Inequality, Business Cycles, and Monetary Policy

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Overview

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- Rapidly becoming outdated due to better data and computational techniques
- A lot of work to build a new generation of monetary models consistent with newly discovered facts
    - heterogeneous agent New Keynesian models (HANK)

Plan for my talk

- Optimal monetary policy in RANK
- Optimal monetary policy in HANK
    - based on my work "Inequality, Business Cycles, and Monetary-Fiscal Policy" with Anmol Bhandari, David Evans, and Thomas Sargent.
- Going forward

Monetary policy in RANK world

Textbook New Keynesian model

- Monopolistically competitive firms with sticky nominal prices
- Representative consumer supply labor to firms, buys all goods produced by firms
- Fiscal policy: sluggish, cannot react to business cycle shocks
- Monetary policy: nimble, can react to business cycle shocks

Three equations RANK model

- Welfare of representative consumer

$$-\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(\pi_t^2 + \alpha x_t^2\right)$$

where π_t is inflation and x_t is "output gap"

- Phillips curve

$$\pi_t = \beta \mathbb{E}_t \pi_{t+1} + \kappa x_t$$

- IS curve

$$x_t = -\left(i_t - \mathbb{E}_t \pi_{t+1} - r_t^e\right) + \mathbb{E}_t x_{t+1}$$

where i_t is nominal interest rate, r_t^e is "efficient" real rate

Optimal monetary policy

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$$-\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(\pi_t^2 + \alpha x_t^2\right)$$

- Microfoundation for central bank dual mandate to pursue both low inflation and unemployment

Optimal monetary policy

- Optimal response to productivity shock
  - "divine coincidence": CB should keep inflation low, the output gap will close itself

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- Optimal response to Phillips curve ("mark up") shock
  - "lean against the wind": to offset inflationary pressure, CB should increase interest rates to lower output gap
- Optimal policy can be approximated well with a "Taylor rule"

$$i_t = \bar{\imath} + \phi_\pi \pi_t + \phi_x x_t.$$

Monetary policy in HANK world

Heterogeneous agent New Keynesian model

- Augment basic NK model with realistic model of labor markets
  - heterogeneity in earnings and wealth
  - heterogeneity in exposure to aggregate shocks
  - idiosyncratic shocks
- Discipline it using high-quality micro-level data
  - administrative panel data on earnings
  - data on asset holdings
- Study optimal monetary policy in this economy
  - numerical techniques are new and sophisticated
  - economic intuition for the results is straightforward

New channel of monetary policy

- New role for monetary policy in HANK economies: provision of **insurance** against aggregate shocks
- Quantitatively, welfare gains from insurance swamp losses from abandoning price stability

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  - standard deviation of log output in the U.S. about 3%

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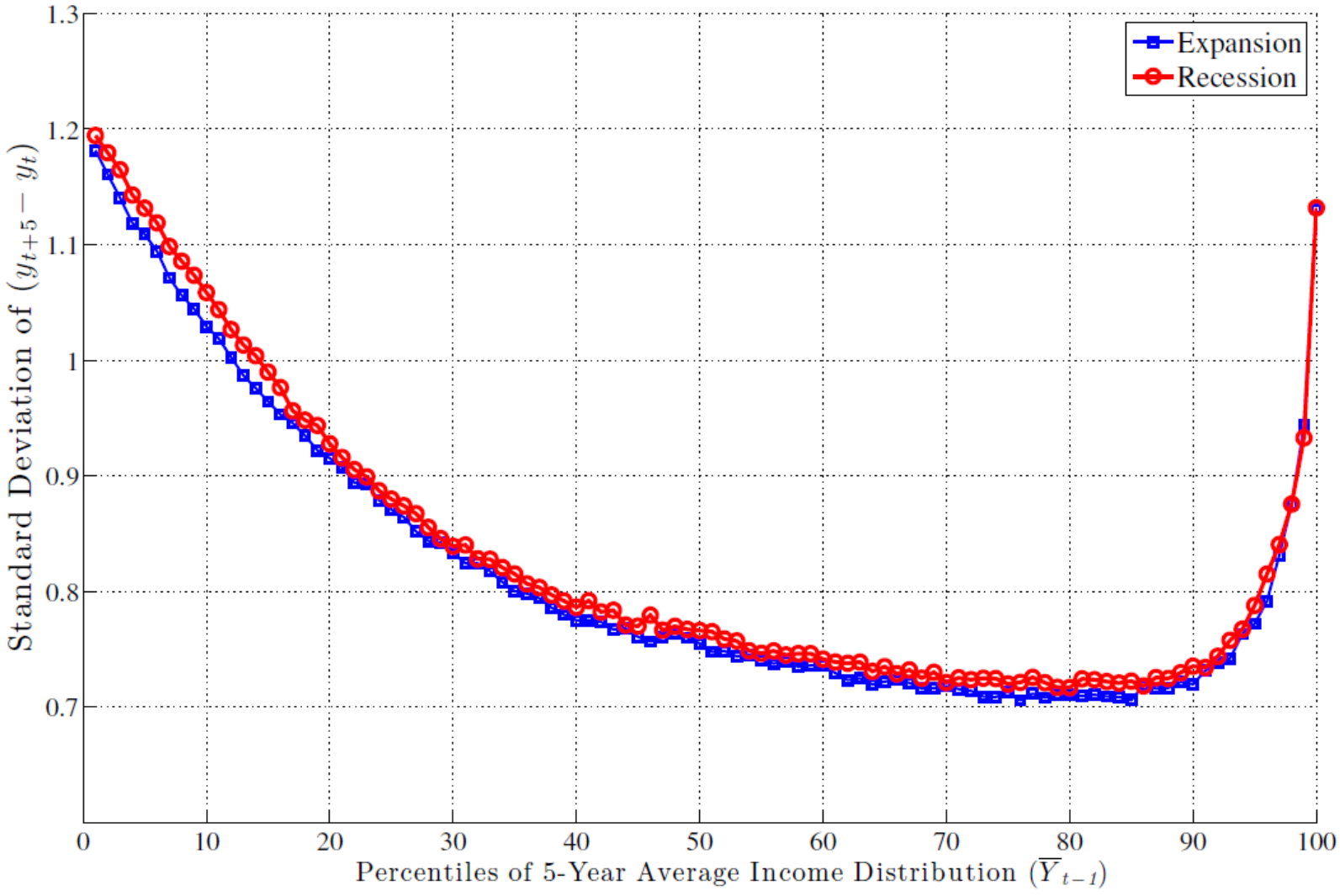
  - a world where 100% of households bear a 3% shock is very different from a world where 3% of households bear a 100% shock
- In the data, aggregate shocks have very heterogeneous impact
  - direct incidence of shock varies
  - asset heterogeneity: ability to cope with shock varies

Effects of recessions and expansions by earnings

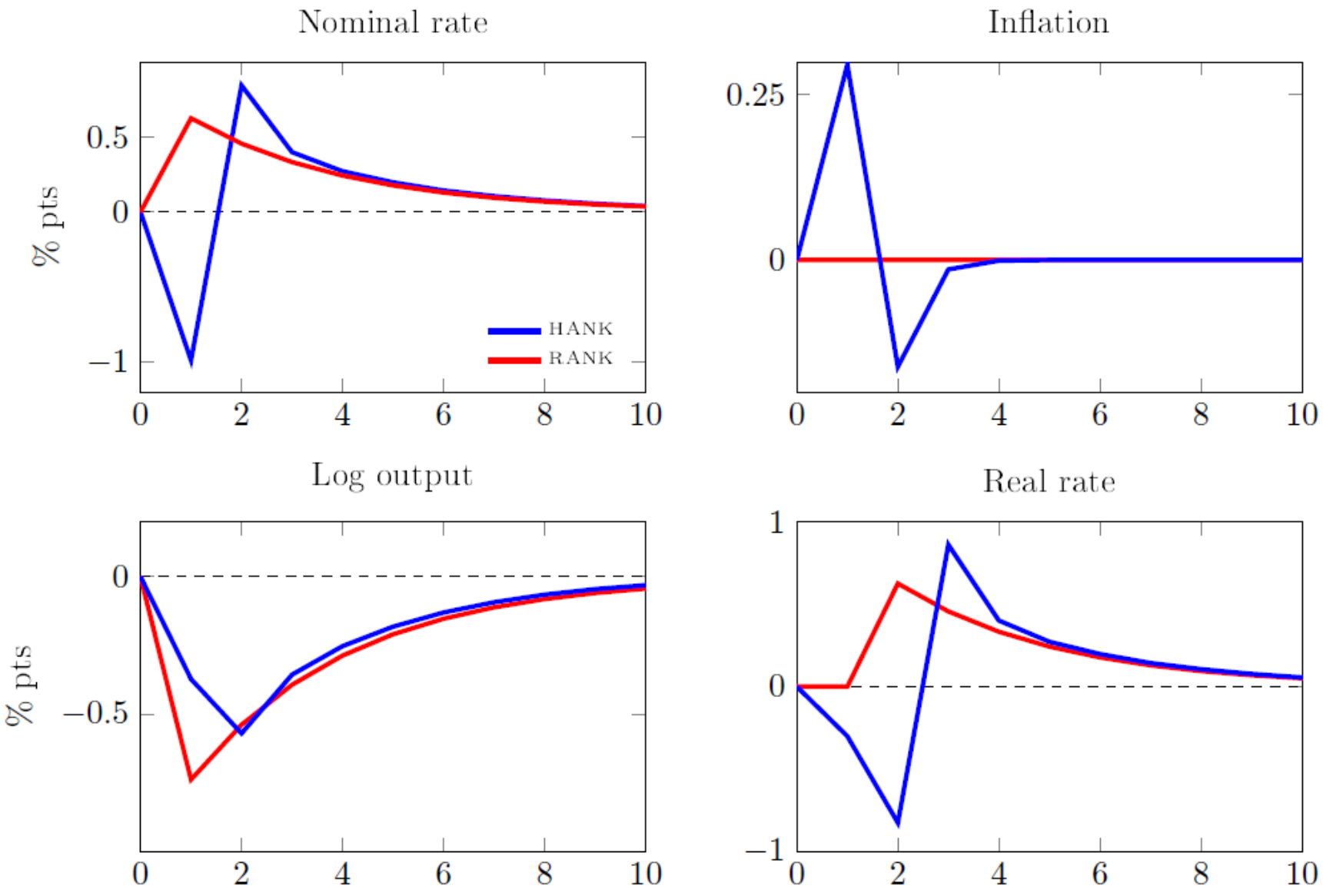


Source: Guvenen et al (2014)

Heterogeneous impact of productivity shocks

- Consider a recession driven by a negative productivity shock
  - would be efficient if everyone's consumption fell equally
- The impact of the shock is heterogeneous
  - poor households are hit more middle class
  - asset-poor and borrowers suffer more than asset-rich and lenders
  - double whammy: asset-poor households suffer highest fall in earnings
- CB can use monetary policy to provide insurance to offset heterogeneous impact of the shock

Optimal response to a negative productivity shock



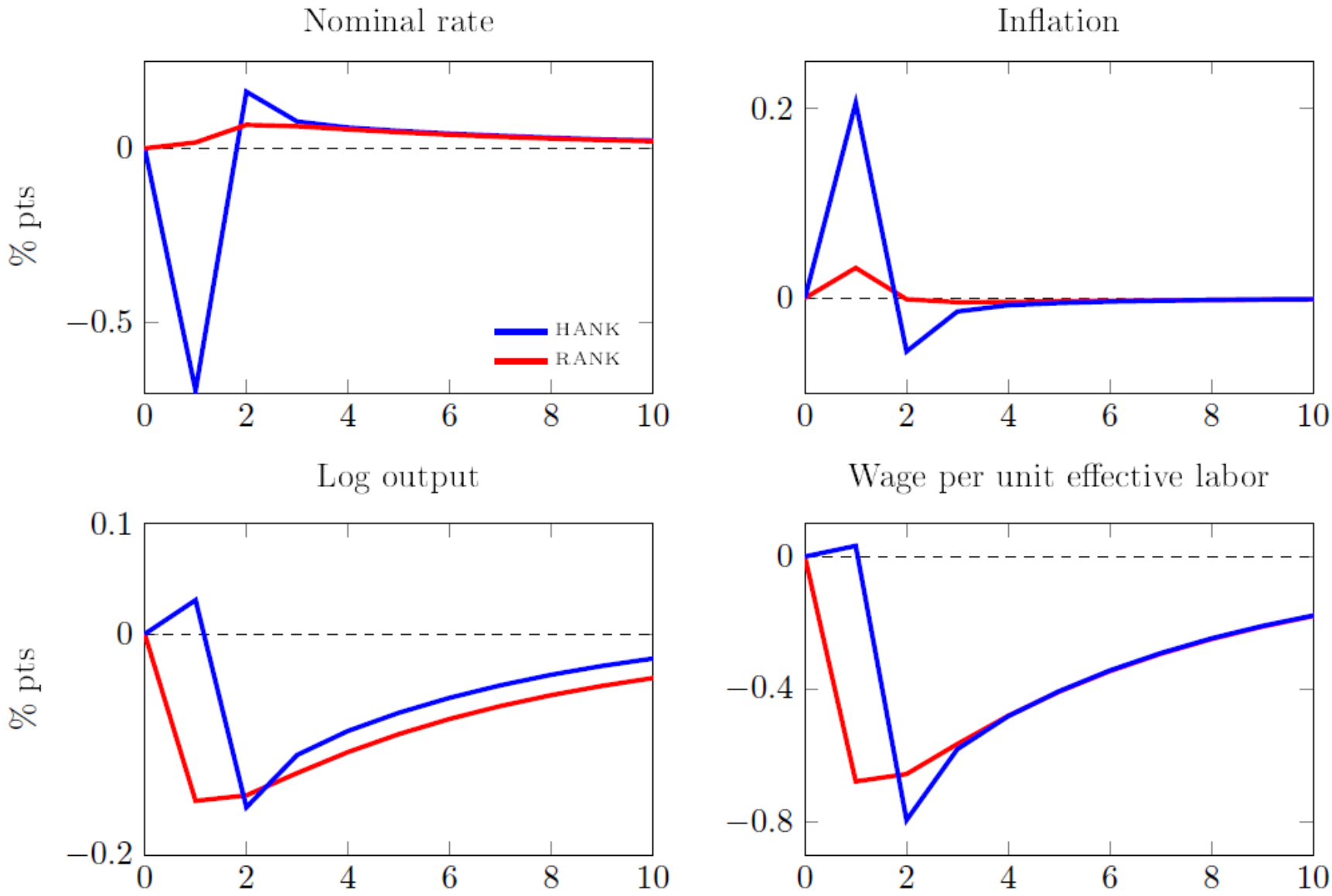
Discussion

- Loose monetary policy in response to negative shock
  - cushions fall in output to reduce unequal impact on earnings
  - increases inflation and lowers real rates to help borrowers
- Optimal response to positive productivity shock is the opposite
- It provides insurance rather than redistribution
  - net expected income flow for all households is roughly zero
  - fiscal policy is a much better tool to pursue redistribution

Heterogeneous impact of markup shocks

- Consider a positive markup shock
  - classical effect: increases inflationary pressure, CB offsets it by raising interest rates and reducing firms' marginal costs
- Heterogeneous impact of this shock
  - returns on equity increases, returns on labor falls
- Equity holdings are highly skewed in the data: most households have no equity holdings at all
  - gains from insurance are **large**
- To provide insurance, CB can set interest rates to increase wages and help workers
  - worker's wages $=$ firms' marginal costs
  - opposite response from "leaning against the wind"

Optimal response to a positive markup shock



Discussion

- Loose monetary policy stimulates aggregate demand, increases real wage
- This partially offsets heterogeneous impact of markup shock
- Benefits of insurance much larger than costs of inflation spike

Lessons

- Provision of insurance against aggregate shocks should be a first order concern for monetary policy
- Simple Taylor rules are poor approximation of optimal policy
- CB should consider the heterogeneous impact of both exogenous shock and monetary response in setting its policy

Going forward

Three major advances in recent years

- High quality administrative data to study how aggregate shocks affect households on micro-level and frictions they face
  - impact of aggregate shocks: Guvenen et al (2014)
  - MPC heterogeneity: Jappelli and Pistaferri (2014)
  - impact of monetary policies: Coibon and Gorodnichenko (2015), Coibon et al (2021), Andersen et al (2021)
- High frequency data to better identify monetary shocks and the channels through which they work
  - Bernanke and Kuttner (2005), Nakamura and Steinsson (2018)
- New computational techniques to solve and estimate HANK models matched closely to microdata
  - Kaplan, Moll, Violante (2018), Bhandari et al (2021), Auclert et al (2021), Bayer et al (2021)

Next steps

- These three lines of work suggest that workings of aggregate shocks and monetary policy are quite different from textbook NK model
- It is now feasible to study models that are consistent with both macro and micro level empirical facts
- Research departments of central banks should be developing such models and use them to guide the conduct of monetary policy