# ECONOMICS OF LESS DEVELOPED COUNTRIES

EC3040b
Spring 20157
Tutorial 1

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# Outline

**Purpose of Tutorial**

- Opportunity to ask questions
- Revision
- Some new material

**Contents**

- The Long Run (new material)
- Classic Models - Harrod Domar, Solow Model (revision, 1 new slide)
- Divergence/Convergence (new material)
- Growth Diagnostics (revision plus additional slides)

# Additional Readings

- Pritchett (1997) *Divergence, Big Time*, Journal of Economic Perspectives, No. 3.
- Hausmann, Klinger and Wagner (2008) *Doing Growth Diagnostics in Practice: A Minibook*, CID Working Paper 177. http://www.cid.harvard.edu/cidwp/pdf/177.pdf
- Hausman (2008) In Search of the Chains that Hold Brazil Back CID Working Paper No. 180. http://www.hks.harvard.edu/fs/drodrik/Growth%20diagnostics%20papers/In%20search%20of%20the%20chains%20that%20hold%20Brazil%20back.pdf

# Four Central Questions

1. Why are some countries rich and others poor?
2. What are the mechanics of development?
3. Where will the process tend to? Convergence? Divergence?
4. What is the approach to develop a policy response for a particular country?

# 1. The Long Run: Since Year 1

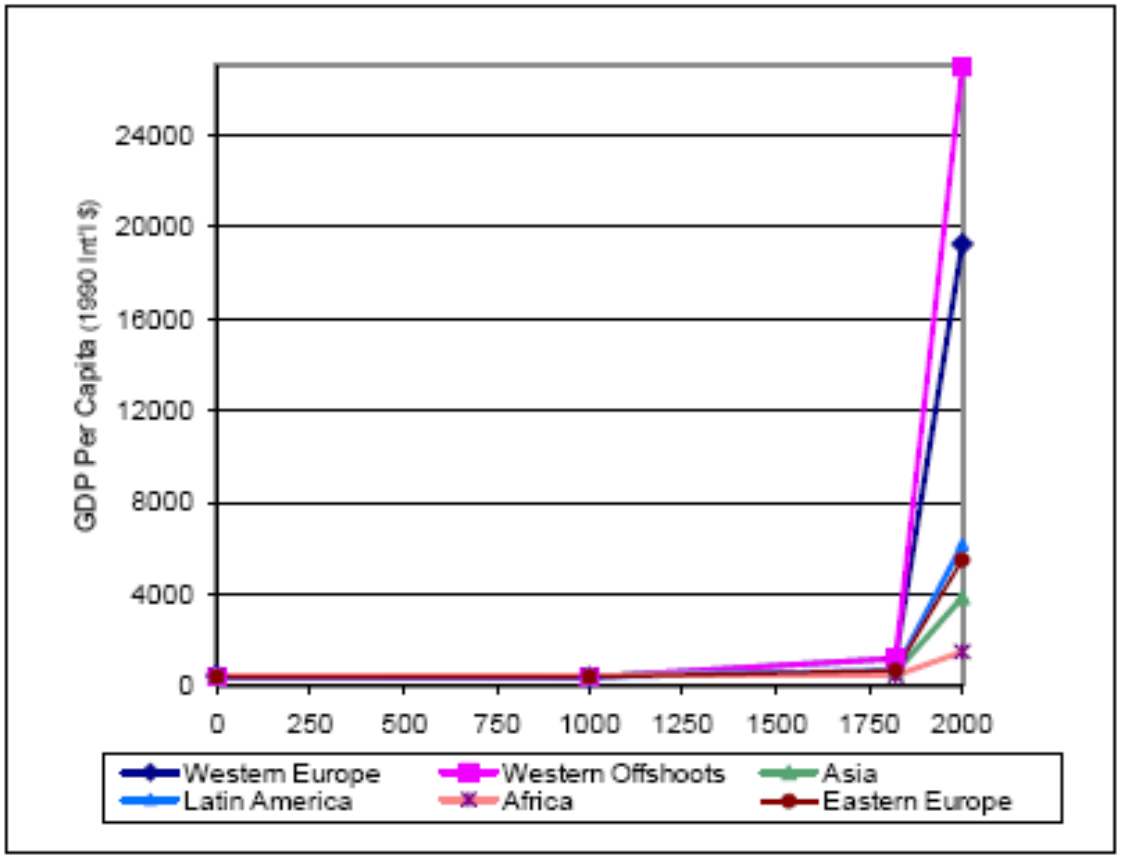


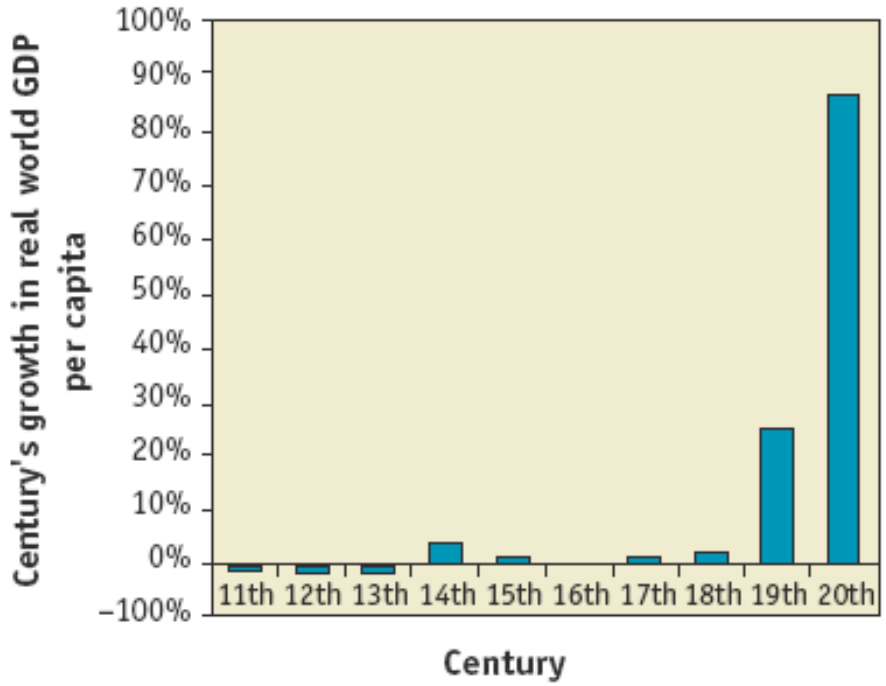

Figure 2.1. The Evolution of Regional Income per Capita over the Years 1 - 2001

Sources: Maddison (2003)[2]

# Economic Growth by Century

FIGURE 11

**Worldwide Growth in Real GDP per Capita, 1000–Present**

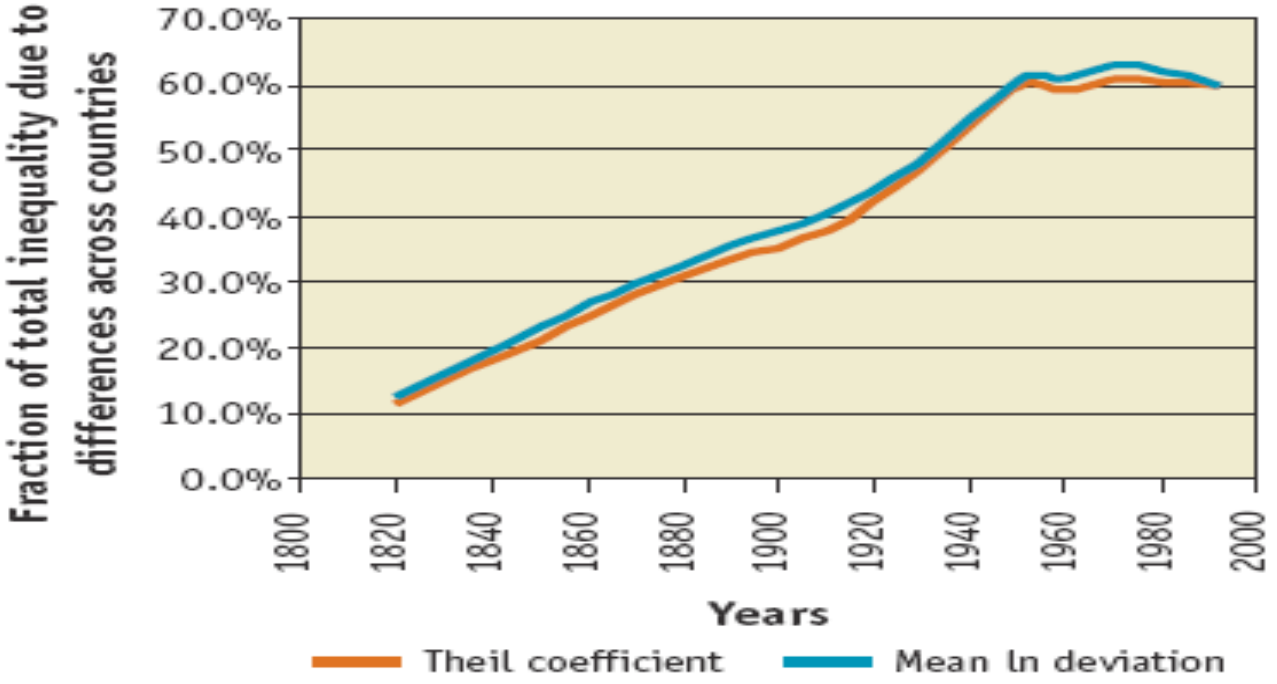



*Source:* DeLong 2000.

# World Inequality: Differences across Countries

FIGURE 1.4

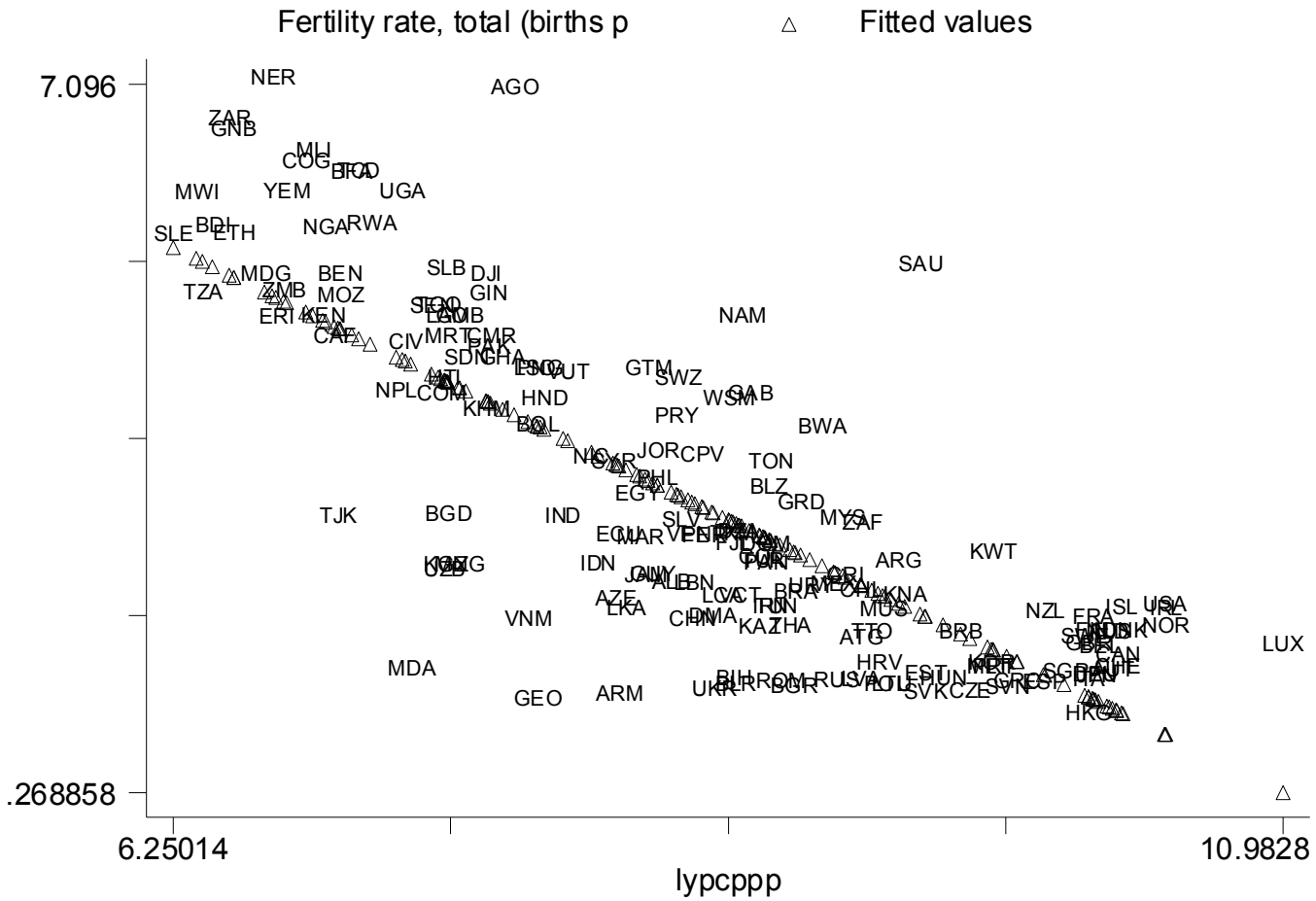
**Fraction of World Inequality Accounted for by Differences across Countries**




*Source: Source:* Bourguignon and Morrison 2002.

# Development and Population: The rich get rich & the poor get children

**Fertility rate (births per woman) vs. log GDPpc at PP**



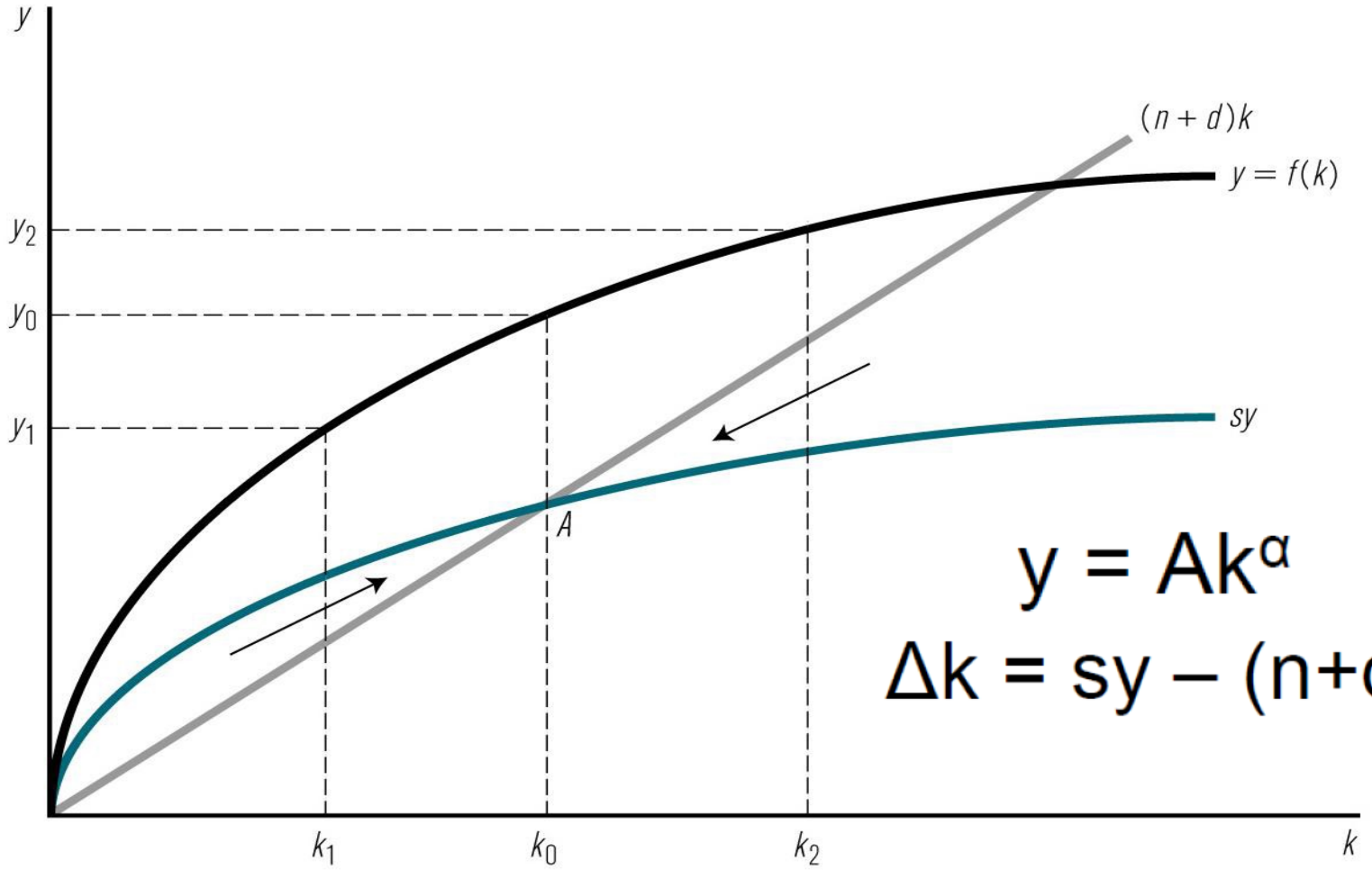

# Harrod-Domar
## (Rostow - Stages of Economic Growth)

- S = sY, I = $\Delta K$
- Assume incremental capital output ratio k = Δ K / Δ Y
- As I = S (closed economy) so Δ Y/Y = s/k
- Growth jointly determined by s and k
- Mobilisation of domestic and foreign savings for pre-growth investment (increased taxes, foreign aid, consumption deferral and in an open economy - aid and FDI)
- Tech progress as a decrease in k
- Neglects quality of investment, institutions, but is simple and can accurate in the short term

# Solow Model

- Extension of H-D model – allows for substitution between L and K
- CRTS for K and L combined, DRTS in K
- $Y = K^{\alpha}(AL)^{1-\alpha}$, where A is the productivity of labour
- $y = Ak^{\alpha}$ (per worker), note that k is K/L
- $\Delta K = sY - dK$
- $\Delta k = sy - (n+d)k$ (capital accumulation equation in per worker terms)
- Output growth = short run f(↓ labour quantity, ↑ in capital (savings and investment), in the long run f(↑ technology).

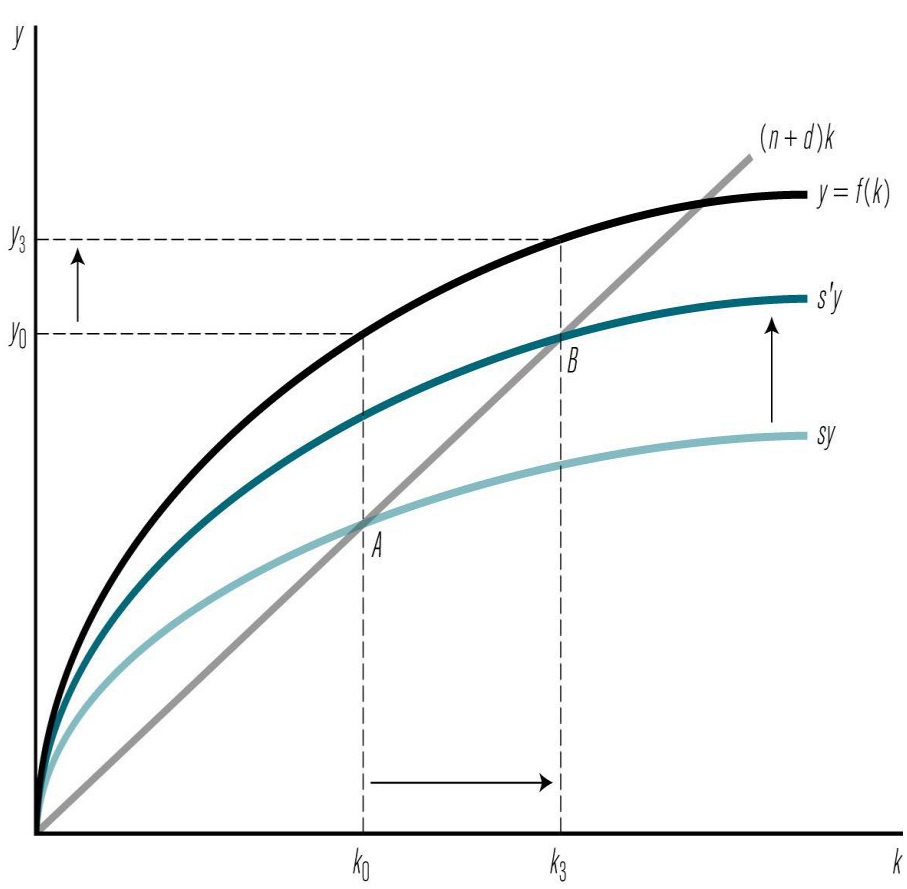
# The Solow Diagram and Steady State ($k_0$)

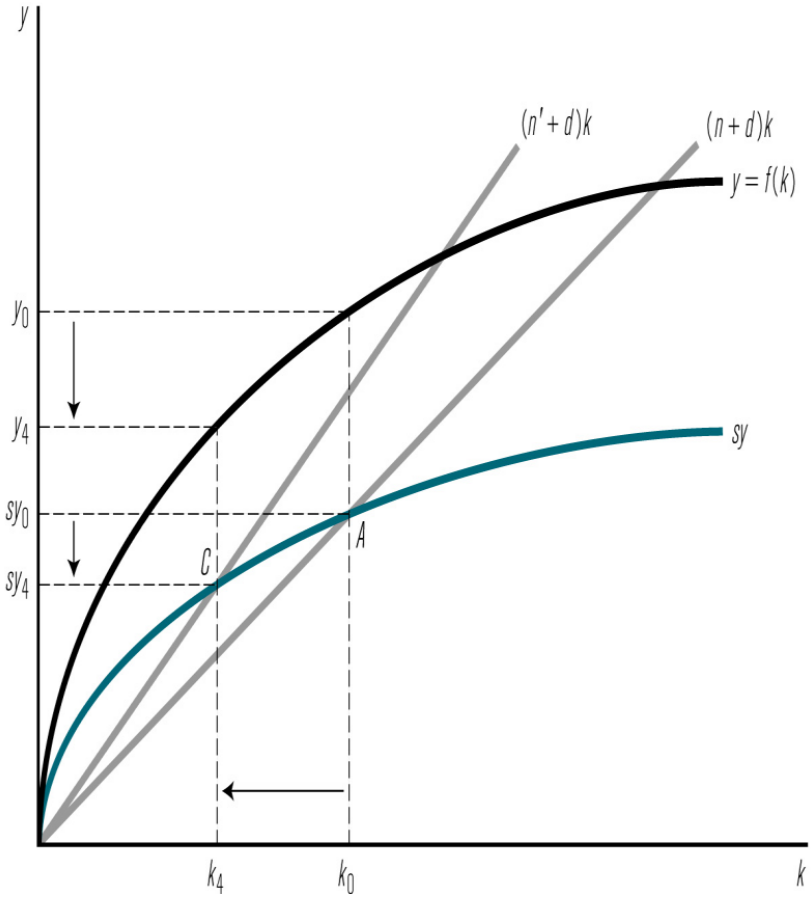



$$y = Ak^{\alpha}$$

$$\Delta k = sy - (n+d)k$$

# Changes in Savings and Population Growth Rates

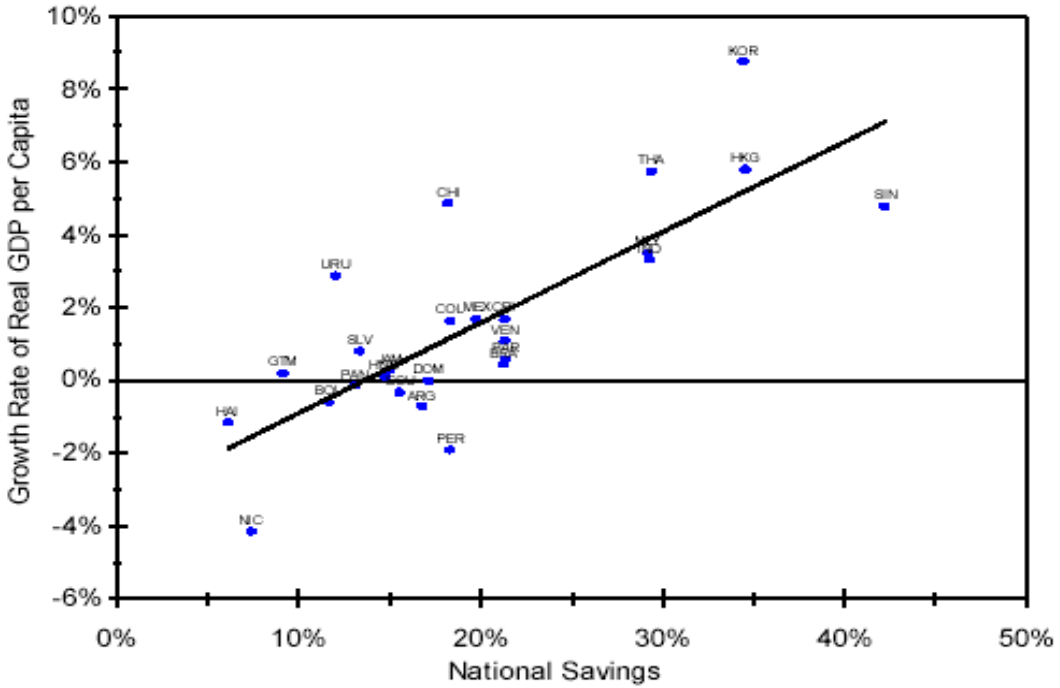



# Growth and Savings may be Related: But can not assign causality

**Saving and Growth, Latin America and E.Asia**

Percent of GDP, 1984-1993




# Solow Conclusions

- Differences in income levels due to:
  - More investment
  - Lower population growth rates
- Differences in sustained growth rates
  - Technological progress (known as Total Factor Productivity)
- Policy Conclusions:
  - Open to foreign investment and mobilise local savings
  - Technology transfer

# Solow Growth Model Convergence

- When economies have the same levels of technology, investment and population growth, those countries that have lower income levels have higher rates of growth compared to higher income level countries.
- Evidence
  - 1870-1990 there was a pattern of convergence among the per capita income growth rates developed "advanced capitalist" countries.
  - The poorest six countries in 1870 that are presently high income countries (Sweden, Canada, Italy, Norway, Finland and Japan) display the fastest national growth rates in the period between 1870-1960.
  - In the same time period the richest five countries have the slowest growth rates.

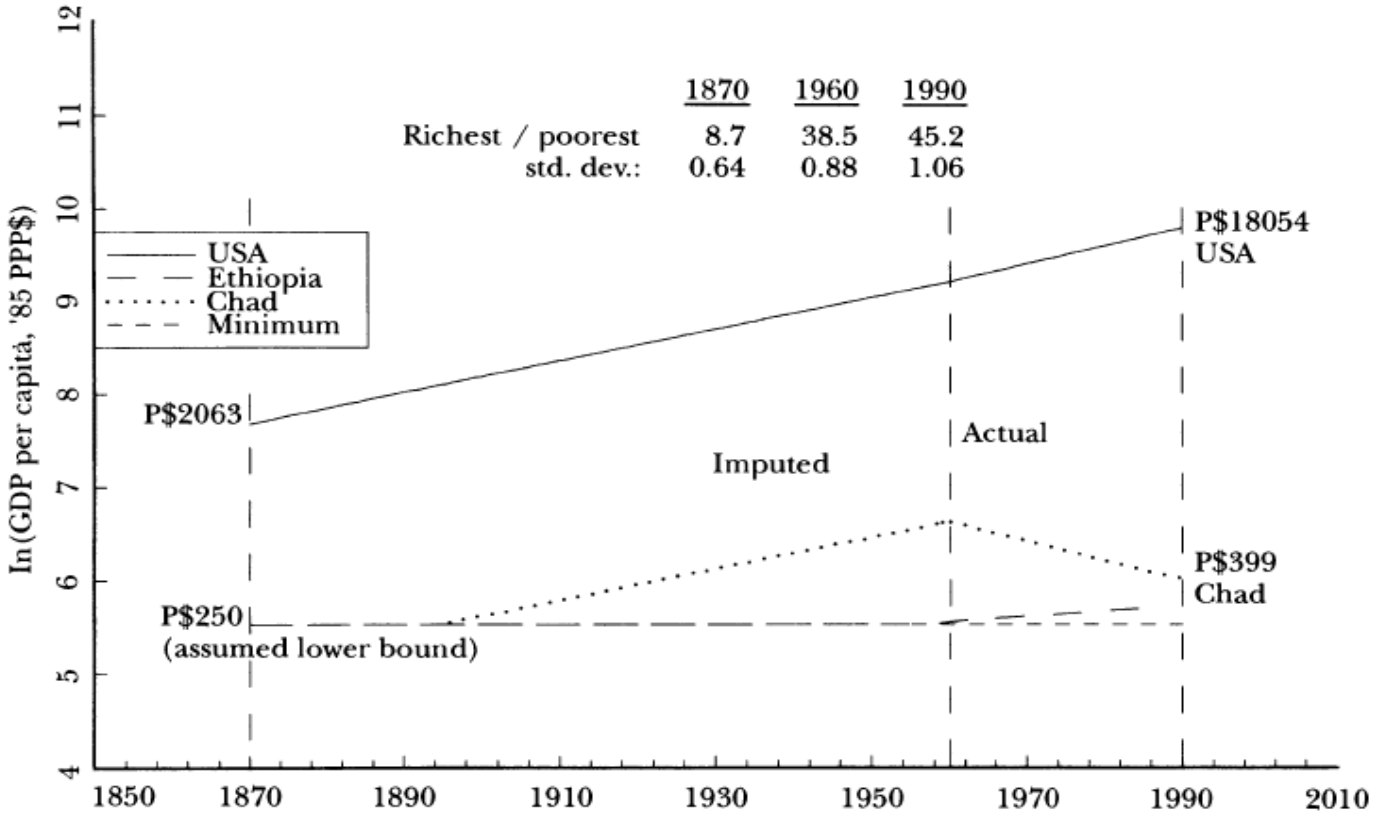
# Pritchett (1997) Includes Estimates for Developing Countries

- Discussion of convergence biased by the availability of historical economic data for set of advanced capitalist countries.
  - Developing countries have been on average growing slower providing evidence for actual divergence in per capita income.
  - Between 1870 and 1990, the ratio of richest to poorest countries' income increased from roughly 9 to 1 to 45 to 1.

# Divergence since 1850

**Simulation of Divergence of Per Capita GDP, 1870–1985**

*(showing only selected countries)*




# Conclusions from Pritchett (1997)

- The growth rates of advanced developed countrieslevels which gives credit to idea of “advantage to backwardness indicate a certain convergence in income”.
- With the larger sample of countries that include lesser developed economies, clear empirical evidence of divergence.
- Acknowledges instances of rapid growth and regional convergence (primarily in East Asia).

# The Hausmann-Rodrik-Velasco Growth Diagnostics Framework

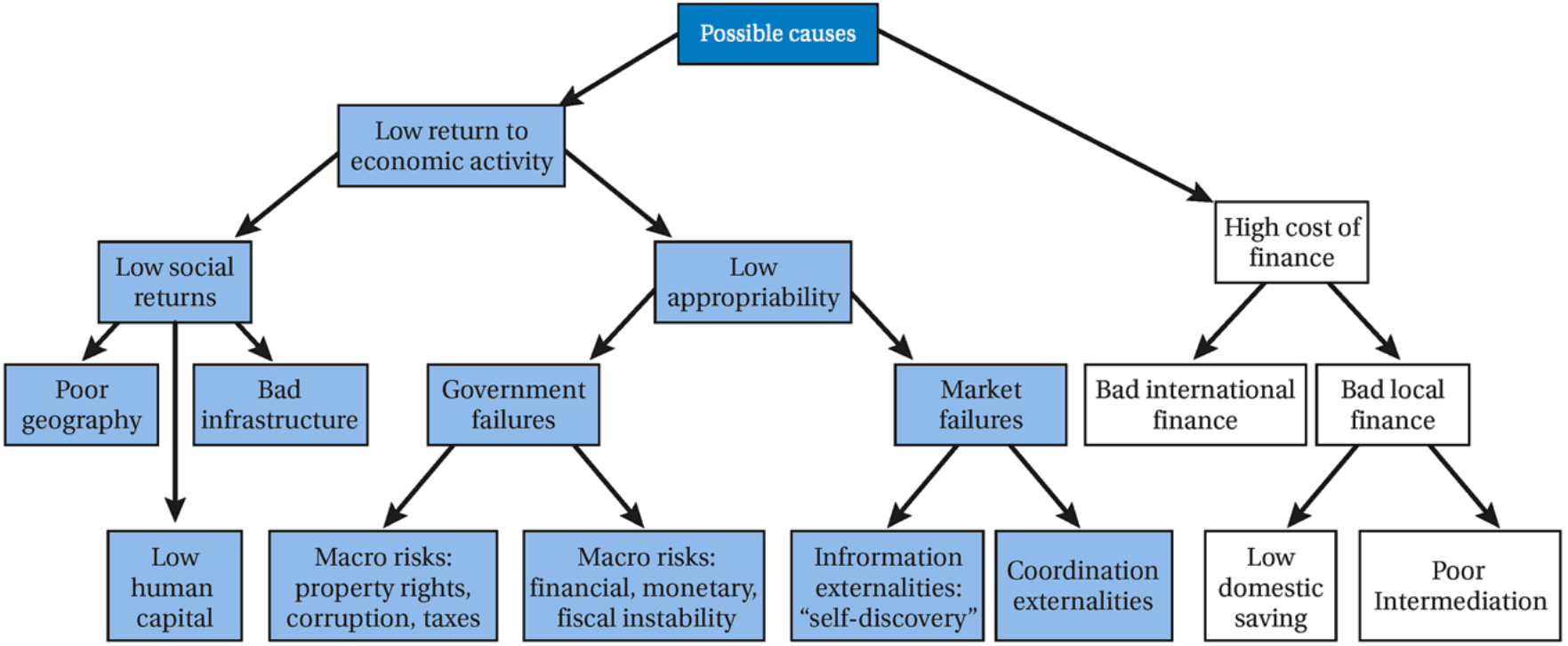
- Focus on a country's most binding constraints on economic growth
- No "one size fits all" in development policy
- Not simple to find the binding constraint.

# Decision

- First Node: Differentiates between
  - stories based on low investment demand (lack of projects) than cay pay a reasonable private return
  - problems associates with the inability to acquire the financial resources to invest.
- Left Side Node:
  - Either social returns are low
  - Proportion of the returns that can be privately appropriated is low

# Hausmann-Rodrik-Velasco Growth Diagnostics Decision Tree

*Problem: Low levels of private investment and entrepreneurship*




*Source:* Ricardo Hausmann, Dani Rodrik, and Andrés Velasco, "Getting the diagnosis right," *Finance and Development* 43 (2006), available at http://www.inf.org/external/pubs/ft/fandd/2006/03/hausmann.htm. Used with permission.

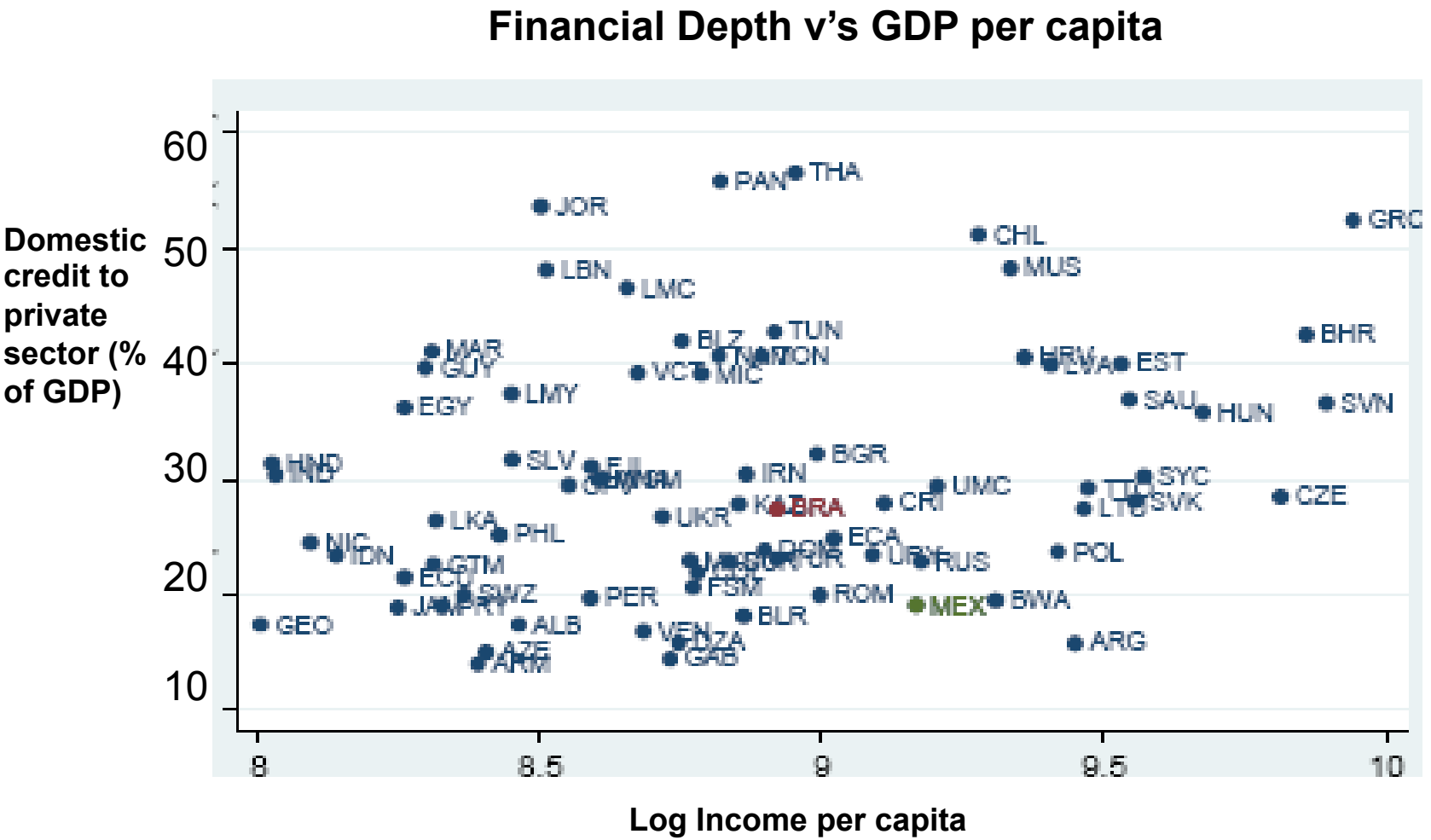
# Definition: Shadow Price

- **Technically** - the change in the objective value of the optimal solution of an optimisation problem obtained by relaxing the constraint by one unit.
- **Intuitively** - if a production line is already operating at its maximum 40 hour limit, the shadow price would be the maximum price (equal to the total benefit) the manager would be willing to pay for operating it for an additional hour.
- **In development** - a shadow price is the total benefit (in social welfare) generated by relaxing a constraint by one unit. Constraints include the level and cost of education, infrastructure, finance as well as the quality of institutions.
- Shadow price provides powerful insights into problems to the decision makers.

# If a Constraint is Binding, then…

1. The (Shadow) price of the constraint is high
   - Can not be calculated directly but can be implied by market prices or indicators of unmet demand.
2. Movements in the constraint should produce significant outcomes
3. Agents in the economy should be attempting to bybass/overcome the constraint
4. Agents less intensive in that constraint should be more likely to survive and thrive and vice versa (animals in the Sahara)

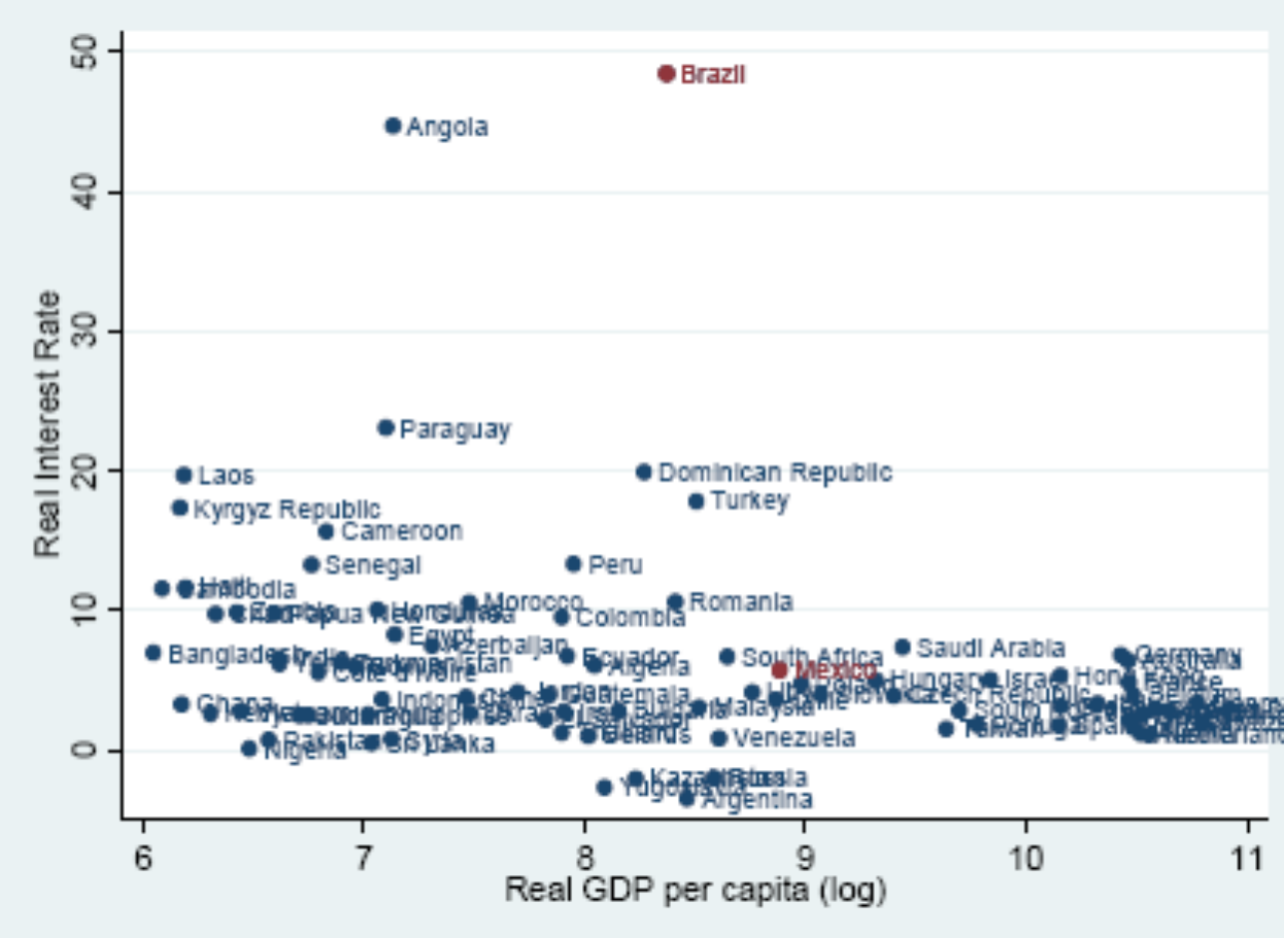
# Example: Finance in Brazil and Mexico




# Further Analysis: Looking at Prices

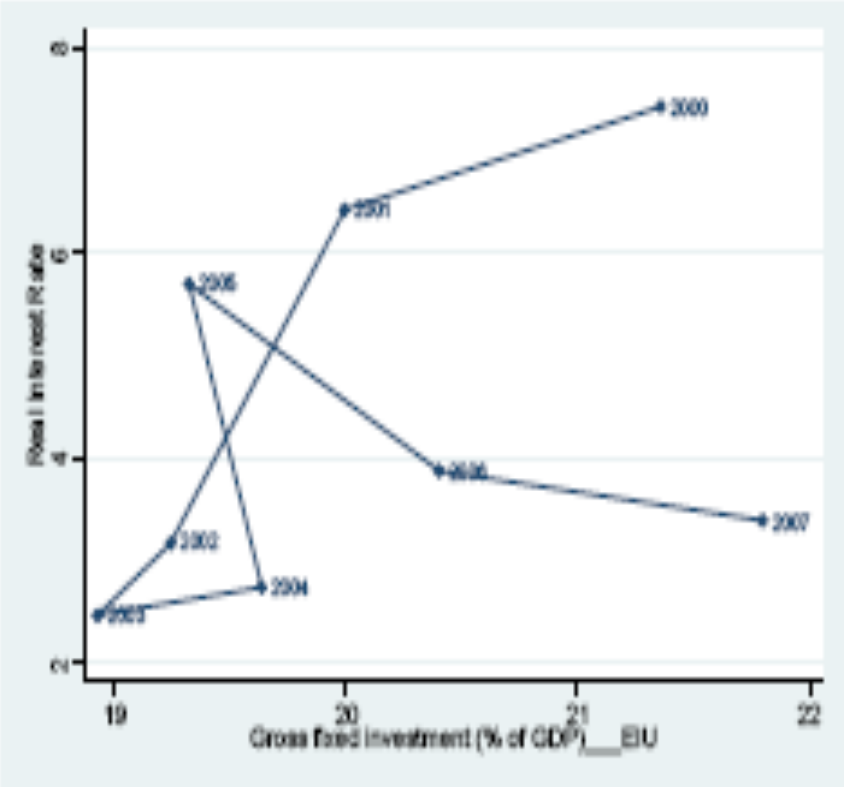
- Suggests that financial depth in Brazil is significantly higher than in Mexico.
- But the quantity of finance supplied in an economy may be low because of low demand.
- First Clue: High price of finance in Brazil
  - Indicates that access to finance might be a binding constraint in Brazil not Mexico.

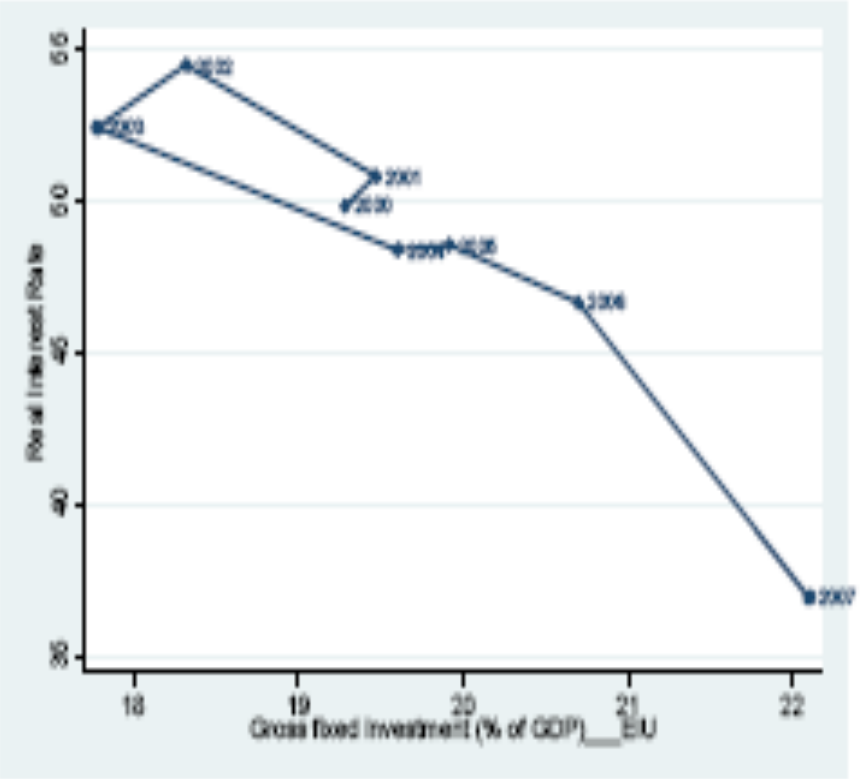
# Real Interest Rates v's Real GDP per capita



# Second Clue: Investment Seems to Respond to Declining Real Interest Rates in Brazil

**Investment vs. Real Interest rates, Mexico (left) and Brazil (right)**




# Examples of Constraints

| If this constraint is binding… | then we might expect to see: |
|---|---|
| Labor market regulations | Higher than normal levels of informal employment |
| Contract enforcement | The emergence of extra-legal contract enforcement mechanisms like trading within social groups or organized mafias enforcing contracts (Dixit 2005) |
| Electricity infrastructure | Many businesses investing in their own generators |
| Crime and security | Large outlays for private security guards |
| Uncertainty of monetary stability | Dollarization, use of inflation indexed contracts. |
| Coordination failures in the discovery of new activities | Vertical integration in new successful business.<br>Efforts for industry groups to share costs in feasibility studies for new sectors and markets |
| Low appropriability due to high taxes | Greater use of cash for business transactions |

# Hausmann-Rodrik-Velasco: Guidelines

1. Moving downwards in the decision tree, rather than upwards or sideways
2. Working off at least an implicit model of what drives (or will drive) growth in the economy
3. Looking for the tell-tale symptoms that a given constraint binds
   - If the constraint is human capital, the skill premium must be rising while returns to complementary factors remain depressed.
4. Looking for clues that the hypothesized constraints are consistent with recent growth experience
   - Did growth boosts occur when those constraints were relaxed?

# Hausmann-Rodrik-Velasco: Guidelines

5. Using firm-level surveys critically, cognisant that complaints do not always accurately identify binding constraints
   - Businesses may complain about access to finance when the real trouble is that they cannot document profitable projects; or respondents may be the established firms that do not represent the most dynamic part of the economy.
6. Locating successful firms or sectors and tracing their success
7. Combining cross-national benchmarking, firm-level surveys, and aggregate macroeconomic data

# Questions?