**CLASSICAL THOUGHT**

Classical political economy represents the main branch of economics during 18th and 19th centuries.   
  
The main representatives of this current are **Adam Smith** (founder, 1728-1790), **Jean Baptiste Say** (1767-1832), **Thomas Robert Malthus** (1766-1864), **David Ricardo** (1772-1823) and **Karl Marx** (1818-1883).

**Karl Marx**Karl Marx is critical of classical school, yet uses its same analytical tools.

All these authors experienced the period of **industrial capitalism** (1700s – end of 1800s), characterized by the evolution of farms into factories, the sign of the rise in importance of capital in society and in the economic system: the ownership of capital was the major source of power.

* The primary focus for capitalists was profit: those who owned money (M1) used it to build factories and hire workers. This way, capitalists could produce a commodity (C) sold for a value (M2) larger than the quantity of money employed at the beginning. So **M1 🡪 C 🡪 M2**.
* The problem lies in the fact that **M2 > M1** is just an **expectation** and, to fulfil it, the entrepreneurs exploited workers: in that period population was growing exponentially and therefore lots of people were looking for a job, so that **work supply** was **larger** **than** **job** **demand**. This implies that firms had power, an advantage and used it to pay the workers with low wages. Landowners borrowed it to capitalists to build factories and received a rent in exchange.
* Therefore, in industrial capitalism the society was driven by profit purposes (**profit-driven economy**) and this influenced the behaviour of all agents in economy. In this environment all the economists mentioned earlier developed their theories.

**They have some common features:**

1. All classical economists were interested in **growth** and **development**, which according to them results from a situation called **stationary state** or **zero-growth**: this reflects a **pessimistic** attitude towards the possibility for capitalism to reach a long-run economic growth.
2. They all focused on **costs of production** as main **determinant** of **price**: prices are the result of the costs of production, therefore the value of commodities should correspond to the costs of production sustained by entrepreneurs.
3. Moreover, they were interested in studying the **distribution** **of** **income** **among social classes**. The placed importance on it because it was related to the **fairness** of capitalist system.
4. Market as self-stabilizing mechanism of distribution
5. Critique on Government intervention

**Aim:**

* Classical economists attempted to provided a consistent explanation of the changing relationships between income distribution and prices in the course of economic development. This reflects the emerging social classes created by capitalist development (18th century)
* They strived to obtain what they considered to be their rights
* Most classical economists thought markets had a self-stabilizing mechanism that permitted them to work efficiently without much government intervention.

**ADAM SMITH**

Adam Smith was a Scottish economist, influenced by Francis Hutcheson and David Hume. He published in several fields as well as economy, such as moral philosophy, history of astronomy, dance, poetry and others.

His main economic contributions were:

**Motivation for human action:** his view was influenced by Hutcheson, whose idea was that *“all men are not purely self-interested”* (human being have a natural disposition to care about the good of their society). According to Smith, **self-interest** and **moral rule** are necessary for a well-functioning economy and common life in society.  
In particular, each man is motivated by self-interest, yet it is mitigated by the recognition of others’ interests (others’ opinion).   
In his words, this recognition is called **sympathy**: everyone makes their own choice pursuing their self-interest but seeking approval from other people. This implies that we consider our actions according not only to their effect on ourselves but also to their effect on other people in the economy. The sympathy represents the ability to shar the feeling of other member of the society, it is prerequisite for the very survival of human societies because it ensure tha the pursuit of self-interest on the part of a multitude of economic agents (in a competition among themselves) leads to the well-being of the society. Humans, are social creatures who act with moral restraint, using “fair play” in competition.

* There are two kinds of sympathy:  
  The **approval by actual people** (e.g. family members)  
  The **approval by community** (people from the same community but not so close).

The linkage between self-interest and benefit for the whole society is the **invisible hand**, a force implying that when a man follows his self-interest mitigated by sympathy, he produces a positive output beneficial for the whole society. The invisible hand is the force that brings all the agents (demand and supply) in the economy in equilibrium for all goods and commodities.   
*EX*: Suppose that a firm charges a very high price in the market: this creates an incentive for other firms to produce the same good at a lower price. This means that the consumers will want to buy the good at the lowest price, so they switch from buying the good from the first firm to buying it from others. Eventually, the market price will arrive to the lowest level, because no consumer in the market wants to purchase it at the higher price.

**Competition** (prices and quantities are free to adjust to satisfy the economic agents) implies the imposition of the low price, which represents equilibrium between demand and supply, resulting from the decision by consumers to buy only the good offered at a low price. The mechanism of the invisible hand is a force, internal to the market, which brings supply and demand to be equal and is driven by the agents themselves. When equilibrium is reached, it is beneficial to all agents in the economy.

Given that the economy is composed by the sum of all agents, no single agent but the whole society is better-off (optimal result). Therefore all agents, following their self-interest mitigated by sympathy, produce an **efficient allocation of resources**. Smith admits it is **not** an **automatic** result, yet it is a possibility.

**Role of government:** Smith considers **four situations** when government intervention is needed to increase benefit (**positive role of government**):

1. Maintaining a **national defense** (market alone is not able to arrive at beneficial results)
2. Building administration and **justice** in the economy (we need an intervention)
3. When there are public works that are not considered by private agents, because sometimes they do not decide to enter the market since there is no advantage. **Unproductive sector** (government need to enter and produce the output for this sector)
4. **Education** (for smith it is a sort of public good, and it has to be produced by the state)

Therefore **minimal intervention** is admitted in small and well-defined cases, since the invisible hand is a much more important force to produce benefit. His position is against the mercantilist view since regulations of trade and production are carried out after lobbying by merchants and manufacturers and this leads to an inefficient allocation of resources. Therefore, he is a ***laissez-faire***supporter in the great majority of cases.

**Determinants of natural wealth:** the main target of the economy is the ***“nature and causes of the wealth of nations”***. He identified this with the **per-capita income**, the total output produced by the economy divided by the population participating in this economy. What increases this variable? According to him, it depends on two factors:

1. **productivity of employees** in the production process *(π = Y/L). It depends again on the stage reached by the division of labour*
2. **share of citizens employed** in the production process. *(L/N)*

If we call:  
*Y,* the output of the economy (income) *N,* the population *L,* the employees  
*π,* the productivity (ratio between output [Y] and number of employees [L])

1. we can say that .
2. Therefore, output (y) can be written as L
3. So, y = πL. 🡪 In other words, national income (Y ) is equal to the quantity of product obtained on average by each worker (or labour productivity, π) multiplied by the number of workers employed in production (L).
4. If we divide both terms for N, we have 🡪 . Per-Capita Income depends on productivity and on the share of citizens employed L/N.

Productivity depends 🡪 level of **division of labour**: a high level of it brings to an increase in productivity.   
To show the three circumstances that connect them, he uses the example of the pin factory:  
**π** 🡪 depends on the level of the division of labour   
**1)** If a worker focuses only on the same task the downtime related to move from one task to another task, goes down. 🡪 **π goes up**  
**2)** While if he keeps doing the same job, overtime his production will increase 🡪 **first π goes down, then it goes up again   
3)** If some technical innovations are implemented/introduced **π goes up.**

\*\*\*But, for smith, there are also **negative effects** related to division of labour: a man who continuously repeats the same task over time would reduce to a **brute worker**, with reduced mental and physical skills. However, Smith considers these negative effects as small if compared to the positive ones.\*\*\*

But Smith states that the division of labour, in turn, depends on other variables, such as the **size of the market**, (since the division of labour is only possible when the economy can produce for a sufficiently large market, and can be intensified only if the market is expanding) again depending on:

* *Per-capita income* (more consumers that may buy the good) or average disposable income of consumers (Y/N)
* Free-Market Policies/ The level of liberal policies (by public authorities)
* Another factor is the level of development of **infrastructures** and **communication**, which enable people to move the goods across different spatial points.

The adoption of policies aiming at eliminating the obstacles to free trade and at favouring the expansion of the markets can introduce a **virtuous cycle/spiral**: if someone increases the size of the market, division of labour goes up and so does productivity. This translates in an increase of the wealth of the nation (per-capita income), which implies again an increase in the size of the market. The process repeats.   
  
Briefly:  
The expansion of the markets ⇒ ↑ division of labour ⇒ ↑ productivity ⇒ ↑ per capita income ⇒ further expansion of the markets.  
These mechanisms constitute the essence of the Smithian theory of the wealth of nations.

Economic growth (growth of per capita income Y/N) derives from π (and the combined action of the above-mentioned virtuous cycle) and L/N .

Here he makes an important Distinction: **Productive Labor vs Unproductive Labor**

1. The former (L) is composed by all the workers employed in the production process of goods, it essential to sustain the growth process.
2. The latter concerns the production of unnecessary goods for the functioning of the economy (e.g. luxury goods), it is not essential for the growth process. So there shall be less workers engaged in producing this kinds of goods, since the economy must grow.

**L/N, the share of citizens employed in the production process**.So the share of productive workers divided by total population depends on some factors

* **Institutional elements** introduced by government (e.g. age restrictions to be considered a worker is between 18-64)
* The **stage reached** by the process of **accumulation of capital**.

\*\*Surplus: Like Petty and Quesnay, Smith considers that the economy is able to produce a surplus. This net product can be used in productive activities, through an increase in capital stock, leading to economic development.\*\*Accumulation: or in other words the productive utilisation of the surplus, consists not only in investment in new means of production but also in the use of part of the surplus as means of subsistence for additional productive workers.

**Division of social classes:** according to Smith, there are three social classes:

* **workers** (do not own means of production and land but offer their labour service to capitalists in exchange to wages. Their propensity to save is 0 because the wage corresponds to the subsistence level)
* **landlords** (do not own capital and their propensity to save is very low or equal to 0. The income they receive in form of rent is spent in some good)
* **capitalists** (own the means of production and are interested in accumulating capital to launch investments. They gain profit, used to increase accumulation of capital: this means they have a positive propensity to save). The contribution in terms of economic growth is given by capitalists, who invest profits in new accumulation of capital and therefore are considered the **engine** **of the economy**.

Since workers receive a wage just sufficient to maintain themselves, the incomes of capitalists and landlords are equal to the surplus obtained within the economy. In particular, the higher is the proportion of the surplus which goes to profits, the higher will be the rate of growth of the wealth of the nation. The general interest of the nation, therefore, coincides with that of the bourgeois class.

**Theory of value**

The “theory of value” concerns the linkages among sectors of the economy (social classes) that enables the operation of the economic system based upon the division of labour. The linkages among the sectors of the economy system contribute to the determination of the prices (values in exchange) of various goods and the income distribution.

Example: Simplified Economy  
If there is an economy composed by two classes

* Workers 🡪 wages
* Farmers 🡪 profits
* One sector (agricultural) producing 🡪 one kind of output (corn),
* We need an amount of work and an amount of seeds.

In this simplified economy, workers need to buy the corn from farmers to survive.   
In turn, farmers need to buy workforce from workers, so the act of **exchange** between workers and farmers is pivotal to the functioning of this economy.   
The price of corn has to be set to a level that guarantees the reproduction of this economy in the future; namely, it must guarantee a level of profits and wages that enables the process to repeat over time.

The same happens in we consider two sectors, adding the manufacturing sector. If the output of this new sector enters as a mean of production in the agricultural sector (corn is produced by using seeds, work and manufactured goods), this implies that factories and farmers enter into contact to exchange the manufactured goods.   
The prices of the goods are fixed at a level that satisfies everyone and guarantees the reproduction of the process.

How are these prices set? Smith introduces a distinction between **value in use** and **value in exchange**,

1. Value in use is the utility we obtain by the possession of material goods
2. Value in exchange is the power of a given good to buy other goods (= market price).

Smith focuses on the latter, introducing another distinction between

1. **Price market** (observed in the market and resulting from supply and demand)
2. **Natural price** (theoretical price corresponding to reproduction condition in the economy).

Smith plans a three-stage **programme** for his investigation of the problems of **economic value**:

1. **To identify the “real” measure to value**

The two prices differ in each period, since the price market, caused by demand and supply, may change also its theoretical value. In general, the natural price is a sort of central price and the market price oscillates around it. This fluctuation is the result of the change in demand and supply in the market.   
  
In studying the natural price, Smith identifies it with **production costs**. However, this relation is not feasible because it does not take into account the possibility that other goods enter as means of production for the good in question: in this case, to know the price of either good implies to know the price of the other, resulting in a **logical vicious circle**.

The solution is finding a good that enters in both production functions without needing to be known *a priori*.   
This is the problem of finding a **measure of value** and Smith tries to solve the problem introducing two definitions (which can both have math formulations):

* **Labour embodied** (the value of a commodity corresponds to the quantity of labour needed to its production) [early and rude society]
* **Labour commanded** (the value of a commodity corresponds to the quantity of labour it can purchase) [more complex society].

The first solution works only in a simple primitive economy without land and capital (only workers) and not in one divided into sectors and social classes. For example, the quantity of labour embodied used to produce a commodity is split into **direct** (labour needed to produce the commodity) and **indirect labour** (labour needed to produce the production means that enter in the production function of the commodity).

However, the latter makes things complicated if we do not take labour commanded into account. In the model of the labour commanded, suppose that wages are equal to 10 and price is 300, labour is equal to the ratio between price and wage, so 300/10 = 30. This model works in a complex economy made up of different sectors and social classes.

**Labour theory of value** let’s do an example:

* Assume that only one good (corn) is produced and, do produce it
* Labour and capital are needed, both measured in terms of corn.
* Wages are paid after work (production process) is done and this implies that wages do not enter in the calculation of capital (composed only by corn that enters at the beginning of the production process).
* No rent is paid on land used
* Suppose that there is no rent and therefore there are only two classes: capitalists and workers.
* ***k*** stands for **capital coefficient** (seeds needed to produce 1 unit of corn), so it is necessary that ***k* <1** (otherwise surplus = 0).
* ***l*** stands for **labour coefficient** (labour needed to produce 1 unit of corn).
* Now we can express the labour embodied (both direct and indirect)   
  as **λ**, which is equal to . Therefore, and .
* As for labour commanded, ***r*** stands for **rate of profits** (profits divided by capital), so .
* ***w*** stands for **monetary wage**
* ***p*** is the **monetary price** of 1 unit of corn. The value of the corn in labour commanded is given by . According to Smith, *p* is the natural price that guarantees the reproduction of the good in the economy, so if it has to satisfy this condition, it should correspond to the cost sustained by capitalists plus profits.

Therefore,  
,   
So price of a commodity is the sum of wages (w ·l) and profits (p · k · r) plus the capital anticipated (p · k) to produce it.  
This way, price is the natural price that satisfies the condition of reproduction of the economy.

Expressing the price in labour commanded:  
If we divide both sides for *w*, we get .   
The labour commanded is greater than the embodied labour precisely because there is a profit, and that it becomes always greater as the profit rises.

Isolating , we get ,

so is the labour commanded, which takes into account the profit rate, corresponding to the income of the capitalist.

The theory of value based on labour commanded is correct as a price theory if profit is pre-determined (i.e., if it presupposes a theory of profit as a residue). On this argument, however, Smith sometimes lets himself be led astray by misleading propositions.

Smith does not elaborate any systematic account of the independent determination of wages, rents and profit, and, without these, his theory of value remains enmeshed in circularity (vicious cycle problem).

1. **To isolate its component parts;**

Moreover, wage represents the income of the other social class, workers. Therefore, to know the value we need to know also profit rates and wage, whereas for labour embodied we needed only *k* and *l*. To understand what the value of labour commanded is, we need a theory explaining what the value of wages and profit rate is.   
Smith states that wages correspond to a subsistence level, but he says nothing about profit rate, so the equation is useless if we do not determine the termination of profit rate.

Later, Smith introduced a third theory of value considering the problem behind this second version. He called this third version **adding-up of components theory**, which states that the value (= *p*) of a given commodity is equal to the sum of the income of the social classes in the economy, so the income of workers, landowners and capitalists.

Since in our example landowners are absent, the formula becomes .   
If the capitalist uses the capital in the production process, it is a sort of remuneration for using this capital, which is similar to a rent but refers to capital rather than to land.

The problem with this theory is the fact that, to get a price, we need to know the price of the good that enters in the wage and in the capital. In more complex economic systems, they are not expressed in terms of corn like in our simplification, so we need a primary source of the value of the good entering in capital and wages. In turn, these goods are produced by other means of production, so we need a primary source of value, which is the problem related to this third theory of value. This problem is called **vicious cycle problem**.

Furthermore, there is another problem: this solution does not consider the linkages between the incomes of different economic sectors: the total income of the economy corresponds to the sum of their income, but if one of them goes up almost one of those of the other classes must decrease. In fact, total income for a given period of time is fixed. This problem is called **logical inconsistency problem**.

If we divide everything for total income, we have  
**1 = w/y + rent/y + profits/y** in any period of time, because the share of income for each social class must satisfy this condition. This limit was not considered by Smith.

1. **To analyse the factors that might account for a deviation of the “market price” from the “natural price”.**

The “market price” (i.e., the price we observe in the market) may differ from the natural level. For each good, in a given moment in time and in a specific place, the exhange value may differ from the natural price. Actually, these differences are very common and caused by accidental circumstances which modify – in unpredictable ways – the supply and/or demand of this commodity.

In the presence of an excess of demand, the market price will rise, while it will fall if supply exceeds demand. However, “the natural price ... is, as it were, the central price, to which the prices of all commodities are continually gravitating” (p. 160); and this occurs precisely because competition regulates the operation of the markets.

The above-mentioned sentence contains two important messages:

* The prices of all commodities continually gravitate towards their natural price. Without using the term, Smith is trying to bring in a concept later economist describe as “equilibrium”. In particular he comes close to this idea when describing the convergence of natural and actual prices as “this centre of repose and continuance..”
* Competition is the force that leads the market prices to their natural level, while monopolistic forces prevent this tendency. Smith writes: “monopolists, by keeping the market constantly understocked . . . sell their commodities much above the natural price”.

**Economic growth and stationary economy:**

The division of labour unquestionably leads to a rapid increase in productivity, which in turn leads to the growth rate of the economy. Two interrelated questions are important:

1. What is the reason that compels society to the continuous division of labour, and, therefore, to economic growth?

Smith suggests that people in all societies are characterized by the insatiable desire for bettering. In a modern economy this takes the form of a *desire to increase the revenues (or profits).*

The consideration of his own profit is the sole motive which determines the owner of any capital to employ it either in agriculture, in manufactures, or in some particular branch of the whole sale or retail trade. (WN, p. 355)

The profit is the goal of a typical entrepreneur and is the cause pushing him to invest in new plant and equipment, which allows a finer division of labour, a subsequent increase in productivity, and, therefore, economic growth.

Smith also claims that, because of competition, the profit rates obtained in different branches of commerce should be either equal or tend to equality.

1. How do we know that this growth tendency will continue and will not be stopped? In general, capitalists are pushed towards increasing their accumulation of capital in order to raise profits, so this mechanism usually takes place. Therefore, economies should exhibit a positive growth over time, but are we sure this really happens?

According to Smith, **the increase of profits encounters a limit**:

The increase of stock, which raises wages, tends to lower profit. When the stocks of many rich merchants are turned into the same trade, their mutual competition naturally tends to lower its profit; and when there is a like increase of stock in all the different trades carried on in the same society, the same competition must produce the same effect in them all. (WN, p. 87)

Smith takes into account two kinds of competition:

* **Internal competition** is the one internal to a single market that enables to equalize supply and demand within it (invisible hand mechanism); In the product market where each producer is compelled to sell what he deals is somewhat cheaper;
* **Competition among capitalists** leads all economic sectors, so it is not related to a single market. All capitalists want to realize the highest level of profit, so without restrictions they are free to move their capital across different sectors to find the most remunerative solution 🡪 competitive forces push profits to equalize in all sectors.   
  This competition, in turn, results in the fact that profits in all sectors must eventually be equal to 0 (positive profit during competition 🡪 short run, 0 profit at the end of competition 🡪 long run).  
  This long run condition is called **stationary state** or **zero-growth condition**.

The sentence is quite misleading respect to the central point of the theory of value. Smith’s theory of value forgets the presence of a constraints binding on the income distribution. More in detail, according to Eq. (5), if w ↑ ⇒ p ↑. Here, Smith assumes instead that an increase in wages leads to a reduction in profits  
.In the labour market, where the **competition of producers raises the wages paid to the workers, and, therefore, profits are diminished**.

An increase in the accumulation of capital (new investment) produces an increase in the share of workers employed in the productive sector over the total population.  
So L/N goes up, implying an increase in the wealth of nation expressed as per capita income 🡪 increase in y/N.

This interpretation of the **falling rate of profit** as a result of the intensification of competition is advanced by Ricardo. At the same interpretation will arrive later Marx.

We can interpret this passage of Smith as an anticipation of the idea of steady-state of the economy – i.e., a situation in which all accumulation and growth come to a halt – even if it seems not compatible with his theory of value.

**Final observations**

The concept of natural law is present in Smith. In the analysis of the human behaviour, Smith shows that moral and legal rules are sufficient elements in constructing social harmony. Market exchanges produce (frequently) beneficial outcomes since people, pursuing the self-interest limited by sympathy, act in a “rational way”.

The theory of value (labour commanded) has two disadvantages.

1. The components of (natural) price are expressed in terms of labour (i.e., wages, profits, and rents ar expressed in wage). But the price of labour needs to be determined. How this price is determined in the first place? We are in a vicious cycle.
2. Smith considers wages, profits, and rents as given from outside, and he simply adds up these three income categories to determine the natural prices. On the basis of this interpretation, if one of the constituent of the (natural) prices changes, then the prices of the commodities change in the same direction, leaving profits and rent unaltered. If this interpretation is correct, then the Smith’s theory of value fails to take into account the constraint binding on the total income and thus makes a logical error. This point leads to problem of logical consistency.

Ricardo tries to solve these two drawbacks

**THOMAS ROBERT MALTHUS (1766 - 1834)**

Malthus is famous for his population studies: his idea is that the growth of population may bring the society in a condition of poverty (**negative effect of population growth on society**) and he was influenced by Smith’s suggestion of a stationary economy in the long run.

**Malthus’ Mechanism**His theory can be summarized by a statement according to which **agricultural** **production** grows according to **arithmetical proportion** (**Ft = F0 + rt 🡪** growth rate is the sum of initial output and rate of food at a certain time), which can be represented in a **linear** way graphically.   
Instead, **population** grows according to a **geometrical** proportion 🡪 **Pt = P0(1 + r)t**, which is not linear but **exponential** graphically. In fact, the quantity of **land** is **limited**, but the capacity of **growth** of the **population** is **unlimited**, so food cannot satisfy the increase of population.

**Population Growth can become a problem**More in detail, he argues that the human sex drive causes faster and faster expansion of the population. Food production does not keep up with population because of the law diminishing returns: as more people work on a fixed amount of land, less and less output is added.

**Counteracting Force – Availability of means of subsistence**The result is an ever-widening imbalance between the number of people and the supply of food. This implies that population, at time t + 1, is pushed down by some forces that will reduce the gap.

In other words, the idea is that population growth is necessarily limited by the availability of means of subsistence.

* As soon as these become available in excess of the strictly necessary, the population tends to grow more rapidly than agricultural production (if food is more than population there will be over-nutrition, a low level of mortality and larger birth rate)
* However, there is a counteracting force. Malthus says that **malnutrition and disease** – caused by a more limited food supply – will lead to increased mortality and stop the imbalance from getting out of control. Less food also means that fewer children will be supported, and the birth rate will fall. This **will lessen the pressure on land, restoring living standards**.

**Malthusian Trap**The implication is that any kind of intervention aimed at improving the health of population (e.g. policies in favour of working conditions) is useless, because in the long run it will be cancelled out by the gap between food and population, since the economy always reverts to the level of food output that is just enough to support a stable population.

**Iron Law of Wages – Malthusian Principle**Therefore to reach equilibrium, **wages** must be **equal** to **subsistence level**, according to which the wage rate tends to oscillate around subsistence level.

The problem with this kind of analysis is the fact that Malthus does not consider **technological** **innovation**, which may increase the production of food and undermine this mechanism.

**JEAN BAPTISTE SAY (1767-1830)**

He was famous for his **Say’s law**, which can be summarized by the sentence ***“supply creates its own demand”***.

Say claims that as soon as a product is made, it creates a market for other products “to the full extent of its own value”. This means, for example, that the money a tailor receives when he makes and sells a shirt is then used to buy bread from the baker and beer from the brewer.  
This hypothesis is based on the idea that people have no desire to possess money, yet they use all of them immediately to buy goods in the economy.

Therefore, the total value of commodities supplied matches the total value of goods demanded: This way, no over-production can be observed, since all supply is demanded by consumers.

Nobody wants to hold on to money, because it falls in value 🡪 they swap it for other products they want 🡪 Supply creates its own demand.

If supply creates an equal value of demand, there can never be overproduction, or “gluts”, in the economy as a whole. Say’s law has become a forum for conflict between the classical and the Keynesian economists. The former, such as Say, believe that production, or the supply side of the economy, is the most important factor in growing an economy. Keynesian argue that growth comes only with increased demand.

**DAVID RICARDO (1772-1823)**

**Analytical Programme**  
Ricardo tries to explain the main target of political economy, namely how **national income** is **divided** among **three social classes**: **workers**, **landowners** and **capitalists**.   
In doing so, he used the same view as Smith: according to him, society is based on **division of labour** and there are **two sectors**, **agricultural** and **manufacturing**. This means that there are three types of income:

1. **Wages** (= subsistence level)
2. **Rent** (used by landowners for luxury consumption)
3. **Profit** (used by capitalists to increase the accumulation of capital).

Therefore, the driver of the economic growth is eventually the capitalist, who accumulates capital and drives growth.

**Trying to solve the problem of “vicious cycle” in Smith’s analysis of value using the theory of labour embodied**  
Up to this point, Ricardo’s view is identical to Smith’s one, yet his main contribution is using the same framework to solve the **two problems** encountered by **Smith** in his **labour theory**:

* The **vicious cycle** (determination of national prices requires the determination of the price forming the income of the various classes)
* The **logical inconsistency** (the adding-up theory does not satisfy the budget constraint of income: the sum of the share of income of the three classes must be equal to 1 and the fact that if *w* goes up so does the price disrespects this statement).

The solution advanced by Ricardo entails the introduction of constraint condition in the analysis.

**Wages**  
According to him, wage corresponds to **subsistence level** and **differential rents** correspond to rents, which are determined according to the **theory of differential rent**. Profits, instead, are the **residual** part 🡪 **profit = total income – (rent + wage)**.   
Therefore, if rents or wages go up profit is automatically reduced: this is Ricardo’s solution to logical inconsistency.

Ricardo introduces the determination of rents through the **Theory of differential rents**. – **Rents and Profits**Example: Simple model of the economy

* Suppose that there is an economy based on the division of labour with two broad sectors – agricultural and farms (manufacturing) – and three classes: workers, landowners and farm capitalists.
* Wages correspond to subsistence consumption level (depending on the historical factors determining the minimum standard of living) and therefore constitute part of the necessary expenses of production; rent and profits correspond to the surplus.
* The landlords allot their rents to luxury consumptions, the capitalists are induced by competition to invest practically the whole of their profits. Therefore economic development stems from accumulation of capital

If there are an abundance of fertile land at an excellent location, only a small portion of it is cultivated. Land is a free good; no rent is paid.

However, when population grows, land of inferior quality will have to be cultivated, and rent will be paid for the better land.

* Land used to produce output (corn) is divided into three parts:   
  **land 1**, highly productive (130 units of corn)  
  **land 2**, with a medium productivity (120 units of corn)  
  **land 3**, with a low level of productivity (110 units of corn).

These different quantities of output are obtained using the same amount of capital and labour, so the production function for every land corresponds to F (30 units of seed 🡪 capital + 50 units of corn 🡪 wage).

Suppose that there are three stages of economic development:

Suppose there are three plots of land: No.s 1, 2 and 3, each of equal size, but different quality. With an equal amount of labour (one worker receiving a fixed subsistence wage equal to 50 tons of corn) and capital (30 tons of corn as seeds and 50 tons as subsistence for the worker)1 on each plot, a net produce of 100, 90 and 80 tons of corn are obtained on each respective plot. This is the final result of three different stages

1. Stage 1 is the starting period of development, when population is low and availability of land is high, so only land 1 is needed to satisfy the needs of the population. This implies that no rent is paid (surplus of land), so there is no competition among landowners. π/*k* represents the profit rate, equal to the ratio between total profit and capital (value anticipated by capitalists at the beginning of the period, which includes wages 🡪 w + k).

*Stage 1*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Land** | ***y*** | **Seeds (*k*)** | ***w*** | **Rent** | **Surplus (output – cost)** | **π (net output – *w* – rent)** | **π/*k*** |
| 1 | 150 | 30 | 50 | - | (130 – 30 – 50) = 50 | 50 | 50/80 = 0.63 |

1. At stage 2 population has increased, implying the need to use land 2 and competition among capitalists to obtain land 1 (most productive). This means that the landowners of land 1 are able to require a rent, corresponding to the difference between net output obtained by land 1 and net output obtained by land 2. Net output is calculated as the difference between *y* and seeds, so rent = (130 – 30) – (120 – 30) = 100 – 90 = 10.

*Stage 2*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Land** | ***y*** | **Seeds (*k*)** | ***w*** | **Rent** | **Surplus (output – cost)** | **π (net output – *w* – rent)** | **π/*k*** |
| 1 | 130 | 30 | 50 | 10 | 50 | 130 – 30 – 50 – 10 = 40 | 40/80 = 0.5 |
| 2 | 120 | 30 | 50 | - | 120 – 30 – 50 = 40 | 40 | 40/80 = 0.5 |
| Tot. | 250 | 60 | 100 | 10 | 90 | 80 |  |

1. At stage 3, further increase in population leads to two kinds of competition among capitalists: one to use land 1 and one to use land 2, resulting in two kinds of rent, one for each piece of land. Rent 1 is equal to net output of land 1 and net output of the land with the lowest level of productivity, namely land 3. Therefore rent 1 = (130 – 30) – (110 – 30) = 100 – 80 = 20. The same for rent 2, which corresponds to 10.

*Stage 3*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Land** | ***y*** | **Seeds (*k*)** | ***w*** | **Rent** | **Surplus (output – cost)** | **π (net output – *w* – rent)** | **π/*k*** |
| 1 | 130 | 30 | 50 | 20 | 50 | (130 – 30) – 50 – 20 = 30 | 30/80 = 0.37 |
| 2 | 120 | 30 | 50 | 10 | 40 | (120 – 30) – 50 – 10 = 30 | 30/80 = 0.37 |
| 3 | 110 | 30 | 50 | - | 110 – 30 – 50 = 30 | (110 – 30) – 50 = 30 | 30/80 = 0.37 |

**Marginal Land – Conclusions**This is a way to show that rent, on a given land, is equal to the difference between the net product of a given land and the net product of the least fertile land (brought into cultivation).

**Rent – Conclusions**So, the theory of determination of rent according to Ricardo follows this reasoning, so that when a new land is introduced, profits go down because rents are paid on the most productive land. This way, wages are determined at the beginning (subsistence level), rents are determined according to the theory of differential rent and profits are residual: this is how Ricardo solves the problem of logical inconsistency.

**Profits – Conclusions**   
With respect to profits, Ricardo argues that **they are a residual**, that is what remains to the entrepreuner after he paid the rent to the landlord and the wages to the workers. This implies a presence of constraint binding on the total income.

In conclusion, Ricardo, with the theory of differential rent and the determination of profits as residual, is able to solve the logical consistency problem of Smith’s analysis.

**Falling Rate of Profits (π/k)**

What happens to the rate of profits (π/k) in agriculture?

* When only land No.1 is cultivated, the profit is equal to the surplus of the land 1, that is, 50 tons of corn (see table (Stage 1)
* When also land No.2 is cultivated, the pofit on land No.1 shrinks to 40 tons, because 10 tons are now paid for the rent of land 1. Also the profit on land No.2 is equal to 40 (no rent is paid on this land; see table (Stage 2))
* Finally, when even land No.3 is brought into cultivation, the profit on land No.1 shrinks further to 30 tons. Also the profit on land No.2 declines to 30. And the profit of land No.3, on which no rent is paid, is also equal to 30 tons (Stage 3).

Ricardo’s model implies that, **as less fertile land is brought into cultivation, the profits in agriculture drop.** Since in each land are employed the same quantities of workers and capital, also the profit rate (=π/k) drops (see tables Stage 1, Stage 2, Stage 3).

Ricardo also argues that the increase of rents and the decline of the profits in agriculture signals that the general rate of profit in the economy is decreasing.

This conclusion is the result of the idea, introduced by Smith, that when capitalists are free to move their capital from one investment to another, the return on the funds invested in the different sectors — the rate of profits — must exhibit the same pattern.

The net effects of such developments and of diminishing returns to land would in the long-run lead to a stationary state, i.e. to an economy without growth.

**Technological Changes**

In formulating the theory of falling rate of profits, Ricardo understimates the role of technological progress in raising production which can suspend the operation of the law of diminishing returns. The increase in agricultural productivity due to technological progress can prevent the reaching of the stationary state.  
Ricardo seems more interested in studying the impact of an increase in productivity on total employment.

In a first stage, according to what is known as the **theory of compensation**, Ricardo sustains that **technological progress**, when introduced in in a given sector, **generates unemployment** in the sector itself; however, in the long-run the jobs lost in the first sector are made up for by new jobs in other sectors, and the general standard of living improves.

In a second stage, the opposite thesis – i.e., technical progress generates unemployment – is supported by Ricardo. Ricardo’s reasoning may be summarised as follows. The capitalist introduces new machinery with a view to generating an increase in profits. The net product of the economy, identified with profits and rents, increases. However, the investment in machinery implies the decision to employ in the production of machinery a certain number of workers, previously employed in producing subsistence goods. We thus have a lower production of subsistence goods. As a consequence, the number of labourers that the economy can maintain necessarily decreases. Thus employment decreases.

**The theory of comparative advantage**

It was strongly influenced by the dominant mercantilist prescription, implying that the government trade restrictions are the main economic prescriptions followed by the state.   
According to the mercantilists’ view, governments introduce international trade restrictions policies with the attempt to enrich the nations through an inflow of gold.

The policy implication is **that both import and export must be improved to reach the economy well-being**. The theory of comparative advantages reinforces this policy conclusion: the international division of labour brings about increased availability of commodities for every country.

According to this theory, **each country specializes in the production of those commodities for which it enjoys a relative advantage in the cost of production**. This means that there can be international trade between two countries even if, in terms of difficulty of production (expressed in terms of the hours of labour necessary for their production), all commodities have a higher cost in one country than in the other.

Example:  
Suppose that there are two countries (Portugal and England) and each of them produces only two goods (wine and cloth).

* To produce one unit of wine, Portugal needs 80 hours of work and to produce one unit of cloth it needs 90 hours.
* England produces one unit of wine in 120 hours and one unit of cloth in 100 hours of work. The value of these two goods is expressed in terms of time of labour.
* Therefore, Portugal needs 170 hours to produce one unit of each good and England needs 220 hours to do the same if they both produce internally the products.
* The ratio between the two goods is 1 wine/1 cloth and wine is expressed in terms of cloth.
* So, for Portugal the ratio is 80/90 = 0.89 and for England it is 120/100 = 1.2.

So, even if Portugal has an advantage in both goods (cheaper) and therefore has an **absolute advantage**, England is **comparatively more efficient** in producing cloth, since the cost of wine in terms of cloth is greater. On the contrary, Portugal is comparatively more efficient in producing wine.

**So, if the two countries decide to trade internationally and focus on the good in which they have a comparative advantage of production, they may increase their economic situation**. In this case, the price of exchange must be stated in terms of cost.

🡪 🡪 condition for the theory to work

Portugal needs 160h to produce 2 units of wine, whereas England takes 200h to produce 2 units of cloth.   
If they exchange one unit of wine for one of cloth, the result is that they both have 1 unit of each good at the same cost (in terms of time). This way, both Portugal and England take less time (**lower cost**) to get **the same amount of goods** if they engage in **international trade** 🡪 160 < 170 (save 10hrs) and 200 < 220 (save 20hrs). In addition, each country can use the hours saved for increasing the production of the good for which it has a comparative advantage.

**When countries specialize in goods for which they have a comparative advantage, more goods are produced in total, and trade delivers more and cheaper goods to both nations.**This works only if the country has a comparative advantage in the production of one of the two goods.

**Theory of Value**

We can distinguish two successive stages in the development of Ricardo’s theory of value

**Stage One:** Ricardo simply “circumvents the problem” of value focusing exclusively in the agricultural sector of the economy

* Output and capital advanced are the same (different quantities of the same output, e.g. corn): corn represents the output as well as the mean of production (input), the wages and profits.   
  Under the policies of competition among capitalists at sector levels, we expect that the profit rate observed in the agricultural sector is the same for all the other sectors of economy.
* The relative prices of all commodities produced in the economy must adjust in such a way as to ensure the uniformity of the rate of profits.

This hypothesis, however, is too simplistic and does not consider the linkages/interdependence among different sectors and different technological compositions of the various sectors. Moreover, the possibility that means of production of one sector can enter another sector is ignored.

**Stage Two**: Ricardo accepted this criticism and, in a second stage, introduced a different solution, using the **labour embodied theory** to explain the exchange rate between two goods (not to explain price level in a primitive economy without land and capitalists as Smith used to). According to this theory, the exchange ratio between two commodities corresponds to the ratio between the quantities of labour directly and indirectly required to produce each of them.  
This theory is useful also in more complex economies, including land and capitalists, to explain the so-called **natural exchange ratio** between two commodities.

Example:

* Assume that an economy produces two goods, corn (cn) and bread (br) and there are no rents.
* Therefore, the economy is made up of two classes (workers and capitalists) and wages are paid after work (end of production process), therefore do not enter in the calculation of profit.
* Capital in both sectors is made of corn and the capital coefficient   
  (*k* 🡪 quantity of capital employed in the production process of corn and quantity of corn employed in the production process of bread) is equal to 1
  + Therefore capital which is not used in the production of corn is devoted to the production of bread, that is more capital intensive than the other one (larger capital coefficient 🡪 *k*br > *k*cn).
* The quantity of labour employed in each sector is equal (*l*cn = *l*br).
  + Therefore the quantity of labour directly and indirectly needed to produce 1 unit of corn is equal to the quantity of labour directly needed to produce 1 unit of corn plus the quantity of labour directly and indirectly needed to produce the capital entering the production of corn

λcn = *l* + λcn*k*cn; *l* = λcn (1 + *k*cn);  
.   
This is the quantity of labour directly and indirectly needed to produce one unit of corn.

* In the second sector, the quantity of labour embodied needed to produce one unit of bread is equal to

*l +* price of the corn + capital coefficient of bread (remember capital is made of corn) 🡪 λbr = *l* + λcn*k*br = *l* +  *k*br = =  **🡪** quantity of labour embodied needed to produce one unit of bread.

* Labour embodied theory tries to explain the natural exchange ratio between two commodities. Therefore, if we take the ratio between labour embodied in the two sectors (λcn and λbr) it is proportional to the ratio of the prices of the two goods 🡪
* To show this proportionality, we need to find the value of the two prices. Price of corn is equal to the product of wage labour, wage plus the cost of capital, the quantity of capital plus the value of capital anticipated and the rate of profit

🡪 🡪 🡪 🡪

* As for the bread sector, since the capital in both sectors consists of corn, the price of the capital in the bread production is equal to the price of corn.

🡪

* For the condition to be satisfied, we have to consider the ratio of Pcn and Pbr 🡪

**🡪**

As for , we have 🡪

If two commodities contain different proportions of direct and indirect labour, their exchange ratio (pcn/pbr) depends on the profit rate r of the economy.

If the profit rate rises, the exchange rate (i.e., the price ratio) rises too, whereas the quantity of labor employed in corn and bread does not change!

The profit rate changes reflect a change in income distribution among classes. In our simplified exercise without rents, a rise in profit rate occurs because a decrease in wages. Remember that the price of a generic commodity using only itself as a mean of production canbewrittenas: p=l·w+p·k+r·p·k. Itisimmediatetoseethatanegative relationship between w and r occurs: r = (1/k) − [l · w/(p · k)] − 1. In particular, a decrease in w is accomplished by an increase in r.

**The fact that the exchange ratio between commodities depends also on the income distribution is a bad news for the labour-embodied theory of value: it means that this theory does not completely explain exchange ratios between commodities**. Ricardo minimizes the problem, and claims that the effects of the rate of profits on the exchange ratios between commodities are in fact negligible and not exceed six or seven per cent.

In such aforementioned situation, it would be very helpful if we could find a commodity whose production would always require the same quantity of labour and whose price would not change with every change in the profit rate. If we discover such a commodity, such an “invariable measure of value”, we can use it as a numeraire. Then, we would be able to identify the source of each change in the relative prices in the quantity of labour contained in the production of the numeraire commodity.

Ricardo devoted the rest of his life to the discover of such a commodity, however, without success.

Briefly:

The two quantities seem similar, yet there is a slight difference in denominator, namely the presence of the profit rate in the calculation of price. This implies that, if the profit rate goes up, the exchange rate (the price ratio) does the same, so it is sensitive to profit rate. **The ratio between the values of labour embodied, on the contrary, is not sensitive to profit rate**: this means that Ricardo’s labour embodied theory to explain the exchange rate of two commodities fails.

The **failure** lies in the presence of *r* in only one of the two ratios. Therefore, on the one hand Ricardo was able to solve Smith’s vicious cycle problem, yet the solution presented suffers from another problem: the sensitivity of the price ratio and the insensitivity of labour embodied to profit rate.

In general, if the distribution of income changes among classes, the price ratio changes and the labour embodied ratio remains fixed. Ricardo states that this problem is irrelevant because he thought that the effect of profit rate on the price ratio was very slight. To find a solution, it is necessary to identify a commodity whose production regards always the same quantity of labour (insensitive to income distribution) and the price does not change when distribution of income changes (insensitive to income distribution as well). Ricardo tried to identify this commodity without success.

**Borrowing and Debt – Ricardian Equivalence**

Should government spending be financed by borrowing or taxation? This question is addressed by Ricardo.

Ricardo argues that the **method of financing should make no difference**. Taxpayers ought to realize that government borrowing today will lead to more taxation in the future. **In either case they will be taxed**, so they should set aside savings that are equivalent to the amount they would have been taxed today in order to meet that eventuality.

Ricardo suggests that people understand a government’s budget constraints and continue to spend in the same way regardless of its decision to tax or borrow because they know these will ultimately cost them the same. This idea is known as **Ricardian equivalence**.

**KARL MARX**

Karl Marx was a revolutionary economist, founder of the Communist movement. He published the *Communist Manifesto* that represents the programme of the movement.

There is a clear relationship between Marx and all classical economists, since he uses the same framework and, in particular, the labour theory of value. In addition, he agrees with them about the importance of profit as the main driver of output growth and of the behaviour of social classes. At the same time, despite the common points, he criticizes the classical economists in two points:

* **Origin of profit (Theory of Exploitation):** he places it in **labour exploitation** while classical economists had not been able to understand it. Marx focuses his analysis on two social classes: **workers** and **capitalists** (no landowners), since this division reflects the situation of that time, with the **struggle** between these two classes. This struggle is aimed at increasing their situation and behind this competition is the pursuit of profits by capitalists. In capitalism, the firms are forced to behave as cave men (extract as much as possible from business activity) and if they were unable to produce a better condition they would be cut out of the market, so they were pushed to search profits. To do this, they had to push the wages at low levels: this way, they could extract large profits from the production process and increase the accumulation of capital, being able to invest more. The competition in the extraction of profit is at the centre of the exploitation of labour, being its cause 🡪 **firms seek the maximum production from workers for the lowest cost**. To show this behaviour, Marx uses the example of a workday production: the first part of the workday is devoted to produce profits needed to pay the wage (fraction of the profit); the rest of the workday is devoted to generate surplus profit that goes to the capitalist. The part devoted to maximize profit is the second one and to do this they have to decrease the first one as much as possible. This is the core of the fight: capitalists try to maximize the second part and workers try to defend the fraction of profit devoted to their wages. This **struggle** is **exploitative** because capitalists are more powerful than workers because in the market there is a large supply of workers and because they own the means of production. Marx explains this exploitation according to the value theory of labour, measuring exploitation by expressing value in terms of labour directly and indirectly employed (labour embodied theory = CE).   
  Assume that there is one good (corn) produced by seeds (corn itself) and labour: using the same terminology of Smith and Ricardo, . *k* must be < 1*.* If we take *v* as the fraction of workday spent in the production of wages, we can write that where is the **surplus value captured by capitalists (*s*)**, is the **capital** (***c***) and  **(*V*)** is the part of profit devoted to **wages**. is the **variable capital**, whereas **c** is the **constant capital** used in the production process. The **rate of exploitation** (**σ**) is equal to ***s/V***, so *.* When v = 1, exploitation is 0 because workers devoted all the workday to produce wages; on the contrary, exploitation is at its maximum when v = 0.  
  The profit rate (***r***) is equal to ***s/c***, which can be expressed as . This way, the **technical composition of capital** is equal to , so exploitation rate is in a positive relationship with the profit rate. Marx believes that the **competition** among capitalists will lead to an **equalization** of **profit rates** across economic sectors.
* **Capitalist system:** classical economists considered it as universal and static (result of the organization of society), whereas Marx considers capital as a mean of production resulting from a particular historical context. He highlighted the inability of classical economists to acknowledge the existence of “exploitation” in the capitalistic mode of production and to capture the historical evolution of capitalism.  
    
  Therefore, it evolves and will eventually break into socialism and communism  
  This idea of capitalism is a consequence of IR: Marx was writing against a backdrop of great industrial change. Overcrowded, newly industrialised cities were expanding, and much of the working class lived in great poverty. Marx saw history as the story of class struggles, in which the oppressed fight against their oppressors.  
  Socialism, he thought, would bring to the collapse of capitalism towards socialism and communism.  
    
  Marx argued that the capitalist bourgeoisie mercilessly exploited the proletariat. He recognised that the work carried out by the proletariat created great wealth for the capitalist. The products created in the factory (the material outcome of the workers’ labour) were sold for more than the value of the labour itself i.e. more than the workers’ wages.  
  Marx sustained that the capitalistic mode of production is characterized by instability, continous crises, and a “progressively tendency of the rate of profit to fall”. All these aspects will bring to the collapse of the capitalistic system.

At the beginning, Marx uses the same framework as Classic Economists in the value theory of labour (labour embodied), yet there is a difference: **Marx states that goods are not traded at labour values (no correspondence)**. Instead, **goods** are **exchanged** at **production prices**, corresponding to a uniform rate of profit. The ratio between the production prices of two commodities is different from the ratio of their values expressed in labour theory 🡪 . For them to be equal, a condition must be satisfied: . A second condition is that 🡪  **🡪**   
Marx knows it is impossible, yet when we measure **aggregate labour** the working composition of labour works well, so the equality is satisfied: the value of the output expressed in labour terms is equal to the production price. He uses this result to move from value expressed in labour terms to value expressed in terms of production price. For example, to express the rate of profit of sector j je uses the equation . So, to translate the value from labour to production price he uses the calculation . Yet, this operation does not work, since two conditions to move from to this are needed: **technological** **composition of capital equal in all sectors** and **real wage (wv) equal to total workers in the economy (1/L 🡪 productivity of labour)**. The second condition entails that the rate of profit is equal to 0, which is impossible.

Marx criticizes the usage of labour embodied theory to measure the value of goods, since the ratio of the production price of the two goods does not correspond to the ratio of the values of the goods expressed in terms of labour. However, if all values are expressed in terms of aggregate labour the formula works according to the formula that leads to a price measure from a value measure. However, this works only if the two conditions are satisfied and this never happens, so the operation does not work. Ironically, these two conditions were the same that undermined the equality between the ratio of the production price of the two goods and the ratio of the values of the goods expressed in terms of labour.

The **reproduction scheme** is a framework used by Marx to describe the functioning of an economy: it is a **two-sector model** organized in a general equilibrium (each sector operates in equilibrium). In particular, Marx identifies **two** kinds of reproduction **schemes**. In the simpler one, the entire surplus produced in the economy is spent in luxury consumption and, period after period, the level of output stays unchanged. This economic system is able to reproduce the same level of output in all periods. The second version is the **extended reproduction scheme**, where a fraction of surplus is invested in increasing the accumulation of capital. This way, the system is capable of producing a level of output that increases over time. The rate of growth of this output follows a stable level called **balanced growth** pattern.  
There are two sectors: one (*p*) produces the means of production that assist the production of the same capital stock and of other sectors. The other one (*c* 🡪 consumption) produces consumer goods used partly as wages and partly as luxury consumption. The means of production of this sector are composed by goods of sector p. The value of the gross output of the sector p as

**Exploitation and Value**

Marx’s theory of exploitation aims at bringing to light the “true” nature of the capital-labour relationship.

The worker enters labour market selling his “labour power”. The **value of labour power is equal to the value of the means of subsistence** necessary for the survival and the reproduction of the working class.

The capitalist enters the labour market with the good he possesses capital comprising wages. He pays the value of the labour power and acquires its use value.

After the exchange, labour becomes a means of production. The product of labour, i.e. the set of goods produced with the use of labour, belongs to capitalist.

In the production process, **labour produces goods those value is higher to that of the labour power**. The difference is the surplus value. Surplus value is the valorization of capital and belongs to the capitalist.

**The surplus value is appropriated by the capitalist, and it expresses the exploitation of workers by capitalists.** Exploitation arises out of the fact that the capitalist exercises command to make the workers produce a higher value that he pays them as a wage.

Algebra. From a formal point of view, Marx analyzes exploitation by using the theory of labour value. In his view surplus value is produced by labour and only labour.

Marx, following Ricardo, adopts the labour-theory of value. The value of the product is assumed to be equal to the labour directly (labeled as “living labour”) and indirectly used to produce it.

* Assuming that only one commodity is produced (corn) by means of itself and labour, λ is the labour-value of one unit of corn:
* If we indicate with v the value of labour power (i.e., the value of the means of subsistence), Eq. (8) can be re-written as λ = l · (1 − v ) + v · l + λ · k = S + V + C

Where V is called variable capital, C constant capital, and S is the surplus value.   
The labour time is divided into a proportion needed to produce wage (v) and a proportion devoted to satisfy the capitalist’s request (s = (1 − v )).   
Then, v · l is the labour needed to reproduce the labour power, and (l − v · l) is the labour time appropriated by the capitalist.

* The rate of exploitation (σ) is equal to  
  It is easy to see that σ goes to zero when v = 1, i.e. when workers spend all time working for themselves (and not for the capitalist).
* The rate of profit r is defined as ratio between the surplus values (S) and the sum of constant and variable capital (C + V ):
* The rate of profit r profit can also be expressed as  
  where q = C /(C + V ) is the so-called value composition of capital (i.e., the ratio of constant capital to the total capital invested).

According to Eq. (12), the rate of profit rises when the rate of exploitation σ increases and it falls when the value composition of capital q increases or vice versa.

Marx believed that competition among capitalists would lead to equalization of the rate of profit across the sectors of the economy. If the value composition of capital q is equal across sectors, an equal rate of profit across sectors implies also an equal exploitation rate σ.

But normally the value composition of capital is not equal across sectors. In this case, those sectors where q is higher should be characterized by a higher rate of exploitation.

**The Transformation of Values into Prices**

Some authors argue that there is a logical inconsistency between the first two volumes of Capital, in which the analysis is based on labour values (labour embodied), and the third volume of Capital, in which Marx’s analysis is in terms of prices of production. The contradiction is that we cannot have two price systems, one in terms of values and the other in terms of prices of production.

**Marx maintains that goods are exchanged at “production prices”**, which are prices determined in such a way as to guarantee a uniform rate of profit.

If we indicate the rate of profits of industry j as: rj = sj /(cj + vj ), Marx proposes the following trasnformation:

1. He estimates the rate of profits according to this formula: r = Σj sj / Σj (cj + vj );
2. He applies the so calculated rate of profit to the cost of production of the single industries to calculate the prices (i.e., pj = (cj + sj ) · r for each sector j).

In general, the ratio between the production prices of two goods does not coincide with the ratio between the quantities of labour embodied in them.

**The Dynamics of the Capitalist System**

Marx analyzes the conditions for an economic growth of the economic systems. He distinguishes between “the simple reproduction scheme” and the “expanded reproduction scheme”.

The simple reproduction scheme is characterized by the fact that the levels of production remain constant over time (the surplus is entirely consumed and there is no net investment). It refers to an economy in stationary state. In the expanded reproduction scheme, instead, the surplus is, at least partly, absorbed by an additional demand of investments. The maximum growth of the economy will take place when the whole surplus is invested.

Our previous example refers to a two sectors reproduction economy. For the economy to be able to reproduce itself on an unchanged scale, it is necessary that supply and demand are equal in both sectors. Any surplus over the subsistence consumption is absorbed by luxury consumption goods.

It is evident the Say’s law rules in a reproduction stationary state (i.e. equilibrium). If the supply and demand are equal in each sector, they must be equal on aggregate.

But Marx believed that the economic reality is not represented by the equilibrium condition of the reproduction scheme. The economy always moves in disequilibrium.

Marx highlights the possibility that the process of (expanded) reproduction of capital may generate problems in the form of crises. In an expanded reproduction scheme:

1. Investment is an increasing function of the rate of profit.
2. The rate of profit is a decreasing function of wages.

According tho these hypotheses, if wages increase, investment will be discouraged. This will reduce the aggregate demand and trigger a crisis. The market prices will fall together with the levels of output, pushing the average rate of profit down again. Thus the crisis will deepen.

However, with a reduction in investment, the demand for labour will also decrease and the unemployment will rise. The increasing unemployment will lead to a decline in wages which will allow profits to increase again in a new expansionary phase.

But, according to Marx, it is not because of the periodical crises that capitalism will eventually collapse. There are long run structural factors that will lead to this collapse.

* In the long run **technical progress will lead capitalists to replace labor by machines**. This will reduce the labor demand increasing the unemployment and will raise the productivity of labour more than wages. The result will be a falling share of wages on the aggregate output. The falling share of wages leads to the “increasing immiseration” of the proletariat. Moreover workers will become increasingly subordinated to (alienated by) mechanized production processes.
* **The increased mechanization process** (i.e., the substitution of machines for labour) brings to a falling rate of profit over the long run. This tendency can be proved quite simply by using a model of an economy in which one commodity is produced. The maximum level of profit (rmax ) holds when the wage is zero (i.e., when the value of the means of subsistence v = 0): = rmax  
  It is immediate to see that the upper limit is decreasing when technical pogress improves the quantity of means of production (k) necessary to produce a given quantity of output.

The decline in the profit rate and the growing immiserization of workers and the middle class in the wake of the cyclical crises would, sooner or later, lead to stagnation of investment, militant class struggle and finally the socialist revolution.