ECON 256: Poverty, Growth & Inequality

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Institutions and Development

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?

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

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

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 ⇒ less than double output
- Constant Returns to Scale: double both inputs ⇒ 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

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: $\dfrac{\text{Capital Share in Production Function}}{\text{Labor Share in Production Function}} = \dfrac{\text{Spending on Capital}}{\text{Spending on Labor}}$

Measuring Misallocation of Inputs

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

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

- If we know α, then measure Capital to Labor Misallocation using formula

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

- τ_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

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

- Imperfect competition: Firms produce different varieties of a good
- Constant Elasticity of Substitution, σ, 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

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×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)

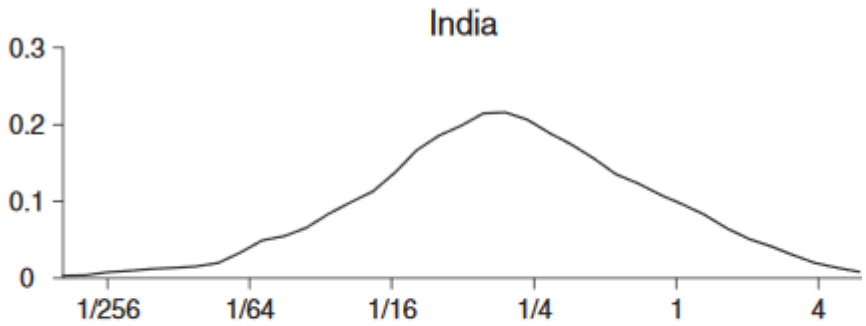
Hseih and Klenow study misallocation in manufacturing plants in China, US, and India

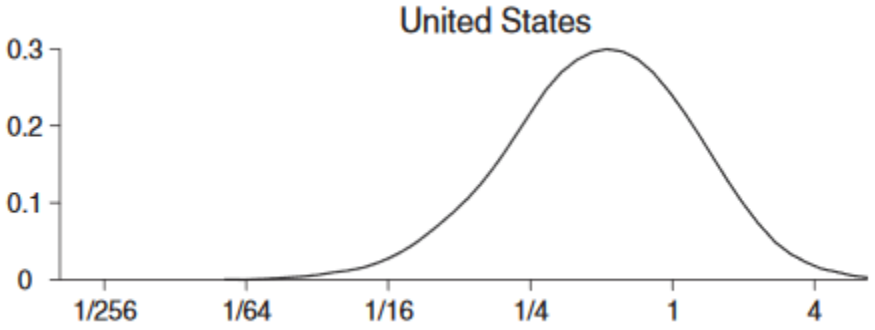
- Find huge variation in TFPQ across firms (puzzling, but not necessary inefficient)
- Also find huge variation in TFPR across firms, indicating misallocation **across** firms
- Further, find significant misallocation of inputs **within** firms

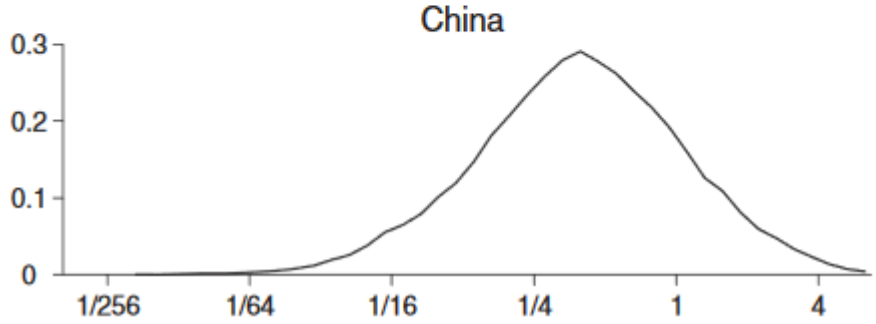
Results suggest Misallocation may be a significant factor in explaining development gap

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

Distribution of TFPQ



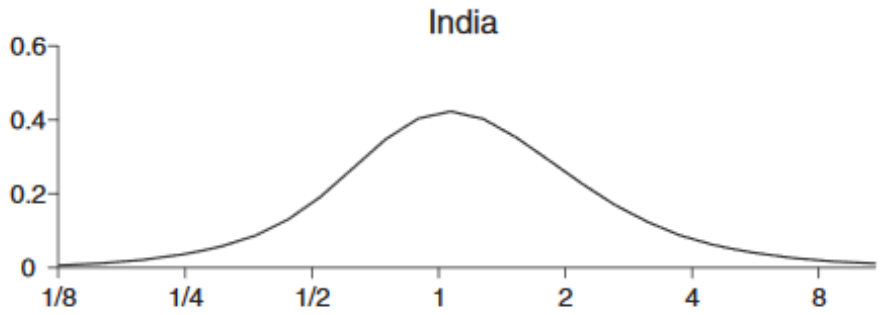


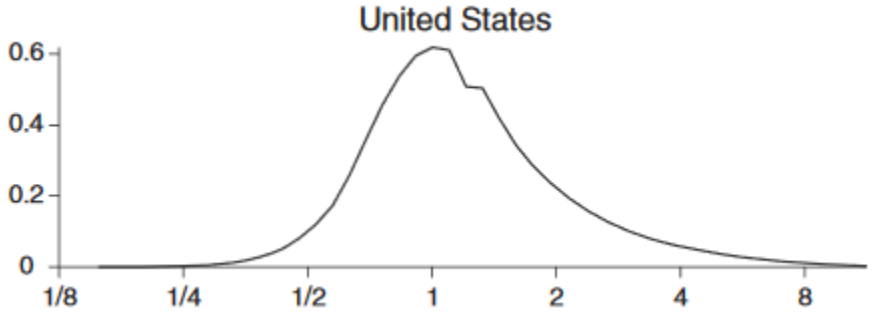


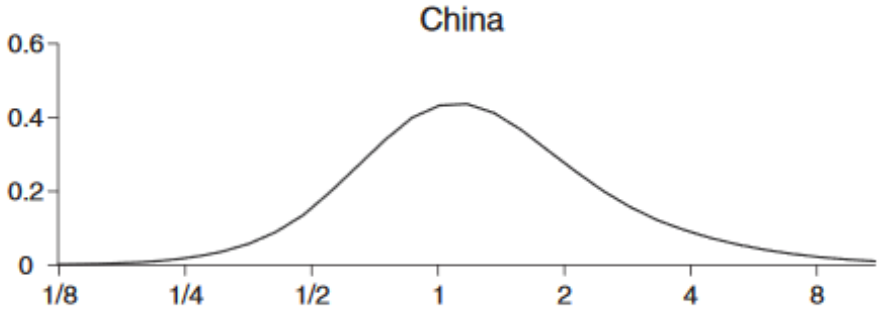
Huge differences in TFPQ across plants

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

Distribution of TFPR







Still big differences in TFPR 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

Hseih 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

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

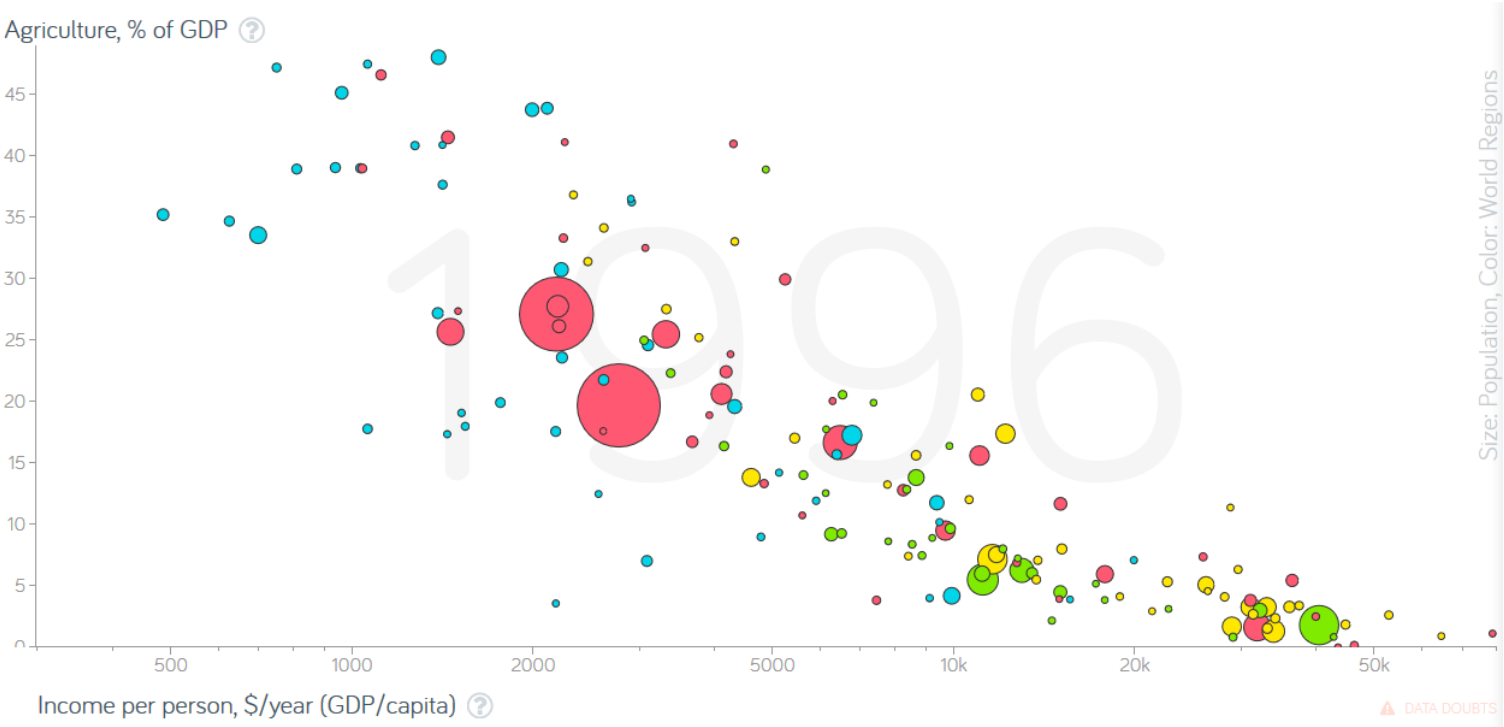
Why is misallocation much higher in Developing countries than in the United States?

- 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



Gapminder

Example of Misallocation: Size Restrictions on Farms

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 ¼ 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

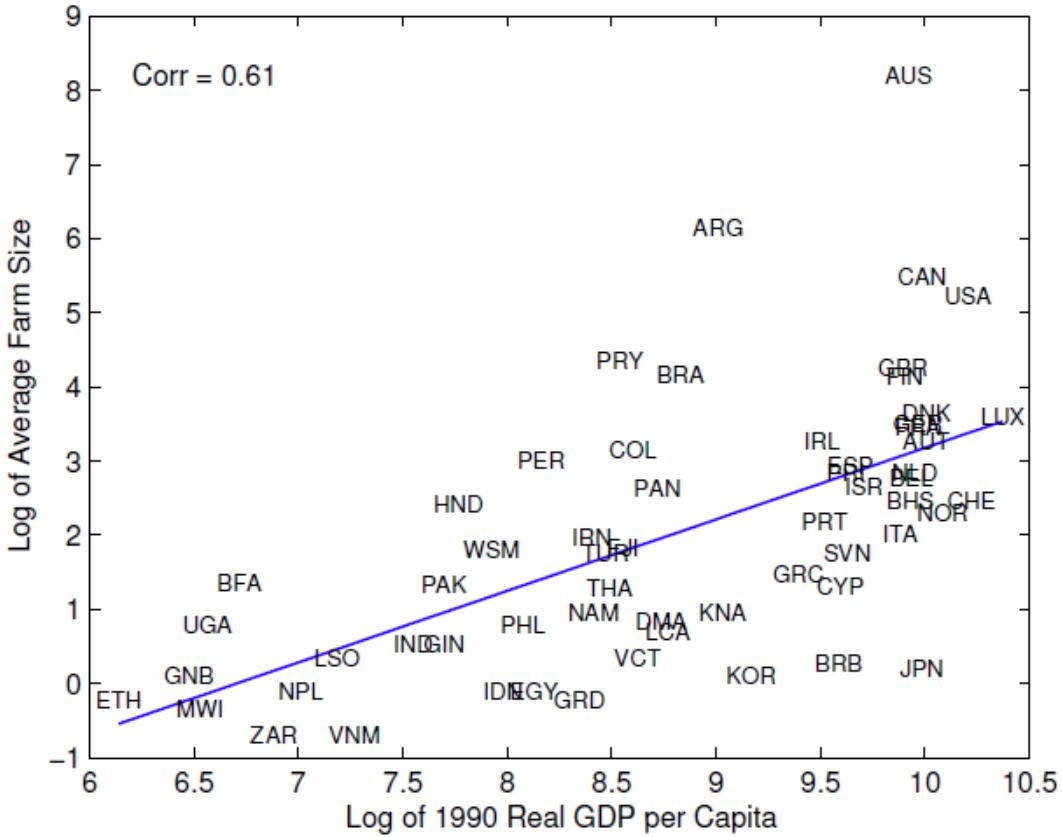
Differences in Farm Sizes between Rich and Poor Countries

Compared to Rich Countries, in Poor Countries:

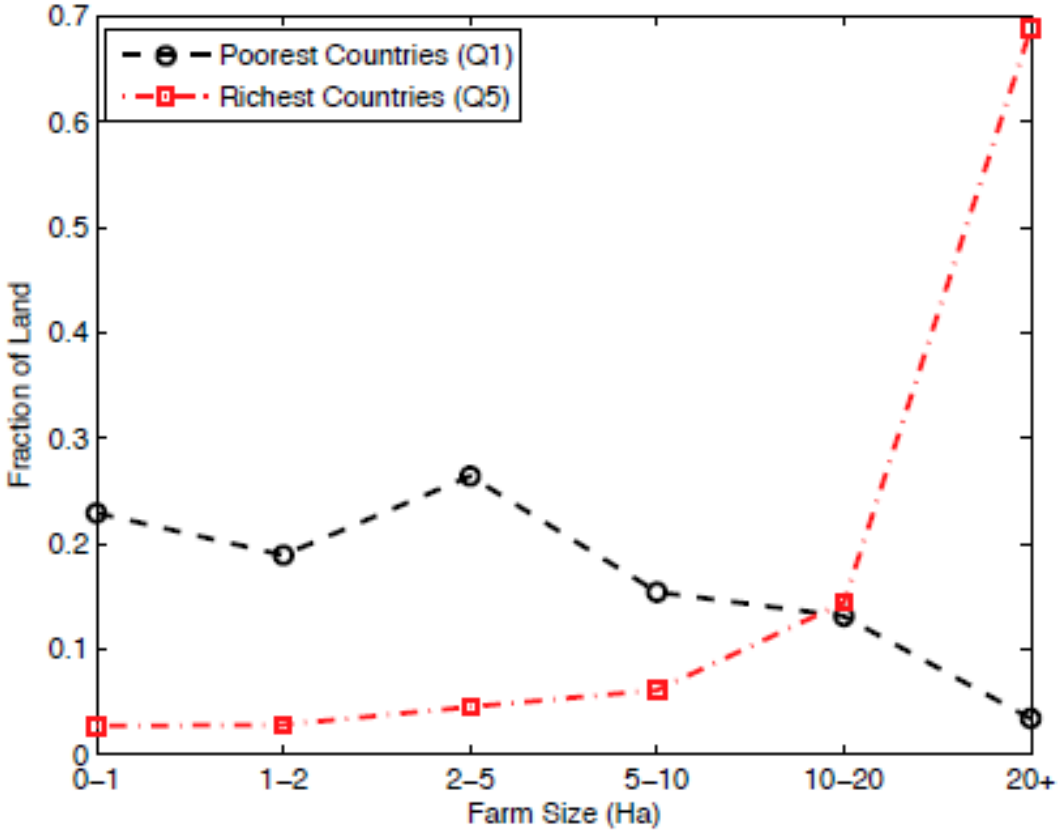
- Average Farm Size is 34 times smaller
- 94% (vs 32%) of Farms are <5 Ha; Only 0.2% (vs 38%) of Farms are >20 Ha
- Farms <5 Ha have 68% (vs 10%) of Land; Farms >20 Ha have 3.4% (vs 68.7%) of Land
- Labor Productivity is 47 times smaller in Agriculture (7 times smaller in non-Agriculture)

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

Average Farm Size versus GDP per Capita



Distribution of Farm Sizes for Rich vs Poor Countries



Policies that Distort Farm Sizes and Productivity

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

Less Distortionary Policies:

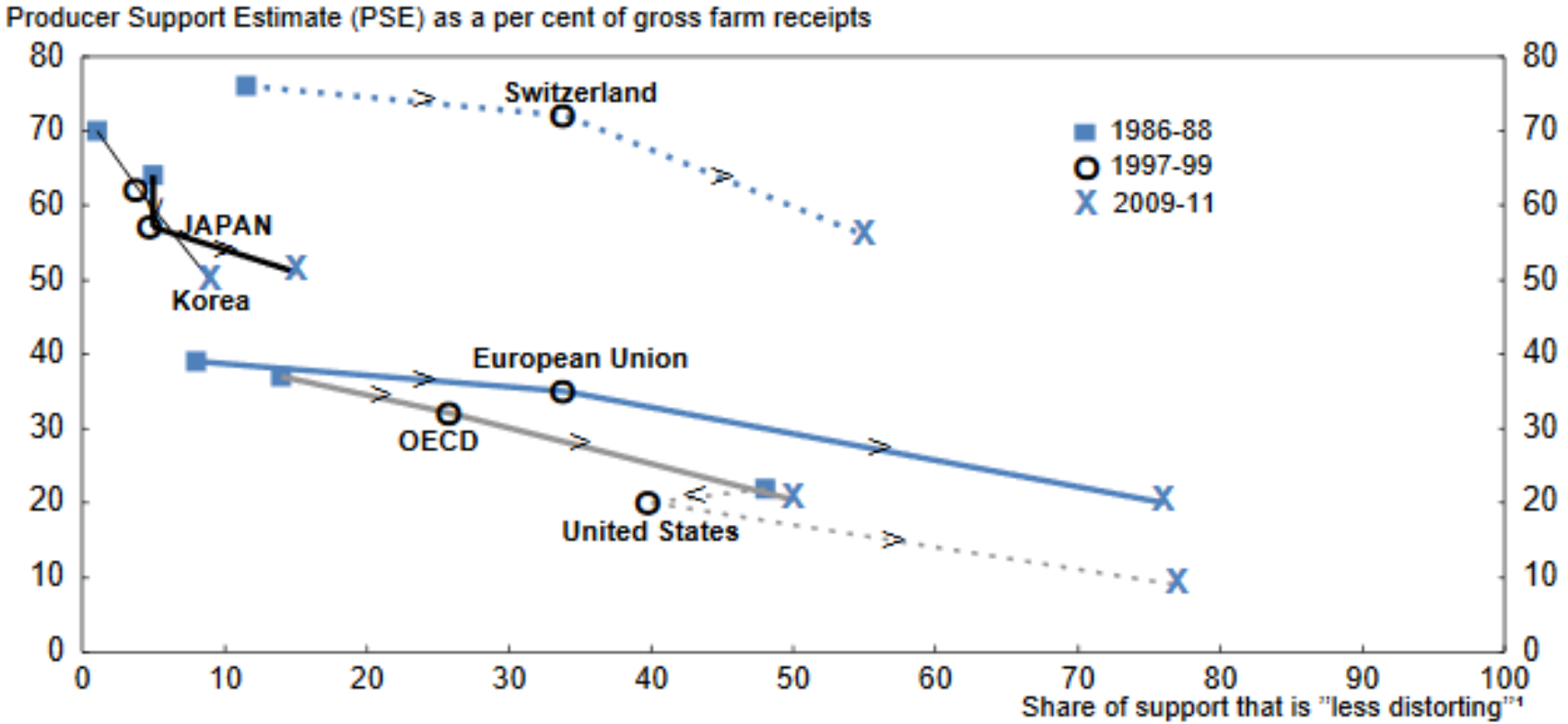
- Direct payments to farmers based on inputs used and land area farmed
- Education and training for farmers

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



OCED Economic Surveys: Japan 2013

Things to Think About

Agricultural Support in Rich countries ⇒ 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

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