

Markets and Development

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Agenda

- ▶ Introductions
- ▶ Syllabus
- ▶ Big picture: Development economics and market failures
- ▶ Stiglitz (1989): Markets, market failures, and development
- ▶ BREAK
- ▶ Review: Optimization
- ▶ Simple models of market failures and firm production
- ▶ Market failures and misallocation

Introductions

- ▶ Name
- ▶ Where you're from



Syllabus

[Link](#)

Outline

Development economics and market failures

Stiglitz (1989): Markets, market failures, and development

Review: Optimization

Simple models of market failures

Market failures and misallocation

What is development economics?

Development economics is the study of why some countries are poor and others are rich, focusing on the policies and logic of economies where poverty is widespread

"A central question in development economics is, how can we account for differences in the levels of income and the rates of growth between the developed and less developed economies?"
(Stiglitz 1989 AER)

Three perspectives (from VoxDev)

1. **A Policy Lens:** Examining the programs and initiatives that drive economic growth, social progress, and equitable distribution
2. **A Capability Lens:** Studying how societies expand human capabilities and agency
3. **A Structural Lens:** Understanding the specific 'logic' of economies with large population in absolute poverty → the focus of this course

Not just any research question in a developing country

Pillars of modern development economics

Modern development economics moves beyond ‘grand macro theories’ to focus on **micro-foundations**:

- ▶ **Firms & Misallocation:** Why are firms in developing countries often small and unproductive? (Credit constraints, land markets, management) → the focus of this course
- ▶ **Human Capital:** The long-run impacts of health, nutrition, and education on productivity and inter-generational mobility
- ▶ **State Capacity:** The role of bureaucracy and institutions—policy *and* implementation
- ▶ **Credibility revolution:** A heavy reliance on the RCTs and quasi-experiments to bridge the gap between research and policy

Why focus on small firms?

Stylized facts for developing countries:

- ▶ **Employment:** 70–90% of the workforce in low-income countries is employed in micro-enterprises (often < 5 employees) or is self-employed
- ▶ **The ‘Missing Middle’:** Developing economies often lack mid-sized, high-growth firms ⇒ ‘bimodal’ distribution of many tiny, low-productivity firms and a few massive ones
- ▶ **The Productivity Gap:** gap in Total Factor Productivity (TFP) between the most and least productive firms is much larger in developing countries than in rich countries

A key focus for this course: To understand why countries are poor, we must understand why their firms are small and unproductive

Markets in rural and low-income developing contexts

Market failures are common

- ▶ Implication for firms: optimization not possible
 - ▶ No/constrained land market \Rightarrow cannot optimize land use
 - ▶ No/constrained labor market \Rightarrow cannot optimize labor supply
 - ▶ No/constrained credit market \Rightarrow cannot optimize either input
- ▶ Economic implications:
 - ▶ Different types of behaviors become rational, e.g., low adoption of profitable technologies
 - ▶ Lower productivity due to misallocation of resources and lack of investment
 - ▶ Shocks may affect both production and consumption in households that are also producers: entrepreneurs

Examples of market failures

- ▶ **Credit market failures:** High interest rates and collateral requirements prevent investment in technology
- ▶ **Insurance failures:** Risk-aversion leads to 'safety first' strategies rather than profit maximization
- ▶ **Contractual/legal frictions:** Difficulty in enforcing contracts limits firm size and investment
- ▶ **Managerial frictions:** Lack of training or 'business sense' as a bottleneck to growth

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Why are poor countries poor: Beyond factor endowments

Not just a shortage of resources in poor countries (historical neoclassical view)

- ▶ If just less physical capital: higher returns should ↑ capital flows ⇒ we don't see this
- ▶ If just less human capital: should see higher incomes for highly-educated ⇒ instead see high unemployment and migration
- ▶ Standard models predict growth convergence ⇒ has not occurred

Suggests differences in how economic agents interact ⇒ **markets**

- ▶ Market failures more common and private nonmarket solutions less successful in developing countries: why?

Information constraints in technology

- ▶ **Learning by doing:** Difficulties in acquiring the learning of developed nations (e.g., technology transfer) ⇒ Specialize in low-learning technologies
 - ▶ But why these difficulties?
- ▶ **Localization:** Suitability of high-income country technologies for developing contexts
 - ▶ But why not develop local technologies if returns are high?

Closer to a market failure: **appropriating returns to skill investment**

- ▶ Harder for developing country firms to appropriate returns from investing in labor force (contract law, court system), leading to undersupply or underutilization

Information constraints in product markets

Challenges in **product differentiation**

- ▶ Consumers often judge a category of products collectively if output of specific producers cannot be differentiated
- ▶ One firm producing low-quality goods ruins the reputation for others and reduces demand and prices
- ▶ This leads to an underproduction of high-quality (higher cost) items

Why this matters more in developing countries

- ▶ Many firms producing very similar goods (think of agriculture)
- ▶ Limited infrastructure/institutions for quality certification
- ▶ Small-scale firms have limited capacity to invest in market differentiation (advertising, packaging, etc.)

Capital/credit constraints

- ▶ **Weak financial markets:** Firms cannot easily raise capital or divest risk ⇒ risk-aversion and under-investment
 - ▶ In developed nations, large conglomerates act as internal capital markets; LDCs lack these institutional sources of financing
- ▶ **Persistence of scale:** Borrowing constraints have a greater impact on firms early in their learning curves ⇒ most developing country enterprises

Conclusions

Not the best paper

- ▶ Many somewhat muddled ideas, not well-integrated
- ▶ Surface-level analysis, largely descriptive
- ▶ But a simple introduction to early work shifting attention to the role of market failures

Proposed policy implications:

- ▶ Identify which failures can be fixed by making markets work better vs. establishing non-market institutions
- ▶ Potential roles for government in price stabilization (reduces risk for producers), tax reform (e.g., allow loss offsets to not exacerbate risk), invest in information public goods

BREAK

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Household optimization: Consumption & labor

The household maximizes utility u from consumption (c) and leisure (l):

$$\max_{c,l} \quad u(c, l; z_h) \quad \text{s.t.} \quad pc \leq w * (L - l) + E = Y$$

where L is total time endowment, w is wage, E is exogenous income, and z_h is a vector of household characteristics.

How do we find the optimal c^*, l^* ?

Household optimization: Consumption & labor

$$\max_{c,l} \quad u(c, l; z_h) \quad \text{s.t.} \quad pc \leq w * (L - l) + E = Y$$

Lagrangian: $\mathcal{L} = u(c, l; z_h) + \lambda[w * (L - l) + E - pc]$

λ : marginal value of an extra dollar of budget

First Order Conditions (FOCs):

- ▶ $\frac{\partial \mathcal{L}}{\partial c} = u_c - \lambda p = 0 \implies u_c = \lambda p$
- ▶ $\frac{\partial \mathcal{L}}{\partial l} = u_l - \lambda w = 0 \implies u_l = \lambda w$

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Optimality condition:

$$\frac{u_l}{u_c} = \frac{w}{p}$$

The marginal rate of substitution between leisure and consumption equals the real wage.

Firm optimization: Input demand

Firms maximize profits π by choosing capital (K) and labor (L):

$$\max_{K,L} \quad \pi = p * f(K, L; z_q) - wL - rK$$

where z_q is a vector of firm or location characteristics affecting production, w is the wage, and r is the rental rate of capital

How do we find the optimal K^*, L^* ?

Firm optimization: Input demand

$$\max_{K,L} \quad \pi = p * f(K, L; z_q) - wL - rK$$

First Order Conditions (FOCs):

- ▶ $p * f_L(K, L) = w$
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Implication:

- ▶ In perfect markets, the firm's labor and capital demand L^*, K^* depends only on prices (p, w, r) and technology.
- ▶ The firm expands production until the value generated by the last unit of input exactly equals its market cost.

The real world

- ▶ How does optimization differ in the real world?
- ▶ In this course: how do contextual factors in low-income countries affect firm decision-making?
 - ▶ Market failures
 - ▶ Uncertainty
 - ▶ Infrastructure and institutions
 - ▶ Human capital
 - ▶ Etc.
- ▶ Today: market failures and firm decisions

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Motivating example: Firm with credit market failures

Suppose the firm has an endowment of capital K_0 and faces a borrowing limit \bar{B} . Total capital is $K = K_0 + B/r$, where $B \leq \bar{B}$.

$$\begin{aligned} \max_{L,K} \quad & p * f(K, L) - wL - r(K - K_0) \\ \text{s.t.} \quad & K \leq K_0 + \bar{B}/r \end{aligned}$$

How do we find the optimal K^*, L^* ?

Motivating example: Firms with credit market failures

$$\begin{aligned} \max_{L,K} \quad & p * f(K, L) - wL - r(K - K_0) \\ \text{s.t.} \quad & K \leq K_0 + \bar{B}/r \end{aligned}$$

Lagrangian:

$$\mathcal{L} = p * f(K, L) - wL - r(K - K_0) + \mu[K_0 + \bar{B}/r - K]$$

μ is the **shadow price** of the credit constraint \Rightarrow the marginal value of an extra dollar of credit

The FOC for capital now becomes:

$$p * f_K = r + \mu$$

Motivating example: Firm with credit market failures

The FOC for capital now becomes:

$$p * f_K = r + \mu$$

Case 1: The constraint does not bind ($\mu = 0$)

- ▶ $p f_K = r$. The firm reaches its optimal scale.
- ▶ What happens if $K^* < K_0$ and there are credit constraints or weak capital markets?

Case 2: The constraint binds ($\mu > 0$)

- ▶ $p f_K > r$. The marginal return to capital is *higher* than the market cost.
- ▶ What does this "wedge" imply?

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Case 2: The constraint binds ($\mu > 0$)

- ▶ $p f_K > r$. The marginal return to capital is *higher* than the market cost.
- ▶ What does this "wedge" imply?
- ▶ ⇒ The firm is "under-investing" due to the lack of liquidity.

Credit market failures and misallocation

Suppose that credit constraints bind for some firms.

- ▶ What does this imply for the allocation of capital?

Credit market failures and misallocation

Suppose that credit constraints bind for some firms.

- ▶ What does this imply for the allocation of capital?
- ▶ More productive firms cannot access enough capital.
- ▶ Less productive firms may use too much capital.
- ▶ Large μ values in empirical data suggest high potential gains from improving credit access.

Another real-world consideration: production uncertainty

Production outcomes are often risky (think of agriculture).

- ▶ **Period 1 (Input stage):** Firm chooses K and L and pays input costs $rK + wL$.
- ▶ **Period 2 (Realization stage):** Production $\theta f(K, L)$ is realized, where θ is a random productivity shock (e.g., weather).

The financial friction: Inputs must be paid *before* output is sold.

The firm uses its endowment W and borrows B :

$$rK + wL \leq W + B \quad \text{where } B \leq \bar{B}$$

The constrained optimization problem

Assuming risk neutrality for simplicity, the firm maximizes expected profit:

$$\max_{K,L} \quad E[\pi] = p * E[\theta]f(K, L) - B$$

$$\text{s.t. } B = rK + wL - W \leq \bar{B}$$

Substituting the constraint into the objective:

$$\max_{K,L} \quad p * \bar{\theta}f(K, L) - (rK + wL - W)$$

$$\text{s.t. } rK + wL \leq W + \bar{B}$$

Where $\bar{\theta} = E[\theta]$

The constrained optimization problem

Let μ be the multiplier on the Period 1 liquidity constraint:

$$\mathcal{L} = p\bar{\theta}f(K, L) - (rK + wL - W) + \mu[W + \bar{B} - rK - wL]$$

FOC for Capital (K):

The constrained optimization problem

Let μ be the multiplier on the Period 1 liquidity constraint:

$$\mathcal{L} = p\bar{\theta}f(K, L) - (rK + wL - W) + \mu[W + \bar{B} - rK - wL]$$

FOC for Capital (K):

$$p\bar{\theta}f_K = r(1 + \mu)$$

The distortion:

- ▶ If **unconstrained** ($\mu = 0$): Firm equates expected marginal product to the cost.
- ▶ If **constrained** ($\mu > 0$): The firm faces an 'effective' cost of capital much higher than the market rate.

How does uncertainty (θ) make this worse?

1. **Risk aversion:** If the firm is risk-averse ($E[u(\pi)]$), they will further reduce K to avoid low-payoff states (Precautionary under-investment).
 - ▶ Many developing country firms are micro-enterprises
2. **Collateral risk:** If θ is low, the firm may default in Period 2, losing the endowment W and future access to credit.

Implications

- ▶ Credit constraints (\bar{B}) limit scale
- ▶ They also prevent firms from ‘insuring’ themselves to deal with risk
 - ▶ Effects on input decisions, technology adoption, diversification

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From micro to macro: Misallocation

Misallocation: A state where factors of production (K, L) are not allocated to their most productive uses, leading to aggregate TFP losses.

- ▶ **The Micro view:** Firms i face "idiosyncratic wedges" or firm-specific distortions (τ_i).
 - ▶ Optimization gives $p f_{K,i} = r(1 + \tau_i)$
- ▶ **The Macro view:** τ_i wedges distort allocation of inputs across firms
 - ▶ Efficient economy: Marginal Products equalized across firms (e.g., all equal to r)
 - ▶ Inefficient economy: too much K in low-productivity firms, not enough in high-productivity firms \Rightarrow big potential gains from efficient resource reallocation

Evidence: Misallocation in developing countries

How do we measure misallocation? The literature typically focuses on the **dispersion of Revenue Productivity (TFPR)**

- ▶ **The Efficiency Benchmark:** In a world without "wedges," TFPR should be equalized across firms
 - ▶ Resources should flow to high-TFP firms until their marginal returns match the market
 - ▶ If not true \Rightarrow misallocation ('indirect' approach)
- ▶ **Empirical findings** for developing countries:
 - ▶ TFP dispersion is significantly higher in developing countries
 - ▶ Higher density of small, low-productivity firms that 'survive' due to distortions, while high-productivity firms remain small
 - ▶ Correlation between firm productivity and firm size is much weaker

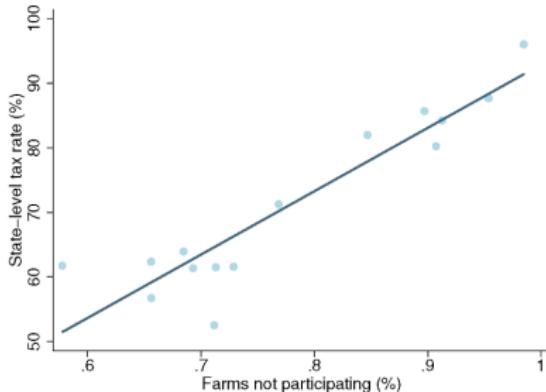
Causes of misallocation

Restuccia & Rogerson (2017) categorize sources of "wedges" (τ_i) into three buckets:

1. **Statutory Policies:** Size-dependent taxes or regulations
 - ▶ E.g., in India, labor laws that only kick in after a firm reaches 100 employees, discouraging growth
 - ▶ Tax collection institutions that encourage informality \Rightarrow small firms
2. **Discretionary Interventions:** "Crony capitalism" or corruption where credit/licenses are granted based on political connections rather than productivity
3. **Market Frictions:**
 - ▶ *Credit Constraints:* Productive firms cannot borrow to reach their optimal scale ($pf_K = r(1 + \mu)$)
 - ▶ *Land Markets:* Insecure property rights prevent land from being transferred to the most efficient farmers

Example: Land market frictions in India (Bolhuis et al 2026)

- ▶ Large dispersion in farm TFP
- ▶ Land rental markets should solve this by reallocating land, but many farms avoid rental markets
- ▶ Connection with state regulations:
 - ▶ Smaller farms, less rental activity, and more misallocation in restrictive states
 - ▶ Policies originally meant to protect vulnerable tenants
- ▶ > 50% of national misallocation losses state-level rental barriers
- ▶ Eliminating these would raise productivity by 65% on average



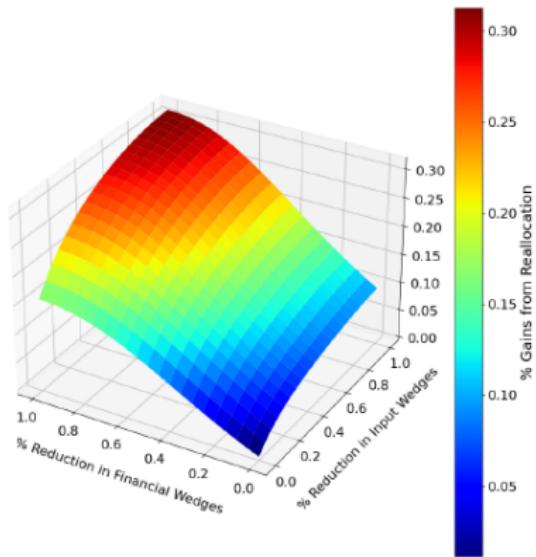
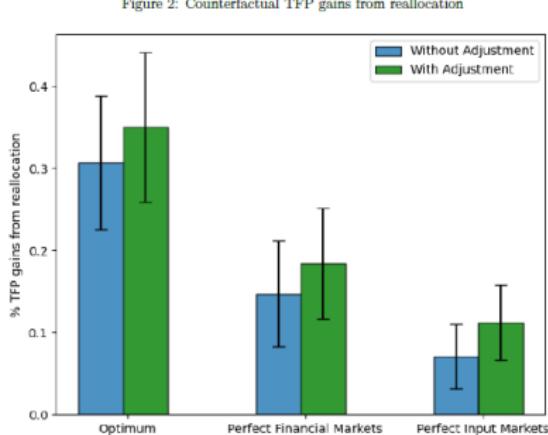
Notes: State-level rental barrier as an effective tax rate on the rent-in rate of land against the percentage of farms not participating in the land rental market. Blue circles represent each of the 15 states in the sample.

Source: Bolhuis et al.

From indirect to direct: Identifying sources of misallocation

- ▶ Silver (2024 WP): Novel method to separately identify financial and input market distortions using panel data from Thailand
- ▶ Estimates aggregate productivity effects of eliminating misallocation from these distortions

Figure 3: Gains from partial reductions of τ and Λ



Consequences: The Macro-Micro link

- ▶ **Static Losses:** Moving resources from "distorted" firms to their efficient uses could increase GDP
 - ▶ Bils, Klenow, & Ruane (2017): manufacturing TFP gains of 40-60% in India from eliminating misallocation
 - ▶ Borhuis et al (2026): 65% gains in farm productivity in India from addressing land market distortions
 - ▶ Silver (2024 WP): 31% gains in aggregate farm productivity in Thailand from eliminating financial and input distortions
- ▶ **Dynamic Losses (The "Innovation Trap"):**
 - ▶ If a firm knows that becoming "too big" or "too productive" will attract government scrutiny or higher taxes, it *invests less* in TFP-improving technology.
 - ▶ ⇒ Lower long-run growth path for the entire economy
- ▶ Importance of *distribution* of technology and resources, not just aggregate levels

Where to from here?

Exploration of various challenges/constraints particularly affecting the private sector in developing countries

- ▶ Household-firms and separation failures
- ▶ Risk and uncertainty
- ▶ Technology adoption
- ▶ Credit and capital
- ▶ Labor markets
- ▶ Firm management