Development Economics

Slides 12

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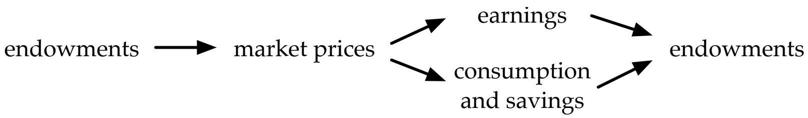
Inequality and Development: Evolving Together



Endowments

⇒ Supply and demand for goods

⇒ Equilibrium

⇒ Wages, rents, profits ⇒ human, physical capital accumulation

⇒ **Endowments**

A Little Taxonomy For Sources of Inequality

1. **Savings**: How do savings rates change with income?
2. **Rates of Return**: Variations in the rate of return to capital across people and across wealth levels.
3. **Occupational Choice**: Can wealth affect selection into occupations?

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4. **Demand**: Income distribution affects composition of demand, and therefore individual incomes.
5. **Politics and Policies**: Income distributions will affect taxes on labor and capital income via political lobbies.

Microeconomic Concepts

Individual accumulation equations:

$$k_{t+1} = y_t - c_t + k_t, \tag{1}$$

and

$$y_t = f(k_t, \theta_t), \tag{2}$$

where θ_t is some macro state:

- Perhaps external to the economy
- More often external to individual but not to the economy.

Microeconomic Concepts

Examples:

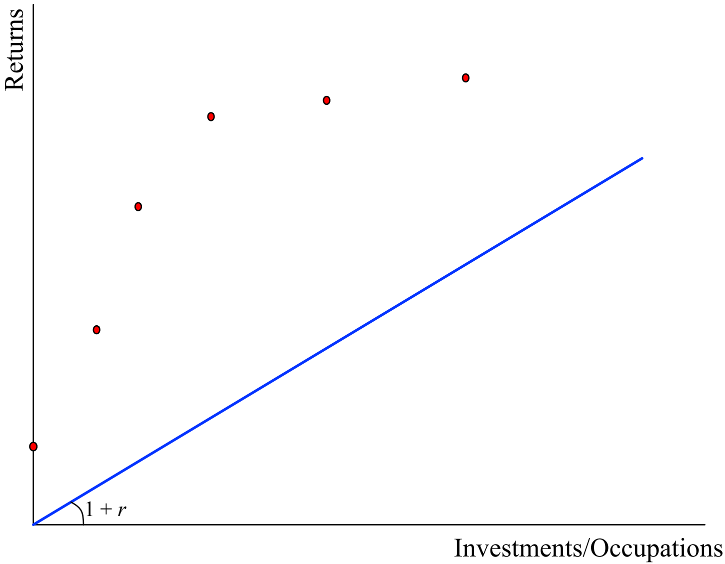
- Pure capital income: $f(k_t) = r(\theta_t)k_t$.
- Wage earning + capital income: $f(k_t) = w(\theta_t) + r(\theta_t)k_t$.
- Skill accumulation over occupations:

$$f(k) = w_u(\theta) \text{ for } k < \bar{x}$$

$$= w_s(\theta) \text{ for } k > \bar{x}.$$

- Can also be used for setup costs, or multiple occupations.

The Household's "Production Function"



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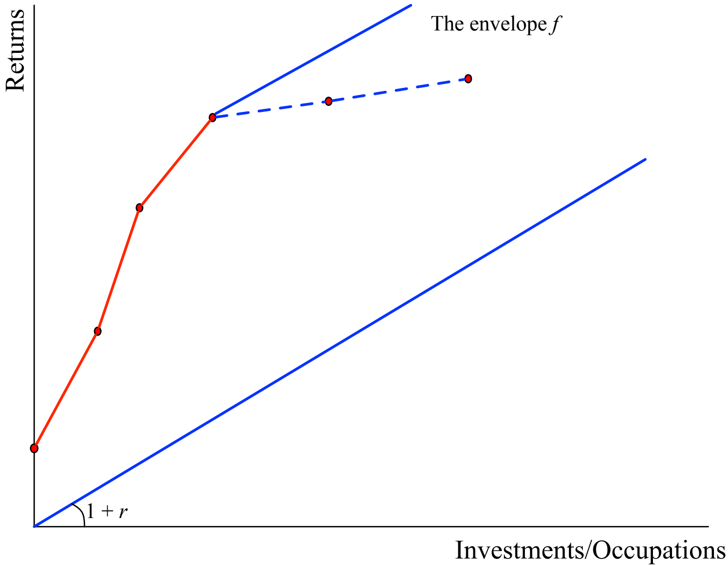


Differential Savings Rates

- **Permanent versus temporary income**

  Friedman (1957), see discussion in Dynan-Skinner-Zeldes (2004)

- Estimates from Survey of Consumer Finances (SCF):

	6-Yr Income Average	Instrumented By Vehicle Consumption
Quintile 1	1.4	2.8
Quintile 2	9.0	14.0
Quintile 3	11.1	13.4
Quintile 4	17.3	17.3
Quintile 5	23.6	28.6
Top 5%	37.2	50.5
Top 1%	51.2	35.6

Source: Dynan-Skinner-Zeldes (2004), they provide other estimates

How Much Do Differential Savings Rates Explain?

- **A very rough calibration for pure capital owners**:
  - Average rate of growth in the economy is g.
  - Rate of return on capital is r.
  - The capitalists save s_R of their income.
- So if initial rich share is $x(0)$, then t periods later it will be

$$x(t) = x(0)\left(\frac{1+s_R r}{1+g}\right)^t$$

  - That is,

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g)-1}{s_R}$$

How Much Do Differential Savings Rates Explain?

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g)-1}{s_R}$$

- Some quick calculations for top 10% in the US:
  - $x_0 = 1/3$ in 1970, rises to $x_t = 47/100$ in 2000.
  - Estimate for g: 2% per year.
  - Estimate from Dynan et al for s_R: 35% (optimistic).
  - Can back out for r: $r = 9.7\%$.
  - Possible, but much higher than the inflation-adjusted rate of return on capital, including dividends (around 6.5%).

How Much Do Differential Savings Rates Explain?

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g) - 1}{s_R}$$

- Similar calculations for top 1% in the US:
- $x_0 = 8/100$ in 1980, rises to $x_t = 18/100$ in 2005.
- Estimate for g: 2% per year.
- Estimate from Dynan et al for s_R: 51%.
- Can back out for r: $r = 10.5\%$.
- Again, there is more going on than just savings differentials.

How Much Do Differential Savings Rates Explain?

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g)-1}{s_R}$$

- Try the top 0.1% for the United States:
  - $x_0 = 2.2/100$ in 1980, rises to $x_t = 8/100$ in 2007.
  - Estimate for g: 2% per year.
  - If these guys also save at 0.5, then $r = 14.4\%$!
  - If they save $3/4$ of their income, then $r = 9.6\%$.

How Much Do Differential Savings Rates Explain?

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g) - 1}{s_R}$$

- Slightly better job for Europe, but not much. Top 10%:
- $x_0 = 29/100$ in 1980, rises to $x_t = 35/100$ in 2010.
- Estimate for g: 2% per year.
- Estimate from Dynan et al for s_R: 35%.
- Can back out for r: $r = 7.5\%$.
- Very high relative to r in Europe over this period.

How Much Do Differential Savings Rates Explain?

$$r = \frac{[x(t)/x(0)]^{1/t}(1+g)-1}{s_R}$$

- Finally, top 1% for the UK:
  - $x_0 = 6/100$ in 1980, rises to $x_t = 15/100$ in 2005.
  - Estimate for g: 2% per year.
  - Estimate from Dynan et al for s_R: 51%.
  - Can back out for r: $r = 11.4\%$.

What Explains the High Rates of Return to the Rich?

- **Two broad groups of answers**:
  - The rich have access to better information on rates of return
  - The rich have physical access to better rates of return.

Information: Investing in Investment

This section is omitted for the course.

- **The greater is wealth, the more effort in finding good rates of return on it.**
- Simplest model:

$$\sum_{t=0}^{\infty} \delta^t c_t^{1-\sigma},$$

where $0 < \sigma < 1$, $0 < \delta < 1$, and

$$c_t = \underbrace{(1 + r_{t-1})F_{t-1}}_{\text{old wealth + return}} + \underbrace{w(1 - e_t)}_{\text{wages on } 1 - e \text{ time}} - \underbrace{F_t}_{\text{new wealth}},$$

and

$$r_t = \beta e_t$$

F: financial wealth, w: wage rate, and e: informational effort.

Information: Investing in Investment

- Use F_t to equate marginal benefits over time:

$$\left(\frac{c_{t+1}}{c_t}\right)^{\sigma} = \delta(1 + r_t)$$

- Use e_t to equate marginal benefits over time:

$$\left(\frac{c_{t+1}}{c_t}\right)^{\sigma} = \delta \frac{F_t}{w} \beta.$$

- Proposition. Individuals with a higher ratio of F to w earn a higher rate of return, and grow faster.

- Proof. Combine the two equations above to see that for all t,

$$1 + r_t = \frac{F_t}{w} \beta.$$

- Or you can have your cake and eat it too. Consider

$$c_t = (1 + r_{t-1})F_{t-1} + w - z_t - F_t,$$

where $r_t = \gamma z_t$ (e.g., paying an expert to do your research).

  - The z that equates marginal benefits is given by

$$\left(\frac{c_{t+1}}{c_t}\right)^\sigma = \delta F_t \gamma.$$

- Proposition. Those with higher F earn higher rates of return.

  - PS: Contrast the two propositions.

Access: Wealth and Rates of Return

Back to course material

Why might wealth affect access to high rates of return?

- Risk-taking
- Stock markets
- Politics (Sokoloff-Engerman on Latin America)
- Imperfect capital markets:

  Inability to seize opportunities with startup costs

  This last item will be our focus here.

Entrepreneurs and Workers

- People indexed on $[0,1]$: **all identical except for their initial wealth**.
  - Choose to become workers or entrepreneurs.
  - Startup cost S for entrepreneurship.
- **Entrepreneurs have a production function** $f(\ell) = A\ell^{\alpha}$.
  - They hire workers at wage w to maximize profit:

$$A\ell^{\alpha} - w\ell$$

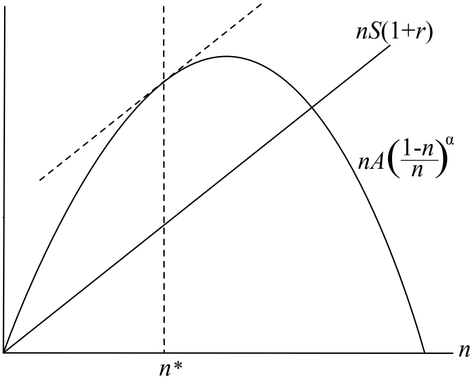
  - w adjusts to equate supply and demand.

The Criterion for Social Efficiency

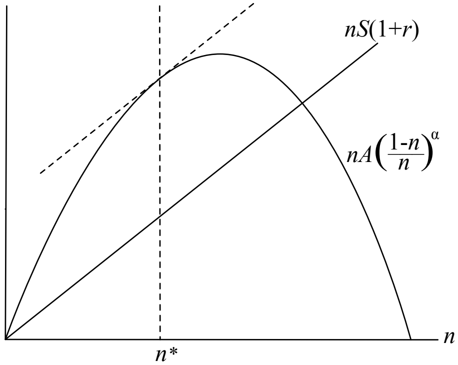
Output net of setup costs: Choose n to maximize

$$\max_n nA\left(\frac{1-n}{n}\right)^{\alpha} - nS(1+r)$$

where r is rate of return on alternative use of funds invested in startup.



The Criterion for Social Efficiency



- **First order condition for maximization of net output:**

$$A\left(\frac{1-n^*}{n^*}\right)^{\alpha} - \frac{\alpha}{n^*}A\left(\frac{1-n^*}{n^*}\right)^{\alpha-1} = S(1+r). \tag{3}$$

- Can this solution be **decentralized**? **Yes, if credit markets are perfect**.

Decentralized First-Best Under Perfect Credit Markets

- **Market equilibrium** with n entrepreneurs and wage w:
  - Because credit markets are perfect, profits equal wages:

$$A\left(\frac{1-n}{n}\right)^{\alpha} - w\frac{1-n}{n} - S(1+r) = w, \tag{4}$$

  - Wages equal marginal product:

$$w = \alpha A\left(\frac{1-n}{n}\right)^{\alpha-1} \tag{5}$$

- Substitute (5) into (4):

$$A\left(\frac{1-n}{n}\right)^{\alpha} - \frac{\alpha}{n}A\left(\frac{1-n}{n}\right)^{\alpha-1} = S(1+r). \tag{6}$$

  - Compare (6) with (3) to **see that n equals n^***.

Imperfect Capital Markets: An Introduction

- **The problem of collateral and repayment**:
  - Example:
  - My assets = 100,000; startup costs = 200,000.
  - Business hires 50 workers, pays them 5,000 each
  - Revenue = 500,000.
  - After one period, repay. Interest rate = 10%.
- **If default**, then:
  - Half profits seized plus expected jailtime worth 60,000.

Imperfect Capital Markets: An Introduction

- To pay or not to pay?

Items	Repay	Default
Principal & Interest	220,000	0
Collateral Credit	110,000	0
Jail	0	60,000
Seizure of Profits	0	125,000
Total	110,000	185,000

- Repay if wealth/collateral is 100,000.

Imperfect Capital Markets: An Introduction

- To pay or not to pay?

Items	Repay	Default
Principal & Interest	220,000	0
Collateral Credit	22,000	0
Jail	0	60,000
Seizure of Profits	0	125,000
Total	198,000	185,000

- Default if wealth/collateral is 20,000.
- Note: It is the same person in both cases!

Imperfect Capital Markets: An Introduction

- More generally:

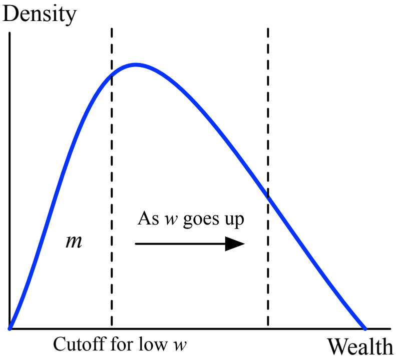
$$W \geq S - \frac{F + \lambda \{f(\ell) - w\ell\}}{1+r}$$

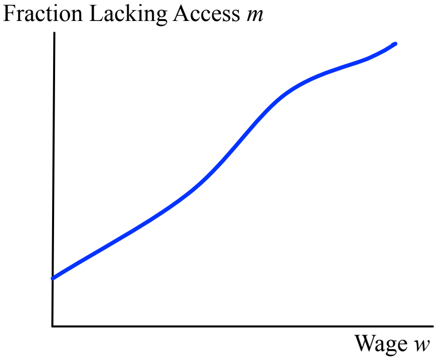
- where W = wealth
- S = setup cost
- F = jail/fines
- w = wage rate
- ℓ = labor
- r = interest rate
- $f(\ell)$ = produced output.

Entrepreneurship with Imperfect Capital Markets

Credit access determined by wage rate and wealth:

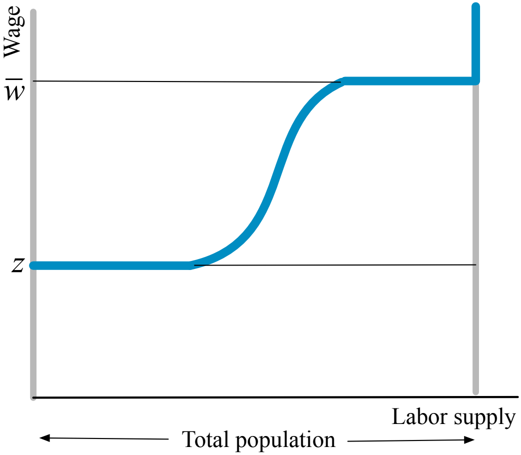
- Threshold defined by $W(w) = S - \dfrac{F + \lambda\{f(\ell) - w\ell\}}{1+r}$.





Equilibrium Under Imperfect Credit Markets

- **This generates supply and demand curves for labor:**



- Supply curve mirrors the “lack of access” diagram.

Equilibrium Under Imperfect Credit Markets

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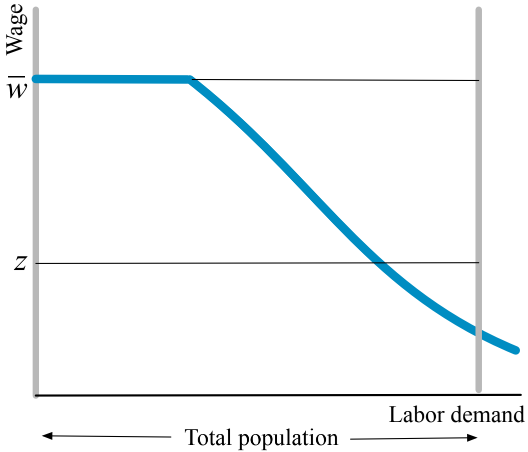

- Demand curve is “product” of access and firm demand for labor.

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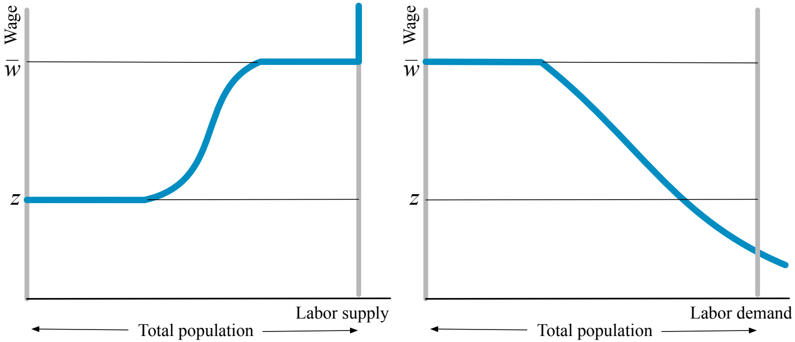
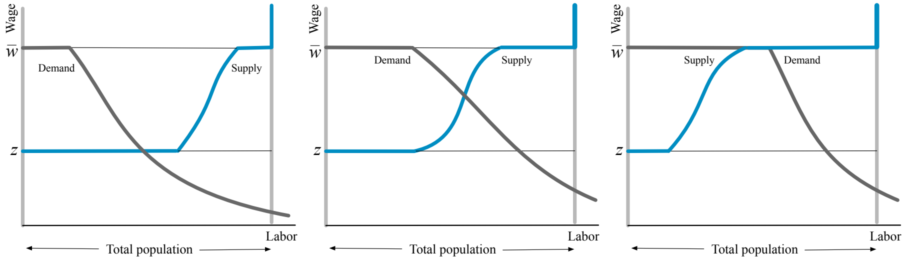


- Supply curve mirrors the “lack of access” diagram.
- Demand curve is “product” of access and firm demand for labor.

Equilibrium Under Imperfect Credit Markets

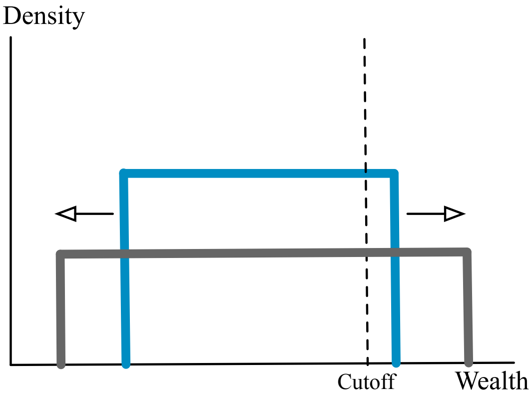
- **Three regimes:**



- **Inefficiency** in Panels A and B compared to the social planner's outcome.
- **Efficiency** in Panel C.

Inequality and Inefficiency

- **Does inequality hinder efficiency or move the system towards it?**
  - It depends on how poor the economy is to begin with.



- Inequality helps when average wealth levels are relatively low.

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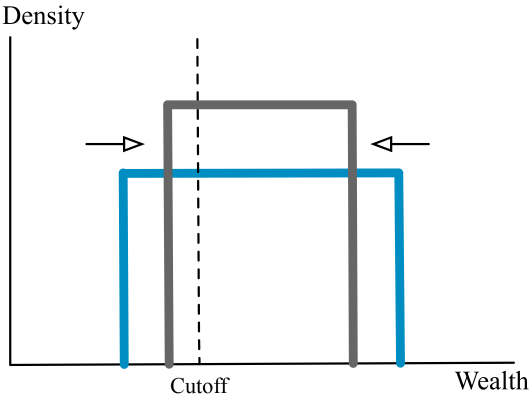

- Inequality hurts when average wealth levels are relatively high.

Inequality and Development

- We studied a small set of topics on **inequality and development**
  - Differential savings rates
  - Differential access to occupations via imperfect capital markets
- **When markets are imperfect, inequality matters!**
  - In very poor societies, can create partial efficiency gains
  - In richer societies, causes efficiency losses
  - Traced to the imperfection of credit markets (our next topic).