

Lecture 1:

Capitalism and Inequality

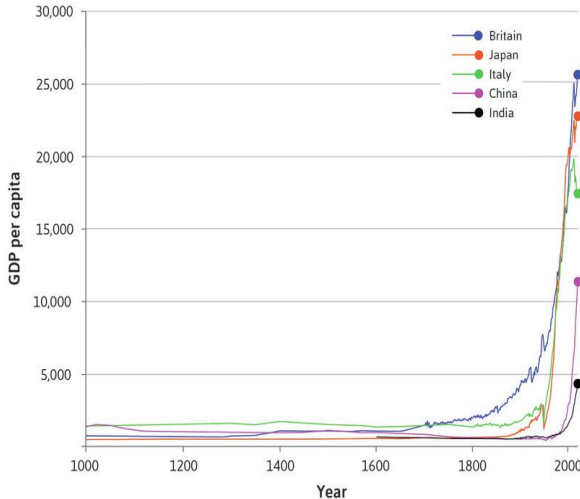
Vinish Shrestha
Towson University

Goals

- Brief understanding of income inequality
- Measuring income and living standards
- Income growth
- The technological revolution
- Capitalism as an economic system
- Specialization
 - Absolute and comparative advantage

Part 1. Evidence of Inequality–Motivation

Figure 1: Inequality over time



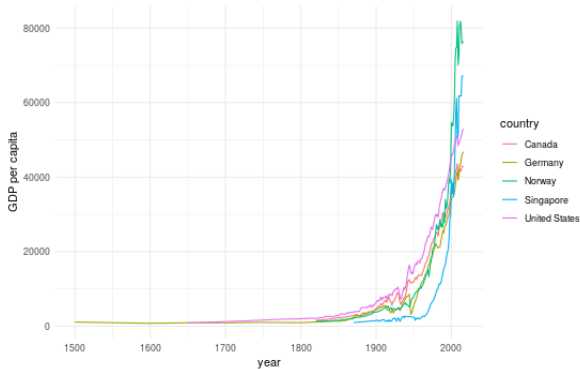
This figure represents the hockey stick. The term comes from the figure portraying an image of a hockey stick.

Use GDP to Measure Living Standard

- One measure for living standard is by using the Gross Domestic Product (GDP)
- It is seen that GDP is quite comparable across countries until 1800s, after which income inequality across countries begin to grow.
- The figure provides a descriptive analysis of income inequality. However, rigorous methods have been developed to analyze inequality. In this course, we will be making use of data like this to realize prominent economic issues.
- You can view the discussion about how valuable data is in economics [here](#)

Income in Developed Countries

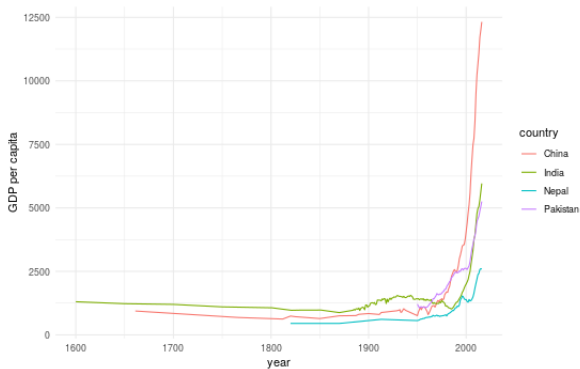
Figure 2: Inequality over time



Five developed countries are selected. Per capita GDP is quite comparable until 1800s, after which per capita GDP begins to grow. Now we will make visual comparison with some of the countries in South Asia in the next Figure. Data that tracks a subject overtime is called the time series data.

Income in Selected South Asian Countries

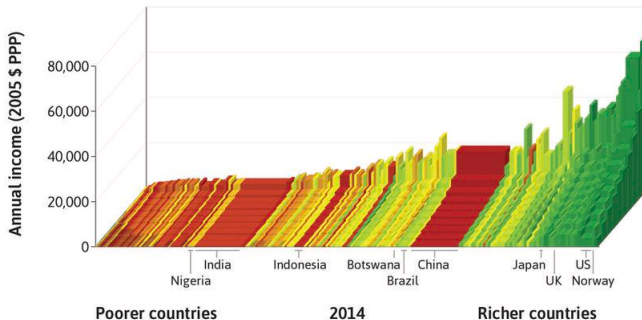
Figure 3: Inequality over time



Four South Asian countries are selected. Except China all three countries are developing countries. The graph shows that even before 1970s, income across all four countries were quite comparable. Although income increased starting from later half of the 20th century across three countries (China, India, and Pakistan), income in China escalated quite dramatically compared to rest of the countries. Nepal is the poorest country of the lot. Plain comparison between Figures 1 and 2 suggest that the timing of growth varied across countries.

Growing Inequality – Developed Countries

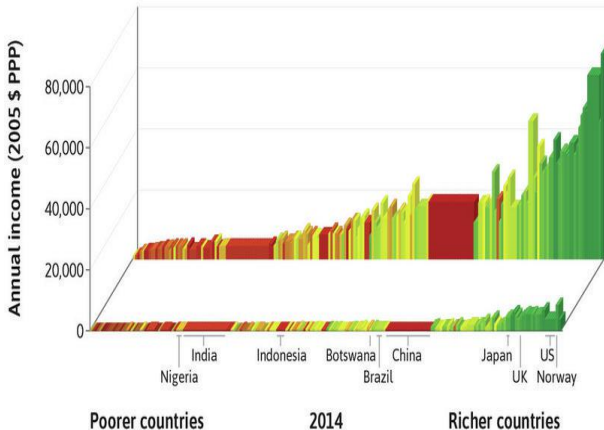
Figure 4: Inequality in 2014



Countries are ranked by using annual income (GDP/population size). In this figure, income is divided into 10 bins, such that each bin has roughly the same number of individuals. Then averages per bin are plotted. The furthest bar represents the average income among the top 10 percent earners, whereas the nearest bar represent the average income among the poorest 10 percent. You can see tall skyscrapers emerge at the background. This is indicative of growing income inequality. In fact, we can use a measure of 90/10 ratio to quantitatively measure income inequality. This is ratio of $\frac{\text{average top 10 percent}}{\text{average bottom 10 percent}}$.

Growing Inequality – Visual Evidence

Figure 5: Inequality in 2014 – top and bottom 10 percentiles



Countries are ranked by using GDP. The skyscrapers in the back shows the average income of the top 10 percent of richest individuals, whereas the front shows the average income of the bottom 10 percent of the poorest individuals. You can see tall skyscrapers emerge at the background.

This is indicative of growing income inequality. In this figure we "sort of" use a measure of 90/10 ratio to quantitatively measure income inequality.

What can we learn from Figures 4 and 5?

- Note that Figures 4 and 5 show the distribution of income across countries at one snap shot of time (2014). This way, we can conduct across country comparison in 2014. The idea of getting data designed for the purpose of capturing information at one snap shot of time is also known as cross-sectional data.
 - The other form of commonly used data which you should be familiar with is called the time series data. For example, Figure 1 uses a time series format to follow five countries overtime.
- Both Figures 4 and 5 show that income inequality (between rich and poor) has increased across all countries, but inequality is specifically high among the rich countries. *Here, the richest population are super-rich, whereas poor are quite poor.*
- A more straightforward measure of income inequality is 90/10 ratio, which is the average income of the richest 10 percent divided by the average income of the poorest 10 percent.

What can we learn from Figures 4 and 5?

- Even in Norway (a country considered relatively equal), 90/10 ratio is 5.4, which says that the richest 10 percent earn 5.4 times more than the poorest 10 percent.
 - In US this ratio is 16 and in Botswana it is 145.
- Another point that Figures 4 and 5 suggest is that inequality, when compared across countries, is huge.
 - Example, average income in Norway is 19 times more than the average income in Nigeria.
- Another realization is that countries that began to see an increase in GDP before 1900s (UK, Japan, Italy, US) are now much richer. However, countries that just recently began to see increases in GDP are not so rich.
- GDP definitely did not increase across all of the countries around the same time!

Part 2. Measuring Income and Living Standards: Gross Domestic Product

- Note that Figure 1 uses GDP per capita to track income over time across the reported countries.
- GDP is a measure to capture output of the economy at a given period, such as quarter, year. How to measure GDP?
 - Economists first decide what to include when calculating GDP.
 - Then give values to items included. More practical way is to represent prices as values of things. But note that prices cannot always capture the value of things. (rely on willingness to buy)
 - This measure shows the total income of the economy (say a country).
- Dividing GDP of a country by the population gives GDP per capita.
- However, is this a solely trustworthy measure of wellbeing?
- Other income alternative is disposable income
 - Net income + transfer payments (unemployment or disability benefits) - taxes
- Both GDP and disposable income are highly incomplete measures of wellbeing, as wellbeing is not always related to what we can buy.
- Listen to a short speech on how incomplete of a measure GDP is [here](#)

What other goods to consider?

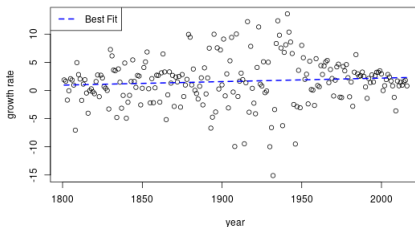
- Read the full speech [here](#).
- What other goods does he argue that is missing from the measure of wellbeing?
- Health
- Education
- Racial Discrimination
- Gender Discrimination
- Economists tend to focus on GDP as it is a relatively easy measure. However, much research has put emphasis on health (life expectancy, child mortality) and education as other measures.
 - These measures are mostly correlated.

Part 3. Growth in Income

- A descriptive way of looking at how well a country is doing over time is to look at the growth.
- Use a formula $growth\ rate = \frac{new\ income - old\ income}{old\ income} \times 100\%$
- Example. The per-captia income of US was \$45,887 in 2000 and \$49,267 in 2010. Calculate the growth rate in 10 years.
 - $growth\ rate = \frac{49,267(new\ income) - 45,887(old\ income)}{45,887} * 100 = 7.37\ percent.$
- However, note that on average the US economy grows by around 2 percent each year. This is given by the flat best fit line in Figure 6.

Income growth in US

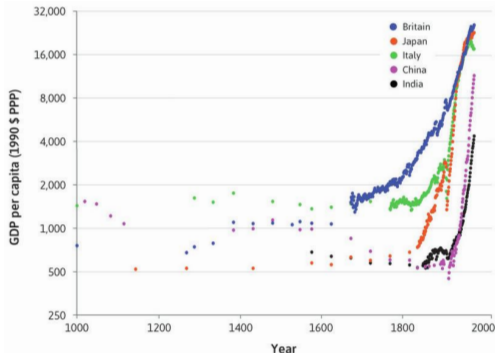
Figure 6: Inequality in 2014



Each point gives the growth rate in that year compared to income in the previous year (base year). The line is the best fit line. You can think of it as the slope of a line $y = mx + c + e$, where y is the growth rate, x is year, and c is the y-intercept. The new term here, which you might be unfamiliar with is e . e represents the error term. You can think of e as a trash can that holds everything else that influences the growth rate, except time (in years). Note that time is x . So e includes everything that is not x but influences the growth rate. So, we need to find an estimate for m (the slope) and c (the intercept). This is done by minimizing $e^2 = (y - mx - c)^2$. Once m and c are estimated, we call this \hat{m} and \hat{c} . Next, calculate $\hat{y} = \hat{c} + \hat{m}x$. This is the best fit line.

Income growth – Using Ratio Scale

Figure 7: Growth Over Time across Selected Countries



Note that the scale in y-axis is such that the ratio between two successive axis points are the same. Unlike Figure 1, ratio scale helps in clarifying the picture so that we can more accurately identify growth at the given time. What we can learn from this figure is: 1) Growth did not occur in a sustained way for a long time; and 2) When period of sustained growth did occur, it did not happen at once across all countries – some countries enjoyed the growth early on (Britain), whereas some had to wait until later (India). This is one reason (though a relatively superficial one) for inequality. Now, the question should be why were some countries like England able to enjoy sustained growth early on?

The Invisible Hand

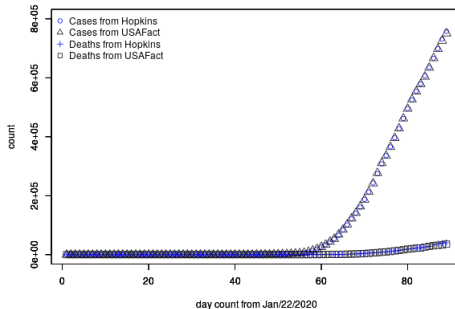
- Question such as why some countries got richer early on, whereas some struggled has been undertaken by several economists. Perhaps, the pioneering work on this line has been done by Adam Smith. In 1776, Smith published *An Inquiry into the Nature of the Wealth of Nations*. Here, he posed a question as to how independent human actions and behaviors of economic agents – consumers, producers, labors, transporters – are able to sustain in a society?
- Smith argued that there is no need for any particular institution or a third party to consistently govern human beings to make the society tick. This dramatically challenged previous societal systems, in which rulers dictated policies to impose order. This not only gave a new stance in economics but also massively influenced the discipline of political science.

The Invisible Hand

- Smith also emphasized the need for self-interest. He writes, *It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.*
 - Perhaps, this particular human behavior helps the society to coordinate naturally. This notion is known as the invisible hand.
- In more recent years, the idea of self interest has been taken to an extreme and is directly associated with capitalism (also a concept often misguided). We are often taught that people are inherently greedy and they act only for they own interest. This has been the stance taken in the mainstream economics for quite a while now.
- However, in his other book *The Wealth of Nations*, Smith himself noted that humans are not solely driven by their intent of self-interest. On average, a human being would feel sad if someone was in pain. And in some situations she/he can undertake an action from an ultimate altruistic standpoint, without thinking about the benefits associated with that particular action.
- Smith also noted that markets may fail, say, if sellers coordinated with one another.

An Example of Market Failure

Figure 8: COVID19 Cases and Deaths in USA



In situations like pandemic, where behavior of one party can (easily) affect the unaffected party, we have a risk of market from failing. Now consider, the classroom environment where market is made up of the teacher and students. If proper measures are not put in place, we will be risking an outbreak of infections in the class. This would then eventually disrupt the entire class. Generally it is the duty of the third party to control market failures from happening. In practice, the third party would be the government, also known as social planners. But it could also be the university. For instance, Towson has implemented some strict measures to monitor the pandemic situation.

Part 4. What Contributed to Growth?-The Technological Revolution

- Remarkable technological changes occurred that coincided with the timing of the upward kink in the hockey stick figure in Britain.
 - It was in the middle of the 18th century.
 - Influenced the areas of transportation, textile and energy.
 - New discoveries, new machines aided the production process
- The process of innovation did not stop with the industrial revolution. Soon, innovation of applications such as steam engine, electricity, and transportation (canals, railroads, and automobiles) followed.
 - All this frees up time for labor, as a labor can perform her/his tasks a lot sooner.
- Now, in last couple of decades, we have seen a massive surge in other forms of technology – internet, phones, emails.
 - This has increased the speed at which information travels, all across the world.
 - Note that the readers of *Times* of London knew about Lincoln's assassination in 13 days after the event.
 - Check out a really cool graph regarding advancement of information speed over time in the next figure.

Speed at which information travelled

Figure 9: Evolution in speed of information travel

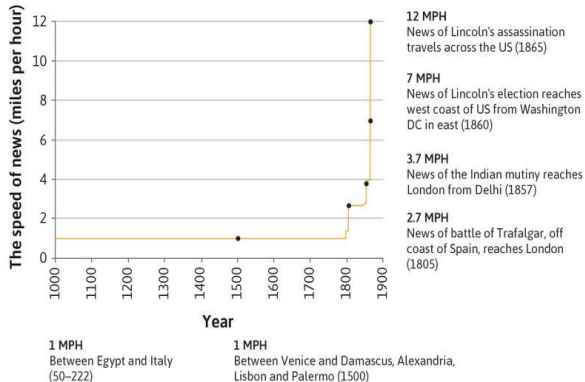
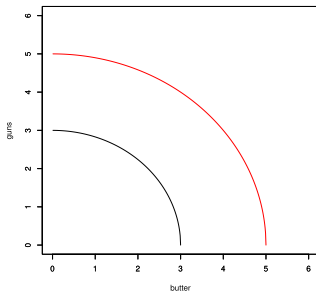


Figure taken from Core Economics Project.

PPF and Economic Growth

Figure 10: Production Possibility Frontier



Note: Economic growth due to technological advancement can be shown by the production possibility frontier (ppf) as shown above. Say, a society only produces butter and guns (although unrealistic, we will run with the simple model to get the point across). Now, ppf, is a frontier that shows the combination of guns and butter that can be produced when all of the resources (land, labor, machines) are used efficiently. If there is an advancement in technology, what happens is that the ppf curve shifts outwards (from black to red in above figure). What it means is that at a given time you can produce more butter and guns after the growth than you initially could.

Other Notable Technological Advancement

- Laundry Machines: Invention of electric laundry machines have known to save time among women.
 - This saved up time can be used in other activities that can be enjoyed in the household or can also be dedicated to market work.
- AI
 - This is a big game changer at the current time.
 - This has replaced significant proportion of work force. For instance, routinized work has been replaced by AI (banking, tellers, book keeping, customer service).
 - This is also known as Skill Biased Technological Change – a process that involves replacement of routinized tasks by machines.

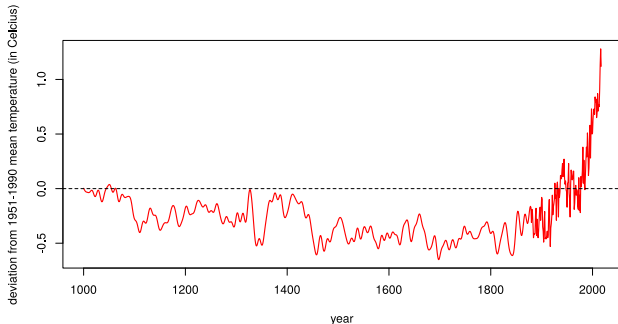
Part 5. No Free Lunch—Effects in Environment

- Economy is part of a society, which is a part of the Biosphere.
- The economy is not just sustained by people to people interaction but also interaction of people with nature.
- Much of the resources, in forms of raw materials, comes from nature.
- Natural resources – although abundant – are limited.
- Moreover, as production sores, there are costs to be paid
 - climate change
 - rising CO₂ emission
 - increase in northern hemisphere temperature

A branch of economics – environmental economics – specifically deals with interaction between humans and the environment in the process of development. Overall, it is necessary to realize that economy is not just a product of human interaction, but environment has a major say as well.

Rise in Northern Hemisphere Temperature

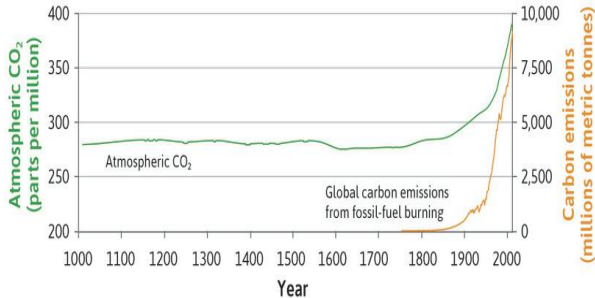
Figure 11: Rise in Northern Hemisphere Temperature



Note: Data from [blob:https://ourworldindata.org/51b1e4ca-2d56-4c6c-abeb-b3c86eaccb0c](https://ourworldindata.org/51b1e4ca-2d56-4c6c-abeb-b3c86eaccb0c). This creates several risk, such as melting of polar ice caps and rising of sea level. The adverse effects of humans on climate is no longer disputed in scientific community. There is a course in economics called Environmental Economics that specifically deals with human interactions, government policies and climate. You are welcome to check that course if interested.

Rise in CO₂

Figure 12: Rise in Northern Hemisphere Temperature



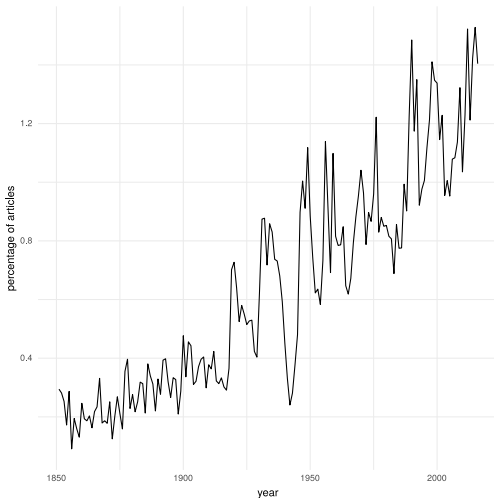
Note: Figure extracted from Core Economics Project. Advancement in technology may enable us to rely more of sustainable sources of energy such as solar and wind.

Part 6. Capitalism

- What comes to your mind when you hear about capitalism?
 - Lets do a word cloud and visualize the findings
- The emergence of term “capitalism” occurred in the 18th century. However, it was not often used. In 1900s the usage of word capitalism has increased quite dramatically. The next figure shows the fraction of articles in New York Times that used the word capitalism over the years.
 - As you can see, the graph is clearly upwards sloping and has several spikes that are correlated with the timing of specific events.
- The word capitalism has been used in several different contexts. Although the definition of capitalism varies (depending on topics of conversation), lets try and define capitalism as precisely as we can.

Usage of Capitalism in New York Times Articles

Figure 13: Usage of Word Capitalism – percent of articles in NY Times



Note: Data from [blob:https://ourworldindata.org/7159f489-a82b-4c8a-bc5c-f254d049aa4f](https://ourworldindata.org/7159f489-a82b-4c8a-bc5c-f254d049aa4f).

Capitalism as an Economic System

- Emphasizes the need for **private property**. The definition of private good varies.
 - Hunters and gatherers owning ornaments and rudimentary weapons.
 - Personal properties: In some societies personal properties are considered private, whereas land is not.
 - In some societies, slaves were considered as private properties.
- The private property: i) Can be used as one's wish, ii) others can be excluded from using it, iii) can be sold.
 - In a capitalistic economy, private goods mainly represent inputs or factors of production such as land, machines, and other inputs. These are also called capital goods and not owned by the government.
 - Note that particularly during the time of slavery, humans were also considered as private goods (in forms of another input – labor).
- **Firms**: Another component of a capitalistic society. e.g. banks, restaurants, supermarkets, internet providers. Note that firms are different from family owned businesses.

Capitalism as an Economic System

- Firms (employers) facilitate labor market (this is also known as demand side), whereas labors (employees) supply their labor (supply side).
- In a capitalistic society, power is generally concentrated in hands of managers and owners of the firm.
- Most of the economies in the world operate in a capitalistic model.
 - Both US and China have capitalistic economy, although how it is delivered is different.
- Encourages division of labor and specialization.
 - People concentrate on what they can produce well, then trade amongst one another.
- *Note to oneself: Early on capitalism promoted competition, which meant dispersion of market power across several firms. Overtime, there has been concentration of power, which means the market power has been concentrated amongst very few players in the market. E.g. Microsoft, Amazon.*

Gains from Trade I

If 100 percent of labor time is spent on a specific good
Ali can produce 1,200 apples or 900 oranges
Malcom can produce 1,000 apples or 600 oranges

- So from the table above, Ali has an **absolute advantage** in production of both apples and oranges, meaning that Ali can produce more of apples and oranges than Malcom can. However, Malcom's disadvantage is less in producing apples.
- For each apple Malcom produces, Ali can produce 1.2 apples ($\frac{1200}{1000}$).
For each orange Malcom produces, Ali can produce 1.5 oranges ($\frac{900}{600}$).
 - This is like saying, although Malcom is at a disadvantage position in producing both apples and oranges, he faces less of disadvantage if he produced apples compared to oranges.
 - So, Malcom has a comparative advantage (comparing ratios of apples and oranges production as above) in producing apples.
 - Ali has a comparative advantage in producing oranges.
- They specialize on good with comparative advantage and then trade.

Specialization of Labor and Some Drawbacks I

- Division of Labor has been widely supported by economists and for obvious reasons, as shown in the previous slide, division of labor increases efficiency.
- However, overtime, we have also realized significant downsides of focusing on a specific task.
- If you are a needle maker, and that is the only skill that you have specialized in, invention of technology will have replaced your work. With the onset of AI revolution, many jobs has been replaced by machines.
 - In the near future, even instructors' work can be replaced by machines. Infact, we are already on this path with softwares such as TopHat and MindTap dictating the course materials.

Conclusion I

- Although per capita income has increased starting from the mid 1700 in selected countries, sustained growth has not been achieved.
 - Some countries experienced growth lot early than others, which has led to across country inequality.
 - Moreover, huge inequality exist between the rich and poor in richer countries.
 - For example, the richest 10 percent in the US earn 16 times more than the poorest 10 percent.
- Technological progress coincides with the timing of growth. However, this does not necessarily mean that technology created growth – correlation is not causation (something that we will talk in detail later on in the course).
- Rise in production has been accompanied by depletion of natural resources, damage to environment, and climate change.