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Long-Term Investors Club
Venice Forum

Towards a Sustainable Future: The Role of Long-Term Investment

Thursday 28 October and Friday 29 October 2010
Venice, Island of San Clemente

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"Long-Term Investment And Technological Progress"

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"Towards Sustainable Future:
The Role of Long Term Investment"
Venice
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Facts and Puzzles

- In the last two hundred years, 1820 – 2010, the world has experienced unparalleled economic growth.
- Global output per capita grew 10 fold.
- But income gaps between countries also grew significantly.
- While income in the West was 2 times that in Africa and Asia, the gaps are now at the order of 10 and more.

International Differences

- We know that technology played a significant role in global economic growth over time.
- We also know that we cannot explain the large differences between countries by investment, in physical capital and in human capital, alone (only 40%).
- Can technologies differ so much across countries?
- What are the barriers to technology adoption? Don’t innovators want to sell more of their patents?

On Modeling Technology

- The following assumption helps to better understand technology adoption.
- Most new technologies are embodied in machines that replace workers in specific jobs.
- Thus, innovations reduce the cost of labor, but at the cost of purchasing machines, namely increasing the cost of capital.
- As a result, technology adoption depends on factor prices, on wages, and on the price of investment.

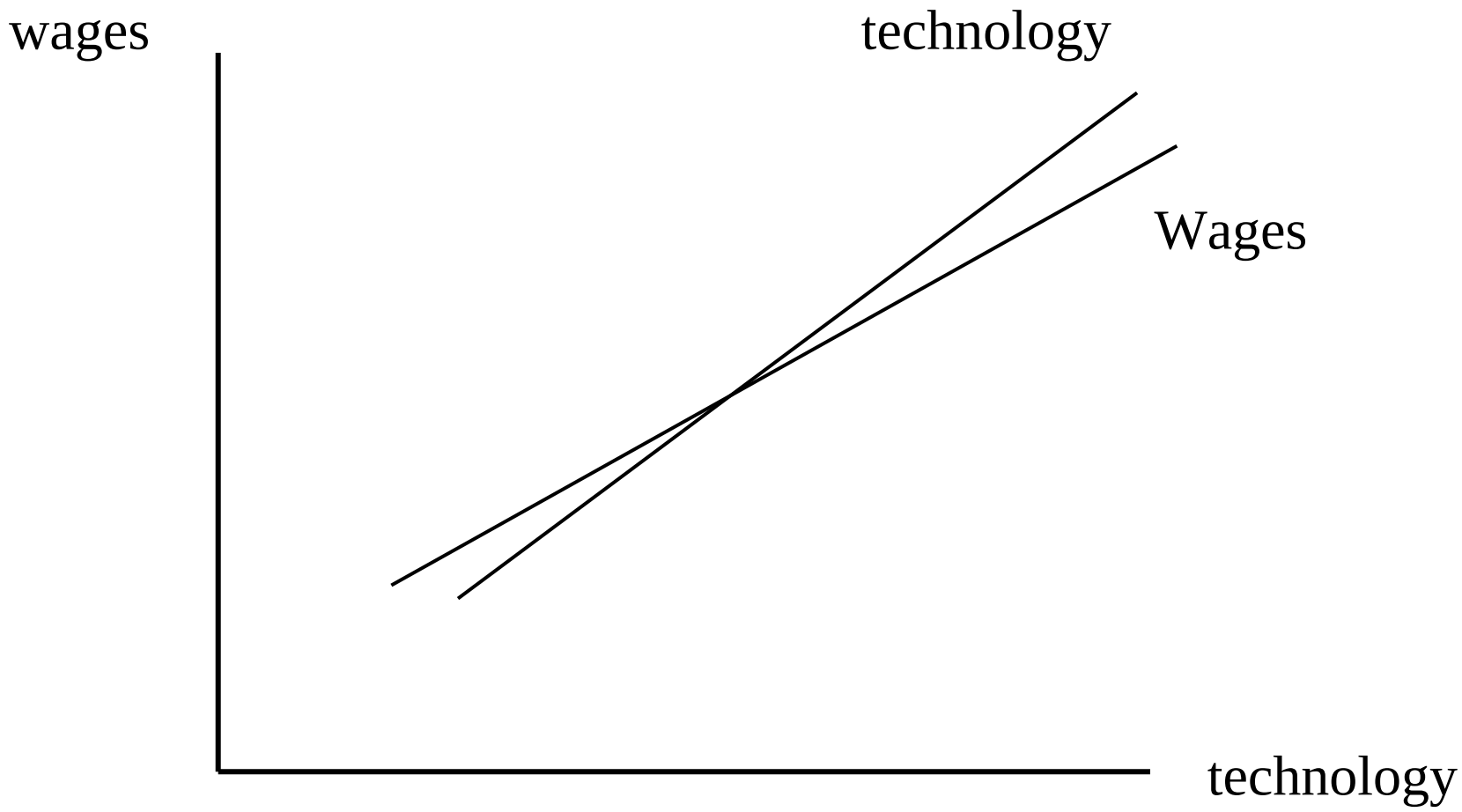
High Wages and Technical Change

- This assumption has a number of important implications.
- First, high wages provide an incentive to adopt more technologies.
- For example, an electric dishwasher will be purchased in a country with high wages, but not in a country with low wages, where manual dishwashing is less expensive.
- Hence, high wages increase technology adoption.

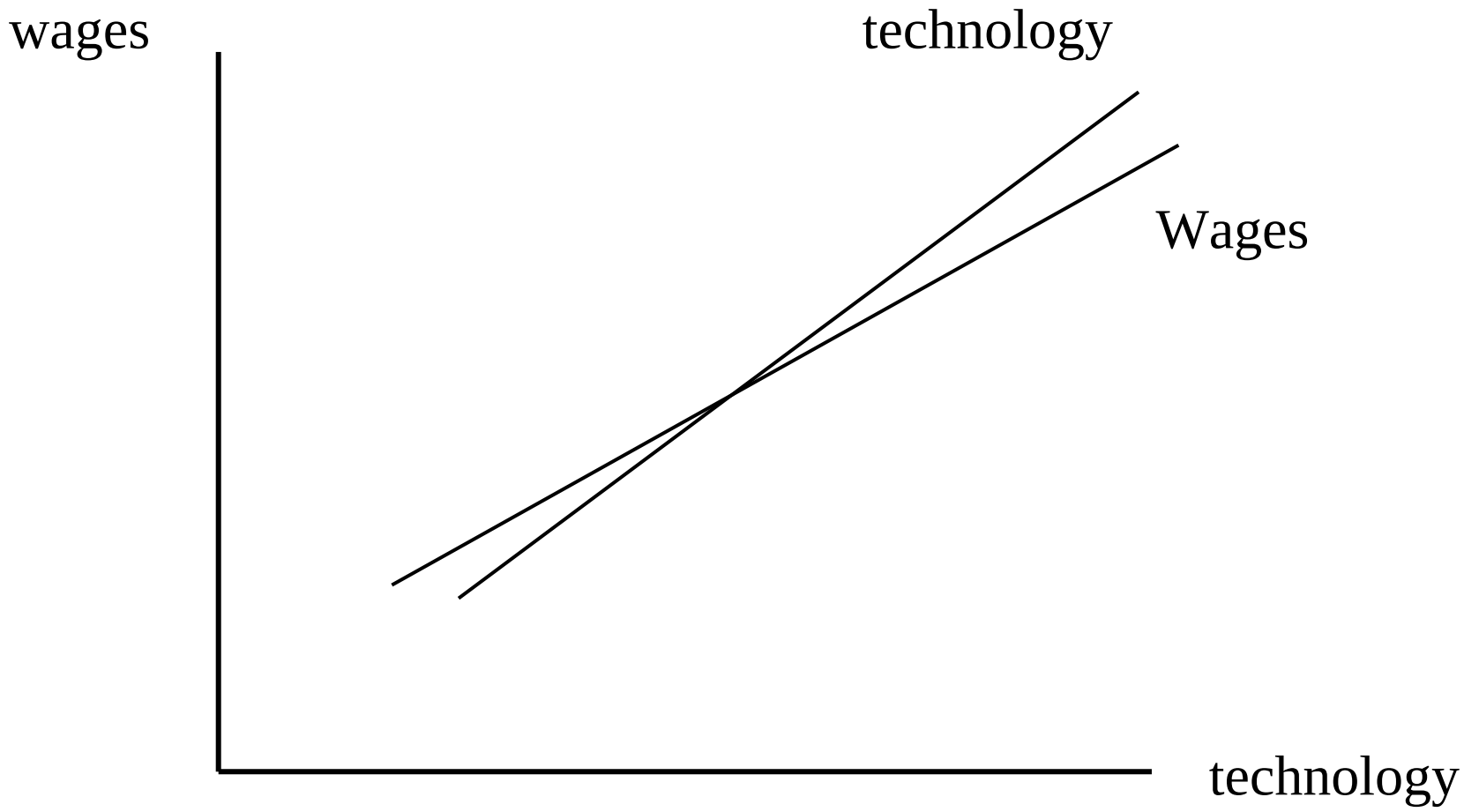
The Feedback Effect

- But technical change affects wages as well.
- As more production is done by machinery, workers concentrate in a smaller number of tasks and produce it more productively.
- Hence technology adoption raises wages.
- This feedback between technology and wages leads to high sensitivity of both to exogenous changes.

Equilibrium



Improvement in Infrastructure



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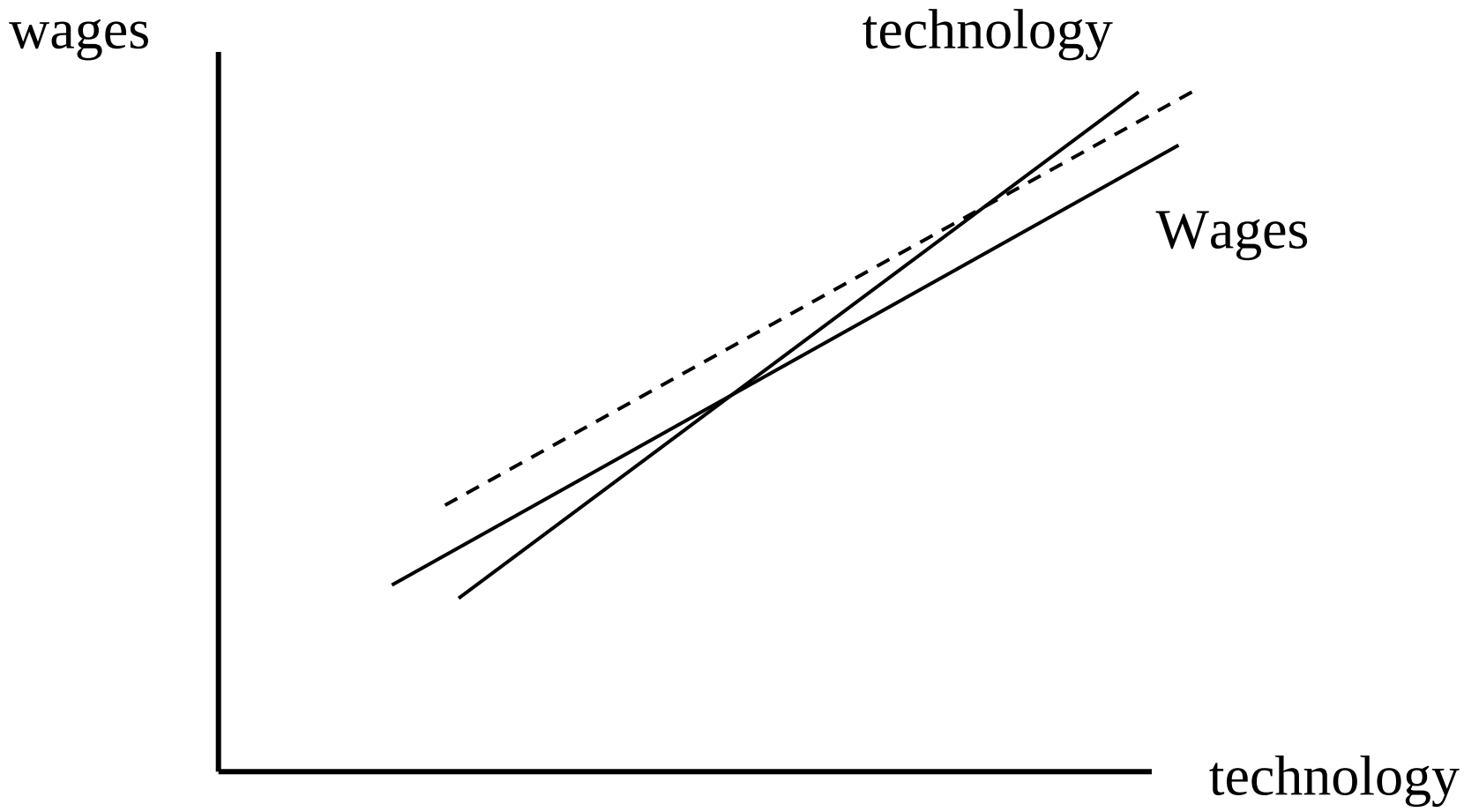
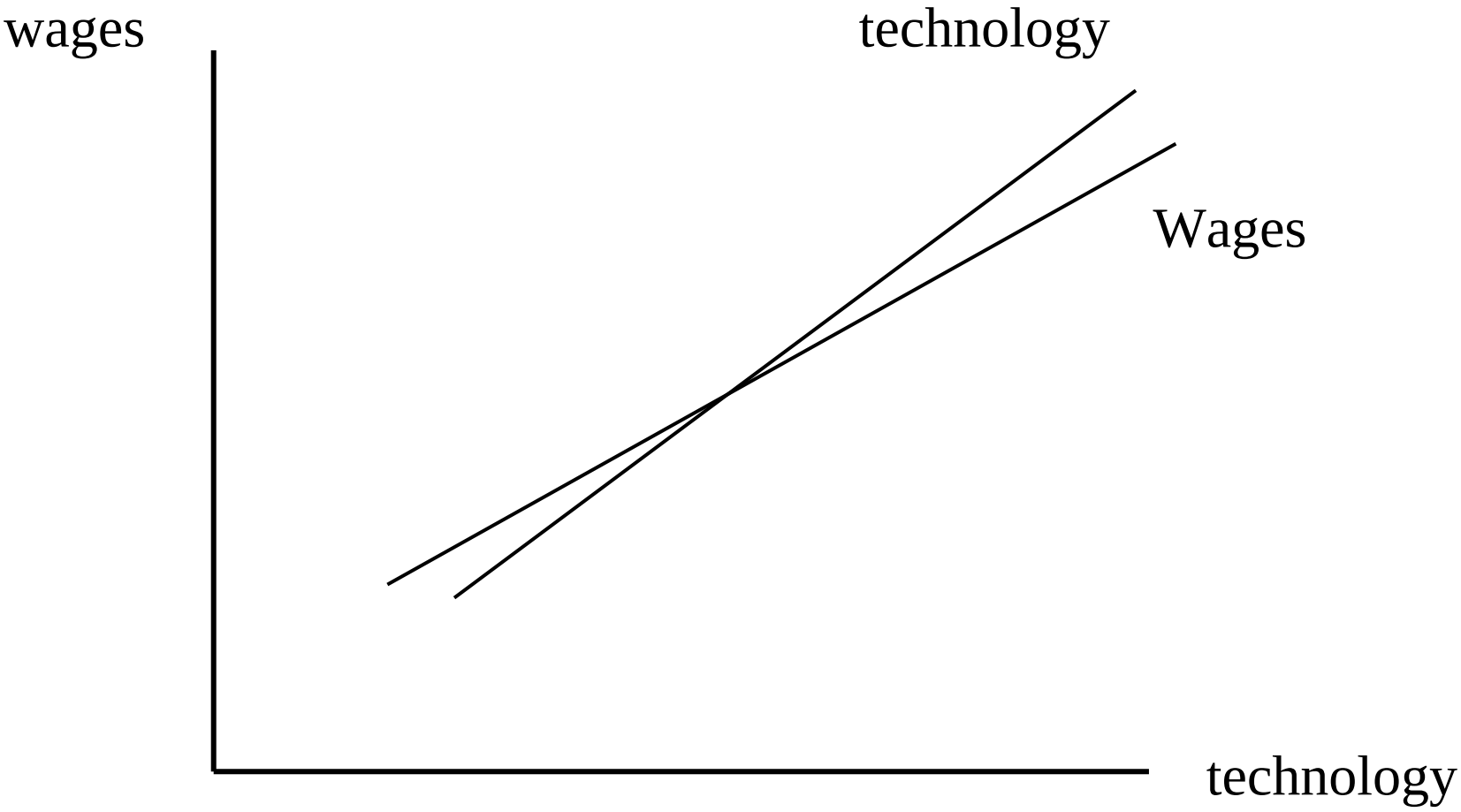


Reduction of the Cost of Investment



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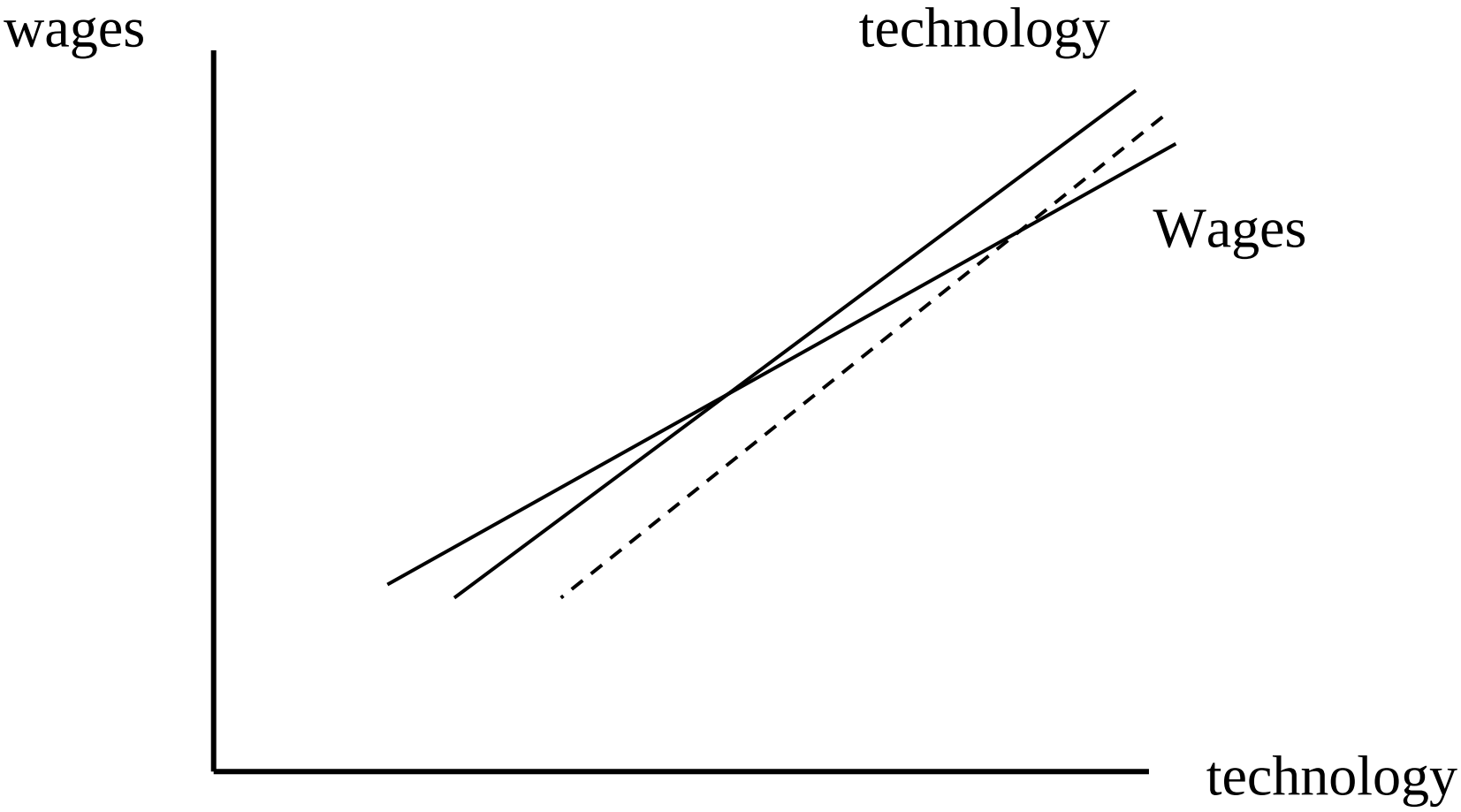


Amplification of Effects

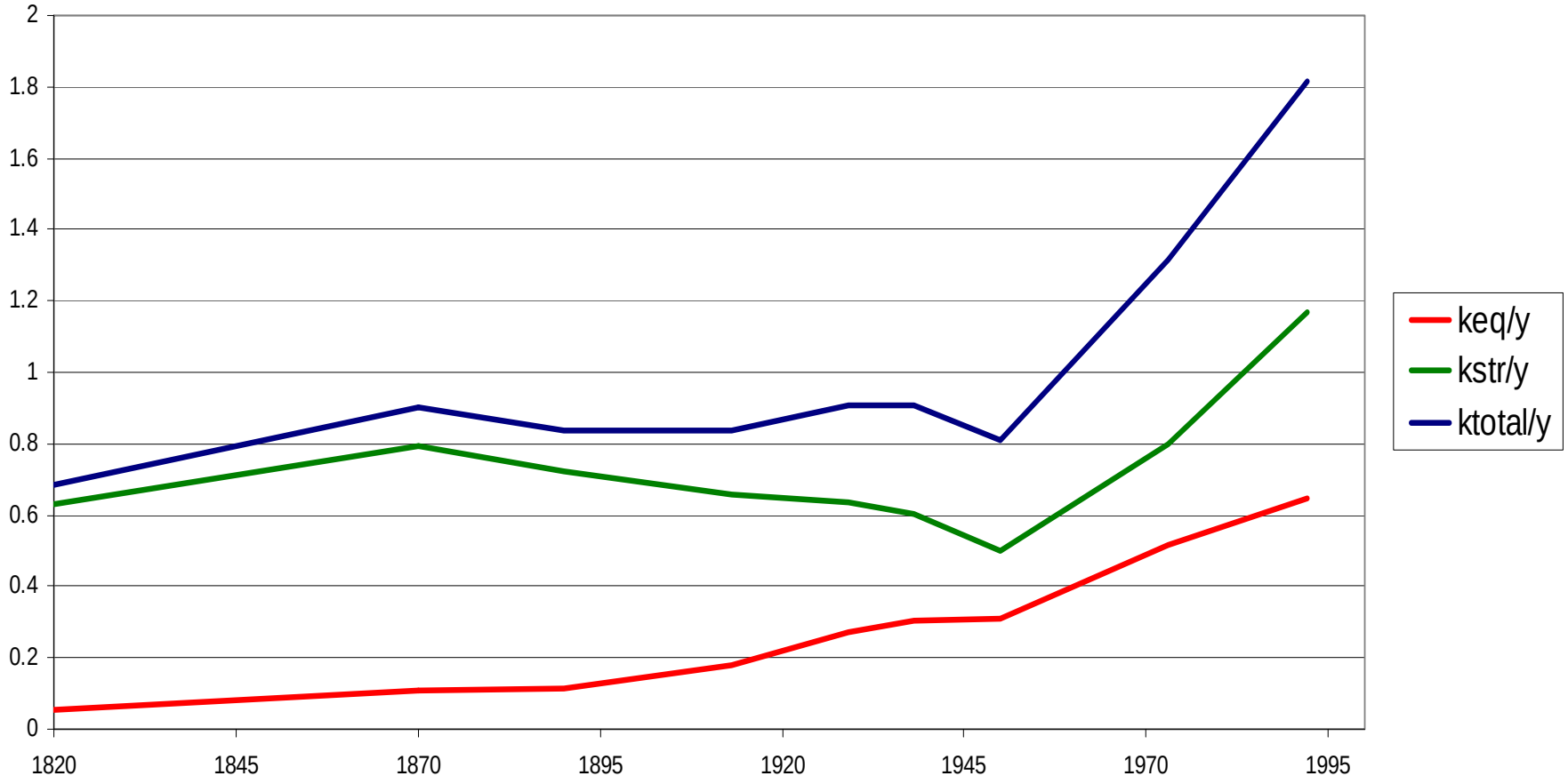
- Hence, the feedback between wages and technology makes the equilibrium very sensitive to changes.
- A reduction in the price of investment goods boosts technology adoption in that country.
- A similar result can be achieved by improving infrastructure and increasing overall productivity in the country.
- This theory can therefore help us in understanding large differences in technology adoption.

Investment, Capital and Technology

- This theory implies that investment in machinery, long-term investment, is highly related to technical progress.
- Adoption of new technologies requires purchasing the machines these technologies are embodied in.
- We should therefore observe a long-run correlation between technology and equipment capital.
- Indeed, over the last two centuries, the ratio of equipment capital to output increased significantly.

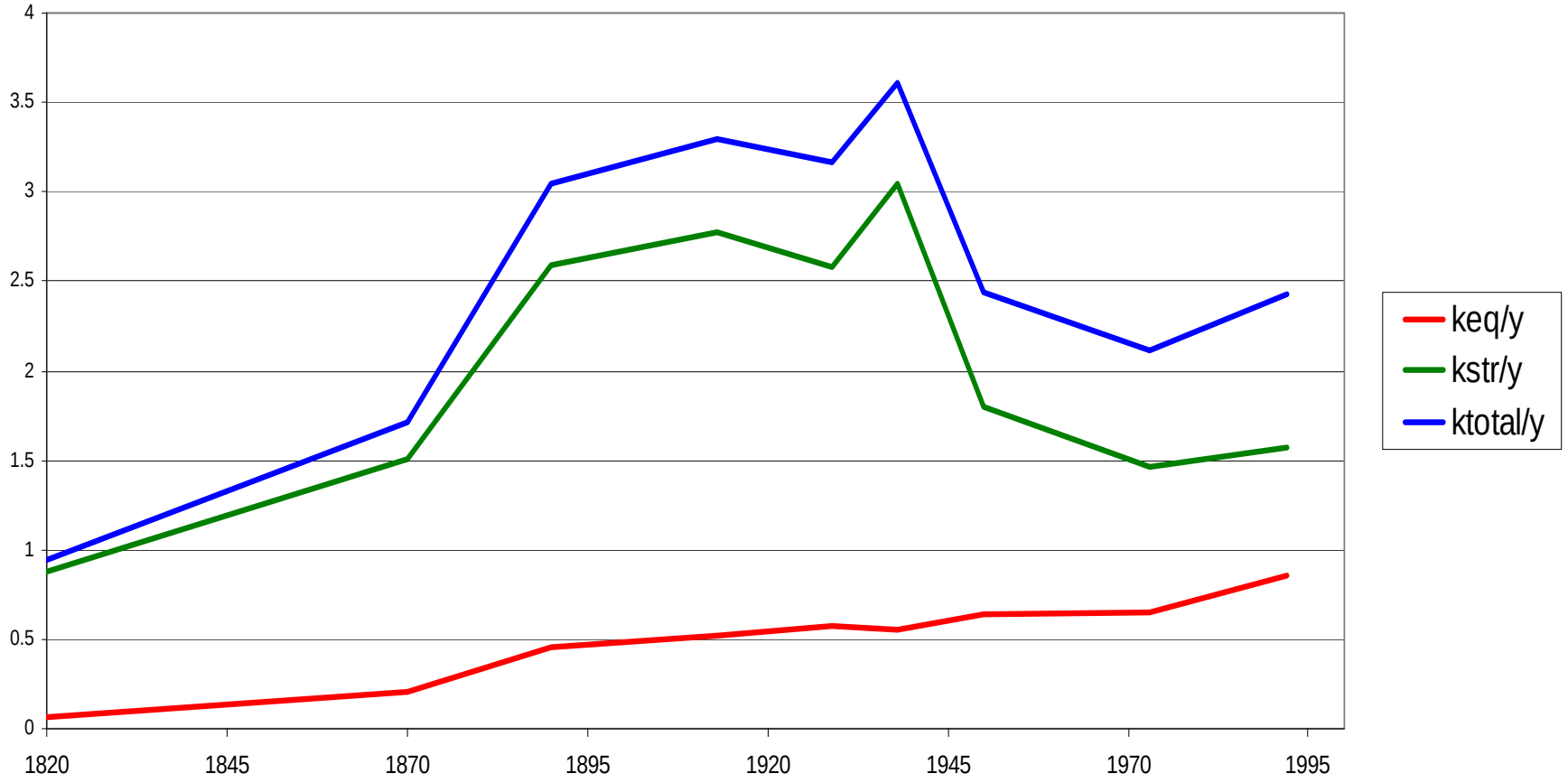
Introduction

UK



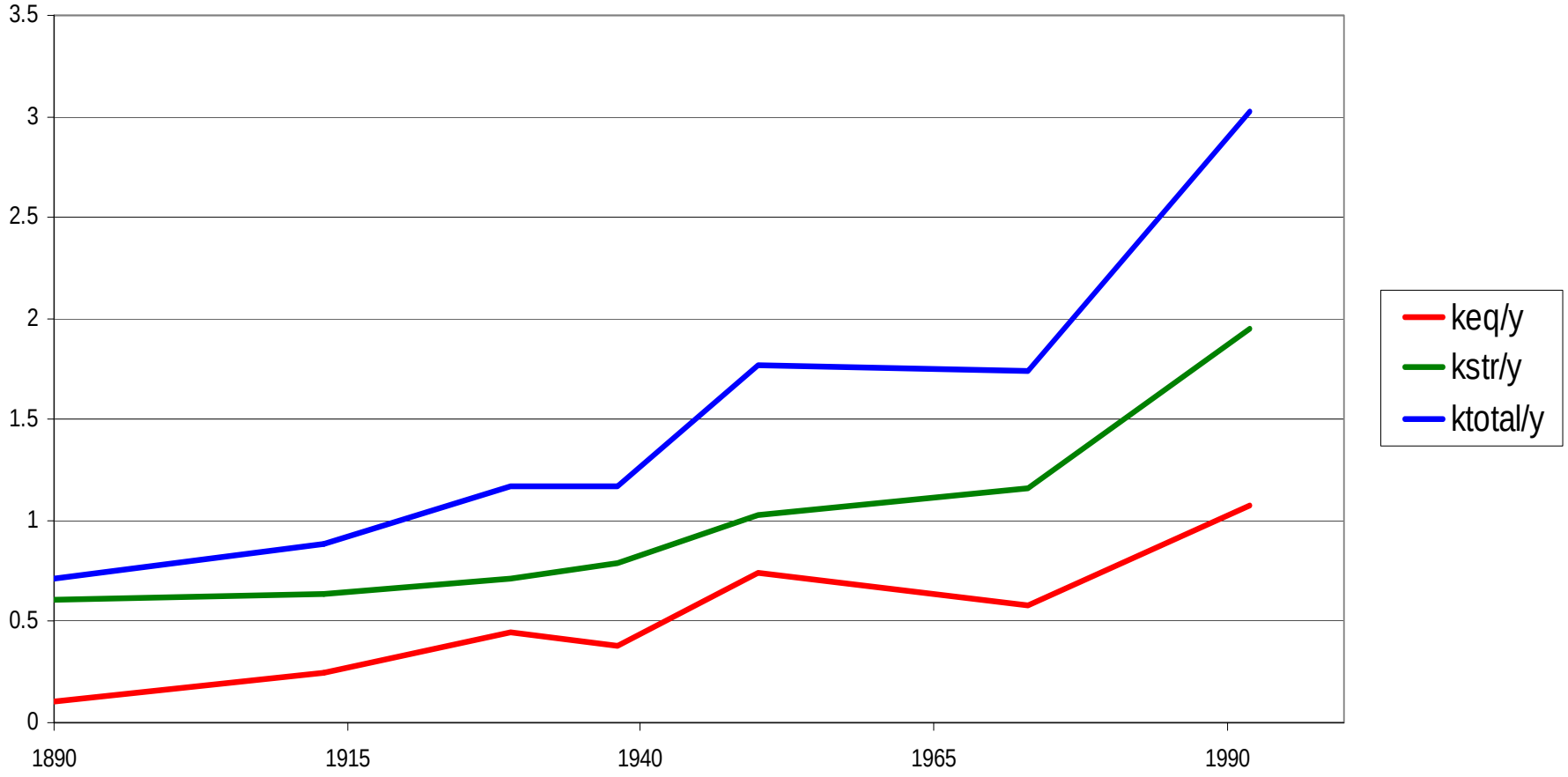
Introduction

US



Introduction

Japan



Introduction
Other Countries

- From 1950 to 1992 equipment capital to output increased:
- From 0.21 to 0.74 in France.
- From 0.39 to 0.70 in Germany.
- From 0.27 to 0.78 in the Netherlands.
- Hence, the rise of equipment capital to output is fairly general (data from Maddison, 1995).

Summary

- Modeling technology as machines that replace workers can be very fruitful to understanding economic growth.
- It can help in analyzing many issues, like global growth process, the role of globalization and more.
- We have seen here how it helps in understanding why countries differ in their growth performance.
- The feedback between technology and the cost of labor makes growth very sensitive to some policies. Mainly the policies that support long-time investment.