

# THE NEXUS BETWEEN INEQUALITY AND MONETARY POLICY

James Bullard, Federal Reserve Bank of St. Louis

#### CEBRA 2021 Annual Meeting

Central banking after the pandemic: The challenges of inequality and inclusive growth

July 8, 2021

Any opinions expressed here are my own and do not necessarily reflect those of the FOMC.

CENTRAL TO AMERICA'S ECONOMY\*

ENVIRONMENT	PRODUCTIVITY	EQUILIBRIUM	INEQUALITY	POLICY	CONCLUSIONS

### Introduction

#### INEQUALITY AND MONETARY POLICY

• Can monetary policy be conducted in a way that benefits all households even in a world of substantial heterogeneity?

• The answer in this talk is "yes."

• Main point: The established academic advice to monetary policymakers (e.g., Woodford, 2003) to try and maintain the "Wicksellian natural real rate of interest" continues to hold in an economy with substantial inequality in consumption, income and financial wealth.

#### THIS TALK IS BASED ON A PAPER

- Bullard and DiCecio (Working paper, St. Louis Fed, 2019):
  - "Optimal Monetary Policy for the Masses."
  - DSGE model including a nominal friction, aggregate shocks to demand and productivity, heterogeneous households, and empirically relevant Gini coefficients for consumption, income and financial wealth.
  - Optimal monetary policy acts to establish the Wicksellian natural real rate of interest just as in the standard New Keynesian model.
  - In these remarks, I will omit details and focus on the implications for inequality.
  - Those interested in more details should consult the paper.
  - See also our slide deck "Classic Policy Benchmarks for Economies with Substantial Inequality."



- In the model, the fundamental drivers of inequality are a hump-shaped pattern of productivity over the life cycle along with different levels of education for households within a cohort.
- All households, rich and poor, need to use credit markets to smooth consumption.
- There is a nominal friction in the credit market (non-state contingent nominal contracting, NSCNC).
- The central bank can overcome this nominal friction by adjusting the real interest rate appropriately in response to aggregate shocks.
- A welfare theorem states that the allocation of resources under this monetary policy is first-best.

	PRODUCTIVITY	EQUILIBRIUM	INEQUALITY	POLICY	CONCLUSIONS

### Environment

#### LIFE-CYCLE MODELS

- General-equilibrium life-cycle economy.
  - Each period, a new cohort of households enters the economy, makes economic decisions over the next 241 periods, then exits the economy. The model is therefore "quarterly."
  - Households have log preferences defined over consumption and leisure.
  - Households are assigned a personal productivity profile when they enter the model.
  - The profile is symmetric—it begins low, rises and peaks exactly in the middle of life, then declines back to the low level. There will be many of these, as discussed below.
  - Productivity units determine the value of an hour worked in a competitive labor market.

ENVIRONMENT	EQUILIBRIUM	INEQUALITY	POLICY	CONCLUSIONS

## Life-Cycle Productivity

INTRODUCTION

#### LIFE-CYCLE PRODUCTIVITY PROFILES

- Households entering the economy draw a lognormal scaling factor and receive a life-cycle productivity profile, which is a scaled version of the baseline profile.
  - A lognormal endowment scaling creates an economy with arbitrarily rich and poor households.
- Life-cycle productivity profiles, once assigned, are deterministic.
- This process is a stand-in for the human capital development that takes place before age 20 in actual economies, including schooling, parenting and any pre-age 20 job experience.
- Huggett, Ventura and Yaron (*AER*, 2011) argue that differences in initial conditions are more important than differences in shocks for lifetime earnings.

#### BASELINE LIFE-CYCLE PRODUCTIVITY



FIGURE: Baseline endowment profile. The profile is symmetric and peaks in the middle period of the life cycle.

#### THE MASS OF LIFE-CYCLE PRODUCTIVITY



FIGURE: The mass of endowment profiles. The endowment scaling factor is drawn from a uniform distribution for ease of visualization.

ENVIRONMENT	PRODUCTIVITY	INEQUALITY	POLICY	CONCLUSIONS

# Characterizing the Equilibrium

#### HOURS WORKED OVER THE LIFE CYCLE



FIGURE: Cross section: Leisure decisions (green), labor supply (blue) and fraction of work time in U.S. data, 19% (red). The labor/leisure choice depends on age only. High-income households work the same hours as low-income households at each age.





FIGURE: Cross section: Labor income profiles. Personal productivity peaks at the middle of the life cycle, and households work more at that time as well, making income even more concentrated in the peak earning years.

#### CONSUMPTION MASS



FIGURE: Cross section: Consumption mass (red) and labor income mass (blue) along the complete markets balanced growth path. Under optimal monetary policy, the private credit market reallocates uneven labor income into perfectly equal consumption for each productivity profile. The consumption Gini is 32%, similar to values calculated from U.S. data.

#### NET ASSET HOLDING MASS



FIGURE: Cross section: Net asset holding mass by cohort along the complete markets balanced growth path. Borrowing, the negative values to the left, peaks at stage 60 of the life cycle (age ~35), while positive assets peak at stage of life 180 (age ~65). The financial wealth Gini is 72.4%, similar to values calculated in U.S. data.

ENVIRONMENT	PRODUCTIVITY	EQUILIBRIUM	POLICY	CONCLUSIONS

# Inequality

INTRODUCTION	Environmei	NT PRODUCTIVITY	EQUILIBRIU	JM INEQU		Policy	CONCLUSION
GI	NI COEFF	FICIENTS					
		<b>Consumption</b>	$Y_1$	Income* Y <sub>2</sub>	<i>Y</i> <sub>3</sub>	<b>Wealth</b> W	L
U	J.S. data <sup>†</sup>	32%		51%		80%	
Ν	lodel	32%	55.7%	51.1%	59.0%	72.4%	

TABLE: Gini coefficients in the U.S. data and in the model with lognormal productivity.

\*  $Y_1$ ,  $Y_2$  and  $Y_3$  denote labor income, labor income plus non-negative capital income and non-negative total income.

<sup>+</sup> U.S. data: consumption (Heathcote, Perri and Violante, *RED*, 2010); pre-taxes/transfers income (CBO, 2016); financial wealth (Davies, Sandström, Shorrocks and Wolff, *EJ*, 2011).

ENVIRONMENT	PRODUCTIVITY	EQUILIBRIUM	INEQUALITY	CONCLUSIONS

## Monetary Policy and Inequality

#### ADDITIONAL FEATURES

- The stylized model can accommodate additional features.
- For details, see the slide deck "Classic Policy Benchmarks for Economies with Substantial Inequality."
- That deck describes the addition of (1) unemployment risk at the household level, and (2) taxation to fund a government.
- A labor authority then runs an unemployment insurance program, and a fiscal authority collects appropriate taxes to fund the government.
- These changes do not alter the recommended monetary policy.

ntroduction Environment Productivity Equilibrium Inequality Policy Conclusions

#### MONETARY POLICY AND INEQUALITY

- The stylized model can generate inequality in consumption, income and financial wealth on the same scale as the U.S. data.
- There is a large natural credit market in the model and all households wish to use this market.
- The monetary policymaker can overcome the credit market friction (NSCNC) with an appropriate monetary policy and achieve the best available allocation of resources.
- Bottom line: There is a "correct" real interest rate in this economy that the monetary authority needs to achieve—the Wicksellian natural real rate of interest.
- The optimal monetary policy can be conducted even in the presence of substantial inequality.

#### PRACTICAL POLICY CHARACTERIZATION

- The optimal monetary policy in the model is not difficult to characterize in practical terms.
- It is a version of nominal GDP targeting, which is itself closely related to price level targeting.
- Recent changes in the U.S. monetary policy framework have moved policy closer toward this ideal.

- In the model, as in the data, productivity over the life cycle plays an important role in determining income and financial wealth for different households at a point in time.
- In addition, household earnings are shaped to a large extent by human capital accumulation before age 20, which is "before entering the model" here.
- In the "Classic Policy Benchmarks" deck, there is an "education authority" which can control the dispersion of beginning-of-the-life-cycle human capital.
- This is an interesting area for further research.

#### GINI COEFFICIENTS



FIGURE: As the dispersion of productivity profiles,  $\sigma$ , increases, the Gini coefficients increase. The ordering  $G_W > G_Y > G_C$  is preserved. The case where  $\sigma = 0$  is the social optimum and has  $G_C = 0$  but  $G_W = 65.3\%$  and  $G_Y = 44.3\%$ . The model can match the wealth Gini in the data with a sufficiently large choice of  $\sigma$ .

NTRODUCTION	ENVIRONMENT	PRODUCTIVITY	EQUILIBRIUM	INEQUALITY	POLICY	

### Conclusions



- This paper attributes observed levels of U.S. inequality to life-cycle effects in conjunction with heterogeneous life-cycle productivity profiles.
- All households in this model, regardless of their assigned life-cycle productivity profile, face a problem of smoothing life-cycle consumption in a world with a credit market friction.
- The monetary authority can remove this impediment to life-cycle consumption smoothing for all households: "optimal monetary policy for the masses."