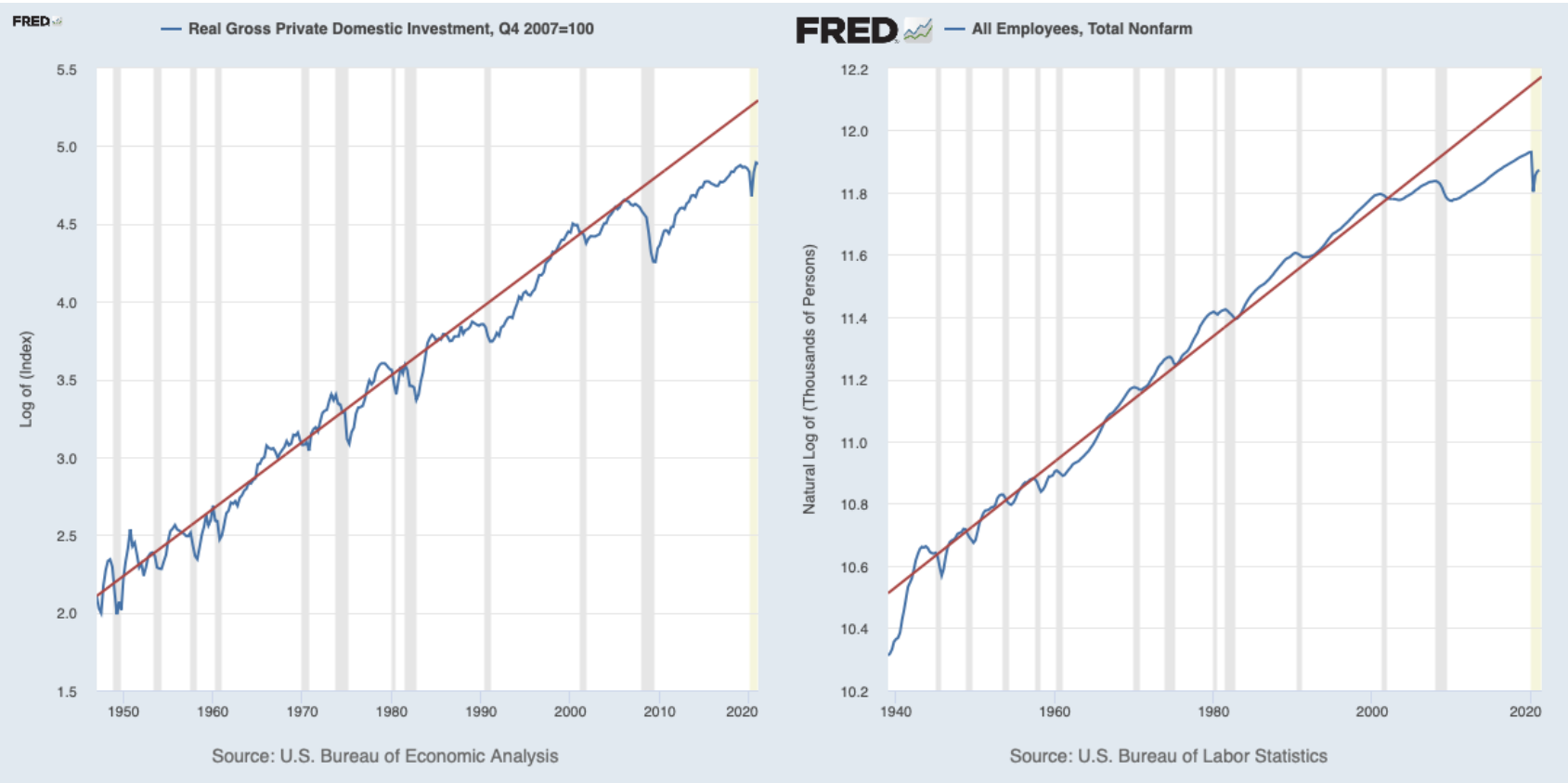
# Aftermath of the Great Recession

- Motivation for the paper
  - Strong departure from long-run (log) linear path after the Great Recession



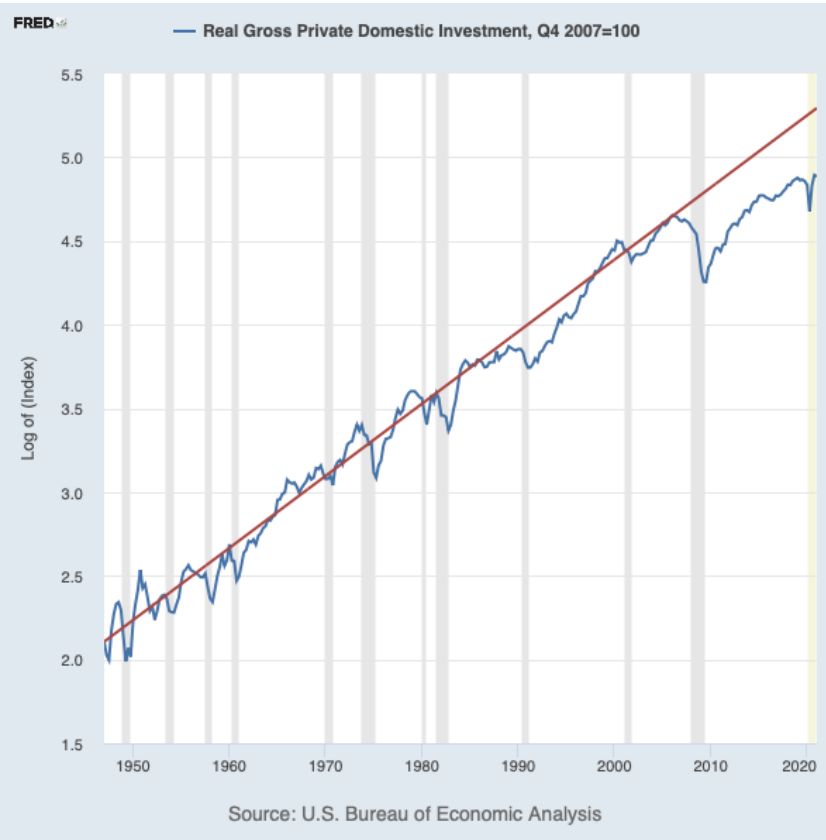
# Aftermath of the Great Recession

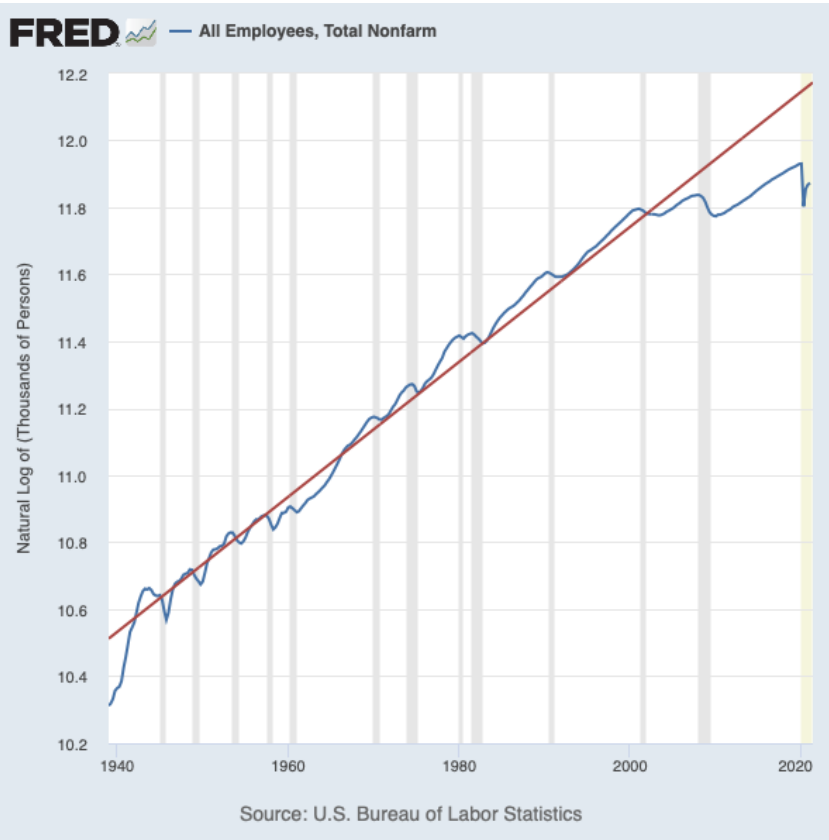
- Can growth accounting tell us where the action is?
  - Labor and Capital
  - In contrast, no much action from TFP (Solow residual)



# Aftermath of the Great Recession

- Can growth accounting tell us where the action is?
  - Labor and Capital
  - In contrast, no much action from TFP (Solow residual)



## This paper

- New Keynesian model to explain the change in steady-state
  - After small shocks the economy goes back to original steady-state
  - But large/prolonged shocks push the economy to lower trajectory
- Key ingredients:
  - Endogenous growth model
  - An initial shock that destroys a lot of capital
  - A Taylor rule whose target output changes over time

## This paper

- New Keynesian model to explain the change in steady-state
  - After small shocks the economy goes back to original steady-state
  - But large/prolonged shocks push the economy to lower trajectory
- Key ingredients:
  - Endogenous growth model
  - An initial shock that destroys a lot of capital
  - A Taylor rule whose target output changes over time

# Key ingredients: $AK$ setup + nature of the shock

- Endogenous growth framework with aggregate capital externality
  - Parametrize the model to get $AK$ structure
- Basic $AK$ properties
  - Capital *always* grows at a constant rate (even out of steady state)

$$\gamma_k = \gamma_c = A - (n + \delta + \rho)$$

  - Shocks that destroy capital move the economy to a different steady state
    - Seems appropriate in view of the data!
- Microfoundation for the capital destruction shock
  - Firms go bankrupt and bankruptcy leads to more depreciation.

## Key ingredients: $AK$ setup + nature of the shock

- Endogenous growth framework with aggregate capital externality
  - Parametrize the model to get $AK$ structure
- Basic $AK$ properties
  - Capital *always* grows at a constant rate (even out of steady state)

$$\gamma_k = \gamma_c = A - (n + \delta + \rho)$$

  - Shocks that destroy capital move the economy to a different steady state
    - Seems appropriate in view of the data!
- Microfoundation for the capital destruction shock
  - Firms go bankrupt and bankruptcy leads to more depreciation.

## Key ingredients: $AK$ setup + nature of the shock

- Endogenous growth framework with aggregate capital externality
  - Parametrize the model to get $AK$ structure
- Basic $AK$ properties
  - Capital *always* grows at a constant rate (even out of steady state)

$$\gamma_k = \gamma_c = A - (n + \delta + \rho)$$

  - Shocks that destroy capital move the economy to a different steady state
    - Seems appropriate in view of the data!
- Microfoundation for the capital destruction shock
  - Firms go bankrupt and bankruptcy leads to more depreciation.

# Key ingredients: Taylor rule with moving output target

- But why aren't all shocks moving the steady states around?
  - Monetary authority pushes the economy around
- Taylor rule

$$R_t^m = \bar{R} + \rho_\pi \left(\pi_t - \bar{\pi}_t\right) + \rho_y \left(\log \widehat{GDP} - \log y_t^p\right)$$

with the ZLB constraint $R_t = \max\left(1, R_t^m\right)$ and the adjusting target

$$y_t^p = y_{t-1}^p + \rho \left(\frac{1}{n} \sum_{j=1}^{n} \widehat{GDP}_{t-4-j} - y_{t-1}^p\right)$$

- Importance for dynamics
  - For small recession, $y_t^p$ does not move much
    - Central Bank pushes for a return to the previous steady state
  - For large recession, $y_t^p$ falls down
    - During recovery the Central Bank stops pushing before reaching the old steady state

    $\Rightarrow$ New steady state

## Key ingredients: Taylor rule with moving output target

- But why aren't all shocks moving the steady states around?
  - Monetary authority pushes the economy around
- Taylor rule

$$R_t^m = \bar{R} + \rho_\pi \left(\pi_t - \bar{\pi}_t\right) + \rho_y \left(\log \widehat{GDP} - \log y_t^p\right)$$

with the ZLB constraint $R_t = \max\left(1, R_t^m\right)$ and the adjusting target

$$y_t^p = y_{t-1}^p + \rho \left(\frac{1}{n} \sum_{j=1}^{n} \widehat{GDP}_{t-4-j} - y_{t-1}^p\right)$$

- Importance for dynamics
  - For small recession, $y_t^p$ does not move much
    - Central Bank pushes for a return to the previous steady state
  - For large recession, $y_t^p$ falls down
    - During recovery the Central Bank stops pushing before reaching the old steady state

    $\Rightarrow$ New steady state

## Key ingredients: Taylor rule with moving output target

- But why aren't all shocks moving the steady states around?
  - Monetary authority pushes the economy around
- Taylor rule

$$R_t^m = \bar{R} + \rho_\pi \left(\pi_t - \bar{\pi}_t\right) + \rho_y \left(\log \widehat{GDP} - \log y_t^p\right)$$

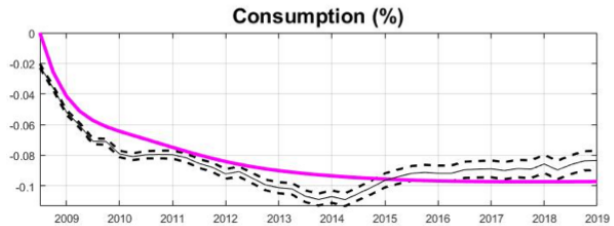
with the ZLB constraint $R_t = \max\left(1, R_t^m\right)$ and the adjusting target

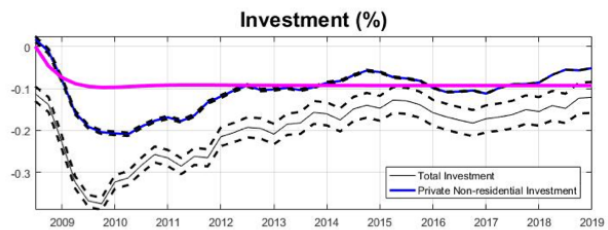
$$y_t^p = y_{t-1}^p + \rho \left(\frac{1}{n} \sum_{j=1}^{n} \widehat{GDP}_{t-4-j} - y_{t-1}^p\right)$$

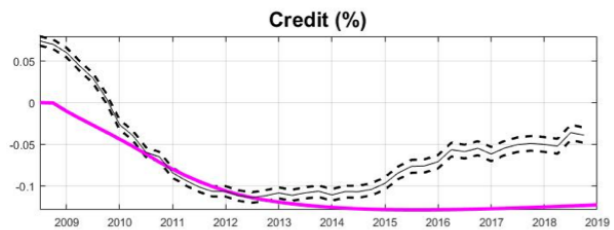
- Importance for dynamics
  - For small recession, $y_t^p$ does not move much
    - Central Bank pushes for a return to the previous steady state
  - For large recession, $y_t^p$ falls down
    - During recovery the Central Bank stops pushing before reaching the old steady state

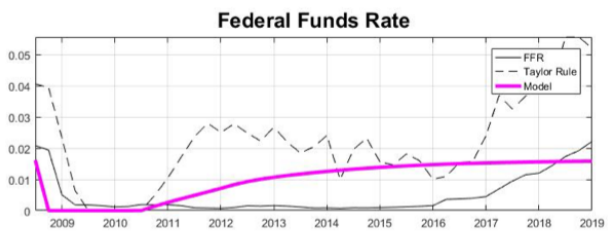
    $\Rightarrow$ New steady state

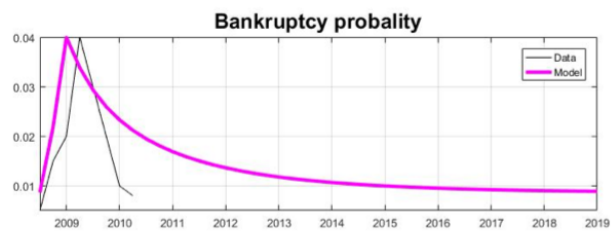
# Results: Large shock

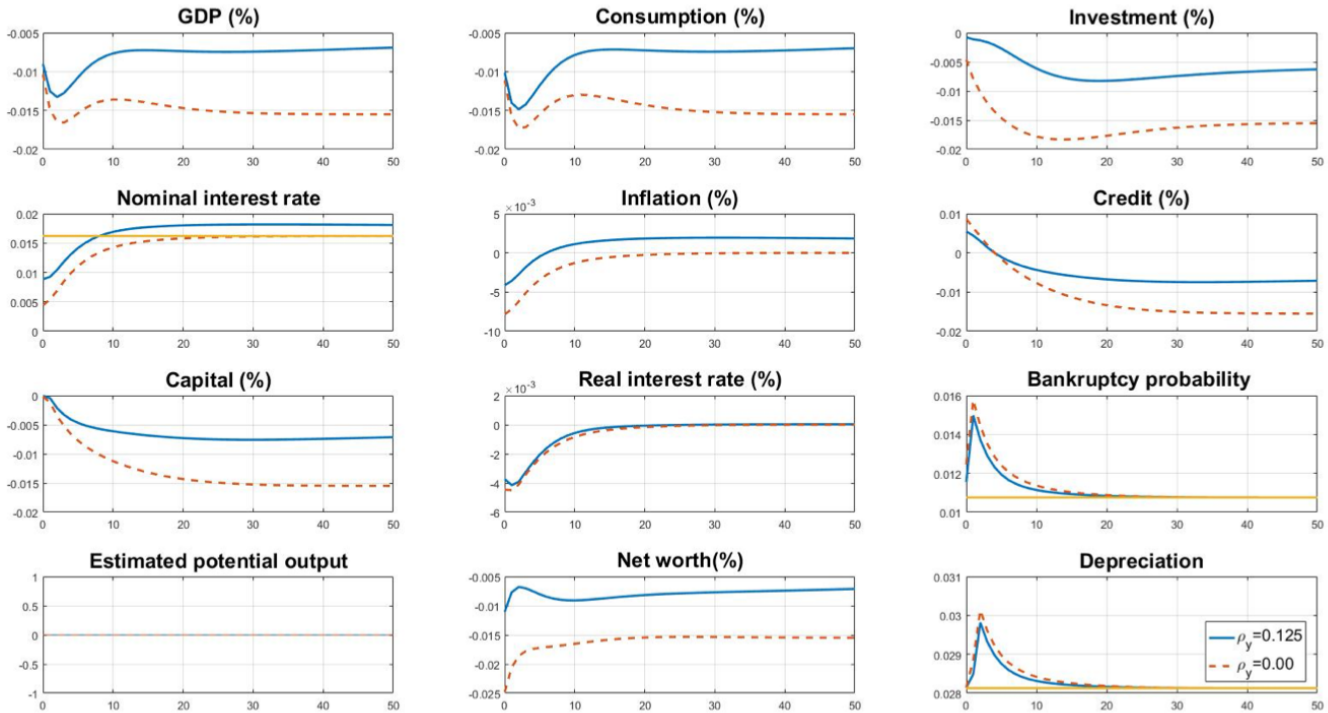



# Results: Small shock

- Outcomes after a small shock (blue lines)



## Comments

- Nice, interesting paper!
  - Different behavior for small vs large shock
  - Reasonable mechanism with plausible outcomes
- What's next?
  - Some comments about the exposition and the state of the literature

# Comments

I would suggest to better motivate two key assumptions

- Spillovers in the depreciation cost of bankruptcy
  - When an entrepreneur defaults, she increases the loss in capital of other defaulting entrepreneurs
  - Not clear to me why this is needed or what feature of the data motivates this assumption
  - But assuming that there are no spillovers more-or-less kills the mechanism, why?
- The behavior of the Central Bank feels odd to me.
  - The CB's output target is low *because* the economy is depressed *because* the CB's output target is low
  - Smart Central Bankers could fix the whole problem!
  - The observed decline in the reported output target might be a sign of something deeper going on.

# Comments

I would suggest to better motivate two key assumptions

- Spillovers in the depreciation cost of bankruptcy
  - When an entrepreneur defaults, she increases the loss in capital of other defaulting entrepreneurs
  - Not clear to me why this is needed or what feature of the data motivates this assumption
  - But assuming that there are no spillovers more-or-less kills the mechanism, why?
- The behavior of the Central Bank feels odd to me.
  - The CB's output target is low *because* the economy is depressed *because* the CB's output target is low
  - Smart Central Bankers could fix the whole problem!
  - The observed decline in the reported output target might be a sign of something deeper going on.

# Comments

I would suggest to better motivate two key assumptions

- Spillovers in the depreciation cost of bankruptcy
  - When an entrepreneur defaults, she increases the loss in capital of other defaulting entrepreneurs
  - Not clear to me why this is needed or what feature of the data motivates this assumption
  - But assuming that there are no spillovers more-or-less kills the mechanism, why?
- The behavior of the Central Bank feels odd to me.
  - The CB's output target is low *because* the economy is depressed *because* the CB's output target is low
  - Smart Central Bankers could fix the whole problem!
  - The observed decline in the reported output target might be a sign of something deeper going on.

## Comments

I would suggest to better motivate two key assumptions

- Spillovers in the depreciation cost of bankruptcy
  - When an entrepreneur defaults, she increases the loss in capital of other defaulting entrepreneurs
  - Not clear to me why this is needed or what feature of the data motivates this assumption
  - But assuming that there are no spillovers more-or-less kills the mechanism, why?
- The behavior of the Central Bank feels odd to me.
  - The CB's output target is low *because* the economy is depressed *because* the CB's output target is low
  - Smart Central Bankers could fix the whole problem!
  - The observed decline in the reported output target might be a sign of something deeper going on.

## Comments

I would suggest to better motivate two key assumptions

- Spillovers in the depreciation cost of bankruptcy
  - When an entrepreneur defaults, she increases the loss in capital of other defaulting entrepreneurs
  - Not clear to me why this is needed or what feature of the data motivates this assumption
  - But assuming that there are no spillovers more-or-less kills the mechanism, why?
- The behavior of the Central Bank feels odd to me.
  - The CB's output target is low *because* the economy is depressed *because* the CB's output target is low
  - Smart Central Bankers could fix the whole problem!
  - The observed decline in the reported output target might be a sign of something deeper going on.

## Comments

Is it possible to derive some theoretical results?

- Does the economy actually change steady-state after a large shock or is the adjustment just really slow?
- Does the economy go back to the old steady state after small shock, or are all shocks permanent?
- Resolution methods can be tricky with multiple steady states → theoretical results would be a nice addition. Maybe in a simplified model.

## Comments

Is it possible to derive some theoretical results?

- Does the economy actually change steady-state after a large shock or is the adjustment just really slow?
- Does the economy go back to the old steady state after small shock, or are all shocks permanent?
- Resolution methods can be tricky with multiple steady states $\rightarrow$ theoretical results would be a nice addition. Maybe in a simplified model.

## Comments

Is it possible to derive some theoretical results?

- Does the economy actually change steady-state after a large shock or is the adjustment just really slow?
- Does the economy go back to the old steady state after small shock, or are all shocks permanent?
- Resolution methods can be tricky with multiple steady states → theoretical results would be a nice addition. Maybe in a simplified model.

## Comments

Is it possible to derive some theoretical results?

- Does the economy actually change steady-state after a large shock or is the adjustment just really slow?
- Does the economy go back to the old steady state after small shock, or are all shocks permanent?
- Resolution methods can be tricky with multiple steady states $\rightarrow$ theoretical results would be a nice addition. Maybe in a simplified model.

## General comment about the literature

- We now have many papers that generate multiple steady states/equilibria/non-linear dynamics.
- Some recent and/or famous contributions:
  - Increasing returns/coordination: Diamond (1982), Kiyotaki (1988), Murphy et al. (1989), Azariadis and Drazen (1990), Schaal and Taschereau-Dumouchel (2015)
  - Labor markets externalities: Pissarides (1992), Sterk (2016), Eeckhout and Lindenlaub (2019), Acharya, Bengui, Dogra and Lin Wee (2021), Fernandez-Villaverde, Mandelman, Yu, Zanetti (2021)
  - Shopping externalities: Kaplan and Menzio (2014)
  - Information externalities: Fajgelbaum, Schaal and Taschereau-Dumouchel (2017)
  - Beliefs updating: Kozlowski, Veldkamp and Venkateswaran (2020)
  - Matching function non-linearities: Petrosky-Nadeau, Kuehn, and Zhang (2013)
  - ... and many more!
- Next step
  - Which mechanism is actually important?
  - Many models seem consistent with macro data $\rightarrow$ looks to micro data to add discipline

## General comment about the literature

- We now have many papers that generate multiple steady states/equilibria/non-linear dynamics.
- Some recent and/or famous contributions:
  - Increasing returns/coordination: Diamond (1982), Kiyotaki (1988), Murphy et al. (1989), Azariadis and Drazen (1990), Schaal and Taschereau-Dumouchel (2015)
  - Labor markets externalities: Pissarides (1992), Sterk (2016), Eeckhout and Lindenlaub (2019), Acharya, Bengui, Dogra and Lin Wee (2021), Fernandez-Villaverde, Mandelman, Yu, Zanetti (2021)
  - Shopping externalities: Kaplan and Menzio (2014)
  - Information externalities: Fajgelbaum, Schaal and Taschereau-Dumouchel (2017)
  - Beliefs updating: Kozlowski, Veldkamp and Venkateswaran (2020)
  - Matching function non-linearities: Petrosky-Nadeau, Kuehn, and Zhang (2013)
  - ... and many more!
- Next step
  - Which mechanism is actually important?
  - Many models seem consistent with macro data $\rightarrow$ looks to micro data to add discipline