

# ECON 256: Poverty, Growth & Inequality

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# Institutions and Development

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If institutions are important for growth and development. Open questions remain:

- **What are the mechanisms through which bad institutions are inhibiting growth?**
- How can countries with bad institutions, improve their institutions?
- Alternatively, is it possible to side-step bad institutions to achieve growth?

One such mechanism: **Misallocation**

# What is Misallocation?

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**Misallocation** is the inefficient allocation of inputs (capital, labor) within and across sectors

- How do we determine the efficient allocation?
- How can misallocation persist?
- What are the gains from reducing misallocation?
- Examples of misallocation and the removal of misallocation

# Efficient Allocation of Inputs

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In absence of market failures, efficiency is when **marginal benefit = marginal cost**

- Marginal Benefit is increased revenue from using 1 more unit of an input in production

$$\text{Marginal Benefit} = \Delta\text{Revenue} = \Delta(\text{Price} \times \text{Quantity})$$

- Marginal Cost is increased cost from purchasing 1 more unit of an input, say Capital

$$\text{Marginal Cost} = \Delta\text{Cost} = r$$

where  $r$  is the rental rate of capital (would be wage for 1 more unit of labor)

# Efficient Allocation of Inputs

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With Cobb-Douglas production function we used for Growth Accounting, profits are

$$Y = AK^\alpha L^{1-\alpha}$$

- Diminishing Marginal Returns in each input: double one input  $\Rightarrow$  less than double output
- Constant Returns to Scale: double both inputs  $\Rightarrow$  double output
- Change in Output from one more unit of each input

$$\frac{\partial Y}{\partial K} = \alpha AK^{\alpha-1} L^{1-\alpha}$$

$$\frac{\partial Y}{\partial L} = (1 - \alpha)AK^\alpha L^{-\alpha}$$

# Efficient Allocation of Inputs

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With Cobb-Douglas production, efficient allocation of inputs implies

$$\overbrace{\left(\frac{\partial Y}{\partial K}\right) / \left(\frac{\partial Y}{\partial L}\right)}^{\text{Relative Marginal Benefit}} = \overbrace{r/w}^{\text{Relative Marginal Cost}}$$

Plugging in formulas from previous page and rearranging, efficiency implies

$$\frac{\alpha}{1 - \alpha} = \frac{rK}{wL}$$

In words:  $\frac{\text{Capital Share in Production Function}}{\text{Labor Share in Production Function}} = \frac{\text{Spending on Capital}}{\text{Spending on Labor}}$

# Measuring Misallocation of Inputs

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Know what efficient relative allocation of Capital to Labor is for a single firm

- Suppose wages and rental rates are common across firms within an industry
- Further suppose all firms have same production function (can differ in productivity)
- Then previous formula should hold for all firms in that industry
- Capital to Labor Misallocation can be measured as deviations from that formula

# Measuring Misallocation of Inputs

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Suppose we have data on capital expenses ( $rK_i$ ) and labor expenses ( $wL_i$ ) for a firm  $i$

- If we know  $\alpha$ , then measure Capital to Labor Misallocation using formula

$$\frac{\alpha}{1 - \alpha} = \tau_i^k \frac{rK_i}{wL_i}$$

- $\tau_i^k$  is the capital wedge. If the wedge equals 1, there is no misallocation.
- We don't observe the capital wedge directly, but can measure it in data as

$$\tau_i^k = \frac{\alpha}{1 - \alpha} \frac{wL_i}{rK_i}$$

- If capital wedge is  $< 1$ , then firm inefficiently uses too much Capital



# Misallocation Across Firms

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Have misallocation of inputs within firm, can also have across firms

- Imperfect competition: Firms produce different varieties of a good
- Constant Elasticity of Substitution,  $\sigma$ , between varieties in an Industry
- Firms can charge markups due to Imperfect Competition

$$\text{Markup} = \frac{\text{Sales} - \text{Costs}}{\text{Costs}}$$

- Most efficient when Markup is constant across firms

$$\text{Efficient Markup} = \frac{\sigma}{\sigma - 1} - 1$$

# Two Concepts of Productivity

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Study misallocation by looking at distribution of two different concepts of productivity

- Standard Productivity (TFPQ or TFP in Quantities) is  $A$  from  $Y = AK^\alpha L^{1-\alpha}$
- Revenue Productivity (TFPR or TFP in Revenues) is defined as  $P \times A$  since

$$\text{TFPR} \equiv PA = \frac{PY}{K^\alpha L^{1-\alpha}}$$

- Key Insight for Misallocation: Even if TFPQ differs across firms, TFPR should be equalized if markups are efficient (firms with higher  $A$  charge lower price, so equal TFPR)

## Hseih and Klenow (2009)

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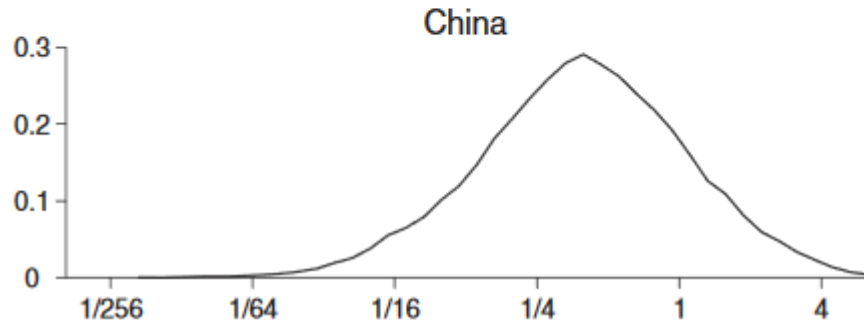
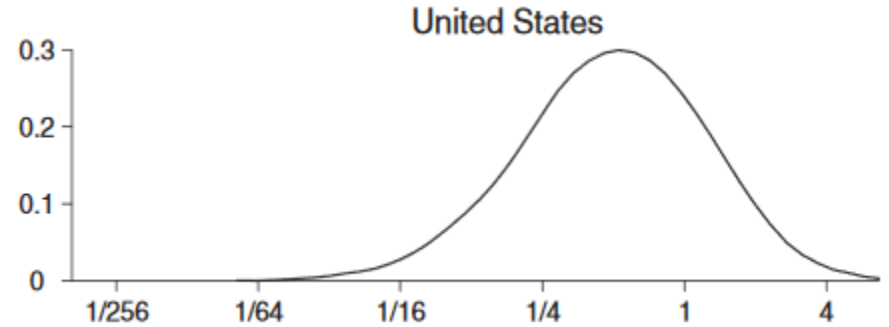
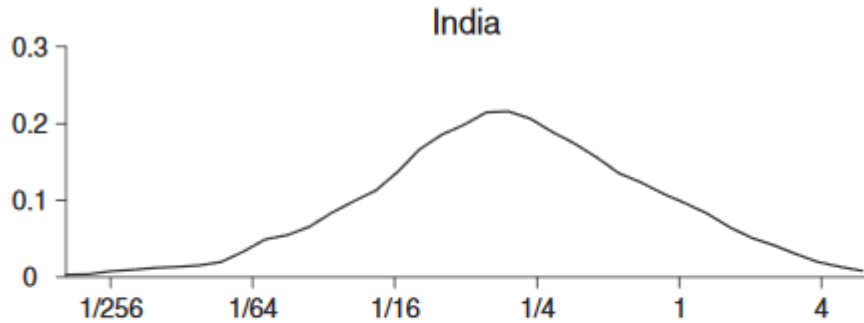
Hseih and Klenow study misallocation in manufacturing plants in China, US, and India

- Find huge variation in TFPQ across firms (puzzling, but not necessary inefficient)
- Also find huge variation in TFPR across firms, indicating misallocation **across** firms
- Further, find significant misallocation of inputs **within** firms

Results suggest Misallocation may be a significant factor in explaining development gap

- Potentially explain up to 50% of TFP Gap between India/China and the United States

# Distribution of TFPQ

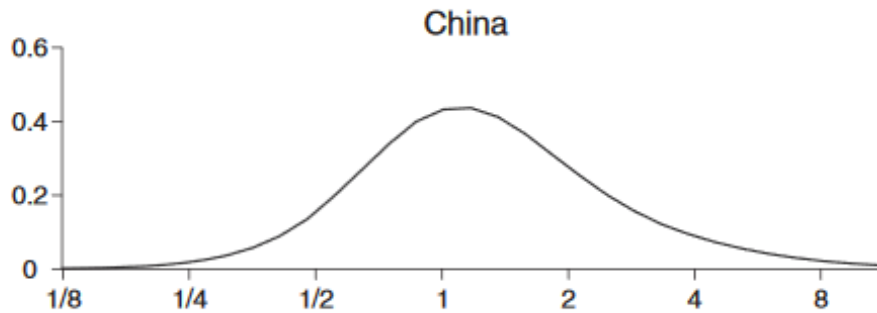
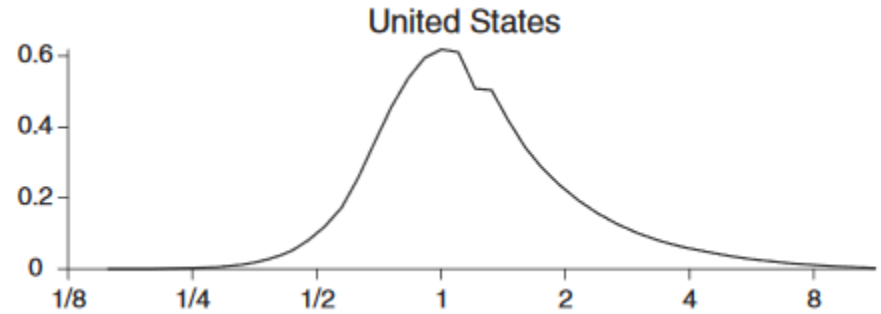
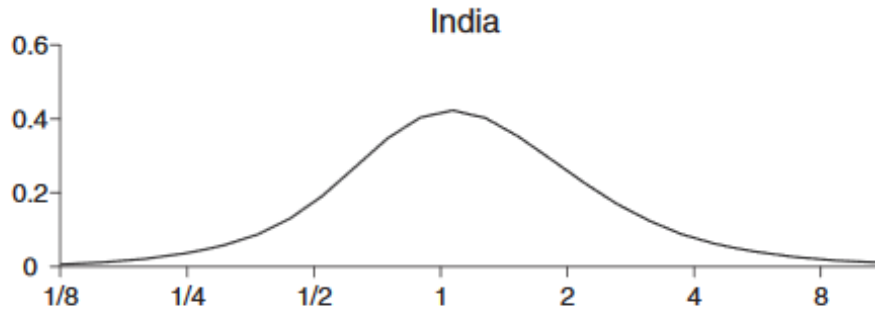


Huge differences in TFPQ across plants

- Graphs are relative to average TFPQ in country
- Some plants 1000x more productive than others. What can explain this?
- Not necessarily inefficient. Not considered misallocation.

# Distribution of TFP<sub>R</sub>

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Still big differences in TFP<sub>R</sub> across plants

- Efficiency would have all plants at 1
- Considered misallocation in model
- Some plants have markups 8x too high/too low

# Dispersion in TFPR

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Hsieh and Klenow examine four sources for the dispersion in TFPR

- Measurement error, since could be just data quality issues.
- Model misspecification, since dispersion might be real, but not actually inefficient.
- Adjustment costs, addressing inefficiencies may be costly or take time
- Government policies which distort prices and costs and therefore markups.

Show the first three can't explain much of the data. The last one can explain a fair amount.

- Some of the misallocation is still a mystery, as is how to reduce it

# Growth through Reduction of Misallocation

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Hseih and Klenow estimate following gains from reducing Misallocation within Industries

TABLE IV  
TFP GAINS FROM EQUALIZING TFPR WITHIN INDUSTRIES

China	1998	2001	2005
%	115.1	95.8	86.6
India	1987	1991	1994
%	100.4	102.1	127.5
United States	1977	1987	1997
%	36.1	30.7	42.9

- Misallocation fell in China 1998-2005, 25% ( $=1-86.6/115.1$ ) of the potential gain realized
- Due to this, Annualized growth rate was 2% higher over period than would otherwise be
- This explains some of China's high growth rate, and also why it can't continue forever

# Sources of Misallocation

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Why is misallocation much higher in Developing countries than in the United States?

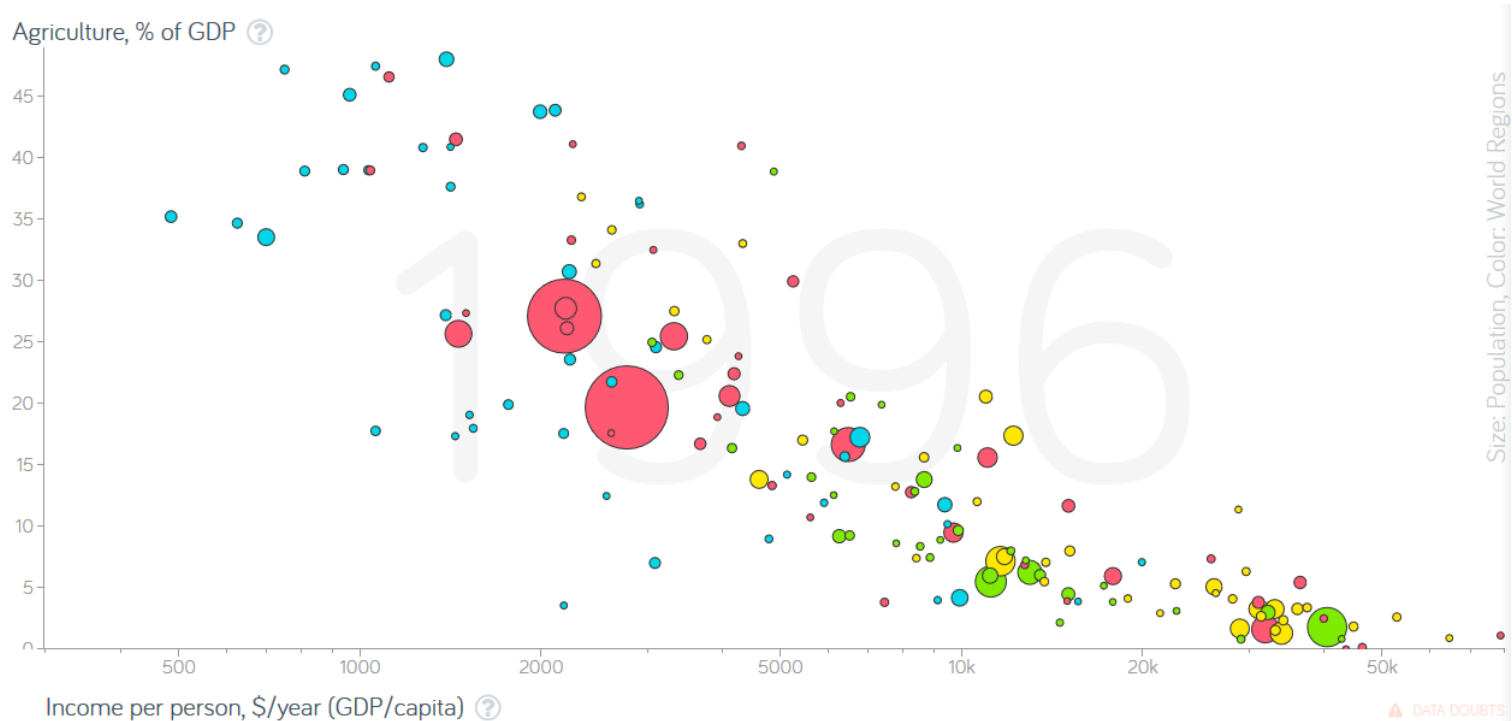
- Less competition, makes it easier for inefficient firms to survive
- More distortionary regulations, especially size and price restrictions
- Better financial system: investment flows

For example: State Owned Enterprises (SOEs) in China are less productive than private-sector counterparts. Despite this, Chinese banks disproportionately lend to SOEs.



# Example of Misallocation: Size Restrictions on Farms

Agricultural Sector is more important in Developing Countries



# Example of Misallocation: Size Restrictions on Farms

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Agricultural Sector is more important in Developing Countries

- In Poor Countries (Bottom Quartile), 65% of Employment is in Agriculture
- In Rich Countries (Top Quartile), 3.8% of Employment is in Agriculture

[A&R \(2014\)](#) show Poor Countries are 7 times less productive in Agricultural Sector compared to non-Agricultural Sectors (In rich countries, sectors are equally productive)

- Only  $\frac{1}{4}$  of this can be due to differences in Capital, Land, and Country-wide Technology
- Argue most important factor is misallocation: too many resources going to small farms

# Differences in Farm Sizes between Rich and Poor Countries

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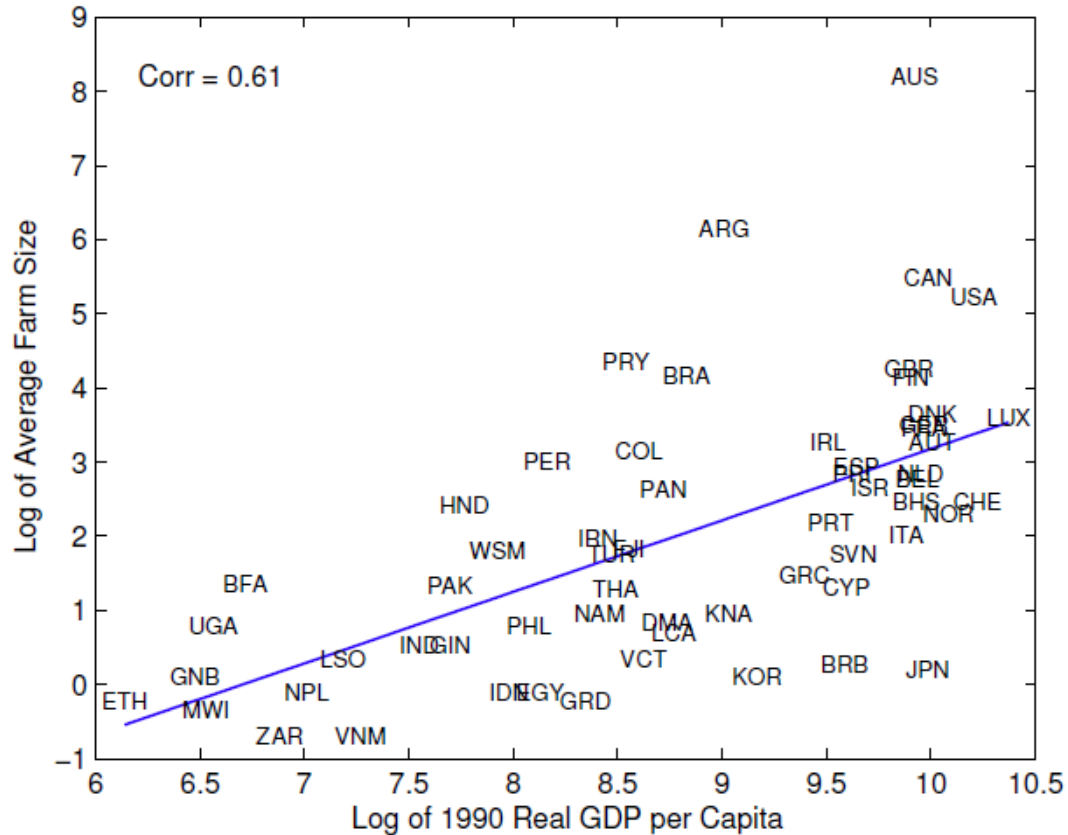
Compared to Rich Countries, in Poor Countries:

- Average Farm Size is 34 times smaller
- 94% (vs 32%) of Farms are <5 Ha; Only 0.2% (vs 38%) of Farms are >20 Ha
- Farms <5 Ha have 68% (vs 10%) of Land; Farms >20 Ha have 3.4% (vs 68.7%) of Land
- Labor Productivity is 47 times smaller in Agriculture (7 times smaller in non-Agriculture)

Note: Small isn't necessarily inefficient, but small inefficient farms are being encouraged

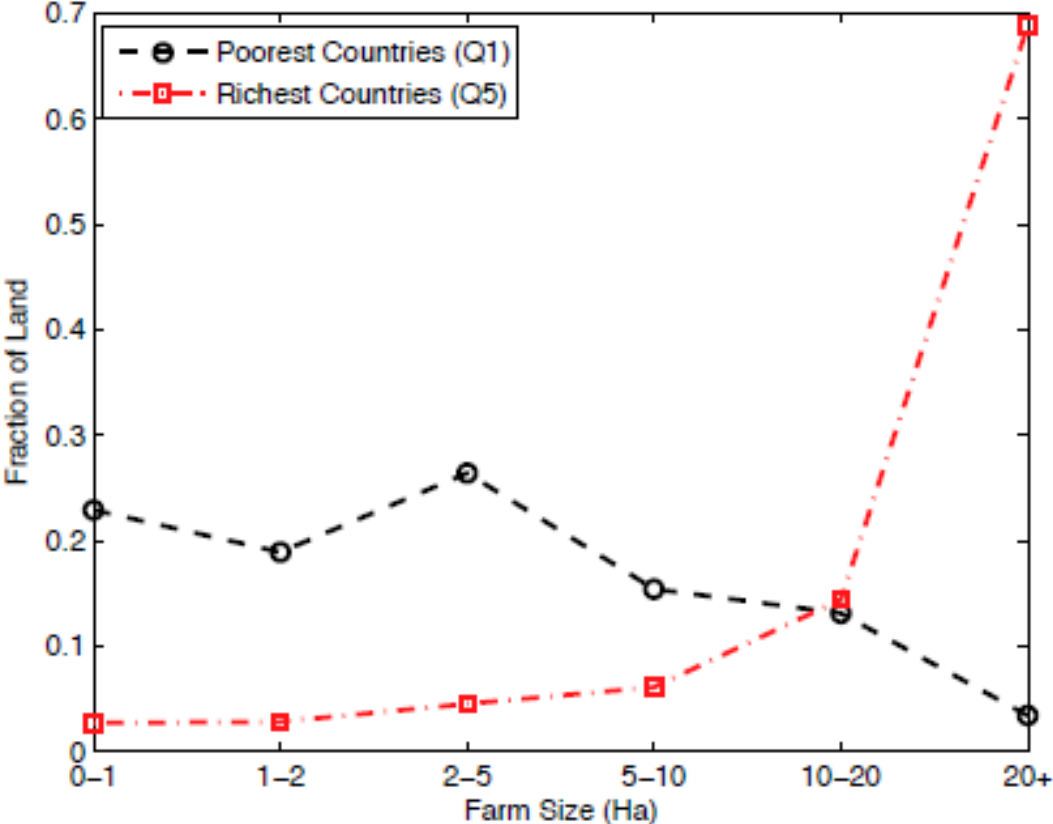
# Average Farm Size versus GDP per Capita

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# Distribution of Farm Sizes for Rich vs Poor Countries

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# Policies that Distort Farm Sizes and Productivity

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Developing Countries have several policies that directly or indirectly limit farm sizes

- Land Reforms: Set an explicit ceiling on Farm Sizes. When laws were passed, larger farms were broken up and redistributed as small farms, which cannot be sold.
- Taxes: Progressive land taxes and agricultural income taxes that tax larger farms at much higher rates than small farms. Also, large subsidies to small farms.
- Tenancy Laws: In India, many farmers didn't own land they farmed. Laws passed that enacted rent ceilings and made it so they couldn't lose rights to farm land.
- Production Quotas: Limits on the agricultural output a farm is allowed to produce

These have the side effect of causing misallocation and lowering Agricultural productivity

# Less vs More Distortive Agricultural Support

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## Less Distortionary Policies:

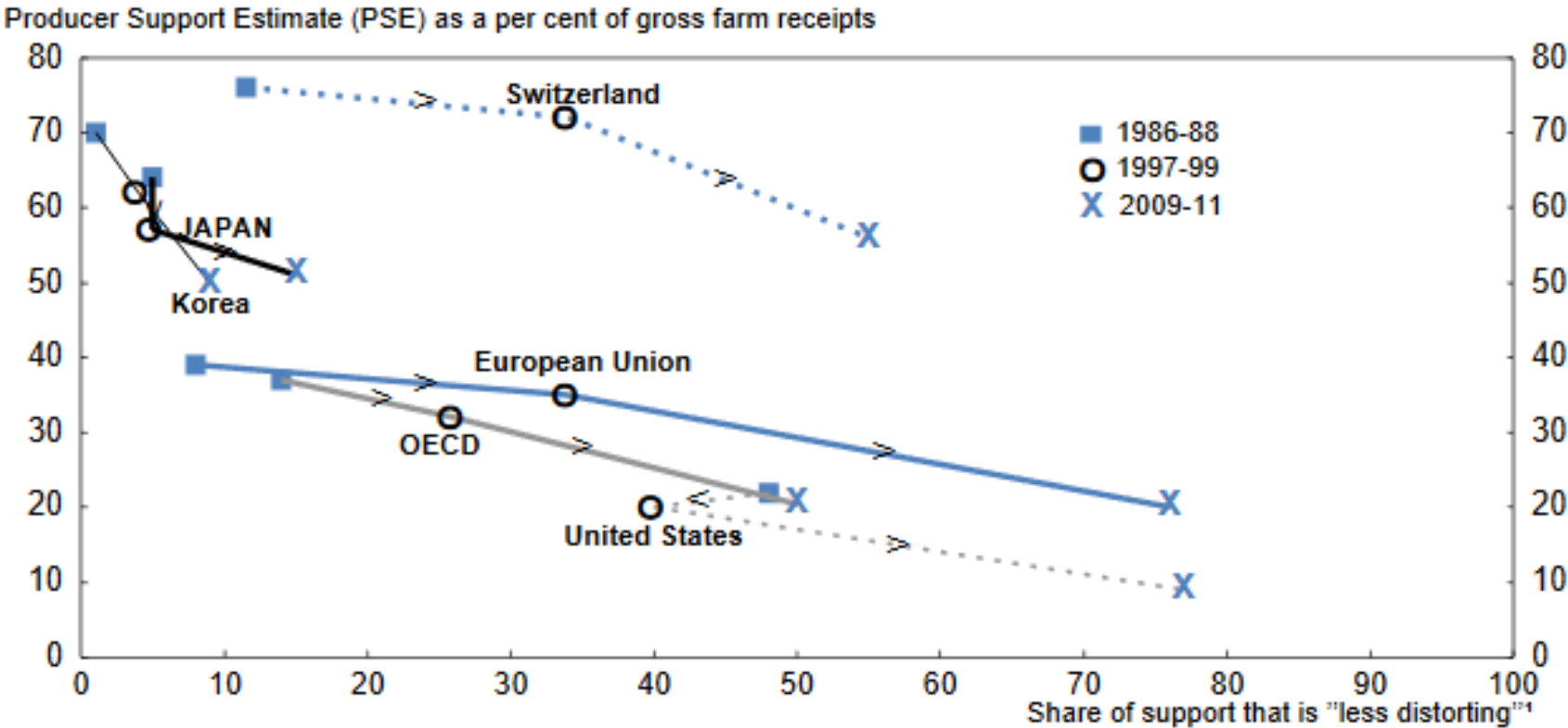
- Direct payments to farmers based on inputs used and land area farmed
- Education and training for farmers

## More Distortionary Policies:

- Price Supports, Import Tariffs, Quotas
- Restrictions on who farmers are, what land can be used, what products are grown

**General Principle:** Target problem directly, not indirectly. Beware unintended side effects.

# Distortionary vs Non-Distortionary Support in OECD Countries





# Things to Think About

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Agricultural Support in Rich countries  $\Rightarrow$  difficult for farmers in poor countries to compete

- Most common countermeasure is Tariffs in Developing countries
- Side effect of raising prices for consumers, while not doing much to raise farmer income

Tariffs not effective at helping poor countries, what might be?

- Continued reduction of agriculture & biofuel support in Rich countries
- Compensatory development aid based on levels of farm support in Rich countries
- Support development of non-Agricultural sectors, so poor farmers have alternatives

# Subsistence vs Non-Subsistence farming in Malawi

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Table 3: Subsistence Consumption, Malawi LSMS-ISA 2010

Ag. Production Deciles	Food Insecurity (last 12m)	Food Consumption/ Nondurable Cons.	Food Consumption/ Ag. Production
Bottom 10%	80.7	0.56	3.09
10-20%	67.8	0.64	2.80
20-30%	65.7	0.65	2.34
30-40%	60.6	0.68	2.00
40-50%	57.4	0.68	1.87
50-60%	50.4	0.67	1.44
60-70%	47.4	0.68	1.22
70-80%	43.4	0.68	1.02
80-90%	35.2	0.69	0.80
Top 10%	28.0	0.68	0.53
Total	50.6	0.67	1.54

Tariffs raise prices consumers pay for Agricultural goods

- Many farmers in developing countries are net-food importers, better ways to help them