

Trade and Growth: evidence, debate, convergence....

**Darryl McLeod, Overview Lecture 7
Economic Growth & Development
Econ 6470 Spring 2013**

Is Trade an engine or handmaiden of Growth?

- Evidence of correlation or indirect effects, see Sachs and Warner, Frankel and Romer, 1999, Dollar and Kraay, Edwards
- Rodriguez and Rodrik, 2000, challenge the existing evidence and replicate all regressions, especially those of Sachs & Warner....
- [Warner, 2003](#) and others reply, a consensus of sorts emerges, Rodrik outlines this in a series of papers: EPZs plus weak RER best of both worlds

Gravity Trade model: Frankel and Romer



The Gravity Model in International Trade: Advances and Applications

By Peter A. G. van Bergeijk, Steven Walinger

Search in this book

Go

About this book

My library

My History

Books on Google Play

Terms of Service

 CAMBRIDGE UNIVERSITY PRESS

Page Scanned by permission of Cambridge University Press. Copyright

These early contributions started the first wave of applications in the early 1960s (see for critical discussions of this early literature, Taplin 1967, and Leamer and Stern 1970, chapter 6). Although the model itself can be applied to many phenomena, most applications involved bilateral trade flows and in our discussion we will thus concentrate on trade. The basic form of the gravity equation is as follows:

$$T_{ij} = \frac{GDP_i^{\alpha} GDP_j^{\beta}}{D_{ij}^{\theta}}, \quad (1.1)$$

where: T_{ij} indicates bilateral trade between country i , and j ; GDP_i^{α} indicates the economic size of i , measured by GDP_i , and D_{ij} indicates the bilateral distance between the two countries. The parameters α , β , and θ are often estimated in a log-linear reformulation of the model. This equation explains bilateral trade using economic size and distance: the larger the two trading partners, the larger the trade flows; the larger the distance between the two countries, the smaller bilateral trade. Usually the model explains 70–80 per cent of the variance in bilateral trade flows.

Trade & Growth Readings:

- [Levine and Renelt \(1992\)](#) exports affect investment, not growth and Sala-i-Martin (1997, [I just ran 2 million...](#)) the Sachs Warner openness (SWO) index is the most robust correlate of growth... after millions of tests and survives [Rodriguez and Rodrik \(2000\)](#) replications, see replies by [Warner \(2003\)](#) and [Wacziarg and Welch \(2008\)](#) who update the SWO index, it still works though not perfectly.... [Dollar and Kraay \(2004\)](#) and [Estevadeordal and Taylor, 2008](#). address problems identified by [Rodriguez and Rodrik \(2000\)](#) In his growth strategies paper, Rodrik admits EPZs and RERs seem to help Chile and China (for RERs see the [USDA ERS Macro database](#)). Proximity and size provide classic instruments for trade and growth as in Frankel, J. A., & Romer, D. (1999). Does trade cause growth?. [American economic review](#), 89, 379-399.

Absolute beta convergence in the U.S.

[see Barro and Sala-i-Martin, 2004 page 47 Chapter 1](#)

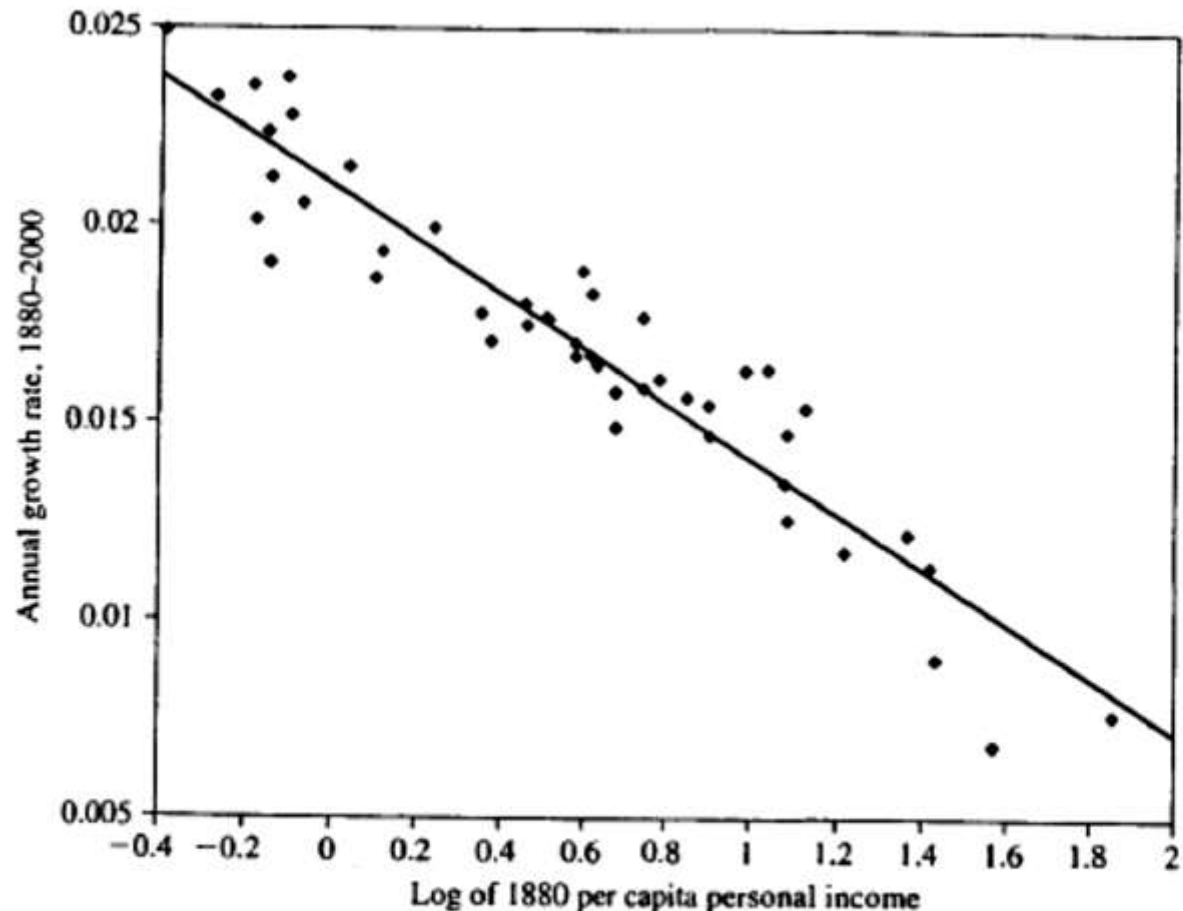
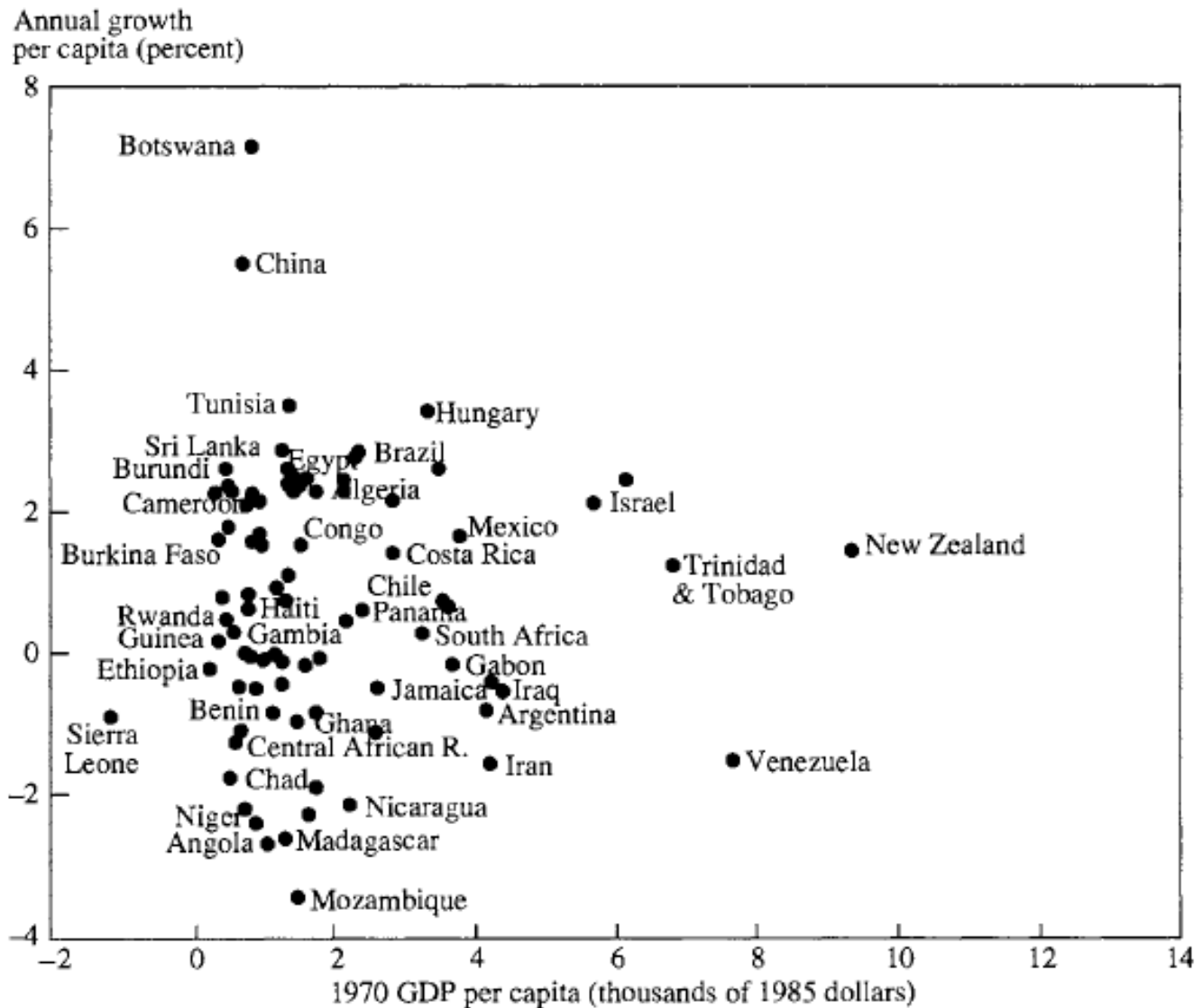


Figure 1.9

Convergence of personal income across U.S. states: 1880 personal income and income growth from 1880 to 2000. The relation between the growth rate of per capita personal income from 1880 to 2000 (shown on the vertical axis) is negatively related to the level of per capita income in 1880 (shown on the horizontal axis). Thus absolute convergence holds for the states of the United States.

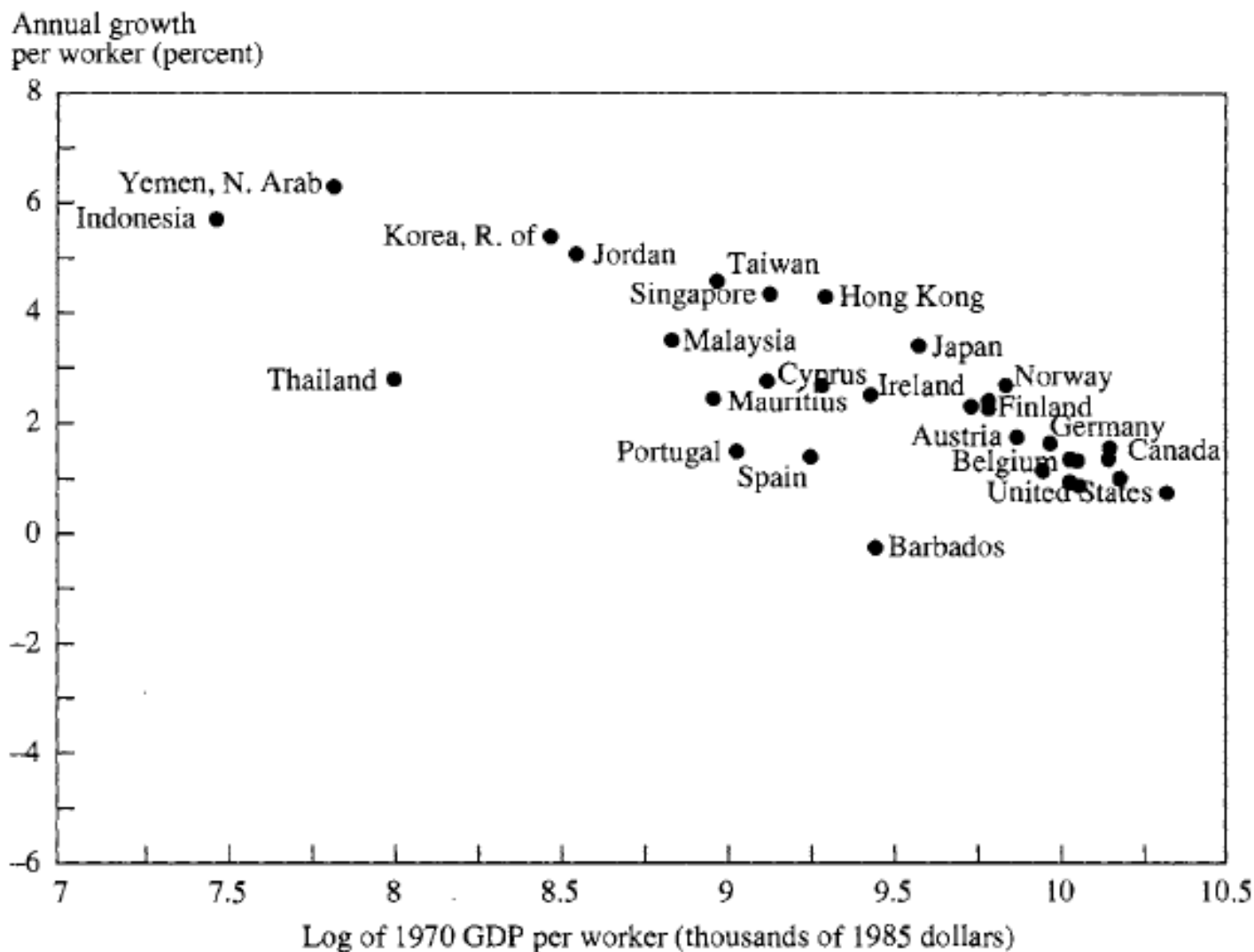
Figure 5. Growth and Initial Income, Closed Economies, 1970–89



Source: Authors' calculations using version 5.5 of the data in Summers and Heston (1991) and World Bank (1994d).

Convergence can be seen unless it is conditional on something

Figure 6. Growth Per Worker and Initial GDP Per Worker, Open Economies, 1970–85



Source: Authors' calculations using versions 5 and 5.5 of the data in Summers and Heston (1991).

Convergence
across
countries rare
conditional on
something...
Sachs-Warner
"openess"

Lack of absolute beta convergence

[see Barro and Sala-i-Martin, 2004 page 45 Chapter 1](#)

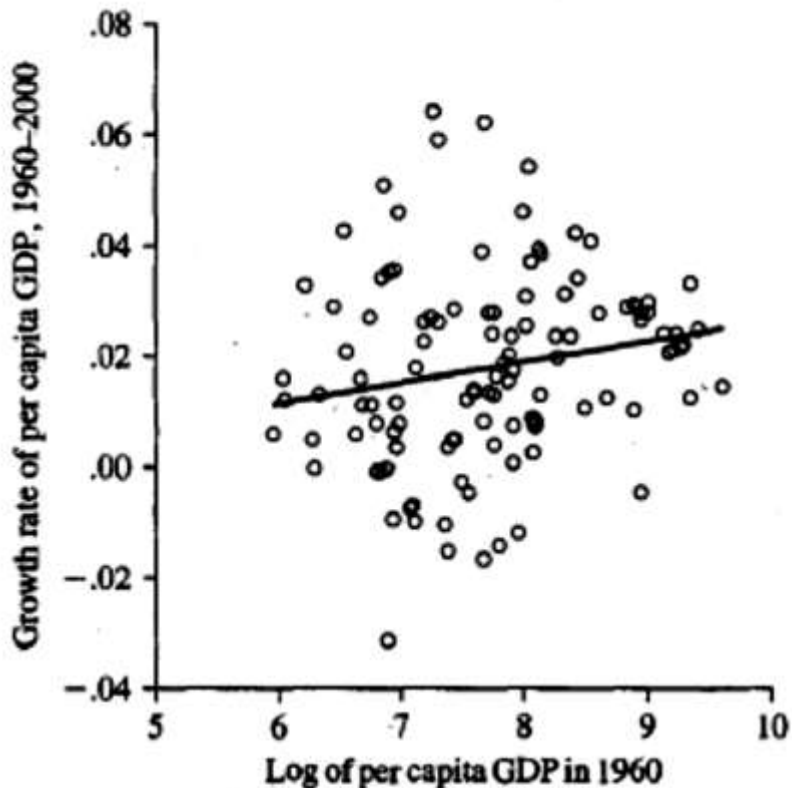


Figure 1.7

Convergence of GDP across countries: Growth rate versus initial level of real per capita GDP for 114 countries. For a sample of 114 countries, the average growth rate of GDP per capita from 1960 to 2000 (shown on the vertical axis) has little relation with the 1960 level of real per capita GDP (shown on the horizontal axis). The relation is actually slightly positive. Hence, absolute convergence does not apply for a broad cross section of countries.

Absolute beta convergence on OECD

[see Barro and Sala-i-Martin, 2004 page 46 Chapter 1](#)

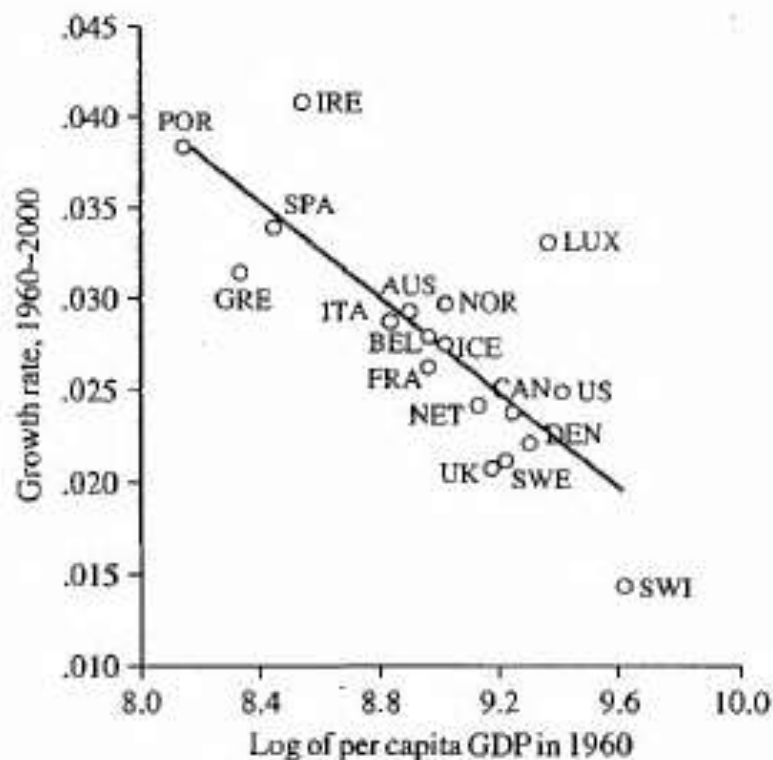


Figure 1.8

Convergence of GDP across OECD countries: Growth rate versus initial level of real per capita GDP for 18 OECD countries. If the sample is limited to 18 original OECD countries (from 1961), the average growth rate of real per capita GDP from 1960 to 2000 is negatively related to the 1960 level of real per capita GDP. Hence, absolute convergence applies for these OECD countries.

Hybrid model #3 CES production function Solow model as $\psi \rightarrow \infty$ (looks just like Sobelo model)

[see Barro and Sala-i-Martin, 2004 page 69 Chapter 1](#)

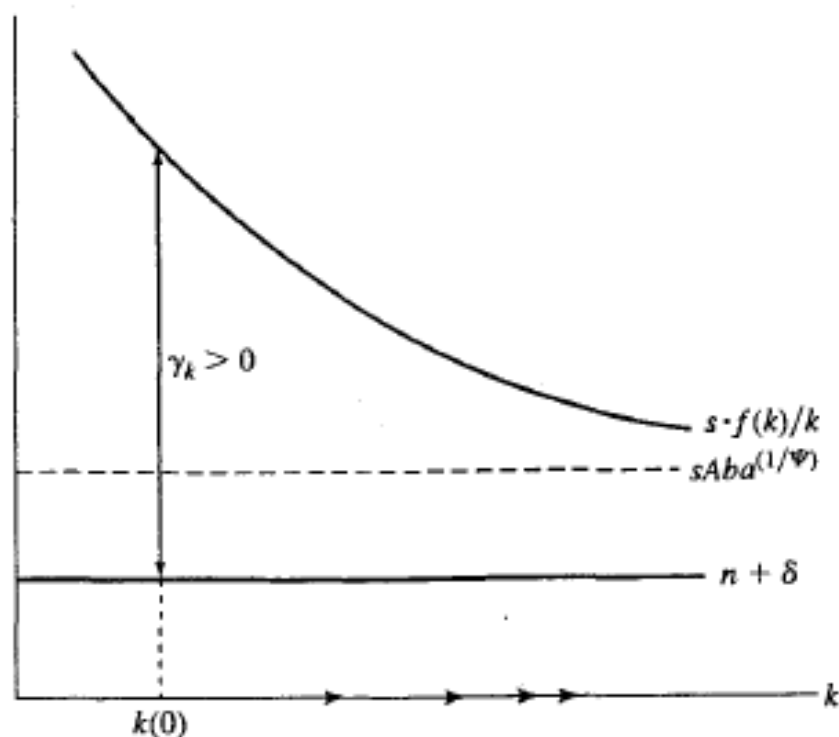


Figure 1.14

The CES model with $0 < \psi < 1$ and $sAb \cdot a^{1/\psi} > n + \delta$. If the CES technology exhibits a high elasticity of substitution ($0 < \psi < 1$), endogenous growth arises if the parameters satisfy the inequality $sAb \cdot a^{1/\psi} > n + \delta$. Along the transition, the growth rate of k diminishes.

RMG factories have higher fixed costs leading to increasing returns

- Home production (H is formal education):

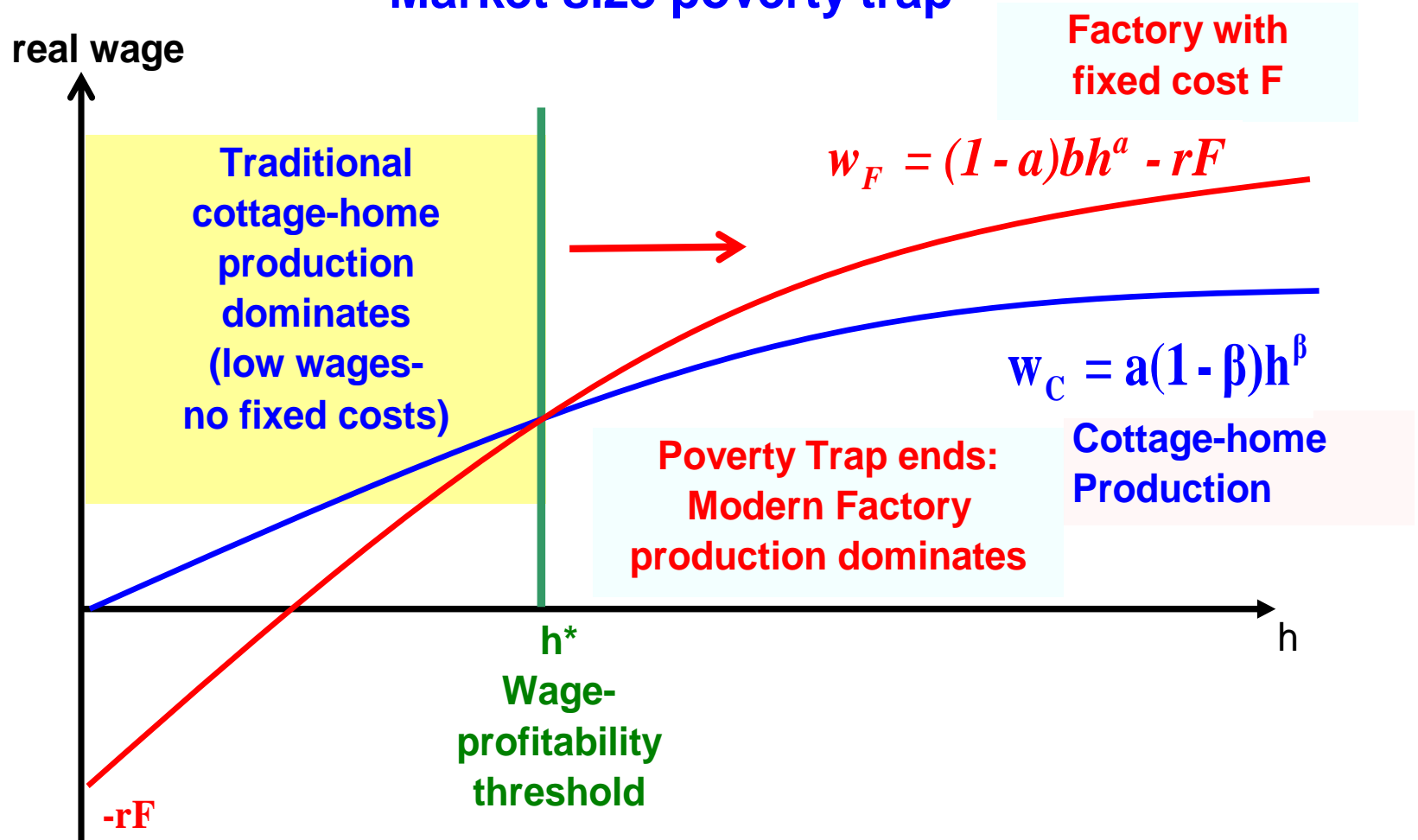
$$Q_T = aH^\alpha L^{1-\alpha}$$

- Factory production: (F is fixed cost)

$$Q_T^F = F + bH^\alpha L^{1-\alpha}$$

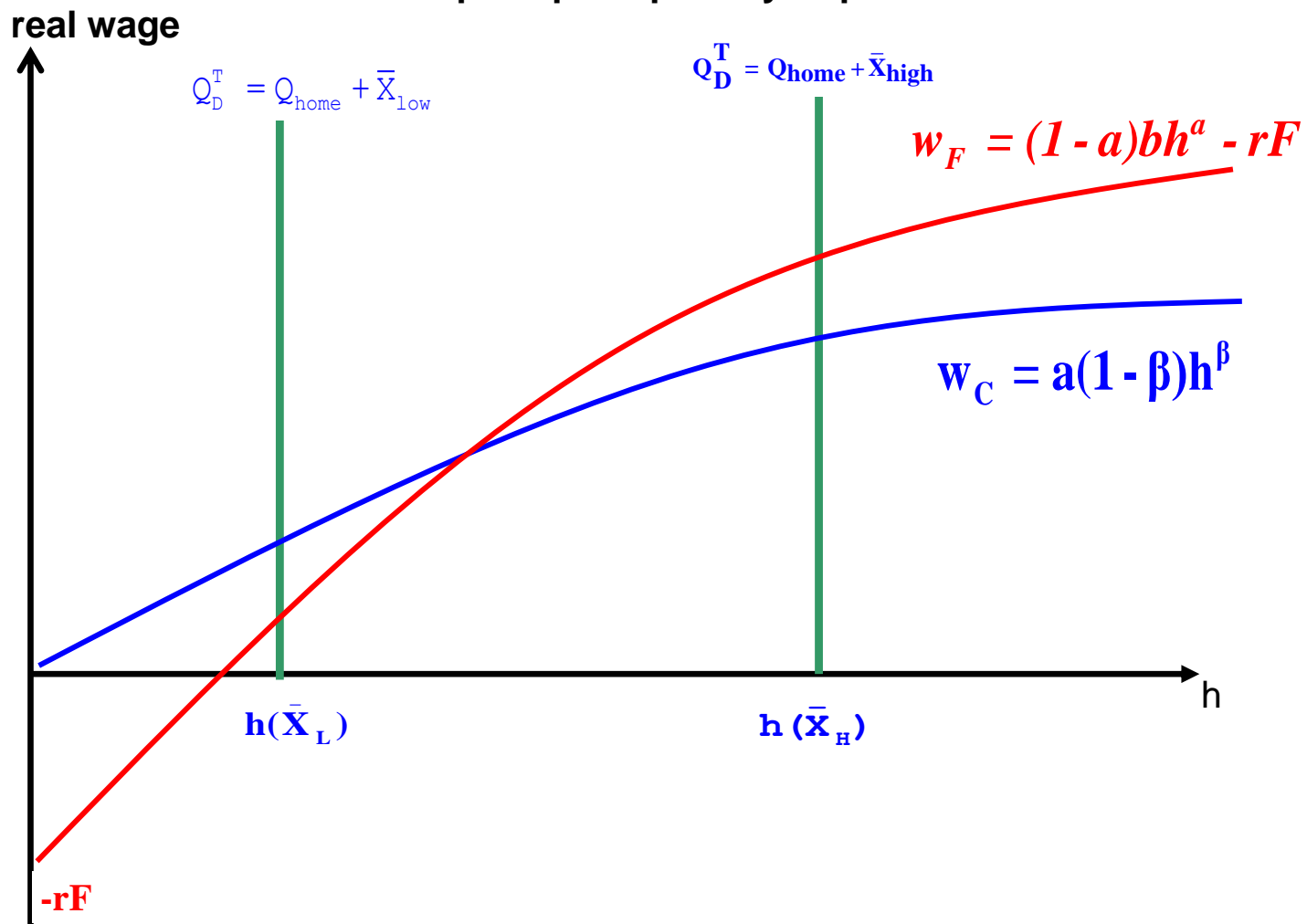
- Key assumption: b much larger than a so real wages higher .

Figure 8
Market size poverty trap



Additional MFA quotas ends poverty trap, allows factories to pay higher wages than traditional firms

Figure 7
An export quota poverty trap



S-shaped Poverty Trap with increasing then decreasing returns create two steady states, k^* low and k^* high (not growth rate the same at both, a typo?) [BSIM Ch 1p, 76](#)

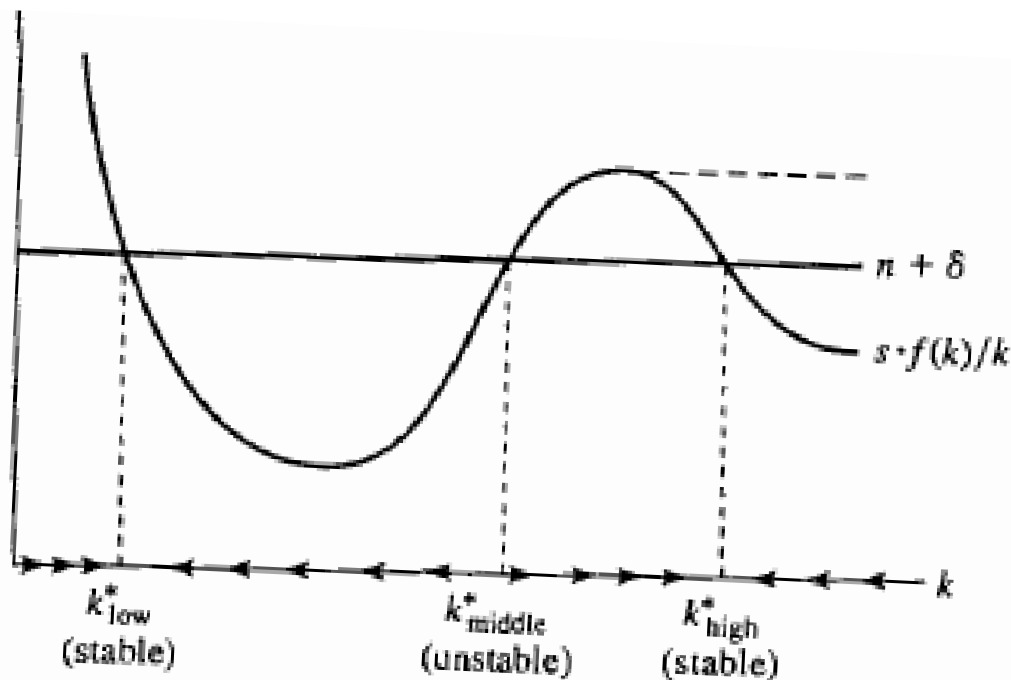
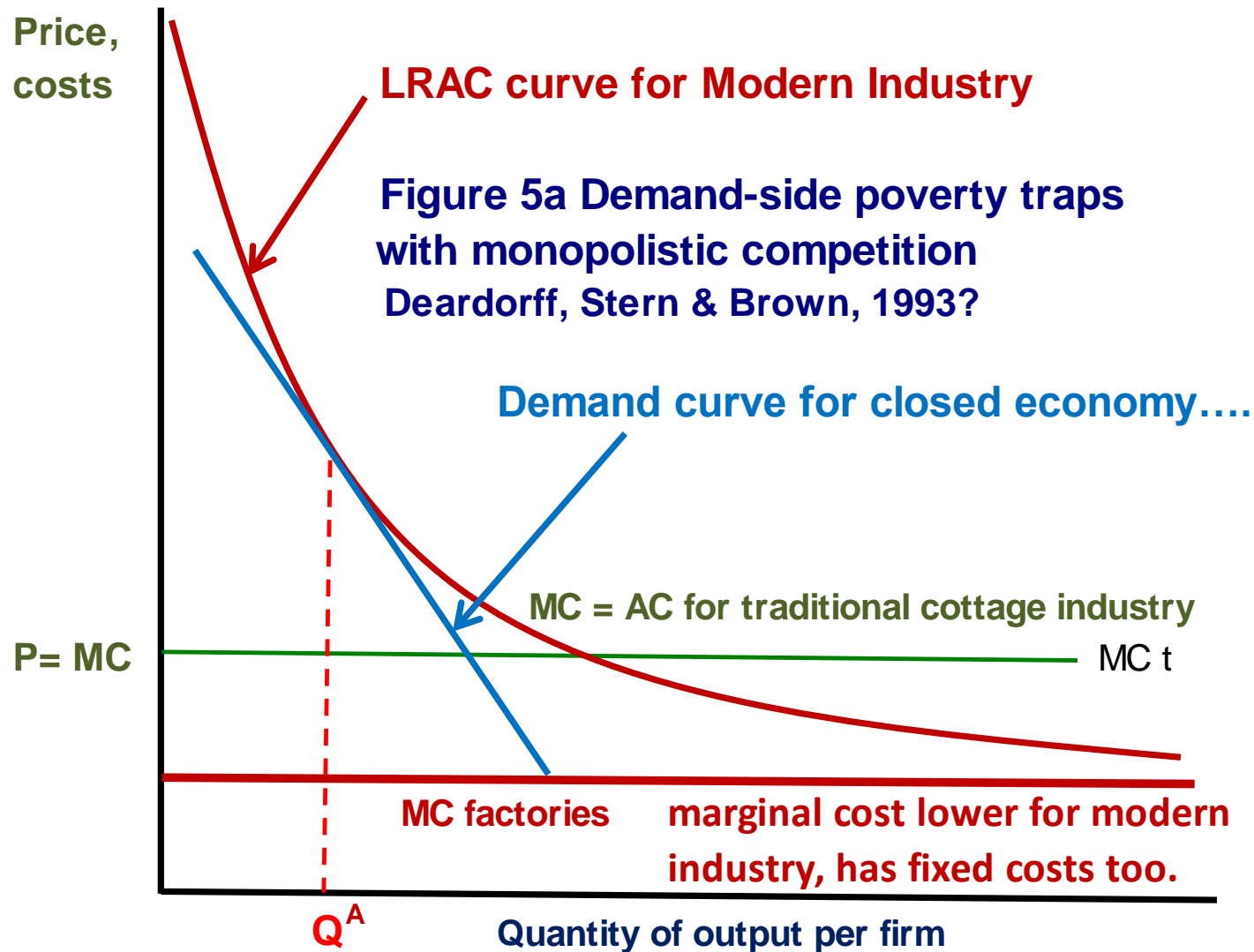


Figure 1.19

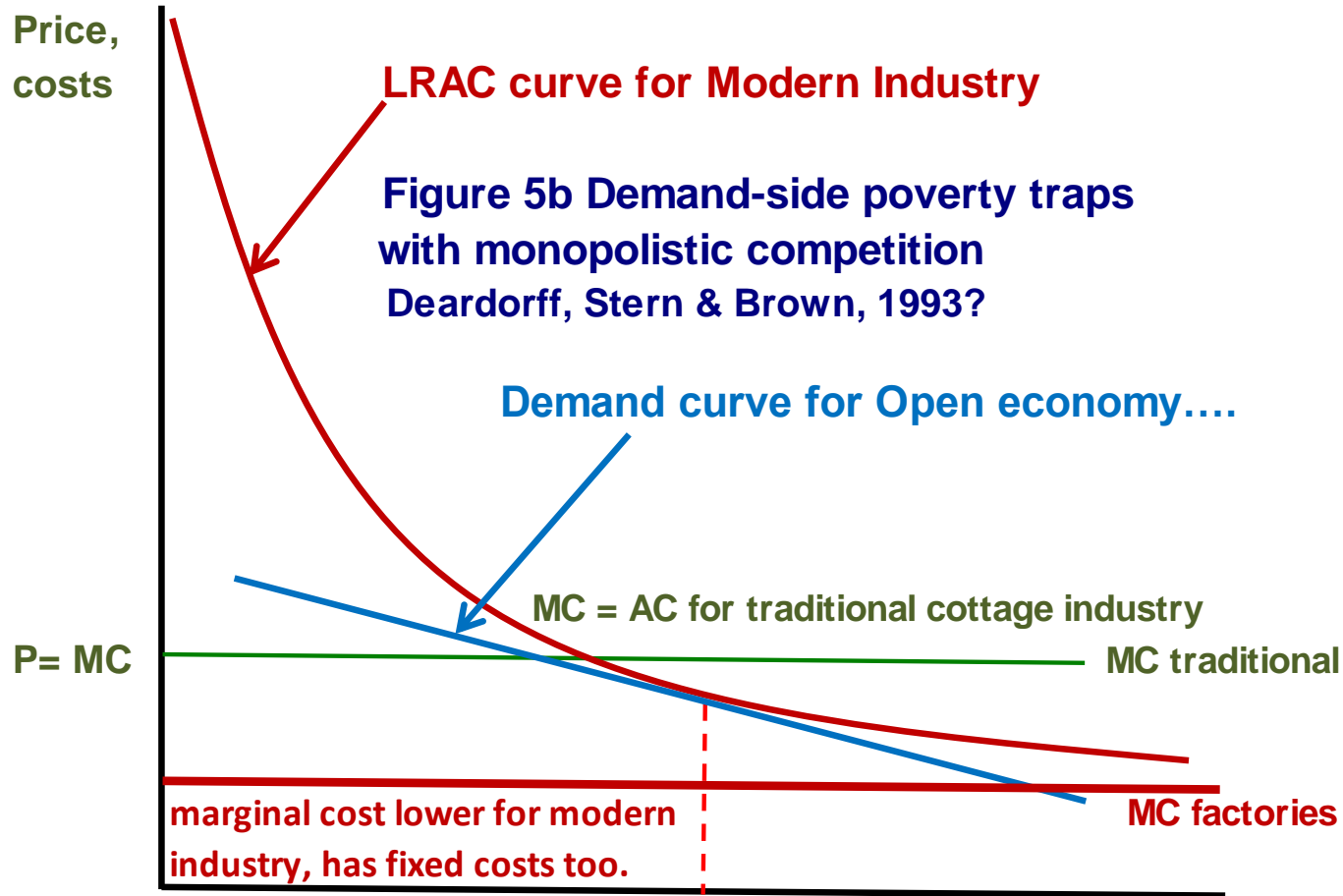
A poverty trap. The production function is assumed to exhibit diminishing returns to k when k is low, increasing returns for a middle range of k , and either constant or diminishing returns when k is high. The curve $s \cdot f(k)/k$ is therefore downward sloping for low values of k , upward sloping for an intermediate range of k , and downward sloping or horizontal for high values of k . The steady-state value k_{low}^* is stable and therefore constitutes a poverty trap for countries that begin with k between 0 and k_{middle}^* . If a country begins with $k > k_{middle}^*$, it converges to k_{high}^* if diminishing returns to k ultimately set in. If the returns to capital are constant at high values of k , as depicted by the dashed portion of the curve, the country converges to a positive long-run growth rate of k .

Demand side Poverty Trap Figure 5a



With inelastic demand, modern firms cannot compete (unless they outlaw competition-- perhaps with import tariffs or quotas + barriers to entry, expensive & hard to get business licenses or import permits)

Demand side Poverty Trap Figure 5b



Quantity of output per firm Q^{FT} Quantity of output per firm

With more elastic demand in open economy, modern firms can compete, but average firm size increases and productivity grows reducing employment (perhaps) and making traditional firms uncompetitive, but costs fall and productivity of those still employed, average firm size after free trade is larger, economies of scale cover fixed and lower LRAC as traditional no fixed cost firms exit.

**Closed
economy
demand side
poverty Traps:
evidence from**

Hsieh, Chang-Tai,
and Peter J.
Klenow. 2010.
"Development
Accounting."
*American
Economic Journal:
Macroeconomics*,
2(1): 207-23, page
221, Figure 9

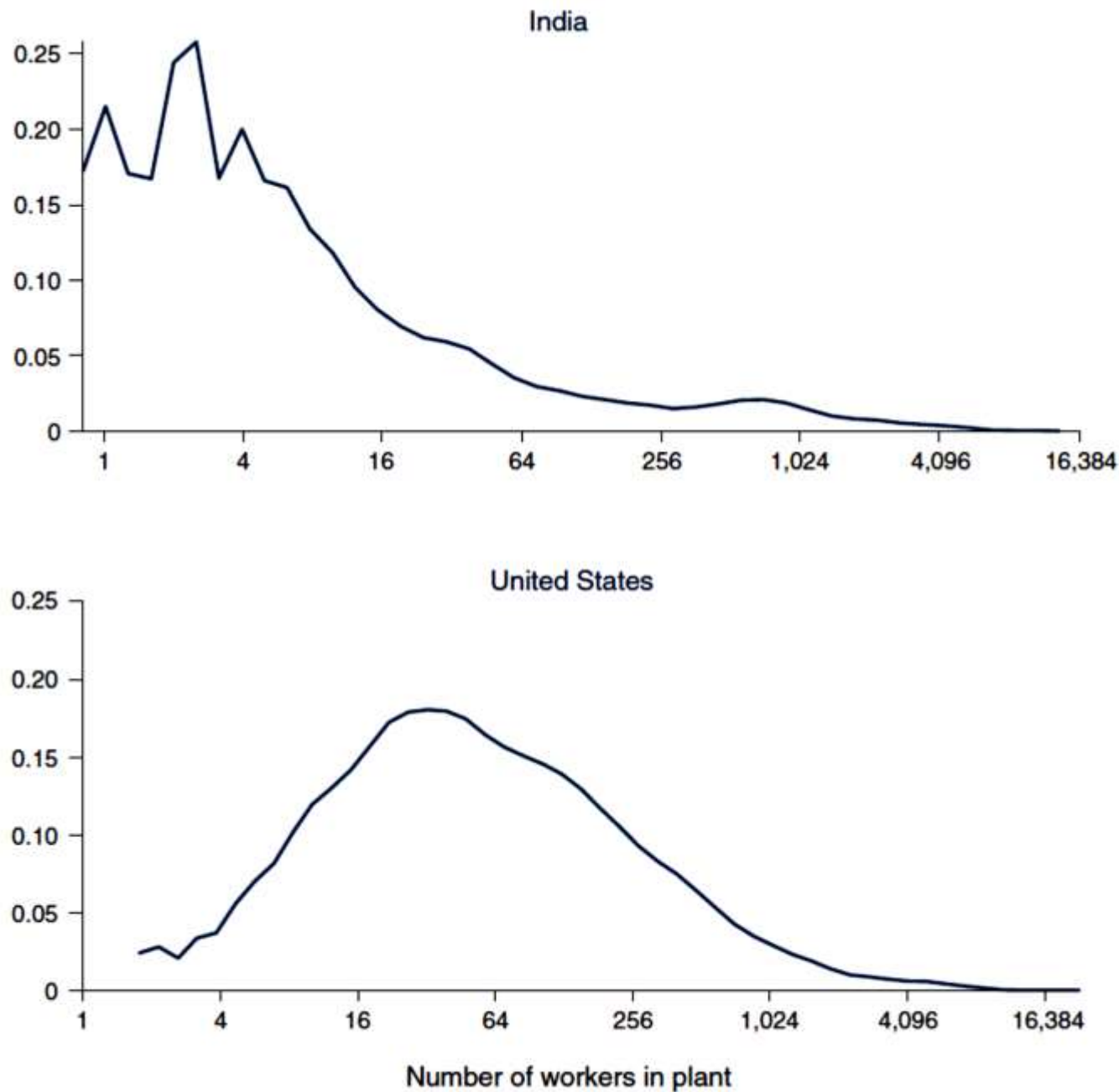


FIGURE 9. DISTRIBUTION OF PLANT SIZE, INDIA VERSUS THE UNITED STATES

Lack of absolute beta convergence

[see Barro and Sala-i-Martin, 2004 page 45 Chapter 1](#)

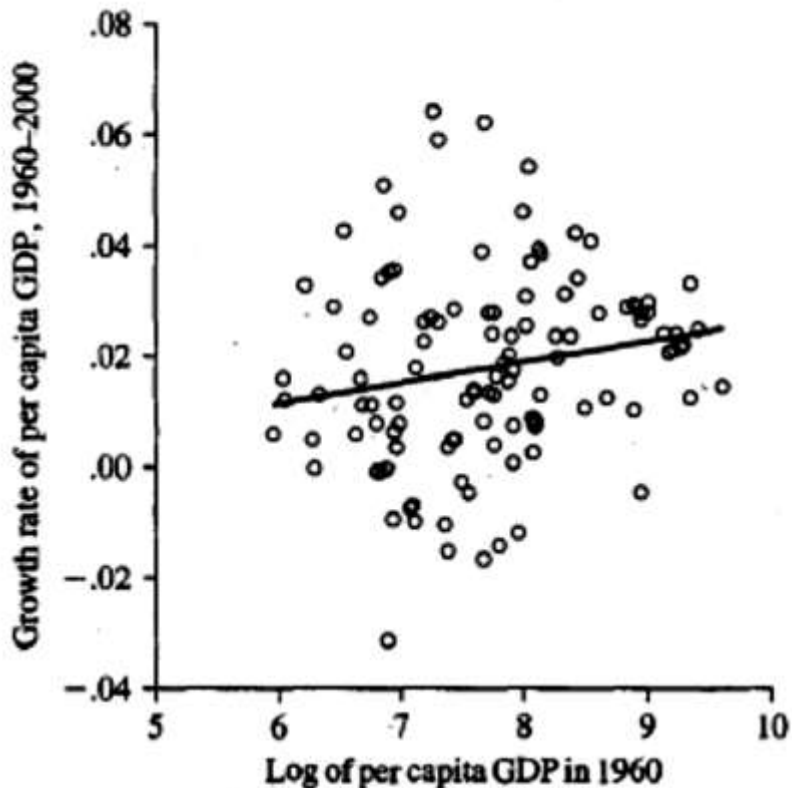


Figure 1.7

Convergence of GDP across countries: Growth rate versus initial level of real per capita GDP for 114 countries. For a sample of 114 countries, the average growth rate of GDP per capita from 1960 to 2000 (shown on the vertical axis) has little relation with the 1960 level of real per capita GDP (shown on the horizontal axis). The relation is actually slightly positive. Hence, absolute convergence does not apply for a broad cross section of countries.

Absolute beta convergence on OECD

[see Barro and Sala-i-Martin, 2004 page 46 Chapter 1](#)

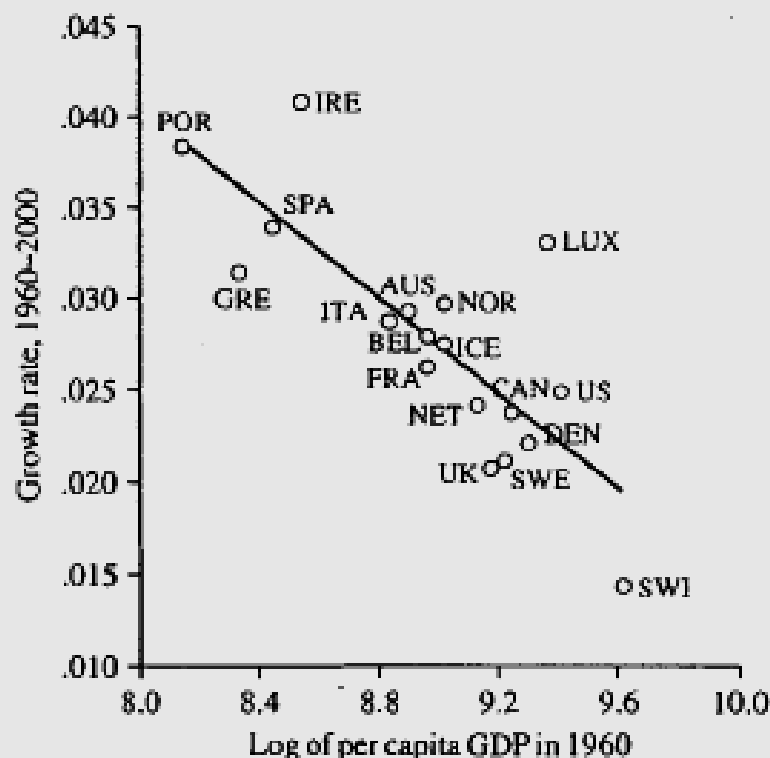


Figure 1.8

Convergence of GDP across OECD countries: Growth rate versus initial level of real per capita GDP for 18 OECD countries. If the sample is limited to 18 original OECD countries (from 1961), the average growth rate of real per capita GDP from 1960 to 2000 is negatively related to the 1960 level of real per capita GDP. Hence, absolute convergence applies for these OECD countries.

Absolute beta convergence in the U.S.

[see Barro and Sala-i-Martin, 2004 page 47 Chapter 1](#)

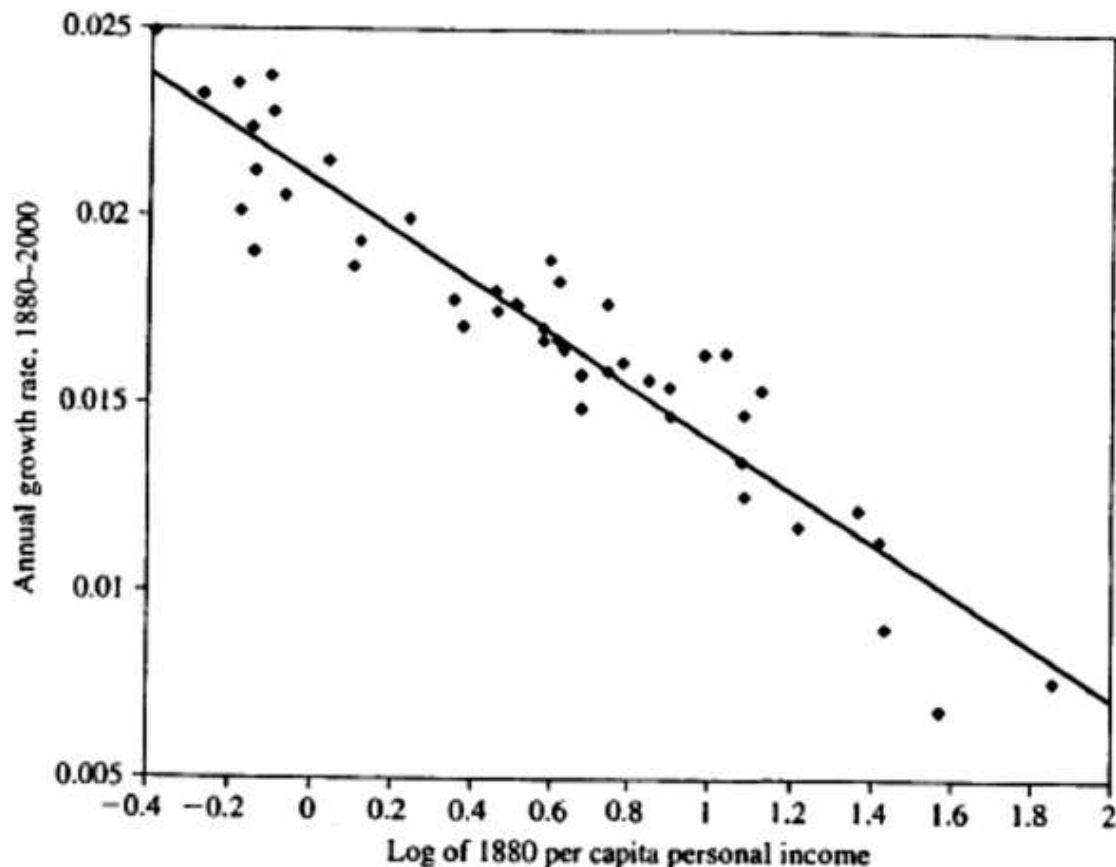


Figure 1.9

Convergence of personal income across U.S. states: 1880 personal income and income growth from 1880 to 2000. The relation between the growth rate of per capita personal income from 1880 to 2000 (shown on the vertical axis) is negatively related to the level of per capita income in 1880 (shown on the horizontal axis). Thus absolute convergence holds for the states of the United States.

