Inequality in Macroeconomics

1. Introduction

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Inequality in Macroeconomics

- ▶ Macroeconomics: aggregation and general equilibrium.
- ▶ Inequality as a macro object.
- ▶ Initial focus: (exogenous) inequality and long-run growth
- ▶ Most recently,
  - what determines the joint distribution of earnings (or labor income) and wealth? Is there a role for policies?
  - how the explicit account of empirically sound inequality shapes the answers to the standard questions in macro?
- ▶ This course: macro models with endogenous distributions.
- ▶ These models extend the neoclassical growth model (NGM) to address these questions.

The NGM and Heterogeneity

- ▶ Ex-ante heterogeneity: constant consumption and any wealth distribution is self-perpetuated.
- ▶ Ex-post heterogeneity (idiosyncratic shocks):
    - Complete markets allow aggregation and representative agent is enough;
    - Consumption distribution is constant, despite idiosyncratic shocks;
    - Wealth distribution depends directly on income shocks.
- ▶ Enough for many questions in Macro,
- ▶ Not for obtaining realistic wealth distributions;
- ▶ And not for those involving distributional issues,
    - Heterogeneous propensities to save and consume (effects of macro policies).
    - Macro and welfare (distributional) effects of (micro) policies and shocks; political economy equilibriums and endogenous policies.
    - Financial frictions, entrepreneurship, misallocation.

Inequality, Data and Basic Facts

▶ Data Sources
  - Greater availability for income and earnings
  - Underrepresentation of wealthiest individuals
  - Wealth: Surveys (Chile: EFH, EPS), Tax data
  - Cross-Country: WID, OECD.

▶ Facts
  - Wealth is highly unevenly distributed, much more so than income (or consumption)
  - Weak relationship between income redistribution and wealth inequality
  - Raising wealth inequality around the world (since the 80s, after a persistent reduction, in developed countries)

Inequality; US

- ▶ Share of wealth and earnings held by each quintile
    - Panel Survey of Income Dynamics (PSID)
    - Survey of Consumer Finances (SCF)
    - Tax data (capitalization method)

Quintile	Earnings			Net Wealth		
	PSID	SCF	Tax info.	PSID	SCF	Tax info.
1	3.4	-0.1		-1.2	-0.7	
2	9.7	3.5		0.7	0.7	
3	15.2	11		4.1	3.3	
4	22.8	20.6		13.3	10	
5	48.7	65		83.1	86.7	
top 10%	32.2	38.4	47.2	67.4	74.4	77.2
top 1%	7.8	18	17.9	30.2	34.1	41.8

Sources: PSID (2006): Krueger et al. (2015); SCF (2010): Kuhn (2014); Tax info. (2012-2014): Saez and Zucman (2015) and The World Top Income Database (http://topincomes.parisschoolofeconomics.eu/)
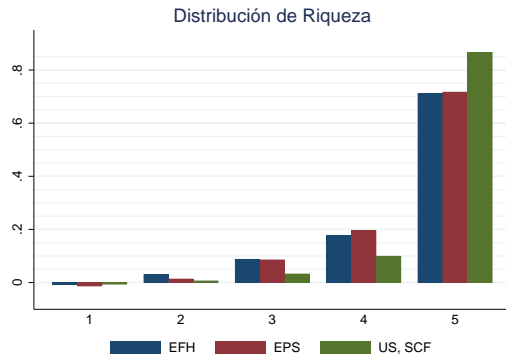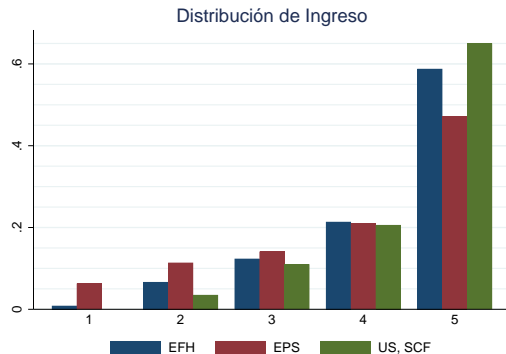
Income, Consumption & Wealth Inequality, US
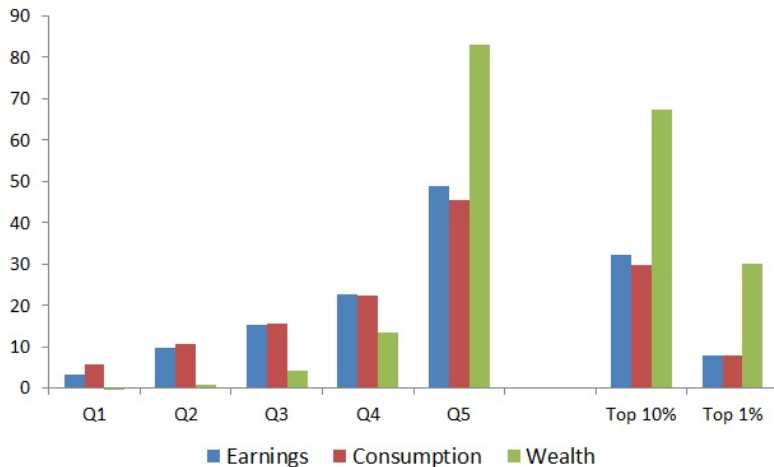
Source: Krueger et al. (2015), Macroeconomics and Heterogeneity, Including Inequality.
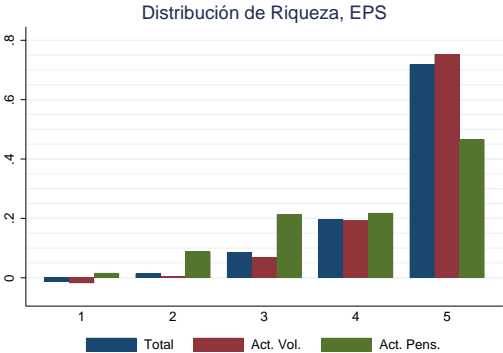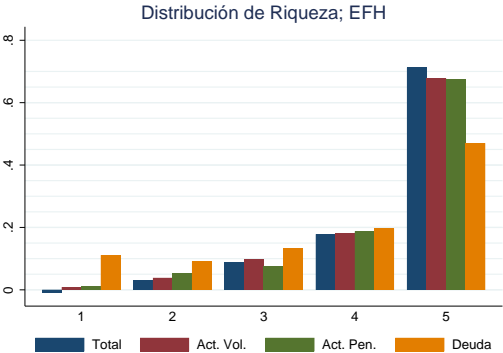
Inequality: Chile

- Share of wealth and income held by each quintile
    - Household Finance Survey (EFH) (2007-11, 2014)
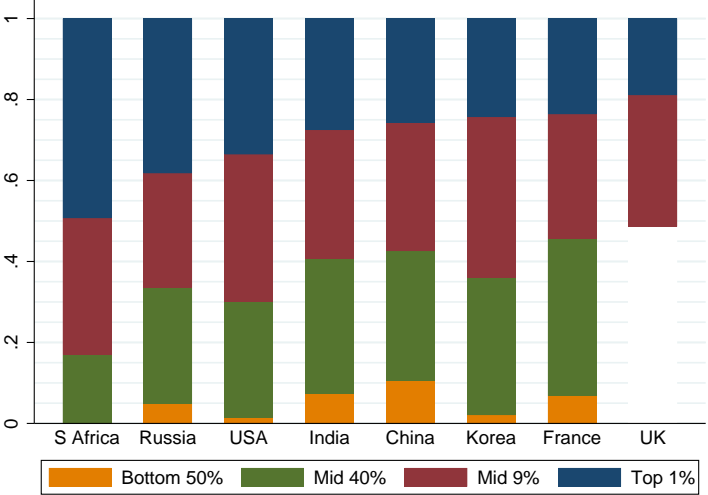   - Encuesta de Previsión Social con datos adm. de pensiones (EPS)

Distribución de Ingreso

Distribución de Riqueza

Source: EPS 2015 and EFH 2017.

Wealth Inequality: Chile
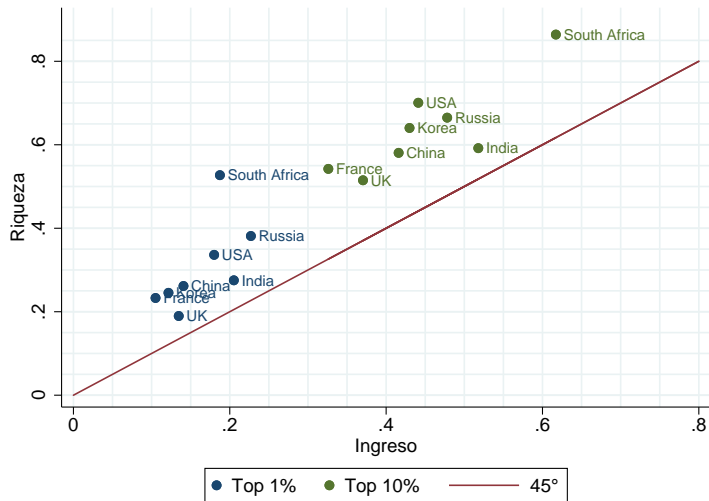

Distribución de Riqueza; EFH

Distribución de Riqueza, EPS

Source: EPS 2015 and EFH 2017.

Wealth Inequality: Cross-Section from WID
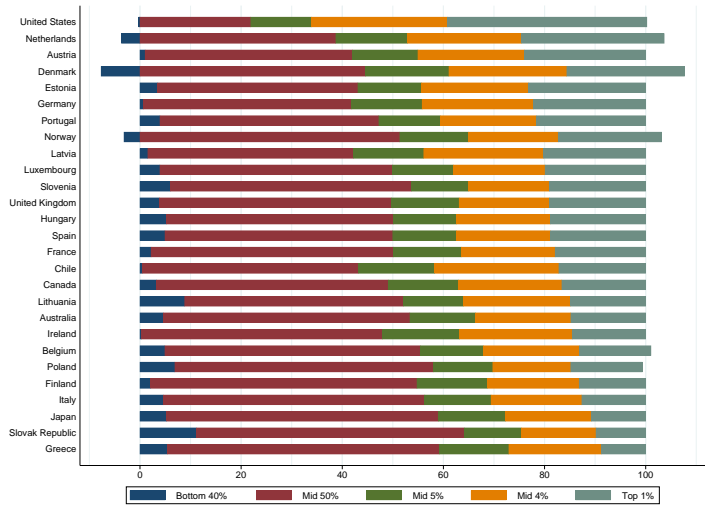
Wealth vs Income Inequality: Cross-Section from WID

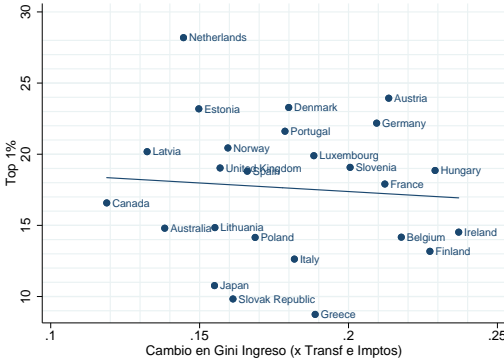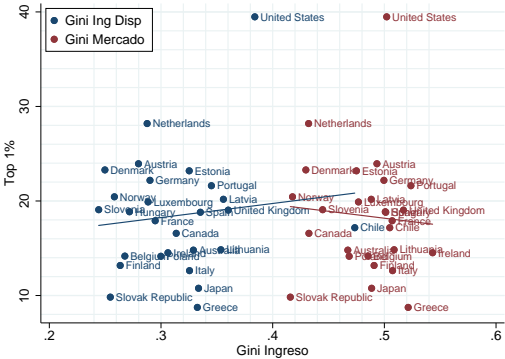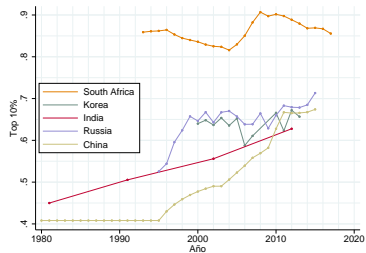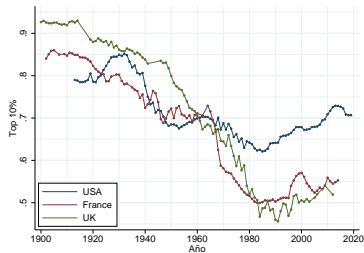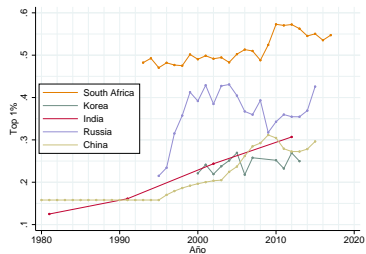# Wealth Inequality: Cross-Section from OECD

Source: OECD.

Wealth and Income Inequality: Cross-Section from OECD

Source: OECD.

Changes in (Top) Wealth Inequality
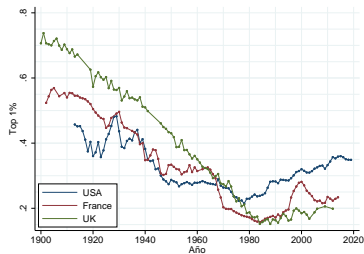
Source: WID.

This Course

- ▶ Review of the Neoclassical Growth Model
  - ▶ Discrete-time dynamic programming techniques
  - ▶ The power of the recursive approach.
  - ▶ Stochastic version of the model
- ▶ How far we can go introducing heterogeneity?
  - ▶ Ex-ante vs. ex-post heterogeneity and complete markets.

Ex-ante Heterogeneity and Incomplete Markets: Bewley Models

- ▶ Modify the standard model so,
  - ▶ there is a continuum of ex-ante identical individuals (same stochastic income process), but receive different income realizations ex post.
  - ▶ Income shocks are assumed to be uninsurable (for exogenous reasons), and
  - ▶ tight limits on borrowing (otherwise, self-insurance is close to full-insurance).
- ▶ Out of this we get an endogenous wealth distribution, which interacts with the equilibrium outcome.
- ▶ Precautionary savings: those with a sequence of good (bad) endowment shocks will have a lot of (low) wealth.
- ▶ Same idea for firms: financial constraints, capital distributions, employment and investment decisions.

Bewley Models

- The state variable is the distribution of wealth across individuals.
- Closed form solutions only available for particular specifications.
- Computation: state variable has an infinite dimension.
- Not too much on analytical side, so we focus on the computation:
  - This requires new techniques for computing equilibria.
  - The early papers restricted attention to steady state equilibria.
  - But more recent papers feature aggregate shocks.

Bewley Models

- Allow for a very rich micro environment in macro models.
- Exciting and very productive area for research:
  - Emergence of new rich household and firm-level data sets
  - Continuous computational advances
  - Renewed scientific and popular interest in distributional questions
- Many applications outside traditional macro models: education, housing markets, family economics, climate change, etc.
- Sometimes they are too costly so we need to evaluate if they are necessary for the topic under study.

This Course

1. Review of the NGM
2. Ex-post heterogeneity and precautionary savings: partial equilibrium
3. General stationary equilibrium (tools)
4. Wealth distribution
5. Policy changes: transitions between steady-states
6. Aggregate uncertainty: macro policies
7. Political equilibrium: endogenous policies
8. Firm heterogeneity and entrepreneurship
9. Financial frictions
10. Labor frictions: search with precautionary savings
11. Nominal rigidities: monetary policy with heterogeneous agents