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Economic Inequality and Possible Policy Responses

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Hyman P. Minsky Lecture

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Any opinions expressed here are my own and do not necessarily reflect those of the Federal Open Market Committee.

Preliminary research

- This presentation contains a discussion of some of my preliminary research with Guillaume Vandembroucke, an economist at the St. Louis Fed.
- Any results presented here are preliminary. They are meant to stimulate discussion and may change as the project progresses.
 - For related work, see G. Vandembroucke, 2016, “Aging and Wealth Inequality in a Neoclassical Growth Model,” *FRB of St. Louis Review*, forthcoming, C. Azariadis, J. Bullard, A. Singh and J. Suda, 2015, “[Optimal Monetary Policy at the Zero Lower Bound](#),” FRB of St. Louis Working Paper 2015-010A, and J. Bullard, 2014, “[Income Inequality and Monetary Policy](#),” remarks delivered at the Council on Foreign Relations, New York, N.Y.

Introduction

Economic inequality in the U.S.

- Economic inequality is generally considered to be high in the U.S.
- A key question for this talk: What proportion of measured inequality is consistent with standard macroeconomics, and what proportion is inconsistent?
- What types of economic policy can change measured inequality for the better?
 - What is the role of monetary policy?

Types of macroeconomic inequality

- Financial wealth inequality
 - Typically thought of as “who owns the financial assets in the economy, such as stocks and bonds?”
- Income inequality
 - Typically thought of as “who earns the highest and lowest annual income in the economy?”
- Consumption inequality
 - The least discussed but the most important, “who actually consumes the most and the least in the economy?”
- We will look at all three types simultaneously.

Main ideas in this talk

- A simple and standard macroeconomic model can account for a large portion of the wealth, income and consumption inequality found in the U.S. data.
- According to the model, some of the measured wealth, income and consumption inequality is “benign.”
- The remainder of the inequality—the “true” inequality—could be influenced by some types of policies but not by others.
- Credit markets play an important role in the model, and if monetary policy has an impact on inequality, it is through this channel.

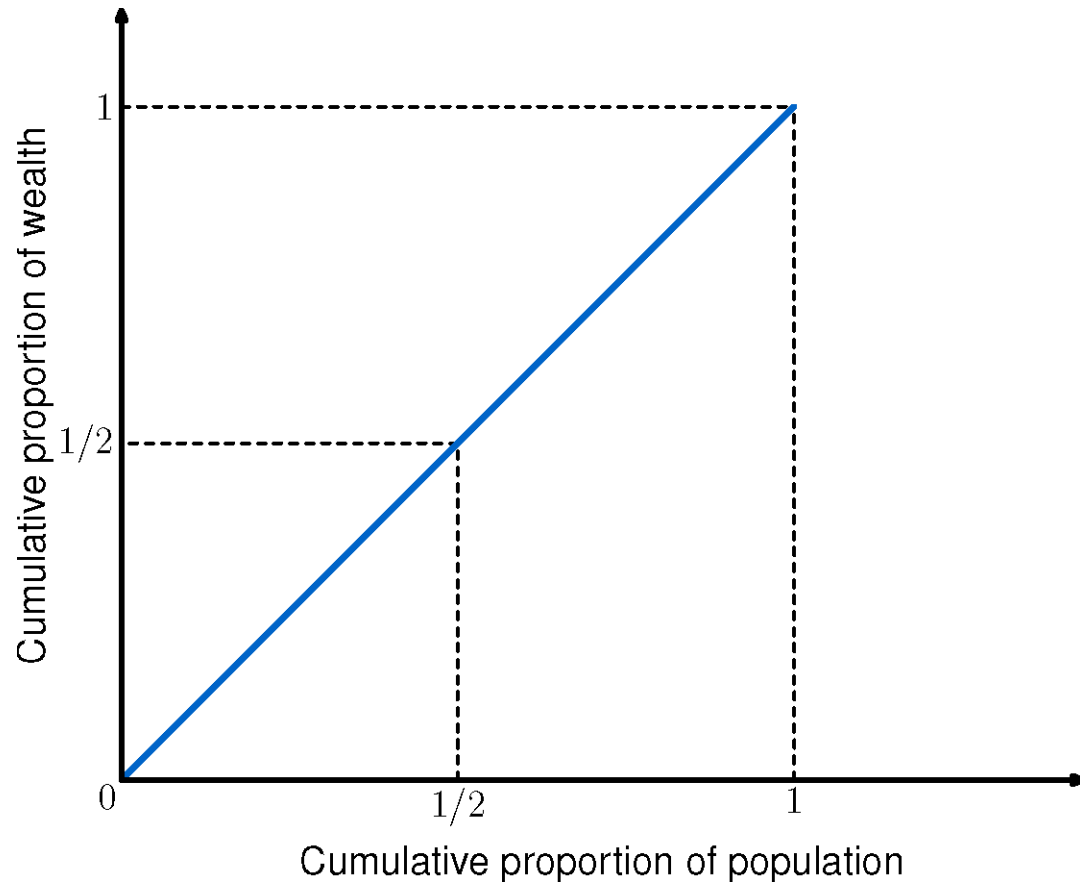
Measuring Inequality

A systematic measure of inequality: Gini coefficients

- What would perfect equality look like?
 - The top 1% have 1% of wealth (income) (consumption).
 - The top 2% have 2% of wealth (income) (consumption).
 - ...
 - The top 10% have 10% of wealth (income) (consumption).
 - ...

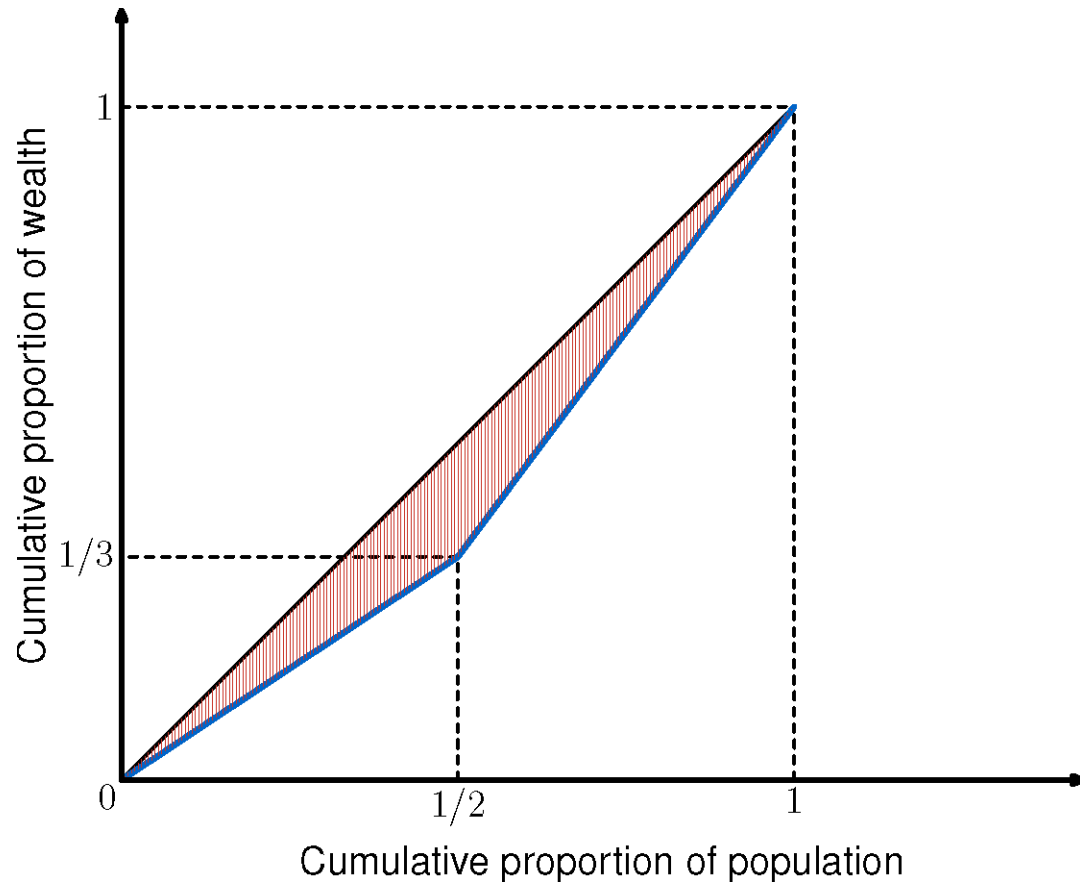
Gini coefficients

- Bottom 50% has 50%
- No inequality
- Gini coefficient is 0



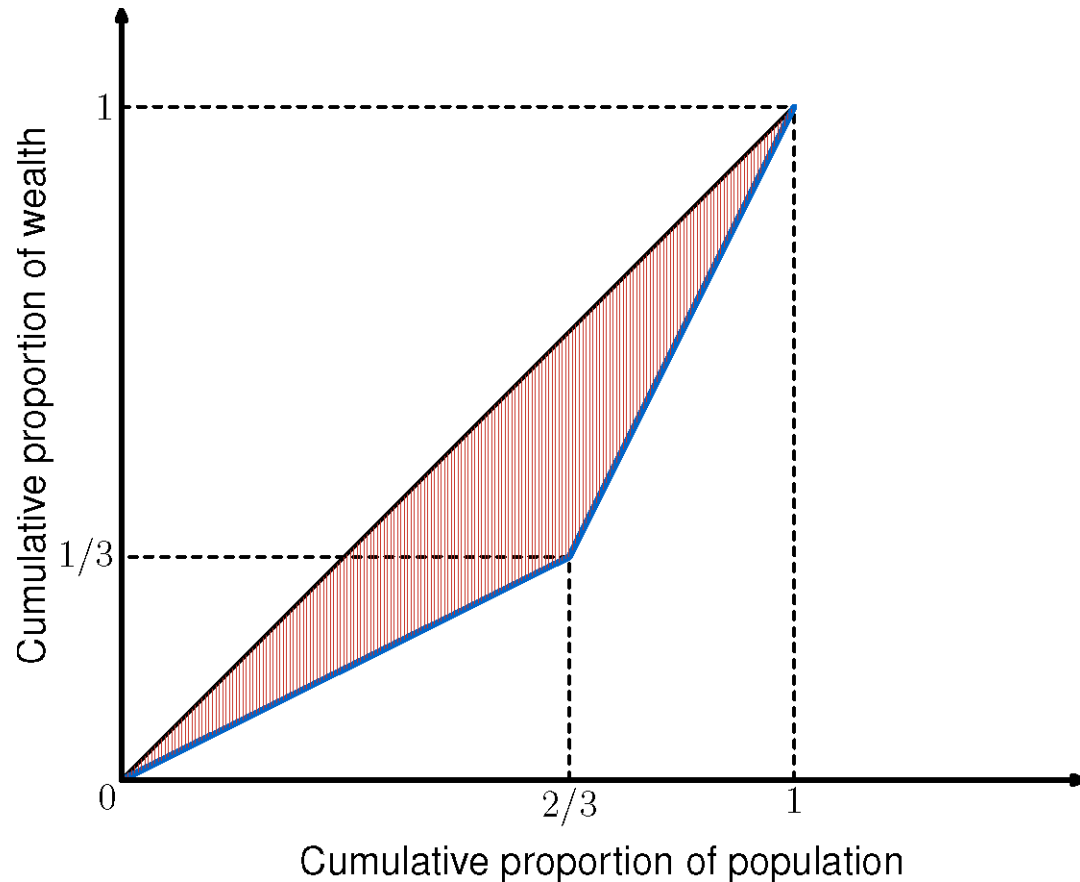
More on Gini coefficients

- Bottom 50% has 33%
- Inequality rises
- Gini coefficient is 0.16



More on Gini coefficients

- Bottom 66% has 33%
- Inequality rises more
- Gini coefficient is 0.33



Bottom line on Gini coefficients

- A Gini coefficient of zero indicates no inequality at all.
- A Gini coefficient of one indicates maximum inequality—one person has everything; everybody else has nothing.
- A Gini coefficient between zero and one serves as an index of the degree of inequality.
- Researchers have measured Gini coefficients for the U.S.
 - There are many issues about the details of the data that we are not discussing here.
 - See J. Díaz-Giménez, A. Glover and J.-V. Ríos-Rull, 2011, “[Facts on the Distributions of Earnings, Income, and Wealth in the United States: 2007 Update](#),” FRB of Minneapolis *Quarterly Review*, 34(1), pp. 2-31, and K.A. Hassett and A. Mathur, 2012, “[A New Measure of Consumption Inequality](#),” American Enterprise Institute *Economic Studies Series*.

Measured Wealth, Income and Consumption Inequality in the U.S.

Wealth, income and consumption inequality

- Typical pattern in U.S. data:
 - Financial wealth is more unequally distributed than income.
 - Income is more unequally distributed than consumption.
 - The three Gini coefficients have a clear ranking.

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	Consumption	Income Gini	Wealth Gini	
	Gini 0.20-0.30	~0.57	~0.80	

Source: Diaz-Gimenez et al. (2011) and Hasset and Mathur (2012)

Some questions

- Why is there any measured wealth, income and consumption inequality at all?
- Could a standard macroeconomic model generate these values for the Gini coefficients?
- If we had such a model, what could it tell us about the sources of inequality and possible policy interventions?

The Life Cycle Model

The life cycle model as standard macroeconomics

- We use a very standard macroeconomic model, the life cycle model.
- Popularized by Samuelson, Modigliani, Azariadis, Auerbach, Kotlikoff and Ríos-Rull, among others.
- Our version is particularly simple relative to existing quantitative theories of U.S. income and wealth inequality.

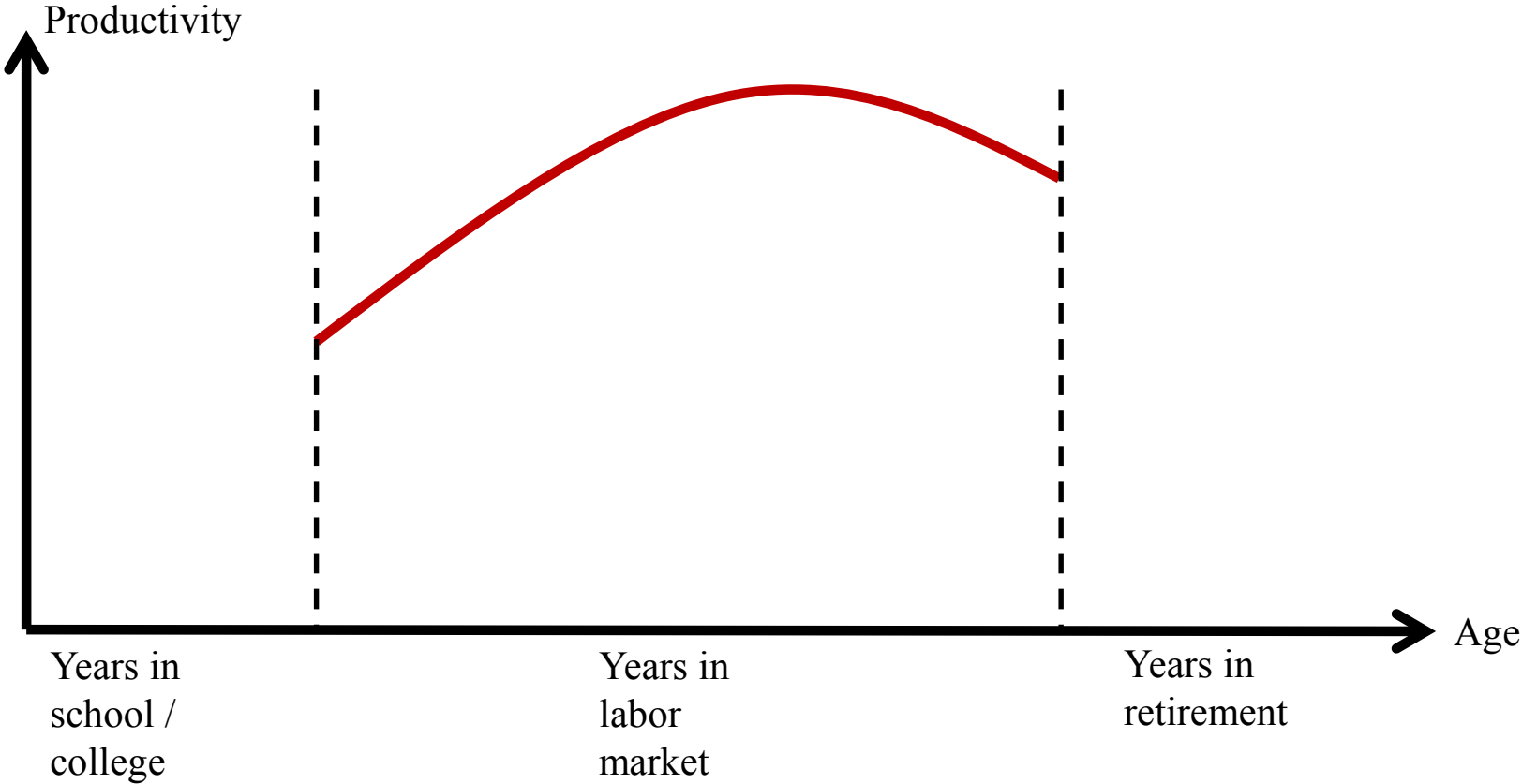
The life cycle model

- The three stages of life
 1. Schooling stage (not an explicit part of our version)
 - Consume
 - Acquire skills to be productive later
 2. Labor market stage
 - Consume
 - Work and get paid according to productivity
 - Acquire more skills on the job
 3. Retirement stage
 - Consume

More on the life cycle model

- We think of people “entering the model” in their early 20s, when they begin to make economic decisions on their own.
- They have some existing amount of human capital that they have been given while they were growing up.
 - This is exogenous in our model.
- The human capital manifests itself as a “lifetime productivity profile.”
- Households can sell their human capital on a market for a competitive wage per unit of human capital.
- Households retire at a fixed age.

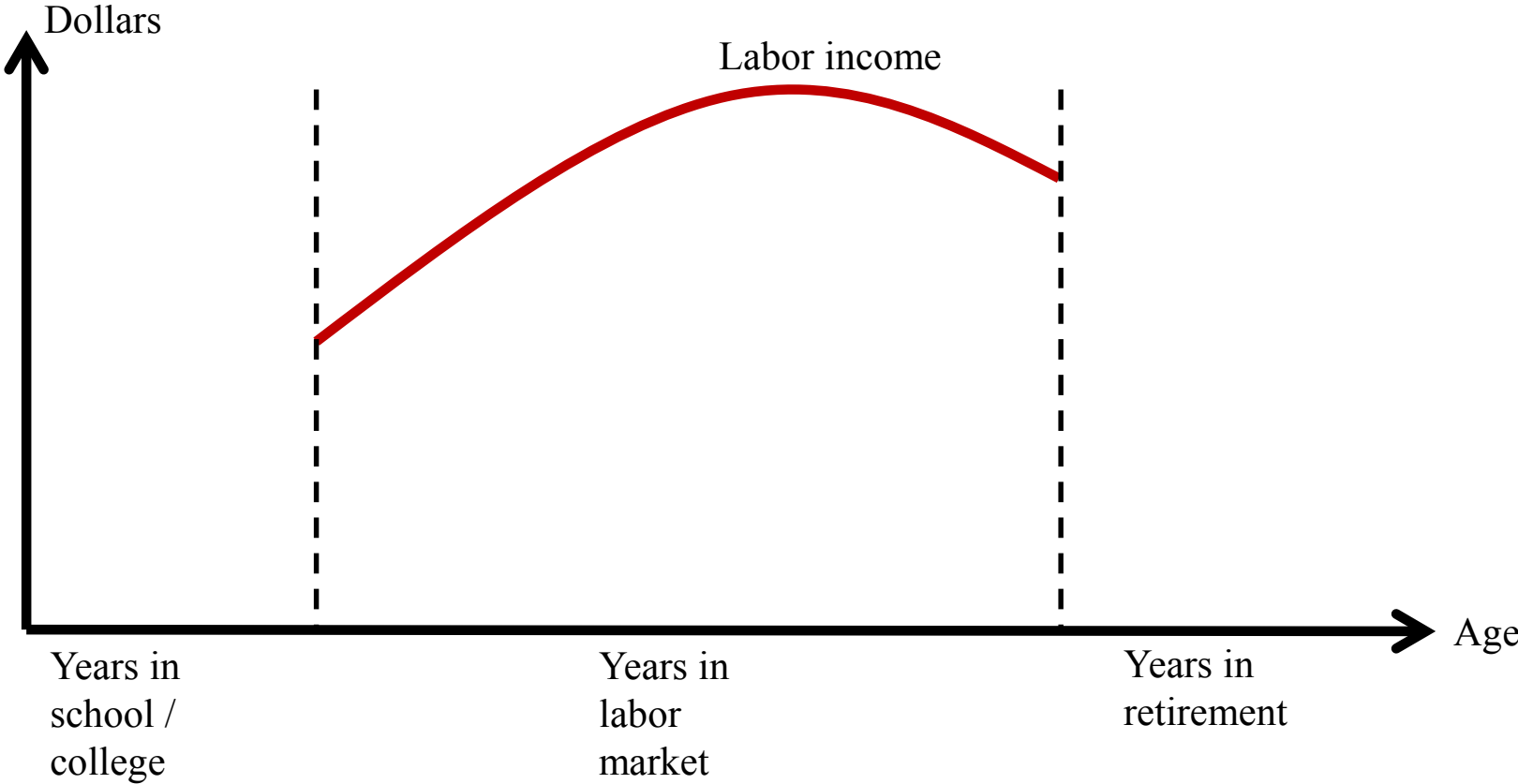
Productivity profiles



From productivity to labor income

- Skills are paid a price on the labor market: a wage.
- A person's labor income therefore depends upon:
 - The “price” of skills
 - Determined by the demand for skills from firms and supply from workers
 - The “quantity” of skills
 - Determined by education and productivity profiles

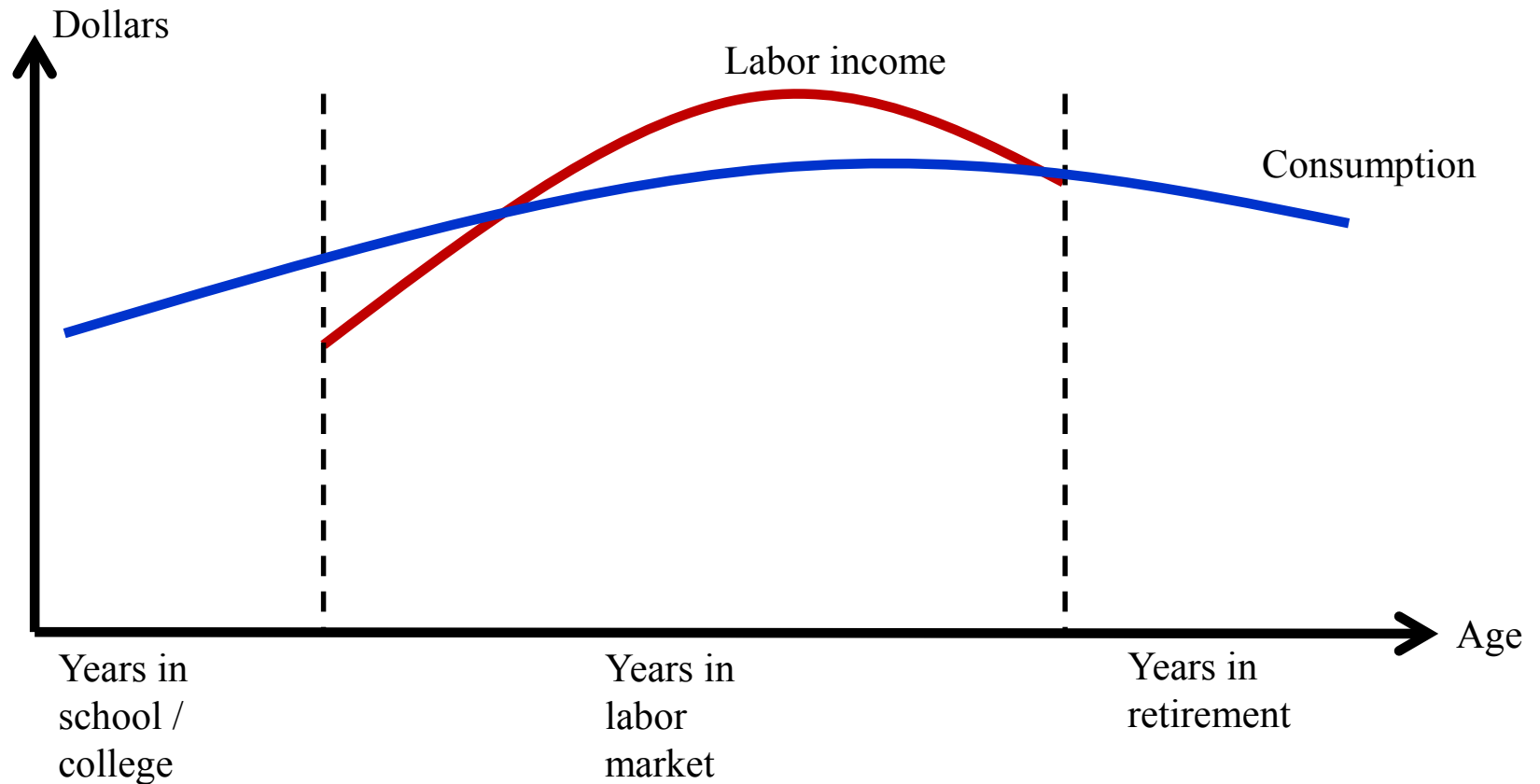
Income profiles



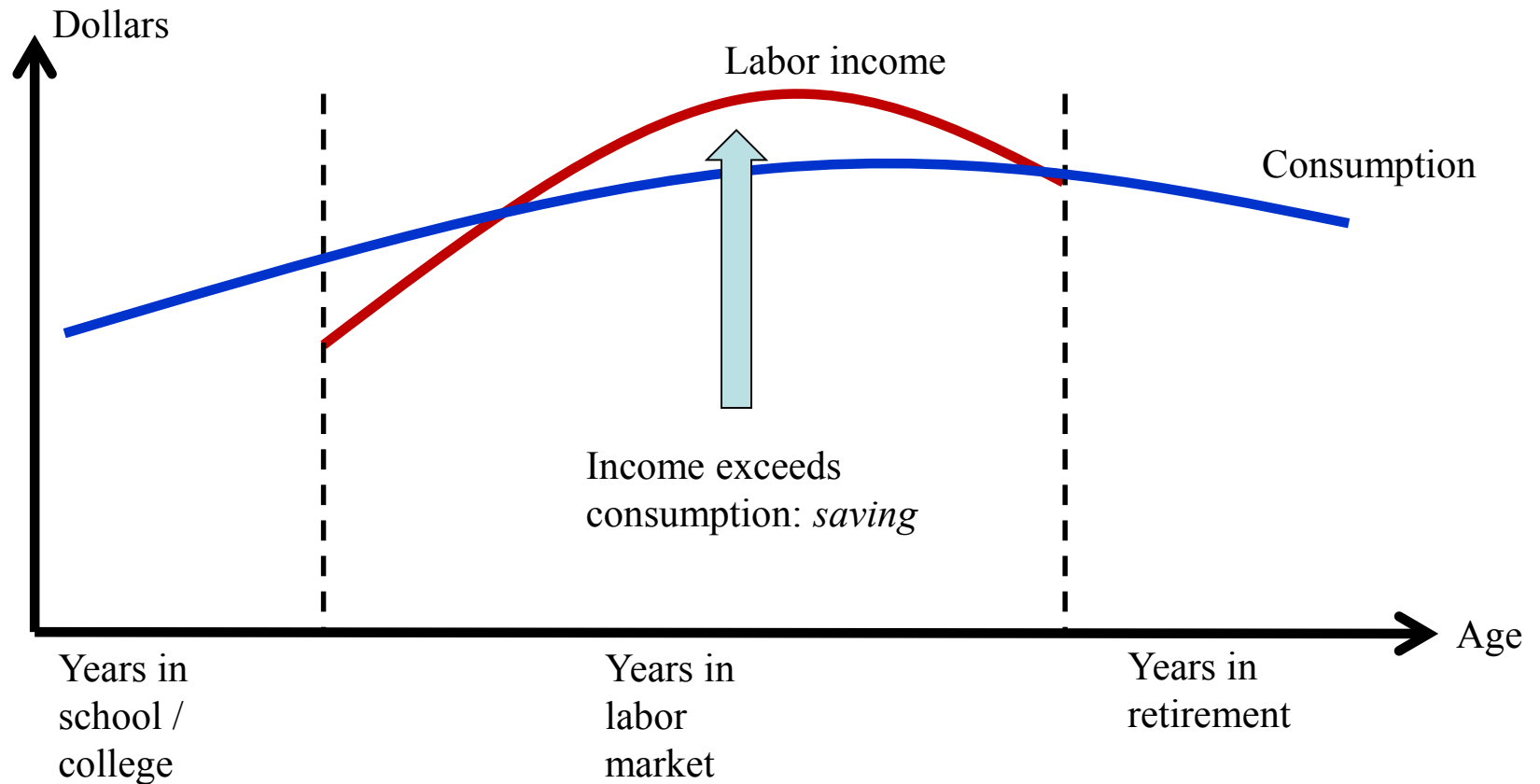
From income to consumption

- Consumption takes place throughout life.
- When labor income is low
 - Must borrow against future labor income ...
 - ... or live from past savings.
- This indicates that credit markets will be important in this model.

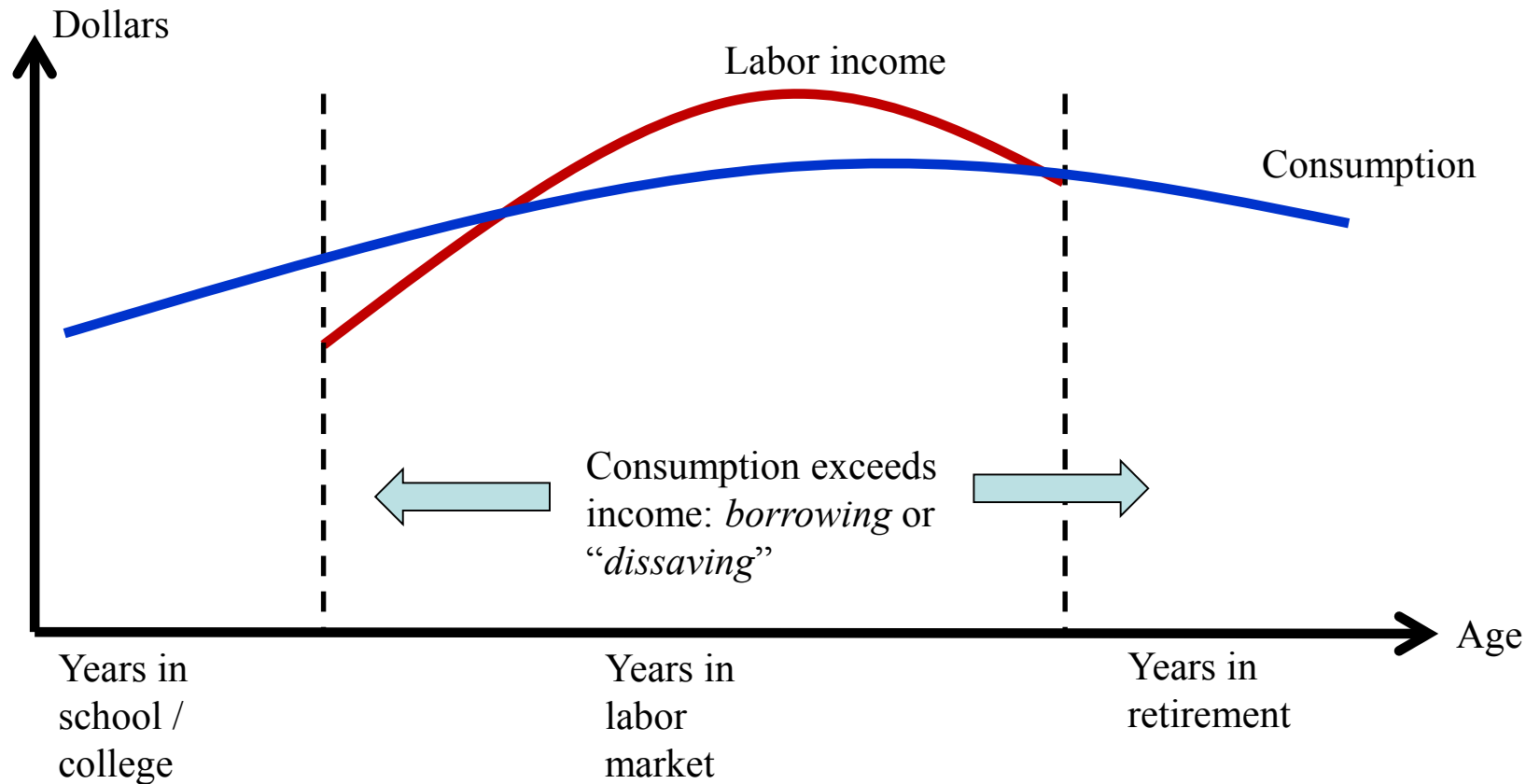
Income and consumption profiles



Income and consumption profiles



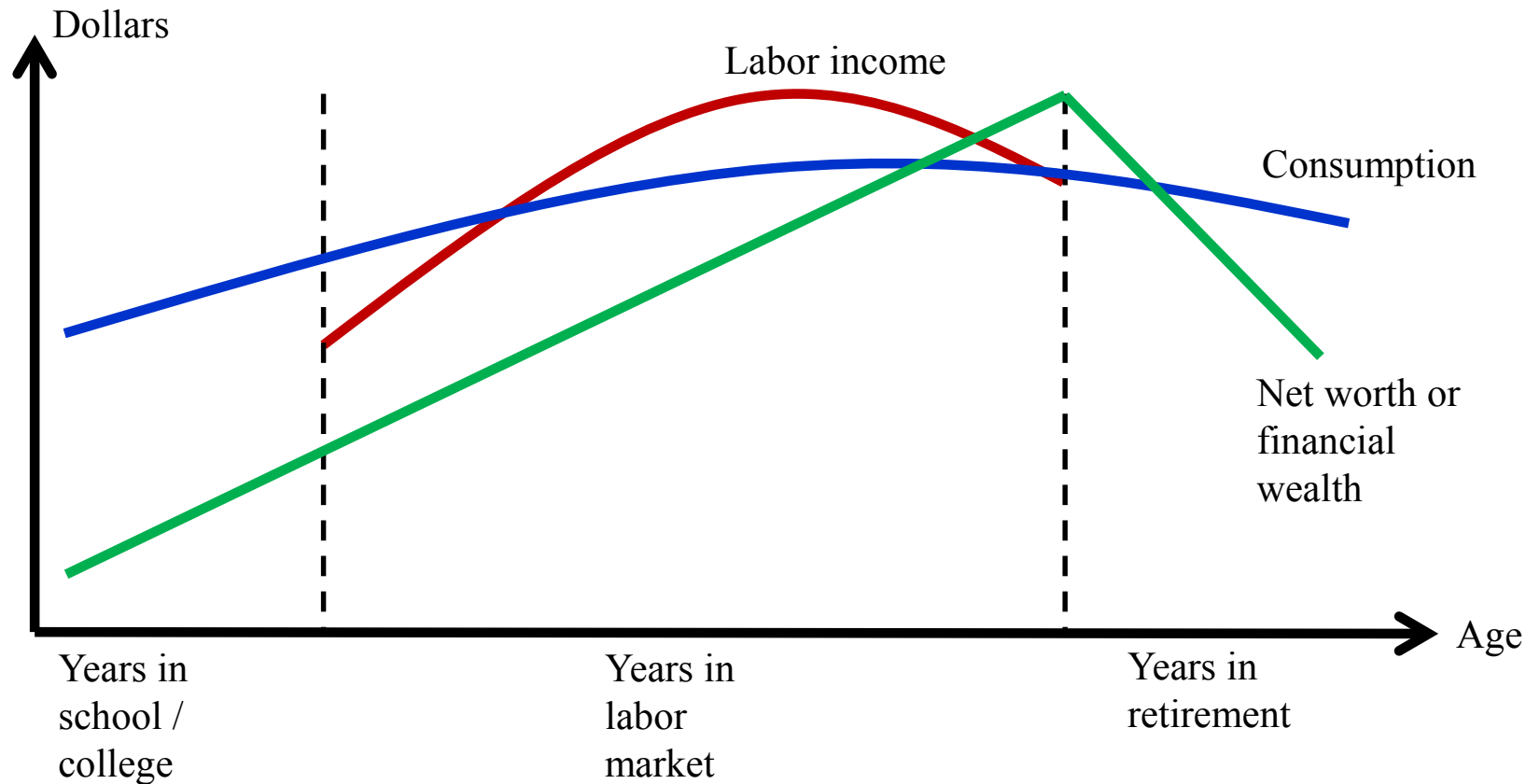
Income and consumption profiles



From labor income and consumption to net worth

- Borrowing implies low net worth.
- Saving implies net worth accumulation.
- “Dissaving” implies that net worth decreases.

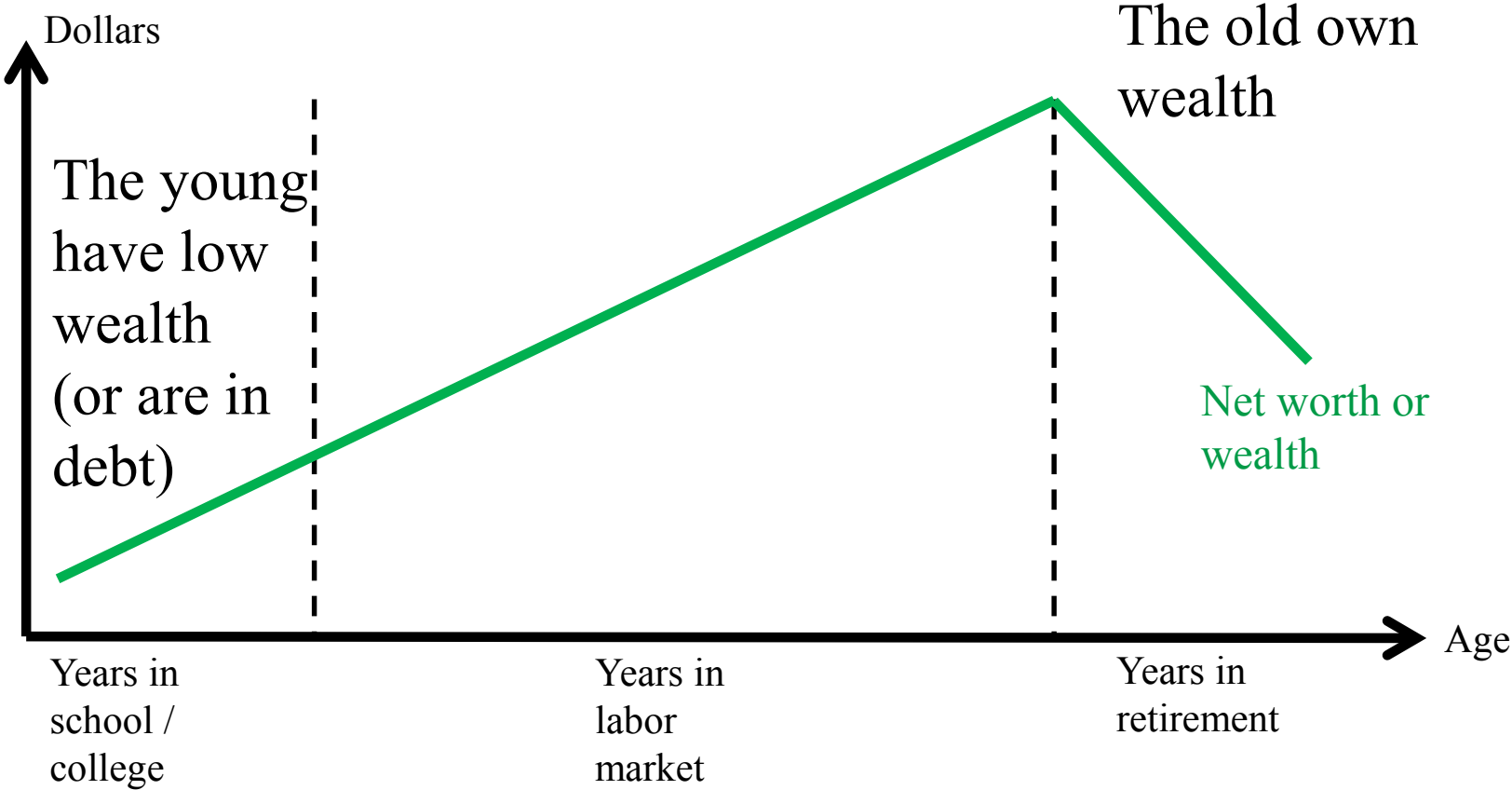
Income, consumption and net worth profiles



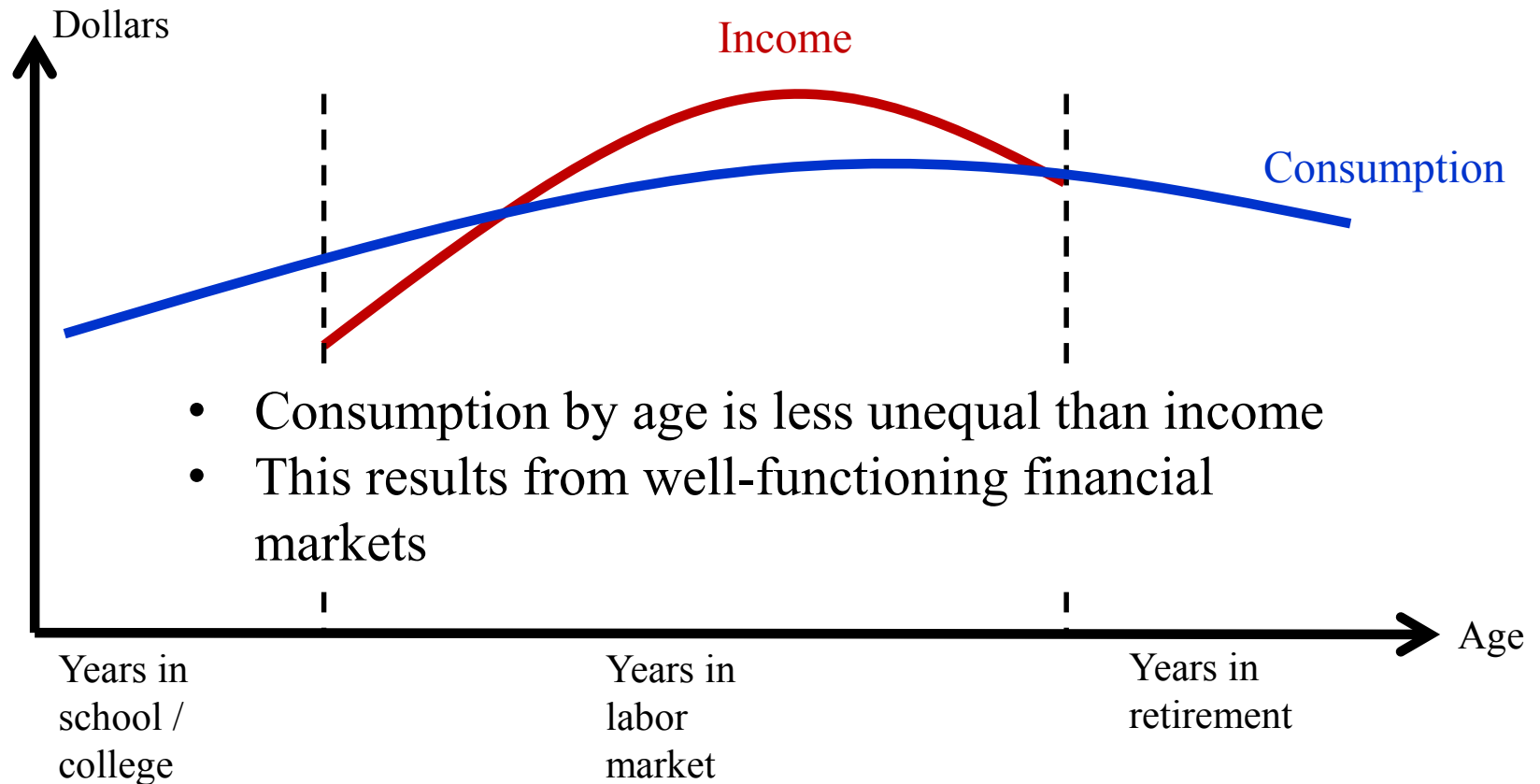
Life cycle theory of inequality

- We have a theory of wealth, income and consumption by age.
- This already *is* a theory of inequality.
 - Age differences imply differences in wealth, income and consumption.
 - Measured inequality arises via the life cycle, even if *all* individuals have the *same* income profile.

Wealth inequality by age



Income and consumption inequality by age



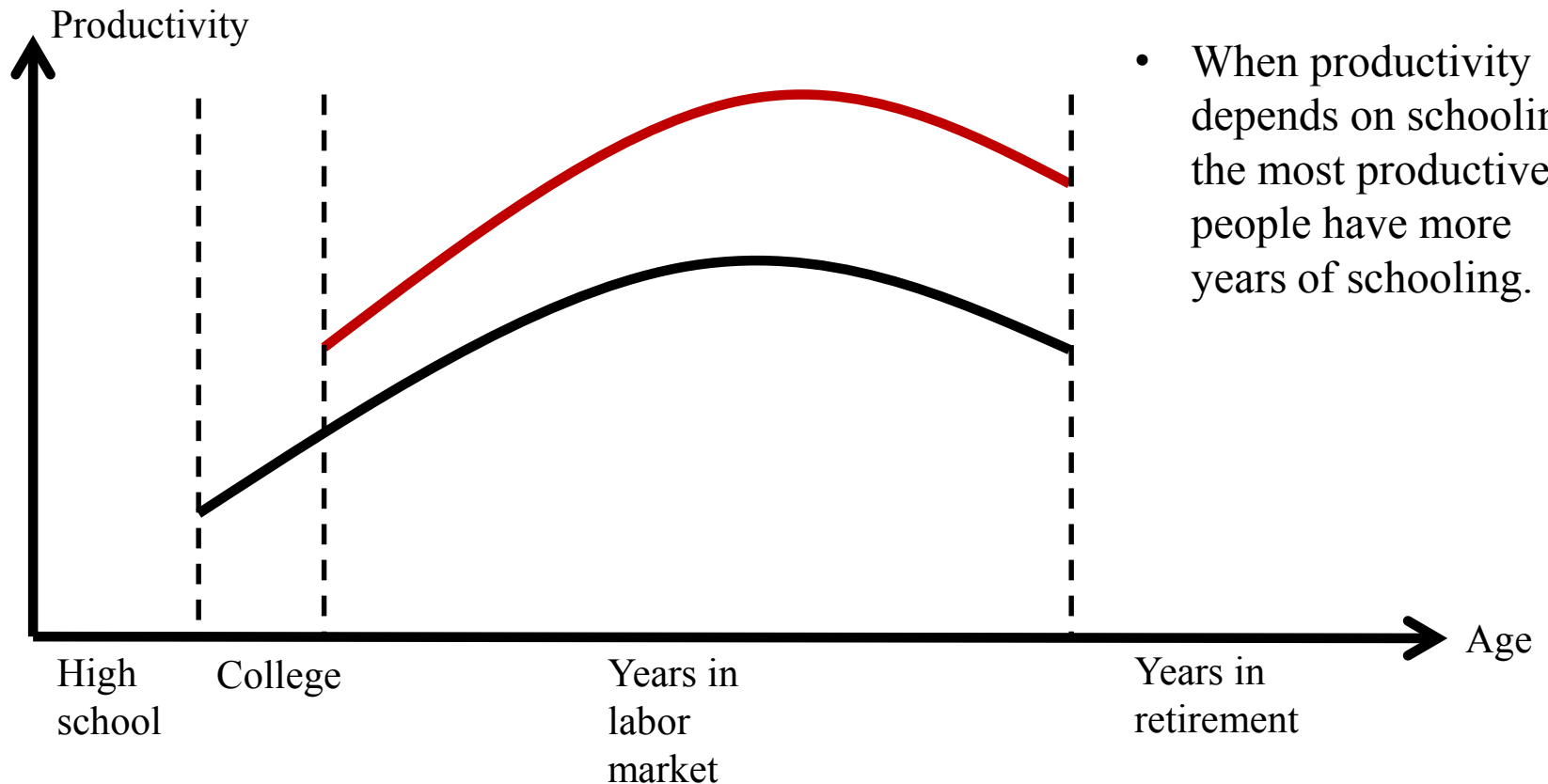
Median income, consumption and wealth in U.S. data



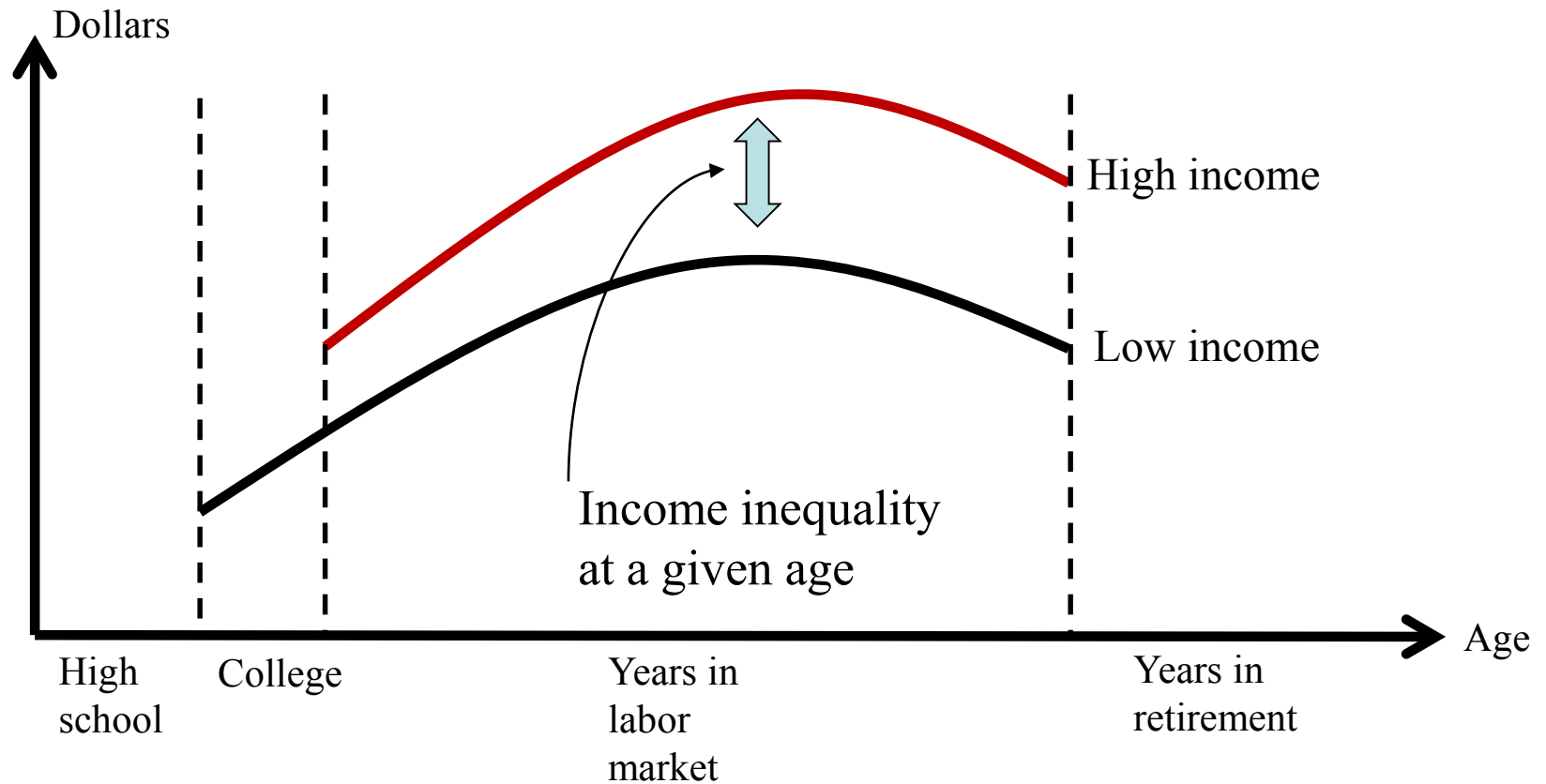
Another source of inequality

- In U.S. data, there is inequality of wealth, income and consumption *within* each age group.
- The theory needs a second source of inequality.
 - See R. Boshara, W.R. Emmons and Bryan J. Noeth, 2015, “[The Demographics of Wealth. How Age, Education and Race Separate Thrivers from Strugglers in Today’s Economy](#),” Center for Household Financial Stability, St. Louis Fed.

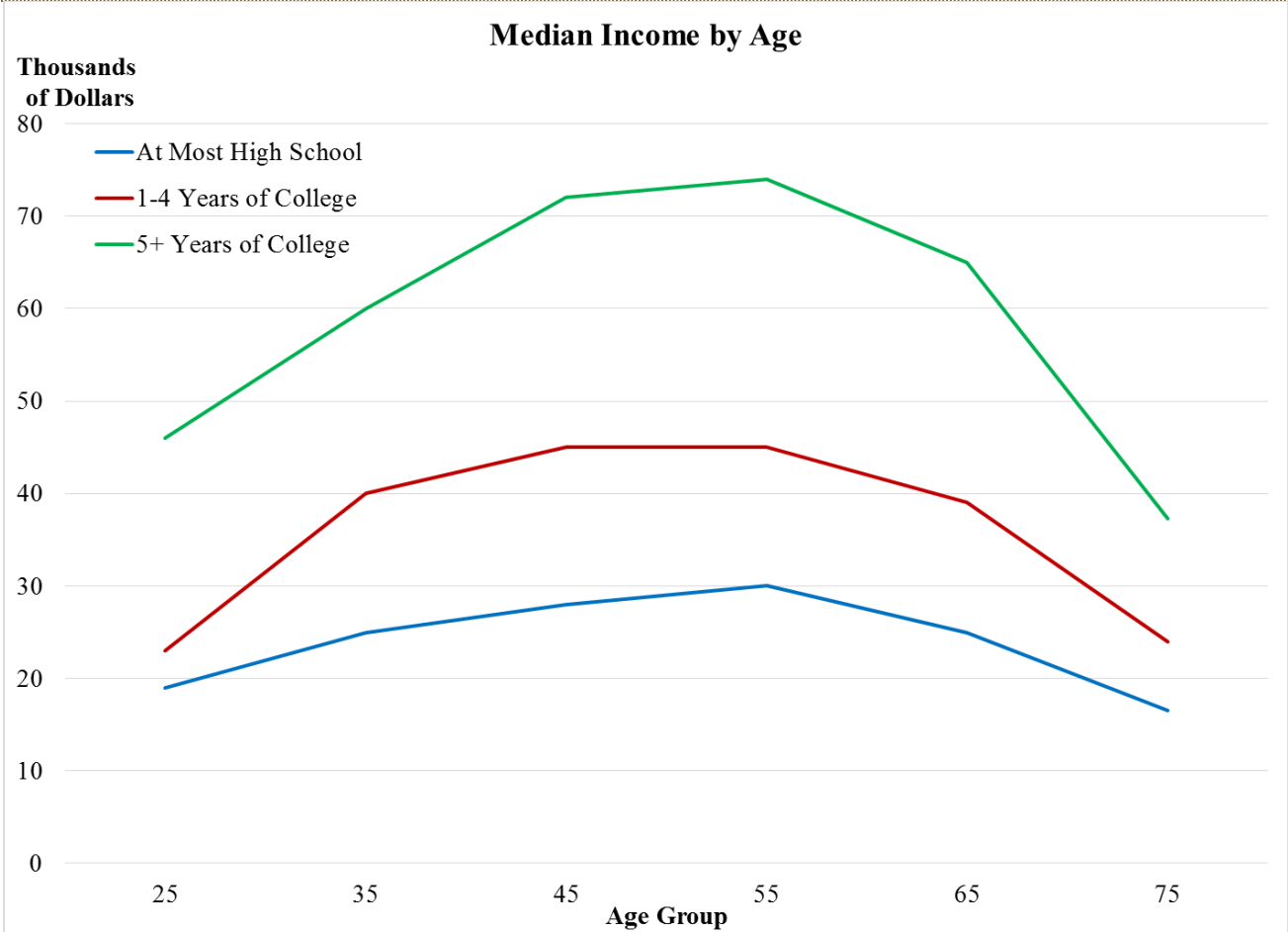
Differences in productivity profiles



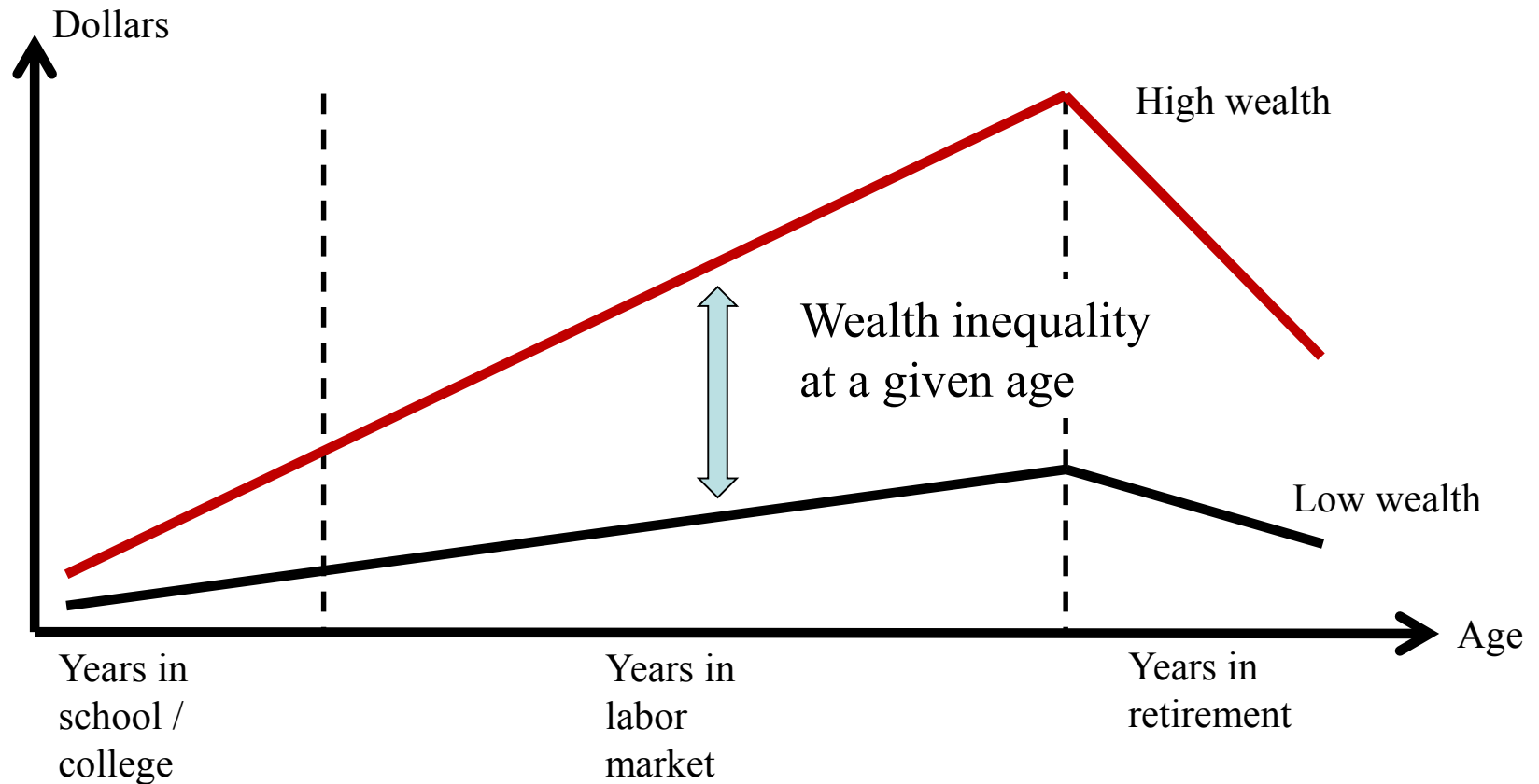
Income inequality across and within age groups



Income inequality: age groups and education levels



Wealth inequality across and within age groups



Using the Theory to Understand Inequality

Can the model get close to the U.S. data?

- The model equilibrium comes close to reproducing income and wealth inequality as observed in U.S. data.
 - Wealth inequality: 0.88 (versus 0.80 in U.S. data)
 - Income inequality: 0.45 (versus 0.57 in U.S. data)
 - Consumption inequality: 0.41 (versus 0.20-0.30 in U.S. data)
- The Gini coefficients are in the correct rank order.
- The wealth and consumption Gini coefficients are somewhat too high, while the income Gini coefficient is too low.
- No billionaires!

Understanding inequality

- Two sources of inequality in the model: (1) age and (2) two-tier productivity profiles.
- Measured inequality coming from age effects does not really represent “fundamental inequality.”
 - These people are identical in terms of lifetime wealth, income and consumption. Hence, we refer to it as “benign” inequality.
- Measured inequality coming from the two-tier lifetime productivity profiles *does* represent “fundamental inequality.”
 - These people are very different in terms of lifetime wealth, income and consumption.

An experiment: reducing inequality

- What would inequality be if we could “magically” move 25% of the population from the low-productivity profile to the high-productivity profile?
 - Wealth inequality: 0.83 instead of 0.88 (6% less).
 - Income inequality: 0.29 instead of 0.45 (35% less).
 - Consumption inequality: 0.24 instead of 0.41 (41% less).
 - A reasonable idea of what can be achieved?
- The economy with more people in the higher-productivity profile would be much richer overall. There would be more output and more consumption across the board.

Policy Options

Broad policy classes

- I will comment briefly on four policy areas:
 - progressive taxation,
 - education,
 - monetary policy and
 - existing policies in place.

Policies—progressive taxation

- Many policy discussions concerning inequality center around progressive income or wealth taxation as a policy response.
- Some types of progressive taxation have no effects in the model studied here.
- For instance, taxing high-income middle-aged households to subsidize low-income young households can end up simply replacing the credit market with a tax-transfer scheme.
- In that scenario, measured inequality would not change.

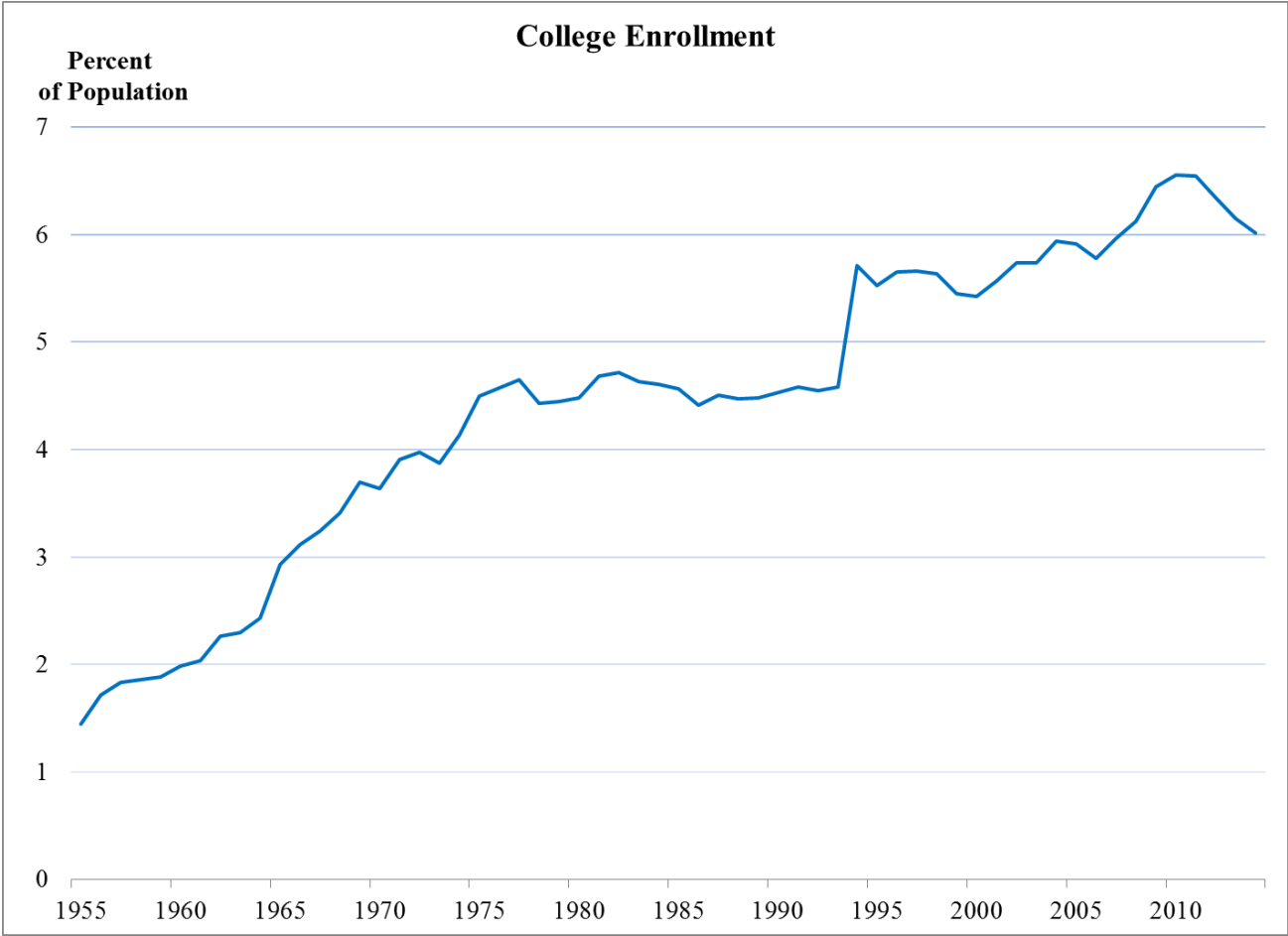
Policies—education

- The nature of this model makes education a natural candidate to reduce measured inequality.
 - In the model, more education could move more people to the higher-productivity profile and reduce inequality.
- This is just general productivity improvement, and so this type of policy would be very good in almost any macroeconomic model.
- Implementation may be costly.
- The evidence on education and inequality does not seem to point in the right direction.

College enrollment through time

- College enrollment (as a percentage of population) increased in the past 60 years.
- Inequality increased as well.
- Is it obvious that more education should reduce inequality?
- Who is getting the education?

College enrollment through time



Policies—monetary policy

- Modern monetary theories view the central bank as influencing the real rate of interest.
- This affects borrowing and lending in the economy, which is a central part of this model. Middle-aged households need to save, and relatively young households want to borrow.
- In the version we are presenting here, the credit market works perfectly, so there is no role for the central bank.
- But one could imagine a role for the central bank in a model that has credit market frictions. See papers presented at the [Monetary Policy and the Distribution of Income Conference](#), held in September 2015 at the St. Louis Fed.

Policies—existing policy

- The Gini coefficients cited for this talk are based on raw (before taxes and transfers) data on income and wealth.
- The U.S. has many policies in place that are intended to mitigate income and wealth inequality.
- We can ask what the wealth, income and consumption Gini coefficients are net of existing taxes and transfers.
- This is suggestive of whether measures to mitigate inequality are working or not.

Policies—existing policy

- The U.S. data income Gini coefficient based on before-taxes and transfers information is 0.57.*
- The income Gini coefficient after taxes and transfers is 0.42.*
- This shows that measured Gini coefficients are affected greatly by current policies.

Summary

Summary

- Inequality in the U.S. is due in part to age differences between people.
 - Older people have more human capital, implying more income.
 - Older people have more wealth because they had more time to save.
- Inequality is also due to differences in productivity early in life.
 - The role of education may be critical.
- Even if policies could mitigate the second source of inequality, significant inequality will remain.



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