LISBON
SCHOOL OF
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UNIVERSIDADE DE LISBOA

Macroeconomics II

Lecture 10

Sustainable development
Limits to growth

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Theoretical Lecture 10

Cap 09 Limits to growth

Sustainable development

- **Concepts of sustainability**
- **Energy and economic and social impacts**
- **Social vs economic sustainability**
- **Limits to growth**

Readings:

Diamond, Jared (2005), ***Collapse*****,** Penguin, London (there is a Portuguese translation)

Core (no Aquila)

Recap:

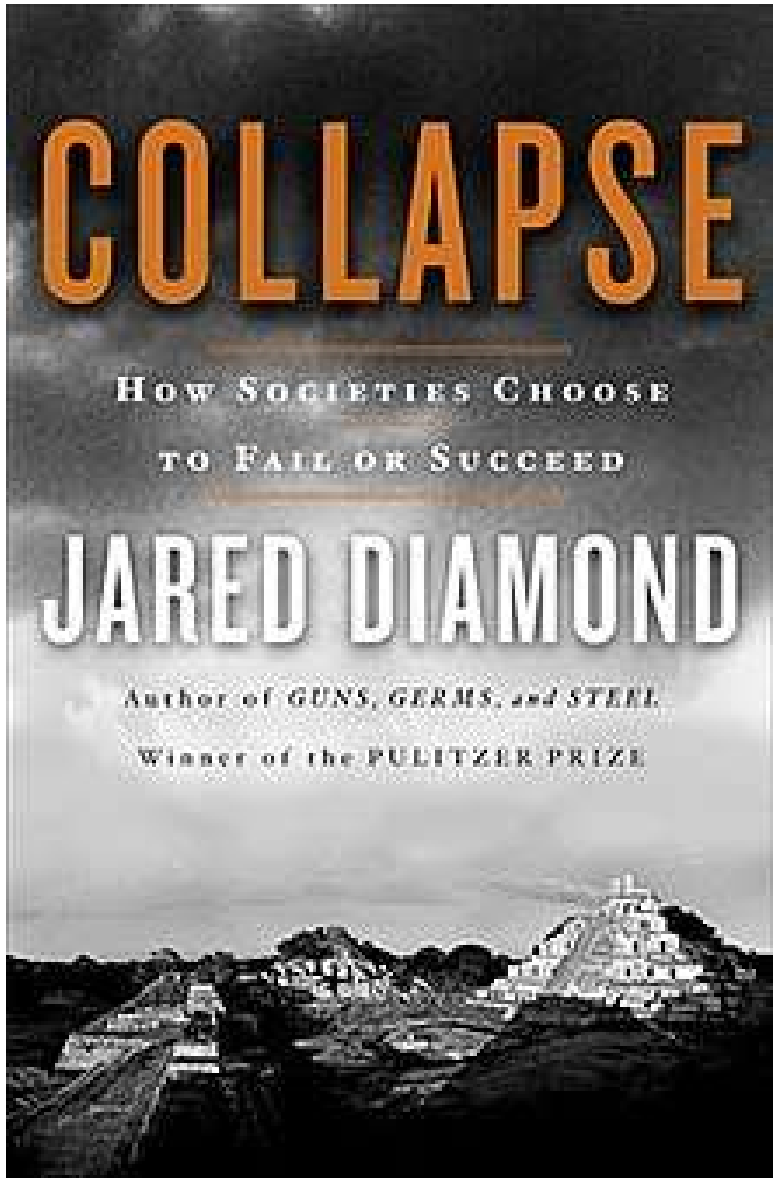
What we discussed: **models and growth theories** (Adam Smith and the classicals, the keynesiano model of Harrod-Domar, the neoclassical models of Solow, AK and Romer)

Next chapter: making development (what to do, how to do, the economic, social and environmental problems)

Today: **limits to growth**

Limits to growth 1

Environment and climate change

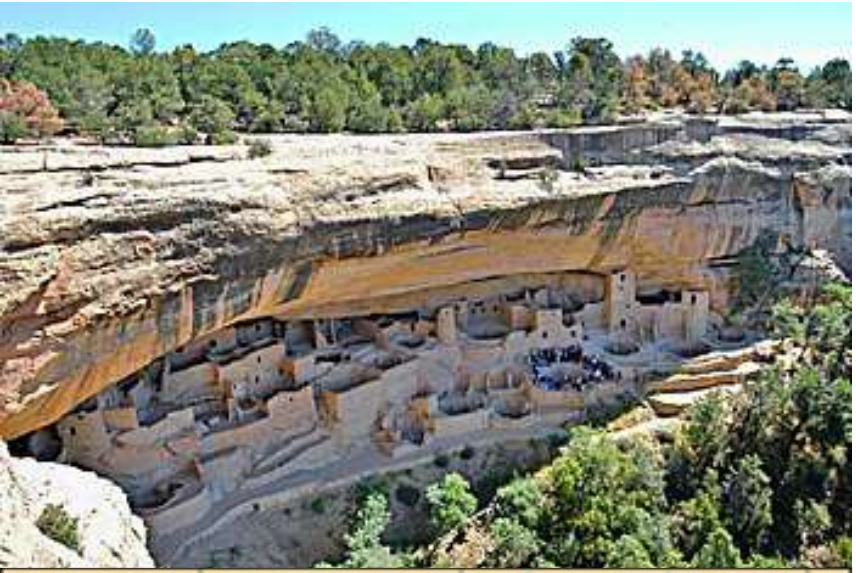


Jared Diamond
(1937-…)
University of California

- How do societies survive and adapt?
- How do they fail?

- **Climate change**
- **Environment, agriculture, water and other resources**
- **Social organization, trade, war**

Easter Island statues



The case of the Anasazi

- in what is now Utah, Colorado, Arizona, New Mexico
- Approx. 500-1350 our era

The Anasazi were able to build large urban settlements and to develop industry and innovative agriculture

They built houses using complex construction methods, developing pottery and writing elaborate pictographs

But the Anasazi society failed

- Drought, in spite of a highly sophisticated irrigation system
- Deforestation is the main candidate for the ignition of the crisis
- But also a social context: much work and social subordination was required for the extent of “public works” we verify as buildings; wars and scarce resources created further contradictions and conflict
- The Anasazi left their homes and migrated south

Third example: the Vikings in Greenland until 1450

“A thousand years ago, a group of Vikings led by Erik the Red set sail from Norway for the vast Arctic landmass west of Scandinavia which came to be known as **Greenland**. It was largely uninhabitable—a forbidding expanse of snow and ice. But along the southwestern coast there were two deep fjords protected from the harsh winds and saltwater spray of the North Atlantic Ocean, and as the Norse sailed upriver they saw grassy slopes and thick forests. Two colonies were formed, and the Norse raised sheep, goats, and cattle. They turned the grassy slopes into pastureland. They hunted seal and caribou.”

The vanishing of the vikings

"(The Vikings) built a string of parish churches and a magnificent cathedral, the remains of which are still standing. They traded actively with mainland Europe, and tithed regularly to the Roman Catholic Church. The Norse colonies in Greenland were law-abiding, economically viable, fully integrated communities, numbering at their peak five thousand people.

They lasted for **four hundred and fifty years—and then they vanished**." (New Yorker)

The collapse of the Norse in Greenland

- Soil erosion
- Limited forest
- Huge use of resources for house building
- Climate change
- No renewal resources: they should have diminished their dependency on cattle
- Despised the **Inuit**, the local inhabitants, who were better adapted to the landscape

Further, more controversial/less clear cut cases

What happened to the planets in the solar system, particularly Mars and Venus?

Is any technological advanced society able to deal with climate change? Or is there an inevitable doomed trajectory?

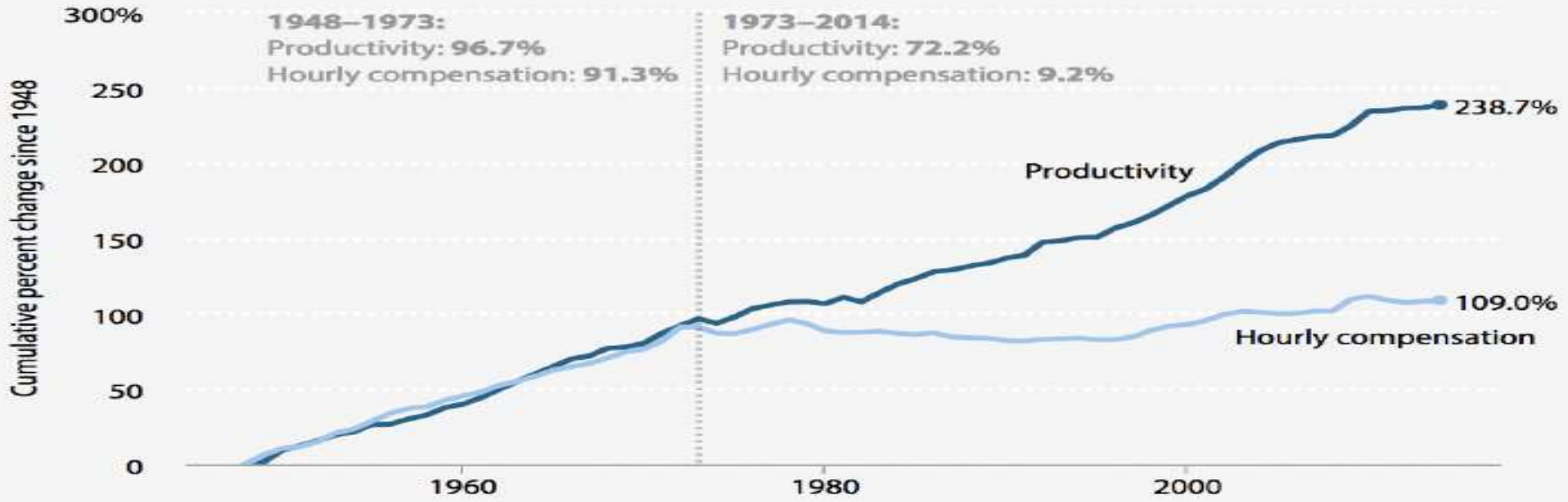
Limits to growth 2

Social conditions
(some examples, to be continued...)

US: a case of unequal division of the results of labour?

FIGURE A

Disconnect between productivity and a typical worker's compensation, 1948–2014



Note: Data are for average hourly compensation of production/nonsupervisory workers in the private sector and net productivity of the total economy. "Net productivity" is the growth of output of goods and services minus depreciation per hour worked.

Source: EPI analysis of data from the BEA and BLS (see technical appendix for more detailed information)

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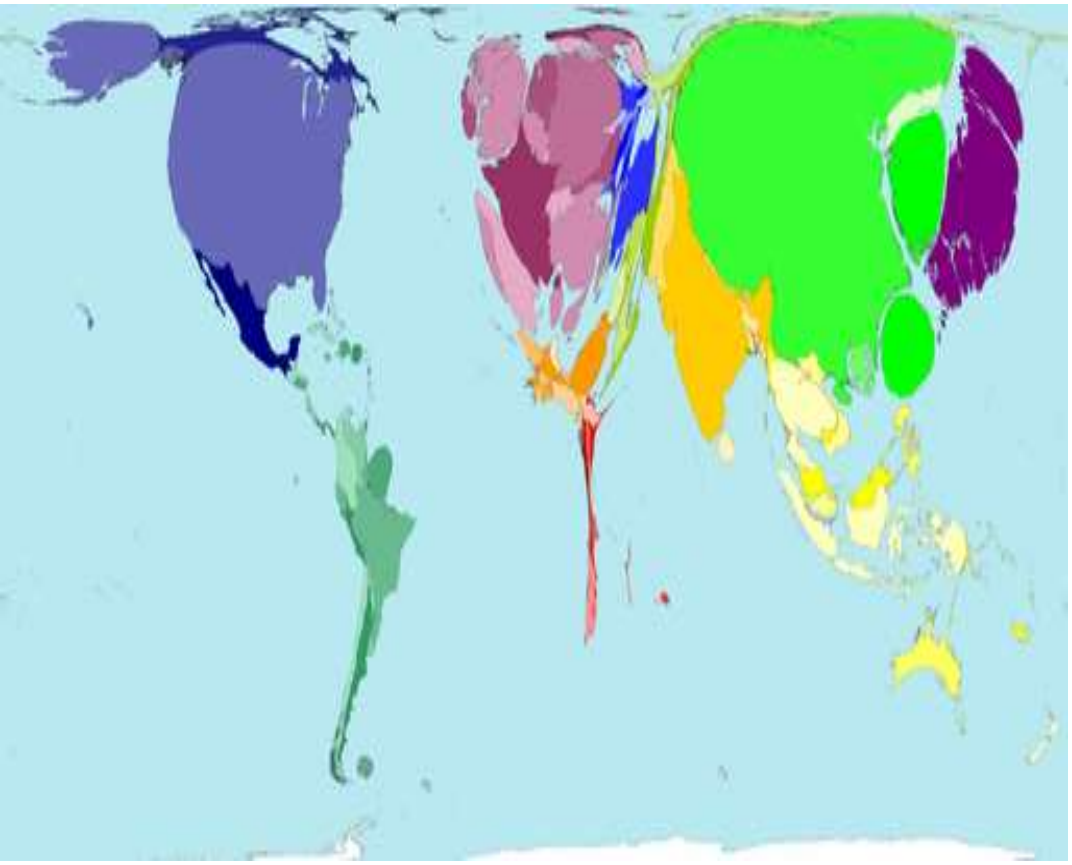
Figure E3

Top 1% vs. Bottom 50% national income shares in the US and Western Europe, 1980–2016: Diverging income inequality trajectories

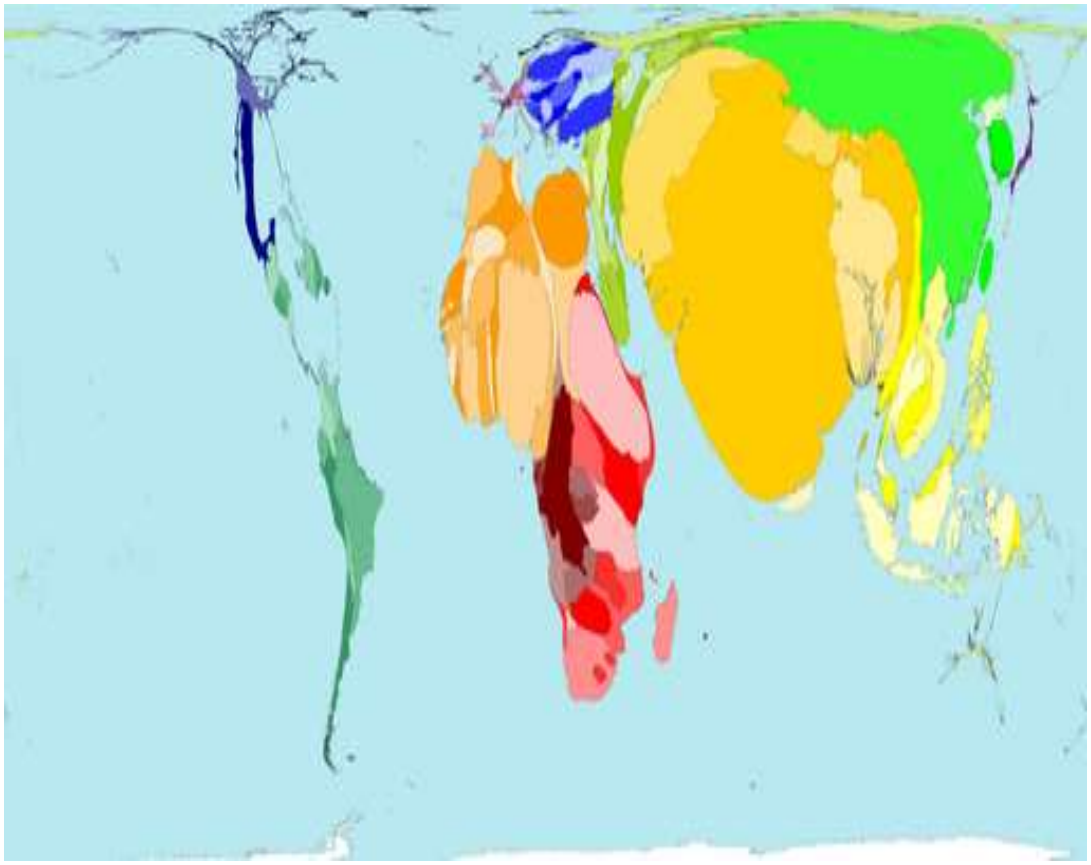
Source: WID.world (2017). See wir2018.wid.world for data series and notes.

In 2016, 12% of national income was received by the top 1% in Western Europe, compared to 20% in the United States. In 1980, 10% of national income was received by the top 1% in Western Europe, compared to 11% in the United States.

Wealth and poverty (World)



Wealth by country as compared to the world average (2015)



Poverty by country as compared to the world average (2003)

So, growth may be a problem

- Societies and their economies express contradictions and social tensions (distribution and property issues)
- Poverty, wealth or education inequality (or inequality in the access to other means of living), exploitation of resources, conditions of work, and rentism may affect the evolution of the economies: **growth may be unequal, uneven and unfair**

Limits to growth 3

Technology

Limits to growth debate

- **Meadows report (1972, MIT team)**: absolute limits to growth given the impact of production, food scarcity and pollution

  Until 2070, collapse:

  "If the present growth trends in world population, industrialisation, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity."

- Reply by **Chris Freeman and the SPRU team** (Sussex, UK): technology is a social choice and may be used to create alternatives against depletion of natural resources

More limits to growth

The Big questions for the 21st century?

Climate Change: scarcity of water and energy? Some regions and cities will be depopulated?

A new pattern of inequality: more restricted common goods (water), uneven access to public goods (security)?

First surprise question (for the lectures)

1. In a model economy defined by the extended Solow model with technological progress, an important and sustained **reduction** of the active population through migration is registered. Represent the impact of such change in a graph.
2. Show in the graph and explain by your own words how a **new equilibrium** is obtained and describe the economic process that is involved.

(You have **15 minutes**. Please reply carefully to both questions, present your graph and explain what happened)

First surprise question (for the lectures)

1. In a model economy defined by the extended Solow model with technological progress, an important and sustained **increase** of the active population through immigration is registered. Represent the impact of such change in a graph.
2. Show in the graph and explain by your own words how a **new equilibrium** is obtained and describe the economic process that is involved.

(You have **15 minutes**. Please reply carefully to both questions, present your graph and explain what happened)