Textos docentes | 167

Introduction to Economics

Ana Batlles de la Fuente
María de las Mercedes Capobianco Uriarte
Anselmo Carretero Gómez
María José López Serrano
Beatriz Montoya Lázaro

edual

Introduction to Economics

texto:

authors:
Ana Batlles de la Fuente
María de las Mercedes Capobianco Uriarte
Anselmo Carretero Gómez
María José López Serrano
Beatriz Montoya Lázaro

translators:
Ana Batlles de la Fuente
María de las Mercedes Capobianco Uriarte
María José López Serrano

Textos Docentes n.º 167

edición:
Editorial Universidad de Almería, 2024
editorial@ual.es
www.ual.es/editorial
Telf/Fax: 950 015459
¤
ISBN: 978-84-1351-316-4

Es la traducción al inglés del manual de «Introducción a la economía» (ISBN: 978-84-1351-226-6), que la editorial publicó hace un año.

En este libro puede volver al índice pulsando el pie de la página

Table of contents

CHAPTER I. INTRODUCTION

1. ECONOMICS: SCIENCE, METHOD, AND DEFINITION

1.1 Science

Economics is an empirical and social science. Scientific knowledge, or the set of knowledge, aspires to formulate, through rigorous and appropriate languages, laws that govern phenomena[1]. It is also defined as an ordered knowledge of reality or aspects of it. However, it is not only a set of well-founded, reasoned, and systematized knowledge; it also encompasses the way to obtain such knowledge.

Subsequently, economics is a science because, using a specific methodology, it establishes laws, describes cause-and-effect relationships, and observes the interrelationships within the scope it covers; in other words, it seeks to explain the reality it deals with through an appropriate method.

Modern economics emerged in 1776 with the publication of Adam Smith's book *"An Inquiry into the Nature and Causes of the Wealth of Nations"* (more commonly known as *"The Wealth of Nations"*). Until then, scholars had addressed various economic aspects, but a comprehensive view was lacking, and this is the merit attributed to Adam Smith.

Sciences can be divided into formal and empirical sciences. The former deal with relationships between propositions but do not experimentally verify them. In contrast, empirical sciences test the validity of their hypotheses against reality. Therefore, economics is an empirical science since its knowledge is based on the experience of the real world. The economist observes facts but does not intervene in them to study the effects of such alterations in general terms. Although many of the social factors involved in economic phenomena can be modified through political measures, these are not adopted solely for the purpose of studying their consequences, a fundamental characteristic of the experimental method. Hence, for the contrast of its hypotheses, economics must resort to the historical analysis of economic events. However, while the experimental approach is not as common as in other scientific disciplines, it is used in specific branches such as experimental economics and the economics of knowledge.

On the other hand, this discipline is a social science because the object of its knowledge is the investigation of a certain type of human actions and relations. Social sciences do not have the precision of other sciences, such as physics or chemistry, where whenever a process is repeated under the same circumstances, the results are the same. Individuals and societies can react differently to the same stimuli. This does not mean that social sciences are less scientific than exact sciences; they are simply different.

Furthermore, the social scientist is within the world he or she aims to analyse and cannot easily abstract from it. They have a specific background and, as a result, value judgments that influence their perspective[2].

We cannot expect economic laws to apply to each case and each individual. The laws of social sciences, in general, and economics, in particular, are based on large numbers and apply to the entire population. "Rare" cases do not matter because, precisely due to the law of large numbers, the outliers on one end cancel out those on the other, both contributing, unknowingly — and perhaps reluctantly — to the fulfilment of the law. It is not easy to know how a specific individual will behave — nor do we care — but we can understand the behaviour of the entire population.

---

[1] The word science is derived from *scientia*, a Latin noun that comes from the verb *scire*, which means to know.

[2] An example of the different ways of seeing things is the fans of two football teams. Faced with the same action — precisely the same reality — some see nothing to penalize, while others see a foul that should lead to the expulsion of the player who committed it.

Other disciplines focus on studying the behaviour of each particular individual, while economics is more concerned with the whole; instead of fixating on the tree, it focuses on the forest.

1.2 Method

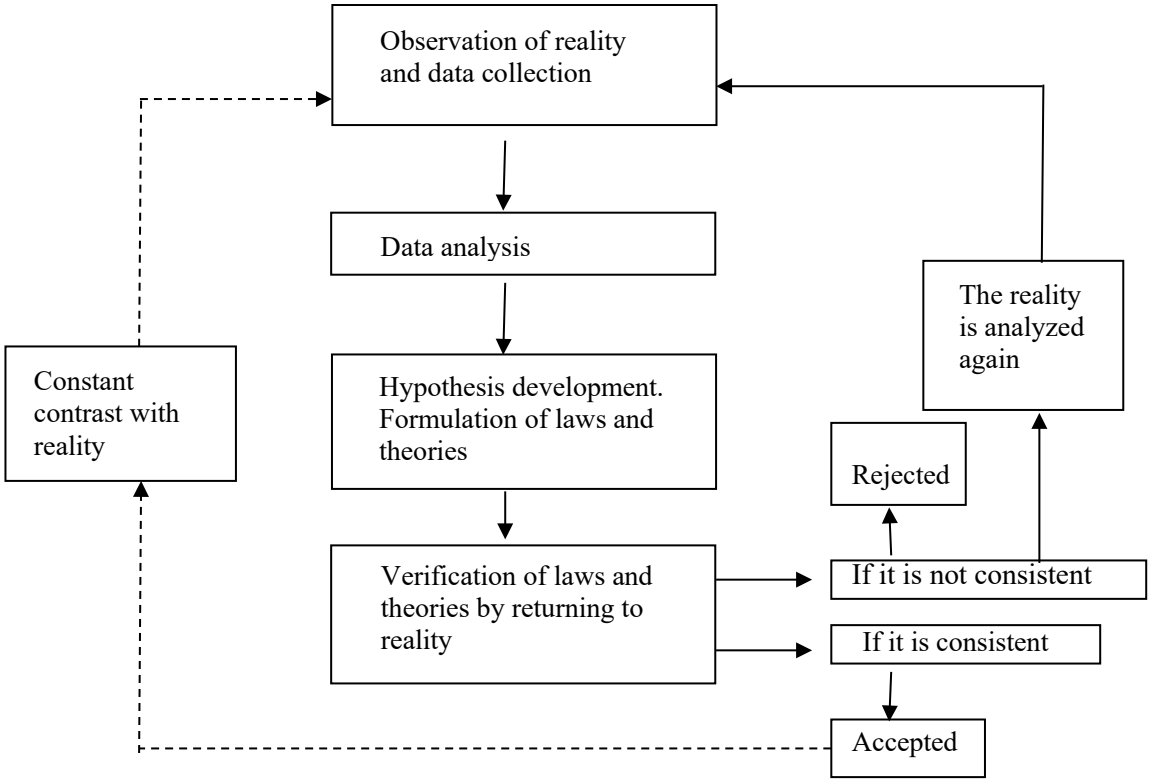
The method is the pathway that a science follows to explain the reality it studies. Each science has its own method, and it makes no sense to apply methods from one science to another. Economics attempts to explain reality using models. Models are simplified representations of reality. They are an abstraction of reality, where non-essential aspects are disregarded in favour of the fundamental ones. If they were an exact description of reality, they would merely duplicate reality and would not add anything to our knowledge of it; thus, it is essential to formulate economic models that can be analysed and used to explain and predict economic phenomena.

Models help us understand reality and enable us to control it. If a model considers very few variables (like the circular flow of income), it will be a simple model but far from reality. As more variables are introduced, the model will approach the reality it aims to explain, but logically, it will become more complicated. It is essential to ensure that the model considers the necessary variables in each case to explain reality adequately.

In essence, a model is like a map. If we want to travel from one town to another by road, a road map will suffice. We cannot expect that map to show us the sources along the way, the paths...; for this, we will need more detailed maps, which will be more realistic but more complicated to create and manage. The extreme would be a 1:1 scale map—life-size—; this map would have everything, but at the same time, because it is reality itself, it would be useless: we do not need a map for that.

As an empirical science, economics constructs models based on reality. It utilizes the methods of induction and deduction: inductively, it moves from observing specific facts to formulating laws, and deductively, it proceeds to verify them. It begins with the observation of the facts and phenomena to be studied[3]. It follows a process of classification, which reveals common characteristics and disregards the particular ones. Thus, through abstraction, i.e., constructing types (consumer, firm...) and utilizing some formal sciences (like Logic or Mathematics), economics obtains propositions of general validity (laws) with which it constructs models. The next step is to verify the models by comparing them with reality. Depending on the degree of adequacy of the model to reality, it is accepted or rejected. Constantly returning to reality and observing new and more data allows for the improvement of the model.

[3] Although it is often left unspoken, perhaps because it is obvious, the formation of the scientist precedes the entire methodological process. A person with inadequate training cannot conduct quality research.



The economy, therefore, starts from reality and ends in reality. There is a continuous relationship between the model and the facts, as they provide the basis for the relationships we seek to explain. It is not enough to test the model once and consider it valid forever; testing must be continuous, as models are not valid indefinitely. Circumstances change, and a model that satisfactorily explained reality at a certain moment may cease to do so over time, giving way to others.

Thus, mercantilist and physiocratic models were predominant during the 18th century. From the late 18th century and throughout much of the 19th century, the accepted model was proposed by the classical school. At the end of the 19th century, it was replaced by the neoclassical model, which went into crisis in 1929, with the Keynesian model taking over. With the onset of stagflation in the late 1970s, it became evident that Keynesian measures were not always valid under certain circumstances. Since then, new ideas more aligned with the classical and monetarist paradigms have been developed. However, Keynesian policies have not been abandoned and remain in use in most countries. Even in the mid-1980s, the New Keynesian School of Macroeconomics emerged as a response to the New Classical Macroeconomics.

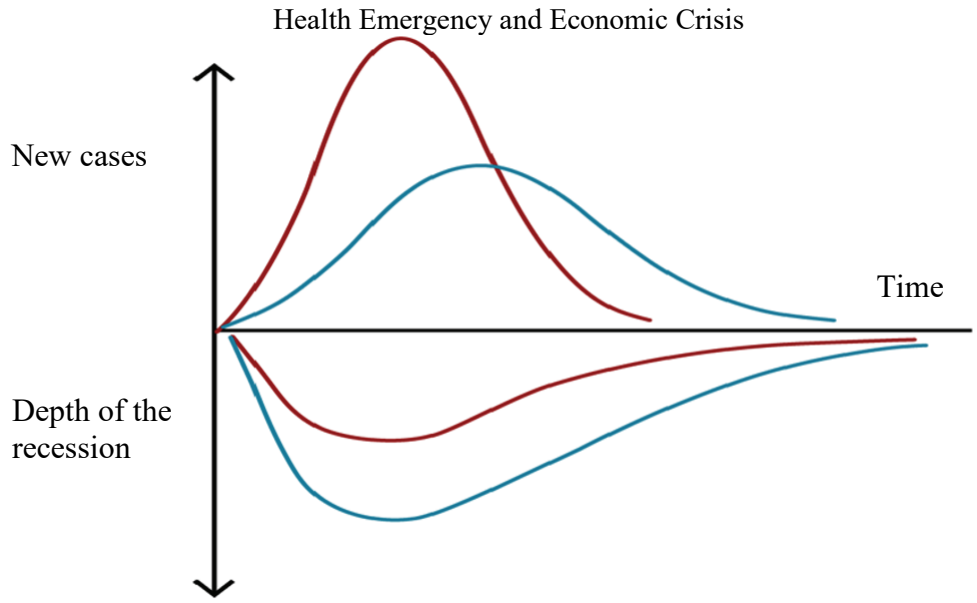
CONTAINING THE PANDEMIC: HOW TO SAVE LIVES AND SAVE THE ECONOMY SIMULTANEOUSLY

García Delgado, J.L. & Myro Sánchez, R. (2021). *Economics Lessons* (16th ed.). Civitas Thomson Reuters.

The purpose of limitations on economic activity and population confinement has been no other than flattening the contagion curve and extending it over time. By reducing the daily number of infected individuals requiring medical attention, a complete congestion of hospital services has been prevented. However, around March 30, 2020, they were very close to saturation, despite expanding the number of rooms for disease treatment and ICUs.

Even without special control measures, the pandemic incurs an economic cost, as it hinders the continuity of productive activities, weakens international trade, and necessitates exceptional healthcare expenses. This cost is evident in the U-shaped curve depicting the GDP evolution, almost symmetrical to the inverted U-shaped curve followed by the pandemic, as illustrated in the "Health Emergency and Economic Crisis" graph.

Implementing measures to slow the virus's contagion rate flattens the curve of the number of infected individuals but, by increasing the economic cost of combating the pandemic, deepens the contraction of the GDP. This is expressed by the downward shift of the curve representing its evolution in the aforementioned graph. However, with public actions maintaining the incomes of workers and businesses, the GDP curve also flattens. This simultaneously achieves combating the virus and mitigating its effects on aggregate spending and production (...)



Source: Baldwin, R. y Weder di Mauro, B., Mitigating the COVID Economic Crisis: Fast and Do Whatever It Takes, A VoxEU.org Book, CEPR Press, 2020

1.3 Definition

It is not an easy matter to give a definition of economics. The word "economics" has a very ancient origin, deriving from the Greek terms "*oikos*", meaning house, and "*nomos*", meaning rule. Therefore, "*oikonomia*" would be the management of the house or domestic administration. In

this sense, the term "economics" was used for a long time to refer to a set of rules or norms for managing or governing the household, family, and, by extension, the community.

Over the years, many definitions have been proposed, discussed, and subsequently replaced. Scholars' efforts to find an adequate definition were so unsuccessful that Karl Gunnar Myrdal (1898-1987) went as far as to say they were "unnecessary and undesirable." He asserted that "the only concept an economist does not need to define precisely is that of the Science of Economics." Malthus, however, held a different opinion. Speaking about the definition in general and its inevitable imprecisions, he wrote, "The lack of precision attributed to it [the definition] is incomparably less, in quantity and importance, than the lack of precision that would result from rejecting it". Myrdal was not alone in his viewpoint. Jacob Viner (1892-1970) even defined economics as "what economists do"; John Maynard Keynes (1883-1946) stated that "a single definition is insufficient to express the nature of Economics", and Joan Robinson (1904-1983) believed that "it offers no advantage (and much error) to give words more exact definitions than the subject to which they refer". Therefore, John Neville Keynes was not mistaken when he said, just before all the aforementioned, that "it can be said of the definition of political economy, as with most other definitions, that the discussion leading to it is of greater importance than the particular formula chosen in the end.

Despite these opinions, an attempt is made to advance—without claiming to cover them all—through the various definitions of Economics given throughout history, distinguishing three stages.

In the first stage, economics was linked to wealth (understood in a material sense), and definitions revolved around this concept. Aristotle (384-322 B.C.) defined it as "the science of wealth". Many centuries later, in the second half of the 18th century, in 1776, the very title of Adam Smith's (1725-1790) main work, considered the father of economic science, still revolved around wealth: *"An Inquiry into the Nature and Causes of the Wealth of Nations".* In those same years, Jean Baptiste Say (1767-1832) defined economics as the "science that studies wealth and the laws of its production and distribution," a definition that reached its peak with John Stuart Mill (1806-1876). All these definitions have the drawback of the lack of precision of the term "wealth".

Another set of definitions, without neglecting the concept of wealth, presents economics as the science that deals with material well-being. Among them, Alfred Marshall's (1842-1924) stands out, stating that economics is "the study of man's activities in ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of well-being... It is, on the one hand, a study of wealth; and, on the other hand—this being the more important—an aspect of the study of man".

These definitions do not adequately consider activities that do not aim at obtaining material goods. By placing wealth and material well-being at the centre of economics, they provide a partial view, as there are economic human actions that aim to satisfy immaterial needs or cover non-material aspects of wealth, such as services[4].

A second group of definitions emphasizes change and price formation. The definition of Economics as the "science of prices and changes" gained special prominence among theorists of marginal utility and general equilibrium from the last quarter of the 19th century. The motivations of individuals to exchange goods could be aggregated, shaping group behaviour, and changes could be added up to form all community transactions. Behind all this are prices, regulating the

[4] We cannot forget that when these definitions were formulated, the importance of the now-called tertiary sector was very limited. Agriculture, livestock, fishing, and increasingly, industry, occupied the vast majority of economic activity, with the final outcome of all being something material, tangible. Therefore, it is not surprising that economists of that time placed the material aspect at the center of economic definitions.

entire system until reaching the equilibrium point, where utility and satisfaction of needs are optimized. Scholars who followed this conception of Economics include William Stanley Jevons (1835-1882), Leon Walras (1834-1910), Wifred Pareto (1848-1923), Gustav Cassel (1866-1954).

This group of definitions, focusing on economic relationships between individuals, exchanges, and prices, excludes from the economic realm systems where changes are of little importance, or social or non-economic reasons prevail, or when prices lose much of their meaning (for example, in centralized systems or activities of non-profit institutions). They also say nothing about the value judgments that economics often needs to make.

Lastly, a more modern stream of definitions relates Economics to scarcity and choice, characteristics present in all economic activity. It was Lionel Robbins (1898-1984) who introduced this stream in 1932, defining Economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses"[5].

Barre states that economics "is the science of managing scarce resources. It studies the ways in which human behaviour takes shape within the possibilities offered by such resources, analysing and explaining the modalities by which an individual or a society must use limited means for the satisfaction of numerous and unlimited desires." Samuelson defines economics as "the study of how societies use scarce resources to produce valuable goods and distribute them among different individuals".

These definitions highlight the scarcity of means to achieve desired ends, which implies the need for choice. Choosing one alternative from several possible alternatives means leaving others unsatisfied. In this choice, the opportunity cost is always present, which, as we will see later, is what a good costs in terms of another.

Definitions based on the concepts of scarcity and choice do not have the drawbacks of those that focused on wealth and material well-being, as they include both material and intangible goods[6]. They also avoid the drawbacks of those based on changes and prices. The main drawback attributed to them is that they are based on the assumption of rationality, which appears implicitly in all of them, while there is some disagreement about the concept of human rationality itself, integrating economic rationality or, to put it another way, the economic principle of optimal use of scarce resources, which is precisely economics.

Currently, it is impossible to conceive of economics without mentioning sustainable economics[7], as it is a key component for achieving the Sustainable Development Goals (SDGs) set in the 2030

---

[5] We prefer to speak of limited productive factors instead of calling them scarce productive factors. It is a fact that the majority of factors are limited because economies have a specific territorial scope (at best, referring to the global economy, the scope of the planet Earth). However, that does not mean they are scarce. In reality, many factors are not scarce; for example, in the case of water, the issue is how to economically harness all the water on the planet, not that it is scarce. The same applies to energy (nuclear, wind, solar, etc.). Insisting on scarcity leads to pessimism and even anxiety when seeking solutions. On the other hand, knowing that there are limited quantities of a resource promotes its rational use, savings, and the search for new alternatives to meet needs (as has indeed happened throughout history).

[6] Scarcity and choice are evident in numerous examples of daily life. A child has to choose what to purchase with their limited—or not so limited—allowance. A professional must decide how to allocate their salary, as it doesn't cover everything they would like to acquire. A municipality has to choose which projects to undertake with its budget (sewerage, lighting, signage, water network, etc.); it can prioritize certain initiatives and will have to defer others to subsequent fiscal years. The same applies to the budgets of a region or the state.

[7] Sustainable economics is primarily related to the following SDGs:
SDG 7: Affordable and Clean Energy.
SDG 8: Decent Work and Economic Growth.

Agenda for Sustainable Development, approved in 2015 by all member states of the United Nations (UN). These goals are a continuation of the Millennium Development Goals (2000-2015) of the same organization. Sustainable economics involves taking measures to reduce greenhouse gas emissions, promoting the use of renewable energy sources, fostering innovation and investment in sustainable infrastructure, and promoting responsible production and consumption practices. Additionally, it aims for inclusive and sustainable economic growth, increased employment, and poverty reduction. In summary, it seeks to achieve a balance between economic growth, environmental protection, and social well-being. To achieve this, it promotes an approach that considers not only the economic aspects of economic activities but also their social and environmental aspects.

As we can see, there is no ultimate definition of economics. All the mentioned ones are useful for describing some aspect of the problem, but none is perfect.

2. INITIAL BASIC CONCEPTS

2.1 Positive Economics and Normative Economics

Positive Economics: It seeks objective explanations about the functioning of economic phenomena; it strives to explain things "as they are", as they occur in reality, independently of value judgments. It is concerned with formulating general compliance laws that do not depend on the way of thinking or the background of individuals. Positive economics establishes propositions of the type "if such circumstances—causes—exist, then such events—effects—will occur". Positive economics, returning to the analogy between economic models and blueprints, outlines various routes to go from one place to another.

Examples of positive economics propositions are: "If taxes increase, consumers" income decreases", "If the price of a product decreases, its demand increases".

Normative Economics: It concerns itself with "what should be". It identifies and isolates economic problems by proposing measures that allow achieving specific goals or objectives (full employment, price stability, etc.). Its propositions depend, to a large extent, on value judgments.

The choices in a particular economic problem are not mathematical equations with a single solution; it is normal to have multiple solutions, more or less reasoned, each with its advantages and disadvantages. Positive economics outlines various routes to go from one place to another; normative economics is responsible for choosing the route (some longer, others faster, some with better scenery, others with tolls).

If reality is well studied, the blueprint of "what is", or positive economics, should be indisputable, accepted laws by all. The debate occurs in the normative blueprint of "what should be": we know—from the laws of positive economics—that there are numerous solutions to address a particular problem, the discussion revolves around which one to choose.

Normative economic discussions include: the size the public sector should have, what solutions are taken to address the issue of unemployment, pollution, poverty... The general state budgets, for example, will be different—as a result of different societal views—depending on the political party that formulates them (left, centre, or right).

SDG 9: Industry, Innovation, and Infrastructure.
SDG 12: Responsible Consumption and Production.
SDG 13: Climate Action.
SDG 14: Life Below Water.
SDG 15: Life on Land.

To provide coherent solutions to normative problems, one must understand positive economics; without knowing the general rules, without understanding how the system is affected—how it reacts—to different variables, it is challenging to find the appropriate solution—the best solution—to the issues raised. This manual covers topics of positive economics, where basic microeconomic and macroeconomic concepts are studied. Positive economics not only serves as the basis for normative economics but also helps understand issues raised in other disciplines in their proper context.

In real life, the normative and positive components of economics are intertwined, and it is challenging to separate them. Many economists have personal views—value judgments—about how society should function, which is difficult to set aside when recommending a specific policy. Even, as we have seen, it is not easy to set aside value judgments when investigating reality to establish the laws of positive economics (economics is a social science).

2.2 Endogenous and Exogenous Variables

Endogenous Variables: These are variables whose values are determined by the model itself.

Exogenous Variables: These are variables whose values are not determined by the model but are given to it.

For example, the consumer behaviour model determines the quantity of each good consumed by the individual, i.e., it determines endogenous variables. To perform this calculation, the model relies on given values, such as the individual's income, the price of the goods acquired, etc. In this case, these are exogenous variables.

2.3 Nominal and Real Values

This distinction refers to the monetary units in which economic variables are expressed.

Nominal Value (or Current): A magnitude is valued in nominal or current terms when it is expressed in monetary units of the year to which it refers.

Real Value (or Constant): A magnitude is valued in real or constant terms when it is expressed in monetary units of a year that serves as a base or reference. Expressing magnitudes from different years in real terms involves valuing all of them in the same monetary units, those of the base year, allowing for easy comparison by eliminating distortion caused by price variation.

When it is said that a person earned 1.000 euros per month last year and now earns 1.080, they are speaking in nominal terms—perhaps unknowingly—because each salary refers to the corresponding year, or, in other words, each salary is expressed in the monetary units of the year to which it refers (the euros received "physically" by the individual each year). Comparing the figures makes it easy to see that the person's salary has grown by 8% in nominal or current terms.

But has the salary really increased by 8%? To know this, we need to know how much prices have grown between those two years. If prices have not risen at all, then indeed, the salary has actually grown by 8%, the same as in nominal terms. But if prices have risen, for example, by 5,7%, then the real increase in salary is no longer 8%: the worker cannot, with the salary of the second year, increase their purchasing power by 8%, as part of the salary increase is "lost" due to the rise in prices.
To calculate real salary, a table is constructed, where the column labelled "index" is crucial[8]. In this column, the value of 100 is assigned to the year 20X2, which serves as a reference (if not specified otherwise, we assume that the base year is the first to standardize calculations). In the

[8] It can also be given another name. For example, the column of deflators.

cell for the second year, the monetary units needed in 20X3 to acquire what could be bought with 100 in 20X2 are entered. Since prices have risen by 5,7%, it seems clear that in 20X3, 105,7 euros are needed to acquire what was purchased with 100 in 20X2. In other words, 105,7 euros in 20X3 are equivalent, in real terms, to 100 in 20X2.

Year	Nominal Salary	Price Increase	Index	Real Salary	Real Salary Increase
20X2	1.000	-	100	1.000	-
20X3	1.080	5,7%	105,7	1.021,76	2,18%

Having done this (that is, constructing the column of index numbers or the column of equivalence of monetary units from different years), expressing a magnitude from one year in the monetary units of another is solved with a simple rule of three.

A straightforward rule of three allows us to know that if 105,7 euros in 20X3 are equivalent to 100 euros in 20X2, then 1.080 euros will be equivalent to 1.021,76. Therefore, the real increase in salary has been 21,76 euros, representing a real increase of 2,18%.

As we can see, once the distortion caused by the rise in prices is eliminated, the real increase in salary is less than it initially seemed. In reality, with the new salary, we cannot increase our purchases by 8% (as one might think when looking at nominal figures), but only by 2,18%.

We have preferred to perform the calculations using a table as it makes it easier to see the relationships between the known and requested magnitudes. The rule of three we used to calculate the real salary in 20X3 can be expressed, in general terms, with the following formula:

$$Real\ Value = \frac{Nominal\ Value}{Index} \cdot 100 \qquad Real\ Value\ (20X3) = \frac{1.080}{105,7} \cdot 100 = 1.021,76$$

Similarly, for calculating the increase in real salary:

$$Real\ Rate = \frac{Nominal\ Rate - \ Price\ Change}{1\ + Price\ Change} \cdot 100$$

For the case of the exercise:

$$Real\ Rate = \frac{0,08\ -\ 0,057}{1\ +\ 0,057} \cdot 100 = 2,18$$

2.4 Absolute Prices, Relative Prices, and Opportunity Cost

When a good is valued in monetary units, it is done in absolute prices. Conversely, when a good is valued in terms of another good, it is done in relative prices.

The relative price is, ultimately, the opportunity cost, i.e., what a good costs in units of another good. Some examples are: going to the cinema means giving up three beers, paving several streets entails not improving the library, etc.

2.5 Concepts of Marginal and Average

The term "marginal" provides information about how one variable is affected by a change in another; it is a dynamic concept widely applied in economics: marginal cost (change in cost with a change in production), marginal revenue (change in revenue with a change in sales), marginal utility (change in utility with a change in consumption), etc. Although we often refer to what happens to a magnitude when the other changes by one unit (how much the cost varies with an

increase in production by one unit, how much revenue varies with an increase in sales by one unit, or how much utility varies with an increase in consumption by one unit), this concept is closely linked to the concept of a derivative, which indicates what happens to a variable when the change in the other tends to zero.

The term “average” indicates the relationship or correspondence between two variables at a given moment; therefore, it is a static concept. Average cost (cost per unit of product), average revenue (revenue per unit of product), average production (production per unit of factor). The calculation is simpler than the marginal term, as it simply involves dividing the related variables: total costs by total production, total revenue by the number of products sold, total production by the number of workers (if we want to calculate average production per worker).

2.6 *Ceteris Paribus* Clause

Economic phenomena often depend on many variables. One way to understand the influence of one variable on the phenomenon under study is to assume that, except for the variable of interest, all others remain constant. The object of study is isolated from everything that influences it, except for the variable being studied.

The demand an individual makes for a good depends on multiple factors: the price of that good, the price of other goods related to the good under study, the individual's salary, their tastes, etc. It is very difficult to study how the demand for the good is affected by changes in salary if, at the same time, the other factors vary. Therefore, when conducting such a study, it is assumed that the factors not being studied remain constant.

The question “how does an individual's demand change as their income increases?” has a certain and immediate answer: it depends. Indeed, it depends on what happens with the other aforementioned factors. In contrast, the question “how does an individual's demand change as their income increases, *ceteris paribus*?” already has a concrete answer, as it assumes that everything other than income remains constant and, therefore, does not affect the demand for the good.

EXERCISE

If an individual's nominal salary in the year 20X1 was 900 euros and in 20X2 it is 940, and the prices between these years increased by 3%. What is the real variation in salary between 20X1 and 20X2?

Creating a table to place the given data and indicate what is asked for is very helpful:

Year	Nominal Salary	Price Growth	Index	Real Salary	Variation in Real Salary
20X1	900	-	100	900	-
20X2	940	3%	Z	Y	X

To calculate the variation that has occurred in the worker's real salary (cell X), that is, the variation in purchasing power or capacity, we must first calculate the real salary of 20X2 (cell Y) with respect to 20X1, and for that, we need to know the equivalence between the monetary units of those two years (cell Z).

First, calculate the equivalence between the monetary units of 20X1 and 20X2. The first year is taken as the base, assigning it the index 100. The index for 20X2 will indicate how many euros are needed in 20X2 to buy this year what in 20X1 was bought with 100. If prices have risen by 3%, it is clear that 103 euros are needed in 20X2 to acquire what in 20X1 was acquired with 100. Therefore, Z = 103.

Second, we need to calculate the real salary of 20X2 with respect to 20X1, which is immediate:

If 103 euros in 20X2 → 100 euros in 20X1
940 → Y

Solving the rule of three, it turns out that Y = 912,62.

Finally, what is the increase in real salary? The individual has gone from 900 euros (the real salary of the year taken as a reference, by definition, is the same as the nominal) to 912,62. So:

If the salary has increased on 900 euros → 12,62
On 100 → The increase will be X

In summary, the complete table would be:

Year	Nominal Salary	Price Growth	Index	Real Salary	Variation in Real Salary
20X1	900	-	100	900	-
20X2	940	3%	103	912,62	1,40%

3. MICROECONOMICS AND MACROECONOMICS

Microeconomics is the branch of economics that studies the economic behaviour of individual persons, whether physical or legal entities, their aggregates, and the relationships between them. It always stays within the market for a particular good, service, or factor. Microeconomics focuses on studying, concerning a specific good, individual demand, the supply of each firm, the aggregate demand of individuals, the aggregate supply of firms, and the relationship between the overall demand and supply of that good. Similarly, in the context of a factor, it examines the labour supply of a tiler, the labour supply of all tilers, the demand for tilers from a construction company, the demand for tilers from all construction companies, and the equilibrium in the tiler job market.

Macroeconomics, on the other hand, studies an economy as a whole. The major macroeconomic topics include production, employment, prices, the public sector, and the economy's relationship with the external sector. It does not focus on studying individual markets but rather the entirety.

Naturally, the relationship between microeconomics and macroeconomics is very close. Any microeconomic change affects macroeconomics and vice versa. For example, if ice cream sales increase (due to a hot summer), it is a microeconomic issue, whereas the increase in the value of overall production is a macroeconomic aspect. If the government implements an active employment promotion policy, it is a clear macroeconomic case, but if companies in a sector hire more workers, it is a microeconomic issue.

It would be a mistake to categorize a topic as microeconomic or macroeconomic based solely on monetary units. The market for vehicles in a country may involve a significant amount of money, but it is still the market for a particular good (cars) and falls under the scope of microeconomics. In contrast, the overall production of a small rural municipality may involve much less money than most individual markets, but it pertains to an economy as a whole (albeit municipal), and thus, macroeconomics is responsible for studying it.

Finally, the line of separation between microeconomics and macroeconomics is not entirely clear, and there are issues that may be challenging to categorize into one or the other.

4. FACTORS OF PRODUCTION

The factors of production or resources are the basic elements used for the production of goods or the provision of services. Traditionally, they have been divided into three categories: land, labour, and capital. Sometimes more extensive classifications are proposed, including, for example, technology[9], information, etc.

Land should be understood in a broad sense, including, in addition to the surface that serves as a base for economic activity, its location, its content, and the free fruits of nature (minerals, water, sunlight, wind, etc.).

Labour encompasses the physical and intellectual capacities of human beings applied to the production of goods and the provision of services. In economics, the term “human capital” is used, for which training is of utmost importance.

Capital refers to the contributions of human beings that facilitate the production process (making it more comfortable, faster, increasing productivity, etc.).

[9] Technology is present in the markets. An example of this is Cabify and Uber, companies that offer their taxi services through an application that brings together the demand and the supply. They provide the price of the service in advance, which varies depending on the supply and demand existing at that time.

It is essential to distinguish between physical capital (machines, buildings, etc.) and financial capital (stocks, bonds, etc.); and between real investment (machinery, buildings, etc.) and financial investment (purchase of stocks). When talking about capital as a factor of production, we refer to physical capital and real investment (even though financial capital is necessary for this investment).

Examples of capital are extensive, ranging from a plow to a tractor, machinery, etc.; any good that contributes to accelerating the production process or any good used to manufacture other goods. Capital goods are opposed to consumer goods, which are goods intended for direct consumption. Capital goods are not intended to directly satisfy human needs, but their accumulation contributes to better and more abundant satisfaction in the medium term. If factors of production dedicated to fishing are used to manufacture ships, there will be less fish available in the market for a while, but once the ships are launched, fishing will be much greater than before.

There are goods that are difficult to classify as capital (or investment) or consumer goods. A truck, an excavator, or a lathe are capital goods, and a chocolate bar, a soft drink, or a shirt are consumer goods. However, sometimes we need to consider the use of the good to classify it in one category or another. For example, a computer is a consumer good for a family and an investment good for a company.

It is interesting to distinguish between gross, net, and replacement investment. Gross investment is the total investment made in an economy. Replacement investment is necessary to maintain constant productive capacity, and net investment is the difference between gross and replacement investment. It is a fact that investment goods or capital depreciate, and if they are not replaced, less can be produced with them over time (if the necessary efforts are not made to keep fishing boats in good condition, they will deteriorate and become obsolete).

If the gross investment of an economy is less than replacement investment, it means that the economy is not investing enough to replace the wear and tear of the capital goods it owns, so in the medium term, the production of that economy will decrease; its net investment is negative. If gross investment is equal to replacement investment, the economy only invests to replace what depreciates; net investment is zero, and the production of that economy will tend to remain constant. On the other hand, if gross investment is greater than replacement investment, the economy is investing more than necessary to replace the wear and tear of its capital goods; net investment is positive, and in the medium term, its production will tend to increase.

In the short term, factors of production are considered constant. Overnight, new lands are not made available for cultivation, people are not trained, and factories are not established. However, in the medium and long term, factors of production can vary: cultivated land can increase or new resources can be discovered, the number of people able to work and their training can increase, and, as we have seen, capital goods can change. Also, the variation can be negative; natural disasters (hurricanes, earthquakes, etc.) or social events (wars or revolutions) can reduce the factors of production in an economy.

5. BASIC QUESTIONS AND THE CIRCULAR FLOW OF INCOME

5.1 Basic Questions

There are three fundamental economic questions that the economy seeks to answer: What to produce? How to produce? And for whom to produce?

The first question, what to produce?, aims to determine the goods produced by the economy (or the services provided) and the quantity of each. Since resources are limited and needs are numerous, it is necessary to decide how resources are allocated, which needs are met, and to what

extent. The classical alternative offered to answer this question was “guns or butter”: how many goods do we produce for war and how many for consumption. Naturally, life is much richer, and the usual alternatives extend beyond war (What do I do? Roads or schools? Sewage or lighting?). The “price theory” answers the question of what to produce?

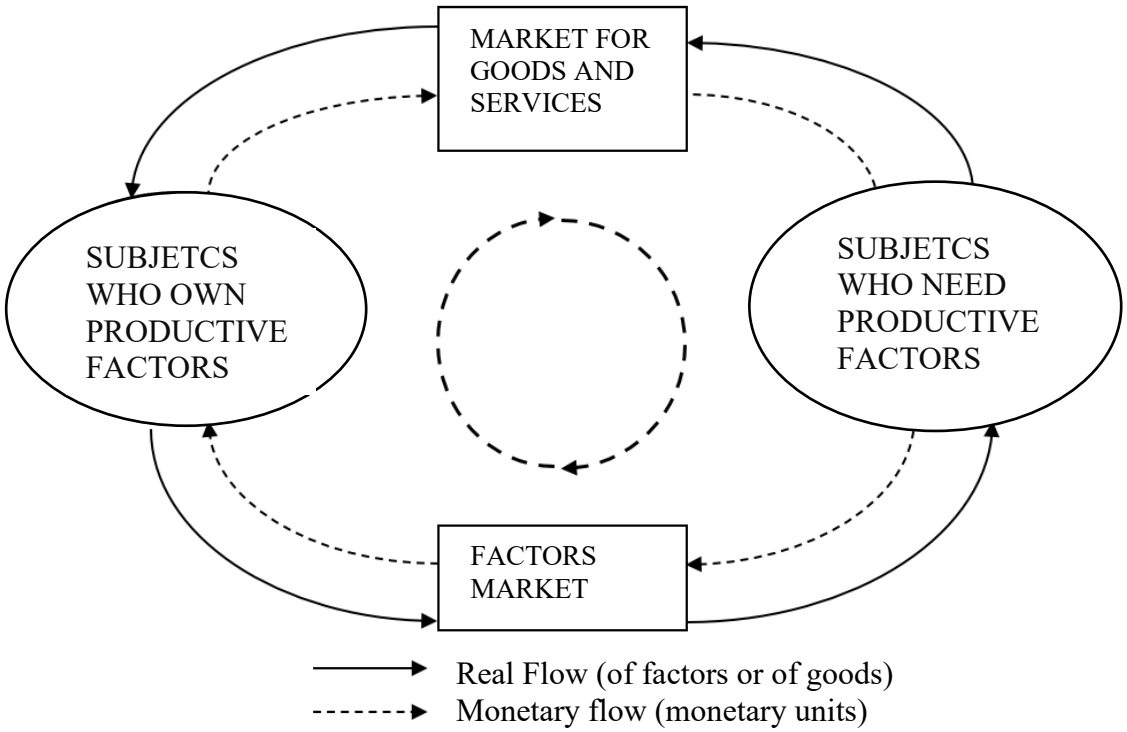
Once decided what to produce, the next question is how to do it. This is addressed by the question, how to produce? There are many ways to produce desired goods, with infinite possible combinations of land, labour, and capital. The same amount of wheat can be obtained with much land, a lot of labour, and very little capital, or with less land, little labour, and a lot of capital. The efficient use of resources is studied by the “production theory”.

The third question, for whom to produce?, is largely resolved by the answers to the previous two questions. The decision about how to produce, i.e., how to use land, labour, and capital and how much of each to use, is accompanied by the compensation (rent, wages, and interest) that the owners of these factors will receive. Consequently, it determines each person's ability to access the goods produced. The part of the economy that studies this topic is known as the “distribution theory”.

5.2 The Circular Flow of Income

Economics, as we have seen, strives to explain reality using models, and one such model is the circular flow of income model.

In society, there are entities that possess the necessary factors to produce goods and offer services. These entities are primarily individual people, who are the ultimate owners of labour, land, and capital. On the other side, there are entities, in this case, businesses, that require these factors to produce. Companies need to hire people (labour), they need a place to operate (a plot of land, a storefront...), and they need money for investment (capital).



The agreements between those who possess productive factors and those who need them take place in the factor market. On one side, there are individuals offering labour, land, and capital,

and on the other side, there are companies in need of these factors. Through mutual agreements (which is the essence of a market, reaching agreements between parties), they hire workers in exchange for wages, rent a location for a fee, or acquire capital in exchange for interest.
The same occurs in the market for goods and services. In this case, companies act as suppliers since they are the ones with the goods, and individuals act as demanders to acquire those goods. Upon agreement, individuals purchase goods and pay companies the agreed-upon price.

The same occurs in the market for goods and services. In this case, companies act as suppliers since they possess the goods, and individuals act as demanders to acquire those goods. After mutual agreement, individuals purchase the goods and pay the companies the agreed-upon price.

It is easy to observe that the monetary flow, which is of interest to us, allows all transactions to be unified; it has a circular movement: it goes from companies to the factor market, from there to individuals, from individuals to the market for goods and services, and from there to companies, to start the cycle again. Hence, the name of the model[10].

The circular flow of income also answers the basic questions. In the goods market, it is decided which goods are produced and in what quantity[11]; in the factor market, which factors are employed, and by remunerating them, it also answers how income is distributed among the owners of land, labour, and capital[12], and therefore, the capacity of each of these groups to acquire goods and services.

In Chapter 2, the elementary theory of the market is studied, including demand and its characteristics, supply and its characteristics, and the equilibrium between the two market forces and some incidents about it. Chapters 3 and 4 deal with elasticity and consumer theory. Logically, the consumer seeks to maximize their utility (satisfaction) by choosing how to spend their money in the market for goods and services. In the context of a crisis, such as the one in 2008 and the pandemic, not only does consumption decrease, but consumption patterns also change. Consumers, seeing their income reduced, look for cheaper goods and services (store brands, promotions, etc.). Therefore, the study of elasticity[13] is key to understanding how changes in the economy and other factors affect consumer behaviour. Ultimately, these topics 3 and 4 are aimed at explaining consumer demand in the market, located in the arrow of the circular flow of income that goes from the goods market to the subjects who own productive factors.

[10] The model can be further enhanced by introducing some additional variables (some—savings, taxes, and imports—are outflows from the flow, and others—investment, public expenditure, and exports—are inflows, always from the perspective of monetary flows), but they are not necessary for the current objective.

[11] In the market for goods and services, there is an indicator that signals the goods to be produced and the quantity of each: the price. If the price of a good decreases, production tends to decrease; if the price rises, more suppliers will enter the market, attracted by the possibility of making profits, and the production of the good will increase. In the latter case, suppliers may consider if there is any other good that could satisfy the need covered by the one that has increased in price, and if they find alternatives, new products will enter the market. We must not forget that consumers are not interested in goods; what interests them is satisfying needs, and a high-priced good often indicates an inadequately covered need, thus signaling a market opportunity for supply.

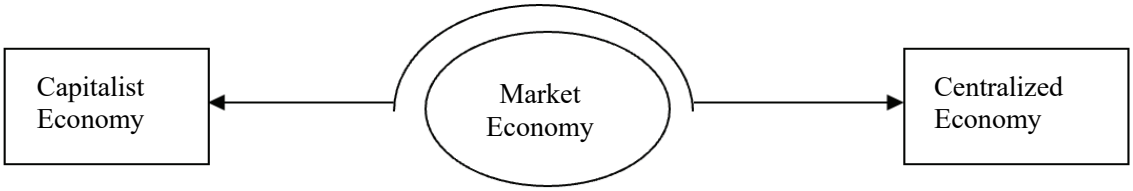
[12] Lipsey, in his book "Positive Economics", raises some additional questions: Are resources used effectively? Are all resources used? Is economic activity growing? The "welfare theory" answers the first question and, along with the three basic ones, is closely related to the price system and falls within the field of microeconomics. The other two questions belong to macroeconomics; the "theory of the business cycle" addresses the first, and the "theory of economic growth" addresses the latter.

[13] Elasticity, as explained in chapter 3, is generally the sensitivity of the quantity demanded for a good or service to changes in the price of the good itself, other goods, or income.

6. DIVERSE ORGANIZATIONS IN THE ECONOMIC SYSTEM

An economic system is the set of basic, technical, and institutional relationships that characterize the economic organization of a society and influence its fundamental decisions and predominant channels of activity.
The different ways of addressing the three basic questions distinguish economic systems:

a) Capitalist economy: answers the basic questions through the market. In each particular market (both for goods and services and for factors), the interaction of forces—supply and demand—determines the price without any intervention from the state. The price acts as an indicator; it signals whether the supply or demand for a good or service should increase or decrease, or whether more or less of a factor of production should be hired as it becomes cheaper or more expensive compared to others.
b) Centralized economy: answers the questions through a central authority that completely controls the economy. In this case, the market has nothing to say; it is this authority that decides what to produce, how much, the factors of production to be used, and the prices of goods and factors.
c) Market or mixed economy: is a combination of the two above. The market answers the basic questions, but under the supervision of the state.



The capitalist economy has the problem of leaving the weakest defenceless. If the market is the only one setting the rules of the game, there are, for example, no minimum wages (wages are determined by the labour market at any given time), and no social security.

The centralized economy ensures full employment of productive resources and remuneration for each; its cost is the lack of freedom to decide and incentives to improve. In these economies, there is officially no inflation since prices are set by the central authority. However, to the extent that planning is unable to perfectly match the supply of goods with their demand, situations of surplus or scarcity—especially the latter—will occur, leading to the emergence of black markets where goods are sold at prices different from the official ones (higher if there is a shortage of the good).

In a market economy, the state, in addition to assuming the basic functions also performed in the capitalist model (establishing a legal framework to guarantee the system's operation, undertaking national defence, police, and justice functions, collecting taxes necessary to finance them), oversees the functioning of the market, ensuring the well-being of the disadvantaged, taking on some tasks of the entrepreneur that the private sector might neglect, and ensuring that public services (healthcare, transportation, etc.) are provided.

The participation of the state also aims to address the failures that occur in the market[14] when it is unable to solve certain problems. For example, in the case of monopolies (which cause the price of a certain good to rise to the detriment of consumers) or when the activities of companies generate negative externalities (harming third parties). In such situations, the state intervenes through various instruments:

[14] Market failures refer to a situation in which the market alone does not efficiently allocate resources.

- Establishing working conditions (minimum ages, duration of the working day, maternity/paternity leave, health insurance, etc.), minimum wages, unemployment benefits, etc., to protect workers.
- Setting maximum prices on essential products and regulating prices in monopolies to protect consumers (maximum price per square meter in social housing).
- Acting as an entrepreneur in certain sectors to ensure that certain economic areas are served, even if they have low or no economic return.
- Promoting and financing transportation and communication infrastructures.
- Monitoring market activities to ensure compliance with regulations and penalizing negative externalities[15].
- Collecting taxes to finance its activities and redistribute income.

Depending on the degree of state involvement in the economy, we find market economies closer to the capitalist system or closer to a centrally planned economy. The United States is a notable example of a market economy that leaves many activities in private hands, while other countries, paradigmatic of the welfare state, entrust such activities to the state, regulate the labour market, provide universal healthcare, etc. Since the fall of the Berlin Wall, centrally planned economies have relaxed their regulations, opening the door, in one way or another, to market intervention. Examples close to a centrally planned economy include Cuba and North Korea.

The choice each country makes in responding to basic economic questions determines the utilization of its productive resources. Consider two identical islands with the same starting point: the same land factor (identical area, natural wealth, climate, etc.), the same labour factor (the same number of inhabitants with the same education), and the same capital factor (identical agricultural, hunting, and fishing techniques). Now, suppose that on one island, each individual organizes freely, deciding whether to engage in agriculture, hunting, or fishing, and on the other, the chief decides what each person does and how they do it. It is evident that, after a certain period, the economic development of the two islands will be very different[16].

A real example is Germany. After World War II, its territory was divided into two. One part, West Germany, was organized according to the principles of a market economy, while the other, East Germany, followed the path of a centrally planned economy under the influence of the USSR.

CENTRAL PLANNING AND MARKET

Kapuściński, R. (1994), *The Empire*, Anagrama Editorial, p. 284. The book chronicles the author's extensive journey through the Soviet Union between 1989 and 1991.

A little further away are the large stores of the White Swan. In this commercial world, the feverish and tenacious crowd serves the same function as colorful advertising does in the West: attracting customers. I saw how a crowd of people ran towards a section on the ground floor, how they made their way, how they attacked. A shipment of shoes had arrived. I approached to get a closer look. They were selling only one pair of shoes per person. It didn't matter which pair or to whom; the shop assistants didn't even look inside the boxes. Each buyer clung to a box, slipped away from the crowd, and stood waiting on the side, a place that quickly turned into a trading post. Gradually, through a chain of transactions, discussions, and compromises, people approached the ideal that consisted of each person having the shoes they needed.

[15] In many cases, a company's production process has an impact on the external environment. If it is positive, there is no cause for concern (for example, a bakery or pastry shop emitting a pleasant smell for those passing by), but if it has a negative impact, measures need to be taken (such as contaminating a river's water).

[16] See Cuervo-Arango and Trujillo.

When, almost 50 years later, the reunification of the country was considered, the situation of the two parts was noticeably different. The development of the first was much superior to that of the second[17].

7. THE PRODUCTION POSSIBILITY FRONTIER (PPF)

It is an economic model that explains, in a very simple way, the behaviour of a country that has to choose what goods to produce and how much of each with the limited resources it possesses. The Production Possibility Frontier (PPF) indicates the maximum quantity of goods an economy can produce using its resources efficiently.

Suppose a country with two productive factors (land and labour) that aims to produce two goods (wheat and cotton). The table shows the various production possibilities of that economy. If it allocates all resources to wheat, it will produce 20 units; logically, the production of cotton will be zero (option A).

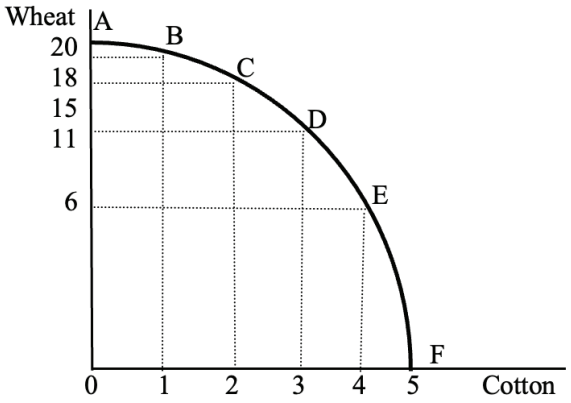
PRODUCTION POSSIBILITY TABLE			
OPTION	WHEAT	COTTON	OPPORTUNITY COST
A	20	0	-
B	18	1	2
C	15	2	3
D	11	3	4
E	6	4	5
F	0	5	6

To produce one unit of cotton (option B), the country will have to withdraw productive factors used in wheat production, so the wheat production will necessarily decrease. Acting rationally[18], factors suitable for cotton production, but less suitable for wheat, will be allocated to cotton (it would not be logical to stop planting wheat on lands that produce it more efficiently). With these considerations, it is assumed that producing one unit of cotton requires giving up two units of wheat; this is the figure in the opportunity cost column: the relative cost of the first unit of cotton is two units of wheat.

If you want to produce one more unit of cotton, the second one (option C), you will have to stop planting wheat in lands that are more suitable for wheat than those left for producing the first unit. For this reason, the cost in wheat of the second unit of cotton is higher than that of the first. Three units of wheat must be sacrificed to obtain the second unit of cotton.

[17] A rigorous analysis of the case would require studying to what extent the two zones into which the country was divided were similar (especially considering soil richness, mineral deposits, and the location of industrial zones) and taking into account the external assistance each received over those years.

[18] The assumption of rationality is present in all economic decisions. If decisions are not made rationally, it is not possible to reach any conclusions.



And so on, each additional unit of cotton requires stopping planting wheat in increasingly better lands for it, so the loss is growing. Until reaching option F, which involves allocating all productive factors to cotton and, therefore, not producing any wheat.

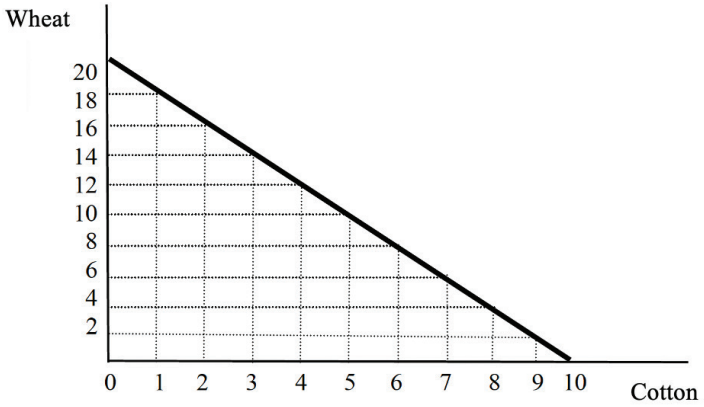
The PPF has a concave shape because the opportunity costs are increasing, meaning that more quantity of one good (wheat) must be given up to obtain the same increase in the other (cotton). This is a consequence of the fact that productive factors are not homogeneous; it does not make a difference to plant wheat or cotton on any land, as there are areas that are more suitable for wheat and others more suitable for cotton[19].

The "law of diminishing returns", which states that, after a certain point, adding additional units of a variable factor to a given quantity of a fixed factor results in increasingly smaller increases in production, is linked to increasing opportunity costs because lower yields lead to a higher cost for each additional unit.

If an economy can produce goods (X, Y), and combinations A (10, 2) and B (4, 5) belong to the economy's Production Possibility Frontier (PPF), and you want to calculate the opportunity cost of increasing one unit of good Y when moving from combination A to combination B, you need to find what is foregone in the production of X by increasing one unit of good Y. In other words, if 6 units of X are foregone (going from 10 to 4) to produce 3 more units of Y (going from 2 to 5), the opportunity cost of increasing one unit of good Y when moving from combination A to combination B is 2 (6/3). Each unit of Y "costs" two units of X, which is the relative cost of the goods (what one good costs expressed in units of the other).

In the case of assuming homogeneous production factors, all land would have the same yield. The cost in wheat of increasing cotton production by one unit would always be the same. Under this assumption, opportunity costs would be constant, and the PPF would be a straight line. If, following the example, it is assumed that production factors are homogeneous, and the opportunity cost is always 2, the new PPF would be a linear function.

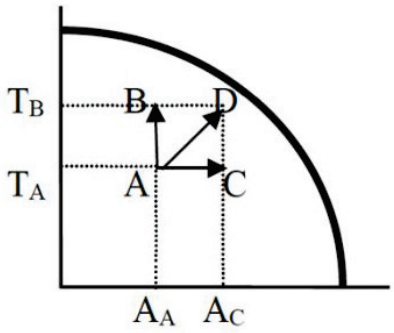
[19] In reality, factors of production are not homogeneous. Planting wheat in one piece of land is not the same as planting it in another, as one is better suited for wheat than the other. The same applies to the factor of labour; when we say that an activity requires an hour of work, we are referring to "an hour of work by a professional in that field". An appendectomy is performed in an hour "by a surgeon"; a plumber is not suitable for that job; and fixing a pipe requires half an hour of a plumber, not half an hour of a surgeon.



7.1 Efficiency and Inefficiency

Three sets of production possibilities can be distinguished with respect to the PPF:

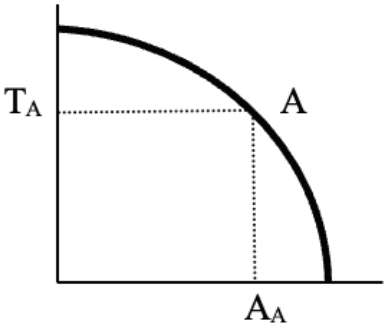
1. Points below the PPF: they are combinations of inefficient production. The economy produces at point A, with T_A units of wheat and A_A units of cotton.



Producing at these points implies underutilization of productive resources, either because there are unused resources (unemployment) or because, if all resources are used, it is done inefficiently. In this case, it is possible to increase the production of one good without decreasing the other (production possibilities B and C), or even increase the production of both goods (production possibility D).

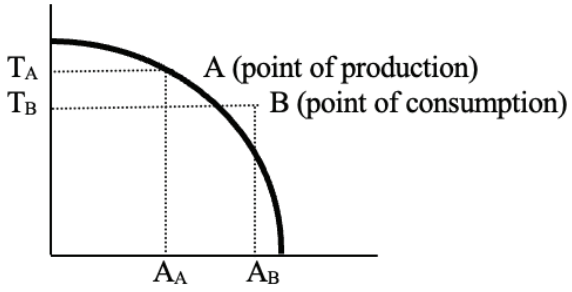
2. Points above the PPF: these are combinations where the economy is making efficient use of resources. It produces at point A, with T_A units of wheat and A_A units of cotton.

At these points, by the definition of the PPF, efficient use of resources is being made, and it is only possible to increase the production of one good if the production of the other is reduced.



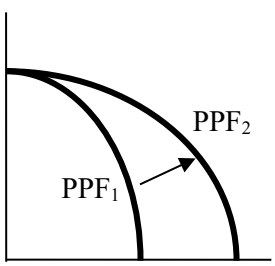
3. Points above the PPF: represent combinations of production that are unattainable with the available productive resources. The fact that they are unattainable from a production perspective does not mean they cannot be reached from a consumption perspective. We can distinguish several cases:

a) Consequences of trade: at a given moment, any combination above the PPF is unattainable from a production standpoint, but it may be achievable from a consumption standpoint if the economy engages in trade with others.

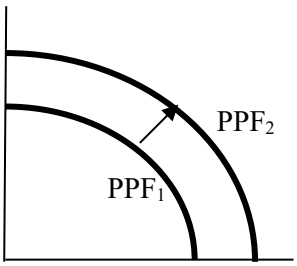


You cannot produce at B, with T_B units of wheat and A_B units of cotton, as there are not enough resources to do so. However, it is possible to produce at A and consume at B. By engaging in trade with other economies, ($T_A - T_B$) units of wheat are exported, and ($A_B - A_A$) units of cotton are imported. A represents the production combination, and B represents the consumption combination.

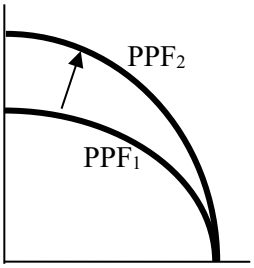
b) Temporal consideration: as we have seen, in the short term, productive factors are considered constant, but in the long term, they can increase. As productive factors grow (population and education increase, more capital goods are available, new natural resources are discovered), or production techniques improve, the PPF shifts or pivots outward, making production possibilities possible that were not achievable in previous periods. In these cases, it is said that the economy has experienced economic growth.



Graph 1



Graph 2



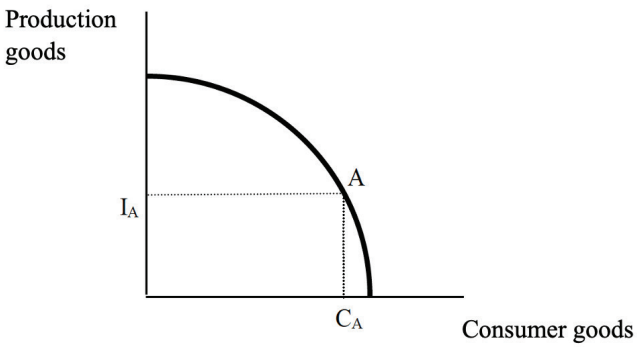
Graph 3

The shift of the PPF can take various forms depending on the circumstances. Graph 1 assumes that cotton production techniques have improved while wheat production techniques have remained constant. Graph 2 assumes a general improvement that lifts the PPF at all points. In Graph 3, the improvement occurs in wheat production techniques while cotton remains constant.

7.2 The PPF and Economic Growth

The PPF can also be useful for studying economic growth. For example, at a more global level, it is assumed that the economy, instead of producing wheat and cotton, allocates its factors to producing consumer goods and capital or investment goods.

By making efficient use of resources, it positions itself at production possibility A, which entails producing C_A consumer goods and I_A investment goods.



If we assume that land and labour factors remain constant, will production increase over time? The answer depends on whether net investment is positive, zero, or negative. If net investment, I_A, is greater than replacement investment, then net investment is positive (more capital goods are produced than are depreciating), and over time, the increase in capital goods will allow an increase in production, resulting in an expansion of the PPF. The economy would transition from PPF_1 in period 1 to PPF_2 in period 2, representing economic growth or an increase in the productive capacity of the economy.

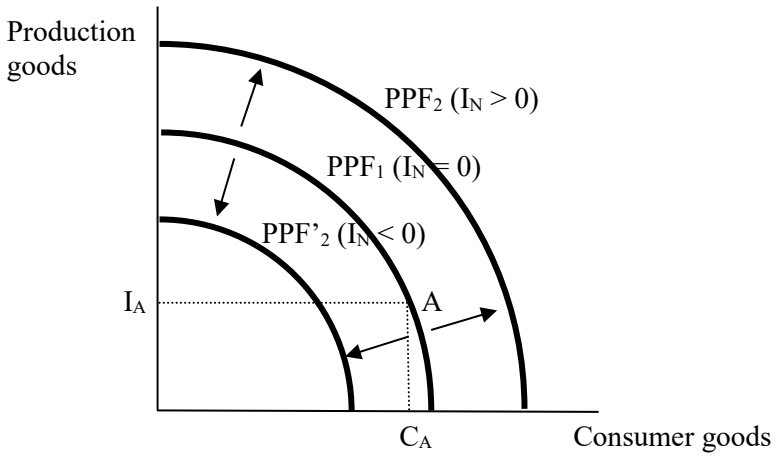
If I_A coincides with replacement investment, net investment is zero (only enough capital goods are produced to replace those depreciating), so *ceteris paribus*, the PPF will not shift over time.

The third possibility is that the investment goods produced are not even enough to replace those depreciating. In this case, net investment is negative, and over time, the capital factor will decrease, leading to a decrease in production. This results in a downward shift of the PPF. The economy would move from PPF_1 in period 1 to PPF'_2 in period 2.

Therefore:

If $I_A > I_R$, then $I_N > 0$, the capital factor increases, and the PPF rises to PPF_2.
If $I_A = I_R$, then $I_N = 0$, the capital factor remains unchanged, and the PPF does not shift.
If $I_A < I_R$, then $I_N < 0$, the capital factor decreases, and the PPF drops to PPF'_2.

Where I_A is total investment, I_R is replacement investment, and I_N is net investment.



The conclusion is simple: an economy that allocates resources to produce investment goods, even if it must forego consumer goods in the short term, will increase its production capacity in the medium and long term and have more consumer and investment goods.

In developing countries, a delicate balance is required. To grow, they should increase capital goods, but the production of consumer goods is so low — in many cases, not even sufficient to feed the population — that they are not in a position to divert factors to produce investment goods.

The only way out is very slow growth or external assistance that facilitates the acquisition of capital goods that they could produce at too high a cost on their own.
Another situation arises in a country emerging from a catastrophe (war) that has destroyed a significant portion of investment goods. If the country can produce at least the necessary consumer goods to sustain the population, the government can limit production and consumption to allocate factors to investment goods. Although there may be some scarcity for a few years, after that, production will increase, and such restrictions will no longer be necessary.

Despite its simplicity, the PPF model is useful for understanding certain aspects of economic functioning:

- Production depends on the resources the economy possesses.
- Not everything is possible. Resources are limited, and choices must be made regarding desired goods and their quantities.
- Choices are typically not framed in terms of guns or butter but are closer to the daily lives of individuals and institutions.
- Resources can be used inefficiently, resulting in production below potential.
- Increased resources allow for increased production.
- Trade enables an economy to reach consumption combinations that exceed its production possibilities, improving the situation of its inhabitants.

7.3 Brief Note on Sustainable Development

The production possibilities frontier could shift downward as a consequence of irresponsible resource usage, so that current development, driven by a selfish and short-term vision, mortgages future development due to the depletion, misuse, or deterioration of productive resources.

Concern for sustainability has always been present in the history of humanity. In its more recent phase, it began to gain strength in the 1970s. Perhaps the United Nations Conference on the Human Environment held in Stockholm in 1972 initiated the path of integration between the environment and development, which later led to sustainable development.

The concept of sustainability, as we understand it now, started to be used in 1980 by the International Union for Conservation of Nature and Natural Resources. In 1983, the World Commission on Environment and Development was established, and in 1987, in its report “Our Common Future” (known as the Brundtland Report), it popularized the concept. The report defines sustainable development as a “process of change in which the exploitation of resources, the orientation of technology, and the modification of institutions are in harmony and enhance the current and future potential to meet human needs and aspirations”. Also, as stated in the Tokyo Declaration (the culmination of its work), it is an “approach to progress that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

In 1992, at the United Nations Conference on Environment and Development held in Rio de Janeiro, known as the “Earth Summit”, significant steps were taken. The Rio Declaration seeks to increase cooperation among states and promotes international agreements to protect the integrity of the environmental and global development system, recognizing the integral and interdependent nature of the Earth. It proclaims in its first principle that “human beings are at the centre of concerns related to sustainable development”, indicating in the third that “the right to development must be exercised in such a way that responds equitably to the developmental and environmental needs of present and future generations”. Since then, summits have taken place continuously. The well-known

Sustainable Development Goals are part of the Agenda 2030, whose full title is "Transforming our World: the 2030 Agenda for Sustainable Development", approved by the UN in 2015.

In recent years, circular economy has gained strength with the goal of extending the lifespan of products within the economy, minimizing unused waste, and reducing the consumption of new resources. This approach contributes to the prolonged sustainability of resources and materials.

BARBED WIRE OR TOOLS?

Kapuściński, R. (1994), *The Empire,* Editorial Anagrama, pp. 96-98. The book captures the author's extensive journey through the Soviet Union between 1989 and 1991.

If I manage to achieve it - I make plans in 1989 - I would like to travel all over the USSR, the fifteen republics of the Union (…). The surface of the Empire exceeds twenty-two million square kilometers, and its land borders extend over forty-two thousand kilometers, more than the equator.

Taking into account that, wherever technically possible, the borders in question were always (and still are) protected by thick barbed wire fences (I saw these swarms on the borders with Poland, China, and Iran), and that this wire, due to the harsh climate, deteriorates very quickly, and it needs to be changed often in hundreds, or rather, thousands of kilometers, we can assume that a significant part of Soviet metallurgy is nothing but the industry dedicated to the production of barbed wire.

After all, it doesn't end at the borders! How many thousands of kilometers of wire were used to fence the Gulag archipelago? Those hundreds of forced labour camps, stages, and prisons scattered throughout the Empire's territory! How many more thousands of kilometers were spent fencing artillery ranges, armored vehicle polygons, and nuclear weapons? And the barbed wire around military barracks? And those around all kinds of warehouses?

If we multiply all this by the years of the existence of Soviet power, it will not be difficult for us to answer the question of why in the stores of Smolensk or Omsk there is no way to buy a hoe or a hammer, not to mention a knife or a spoon: there is no raw material to manufacture such objects; it has all been spent on the production of barbed wire. But it doesn't end there either! After all, tons of this wire had to be transported - by ships, by railway, by helicopters, by camels, by dog sleds - to the most remote places, to the most inaccessible corners of the Empire, and then unload, unroll, cut, and fix it. It is not difficult to imagine the endless complaints - by phone, by telegraph, or by letter - from border post commanders, Lager commanders, and prison directors requesting new shipments of tons of wire in their prudent zeal to stockpile it in case it ran out in central warehouses. And on the other hand, it is not difficult to imagine those thousands of teams and control commissions traveling the Empire from end to end to verify that everything was fenced as it should be, if the fences were high and thick enough, if the tangle of barbed wire was dense enough for not even a mouse to slip through. It is also easy to imagine the telephone calls from Moscow to its subordinates in the provinces, calls that convey alertness and constant concern encapsulated in the question: Are you sure you are all well-fenced there? And here, instead of building houses and hospitals, instead of fixing water and electricity facilities that kept breaking down, for years and years, some men (fortunately not all) were busy fencing their Empire, both internally and externally, locally and at the state level.

8. GLOSSARY OF TERMS

Absolute Price: Refers to the valuation of a good in monetary units.

Capital: Understood as a productive factor, it refers to human contributions that facilitate (accelerate) the production process.

Capitalist Economy: An economic system that answers basic economic questions through the market. In each specific market (both for goods and services and factors), the interaction of forces—supply and demand—determines the price without state intervention.

Centralized Economy: An economic system in which basic questions are resolved by a central authority that fully controls the economy.

***Ceteris Paribus* Clause:** Indicates that, except for the variable under study, all others are considered constant.

Circular Economy: An approach to development that seeks to extend the time products remain in the economy, minimizing unused waste and the use of new resources, contributing to extending the life of deposits.

Circular Flow of Income: A simple model that facilitates understanding some aspects of the basic functioning of the economy.

Deductive Method: Moves from the universal to the particular, proceeding to verify laws.

Economic Growth: Increase in the productive capacity of an economy.

Economic System: A set of basic, technical, and institutional relationships that characterize the economic organization of a society and influence its fundamental decisions and predominant channels of activity.

Economics: "The study of how societies use scarce resources to produce valuable goods and distribute them among different individuals" (Paul Samuelson, 1915-2009).

Efficiency: The property by which the economy utilizes its limited resources in the best possible way. For example, points on the PPC identify efficient combinations because you cannot increase the quantity of one good without producing less of the other or others.

Empirical Science: Part of science that tests the validity of its hypotheses against reality.

Endogenous Variables: Variables whose values are determined by the model itself.

Exogenous Variables: Variables whose values are not determined by the model but are given to it.

Factors or Productive Resources: These are the basic elements used for the production of goods or the provision of services. Traditional productive factors include land, labour, and capital.

Formal Science: Part of science that deals with the relationships between propositions but without experimentally verifying them.

Inductive Method: Moves from the particular to the universal, i.e., from the observation of concrete facts to the formulation of laws.

Labour: Understood as a productive factor, it refers to the physical and intellectual capacities of people applied to the production of goods and the provision of services. When economics talks about "human capital", both the quantitative (number) and qualitative (education) aspects must be considered.

Land: As a productive factor, it includes not only the surface that serves as a basis for economic activity but also its location, content, and the free products of nature.

Law of Diminishing Returns: States that, after a certain point, adding additional units of a variable factor to a given quantity of fixed factor results in increasingly smaller increases in production.

Law of Large Numbers: Indicates that, in general terms, the random movements of many individuals tend to counteract each other, so we can understand the behaviour of the whole.

Macroeconomics: The part of economics that deals with studying an economy as a whole. The major macroeconomic topics are production, employment, prices, the public sector, and the economy's relationship with the external sector. It does not focus on studying individual markets but rather on the overall economy.

Market Economy or Mixed Economy: In this economic system, the market answers basic questions but with state oversight to correct economic failures and ensure a certain level of well-being for the most disadvantaged.

Market Failures: Situations in which the market alone does not allocate resources efficiently or even produces negative externalities (such as pollution).

Method: The path a science follows to explain the reality it studies. Economics uses models to explain reality.

Microeconomics: The part of economics that studies the economic behaviour of individual people, physical or legal entities, their aggregates, and the relationships between them; staying within the market for a specific good, service, or factor.

Model: A simplified representation of reality.

Nominal Value: A variable valued in terms or at nominal or current prices is expressed in monetary units of the year to which it refers or in which it occurs.

Normative Economics: The part of economics concerned with "what should be". It identifies and isolates economic problems, proposing measures to achieve specific goals or objectives. Its propositions depend to a large extent on the value judgments of those who formulate them.

Opportunity Cost: The cost of a good in units of another good.

Positive Economics: The part of economics that seeks objective explanations of the functioning of economic phenomena, explaining things "as they are", as they occur in reality, regardless of value judgments. It formulates laws of general compliance (considering the law of large numbers), which do not depend on the thinking or training of one group or another.

Production Possibility Frontier (PPF): Indicates the maximum quantity of goods and services that an economy can produce or offer by efficiently using its resources. Being on it, it is only possible to increase the production of one good if the production of the other or others is reduced.

Real Value: A magnitude valued in terms or at real or constant prices is expressed in monetary units of a base or reference year. Expressing magnitudes from different years in real terms involves valuing all of them in the same monetary units, those of the base year, allowing for easy comparison by eliminating distortions caused by price variations.

Relative Prices: Refers to the valuation of a good in terms or units of another good.

Scientific Knowledge or Science: That knowledge or set of knowledge that aspires to formulate, through rigorous and appropriate languages, laws by which phenomena are governed. It also encompasses the method of obtaining such knowledge.

Social Science: That which aims to understand the investigation of certain types of human actions and relationships.

Sustainable Development: Present development that allows addressing current needs without compromising the ability of future generations to meet their own needs.

Sustainable Economics: A way of managing economic activity while respecting the environment, promoting long-term social and economic well-being.

CHAPTER II. BASIC MARKET THEORY

In this unit, we will analyse market forces: demand and supply. Initially, we will explore the concepts of demand and supply, their graphical representations, the factors each depends on, and how these factors affect them. Subsequently, by combining the two forces, we will study market equilibrium[20] and observe how it is affected by certain incidents.

The analysis in this unit assumes a market economy, where demand and supply, at equilibrium, set the price at which goods are sold and the quantity. Additionally, the assumptions are made in a scenario (a market) with numerous buyers (demanders) interested in purchasing the good and numerous companies (suppliers) manufacturing it, so that each exerts an insignificant influence on the good's sale price; characteristics, as will be studied later, of a competitive market.

1. DEMAND

1.1 Overview

The demand[21] for a good is the quantity of that good that buyers are willing to acquire over a certain period. It depends on multiple factors: the price of the good (P_X), the prices of goods related to the one being studied (P_Y, P_Z), the income of the buyers (I), preferences (P), etc. Demand can be expressed through a mathematical function:

$$X = f(P_X, P_Y, P_Z..., I, P...)$$

The graphical representation of the individual demand function is the individual demand curve, indicating the quantity of the good the buyer is willing to purchase at each price*, ceteris paribus* (i.e., assuming all other factors affecting demand: prices of other goods, income, preferences, etc., remain constant).

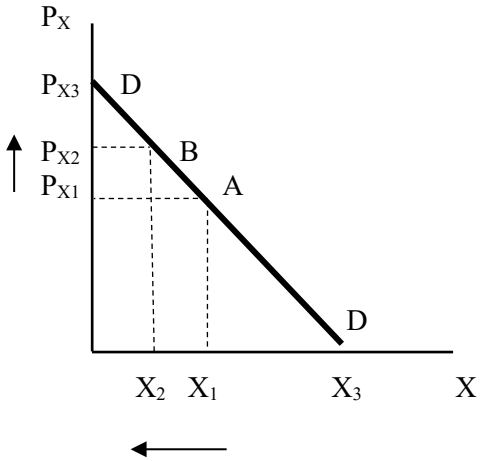
At a price P_{X1}, the consumer will be willing to buy X_1 units of good X. If, *ceteris paribus*, the good becomes more expensive, raising its price to P_{X2}, the consumer will reduce their consumption to X_2. The price rises, and the demanded quantity falls.

For simplicity, in this introductory book, it will be considered that demand is a linear function[22]. Under this assumption, the demand intersects the coordinate axes at two points. The intersection with the ordinate axis indicates the price from which the individual is willing to buy the good: for equal or higher prices (in the graph P_{X3}) there is no demand. The intersection point with the abscissa axis indicates the maximum quantity that the individual wants of the good, even if it is given away (in the graph X_3).

[20] The market is a group of buyers and sellers of a good.

[21] Demand should not be confused with quantity demanded, that is, with a specific quantity of demand indicating how much of a good is demanded in quantitative terms; since demand is the quantity demanded in relation (or related) to the factors on which it depends, which are mostly assumed to be constant during the period of time considered. For example, when referring to the variation in quantity demanded for each price with the *ceteris paribus* condition, one is alluding to the variation in demand.

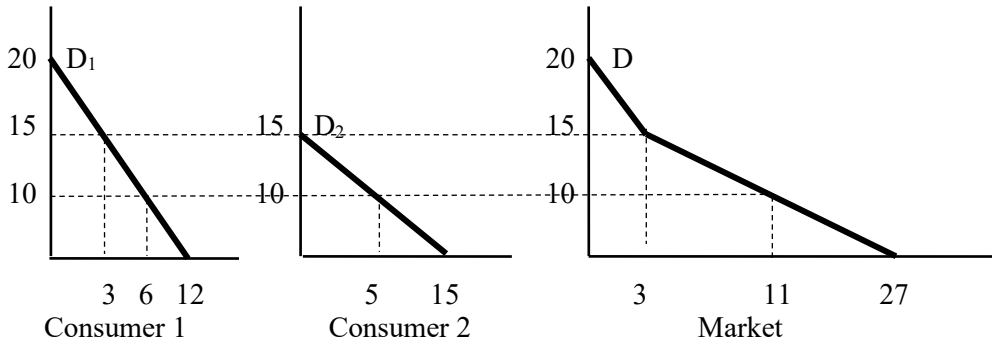
[22] Although, when referring to it, a demand curve or function often appears.



In demand, the relationship between quantity and price is inverse — as the price increases, demand decreases — hence, the demand function is decreasing.

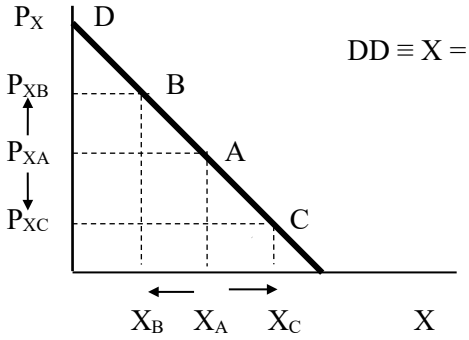
Market demand is the sum of the demands of the individuals composing it. The quantity demanded by the market for each price is the sum of the individual quantities demanded for that price.

Assuming, for simplicity, a market with two demanders. The first buys the good starting at a price of 20 monetary units, and the second from 15. Therefore, between these two prices, the market's demand function coincides with the first demander's function, as the second buys nothing. The market's demand for a price of 15 is 3, which is what the first demander buys. As soon as the price drops below 15, the second demander joins, so, from that price, the market's demand will be the sum of what both demand for each price. If the price is 10, the market's demand is 11, the 6 units bought by the first demander plus the 5 by the second. If the price is zero, the demand is 27, the 12 units wanted by the first demander plus the 15 by the second.



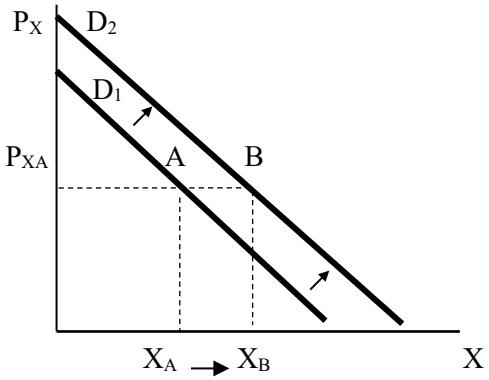
When discussing variations in the demanded quantity of a good, it is essential to distinguish between:

a) **Variations in the same demand function.** These variations in the demanded quantity occur, by the very definition of demand (which indicates the relationship between the price of a good and the quantity, keeping everything else constant), when the price of the good itself changes: if the price rises, the demanded quantity falls, and if the price falls, the demanded quantity rises, but always within the original demand function.



$DD \equiv X = f(Px)$ for certain given values of Py, Pz…, I, P…

b) **Variations due to shifts in the demand function**. They occur when some factor other than the price of the good itself changes: price of other goods, income, tastes or preferences, etc. In this case, the individual varies the demanded quantity of the good for each previous price, so, when circumstances change — when something of that "everything else" other than the price changes — the demand function changes.



If an individual is consuming the quantity X_A at the price P_{XA}, and, for example, increases their income from I_1 to I_2, for each price of the good, demand will increase, leading the consumer to move away from the demand function they were initially in. In particular, for P_{XA}, where with the initial income I_1, they demanded X_A, now with the new income $I_2 > I_1$, they will demand X_B. The individual has transitioned from the original demand function D_1 (which indicates what the subject wants for each price of the good, assuming constant values for other factors affecting demand: P_{Y1}, P_{Z1}, I_1, P_1…) to a new demand function D_2, which indicates what the subject wants for each price of the good once their income has changed to a new value (demand for each price of the good, assuming other factors remain constant — though possibly different from the starting values: P_{Y1}, P_{Z1}, I_2, P_1…). Therefore, the quantity demanded varies due to a change in the demand function.

$$D_1\ D_1 \equiv X = f(P_X), \text{ for } P_{Y1}, P_{Z1}, I_1, P_1\ldots$$

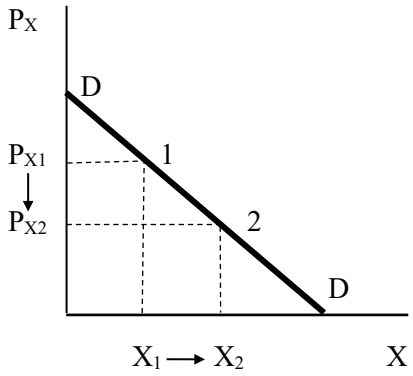
$$D_2\ D_2 \equiv X = f(P_X), \text{ for } P_{Y1}, P_{Z1}, I_2, P_1\ldots$$

1.2 Factors Influencing Demand and their Effects on the Demand Function[23]

1. <u>Price of the good itself</u> (P_X): the price of a good is the most influential factor on its demand. The demanded quantity varies inversely to the price, and the various price-quantity combinations are the different points of the demand function. Therefore, variations in the good's price, *ceteris*

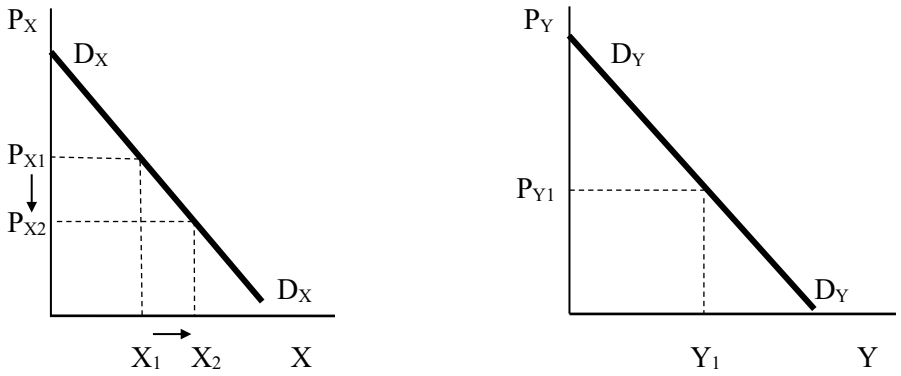
[23] In this question, we will see only how demand reacts (one of the dishes of the scale). When later, once supply (the other dish) is studied, the market equilibrium (the complete scale) and the variations that occur in it are addressed, it will be found that the reactions of demand are "curbed" by supply, which logically has a lot to say in establishing market equilibrium.

paribus, lead to variations in the demanded quantity that end up positioning at other points of the demand function.



2. <u>Prices of other goods (P_Y, P_Z...)</u>. The variations that occur in the demanded quantity of a good when the price of others changes depend on the relationship between the goods. Three cases can be distinguished:

a) **Independent goods:** two goods are independent when variations in the price of one do not affect the demand for the other[24]. Examples are plentiful: pens and soap, lamps and car tyres, glasses and cardboard, etc.



If the price of good X decreases[25], the quantity demanded of X will increase; as the price of the good itself changes, there is a variation in the quantity demanded that would lead to another point on the consumer's demand function. If Y is independent of X, this variation in the price of X does not affect the quantity demanded of Y.

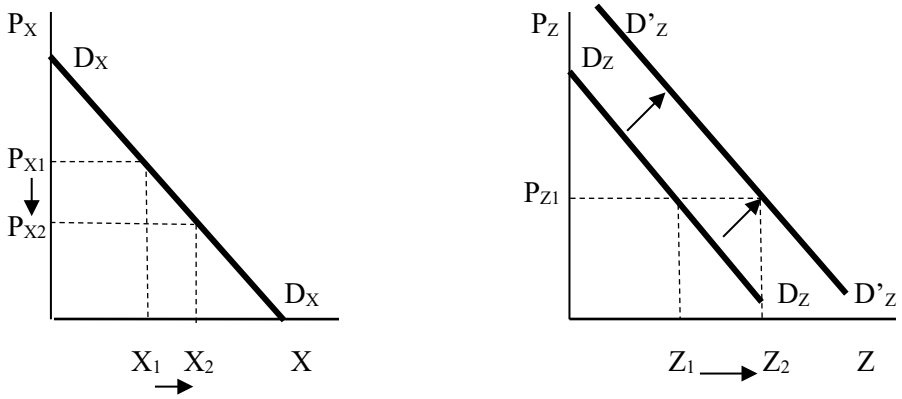
b) **Complementary goods:** two goods are complementary when the demanded quantity of one moves in the same direction as the demand for the other: if the demanded quantity of one increases, the demand for the other increases, and if the quantity of one falls, the quantities of the other fall at any price. Some examples could be: vehicles and fuels (petrol, diesel), mobile phones and chargers, zippers and trousers, etc.

---

[24] In reality, changes in the price of a good always have some effect on the demand for others, no matter how different the goods may be. The reason is that price variations affect the individual's real income: if the price of a good purchased by a consumer rises, they will have less income to spend on others, so the demand for these goods will be affected. The effect will depend on how essential the good is to the individual, the consumer's monetary income, the proportion of the good's price to income, etc. Although housing and clothing are very different goods, if the cost of the mortgage increases, the purchase of clothing (and many other products) will suffer.

[25] In this and the following cases, we will study the effects of price variation in one direction. If the variation were the opposite (in this case, the increase in the price of X), the results would logically be different.

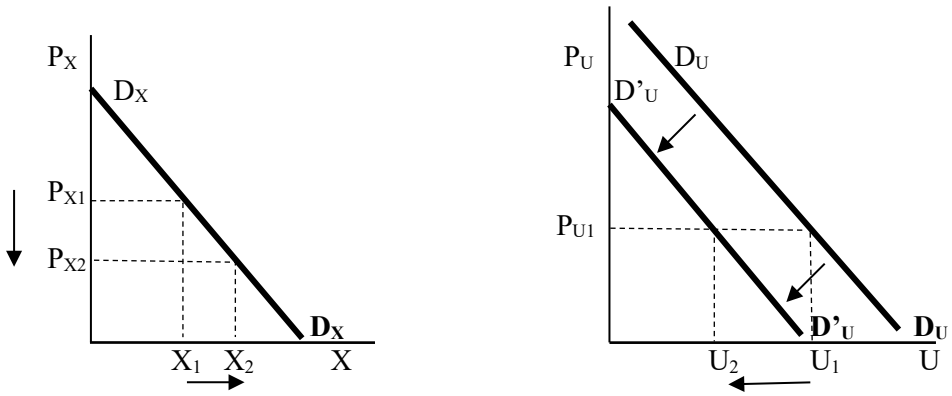
If the price of good X decreases, the quantity demanded of X will increase (from X_1 to X_2), and the new situation would mark another point on the demand function (up to this point, the same as in the previous case). If Z is complementary to X, the demand for X pulls that of Z in the same direction; as the quantity demanded of X has increased, the quantity demanded of Z will also increase for each price (for example, for P_{Z1} it will change from Z_1 to Z_2). The consumer finds themselves in a new demand function for Z: something external to the price of the good itself varies (in this case, the price of another good, X), and there is a variation in the quantity demanded as a result of the upward shift of the demand function for Z (from D_Z to D'_Z).



$D_Z\ D_Z \equiv Z = f(P_Z)$, for P_{X1}, P_{Y1}, I_1, P_1…

$D'_Z\ D'_Z \equiv Z = f(P_Z)$, for P_{X2}, P_{Y1}, I_1, P_1…

c) **Substitute goods:** two goods are substitutes when the demanded quantity of one moves in the opposite direction of the demand for the other: if the demanded quantity of one increases, the demand for the other decreases, and vice versa. The demand for one good *substitutes* for the other. Goods that serve to cover the same need are substitutes for each other; for example, olive oil and sunflower oil; margarine and butter; sugar and saccharin, etc.



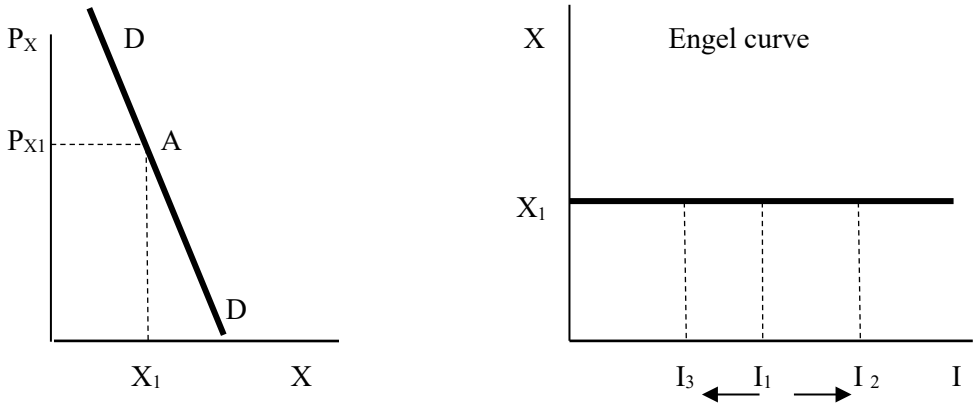
If the price of good X decreases, its quantity demanded increases (from X_1 to X_2), and the new situation would occur at another point on the demand function for X. If U is a substitute for X, the demand for X replaces that of U; as the quantity demanded of X increases, the quantity demanded of U will decrease for each price (for example, for P_{U1} it will change from U_1 to U_2). The consumer finds themselves in a new demand function for U (since the price of X has changed, something external to the price of U; there is a variation in the quantity demanded as a result of the downward shift, in this case, of the demand function for U (from D_U to D'_U).

$D_U\ D_U \equiv U = f(P_U)$, for P_{X1}, P_{Y1}, I_1, P_1…

$D'_U\ D'_U \equiv U = f(P_U)$, for P_{X2}, P_{Y1}, I_1, P_1…

3. <u>The individual's income (I):</u> the variations that occur in the demanded quantity of a good when the consumer's income varies depend on the type of good. The following cases can be distinguished:

a) **Basic necessities:** These are goods whose demand is barely affected when income varies. They usually have a very steep demand function, as they are also very insensitive to variations in their own price. The quantity of bread or salt, for example, that an individual buys depends little on its price and income. Medicines are also basic necessities: a diabetic acquires, for each period, the same quantity of insulin, also regardless of income and price.



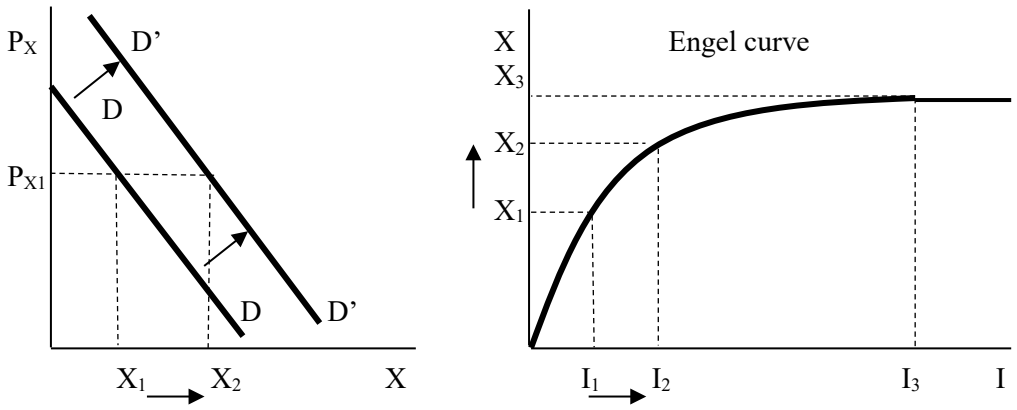
An individual with income I_1 purchases X_1 units of a good at price P_{X1}. If the income increases to I_2, they will continue to purchase the same quantity of the good for each price: their consumption will remain X_1.

The Engel curve relates the quantity demanded of a good and income. Its graphical representation (with income on the x-axis and quantity demanded on the y-axis), in the case of essential goods, is horizontal. For income I_1, the demand is X_1; if, *ceteris paribus*, the income rises to I_2, the demand remains at X_1, and if the income decreases to I_3, the demand for the good remains unchanged.

b) **Normal goods:** These are goods whose demand varies in the same direction as income. As income increases, the quantity demanded increases, and as income decreases, the quantity demanded decreases. They are the most common in the market, hence their name.

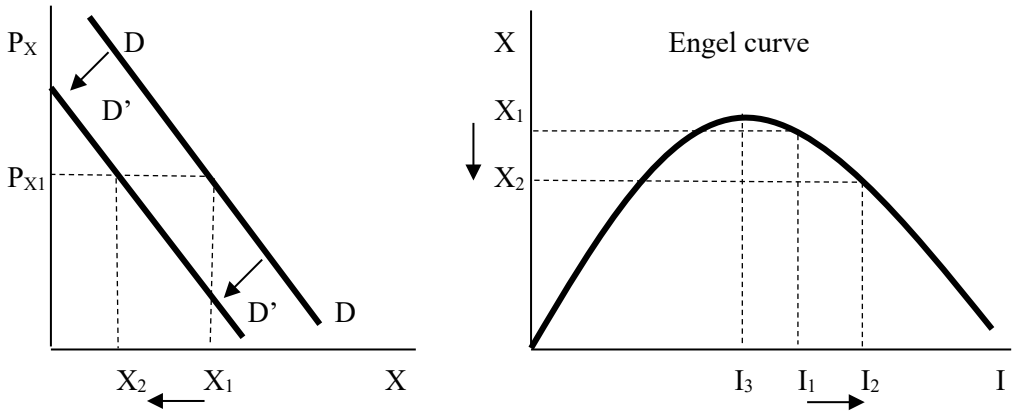
If for a certain level of income I_1 the individual purchases X_1 units of X at price P_{X1}, with an increase in income to I_2, *ceteris paribus,* consumption of the good will increase for each price, acquiring, for the initial price P_{X1}, X_2 units of the good ($X_2 > X_1$). As in the previous case, since a factor other than the price of the good has changed, there is a variation in the quantity demanded due to the shift in the demand function, in this case, shifting upwards from D to D'.

The Engel curve for normal goods is upward sloping: higher income levels are followed by higher consumption of the good. For the initial income I_1, consumption is X_1; as income increases to I_2, consumption increases to X_2. However, the slope of the function decreases as income increases, as a result of which, for equal increments of income, the increments of consumption are progressively smaller, until a point is reached where the individual stops increasing consumption of the good (saturation occurs); in the example, this would occur for income I_3 and consumption X_3.



c) **Inferior goods:** These are goods that, above a certain income level, the consumer decreases their demand as income increases, potentially ceasing to purchase them at higher income levels. Inferior goods include low-quality products, substitutes, supermarket own brands, etc.

An individual with income I_1 (which is above the level mentioned in the definition of inferior goods) purchases X_1 units of the good at price P_{X1}. If the income increases to I_2, *ceteris paribus*, the consumption of the good will decrease for each price, acquiring, for the initial price P_{X1}, X_2 units ($X_2 < X_1$). As something different from the price of the good has changed, the quantity demanded changes because the demand function shifts, in this case downwards, from D to D'.



The Engel curve for inferior goods has an increasing segment, corresponding to very low incomes. Beyond a certain income level, it becomes decreasing, with consumption of the good decreasing as income increases. For the initial income I_1, consumption is X_1; as income increases to I_2, consumption decreases to X_2. In the graph, consumption of the good would rise as income increases until reaching I_3; from that point onwards, consumption decreases as income continues to grow[26].

[26] If an individual has a very low income, they will purchase low-quality products to feed themselves (they will buy sandwiches with few slices of bologna); if their income increases, they will consume more quantity of those same goods (the sandwich will have more slices). But if the income continues to grow, there will come a point where they will begin to substitute low-quality products for better ones (chorizo, salami, ham), until they stop consuming those (they will only eat sandwiches with 100% Iberian acorn-fed ham).

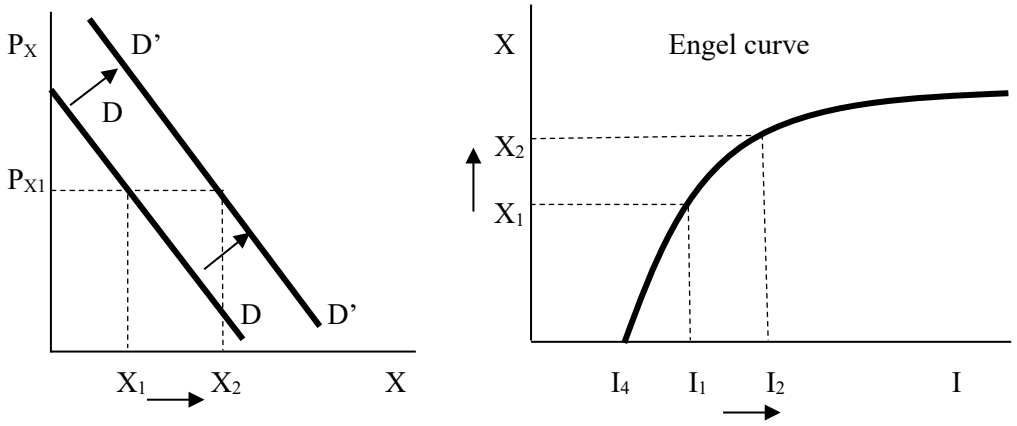
THE CRISIS DRIVES THE SALE OF STORE BRANDS

Products bearing the seal of retailers allow for savings of up to 40%

News 08/24/2008
https://elpais.com/diario/2008/08/24/economia/1219528801_850215.html?event_log=go

On the shelves of a supermarket in Madrid rest two enormous blocks of milk cartons. They all have the same packaging: one-liter cartons. All of them contain milk from Galicia. However, some display the logo of a well-known commercial brand, while others bear the name of the supermarket. There is another substantial difference: the boxes with the store's name cost 30% less. It is a private label product, which retailers prefer to call "retailer's brand" or even "recommended".
The cents saved by consumers when they take home food, cleaning products, or hygiene items packaged under the name of retail chains are particularly attractive in recent months. Supermarkets like Ahorramás, affiliated with the IFA group, claim that sales of their own product, branded as Alipende or Lanta, have grown by up to 20% during the crisis. Large retailers, such as Carrefour, Eroski, or Alcampo, do not provide specific data, but they also acknowledge a significant increase.
Exclusive agreements and differing qualities explain the price difference.
Spain ranks fourth in Europe in terms of market share for store brands, accounting for 34% of total products sold. According to the consulting firm Nielsen, their turnover has grown more in the past 12 months than in the previous two years, reaching 27,3%.

d) **Luxury goods:** These are goods that are only demanded at high income levels; there is no demand for them at low incomes, and when demand for the good begins, it behaves like a normal good. Some examples of luxury goods include jewelry, paintings, and, in general, any high-quality and therefore high-priced product (luxury clothing brands, Michelin-starred restaurants, limited edition sneakers, etc.).



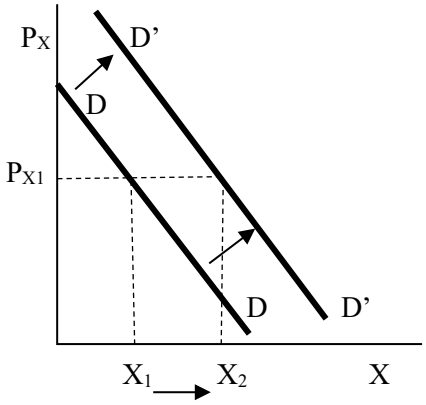
The behaviour of demand is the same as that of a normal good. The only difference in the Engel curve is that it is shifted to the right: there is no demand until a certain income level is reached (for incomes lower or equal to I_4, the quantity demanded is zero).
It is not difficult to find normal, inferior, and luxury goods that fulfil the same need. Consumers, depending on their income, will buy one or the other. For example, there is a wide range of wines; individuals with low incomes will buy cheap and low-quality wines (an inferior good), those with middle incomes will purchase better wines (a normal good), and consumers with high incomes will buy expensive wines (a luxury good).

4. <u>Consumer preferences (P):</u> In addition to the quantitative factors analysed so far, other, more difficult-to-measure factors also influence demand, such as consumer tastes or preferences. In some

cases, a person acquires a good simply because they are attracted to it; in others, advertising campaigns or fashion trends, or the discovery that it has beneficial health properties, drive the purchase.

Increases or decreases in the quantity demanded for these reasons are a result of shifts in the demand function. If a good becomes fashionable (a drink, a model of glasses, a watch) or it is publicized that it is good for health, consumers, for each price, will tend to buy more quantity.

Preference for good X increases, and for the price P_{X1}, the quantity demanded increases from X_1 to X_2. The consumer shifts their demand function from D to D'.



D D ≡ X = f (P_X), for P_{Y1}, P_{Z1}, I_1, P_1…
D' D' ≡ X = f (P_X), for P_{Y1}, P_{Z1}, I_1, P_2…

THE DIGITAL NATIVE GENERATION ADORES ANALOG PHOTOGRAPHY: "FILMS HAVE GONE FROM EXPIRING TO SELLING OUT"

The film industry boasts the highest prices in its history; since 2007, mobile phones come with at least one camera, but analog photography has not disappeared

News 15/08/2022
https://www.eldiario.es/cultura/generacion-nativa-digital-adora-fotografia-analogica-carretes-han-pasado-caducarse-agotarse_1_9241379.html
(...) So, if Kodak declared bankruptcy a decade ago, if the price of films is almost double the usual, if since 2007 all mobile phones on the market have, at least, one lens. Why does a digital native generation shoot in analog?
No 'stock'
Instagram hosts more than 60 million images a day. Yes, it's not news, photography is more popular and immediate than ever. However, within this visual transience offered by social networks, there is a notable demand for analog consumables: second-hand 35 and 120mm cameras, disposable cameras, color, black and white, slide films, Polaroid cartridges, chemicals. And not only that, festivals, artists, collectives, and businesses that, both photographically and cinematically, opt for the analog format.
Fotocasion was founded in Madrid in 1975 and boasts of being "the largest photography store in Europe". Miguel Ángel, a shop assistant in the central Cascorro neighborhood, explains to this outlet that there is a lot of demand, a "boom" of analog led by youth. "From our films expiring to having no stock. Moreover, distributors do not give an arrival date. Now you order 300 films and maybe 30 arrive, we spend months without some models, "Miguel Ángel informs. Currently, most of Fotocasion's analog clientele seeks less quality when buying their films. "They are tired of the digital theme. They look for the vintage quality it gives to photos. They start with disposable cameras", says Miguel Ángel. Fotocasion sells around 1,500 films monthly, about 18,000 annually. In color, one of the best-sellers is the Kodak Portra 400 35mm film, a roll whose price has risen to 17 euros. "These are the highest prices we've had", the Fotocasion salesperson indicates.

5. <u>Other Factors</u>: As observed, market demand represents the aggregate of individual demands at each price point. The factors discussed thus far influence individual demand and, thereby, market demand. Logically, market demand also hinges on the number of buyers and their characteristics, including:

- Population Size: The demand for a good varies significantly between an economy comprising 200,000 consumers and one with five million.

- Population Structure: The demographic pyramid's shape affects the demand for certain products. A broad base — indicating a high number of children and youths — leads to a demand for different products and services (e.g., baby clothes, children's vehicles, babysitting services, educational expenses, certain types of apparel) compared to an inverted pyramid — suggesting an aged population — (e.g., elderly care homes, healthcare services).

- Income Distribution: Countries with identical incomes but different distribution patterns exhibit markedly different demands.

Consider two countries each with a monthly income of 6.000 euros, divided among two family units. In country A, income is evenly distributed, with each family earning 3.000 €/month. In country B, distribution is unequal; one family earns 5.200 €/month and the other 800 €.

Types of goods	COUNTRY A		COUNTRY B	
	Family 1	Family 2	Family 1	Family 2
Basic Necessity	YES	YES	YES	YES
Normal	YES	YES	YES	YES
Inferior	NO	NO	NO	YES
Luxury	NO	NO	YES	NO

In country A, both families will demand basic necessities and normal goods. In country B, both families will also demand basic necessities and normal goods, but the family with lower income will demand inferior goods, and the high-income family will demand luxury goods.

EXERCISE

The supply and demand functions of a good are given by the expressions $P_X = 20 + 2X$ and $P_X = 360 - 3X$. How is the equilibrium price affected if, as a consequence of the emergence of a competing product, the demand decreases by 10 units for each price?:

The initial equilibrium price and quantity of that market are given by the result of the system of equations of supply and demand:

$SS \equiv P_X = 20 + 2\,X \qquad 20 + 2\,X = 360 - 3\,X \Rightarrow \quad 5\,X = 340 \Rightarrow \quad X = 68$
$DD \equiv P_X = 360 - 3\,X$

Substituting in any of the equations, the price is obtained. For example, in SS:

$$P_X = 20 + 2\,X \Rightarrow \quad P_X = 20 + 2 \cdot 68 \Rightarrow \quad P_X = 20 + 136 = 156$$

As the competing product appears and demand decreases by 10 units for each price, the market demand function shifts to the left, so consumers for each PX are willing to buy 10 units less. Or, in other words, for each price, the new demanded quantity (X_F) will be equal to the initial one (X_I) minus 10.

$$X_F = X_I - 10 \Rightarrow \quad X_I = X_F + 10$$

Substituting this expression into the initial demand function (DD) —where the quantity would be X_I —, the final demand function (D'D') is obtained.

$$DD \equiv P_X = 360 - 3\,X$$
$$D'D' \equiv P_X = 360 - 3\,(X + 10) = 360 - 3\,X - 30 = 330 - 3\,X$$

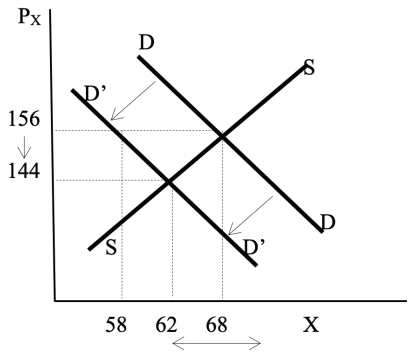
The final equilibrium is given by solving the system of equations formed by the initial supply (SS) and the final demand (S'S').

$SS \equiv P_X = 20 + 2\,X \qquad 20 + 2\,X = 330 - 3\,X \Rightarrow \quad 5\,X = 310 \Rightarrow \quad X = 62$
$D'D' \equiv P_X = 330 - 3\,X$

Substituting in any of the equations, the price is obtained. For example, in SS:

$$P_X = 20 + 2\,X \Rightarrow \quad P_X = 20 + 2 \cdot 62 \Rightarrow \quad P_X = 20 + 124 = 144$$

The price of the good changes from the 156 monetary units of the initial equilibrium to 144: it decreases by 12 monetary units.
Graphically, it would look like:



THANKS TO SUSTAINABILITY, SECONDHAND IS NO LONGER TACKY: "IT'S BECOMING MORE AND MORE TRENDY"

Peer-to-peer selling apps are booming; Wallapop has grown by 200% in two years, and the trend is making its way into supermarkets and luxury stores. Inflation is also driving the sale of used clothing, technology, bicycles, and books.

News 31/12/2022
https://elpais.com/clima-y-medio-ambiente/2022-12-31/gracias-a-la-sostenibilidad-la-segunda-mano-ya-no-es-cutre-cada-vez-esta-mas-de-moda.html

Buying a used mobile phone or sweatshirt in Spain has long been considered tacky. But environmental awareness, and now also inflation, are changing the mindset of more and more people, who are unapologetically purchasing used products. Used items are now considered cool, especially among young people. Apps like Wallapop —whose shipments have increased by 200% in two years— or Vinted, which facilitate peer-to-peer transactions, together have 23 million monthly users, nearly as many as Milanuncios (22 million), a website that processed 5.6 billion transactions last year. Everything is ripe for reuse, from cars to bikes, and from furniture to books. And old barriers are starting to break down: old clothes are becoming vintage, and the secondhand market is entering supermarkets, fashion stores, and the luxury world.

The Humana Vintage store on Hortaleza street, near Gran Vía in Madrid, exemplifies this trend. In the shop window, mannequins sport vintage clothing. Inside, exposed brick walls, metal pipes, and upbeat music accompany the vibrant-colored, original clothing, reminiscent of London's Portobello Road market. The word "vintage" is everywhere. The only difference from a new clothing store is that here, garments don't cost 50 or 100 euros, but ten times less. There are young people and tourists; English and French can be heard.

"Buying secondhand is no longer considered tacky; it's becoming increasingly trendy among young people," says Marian Ortiz, 19, holding several €5 sweatshirts in her hand. José Luis Miñarro, 25, often buys used hats, scarves, jackets, and T-shirts: "It's more economical, more environmentally friendly, more original, and has a creative element; you step away from the fashion that everyone else is wearing". Mar García, 21, wears several secondhand garments and emphasizes sustainability: "I hardly buy anything new anymore; there are too many manufactured things that can be reused to avoid producing more". In this store, there are not only twenty-somethings, although they are the majority. Pedro Quiñones, 43, is looking for a coat: "Secondhand is shedding its 'poor' label; everyone is buying it now".

The brand has gone from 36 stores in 2015 to 48 in 2022 —mostly in Madrid and Barcelona, seven of them vintage— and has nearly doubled the number of items sold in that period (from 3,18 million to 5,91 million).

"These stores used to have piled-up clothes, like a flea market, but now they are refining the experience to give it a neat and cool tone," says David Cordón, professor of consumer behaviour at the Complutense University. Marina Márquez, president of the NGO Circular Vision, offers another insight: "In Northern Europe, buying secondhand has been a trend for years, and it's finally starting to spread to Spain too".

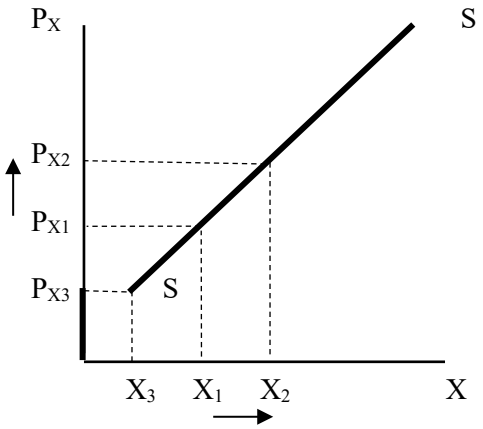
2. SUPPLY

2.1 Overview

The supply of a Good [27] is the quantity producers are willing to offer on the market over a specific period. Besides the good's price, supply depends on various factors: production factors' cost, technological state, taxes and subsidies, prices of other goods, etc. The supply function would be:

$$X = f(P_X, C, T, I, S, P_Y, P_Z...)$$

The individual supply curve graphically represents the individual supply function, showing the quantity a producer is willing to market at each price, *ceteris paribus* (assuming all other factors are constant). In supply, the relationship between quantity and price is direct, so higher prices lead suppliers to offer greater quantities of the good. Therefore, the supply function is increasing. For simplicity, we will assume the supply is a linear function[28].



At a price P_{X1}, the supplier is prepared to produce X_1 units of the good. If, *ceteris paribus*, the price of the good increases to P_{X2}, the supplier will increase production to X_2. As the price rises, so does the quantity offered.

Supply commences from a price (P_{X3} in the diagram), the minimum price at which the supplier is willing to market the product; for that price, a specific quantity (X_3) is offered. For prices below or equal to this, nothing will be produced. The start price for the supply is the price at which the entrepreneur covers the minimal cost they can produce at.

That the individual supply function is increasing can be explained by the "law of diminishing returns". To boost production, the supplier must use more production factors, but eventually, due to the law of diminishing returns, successive additions of factors to the production process yield increasingly smaller increases in output, leading necessarily to a rise in unit cost, so the producer will only be willing to increase production if the unit price also increases[29].

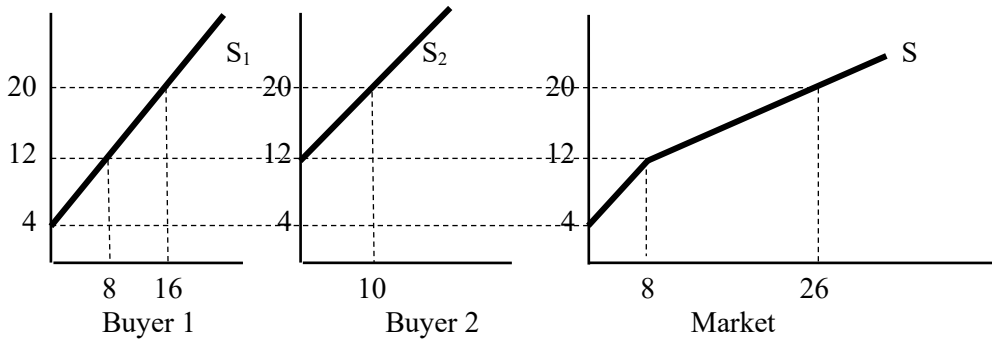
Market supply is the sum of the supplies from all producers. The market supply quantity, for each price, is the aggregate of the individual quantities offered at that price.

---

[27] Similarly to the difference established in the previous section between quantity demanded and demand, quantity supplied is a specific measure of a good, indicating how much of a good is supplied in quantitative terms, which must be distinguished from supply, which is the quantity of a good supplied (i.e., the aforementioned) but referred to a specific period of time.

[28] Although, frequently, when referring to it, it is discussed in terms of the supply function or supply curve.

[29] In the chapter of production and marginal products in the microeconomics subject, this point is studied in more detail.



Let's assume, for simplicity, a market with two suppliers. The first begins producing for prices above 4, and the second for prices above 12. Thus, for $4 < P_X \leq 12$, the market supply matches the supply of the first producer. For $P_X > 12$, the market supply for each price is the aggregate of what the two companies offer; for a price of 20, the supply is 26 (16 from the first and 10 from the second).

It's also simple to explain that supply is increasing by looking at the market supply function. In this case, the price at which supply begins indicates the price at which the most efficient supplier, i.e., the one who produces at the lowest unit cost, is willing to market the product. As the price increases, less efficient suppliers are incorporated into the market; therefore, higher prices are linked to larger quantities offered, and the supply function is increasing.

Imagine a region with nine agricultural entrepreneurs with lands of varying quality (production factors, as we know, are not homogeneous). The table indicates the minimum unit cost at which each can produce a specific good (including the entrepreneur's own salary).

A: 10	B: 23	C: 20
D: 15	E: 15	F: 10
G: 8	H: 20	I: 23

If the price of the good is below 8, there is no supply, as no farmer can cover production costs. If the price is 8, the farmer with plot G will start producing; if it rises to 9, only G continues producing, but if it increases to 10, A and F will join, as they now cover costs; at 15, D and E join; etc[30].

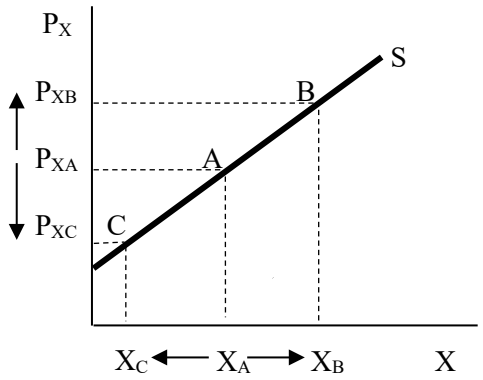
Just like with demand, the quantity offered of a good can change either because the price of the good varies or because other factors besides the price change:

a) **Variations in the supply function** itself occur when the price of the good itself changes. In this case, by the definition of the supply function (quantity offered for each price, keeping all other factors constant), variations in the offered quantity lead to different points on the same

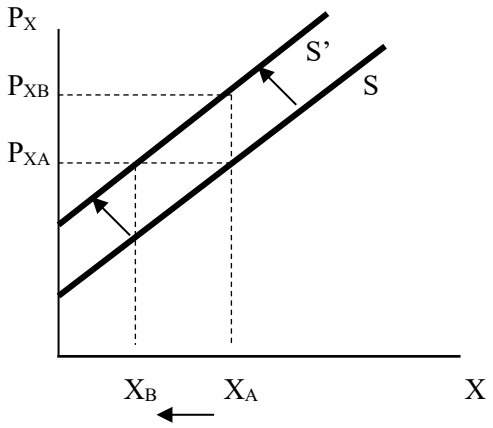
[30] This process does not prevent - on the contrary, it reinforces - that, as the price of the good in the market increases, the entrepreneurs who were already in it hire more factors of production to, in turn, increase their particular supply. Although, as mentioned above, this may lead them to experience diminishing returns and increase their unit costs, it is understood that they do so because the increase in the price of the good outweighs the increase in the unit production cost.

supply function. If the price rises, the offered quantity increases, and if the price falls, the offered quantity decreases, but always within the original supply function.

$$SS \equiv X = f(P_X), \text{ for } C_1, T_1, I_1, S_1, P_{Y1}, P_{Z1}\ldots$$



b) **Variations due to a shift to another supply function** occur when a factor other than the price of the good itself changes, something that in the original demand function was being considered constant (technological state, taxes, subsidies, prices of other goods, etc.). In this case, for each previous price (since it has not varied), the quantity offered of the good changes; as circumstances change, the supply function shifts.



$$SS \equiv X = f(P_X), \text{ for } C_1, Tx_1, I_1, S_1, P_{Y1}, P_{Z1}\ldots$$

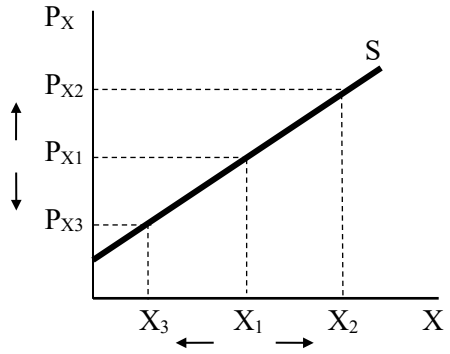
$$S'S' \equiv X = f(P_X), \text{ for } C_2, Tx_1, I_1, S_1, P_{Y1}, P_{Z1}\ldots$$

Initially, the supplier for the price P_{XA} markets the quantity X_A. If, for example, the cost of a factor used in production goes from C_1 to C_2, the supplier will tend to pass this cost increase onto the market, moving the supply function upwards, from S to S'. In the new supply function, they offer the previous quantity, X_A, at a higher price, P_{XB} (or, seen from another perspective, for the previous price P_{XA}, the offer decreases to X_B).

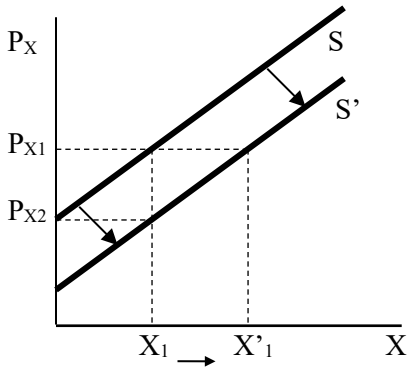
2.2. Factors Influencing Supply and Their Effects on the Supply Function[31]

1. **<u>Price of the Good Itself (P_X):</u>** As observed, price and quantity in supply move in direct relation: increases in price lead to increases in supply, and decreases in price result in falls in the quantity of the good offered. Variations in the price of the good define different points on the supply function.

[31] We must bear in mind what was pointed out in note 24, now applied to supply.



2. **Technology (T):** The essence of technological research is to enhance efficiency and productivity. A technological advancement, *ceteris paribus*, allows for a larger quantity of goods to be marketed with the same or fewer production factors, or equivalently, enables production at a lower unit cost.



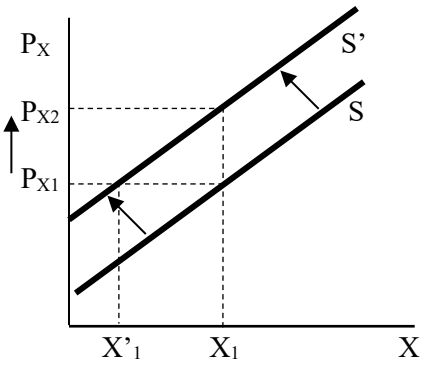
As a result of incorporating technological improvements, producers are prepared to offer each quantity of goods at a lower price (or offer a larger quantity for each price). Since this change is external to the price of the good, it results in a variation of the quantity offered due to a shift in the supply function. With technological advancement, the supply function shifts rightward[32].

With supply function S, at price P_{X1}, the market quantity is X_1. After adopting a technological improvement, producers offer the initial quantity at a lower price (P_{X2}); alternatively, they might offer, for each previous price (such as P_{X1}), a larger quantity (such as X'_1). The outcome is the same: a rightward shift of the supply function, moving from S to S'.

3. **Cost of Production Factors:** The quantity of goods that suppliers are willing to market at each price is directly related to the cost of producing each unit. Hence, the cost of production factors (labour, rent, energy, raw materials, etc.) directly impacts supply.

An increase in the cost of production factors tends to be passed on to the market by producers demanding more monetary units for each unit of goods manufactured. This results in a leftward shift of the supply function.

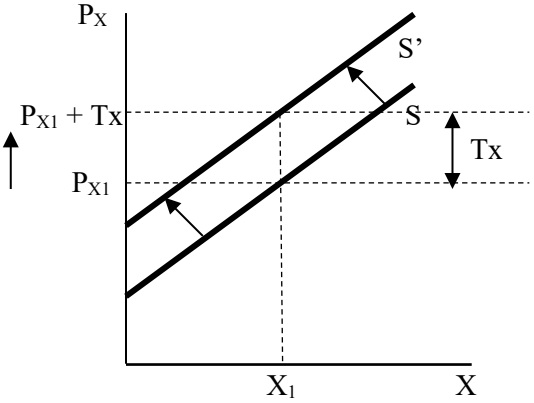
[32] If a technological setback occurs, the reasoning would be the opposite. The same happens in the following points in the face of variations in the cost of factors, in the prices of other goods, etc.



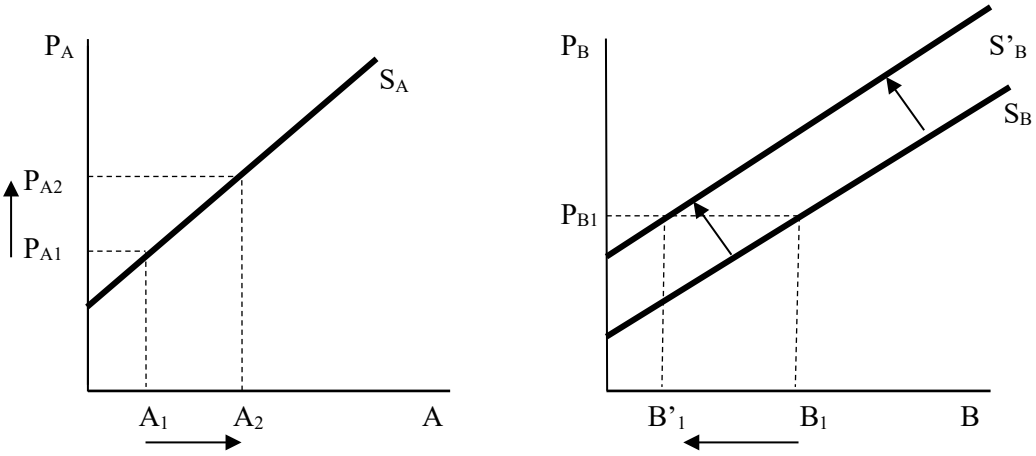
The initial supply function is S, and at price P_{X1}, suppliers market quantity X_1. If the cost of production factors rises, producers will demand more monetary units for each produced unit (attempting to pass the cost increase onto consumers), for instance, P_{X2}; another possibility, as before, is that for the previous price, they reduce the offered quantity to X'_1. In any case, the supply function shifts leftward, from S to S'.

4. **Taxes and Subsidies (Tx):** Taxes and subsidies on production affect the cost of goods and, consequently, supply. Their effect is parallel to that of changes in the cost of production factors: the establishment of a new tax, an increase in an existing one, or a reduction in a subsidy make the product more expensive, and suppliers tend to pass this cost increase onto consumers, shifting the supply function leftward. Conversely, the introduction of a new subsidy, an increase in an existing one, or a reduction in a tax reduces production costs and allows suppliers to move to a new supply function situated to the right of the original.

As in previous cases, the initial supply function is S, and for price P_{X1}, the offered quantity is X_1. If a tax Tx per unit of product is established, suppliers will attempt to pass the tax onto consumers. Initially selling X_1 at P_{X1} units of currency per unit, once the tax is imposed, they will try to sell each unit at price $P_{X1} + Tx$. Essentially, suppliers aim to sell each quantity at the initial price plus the tax. The result is that the supply function shifts upward by the amount of the tax to S', with the vertical distance between the initial and final supply functions representing the tax.



5. **Price Variations of Other Goods:** In some instances, changes in the price of one good can affect the supply of another. A condition for this to occur is that production factors can be interchangeably used to produce different goods. It's evident that if the price of dental services increases, it won't affect the supply of plumbers, regardless of how attracted they might be to the profits of the former, as it's not simple to transition from one profession to another. However, an increase in the price of an agricultural product, along with the resulting benefits for those producing it, can affect the supply of other products being cultivated in areas where the now more expensive product can also be grown. In many agricultural settings, with essentially the same production factors (land, labour, and capital), various products can be cultivated.

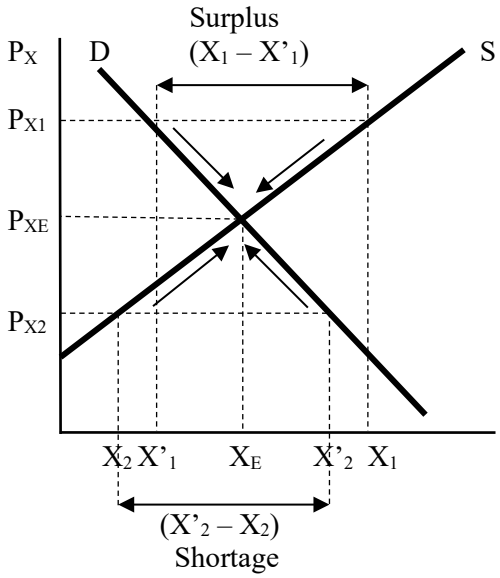


Suppose two agricultural products A and B meet the mentioned conditions. At the start, the supply function of A is S_A, and the market quantity for price P_{A1} is A_1; the supply function of B is S_B, and the market quantity for price P_{B1} is B_1.

If the price of A increases to P_{A2}, the offered quantity might increase to A_2, placing us at a different point on the original supply function (since the price of the good itself has changed). What happens to good B? Some suppliers of B, attracted by the high prices of A and the potential profits from producing it, and knowing they can do so with relative ease, will switch from producing B to A. This decision results in a reduced quantity of B offered for each price. For example, for price P_{B1}, the market quantity would be B'_1 (less than the initial B_1). The variation in the quantity offered of B originates from a factor external to its own price (the price of A changes), thus shifting the supply function from S_B to S'_B.

3. MARKET EQUILIBRIUM

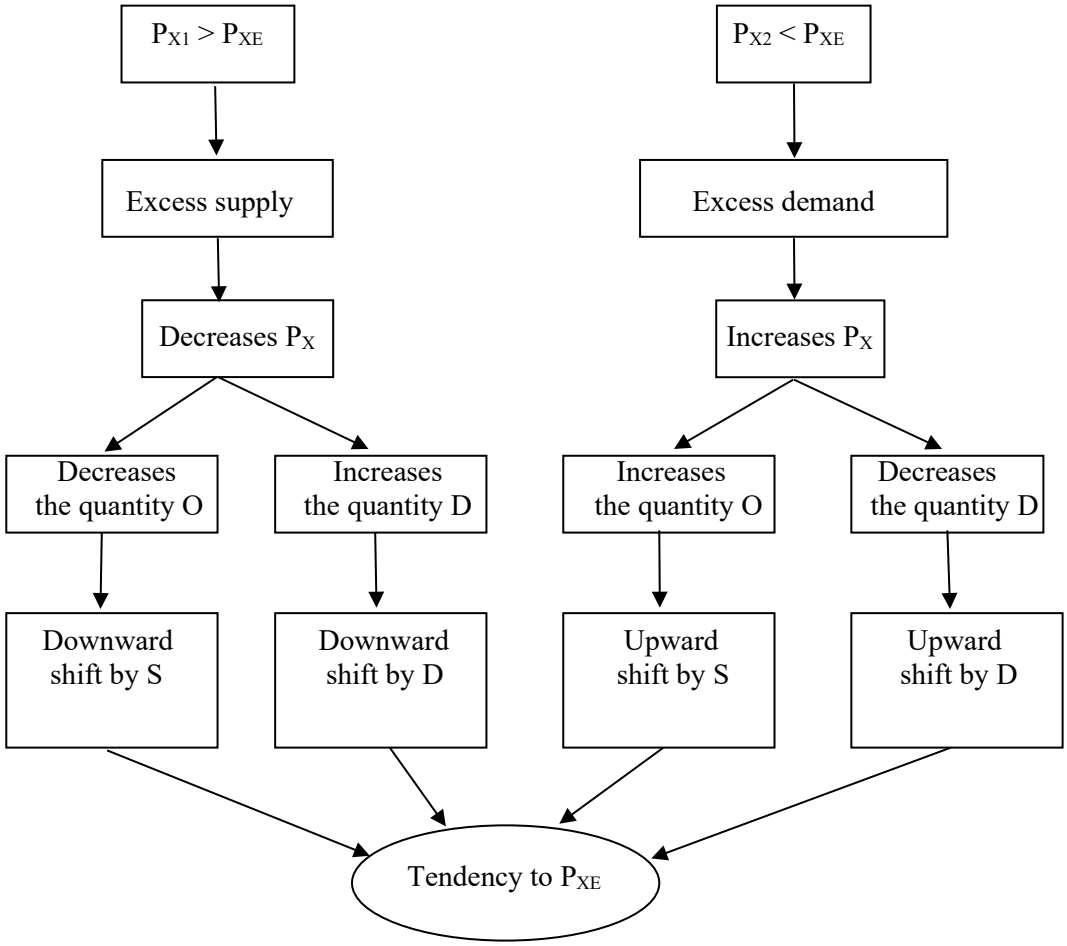
A market is in equilibrium at the price at which the quantity of the product that buyers wish to purchase matches the quantity that sellers wish to sell. Hence, equilibrium occurs at the price of the good that reconciles market forces.



Suppose a market with demand D and supply S. It's clear that at price P_{X1}, there is no agreement between supply and demand regarding quantity. At this high price, supply is willing to market

quantity X_1, but demand only wants X'_1, resulting in a surplus, an excess supply of $X_1 - X'_1$. The only way to sell the unsold goods is to lower prices. This price drop will discourage some suppliers, leading to less product being offered: as the price falls, there is a downward slide along the supply function S (the price of the good itself falls, causing a variation in the offered quantity, leading to new situations at different points on the same supply function). In demand, the opposite occurs; the price drop encourages consumers who did not buy at the previous price, increasing the quantity demanded: as the price falls, there is a downward slide along the demand function D (the price of the good itself falls, causing a variation in the demanded quantity, leading to a new situation at different points on the same demand function).

For price P_{X2}, there is also no agreement between supply and demand. At this low price, supply would market quantity X_2, but demand wants a larger quantity, X'_2. In this case, the market would experience a shortage, an excess demand over supply of $X'_2 - X_2$. This situation leads to a price increase that encourages some suppliers to enter the market, increasing the offered quantity: as the price rises, there is an upward slide along the supply function S (as before, the price of the good itself changes and varies the offered quantity, resulting in movement to different points on the same supply function). In demand, the price increase causes some consumers to stop buying the good, decreasing the quantity demanded: there is an upward slide along the demand function D (the price of the good itself falls, causing a variation in the demanded quantity, leading to a new situation at different points on the same demand function).



These scenarios lead to the same outcome, which aligns with the intersection point of the supply and demand functions. At this equilibrium price (P_{XE}) suppliers and consumers agree on the quantity; suppliers sell all the goods they produce at quantity X_E, which exactly matches what

consumers wish to buy. There is neither excess nor shortage of product, thus no reason for the price to change. Therefore, conditions for a state of equilibrium are met.

4. VARIOUS IMPACTS ON MARKET EQUILIBRIUM

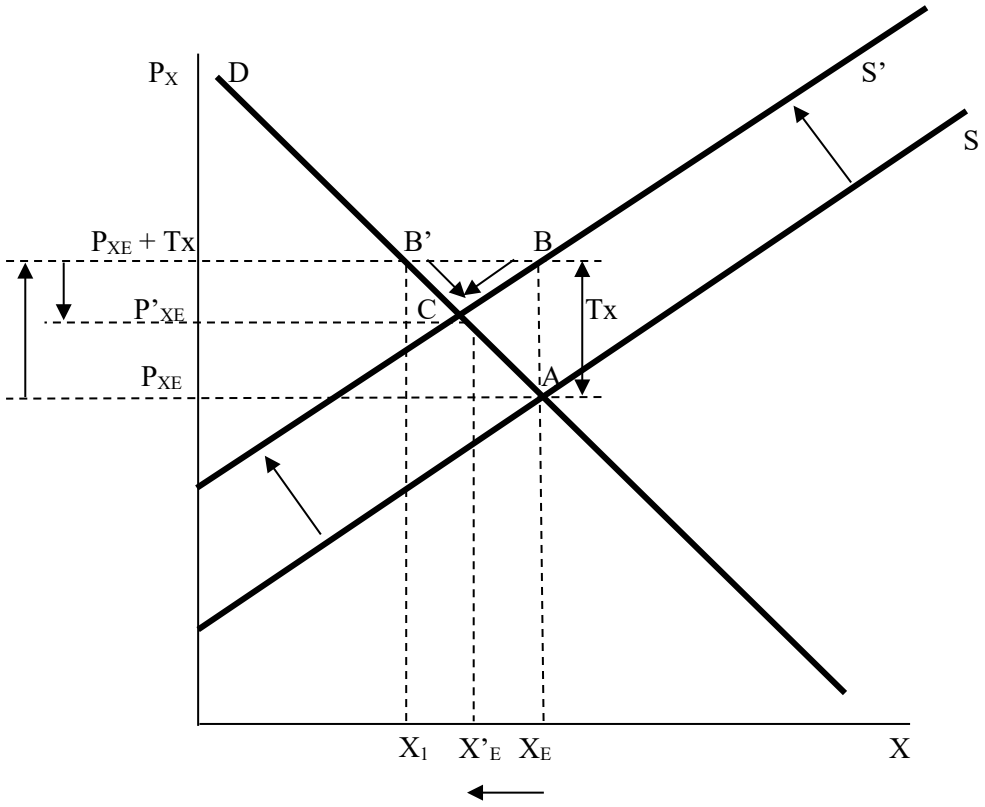
The equilibrium situation discussed above will remain stable as long as circumstances do not change. Should there be any shift in demand (due to changes in the price of related goods, alterations in income, shifts in tastes or preferences, etc.) or in supply (due to technological improvements, changes in taxes or subsidies, etc.), the initial equilibrium is disrupted, initiating a rebalancing process until a new stable situation is reached.

Unlike the scenarios previously studied, now both market forces are present. It will be observed that changes in demand do not necessarily lead to the desired final outcome, as supply also has a say and moderates its aspirations; the same happens when supply changes, vis-à-vis demand.

We will examine how equilibrium is affected by various factors: the establishment of a tax per unit of product, setting maximum and minimum prices, and changes in demand following an advertising campaign. The range of factors that can affect market equilibrium is vast; assuming that the adjustment mechanism to reach the new equilibrium is similar across different cases, studying a few should suffice to explain what would happen in any other scenario.

4.1. Establishment of a Tax

Consider a market with demand D and supply S, in equilibrium at point A, with price P_{XE} and quantity X_E. If the competent authority imposes a tax Tx per unit of product, the equilibrium shifts. Suppliers will attempt to pass the tax onto consumers by increasing the price of the good by the amount of the tax; specifically, they aim to sell the initial quantity X_E at the price P_{XE} + Tx (point B). The supply function moves to S', positioned to the left of the original, with the distance between the two, for each quantity, representing Tx.



Up to this point, the analysis matches that of the impact of a tax on supply. The essential difference now is the presence of demand. Post-tax, suppliers wish to market quantity X_E at price $P_{XE} + Tx$; however, are consumers willing to buy that quantity at that price? Evidently not, as indicated by the graph. At price $P_{XE} + Tx$, consumers are only prepared to purchase quantity X_1, as specified by demand for that price (point B'), resulting in an excess supply of $X_E - X_1$.

This excess supply naturally leads to a reduction in the price of the good, which in turn increases the quantity demanded (sliding downward along D) and decreases the quantity offered (sliding downward along S'). This process halts upon reaching price P'_{XE}, where supply and demand again concur on the quantity (point C).

A (X_E, P_{XE}) — Initial equilibrium point. At the price $P_{XE,}$ there is agreement between supply and demand regarding the quantity (X_E).

↓

The tax Tx is established per unit of product, and suppliers attempt to pass it on to the demanders.

B $(X_E, P_{XE} + Tx)$ — Suppliers intend to sell the initial quantity at the price $P_{XE} + Tx$.

↓

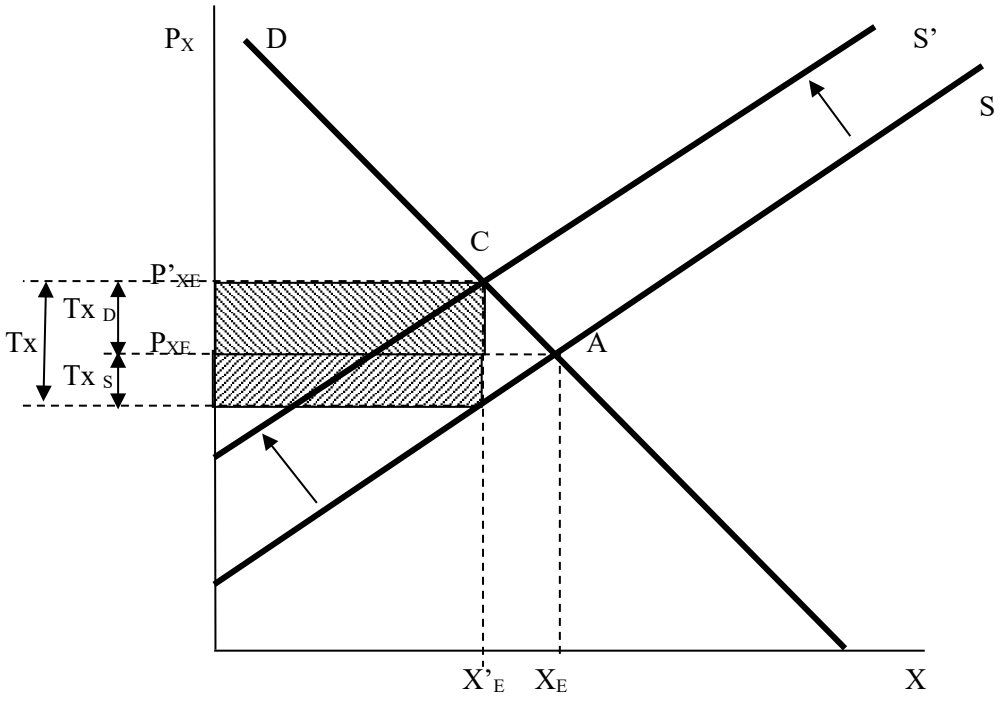
At the price $P_{XE} + Tx$, there is no agreement between supply and demand regarding the quantity. Suppliers want to bring X_E to the market, but demanders only want X_1, resulting in an excess supply, which leads to a decrease in prices.

C (X'_E, P'_{XE}) — Final equilibrium point. At the price P'_{XE}, there is agreement again between supply and demand, this time for the quantity X'_E.

The attempt to pass the entire tax onto consumers, offering the initial quantity at price $P_{XE} + Tx$, is moderated by demand response, settling finally at a price higher than the initial but lower than suppliers' target, for a quantity less than the initial.

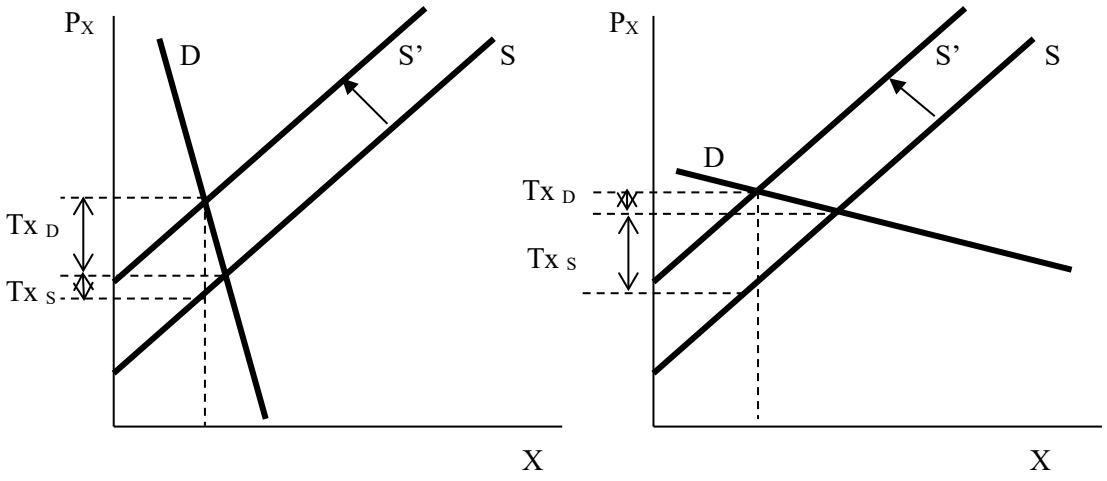
Suppliers manage to shift only a portion of the tax to consumers, equivalent $P'_{XE} - P_{XE}$, per unit, raising the price of the good as a result of the tax. They bear the remainder $Tx - (P'_{XE} - P_{XE})$.

The tax borne by consumers per unit = $Tx_D = P'_{XE} - P_{XE}$
The tax borne by suppliers per unit = $Tx_S = Tx - (P'_{XE} - P_{XE})$.



The overall tax revenue is $X'_E \cdot Tx$, the equilibrium market quantity multiplied by the tax rate. From this total:

- Consumers contribute: $X'_E \cdot (P'_{XE} - P_{XE})$
- Suppliers contribute: $X'_E \cdot [Tx - (P'_{XE} - P_{XE})]$



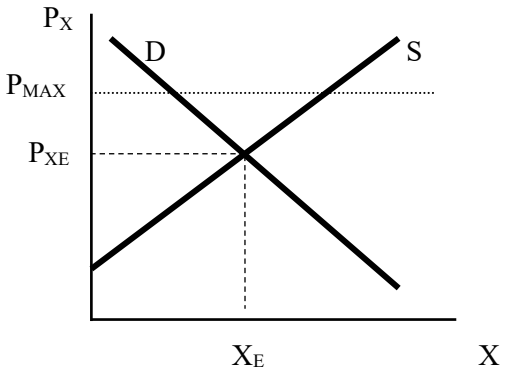
The extent to which suppliers can shift the tax to consumers depends on the elasticity of supply and demand functions[33]. For instance, if demand is inelastic (a characteristic of essential goods or those with few substitutes), suppliers can shift the majority of the tax to consumers; conversely, if demand is elastic (for easily substitutable goods or non-essentials), suppliers will bear most of the tax.

[33] In particular, it depends on the elasticity of the supply and demand functions; a concept that will be studied in the next chapter.

4.2. Maximum and Minimum Prices

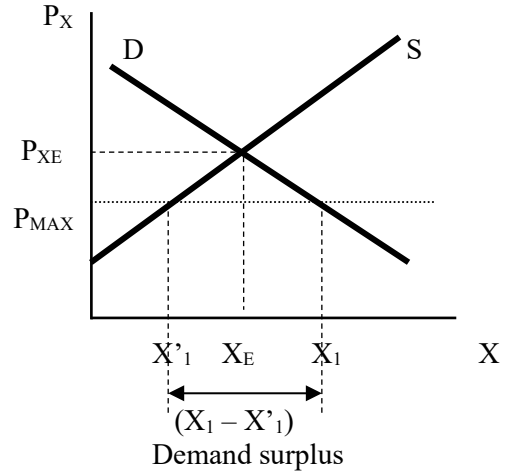
1. <u>Establishment of Maximum Prices:</u> To protect consumers or for other reasons, authorities (local, regional, or national) may set a maximum price above which a product cannot be sold. Three scenarios can occur:

a) If the maximum price (P_{MAX}) is above the market-set price, it has no effect on natural market equilibrium. Authorities prohibit selling the good above a certain price, and the market establishes a lower equilibrium price (P_{XE}), thus complying with the regulation.



b) The market is also unaffected if the maximum price coincides with the natural equilibrium price. In this case, $P_{XE} = P_{MAX}$ and the regulation is adhered to, albeit just barely.

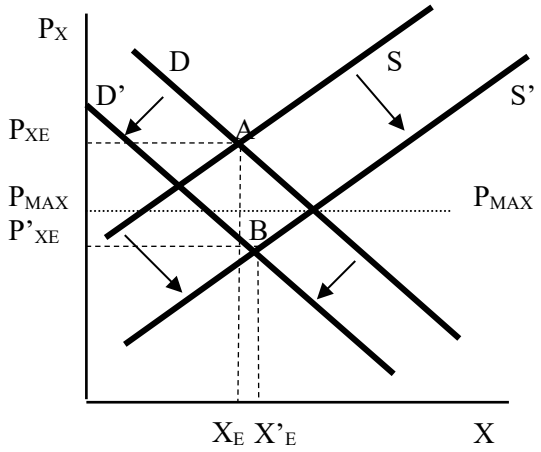
c) However, if P_{MAX} is set below the market's natural equilibrium price, the market is indeed impacted because it would be setting a prohibited price.



In the scenario where PMAX is under the natural equilibrium price, demand would be willing to acquire X_1 units of the good, a quantity significantly higher than the X'_1 that supply is willing to offer at that price. This would lead to an excess demand of $X_1 - X'_1$. Typically, excess demand would naturally lead to a price increase (as the price rises, the offered quantity increases, the demanded quantity decreases, and, after a series of adjustments, a new equilibrium between supply and demand is reached). However, in this case, this solution is not feasible because the price is already at its maximum allowed level.

Without further interventions, excess demand would likely result in a black market, an unofficial secondary market catering to the unmet demand of consumers outside the legal boundaries, at prices above the allowed maximum. A typical example of this situation is ticket scalping for

concerts or sports events; tickets have an official price (official market), but if demand exceeds supply, some will resell tickets at higher prices (black market).



To avoid the emergence of a black market whenever a maximum price below the market rate is set, authorities must implement a series of additional measures to either increase supply or reduce demand. Essentially, the goal is to shift supply and/or demand enough to reach a new equilibrium where the price is at or below the maximum set.

Measures to increase supply could include granting subsidies or introducing new technologies: suppliers would increase the quantity they put on the market at each price, shifting the supply function rightward (to S'). Reducing demand might involve promoting alternative goods: consumers would decrease their purchases of X at each price, moving the demand function leftward (to D').

The shift in supply, demand, or both must achieve a new equilibrium, B, satisfying $P'_{XE} \leq P_{MAX}$. The exact quantity at this new equilibrium is not critical; it could be more, the same, or less than the initial quantity.

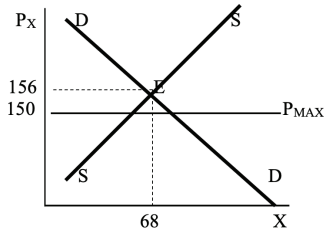
EXERCISE

The demand and supply functions of a market are Px + 3 X = 360 and Px – 2 X = 20. If a maximum price of 150 monetary units is set for this good, what subsidy per unit of product should be given to the suppliers so that they increase production by the necessary amount to prevent the emergence of the black market?

The initial equilibrium is given by solving the system of equations formed by supply and demand:

$$Px = 360 - 3X$$
$$Px = 20 + 2X$$

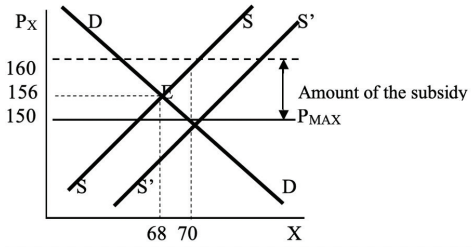
And it occurs at a price Px = 156 and for a quantity X = 68.



If a maximum price of 150 monetary units is established in this market—lower, therefore, than the price naturally set by the market—a parallel market would tend to form, which would sell the product at a price higher than allowed, to meet the excess demand that occurs.

To prevent excess demand and the emergence of the parallel market, it is necessary that, at the same time the maximum price is set, measures are taken to incentivize supply, disincentivize demand, or both. The purpose of these measures is to achieve a new equilibrium that occurs at a price that adheres to the maximum established; in other words, to achieve a new price that is lower or equal to the maximum.

In this problem, it is requested that action be taken solely through supply and to calculate what subsidy per unit of product would need to be given to suppliers to ensure that the supply function shifts enough for the new equilibrium to meet the requirements set regarding the maximum price. Since meeting the requirements only necessitates that the new price be equal to the maximum, what needs to be calculated is the subsidy required to achieve this.



The graph is very helpful for understanding the calculations we need to make. First, we calculate the quantity that demanders are willing to purchase if the price of the good is 150. To do this, we substitute that price into the demand function (DD):

$$Px = 360 - 3\,X, \text{ for } Px = 150 \quad \Rightarrow \quad X = 70$$

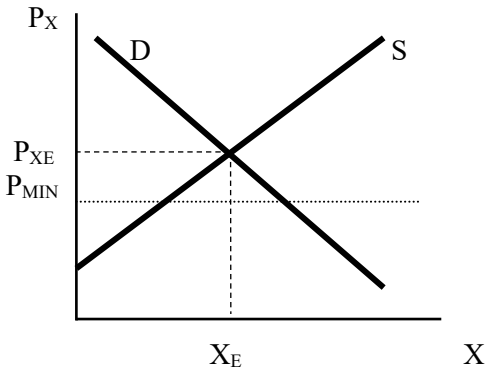
Next, we will see at what price suppliers are willing to put the 70 units of the good on the market in the original supply (SS):

$$Px = 20 + 2\,X, \text{ for } X = 70 \quad \Rightarrow \quad Px = 160$$

Therefore, the distance between the original supply (SS) and the final (S'S') for each quantity is 10 monetary units (160 – 150), which would be the amount of the subsidy. With a subsidy of 10 monetary units per unit of product, the supply function shifts just enough so that the new equilibrium occurs at a price of 150 monetary units, and thus, the requirements regarding the maximum price are met.

2. <u>Establishment of minimum prices:</u> the authority sets a price below which the product cannot be sold. The situations that can arise are:

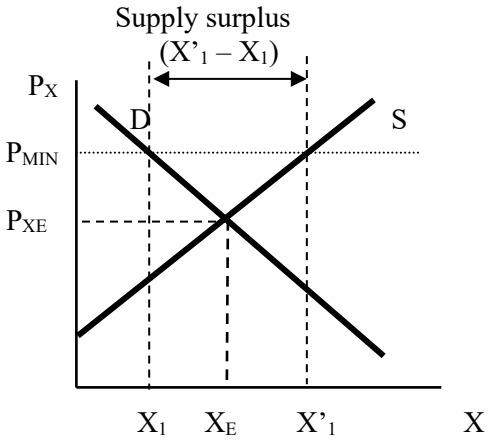
a) If the minimum price P_{MIN} is lower than the market price. In this case, the equilibrium is not affected. Selling the good below a certain price is prohibited, and the market sets a higher equilibrium price (P_{XE}), therefore complying with legislation.



b) The market is also not affected if the minimum price coincides with the natural equilibrium price. In this case, $P_{XE} = P_{MIN}$, and although at the limit, legality is upheld.

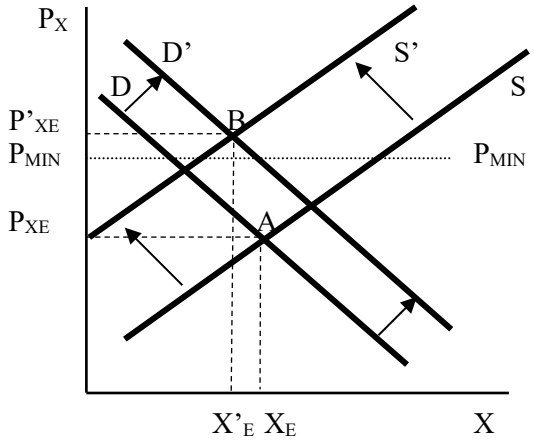
c) However, the market is affected if P_{MIN} is higher than the price naturally established by supply and demand, as it would be a prohibited price.

For the minimum price set, higher than the natural equilibrium price, demand is willing to acquire X_1 units of the good, which is less than the X'_1 that the supply would bring to the market. This would result in an excess supply $X'_1 - X_1$, leading to a fall in prices. However, as in the previous case, the solution is not possible because it is the minimum price at which the good is allowed to be sold.



If $P_{MIN} > P_{XE}$, along with its establishment, measures must be devised to prevent the emergence of a black market, which would distribute part of the product at prices lower than permitted. These measures should reduce supply and/or increase demand. The aim is to shift supply and/or demand as necessary so that the new equilibrium occurs at a price equal to or higher than the minimum set.

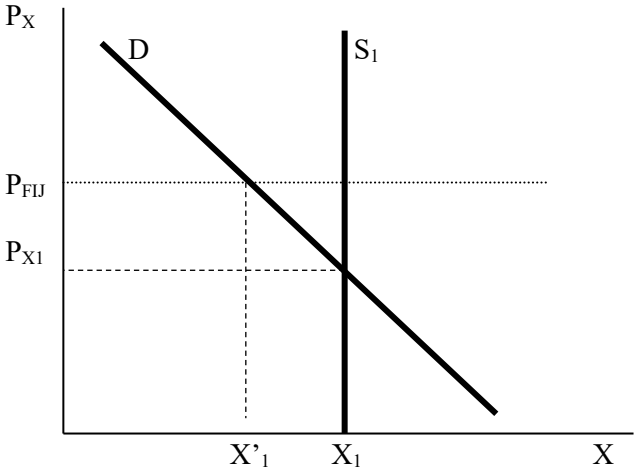
The implementation of a tax, for example, will cause suppliers to raise the price of the good, shifting the supply curve to the left (to S'). An advertising campaign promotes demand, shifting the demand curve to the right (to D'), increasing purchases of the good for each price.



The shift in supply, demand, or both simultaneously aims to achieve a new equilibrium, B, where $P'_{XE} \geq P_{MIN}$. The quantity corresponding to the final equilibrium is not decisive and may be greater, equal to, or less than the initial quantity.

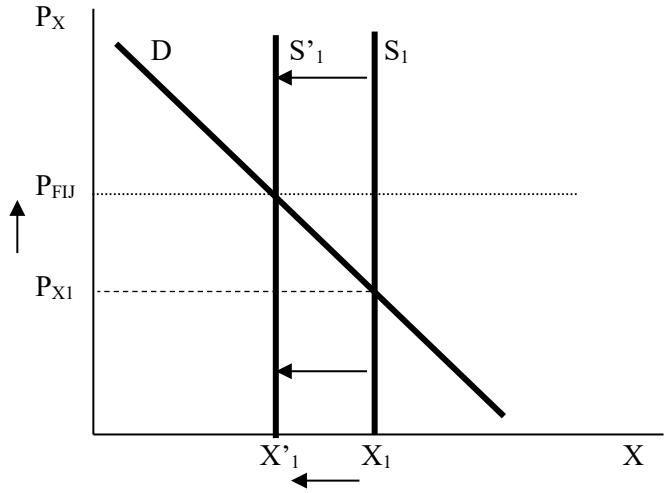
3. <u>Case on price fixing:</u> The competent authority of a country sets the price of wheat considering it a basic necessity. Setting the price combines the two previous cases: the product can only be sold at the fixed price, therefore, it is both a maximum and a minimum. The measure aims to protect both suppliers and consumers. The fixed price ensures a certain income for the former, without uncertainty, which in a way also ensures a minimum level of production. Additionally, it prevents consumers from encountering the product in the market at abusive prices.

In a particular year (year 1), various factors affecting wheat production (e.g., weather conditions) are favourable, and the harvest is very large, resulting in a quantity X_1 being collected. The supply function for that year would be S_1, which is represented vertically because once the harvest is collected, the quantity of wheat is fixed (until the next harvest, there is no possibility of changes, even if the price varies).

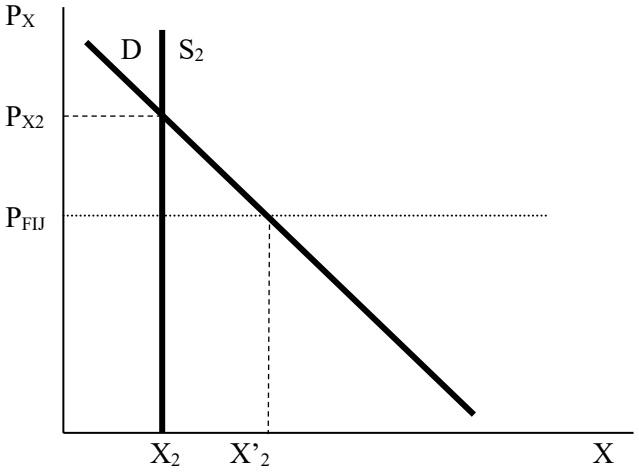


This situation would result in an excess supply and a black market. For the fixed price P_{FIJ}, demand is only willing to purchase the quantity X'_1, and the supply would tend to dispose of the remaining quantity ($X_1 - X'_1$) at lower prices.

To prevent the black market, the administrative body can intervene by purchasing the excess supply, removing it from the market, and storing it in silos or granaries. In this way, the supply curve shifts to the left, to S'_1, with only the quantity X'_1 reaching the market. Ultimately, a new market equilibrium is achieved for the established fixed price, and the black market is avoided.

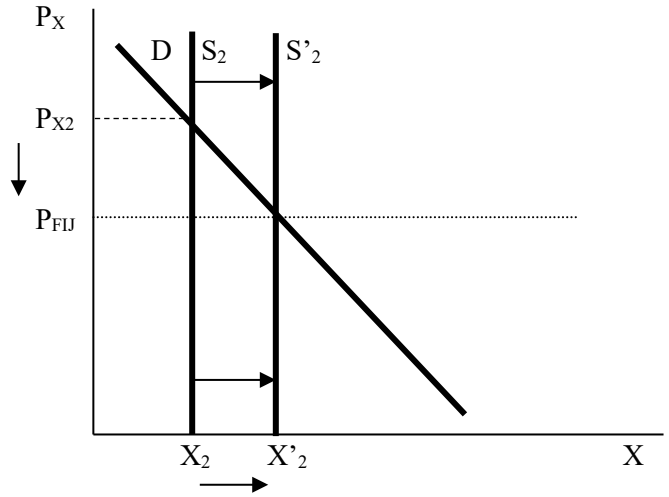


The following year (year 2), let's suppose the situation is the opposite. The harvest is catastrophic, and only the quantity X_2 is collected. The supply curve would be S_2.



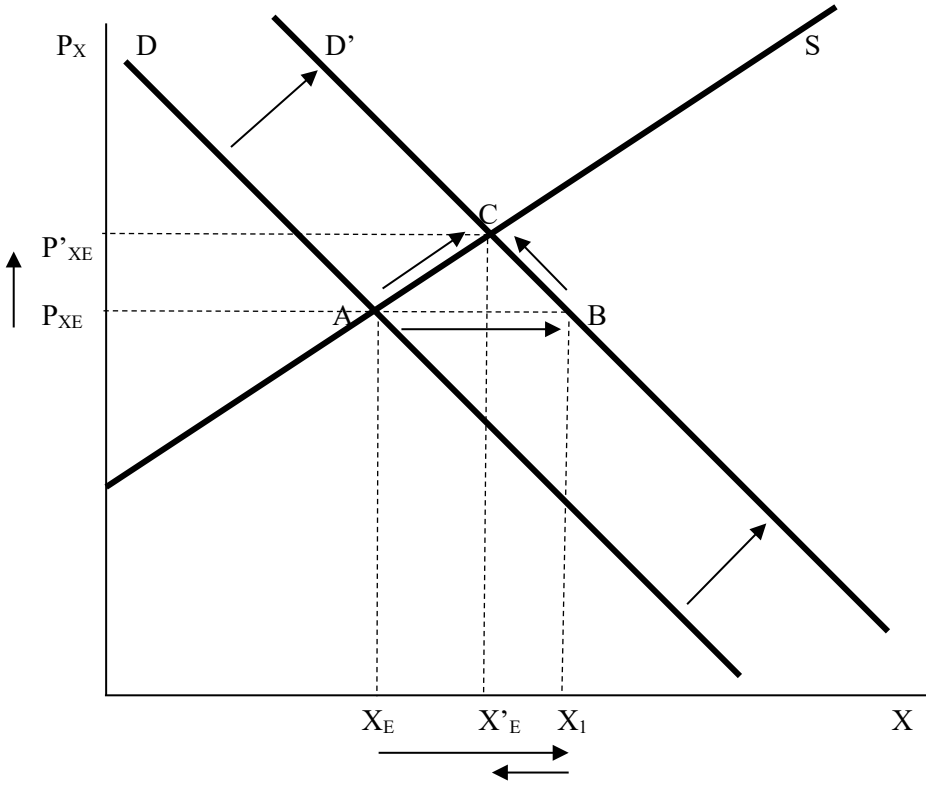
In this case, for the fixed price (P_{FIJ}), the demand wants more quantity than has been produced (there is an excess demand $X'_2 - X_2$), so if complementary measures are not taken, the black market will meet that demand at prices higher than the established ones.

The administrative body can now release the product that was withdrawn from the market in the *prosperous years*, increasing the supply as necessary to prevent the emergence of the black market. The supply curve would shift to the right, to S'_2, with the quantity X'_2 reaching the market.



4.3 Other Incidents in the Equilibrium

Finally, we will analyse a case of a shift in the demand function. The market for a good has a demand curve D and a supply curve S, and it is in equilibrium at point A, for price P_{XE} and quantity X_E.



An increase in the demanded quantity for each price[34], leads to a shift in the demand function to the right, to D'. Consumers who wanted to purchase X_E units of the good at price P_{XE}, after the change, desire X_1 (point B). But at this price, producers are not willing to increase supply, leading to an excess of demand $X_1 - X_E$, which drives up the price of the good. As the price increases, the demanded quantity decreases, and there is an upward shift along the demand function D' (the

[34] The causes that can lead to this effect are multiple. For example: increase in individuals' income, rise in the price of a substitute good, decrease in the price of a complementary good, an advertising campaign that boosts sales, etc.

price of the good itself increases, changing the situation to other points on the same demand function). The price increase also boosts the supplied quantity, resulting in an upward shift along the supply function S (the price of the good itself increases, changing the situation to other points on the same supply function). This process stops when the excess demand disappears, which occurs at the intersection of D' and S, for price P'_{XE} (higher than the initial) and quantity X'_E (also higher than the initial, but less than what demanders initially wanted, after the change in circumstances), which would be the final equilibrium situation.

A (X_E, P_{XE}) — Initial equilibrium point. At price P_{XE}, there is agreement between supply and demand regarding the quantity (X_E)

↓

An increase in consumer preferences causes demand to increase for each price, shifting the demand function to the right.

B (X_1, P_{XE}) — Demanders want X_1 units of the good for the initial price (P_{XE}).

↓

After the change in situation, at price P_{XE}, the agreement between supply and demand regarding the quantity is broken. Suppliers still want to bring X_E to the market, but demanders now want X_1, leading to an excess of demand, which results in price increases.

C (X'_E, P'_{XE}) — Final equilibrium point. At price P'_{XE}, there is again agreement between supply and demand, this time for the quantity X'_E.

The initial intention of the demand (to increase the quantity without altering the price) is thwarted by the supply. The final equilibrium occurs at a price higher than the original and also at a higher quantity, but lower than what the demand aimed for [35].

5. GLOSSARY OF TERMS

Competitive Market: This is the market in which there are many buyers and many sellers of a good, so that each of them exerts an insignificant influence on the sale price of the good or market price. Additionally, the product produced by different producers is identical (undifferentiated).

Complementary Goods: Two goods are complementary when the quantity demanded of one moves in the same direction as the demand for the other: if the quantity demanded of one increases, the demand for the other increases, and if the quantity demanded of one decreases, the demand for the other also decreases at any price.

[35] It is important to always keep in mind the *ceteris paribus* clause. It has been assumed that the initially demanded quantity increases for each price and that everything else remains constant. Other situations could be considered that would lead to different results; for example, if suppliers react to the increase in demand by incorporating new technologies that increase the quantities offered for each price, the supply function would shift (to an S' located to the right of the initial S) and the final result would be different.

Demand: This is the quantity of a good that buyers are willing to acquire in a given period of time. It depends on multiple factors: the price of the good (PX), the prices of goods related to the one in question (PY, PZ), the income of the buyers (I), tastes (P), etc.

Engel Curve: This curve relates the quantity demanded of a good to income.

Fixed Price: The setting of a price by the competent authority.

Independent Goods: Two goods are independent when variations in the price of one do not affect the demand for the other.

Inferior Goods: These are goods that, above a certain income level, consumers decrease their demand as income increases, potentially ceasing to purchase them at high income levels. Inferior goods include low-quality products, substitutes, and generic brands from supermarkets, etc.

Law of Diminishing Returns: Successive additions of factors to the production process generate increasingly smaller increases in output, which necessarily translates into growth in the unit cost.

Market Equilibrium: A market is in equilibrium at the price at which the quantity of the product that buyers want to acquire coincides with the quantity that sellers want to sell. The equilibrium occurs, therefore, at the price of the good that reconciles the forces of the market.

Market: A set of buyers and sellers of a good.

Maximum Price: The setting of a price by the competent authority above which the product cannot be sold in the market.

Minimum Price: The setting of a price by the competent authority below which the product cannot be sold.

Normal Goods: These are goods whose demand varies in the same direction as income. As income increases, the quantity demanded increases; as income decreases, the quantity demanded decreases. They are the most common in the market, hence their name.

Staple Goods: These are goods whose demand is barely affected by changes in income. They usually have a very steep demand curve, as they are also very insensitive to changes in their own price. The quantity of bread or salt, for example, that an individual purchases depends little on its price and income.

Substitute Goods: Two goods are substitutes when the quantity demanded of one moves in the opposite direction of the demand for the other.

Supply: The supply of a good is the quantity of that good that producers are willing to put on the market in a given period of time. Supply, in addition to the price of the good itself, depends on multiple elements: the cost of the production factors, the state of technology, the establishment of taxes and subsidies, the price of other goods, etc.

CHAPTER III. ELASTICITY

1. DEMAND ELASTICITY

1.1 The Elasticity Coefficient

Elasticity is an indicator that provides information about the relationship between two variables. It indicates how one is affected when the other changes. Demand elasticity, or price elasticity, reveals how, *ceteris paribus*, the demand for a good is affected by changes in its price. In other words, it informs about the sensitivity of demand to price fluctuations.

The value of demand elasticity is given by a coefficient—the elasticity coefficient—that is the ratio between the percentage change in quantity demanded and the percentage change in price. Alternatively, it is the change in quantity demanded relative to the initial quantity, divided by the change in price relative to the initial price[36].

$$E_{X,Px} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}} = \frac{\frac{\Delta X}{X}}{\frac{\Delta Px}{Px}} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}$$

At the limit, as the price variation of X tends to zero, the expression for the elasticity coefficient will be:

$$E_{X,Px} = lim_{\Delta Px \to 0} \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{dX}{dPx} \cdot \frac{Px}{X}$$

Suppose that at a price of 20 monetary units, 400 units of a good are demanded, and if the price rises to 22 units, the quantity demanded decreases to 390. A positive percentage change in price of 10% (rising 2 from 20) results in a negative percentage change in quantity of 2,5% (falling 10 out of 400). The value of the elasticity coefficient will be:

$$E_{X,Px} = \frac{-2,5}{10} = -0,25$$

The value of -0,25 means that, at the analyzed point of the demand function (price of 20 and quantity of 400), a 1% change in price results in a 0,25% change in quantity.

If the values from the example are substituted into the expression of the elasticity coefficient, the result is the same:

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{-10}{2} \cdot \frac{20}{400} = -0,25$$

The demand elasticity coefficient is always negative because changes in price lead to opposite changes in quantity. Therefore, when discussing demand elasticity, the sign is often omitted. It is equivalent to talk about an elasticity of -0,25 or an elasticity of 0,25; their economic meaning remains unambiguous[37].

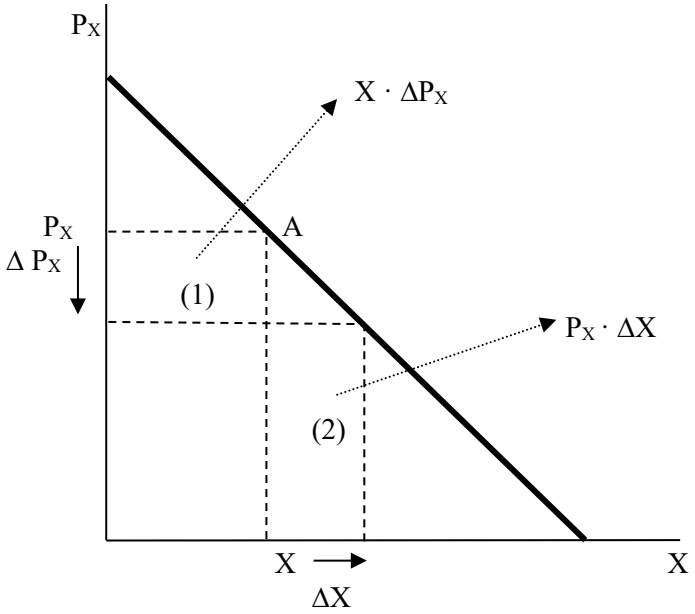
As explained, the elasticity coefficient indicates the sensitivity of demand to price changes. A low value reflects low sensitivity; as seen, a value of 0,25 means that if the price changes by 1%, the quantity demanded changes by 0,25% (or, equivalently, a 10% change in price results in a 2,5%

[36] The comparison of percentage changes is of great interest. A price reduction of one euro is not the same when the initial price of the good is 5 euros (a 20% reduction) as it is when the initial price is 100 euros (a 1% reduction).

[37] Logically, the sign cannot be omitted when performing mathematical calculations.

change in quantity). A high value indicates high sensitivity: if the elasticity coefficient is 4, a 1% change in price leads to a 4% change in quantity (a 10% reduction causes demand to increase by 40%).

Another piece of valuable information provided by the elasticity coefficient, especially for suppliers, is how consumer spending reacts to changes in the price of the good.



Let's assume that we are at point A on the demand function, consuming X units of the good at the price P_X. If the price decreases by ΔP_X, the consumption increases by Δ_X. Initially, the consumer spends on the good $X \cdot P_X$, which is the number of units consumed multiplied by the price. It is easy to see in the graph that the final expenditure is equal to the initial expenditure minus area (1), plus area (2). Area (1), $X \cdot \Delta P_X$, is precisely the denominator of the elasticity coefficient and corresponds to the decrease in expenditure on the good due to the price drop. Area (2), $P_X \cdot \Delta X$, is the numerator of the coefficient[38] and represents the increase in expenditure due to acquiring more units at a lower price. Therefore, the value of the elasticity coefficient is the quotient of the areas that need to be added or subtracted from the initial expenditure to obtain the final expenditure.

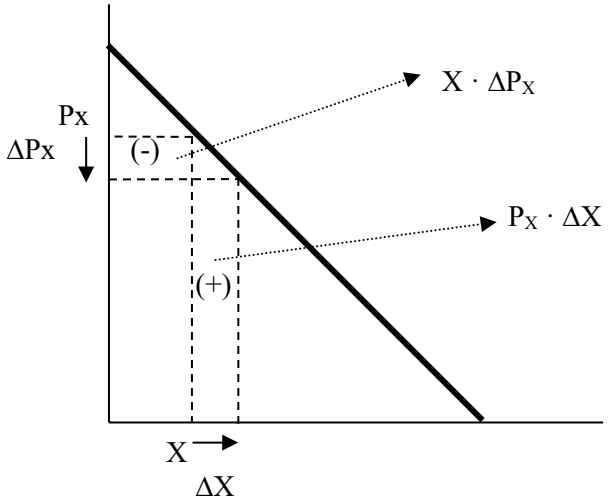
1.2 Price Elasticity Values

Based on the value of the elasticity coefficient, different types of points can be distinguished in demand:

Elastic points: these are points where the elasticity of demand is greater than 1 (or less than -1, which, as seen, is the same). In these points, the quantity demanded of a good responds significantly to price variations: demand is sensitive to price, more so as the elasticity value increases. A change in price by a certain percentage causes a change in the quantity demanded by a higher percentage. If, for example, the elasticity coefficient is 3 (or -3), a 1% decrease in price results in a 3% increase in the quantity demanded.

[38] For graphical representation, significant increments have been assumed for pedagogical purposes, but for calculating the elasticity coefficient value at a point on the demand function, it is appropriate to consider reduced ΔPX. If ΔPX is very small —approaching zero—, so will be ΔX, and even smaller will be the product of the two, thus it can be disregarded without significant error. The area (2) is exactly equal to $(PX - \Delta PX) \cdot \Delta X = (PX \cdot \Delta X) - (\Delta PX \cdot \Delta X)$.

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} > 1$$



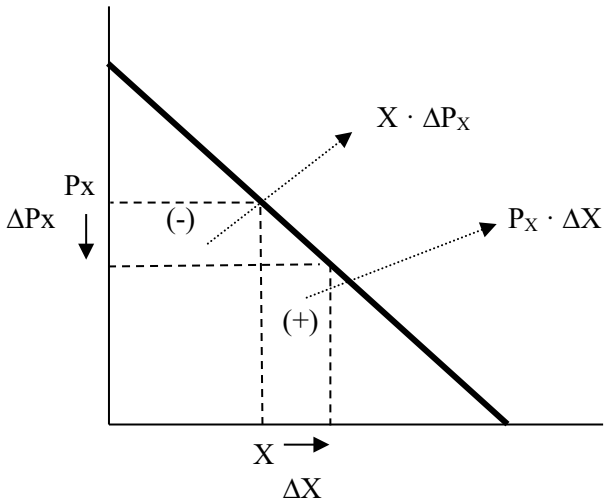
Another characteristic of elastic points is that if the price of the good decreases, consumer spending on it increases (if the price were to rise, spending would decrease).

$$\text{If } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} > 1, \text{ so } \Delta X \cdot Px > \Delta Px \cdot X$$

When the price of the good decreases, the decrease in spending due to the price reduction (area $X \cdot \Delta P_X$, which is the denominator of the elasticity coefficient) is smaller than the increase in spending due to the higher quantity acquired (area $P_X \cdot \Delta X$, which is the numerator of the coefficient). As a result, the consumer's final spending will be greater than the initial spending.

Unitary Elasticity: demand elasticity is unitary when the value of the coefficient is one (or -1). In this case, a percentage change in price causes an equal percentage change in quantity demanded.

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = 1$$



When elasticity is unitary, changes in price do not result in changes in consumer spending. The price changes, and spending remains constant.

$$\text{If } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = 1, \text{ so } \Delta X \cdot Px = \Delta Px \cdot X$$

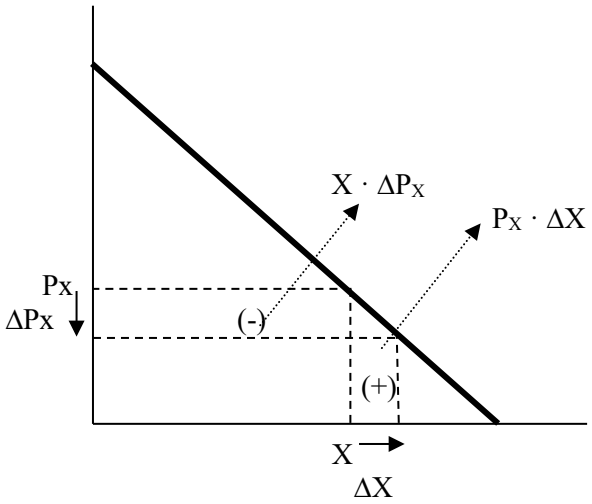
When the price of the good decreases, the decrease in spending due to the price reduction ($X \cdot \Delta P_X$) coincides with the increase in spending due to the higher quantity acquired ($P_X \cdot \Delta X$), resulting in final spending being equal to initial spending.

Inelastic points: these are points where the elasticity of demand is less than 1 (or greater than -1). In these points, demand is not very sensitive to price, becoming less sensitive as the value of elasticity approaches zero. A percentage change in price causes a smaller percentage change in the quantity demanded. If, for example, the elasticity were 0.25 (or -0.25), a 1% decrease in price would result in a 0.25% increase in the quantity demanded.

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} < 1$$

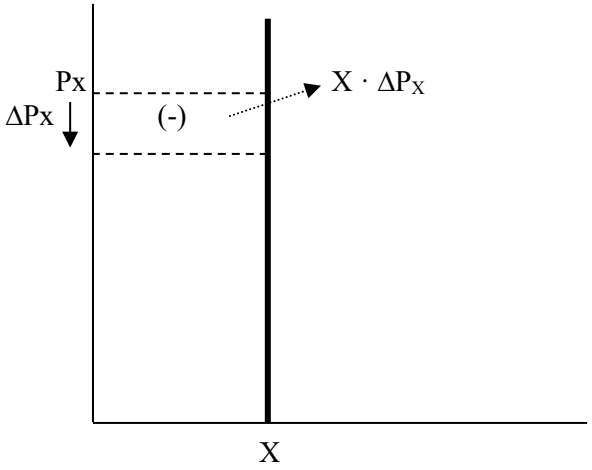
In inelastic points, if the price of the good decreases, consumer spending on it decreases (and if it increases, spending increases).

$$\text{If } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} < 1, \text{ so } \Delta X \cdot Px < \Delta Px \cdot X$$



When the price of the good decreases, the decrease in spending due to the price reduction ($X \cdot \Delta P_X$) is greater than the increase in spending due to the higher quantity acquired ($P_X \cdot \Delta X$), resulting in the consumer's final spending being less than the initial spending.

Perfect Inelastic Demand: demand is rigid or perfectly inelastic when it does not react to variations in price. A change in price (ΔP_X) occurs, but the quantity remains constant ($\Delta X = 0$), resulting in a coefficient of elasticity value of zero. Demand is rigid when the demand function is vertical. The closest example is essential goods. For instance, a diabetic consumes the same amount of insulin weekly, regardless of its price.

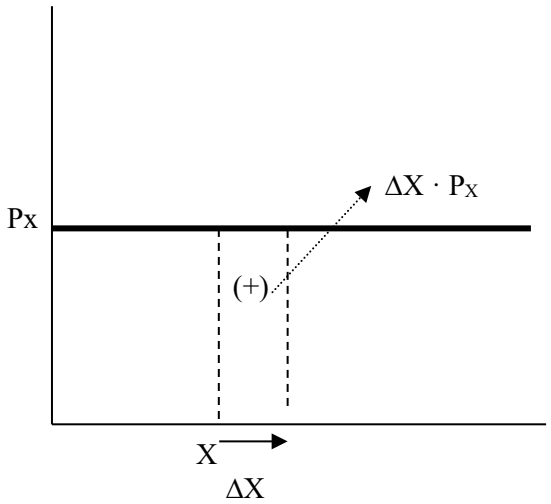


$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}, \text{ if } \Delta Px \rightarrow \Delta X = 0, \text{ so } E_{X,Px} = 0$$

In this type of goods, if the price decreases, consumer spending also decreases, and if the price increases, spending increases.

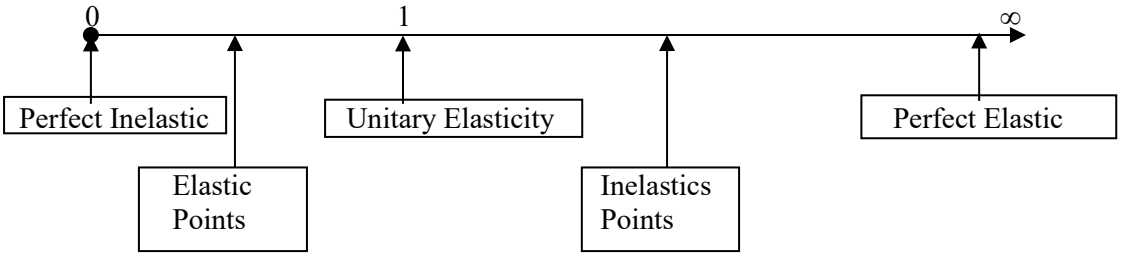
Perfect Elastic Demand: Demand is perfectly elastic, or of infinite elasticity, when variations in the quantity demanded of the good (ΔX) occur without the need for the price to change ($\Delta P_X = 0$). The value of the elasticity coefficient is infinite. Demand is perfectly elastic when the demand function is horizontal.

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}, \text{ if } \Delta Px = 0 \rightarrow \Delta X, \text{ so } E_{X,Px} = \infty$$



If the quantity demanded increases, consumer spending on the good increases, and if the quantity decreases, spending decreases. This case can occur when a consumer is willing to buy different quantities of a good for a specific price.

In summary, depending on the value of the demand elasticity coefficient, the following results can occur:

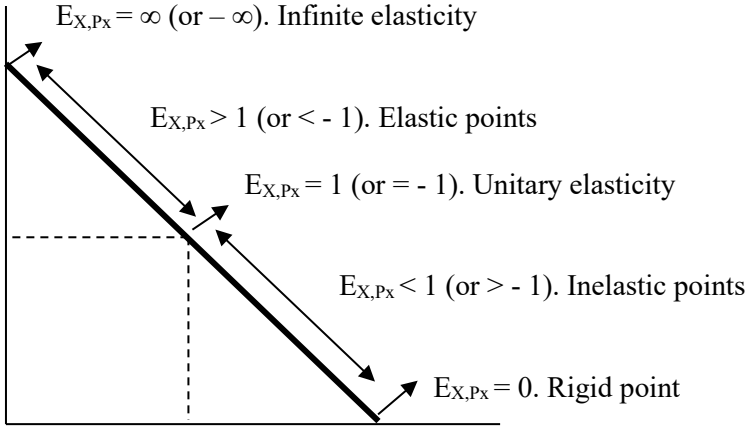


1.3 Elasticity and Slope

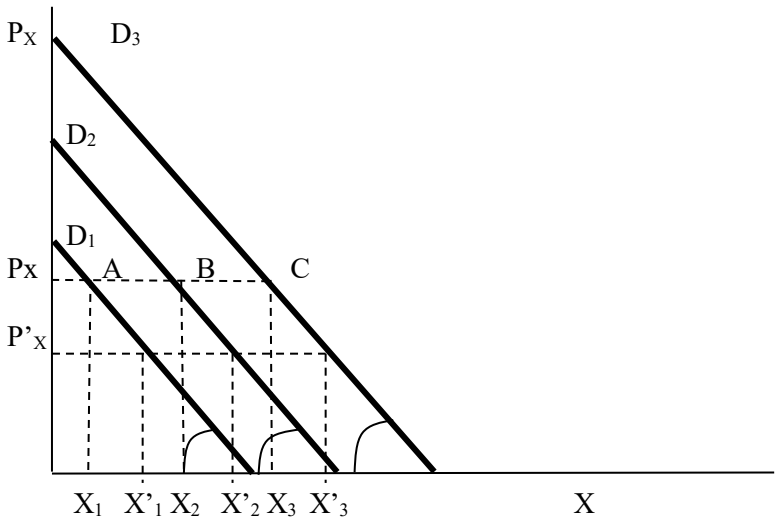
Elasticity at a point on the demand function depends on its slope at that point, but elasticity should not be confused with slope. Slope indicates how one variable changes when the other changes, while elasticity compares percentage changes.

In a linear demand, $\Delta X / \Delta Px$ the inverse of the slope of the function is constant at all points (regardless of the point on the demand function, if the price varies ΔP_X, ΔX will always be the same). However, since X and P_X are different at each point, elasticity $E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}$ will also be different (except in extreme cases when the demand function is horizontal or vertical).

For this reason, in a linear demand function, there are elastic, inelastic, and unitary elastic points.

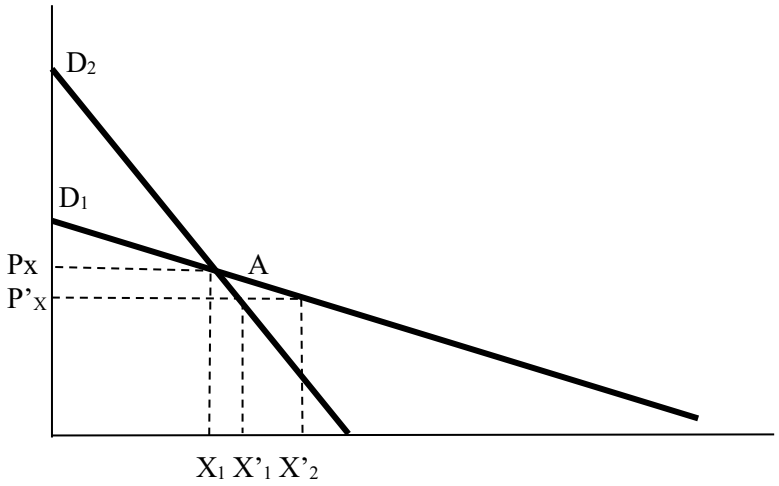


A simple example can help understand the difference between elasticity and slope:

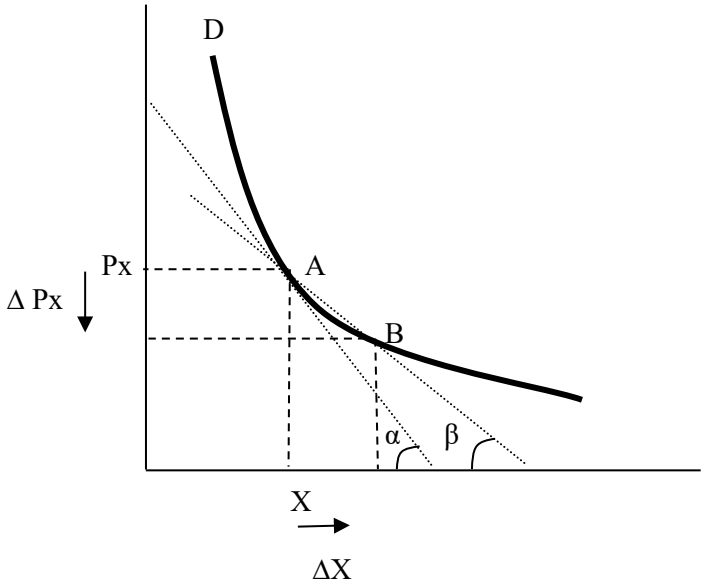


Consider three demanders with demand functions of equal slope: D_1, D_2, and D_3. For the price P_X, demander 1 consumes quantity X_1, demander 2 consumes X_2, and demander 3 acquires X_3. If the price changes by ΔP_X (going from P_X to P'_X), the variation in the quantity demanded ΔX will be the same in all three cases (as the slope of the three functions is equal). However, the elasticity of points A, B, and C (the points of the different demand functions for the price P_X) is different: A is elastic, B has unitary elasticity, and C is inelastic.

At the same time, it is also easy to visually verify that elasticity depends on the slope. Consider two demand functions, D_1 and D_2, intersecting at point A for the price P_X and quantity X_1. It is clear that at this point, the elasticity coefficient value is greater in D_1 than in D_2. At A, demand D_1 is more sensitive to price than D_2. In both cases, $\Delta P_X \cdot X$ is equal, but $\Delta X \cdot P_X$ is greater in D_1 than in D_2.



The exact value of elasticity at each point of the demand function is obtained when the variation of P_X tends to zero, leading to the concept of derivative. In non-linear demand functions, if increments are used, the elasticity value will be an approximation, more accurate the smaller the considered variation of P_X.



If elasticity is calculated at point A considering the ΔP_X that leads to point B, it is putting in the elasticity coefficient expression ($\Delta X/\Delta P_X$), which is the inverse of the tangent of β —the inverse of the slope of the line connecting A and B. On the other hand, if the concept of derivative is used (when ΔP_X tends to zero), it will be putting in the elasticity coefficient expression the inverse of

the tangent of α (dX/dP_X) —the inverse of the slope of the demand function at A. As it can be easily verified, as ΔP_X becomes smaller, the value of $\Delta X/\Delta P_X$ will approach the value of dX/dP_X.

$$E_{X,\,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X}$$

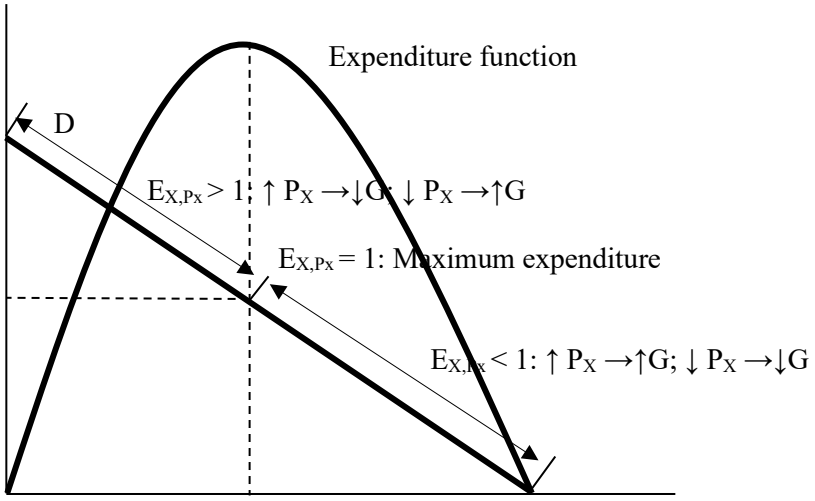
In linear functions, although the quotient $\Delta X/\Delta P_X$ is constant (it does not depend on larger or smaller changes in PX), considering large price variations that could even lead from elastic points of the demand function to inelastic points (or vice versa) is not meaningful. This could make the elasticity coefficient lose meaning and information power.

1.4 Elasticity of Demand and Expenditure

Based on what has been discussed in the previous sections, it is easy to determine, by knowing the value of elasticity, how consumer expenditure on the good will react to changes in price.

$E_{X,Px} > 1$ (o< -1) Elastic points	↑ P_X	↓ Expenditure	Maximum expenditure at: $E_{X,Px} = 1$ (o= –1) Unitary elasticity
	↓ P_X	↑ Expenditure	
$E_{X,Px} < 1$ (o> -1) Inelastic points	↑ P_X	↑ Expenditure	
	↓ P_X	↓ Expenditure	

The relationship between the demand function and the expenditure function is given by the following graph:



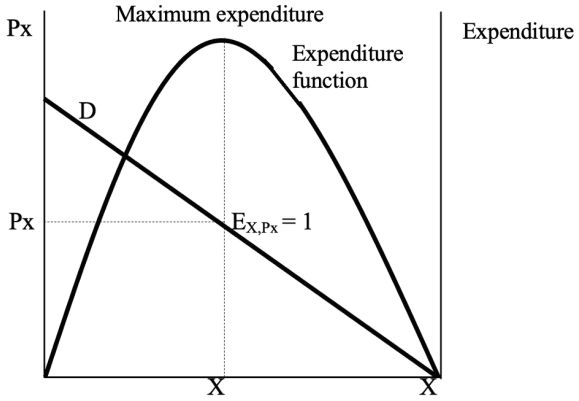
EXERCISE

The demand for a good is given by the expression $X = -10\,P_X + 30\,P_Y - 20\,P_Z + 3\,M$, where $P_Y = 10$, $P_Z = 5$ y $M = 100$. Calculate the máximum expenditure on good X.

To determine the expression of the demand function that depends only on the price of the good, simply substitute P_Y, P_Z and M with their values.

$$X = -10\,P_X + 30\,P_Y - 20\,P_Z + 3\,M = -10\,P_X + 30.10 - 20.5 + 3.100$$
$$X = 500 - 10\,P_X$$

The consumer incurs maximum expenditure at the point on the demand function with unitary elasticity.



Therefore:

$$E_{X,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X} = -1, \text{ where } E_{X,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X} = -10.\frac{Px}{500 - 10Px} = -1$$

$10\,P_X = 500 - 10\,P_X$ ⇨ $P_X = 25$

The quantity corresponding to the price of 25 is, substituting into the demand function, 250 units. Therefore, the maximum expenditure on the good is 6.250 monetary units.

1.5 Factors Determining Demand Elasticity

The type of good. In essential goods such as food, fuel (butane, gasoline, etc.), or footwear, market equilibrium typically occurs at inelastic points on the demand curve. Since these items are necessary for survival, it is challenging to give them up when their prices increase, and consumers tend to increase their spending. On the other hand, goods purchased on a whim will have market equilibrium at elastic points on the demand curve: if their prices rise, buyers will tend to reduce their spending on them.

Substitutability of the good. The more substitutes a good has, the higher (considered in positive values) the elasticity of its demand at market equilibrium. If a good is difficult to substitute, market equilibrium will occur at inelastic points. If the price of an easily substitutable good increases, consumers will shift to other goods that fulfill the same need and reduce spending on it (elastic points). In contrast, if the price of a good with no substitutes rises, consumers will have no choice but to continue purchasing it, leading to increased spending (inelastic points). Demand will be more inelastic the more challenging the substitution becomes among the selected set of

goods; it is more difficult to substitute desserts (in general) than fruit, more difficult to substitute fruit than oranges, and more difficult to substitute oranges than a specific brand of orange.

THE WAR IN UKRAINE DRIVES OLIVE OIL PRICES UP BY 10% IN TWO WEEKS

Lower-quality varieties are the ones that have seen the greatest increase: lampante oil costs 45% more than last year at this time

News, 03/11/2022
https://www.elespanol.com/invertia/empresas/20220311/guerra-ucrania-dispara-precio-aceite-oliva-semanas/656184621_0.html

Olive oil is experiencing a good moment in terms of prices. All varieties of this liquid gold have significantly increased in price since the war broke out in Ukraine. On average, olive oil costs 10% more than it did two weeks ago and 32% more than this time last year.
The social alarm generated around sunflower oil, especially after it stopped being imported from Ukraine, has driven up the prices of lower-quality varieties.
Oil prices have been gradually rising over the past year, and it is following the Russian invasion of Ukraine that this increase has become "effervescent," as explained to EL ESPAÑOL-Invertia by Juan Gadeo, president of the Interóleo Group.

Time to respond to price changes. The longer the response time, the more elastic the demand will be for almost all goods because consumers have more opportunities to adjust their behaviour to the new situation. Additionally, over time, technological advancements favor the emergence of substitute products. If the price of gasoline rises, the possibility of short-term switching to another fuel is practically nonexistent, making these points highly inelastic, and consumers will be forced to spend more. As time passes, adaptation possibilities increase; if gasoline prices remain high, consumers can buy a fuel-efficient car, a diesel-powered one, or use alternative modes of transportation. Therefore, in the long-term demand curve, the equilibrium point will be more elastic than in the short-term.

Importance of the price of the good in the consumer's budget. The more the price of the good represents in the consumer's income, the more elastic it tends to be. Conversely, if the price of the good is insignificant compared to income, elasticity tends to be low. A person may feel the impact of a rise in gasoline prices, but they probably will not notice if the price of buttons, pins, or a shoelace doubles.

1.6 An Example

The demand for a good is given by the values—price and quantity—of the following table:

	PRICE	QUANTITY
A	13,5	10.000
B	12,0	20.000
C	10,5	30.000
D	9,0	40.000
E	7,5	50.000
F	4,5	70.000
G	3,0	80.000
H	1,5	90.000

Elasticity and expenditure will be calculated at each of these points. For the elasticity calculation, the formula based on the increments of X and P_X is applied. For example, at point A (for a price

of 13.5, the demand is 10,000 units), if the price drops 1.5 monetary units (from 13.5 to 12), the quantity increases by 10,000 units (from 10,000 to 20,000).

$$\text{In A: } E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{(20.000 - 10.000)}{(12 - 13{,}5)} \cdot \frac{13{,}5}{10.000} = \frac{10.000}{-1{,}5} \cdot \frac{13{,}5}{10.000} = -9$$

The calculation of elasticity at B would be similar:

$$\text{In B: } E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{(30.000 - 20.000)}{(10{,}5 - 12)} \cdot \frac{12}{20.000} = \frac{10.000}{-1{,}5} \cdot \frac{12}{20.000} = -4$$

The elasticity at H can be calculated by considering the variations that occur when the price of X rises, since there are no data to know what happens if it drops (this could also have been done at the other points, obtaining the same result).

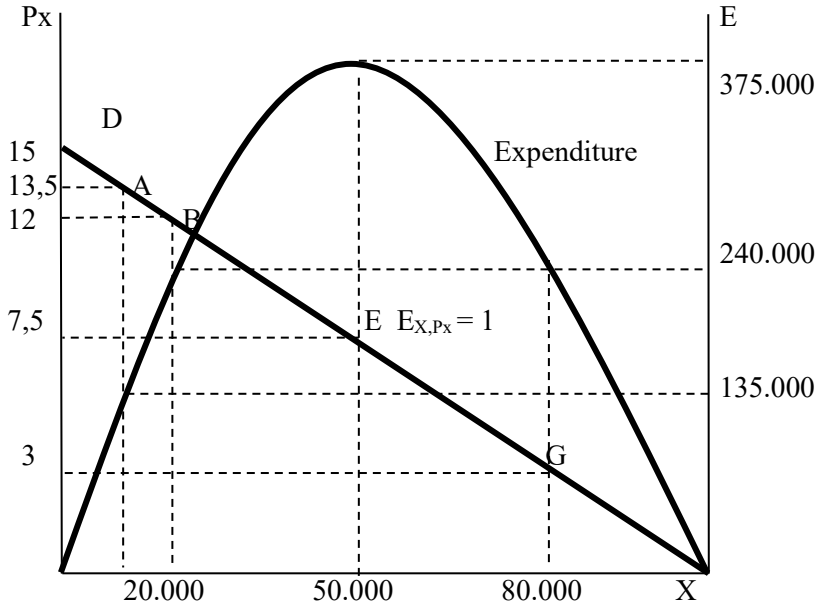
	PRICE	QUANTITY	ELASTICITY		EXPENDITURE
A	13,5	10.000	- 9,00	elastic	135.000
B	12,0	20.000	- 4,00	elastic	240.000
C	10,5	30.000	- 2,33	elastic	315.000
D	9,0	40.000	- 1,50	elastic	360.000
E	7,5	50.000	- 1,00	unitary	375.000
F	4,5	70.000	- 0,43	inelastic	315.000
G	3,0	80.000	- 0,25	inelastic	240.000
H	1,5	90.000	- 0,11	inelastic	135.000

As studied, if the price decreases while at an elastic point, the consumer's expenditure increases. A is elastic ($E_{X,Px} = -9$) and when the price drops 1,5 monetary units, leading to point B, expenditure goes from 135.000 monetary units to 240.000. B is also elastic ($E_{X,Px} = -4$) and when the price falls from 12 to 10,5, expenditure moves to 315.000 monetary units.

In inelastic points, the opposite occurs: a price increase leads to an increase in expenditure. H is inelastic ($E_{X,Px} = -0{,}11$) and when the price rises 1,5 monetary units, expenditure goes from the initial 13.000 units to 240.000. G remains inelastic ($E_{X,Px} = -0{,}25$) and if the price rises again by 1,5 units, expenditure moves to 315.000 monetary units.

The maximum expenditure occurs at the point of unit elasticity ($E_{X,Px} = -1$), which, in the example, is point E. At this point—for a price of 7,5, 50.000 units of the good are demanded—the expenditure is 375.000 monetary units.

The graph represents the demand function and the expenditure function. The abscissa is units of good, the price is the left ordinate, and expenditure the right ordinate. The demand function indicates that for a price of 12, 20.000 units are purchased; the expenditure function shows that if the consumer buys 20.000 units of the good, they are spending 240.000 monetary units. The same expenditure is made when, at the price of 3, 80.000 units are purchased. If the price is 7,5, 50.000 units are bought, with an expenditure of 375.000 monetary units, which is the maximum of the expenditure function and corresponds to the point of unit elasticity of the demand function.



The points of demand in the example belong to the linear function:

$$X = 100.000 - \frac{20.000}{3} Px$$

If the equation of the demand function is known, it is simpler to calculate the value of the elasticity coefficient at each point using the expression:

$$E_{X,\,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X}$$

In the example $\frac{dX}{dPx} = -\frac{20.000}{3}$, constant for all values, so the elasticity will be:

$$\text{In A: } E_{X,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X} = -\frac{20.000}{3} \cdot \frac{13,5}{10.000} = -9$$

EXERCISE

On October 5, 1999, the newspaper Expansión published the following news: "In October 1998, a toll reduction went into effect on five sections of the Acesa highway network, ranging from 10 percent on the Maçanet-Girona Sur stretch to 50 percent on the Montmeló-El Papiol (Barcelona) stretch, known as B-30. In exchange, the company obtained a five-year extension on all its concessions, until 2021. One year after the reduction, the measure has only harmed the toll on the B-30, where revenues have dropped by 32,9% in the first semester, despite a 31,2% increase in traffic. In the rest of the sections affected by the measure, revenues have grown between 0,4% (Barcelona-La Jonquera stretch) and 15.7% (Barcelona-Tarragona stretch)".

With this data, we can calculate the elasticity coefficient of demand for the B-30, as the news indicates that with a 50% decrease in price, the quantity increased by 31,2%. Converting these data into the expression of the coefficient, we have:

$$E_{X,Px} = \frac{\text{Percentage change in quantity}}{\text{Percentage change in price}} = \frac{31{,}2}{-50} = -0{,}624$$

This represents an inelastic point of demand (less than -1). At these points, when the price decreases, even though the quantity demanded increases, spending on the good or service decreases. In this particular case, the news indicates that the company's revenues (corresponding to consumer spending) have fallen by 32.9%.

$$\text{In B: } E_{X,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X} = -\frac{20.000}{3} \cdot \frac{12}{20.000} = -4$$

2. CROSS ELASTICITY

Besides the sensitivity of the demand for a good to variations in its price (demand elasticity or own-price elasticity), it is also of interest to understand how it reacts to changes in other factors that influence it, such as the price of other goods or income. In the previous topic, it was studied how variations in the price of one good can affect the quantity demanded of another.

The cross-elasticity coefficient indicates, *ceteris paribus,* how the demand for one good reacts to a change in the price of another good; therefore, it states the sensitivity of the demand for one good with respect to the price of another. The value of this elasticity coefficient is given by the quotient between the percentage variation of the quantity demanded of one good and the percentage variation of the price of another.

$$E_{X,Py} = \frac{percentage\ change\ in\ the\ quantity\ demanded\ of\ X}{percentage\ change\ in\ the\ price\ of\ Py} = \frac{\frac{\Delta X}{X}}{\frac{\Delta Py}{Py}} = \frac{\Delta X}{\Delta Py} \cdot \frac{Py}{X}$$

In the limit, when the variation of the price of Y tends to zero, the expression for the elasticity coefficient will be:

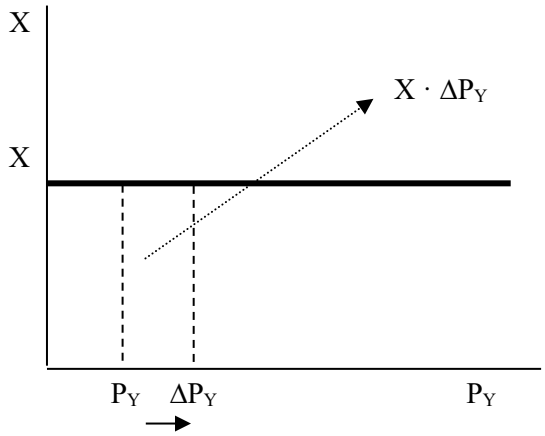
$$E_{X,Py} = lim_{\Delta Py \to 0} \frac{\Delta X}{\Delta Py} \cdot \frac{Py}{X} = \frac{dX}{dPy} \cdot \frac{Py}{X}$$

The value of the cross-elasticity indicates the relationship between the two goods under study. It is important to note that, while the coefficient of own-price elasticity is always negative (and therefore, for analysis, the sign is omitted), the cross-elasticity coefficient can be positive or

negative, and the information from the sign is crucial to understanding how the goods are related[39].

Null cross-elasticity: If the cross-elasticity is null, there is no relationship between the two goods, and therefore, they are independent.

$$E_{X,Py} = \frac{\Delta X}{\Delta Py} \cdot \frac{Py}{X} = 0$$



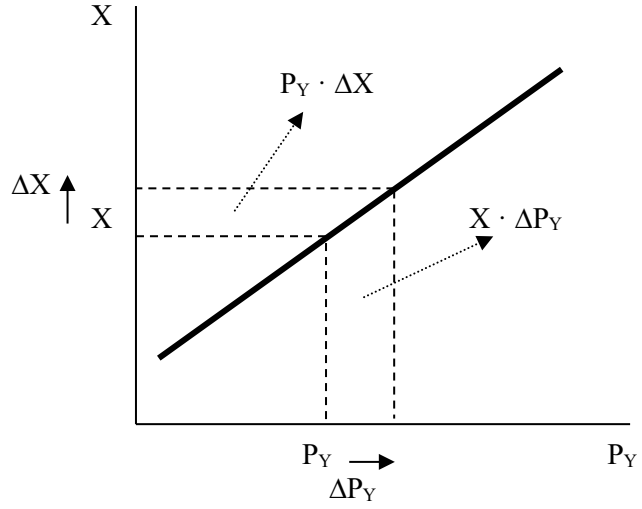
For P_Y, X units of good X are demanded. When the price of Y increases by ΔP_Y and the quantity demanded of X remains constant ($\Delta X = 0$), the product $\Delta X \cdot P_Y$, the numerator of the elasticity coefficient, is zero, and therefore, the elasticity is also zero.

In the second expression of the elasticity coefficient, since the function that relates P_Y to X is horizontal, its slope (dX/dP_Y) — which is the first factor of the coefficient — is zero, and thus the value of the coefficient is also zero.

Positive cross-elasticity: The cross-elasticity coefficient will be positive whenever the two variables compared move in the same direction: if P_Y increases, the quantity demanded of X increases, and if P_Y decreases, the quantity demanded of X decreases.

[39] The coefficient will be positive or negative depending on the values of ΔP_Y and ΔX, since X and P_Y are always positive.

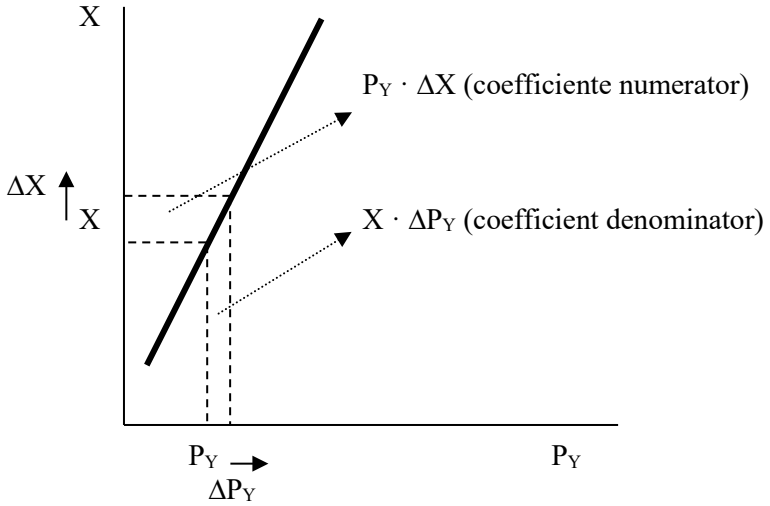
$$E_{X,Py} = \frac{\Delta X}{\Delta Py} \cdot \frac{Py}{X} > 0$$



Originally, for good X, X units are demanded for price Y. If the price of Y increases, the demanded quantity of X also increases. The increase in price Y results in a decrease in its own demand — a logical reaction to its price hike — and an increase in the demand for X. Thus, the demands for X and Y vary in opposite directions (when one decreases, the other increases), indicating they are substitute goods.

$$\uparrow P_Y \quad \begin{matrix} \rightarrow & \downarrow Y \\ \rightarrow & \uparrow X \end{matrix} \quad \text{Substitutes}$$

In this case, the function relating P_Y with X is increasing, thus its slope (dX/dP_Y) is positive, and therefore, the coefficient value is positive.



Goods will be more substitutable the higher the value of the elasticity coefficient and less substitutable the closer its value approaches zero. If the slope of the function is large, a small variation in P_Y results in a considerable variation in the demand for X: the demand for X is highly sensitive to variations in P_Y. As the slope of the function increases, the coefficient of cross elasticity increases, since $P_Y \cdot \Delta X$ (numerator of the elasticity coefficient) tends to increase, while $X \cdot \Delta P_Y$ (denominator of the coefficient) tends to decrease. A function with a small slope implies

little sensitivity of the demand for X to P_Y: as the slope decreases, $X \cdot \Delta P_Y$ increases and $P_Y \cdot \Delta X$ decreases, resulting in increasingly smaller coefficient values.

THE PRICE OF DIESEL HITS A NEW HISTORICAL HIGH

News, 05/05/2022
https://elpais.com/economia/2022-05-05/el-precio-del-diesel-marca-un-nuevo-maximo-historico.html

The escalation in fuel prices shows no signs of abating. According to the latest *EU Petroleum Bulletin*, published this Thursday, the average price of diesel in Spain stands at 1.873 euros per liter this week. This marks the second consecutive week it has reached the highest price in history, rising by 1,4% compared to seven days ago. It's important to note that this is not the amount ultimately paid by drivers when refueling at the gas station. Due to a methodological change and at the request of the European Commission, sources from the Ministry of Ecological Transition explain that the bulletin does not include the mandatory discount of 20 cents per liter that came into effect on April 1st. For weeks, this effect of subsidies was included, but the historical series has now been corrected.

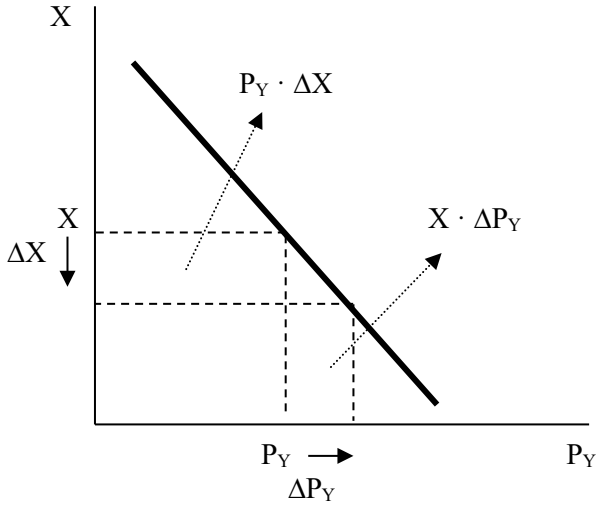
As for gasoline, the price per liter of 95-octane fuel averages at 1.837 euros, a 1,1% increase from the previous week. However, in this case, it still remains 0,4% below the 1.845 euros it reached in the week of March 14th, its historical peak. Both in this case and in that of diesel, what has been surpassed is the average price at the end of March; that is, before the subsidies came into effect. Since then, gasoline has become 2 cents more expensive and diesel, 4 cents.

SPAIN BREAKS RECORD WITH 1,57 MILLION BICYCLES SOLD IN 2021
News, 19/04/2022
https://www.lavanguardia.com/vida/20220419/8207014/espana-bate-record-1-57-millones-bicicletas-vendidas-2021.html

A total of 1.571.368 bicycles were sold in Spain during 2021, marking a new annual historical record and the second consecutive year with over 1,5 million units sold, according to the latest annual report by AMBE (Spanish Association of Bicycle Brands).
The report, compiled in collaboration with Cofidis, was presented this Tuesday in Madrid at an event opened by the Secretary of Transport and Mobility, María José Rallo, and featured a roundtable discussion with representatives from the Directorate General of Traffic (DGT); the Bicycle Office of the Ministry of Transport, Mobility, and Urban Agenda; EY; and AMBE.
The bicycle sector experienced growth last year, reaching record sales figures for bicycles, components, and accessories. Revenue also increased, employment rebounded, and new companies were established. For the second consecutive year, Spain saw over 1.5 million bicycles sold (specifically, 1.571.368 in 2021), a slight increase compared to 1,565,233 units in 2020, when bicycle usage surged due to mobility restrictions resulting from the COVID-19 pandemic.
The largest increases were seen in the gravel category (up 51,2%) and electric bicycles (up 5,3%). On the other hand, there was a notable decrease in the sale of urban bicycles (down 12%) due to the rise of electric bikes and the use of non-urban models in cities, according to AMBE. Mountain bikes remained the most popular type in Spain but were surpassed for the second consecutive year by electric bicycles in terms of business volume.

Negative cross-elasticity: The cross-elasticity coefficient is negative when the compared variables move in opposite directions: if P_Y increases, the quantity demanded of X decreases, and if P_Y decreases, the demand for X increases.

$$E_{X,Py} = \frac{\Delta X}{\Delta Py} \cdot \frac{Py}{X} < 0$$



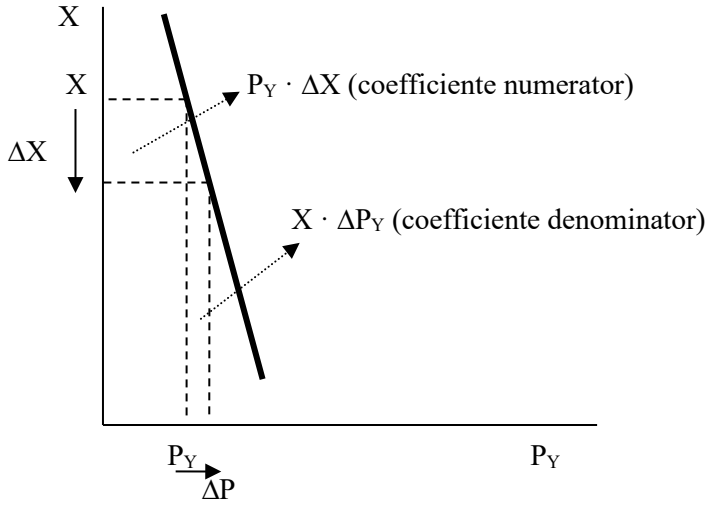
In the initial situation, P_Y units of X are demanded for price X. When the price of Y increases, the demanded quantity of X decreases. In this case, the increase in price P_Y results in a decrease in its own demand and a decrease in the demand for X. The demands for X and Y vary in the same direction (when one decreases, the other decreases), indicating they are complementary goods.

$$\uparrow P_Y \quad \begin{matrix} \rightarrow & \downarrow Y \\ \rightarrow & \downarrow X \end{matrix} \quad \text{Complementary}$$

The function relating P_Y to X is decreasing, so its slope (dX/dP_Y) is negative, and the coefficient of elasticity is also negative.

Goods will be more complementary the lower the value of the elasticity coefficient and less complementary the closer it approaches zero. If the function has a steep slope, a small variation in P_Y results in a large variation in the demand for X: the demand for X is highly sensitive to variations in P_Y (P_Y has a significant impact on X). As the slope of the function increases, the coefficient of cross elasticity decreases — moving away from zero — as the area $P_Y \cdot \Delta X$ (numerator of the coefficient) tends to increase, while the area $X \cdot \Delta P_Y$ (denominator of the coefficient) tends to decrease.

On the other hand, a function with a shallow slope implies low sensitivity of the demand for X to variations in P_Y: as the slope decreases, the area $X \cdot \Delta P_Y$ increases and $P_Y \cdot \Delta X$ decreases, resulting in coefficient values increasingly larger (closer to zero).

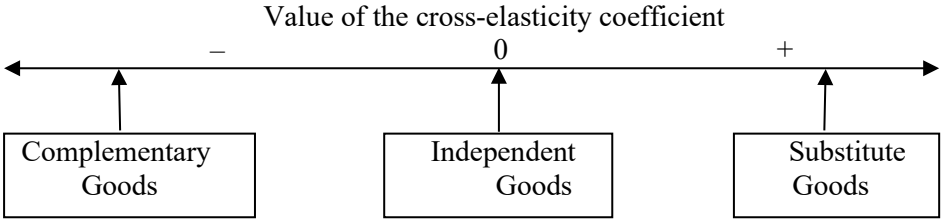


HOW MUCH DID CAR PRICES RISE IN 2022? WILL THEY CONTINUE TO INCREASE?

News, 31/01/2023
https://www.elespanol.com/motor/20230131/subieron-precios-coches-seguiran-aumentando-respuestas/737926669_0.html

A few days ago, it was revealed that the Consumer Price Index (CPI) for new cars saw historically high increases in 2022, with a rise of 10,4%.
According to industry sources, this price hike is attributed to the low availability of products due to the chip crisis and logistical issues, factors that have curtailed production and consequently led to a decrease in sales.
Thus, with fewer cars to sell, manufacturers and distributors were able to increase car prices to the aforementioned double-digit figure (10,4%), as also reflected in the following graph showing the monthly increase in new car prices over the past four years.

In summary, the information provided by the value of the cross-elasticity coefficient regarding the relationship between the compared goods is as follows:



3. INCOME ELASTICITY

When consumers' income changes, the demand for the goods they purchase varies. Income elasticity indicates the sensitivity of the demand for a good as income changes. The income elasticity coefficient is the ratio between the percentage change in the quantity demanded of a good and the percentage change in income.

$$E_{X,M} = \frac{percentage\ change\ in\ the\ quantity\ demanded\ of\ X}{percentage\ change\ in\ the\ price\ of\ Py} = \frac{\frac{\Delta X}{X}}{\frac{\Delta M}{M}} = \frac{\Delta X}{\Delta M} \cdot \frac{M}{X}$$

At the limit, when the change in income tends to zero, the expression for the elasticity coefficient will be:

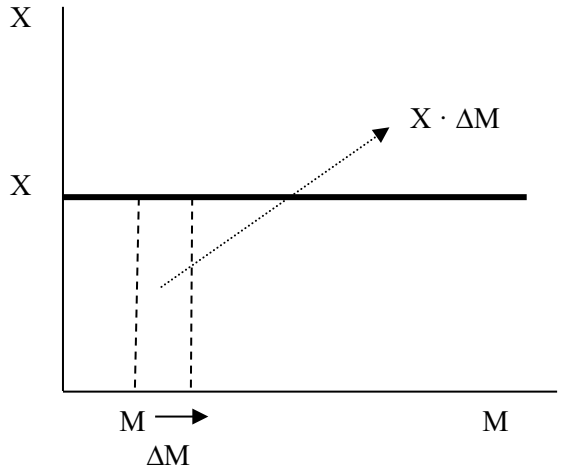
$$E_{X,M} = lim_{\Delta M \to 0} \frac{\Delta X}{\Delta M} \cdot \frac{M}{X} = \frac{dX}{dM} \cdot \frac{M}{X}$$

As with cross elasticity, the sign of the income elasticity coefficient is informative and cannot be disregarded; since M and X are always positive, the sign of the coefficient depends on how ΔM and ΔX behave.

The following cases can occur depending on the value of the elasticity:

Zero income elasticity: A zero elasticity value means that the quantity demanded of the good does not change as income varies. This is the case for a necessity good.

$$E_{X,M} = \frac{\Delta X}{\Delta M} \cdot \frac{M}{X} = 0$$



The Engel curve indicates that for income M, X units of good X are demanded. As income rises, the quantity demanded of X remains constant (ΔX = 0). The product ΔX · M, the numerator of the elasticity coefficient, is zero and, therefore, the elasticity value is also zero.

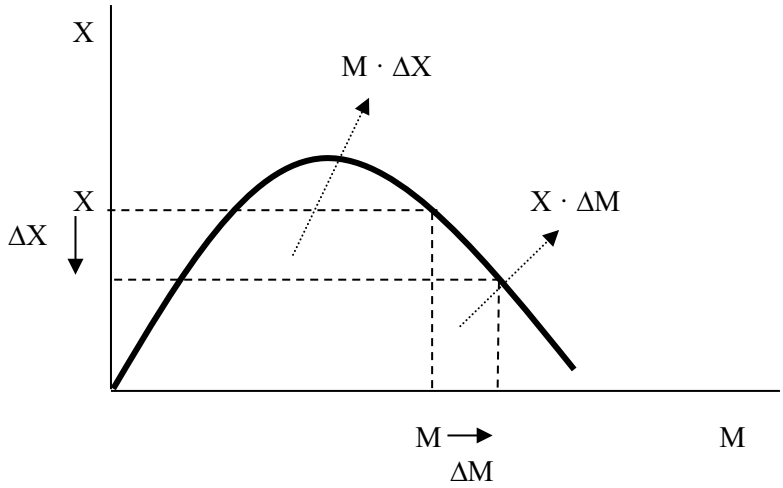
If the expression of the elasticity coefficient based on the derivative is considered, as the slope of the Engel curve is zero (dX/dM = 0), the value of the coefficient will also be zero.

$$E_{X,M} = \frac{dX}{dM} \cdot \frac{M}{X} = 0$$

Negative income elasticity: Negative income elasticity indicates that the compared variables move in opposite directions: if income decreases, the quantity demanded of the good increases, and if income increases, the demand decreases. This occurs in the decreasing zone of the Engel curve for inferior goods.

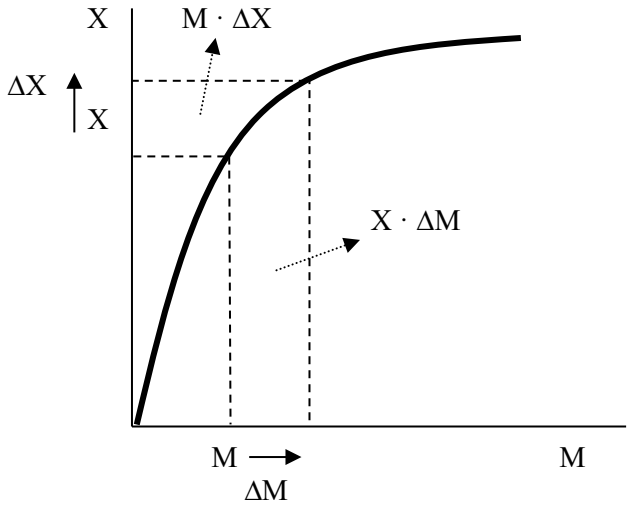
$$E_{X,M} = \frac{\Delta X}{\Delta M} \cdot \frac{M}{X} < 0$$

Initially, for income M, X units of X are demanded. As income rises, the quantity demanded decreases. When the Engel curve has a negative slope (dX/dM), the elasticity coefficient is also negative.



As can be easily seen on the Engel curve, an inferior good has positive income elasticity for low incomes: those corresponding to the increasing zone of the Engel curve; in that segment, changes in the quantity demanded move in the same direction as changes in income. At the maximum of the Engel curve, the income elasticity would take a zero value. Therefore, depending on the income level, inferior goods can have positive, zero, or negative income elasticities. However, if the income elasticity is negative, it is undoubtedly an inferior good.

Positive income elasticity (less than one): Income elasticity is positive when the relationship between the two variables is direct: income and demand vary in the same direction. Moreover, the percentage changes in the quantity are smaller than the percentage changes in the income that cause them, which makes the value of the elasticity coefficient less than one. This is the case for most goods; as income increases, consumers increase demand in a smaller proportion. If this occurs, it is a normal good[40].



[40] In some cases, the demand for a normal good may increase to a greater extent than income.

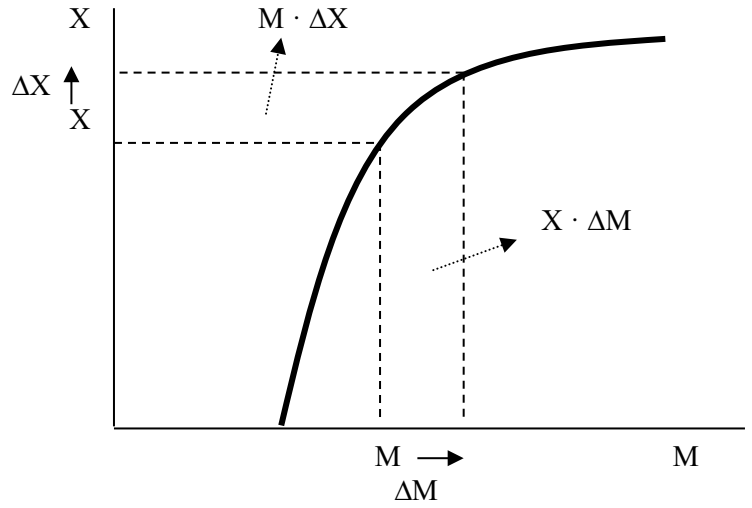
$$1 > E_{X,M} > 0 \Rightarrow 1 > \frac{\Delta X}{\Delta M} \cdot \frac{M}{X} > 0$$

Originally, for good M, the demand is X. If income increases, the quantity demanded also increases. As seen in the previous topic, the increases in demand, with successive increases in income, become progressively smaller until reaching saturation point, where the demand for the good does not increase even as income continues to grow. The slope of the Engel curve, although positive, becomes smaller and smaller until it reaches zero at saturation.

Positive income elasticity (more than one): Just like the previous case, a positive elasticity indicates a direct relationship between the compared variables, but this time, the percentage changes in the quantity are greater than the percentage changes in the income; for this reason, the value of the elasticity coefficient is greater than one. This would be the case for a luxury good[41].

$$E_{X,M} = \frac{\Delta X}{\Delta M} \cdot \frac{M}{X} > 1$$

The graphical representation of the Engel curve is similar to that of normal goods, shifted to the right, as demand begins at higher income levels.

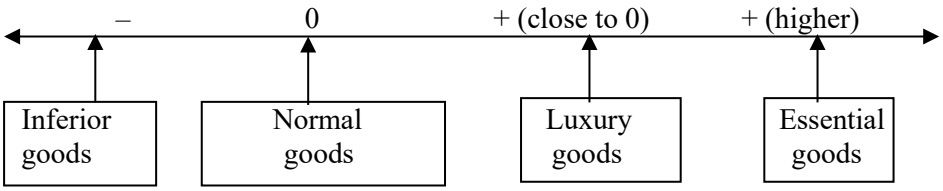


Originally, for good M, the demand is X. If income increases, the quantity demanded also increases. With the Engel curve shifted to the right, the product M · ΔX, which is the numerator of the elasticity coefficient expression, is greater than for normal goods (the two graphs can be compared); this causes the elasticity value for luxury goods to be higher than that for normal goods.

In summary, the information that the value of the income elasticity coefficient provides about goods is reflected in the following scheme:

[41] There may be cases where percentage changes in income produce smaller percentage changes in quantity, resulting in an elasticity coefficient of less than unity.

value of the income elasticity coefficient



The following table summarizes the elasticities of demand that have been previously studied:

Sensitivity of demand for X to				
	Its own price	$E_{X,Px}$	= 0	Rigid
			< 1	Inelastic
			= 1	Unitary
			> 1	Elastic
			= ∞	Perfectly elastic
	The Price of other goods	$E_{X,Py}$	< 0	Complementary goods
			= 0	Independent goods
			> 0	Substitute goods
	Income	$E_{X,M}$	< 0	X inferior
			= 0	X essential
			$0 < E \leq 1$	X normal
			> 1	X luxury

A good X can have an equilibrium market value of the demand elasticity coefficient ($E_{X,Px}$) greater than one (elastic point), may have a cross elasticity with respect to another good Y ($E_{X,Py}$) negative (therefore, X and Y are complementary goods) and have an income elasticity ($E_{X,M}$) positive and less than one (indicating that X is a normal good).

EXERCISE

A company is the sole provider in its market and manufactures its product incurring a fixed cost of 2.000.000 monetary units and a variable unit cost of 300 monetary units. Currently, at a price of 500 monetary units, the market demands 25.000 units of the product. The management is considering lowering the price to 490 with the aim of increasing its profit. Knowing that the demand elasticity at the current equilibrium point is equal to 3, what will be the effect of the price reduction on the firm's profit?

Being at an elastic point of demand, lowering the price of the good will increase consumer spending on it; but, as more units are demanded, the production cost of the company will also increase. The final result is therefore uncertain: it depends on how much income and spending increase.

The initial and final profit will be compared. The calculation of the initial profit is immediate, as all the data is available to determine the company's income and cost:

$I_1 = X_1 \cdot P_{X1} = 25.000 \cdot 500 = 12.500.000$ monetary units
$C_1 = C_F + C_V = 2.000.000 + 25.000 \cdot 300 = 9.500.000$ monetary units
$B_1 = I_1 - C_1 = 3.000.000$ monetary units

Where C_F is the fixed cost, which is the cost that does not depend on the units produced, and C_V is the variable cost, which depends on production (cost per unit of product manufactured times the number of units produced).

To determine the final profit, first, you must calculate how many units of the good the demand will acquire if the price is reduced from 500 monetary units to 490. Since the value of demand elasticity in the initial situation is known — for PX = 500 and X = 25,000 — the expression of the elasticity coefficient can be used to determine the variation in quantity when the price changes.

$$E_{X,Px} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{\Delta X}{(490 - 500)} \cdot \frac{500}{25.000} = -3 \qquad \Rightarrow \qquad \triangle X = 1.500 \text{ units}$$

Therefore, if the price drops to 490 monetary units, the demand will acquire 26.500 units of the good (25.000 plus 1.500). The final situation will be:

$I_2 = X_2 \cdot P_{X2} = 26.500 \cdot 490 = 12.985.000$ monetary units
$C_2 = C_F + C_V = 2.000.000 + 26.500 \cdot 300 = 9.950.000$ monetary units
$B_2 = I_2 - C_2 = 3.035.000$ monetary units

If the price is reduced by 10 monetary units, the profit increases by 35.000 monetary units.

4. SUPPLY ELASTICITY

Supply elasticity indicates the sensitivity of supply with respect to the price of the good. The expression of the elasticity coefficient is the same as for demand, with the only difference being that price and quantity refer to supply.

$$E_S = \frac{percentage\ change\ in\ quantity\ supplied}{percentage\ change\ in\ price} = \frac{\frac{\Delta X}{X}}{\frac{\Delta Px}{Px}} = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}$$

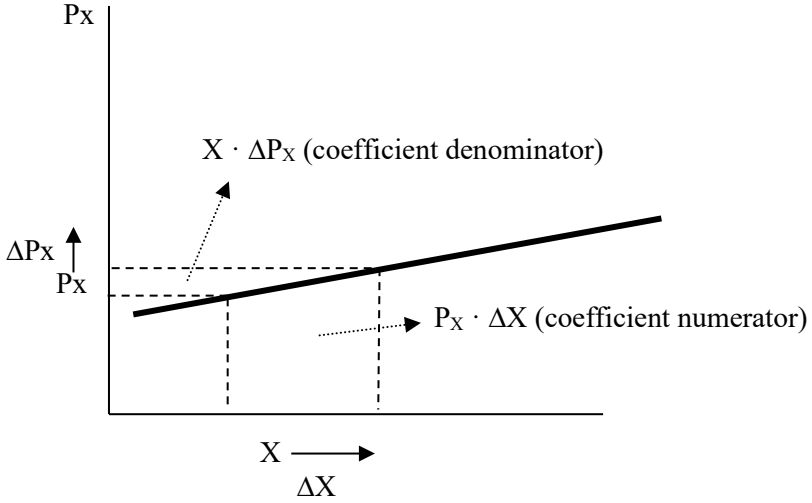
The expression of the coefficient when the variation of P_X tends to zero is:

$$E_S = lim_{\Delta Px \to 0} \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = \frac{dX}{dPx} \cdot \frac{Px}{X}$$

As price and quantity vary in the same direction in the supply, the elasticity coefficient of the supply is always positive. Depending on the value of the elasticity coefficient, the following cases can occur:

Elastic supply: The supply is elastic when a percentage change in the price causes a greater percentage change in the quantity offered. The elasticity coefficient takes a value greater than 1. In this case, suppliers respond significantly to price variations: the supply is sensitive to price; more sensitive the higher the value of elasticity.

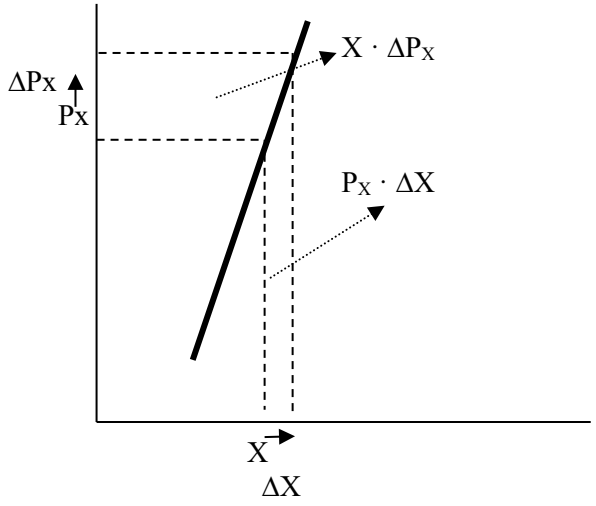
$$E_S = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} > 1$$



$$\text{Si } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} > 1, \text{ thus } \Delta X \cdot Px > \Delta Px \cdot X$$

Inelastic supply: In this case, percentage changes in price produce smaller percentage changes in quantity. When this happens, the value of the coefficient is less than one. Suppliers do not react significantly to variations in the price of the good: the supply is insensitive to price; less sensitive the closer the value of elasticity is to zero.

$$E_S = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} < 1$$

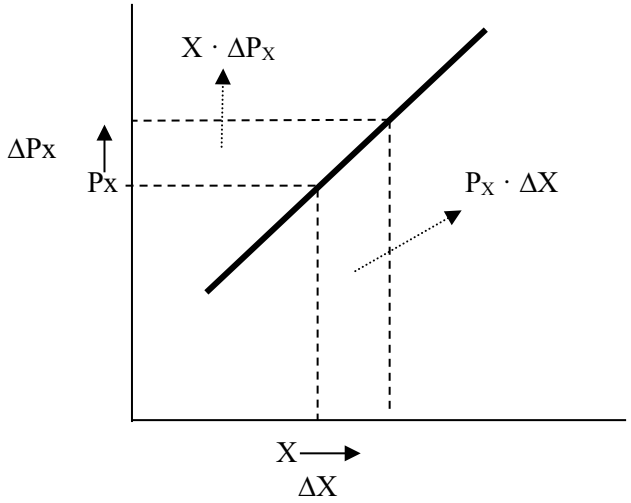


$$\text{If } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} < 1, \text{ thus } \Delta X \cdot Px < \Delta Px \cdot X$$

Unit elasticity: The supply has unit elasticity when the value of the elasticity coefficient is one[42]. In this case, percentage changes in price are followed by equal percentage changes in quantity.

$$Es = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = 1$$

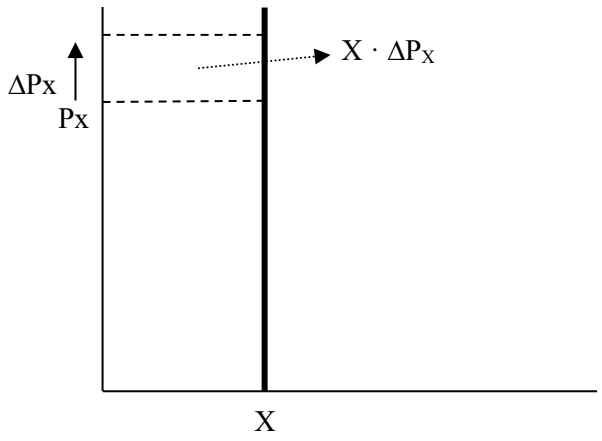
$$\text{In this case, if } \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X} = 1,\ \Delta X \cdot Px = \Delta Px \cdot X$$



Rigid supply: The supply is rigid, or perfectly inelastic, when it does not react to variations in price. A change in price (ΔP_X) occurs, and the quantity offered remains constant ($\Delta X = 0$), so the value of the elasticity coefficient is zero.

$$Es = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}, \text{ si } \Delta Px \text{ y } \Delta X = 0, \text{ so } Es = 0$$

[42] The unitary elasticity in supply does not hold the same importance as it does in demand (maximum expenditure by the consumer on the good).

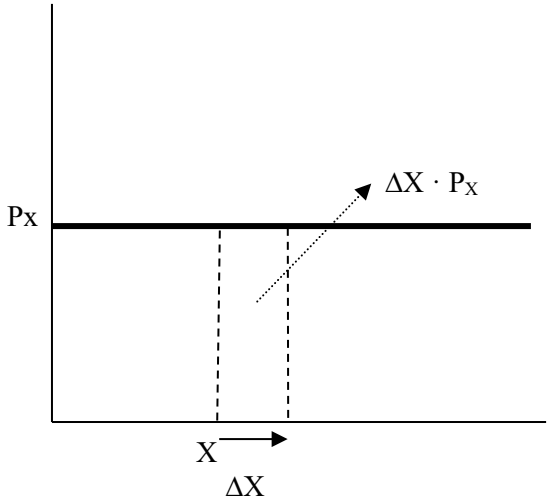


Some examples of rigid supplies are the seating capacity of a football stadium, a bullring, or a theater, the works (paintings, sculptures) of deceased artists: even if the price increases, the quantity offered cannot increase. Also, close examples are short-term offers of goods that require suppliers a reaction time: an example is the offer of fresh fish, when fishing boats arrive at port, they do so with a fixed quantity of product; no matter how much the price rises in the auction at the fish market, there is no possible reaction, at least until the next day. The primary housing market (new housing) is also very rigid because building a house requires a lengthy manufacturing process that prevents a quick short-term response.

Perfectly elastic supply: The supply is perfectly elastic, or of infinite elasticity, when changes in the quantity offered of the good (ΔX) occur without the need for its price to vary ($\Delta P_X = 0$). The value of the elasticity coefficient is infinite. The supply is perfectly elastic when the supply function is horizontal.

$$E_S = \frac{\Delta X}{\Delta Px} \cdot \frac{Px}{X}, \text{ si } \Delta Px = 0 \rightarrow \Delta X, \text{ so } E_S = \infty$$

This case can occur when the company has a production function that allows it to bring different quantities of the good to the market at the same cost.



EXERCISE

The demand function for good X is X = 125 – 10 P_X – 5PY + 0.04M. If the price of X is 8, the price of Y is 5, and the consumer has an income M of 1.000 monetary units, what is the own-price elasticity? What is the relationship between goods X and Y, and how is X with respect to income?

$$E_{X,Px} = \frac{dX}{dPx} \cdot \frac{Px}{X} = -10 \frac{8}{125 - 10 \cdot 8 - 5 \cdot 5 + 0{,}04 \cdot 1000} = \frac{-80}{60} = -1{,}33$$ Elastic

$$E_{X,PY} = \frac{dX}{dPy} \cdot \frac{Py}{X} = -5 \frac{5}{60} = \frac{-25}{60} = -0{,}41$$ X and Y and complementary

$$E_{X,M} = \frac{dX}{dM} \cdot \frac{M}{X} = 0{,}04 \frac{1000}{60} = \frac{40}{60} = 0{,}66$$ X is normal

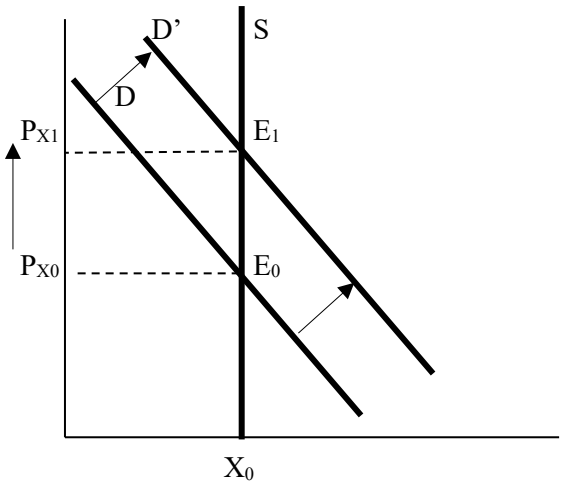
5. ELASTICITY AND TIME

The passage of time has significant repercussions on elasticity; it increases the possibilities for suppliers and demanders to adapt to the new situation, and their reaction to price variations is greater. For this reason, in the long run, the elasticity of equilibrium points of different functions tends to be greater than in the short term. An example of each will be studied.

5.1 The Supply

The classic example to study the elasticity of supply over time is that of fishing. When the fishing boats arrive at port in the morning, the quantity of the product is fixed: what the boats bring. Therefore, *at the very short term* (at that moment), the supply is rigid (E_s= 0); if, for example, demand increases, causing an increase in prices, the supply cannot react.

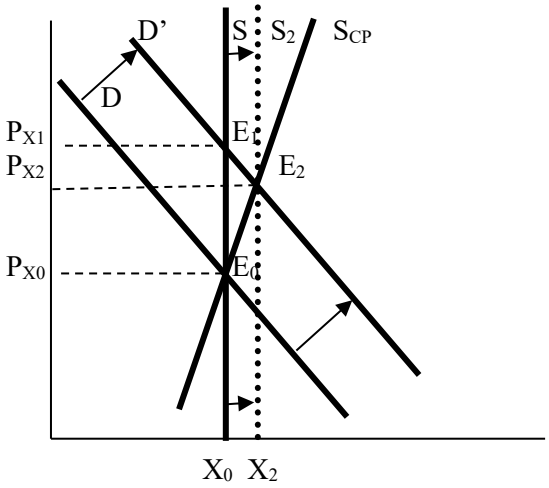
The usual demand function is D, and if the boats arrive at port with the quantity of product X_0, the supply S, at that moment, is vertical for that quantity. The equilibrium would be at point E_0, for the price P_{X0} and the quantity X_0.



If one day the suppliers encounter a demand D', higher than usual, their capacity to react is null, and rebalancing is only possible via an increase in price. The equilibrium would be at point E1, for the price P_{X1} and the quantity X_0. The elasticity of the supply at point E_0 is null: it is a rigid supply.

$$Es(X_0, P_{X0}) = \frac{\Delta X}{\Delta Px} \cdot \frac{P_{X0}}{X_0} = 0 \text{, so } \Delta Px \text{ y } \Delta X = 0$$

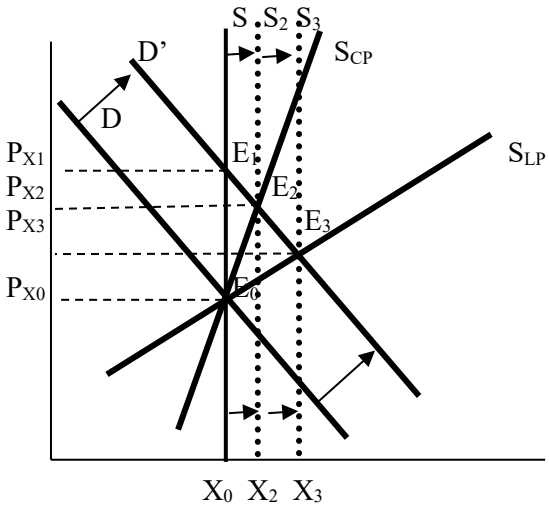
If the increase in demand is not a one-day occurrence and consolidates, the fishermen, attracted by the higher price, will tend to increase the supply (increasing catches). In the short term (weeks, months), the increase in supply will be limited, as it can only be achieved by dedicating more time to the task or hiring some more fishermen (in short, increasing the variable factors). In this way, they will be able to return to port with a quantity of product X_2, logically greater than the initial X0. The supply upon arriving at port will then be S_2, also vertical (because, once again, when the boats arrive at port, they can only offer the product they bring). The new equilibrium will be at point E_2, for the quantity X_2 and the price P_{X2}, lower than $P_{X1.}$



The short-term supply function S_{CP} is no longer vertical; by allowing some time to pass, suppliers have been able to react—albeit slightly: initially, without time to react, they offered for the price P_{X1} the quantity X_0, but now, when they have been able to react a little, for the price P_{X2} they offer X_2. The short-term supply function contains the initial and final equilibrium points (E_0 and E_2). The elasticity at point E_0 is greater considered as a point of S_{CP} than as a point of S.

$$Es(X_0, P_{X0})enS_{CP} > Es(X_0, P_{X0})enS$$

If suppliers consider that the increase in demand is definitive, they will not be satisfied with increasing the supply by incorporating variable factors into the production process (since it is a solution that raises the unit cost and, therefore, reduces profit), but will take measures to permanently adapt the fishing fleet to the new situation.



In the long term[43], once that restructuring of the fleet has taken place, the boats will return to port with a quantity of product X_3, greater than the previous ones. The supply upon arriving at port will be S_3, and the new equilibrium will be at E_3, for the quantity X_3 and the price P_{X3}.

The long-term supply function S_{LP} is obtained once the suppliers have had enough time to fully adapt to the new circumstances. It goes through the initial equilibrium point E_0 and the final E_3. The elasticity at point E_0 is greater in S_{LP} than in S_{CP}.

$$Es(X_0, P_{X0})enS_{LP} > Es(X_0, P_{X0})enS_{CP} > Es(X_0, P_{X0})enS$$

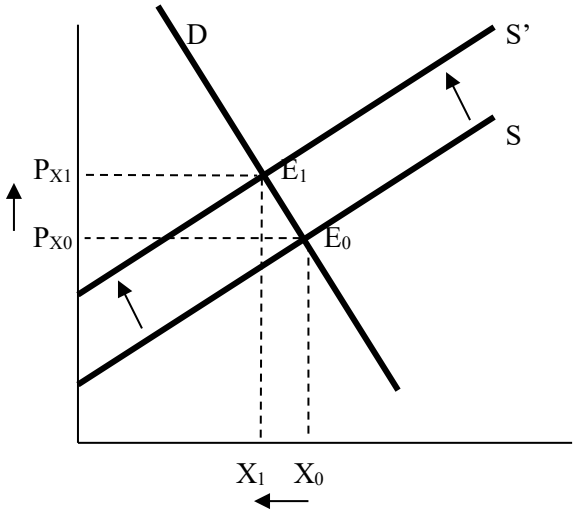
Prices rise significantly in the short term, sending a signal to suppliers to adapt to the changes. As adaptation occurs, the quantity offered increases and the price decreases.

5.2 The Demand

The short-term demand function is one in which consumers, due to lack of time, have a very limited reaction to changes in the price of the good. When they have the opportunity to do so, it is a long-term demand.

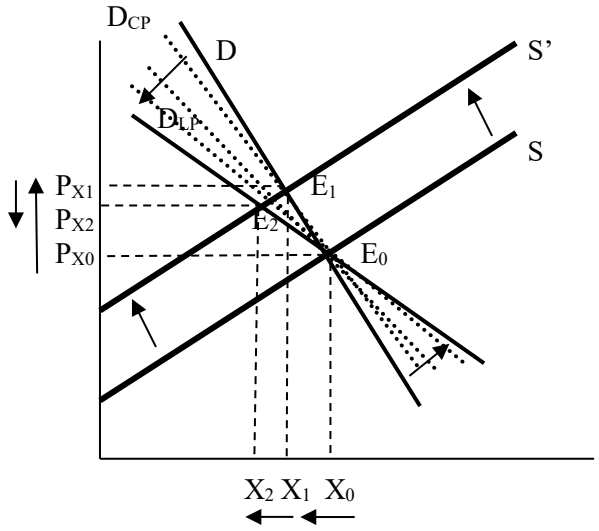
Consider the beef market. The initial demand and supply are D and S, and the equilibrium is at point E_0, for the price P_{X0} and the quantity X_0. If, due to an increase in the cost of cattle feed, the supply function shifts upward (S'), the short-term equilibrium will move to point E_1, for the price P_{X1} and X_1.

In the short term, the demand function does not vary; consumers may think that the price increase has been circumstantial and that they will soon be back to how things were before, and will not substantially change their habits and preferences.



If time passes and the price increase of beef consolidates, many consumers, seeing that the price increase *is serious*, will change their consumption habits and look for substitute products (other types of meat, fish, etc.): they were willing to buy beef at a higher price occasionally, but no more. The successive short- and medium-term demand functions D_{CP}, as time passes, are rotations, counter-clockwise, of the initial demand function D, taking the initial equilibrium point E_0 as the center. By giving them time to react, for the price P_{X1} they will demand increasingly smaller quantities. This will cause the intermediate equilibriums—as consumers react—to occur at increasingly lower points on the S'.

[43] Long term is understood as the period of time in which producers can adjust all productive factors to the new situation. Short term is when they can only adjust a portion of the factors.



Once enough time has passed for all consumers to have reacted, the situation will stabilize. The demand function in which the initial and final equilibrium points are located is the long-term function D_{LP}, and the equilibrium will be at point E_2, for the price P_{X2} and the quantity X_2. Once demand has had time to adjust to the new situation, both the equilibrium price and quantity (E_2) are lower than those reached in the short term (E_1). Unless there is another shift in supply or demand, the situation will tend to be stable.

Finally, it is clear that the elasticity at E_0 is lower[44] (it is a less elastic point) if considered a point of D (initial demand function), than if considered of D_{CP} (short-term demand function), and in this it is lower than if considered a point of D_{LP} (long-term demand function). The demand is more sensitive in the long term (since consumers have had time to react to changes in the price of the good) than in the short term (without time to adjust to those changes).

$$E_{X0,\,Px0}(D_{LP}) > E_{X0,\,Px0}(D_{CP})$$

6. GLOSSARY OF TERMS

Complementary goods: Satisfy the same need together. It occurs in those goods where the behaviour of one good inevitably affects the behaviour of the other due to their close connection: Example: mobile phones and chargers.

Cross elasticity: Indicates, *ceteris paribus*, how the demand for a good reacts to a change in the price of another good; therefore, it shows the sensitivity of the demand for one good with respect to the price of another.

Elastic points: Are those points where the elasticity of demand is greater than 1 (or less than –1, which, as seen, is the same). In them, the quantity demanded of a good responds significantly to price variations: the demand is sensitive to price; more sensitive the higher the value of elasticity.

Elasticity coefficient: Indicates the relationship between two variables. It is obtained by relating the percentage changes that occur in one as a result of percentage changes in the other.

Elasticity: Informs about the sensitivity between two variables. It is measured by the elasticity coefficient.

[44] In absolute value.

Income elasticity: Indicates the sensitivity of the demand for a good as income varies. The income elasticity coefficient is the ratio between the percentage change in the quantity demanded of a good and the percentage change in income.

Independent goods: Are goods whose markets do not affect each other. Example: a blue pen and a motorcycle.

Inelastic points: Are those points where the elasticity of demand is less than 1 (or greater than –1). In them, the demand is less sensitive to price, less sensitive the closer the value of elasticity is to zero.

Perfectly elastic demand: Demand is perfectly elastic, or of infinite elasticity, when variations in the quantity demanded of the good (ΔX) occur without the need for its price to vary ($\Delta P_X = 0$). The value of the elasticity coefficient is infinite.

Price elasticity or demand elasticity: Tells how, *ceteris paribus*, the demand for a good is affected when its price varies or, in other words, informs about the sensitivity of the demand with respect to the price of the good.

Rigid demand: Demand is rigid, or perfectly inelastic, when it does not react to variations in price. A change in price (ΔP_X) occurs, and the quantity remains constant ($\Delta X = 0$), so the value of the elasticity coefficient is zero**.**

Slope: Indicates how much one variable changes as the other changes.

Substitute goods: Satisfy the same or similar need and can therefore be easily substituted by the individual depending on their price. Example: olive oil and sunflower oil.

Supply elasticity: Indicates the sensitivity of supply with respect to the price of the good. The expression of the elasticity coefficient is the same as for demand, with the only difference being that price and quantity refer to supply.

Unit elasticity: The elasticity of demand is unitary when the value of the coefficient is one (or –1). In this case, a percentage change in price causes an equal percentage change in the quantity demanded.

CHAPTER IV. CONSUMER THEORY

If, for a moment, we set aside the fact that goods have a cost and must be acquired, the consumer will be guided by their tastes and preferences (or by the needs that the goods satisfy). Individuals will acquire certain goods, and in certain quantities, based on the utility they find in them.

However, things do not work that way. Goods have a price, and consumers have an income. When acquiring goods, individuals must combine their tastes and preferences with the cost of goods and the income they have.

This chapter will explore a simple model of consumer behaviour. Firstly, using indifference curves, we will analyse their tastes and preferences. Then, we will examine the constraints on the individual (determined precisely by the prices of goods and the income they receive). Finally, by combining these two aspects, we will reach the equilibrium situation and analyse the variations that occur when the initial circumstances change.

1. UTILITY AND CONSUMER SURPLUS

To explain consumer behaviour and how they choose among different consumption possibilities, the concept of utility will be employed. Utility is understood as the satisfaction an individual obtains or experiences from consuming or possessing a good, or from receiving a service. Therefore, utility is the quality that makes a good or service desirable. Individuals value and, consequently, demand a good to the extent that they find utility (satisfaction) in it[45].

There are no major difficulties in admitting that utility is orderable. Anyone can state that the utility you can find in having a cup of coffee is greater than the one you have for having tea. The utility of a good for an individual can also be measured by the monetary units they are willing to pay to acquire it.

Total utility is what an individual obtains from the set of units consumed of a good X: U = f(X). Marginal utility is the change in utility resulting from consuming an additional unit of X. The marginal utility of a specific unit of a good is the increase in utility that unit provides to the individual.

$$MUx = \frac{Variation\ in\ utility}{Variation\ in\ quantity} = \frac{\Delta U}{\Delta X}$$

In the limit, as ΔX tends to zero:

$$\mathrm{MUx} = \lim_{\Delta X \longrightarrow 0} \frac{\Delta U}{\Delta X} = \frac{dU}{dX}$$

The law of diminishing marginal utility indicates that, after consuming a certain number of units of a good[46], the addition of successive units is associated with progressively smaller marginal utilities, eventually reaching zero marginal utility when the individual becomes saturated with the good. The consumption corresponding to zero marginal utility coincides with the maximum total utility for that good[47].

Suppose the utility table (total and marginal) for an individual regarding a specific good is as follows:

---

45 The hypothesis that individuals act rationally when making decisions is maintained.

46 It can be from the first unit.

47 Once that point is reached, if the consumption of the good continues to increase, negative marginal utilities could be encountered (resulting in a decrease in total utility). A rational individual who is in control of their actions will not exceed the saturation level: it makes no sense to consume something that not only does not provide any satisfaction but also diminishes it.

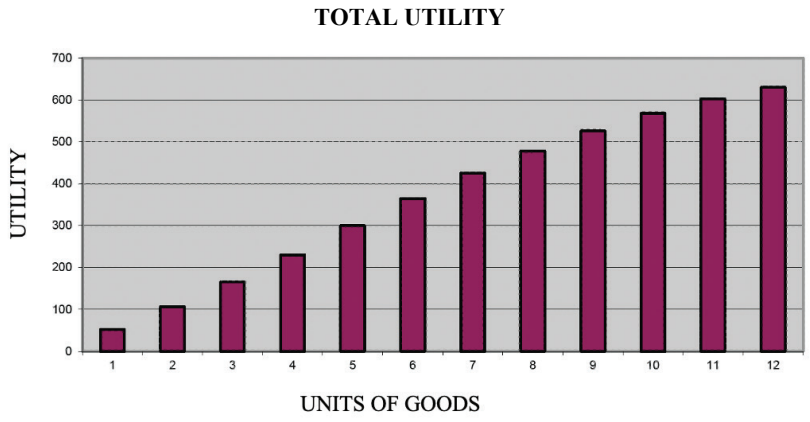
Units of the good	1	2	3	4	5	6	7	8	9	10	11	12
Total Utility	52	107	166	230	300	365	425	478	526	568	603	630
Marginal Utility	52	55	59	64	70	65	60	53	48	42	35	27

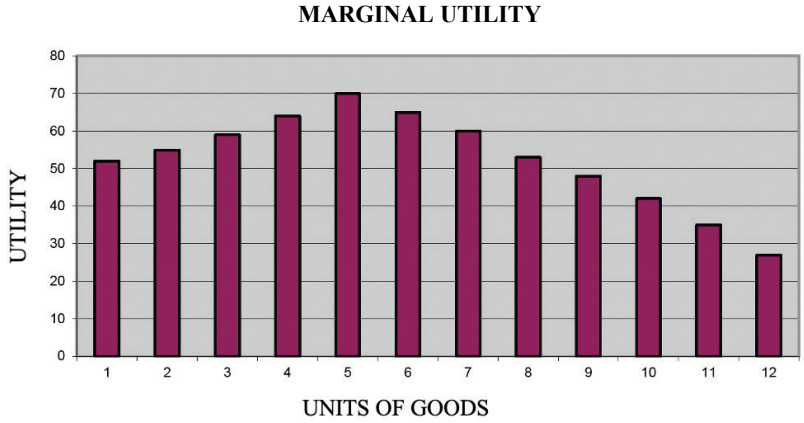
Consuming one unit of the good provides the individual with a utility of 52; being the first, it is both total and marginal utility. With the consumption of the second unit, utility increases by 55 (which is the marginal utility of that second unit), making the total utility 107 (52 + 55). Marginal utility grows until the fifth unit; from the sixth onwards, the law of diminishing marginal utility begins to hold: the consumption of successive units progressively increases the individual's utility less.

THANKSGIVING: THE DAY WHEN 280 MILLION AMERICANS WILL SPEND 1 BILLION DOLLARS ON TURKEY.

• *No one knows exactly how turkey became popular as a dinner.*
• *The first president to pardon a bird was George Bush Sr. in 1989.*
https://www.eleconomista.es/internacional/noticias/9535626/11/18/Accion-de-Gracias-el-dia-en-el-que-280-millones-de-estadounidenses-gastaran-1000-millones-en-pavo.html

Just like grapes on New Year's Eve, in the United States, there is a holiday synonymous with a specific food: Thanksgiving Day, the fourth Thursday of November, practically mandates eating turkey to gather energy before diving into 'Black Friday' shopping. But many businesses would love to have the same sales as turkey farmers: in a single day, over 1 billion dollars will be spent on purchasing these birds. The figures are staggering according to the National Turkey Federation of the U.S., 277 million people - 85% of the country's population - consumed turkey in 2017, a number expected to rise to 280 million this year. In total, they will devour 45 million birds in a single day, representing 77% of the annual production of whole turkeys in the U.S. For this, they invested 1,01 billion dollars.

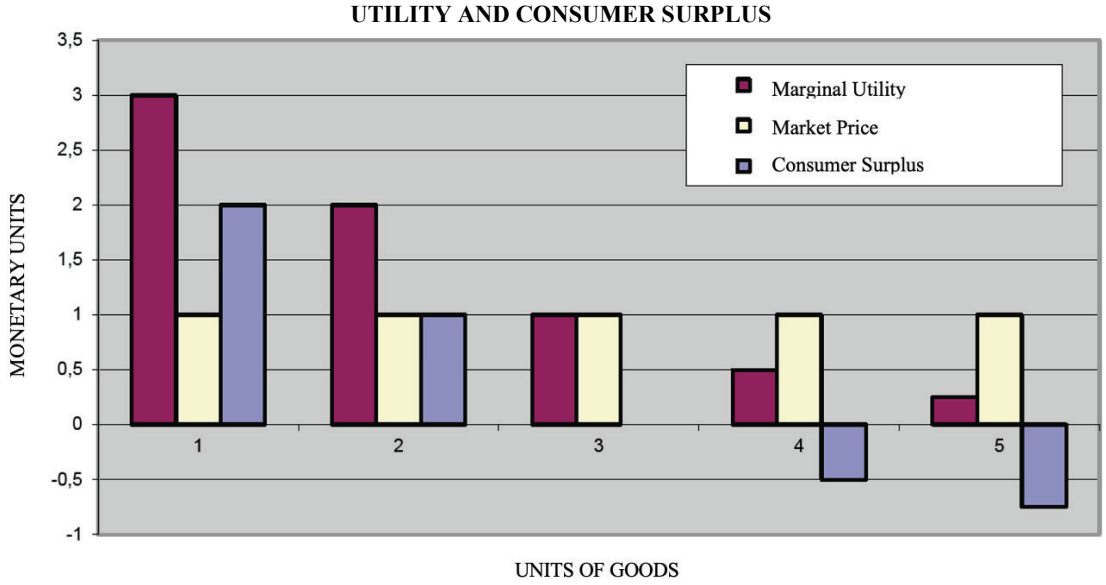




The difference between the utility that an individual finds in consuming a good and the market value of that good is known as consumer surplus. The surplus is what the consumer receives above what they pay. It is the reason for the demand for a good; if there is no surplus, the consumer will not buy the good.

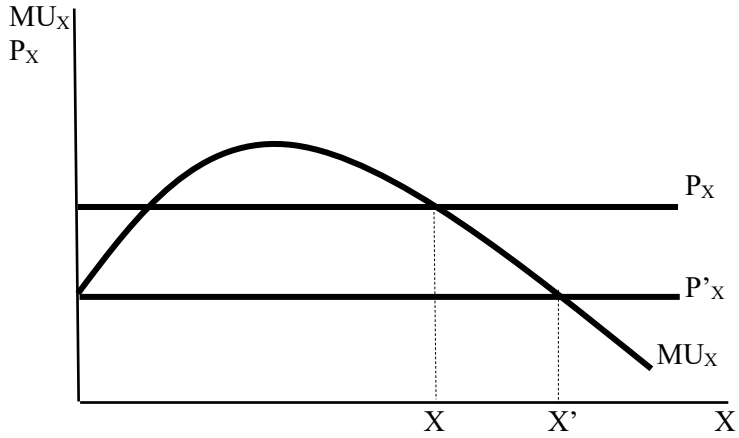
The price of a good in the market is usually fixed. In contrast, the consumer's utility depends on the number of units consumed. An individual will acquire successive units of a good as long as the marginal utility is greater than or equal to the price of the good. In other words, the consumer will buy units of the good as long as they receive a surplus, or at least the price of the good matches the individual's valuation of it.

Let's assume a person has just exerted significant physical effort and wants to buy a small bottle of water. They are willing to pay 3 euros for the bottle (this is the value they place on the bottle and, therefore, the marginal utility they find in it). When they inquire about the price, they are asked for one euro. Since they value the bottle more than what they are asked to pay, they buy it. The consumer surplus is 2: the individual's valuation of the good (3) minus the market price (1). After quenching the initial thirst, the athlete values the second bottle less; the graph assumes they would be willing to pay 2 euros for it. As they are still charged one euro, they will also buy it; the surplus for this second bottle is one. They will also buy the third bottle, as they value it by the same amount it costs; therefore, the surplus for this bottle is zero. The consumer is willing to buy a fourth bottle, paying fifty cents, but as it costs one euro, they do not buy it: they value it below its cost, so the consumer surplus for this bottle is negative (-0,5). Naturally, they would not buy the fifth bottle either.



The athlete in the example purchases three small bottles. The total utility for the consumption of the three units is 6 (3 for the first, 2 for the second, and 1 for the third). The consumer surplus is 3 (2 from the first unit and 1 from the second); it can also be calculated by subtracting the market price of the good (3) from the total utility (6).

The individual consumes units of a good until the diminishing zone of the marginal utility function intersects with the market price of the good, that is, once the law of diminishing marginal utility has started to take effect. They acquire units of the good indicated by the marginal utility function in the decreasing part for the price of the good. Therefore, the decreasing zone of the marginal utility function serves as the individual's demand curve for that good[48].



In the example of the small bottle, the law of diminishing marginal utility holds from the first unit; consumption stops at the third unit, which is when marginal utility intersects with the price. In the previous example, marginal utility grows until the fifth unit before starting to decline. Assuming the market price of that good is 58, the consumer will acquire 7 units; they acquire the seventh unit because they value it (60) more than it costs (58), but they do not acquire the eighth unit because they value it (53) less than it costs (58).

[48] When marginal utility is increasing, the individual values the subsequent units more (they provide more satisfaction than the previous ones), so they continue to consume, even if the consumer surplus is negative. In the example, although the price of the good (58) exceeds the marginal utility of the first unit (52), the individual consumes it, driven by the greater utility of the second unit; the same will happen with the second unit compared to the third. However, this impulse to consume successive units disappears when movements occur in the diminishing marginal utility zone (as the next unit provides less satisfaction than the previous one); that's why consumption is suspended when marginal utility falls below the price.

NETFLIX: THE REASONS BEHIND THE FIRST DECLINE IN SUBSCRIBERS FOR THE STREAMING PLATFORM IN 10 YEARS

News, 20/04/2022 https://www.bbc.com/mundo/noticias-61162182

The streaming giant has lost around 200.000 subscribers in the first three months of 2022, facing intense competition from its rivals. It is the first time in a decade that its user numbers have decreased. As a result, the company - whose stocks have plummeted - has stated that it will take a stricter approach to password sharing to regain its growth. Netflix has also been affected by price increases in some markets and its withdrawal from Russia in response to the conflict with Ukraine. The loss of subscribers may not end here. The platform has also warned its shareholders about the possibility of losing another two million users in the next three months until July. (…) Analysts explain that consumers are cutting back on subscriptions to save money and due to feeling overwhelmed by the volume of available content.
Netflix also faces intense competition from services such as Amazon, Apple, or Disney, which have invested significant amounts of money in their streaming services.

2. THE INDIFFERENCE CURVE

Assumptions will be established about the consumer's preferences that will serve as the basis for the model to be developed:

- Assumption 1: The model contains all possible combinations of consumption that the individual can make, so that when faced with any two different combinations, the individual can always say whether they prefer one over the other or if they are indifferent between both.
- Assumption 2: The individual's preferences are “consistent” (the individual does not contradict themselves or change their mind): if they prefer combination A to B and combination B to C, then they prefer combination A to C.
- Assumption 3: A greater quantity of a good is always preferred to smaller quantities.

If the individual consumes goods X and Y, and the chosen combination is A, with consumption X_A and Y_A, they will prefer any combination in quadrant P (preferred combinations) — including the edges — to A, as these combinations have more quantity of at least one good. Combination A will be preferred to any in quadrant NP (non-preferred combinations) — including the edges — as these have less quantity of at least one good.

EXERCISE

What expenditure will an individual make on a good, which costs 60 monetary units, if the total utility derived from consuming that good is indicated by the following table?:

Units of the good	1	2	3	4	5	6	7	8	9	10	11	12
Total Unity	52	107	166	230	300	365	425	478	526	568	603	630

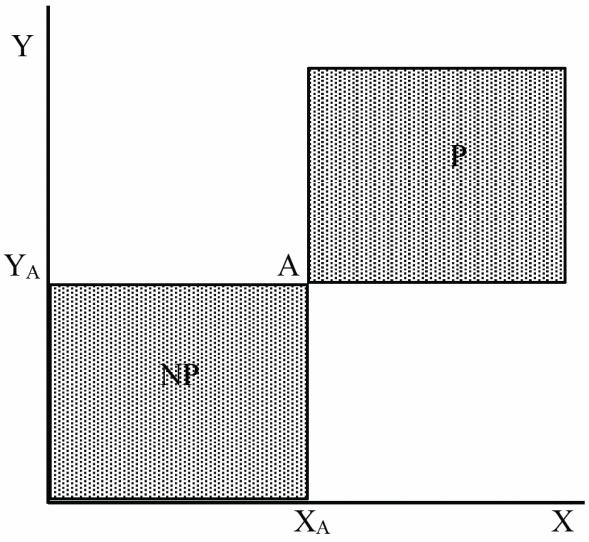
The consumer buys units of a good as long as they value them at or above the cost, meaning whenever the marginal utility of the unit is greater than or equal to the price of the good, or in other words, whenever the consumer surplus is positive or zero.

Using the information provided in the table, the marginal utility of each unit can be easily calculated: the difference between the total utility of the current unit and the total utility of the previous unit is the increase in utility resulting from the consumption of that unit. Whenever the marginal utility is greater than or equal to the price, the consumer will purchase that unit, and whenever this happens, the consumer surplus is positive or zero.

Finally, it is important to note that the consumer does not stop consumption if the marginal utility is increasing. That's why they acquire the first three units of the good, even though they cost more than their valuation: as they value the next unit more, they consume the previous one. Consumption stops, however, when the marginal utility is in the decreasing phase.

Units of the good	1	2	3	4	5	6	7	8	9	10	11	12
Total Unity	52	107	166	230	300	365	425	478	526	568	603	630
Marginal Utility	52	55	59	64	70	65	60	53	48	42	35	27
Price of the good	60	60	60	60	60	60	60	60	60	60	60	60
Consumer surplus	-8	-5	-1	4	10	5	0	-7	-12	-18	-25	-33
Cumulative Expenditure	60	120	180	240	300	360	420	480	540	600	660	720

The consumer in the exercise purchases up to the seventh unit of the good. They do not acquire the eighth unit because they value it less (53) than the asking price (60), and it is in the decreasing marginal utility zone. The consumer's expenditure if they buy seven units is 420 monetary units (7 x 60).



Among the combinations contained in the other two quadrants, those indifferent to A will be found. These combinations have more of one good and less of the other, so when asked whether the individual prefers combination A or any of those contained in those quadrants, they can respond that they are indifferent between one and the other[49].

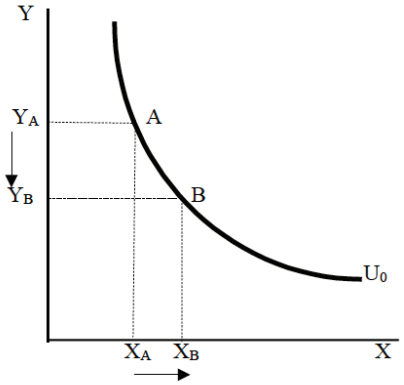
The set of consumption combinations in which the individual finds the same utility is called the indifference curve.

A consumer's utility is a function of the goods they consume. If they consume goods X and Y, the utility function would be: U = f (X, Y). The utility function defines infinite indifference curves (one for each of the infinite possible levels of individual utility[50]). Due to assumption 1, each and every possibility of consumption is contained in an indifference curve.

- 1 = f(X, Y) would be the expression of the indifference curve containing the consumption combinations of X and Y that provide the individual with a utility of 1.
- 2 = f(X, Y) is the indifference curve containing the consumption combinations that provide the individual with a utility of 2.
- .../...
- n = f(X, Y) is the indifference curve containing the consumption combinations that give the individual a utility of n.

2.1 Properties of Indifference Curves

1. Indifference curves have a negative slope. If the consumption of one good decreases, the consumption of the other must increase to maintain a constant level of utility.



If the individual reduces the consumption of Y from Y_A to Y_B and wants to maintain the utility level U_0, they must necessarily compensate for the loss of Y with an increase in X, for example, from X_A to X_B.

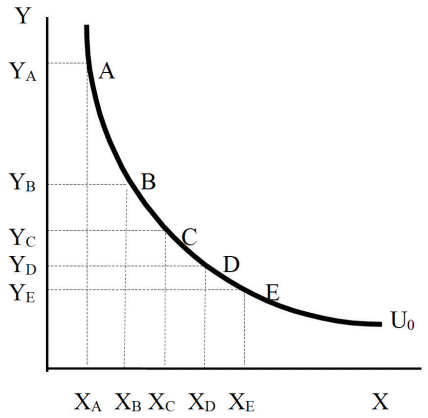
2. Faced with successive and equal increases in the quantity consumed of one of the goods, the consumer is willing to give up progressively less quantity of the other good to maintain utility constant.

The individual is initially at A, consuming Y_A and X_A. If they want to increase the consumption of X by the amount $X_B - X_A$, they are willing to give up $Y_A - Y_B$ to maintain constant utility. If

[49] It is assumed that goods X and Y are desired by the consumer and do not have a special relationship (complementarity or substitutability). Logically, numerous specific cases could arise, each with its corresponding reflection in the analysis; for example, one of the goods being desired (food, clothing, etc.) and the other not (waste).

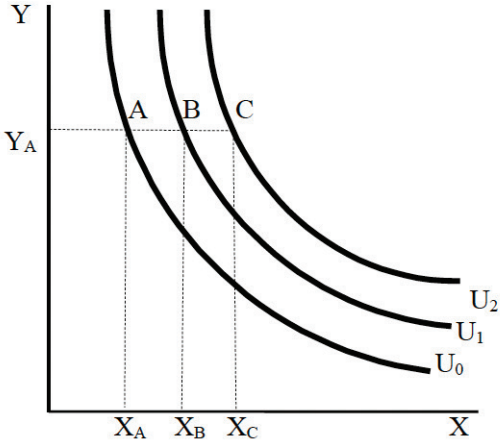
[50] The levels of utility are identified with the set of real numbers.

they are then proposed to increase the consumption of X again by the same amount ($X_C - X_B = X_B - X_A$), they are willing to give up less quantity of Y ($Y_B - Y_C < Y_A - Y_B$), and so on.



As a good becomes scarce, the consumer values it more and finds it harder to part with it. There comes a point where, no matter how much of the other good is offered, they are not willing to part with more units of the scarce good. If they were to do so, it would come at the expense of reducing utility (thus moving to a lower indifference curve).

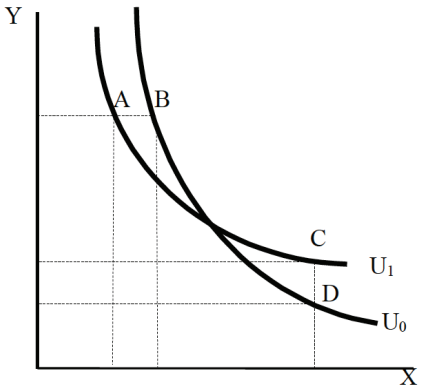
3. The further away from the origin of the coordinates the indifference curves are, the greater utility they represent for the consumer.



The person will prefer to consume a combination that is on the indifference curve U2 over one on U1, and will prefer any combination on U1 to those on U0. Due to assumption 3 (greater quantities of a good are preferred to lesser quantities), the individual will choose consumption possibility C over B (C has the same amount of Y and more of X), and B over A (for the same reason).

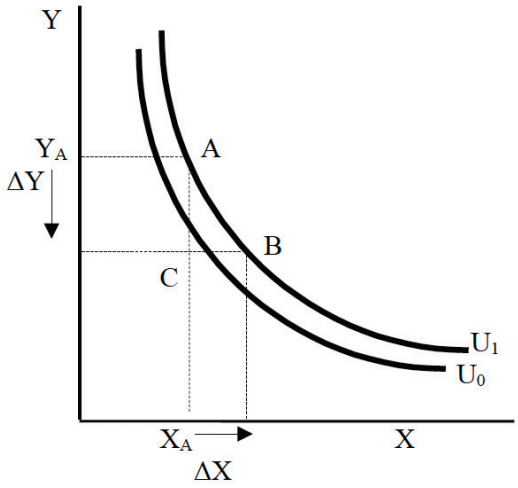
4. Indifference curves do not intersect. If they were to intersect, it would indicate an inconsistent consumer (contradictory behaviour), which goes against assumption 2.

If an individual prefers combination B to A (as B has the same amount of Y and more X), and combination B is indifferent to D (as they are on the same indifference curve U0) and combination A is indifferent to C (both are on indifference curve U1), the individual should prefer combination D to C. However, if indifference curves intersect, the opposite occurs.



2.2 Marginal Rate of Substitution

The Marginal Rate of Substitution (MRS) indicates how much of one good the consumer is willing to give up in exchange for a quantity of the other, to maintain constant utility (i.e., to stay on the same indifference curve).



If the consumer moves from the consumption combination A to B, which are on the same indifference curve U1, they are willing to give up ΔY units of good Y in exchange for ΔX units of X. The MRS is given by the relationship between the changes in the consumption of the goods:

$$MRS = \frac{\Delta Y}{\Delta X}$$

In the limit, as ΔX tends to zero, $\text{MRS} = \lim_{\Delta X \to 0} \frac{\Delta Y}{\Delta X} = \frac{dY}{dX}$

Therefore, the MRS at each point on the indifference curve coincides with the slope of that curve at that point (dY/dX).

Analysing in more detail the transition from consumption possibility A to B, the following events occur:

- On one hand, the consumption of good Y decreases, leading from point A to point C. As the consumption of one good (Y) decreases while the other (X) remains constant, utility

decreases, moving to a lower indifference curve: from initial U_1 to U_0. Utility decreases by $\Delta Y \cdot MUy$.

- On the other hand, the consumption of X increases, moving from point C to B. On this occasion, as the consumption of X rises while the consumption of Y remains constant, the individual's utility increases, shifting to an indifference curve higher than U_0. Utility grows by $\Delta X \cdot MUx$.

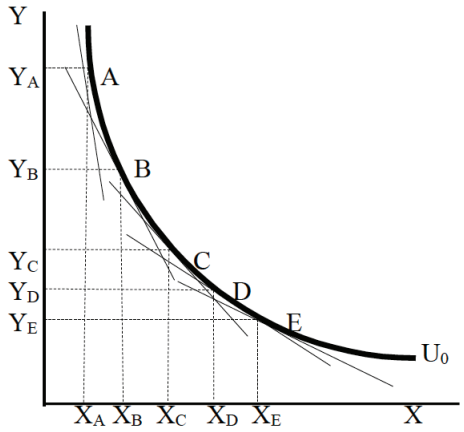
For the individual to end up on the original indifference curve U1 after these changes in the consumption of X and Y, it must be the case that the loss of utility due to the reduction in the consumption of Y is exactly compensated by the gain in utility from the increase in the consumption of X:

$$\Delta Y \cdot MUy = \Delta X \cdot MUX \rightarrow \frac{\Delta Y}{\Delta X} = \frac{MUx}{MUy}$$

Then, the MRS —which, as seen above, is given by the ratio of changes in the consumption of goods and, in the limit, when ΔX tends to zero, coincides with the slope of the indifference curve— is also equal to the ratio of marginal utilities at each point on the indifference curve.

$$\text{MRS} = \frac{\Delta Y}{\Delta X} = \frac{MUx}{MUy} \quad or \quad MRS = \frac{dY}{dX} = \frac{\frac{dU}{dX}}{\frac{dU}{dY}} = \frac{MUx}{MUy}$$

The MRS is always negative, as the indifference curve is decreasing, and changes in one direction of a good must be accompanied by changes in the opposite direction of the other. Moreover, as there is a downward shift along the indifference curve, the MRS becomes progressively smaller, as the consumer is willing to give up less and less quantity of Y —as it becomes scarcer— in exchange for continuing to increase the consumption of X. The slope at A is greater than the slope at B, at B is greater than at C, and so on.

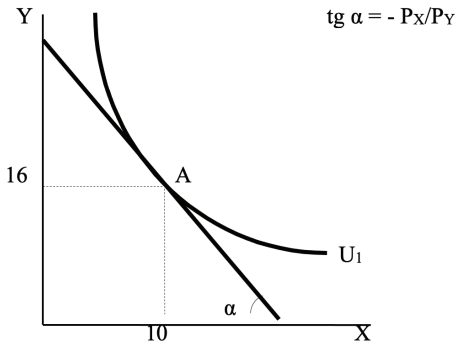


An MRS of -0,25 means that the individual, at that point on the indifference curve, is willing to exchange Y for X in that proportion to keep their utility constant. They are willing to give up 0.25 units of Y in exchange for one unit of X, or equivalently, to give up 4 units of X in exchange for 1 unit of Y.

EXERCISE

A consumer who purchases two goods, X and Y, has preferences expressed by the utility function U (X, Y) = 20 $X^{1/2}$ $Y^{1/3.}$ They have a monetary income of 200 units, and market prices for the goods are set at P_X = 12 y P_Y = 5Determine the value of the Marginal Rate of Substitution at the consumer's equilibrium.

The Marginal Rate of Substitution (MRS) indicates the individual's willingness to exchange one good for another while keeping utility constant. Its value varies at each point on the indifference curve and is given by the slope of the curve at each point.



At the consumer's equilibrium point (A), the slope of the indifference curve is equal to the slope of the budget line, as it is the point where the budget line is tangent to an indifference curve. Knowing the slope of the budget line is straightforward:

$$\text{MRS}= \frac{-P_x}{P_y} = \frac{-12}{5} = -2{,}4$$

Therefore, the consumer, to keep the utility level constant at that point, is willing to give up 2.4 units of Y in exchange for one unit of X.
Although it is somewhat more cumbersome, the value of the MRS can also be determined by directly calculating the slope of the indifference curve at point A since, as mentioned, the MRS is identified with the slope of the indifference curve at each point:

$$MRS = \frac{MU_x}{MU_y} = -\frac{10\,Y^{\frac{1}{3}}X^{-\frac{1}{2}}}{\frac{20}{3}\,X^{\frac{1}{2}}Y^{-\frac{2}{3}}} = -\frac{3Y}{2X}$$

Substituting X and Y with the quantities consumed by the individual at point A, which are X = 10 and Y = 16, we obtain:

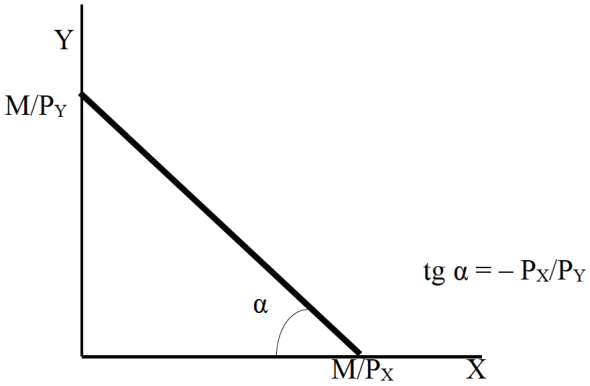
$$MRS = \frac{MU_x}{MU_y} = -\frac{3\cdot 16}{2\cdot 10} = -\frac{48}{20} = -2{,}4$$

3. THE BUDGET LINE OR BUDGET CONSTRAINT

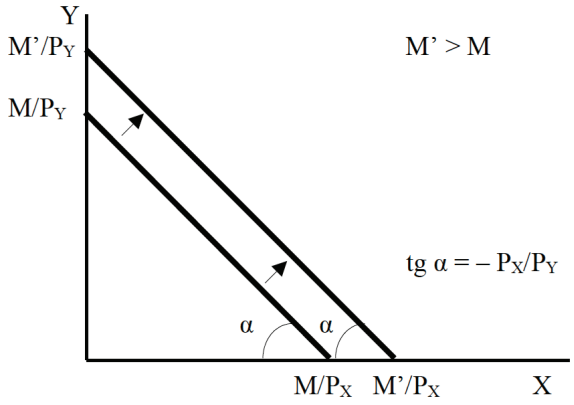
The budget line, or budget constraint, illustrates the consumption possibilities available to an individual, taking into account their income and the prices of the goods they acquire. If the individual has an income M and demands two goods, X and Y, with prices PX and PY, the analytical expression for the budget line is:

$$M = X \cdot P_X + Y \cdot P_Y$$

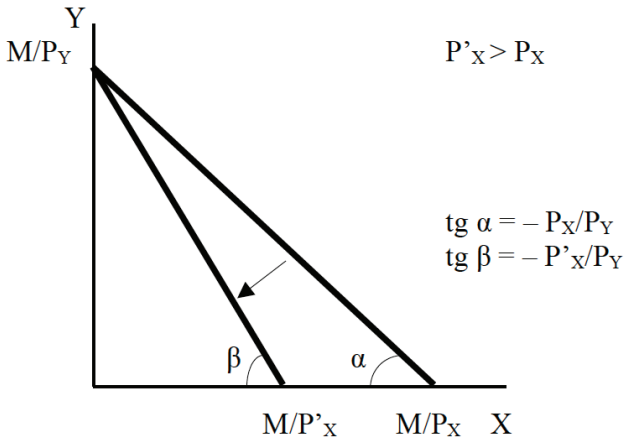
The individual can acquire—has the money to do so—the consumption combinations that lie on the budget line and below it. The budget line intersects the x-axis (good X) at M/PX, which is the maximum quantity of X that can be acquired if the entire income is allocated to purchasing that good. It intersects the y-axis (good Y) at M/PY, the maximum quantity of Y that can be bought if the entire income is spent on it. The slope of the budget line is the ratio of the prices of the goods, with the sign changed.



Since income and the prices of goods are exogenous variables —they are given to the model—, every time they change, the budget line will be affected. Changes in income, *ceteris paribus*, result in parallel shifts in the budget line (prices, which determine the slope, remain constant). If income increases, for example, from M to M', the budget line shifts upward.



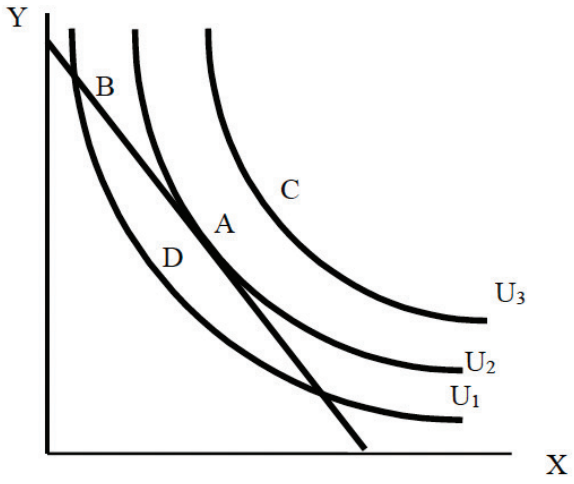
Changes in prices affect the slope of the budget line. When the price of a good changes, the budget line rotates with the point of intersection with the axis of the unchanged-price good as the centre.



If, for example, the price of X increases (from P_X to P'_X), the line rotates clockwise around the point of intersection with the axis of good Y. This point remains unchanged because, with no changes in M or P_Y, the maximum quantity of Y the individual can acquire remains unaffected. However, after the increase in the price of X, the individual can acquire a lesser quantity of this good.

4. CONSUMER EQUILIBRIUM

By combining consumer preferences —what they would like to do— with the budget constraint —what they can do— we obtain the equilibrium situation. The consumer will strive to position themselves at the possible consumption combination (i.e., the one they can afford) where they are most satisfied.



Consider an individual with a family of indifference curves defined by the utility function U = f(X, Y). This individual receives an income M and purchases two goods, X and Y, with prices PX and PY. To determine the equilibrium situation, both indifference curves and the budget line are depicted on the same graph.

If we focus solely on preferences, the individual would prefer combination C among the indicated consumption combinations because it lies on the highest indifference curve (and, therefore, provides the greatest satisfaction). However, their income does not allow it as combination C is above the budget line. The individual can afford to consume the quantities of X and Y indicated

by combinations A, B, and D; among them, they will choose A as it lies on the highest indifference curve.

Thus, the individual will position themselves at the point on the budget line where it is tangent to an indifference curve, as it represents the possible point of maximum utility. Since indifference curves cannot intersect, there is only one point that satisfies this condition.

At this point, the slope of the budget line coincides with the slope of the indifference curve. The slope of the indifference curve is the Marginal Rate of Substitution (MRS), and the slope of the budget line is the ratio of the prices of the goods with the sign changed.

Slope of the indifference curve at A = Slope of the budget line

$$\text{MRS}=\frac{Px}{Py}\ what\ is\ the\ same\ -\frac{MUx}{MUy}=\ -\frac{Px}{Py}$$

Operating to isolate the terms related to each of the goods in the equation, we get:

$$\frac{MUx}{Px}=\frac{MUy}{Py}$$

This is the consumer equilibrium condition. The consumer is in the situation of maximum satisfaction at the point on the budget line that satisfies this condition[51].

$$\frac{MUx}{Px}=\ MUx\frac{1}{Px}$$

If P_X is the price of good, $X \cdot \frac{1}{P_X}$ is the quantity of good X that can be acquired with one monetary unit. $MUx\ \frac{1}{Px}$ is the utility obtained from the quantity of X acquired with that monetary unit. Therefore, the consumer is in equilibrium when the marginal utility of the last monetary unit spent on good X is equal to the marginal utility of the last monetary unit spent on good Y. In general terms, the consumer is in equilibrium when the last monetary unit spent on each good yields the same utility.

If the utility from the last monetary unit spent on X provides the individual with more satisfaction than the one spent on Y, it is clear that they would tend to reduce the consumption of Y and increase that of X, shifting monetary units spent on Y to X. As the consumption of X increases, the marginal utility in this good (the utility obtained from the last monetary unit spent on it) decreases[52], and as the consumption of Y decreases, the marginal utility in it increases[53]. This causes (MU_X / P_X) to decrease, while (MU_Y / P_Y) increases. The process will stop when the two ratios are equal; at that point, there is no longer a reason to shift monetary units from one good to another, as the last units spent on each satisfy the consumer equally.

If the individual were at point B on the graph, the slope of the tangent to the indifference curve is less than the slope of the budget line.

---

[51] That condition is fulfilled by infinite points (infinite combinations of consumption), but only one is on the budget line. It is assumed that the consumer spends their entire income on goods X and Y. In any case, there would be no difficulty in assuming that X represents the consumer's expenditure on goods and services, while Y represents savings.

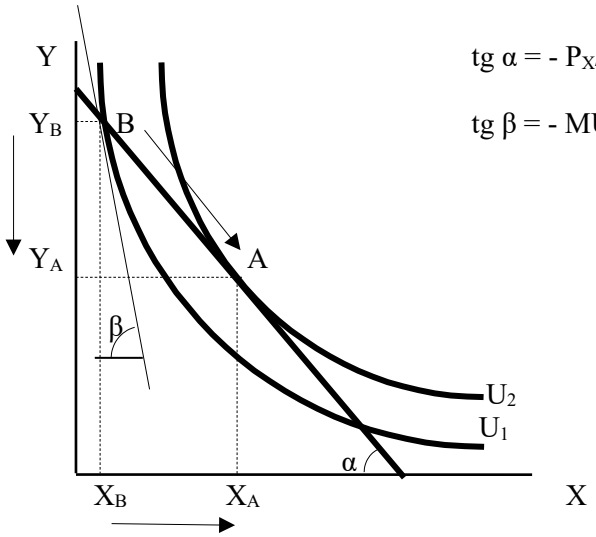
[52] By the law of marginal utility

[53] By the law of marginal utility

$$-\frac{MUx}{MUy} < -\frac{Px}{Py} \text{ or what is the same: } \frac{MUx}{MUy} > \frac{Px}{Py} \Rightarrow \frac{MUx}{Px} > \frac{MUy}{Py}$$

Therefore, the consumer will shift monetary units currently spent on Y to X; by doing so, the consumption of Y decreases, and that of X increases, gradually approaching point A, where:

$$-\frac{MUx}{MUy} = -\frac{Px}{Py} \text{ and, therefore: } \frac{MUx}{Px} = \frac{MUy}{Py}$$



EXERCISE

A consumer's preferences are expressed by the family of indifference curves U(X, Y) = 2·X·Y. This consumer has an income of 40 monetary units, and the prices of the goods they purchase are $P_X = 10$ and $P_Y = 5$. Determine the maximum utility this consumer can achieve.

The quantities of X and Y that provide the maximum utility to the consumer are those of the possible consumption combination that gives them the most satisfaction. This combination corresponds to the point on the budget line where it is tangent to an indifference curve. The quantities of X and Y are the solutions to the system of equations:

$$\frac{MUx}{Px} = \frac{MUy}{Py} \qquad Where:\ MUx = \frac{d\,U(X,Y)}{d\,X} = 2\,Y$$

$$M = X \cdot Px + Y \cdot Py \qquad MUy = \frac{d\,U(X,Y)}{d\,Y} = 2\,X$$

Substituting into the first equation of the system:

$$\frac{2\,Y}{10} = \frac{2\,X}{5} \quad \Rightarrow \quad 10\,Y = 20\,X \quad \Rightarrow \quad Y = 2\,X$$

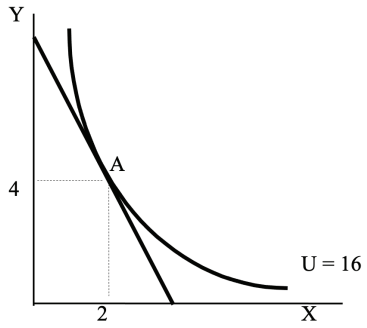
The system of equations becomes:

$$Y = 2 \cdot X$$
$$40 = 10 \cdot X + 5 \cdot Y$$

Its solutions are: X = 2 e Y = 4

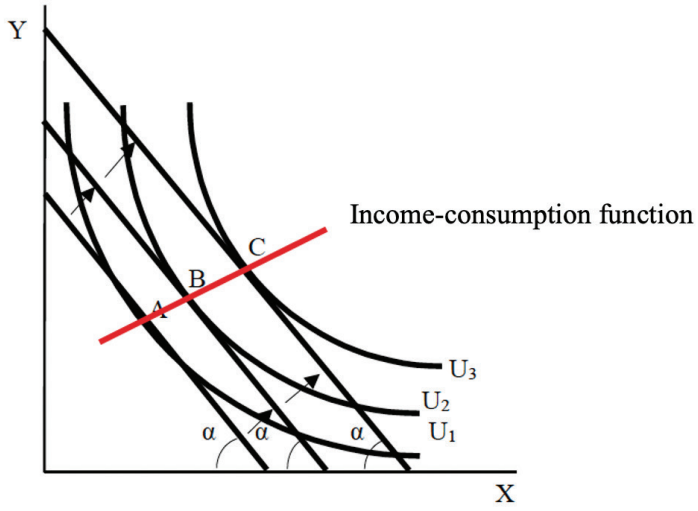
The individual's utility in that situation, which is the maximum achievable, is:

$$U\,(X, Y) = 2\,X\,Y = 2 \cdot 2 \cdot 4 = 16$$



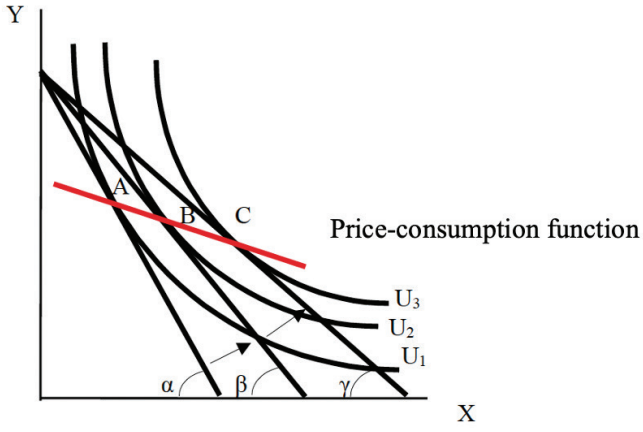
5. EFFECTS ON EQUILIBRIUM

Whenever there is a change in the consumer's income or the prices of goods, the equilibrium will be affected. If the income changes, the budget line shifts in parallel (upwards or downwards, depending on whether it increases or decreases). The connection of successive consumer equilibria when income changes is referred to as the income-consumption function.



Initially, the consumer—with a utility function U, income M, and purchasing goods X and Y at prices P_X and P_Y—would be in equilibrium at point A. If the income increases to M_1, the budget line shifts upward, and the equilibrium would move to B. If it further grows to M_2, the process repeats, and the equilibrium would be at C. The function that connects points A, B, and C is the income-consumption function. The slope and shape of the function depend on the relationship between goods X and Y with respect to income.

If the price of one of the goods changes, the budget line rotates, and the connection of successive consumer equilibria is called the price-consumption function. The shape and slope of this function depend on the relationship between goods X and Y.



In this case, initially, the consumer—with a utility function U, income M, and purchasing goods X and Y at prices P_X and P_Y—would be in equilibrium at point A. If, *ceteris paribus*, the price of X decreases, the equilibrium would move to B, and if it decreases again, it would be at C. The function that connects points A, B, and C is the price-consumption function.

THE CITIZENS' INCOME FALLS, AND SPAIN DROPS IN THE WORLD ECONOMIC RANKING

News, 10/01/2023 https://www.elblogsalmon.com/economia/renta-ciudadanos-cae-espana-retrocede-puestos-ranking-economico-mundial

The data presented by the INE at the beginning of the year is alarming. It shows that the income of Spanish citizens increased during the last quarter of 2022 by 1.6%, although spending has increased by 12%, so six out of ten households need to dip into their savings to make ends meet. Specifically, the income of Spaniards increased to 186.6 billion euros, but consumption translated to 192.034 billion euros. All this has resulted in the savings rate of Spaniards standing at -3.2% of their disposable income at the end of the past year, very different from the 6.4% with which the same quarter of 2021 ended. In addition, the investment rate decreased by 2.9% to 12.901 million euros. (...) High inflation, especially of essential products, has not been accompanied by a rise in wages. Added to this is the increase in interest rates, which has negatively impacted mortgages. The indebtedness is such that it is expected that the situation will continue to worsen until 2024, where recovery could begin. Although Spain has been striving since 1985, the year of its entry into the European Economic Community, to catch up with the rest of the economies in the center and north of the Eurozone, it has really seen the gross national income of Spaniards continuously decline since 2019, dropping by more than 1,700 euros per citizen in 2021. Thus, the GDP data for 2019 was 25,180 euros, while in 2021, it was 23,450 euros (according to data from the European statistical office, Eurostat). The impoverishment of Spaniards is real.

6. SUBSTITUTION EFFECT AND INCOME EFFECT

A consumer with a utility function U and an income M purchases goods X and Y at prices P_X and P_Y. The initial equilibrium occurs at point A, for quantities X_A and Y_A. If X is a normal good and, *ceteris paribus,* its price decreases[54], the budget line rotates to the right, and the new equilibrium would be at B (the point of tangency of the new budget line with an indifference curve), for quantities X_B and Y_B. As a result of its cheaper price, the demand for X increases $X_B - X_A$ (what has been called in the graph ET: total effect). This increase is due to two factors: the substitution effect and the income effect[55].

- Substitution Effect: The reduction in the price of X makes this good cheaper relative to Y (or, equivalently, Y becomes more expensive relative to X), and it breaks the initial consumer equilibrium situation by changing the relative prices of the goods.

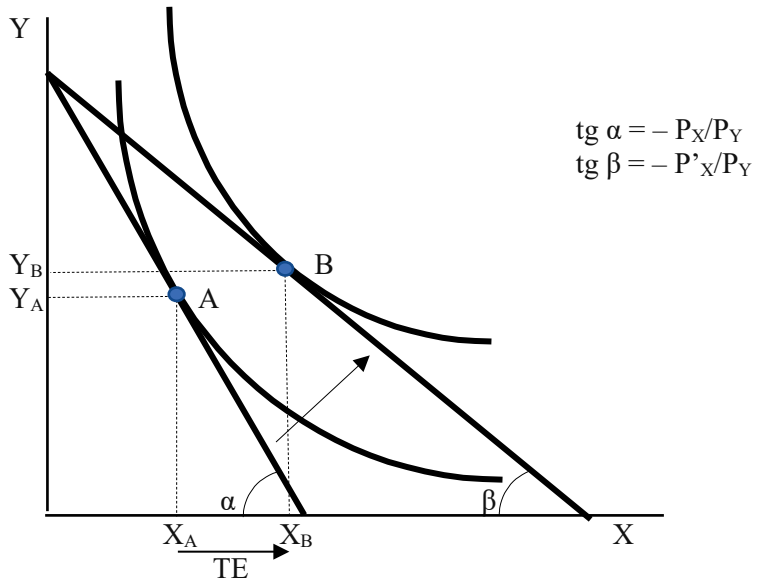
$$\frac{MUx}{Px} = \frac{MUy}{Py}$$

[54] If the initial assumptions were different, some of the consequences would also vary, as will be seen later.

[55] The substitution and income effects pertain to the good that has experienced a price change, although other goods (in our case, Y) are also affected.

The fall in the price of X increases the ratio (MU_X / P_X). After the reduction in P_X, the last monetary unit spent on X satisfies the individual more than the last spent on Y, so —as seen above— monetary units will be shifted from Y to X, reducing the consumption of Y and increasing that of X until the equilibrium condition is restored.

As the price of X falls, the consumer *substitutes* Y for X. The new equilibrium will be for a larger quantity of X than the initial one and a smaller quantity of Y.



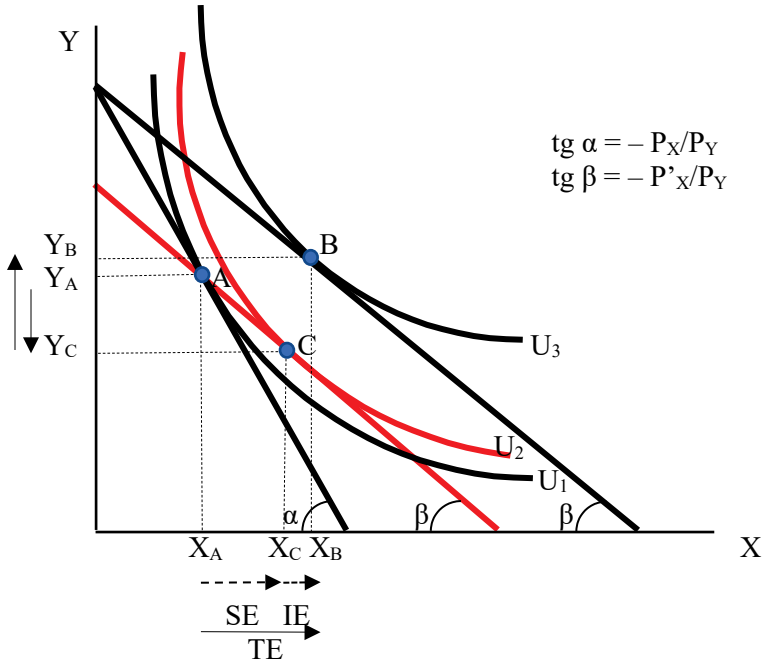
- Income Effect: This is what changes the demand for the good as a result of the variation in the individual's real income. When the price of X decreases, real income increases, allowing the individual to acquire a larger quantity of all goods, particularly good X, which has decreased in price.

To graphically represent these effects, it is necessary to separate the variation in the demand for X resulting from its cheaper price relative to Y from the variation produced by the increase in real income.

To represent the substitution effect, it is assumed that, after the change in the price of good X, the individual's real income remains constant[56]. This is achieved by representing an *intermediate* budget line with the slope of the final budget line (thus capturing the variation in the price of X) and passing through the initial equilibrium point A (maintaining purchasing power[57]). The point of tangency of this budget line with the corresponding indifference curve, point C, indicates the change in consumption as a result of the substitution effect.

[56] There are various ways to approach the problem. The Slutsky approach, which will be followed here, assumes that, to isolate the substitution effect from the income effect, the real income of the individual is kept constant. Another approach is the Hicks approach, which assumes that the level of utility remains constant. In this case, the equilibrium that separates the substitution effect from the income effect would occur at the point where an intermediate budget line, with the slope of the new price ratio, is tangent to the initial indifference curve (U_1).

[57] If the intermediate budget line were below A, this point would be unreachable, suggesting a situation with a lower real income than the starting one. Conversely, if the budget line were above A, an increase in real income would be assumed. The only way to keep real income constant after the change in the price of X is for the intermediate budget line to pass through A.



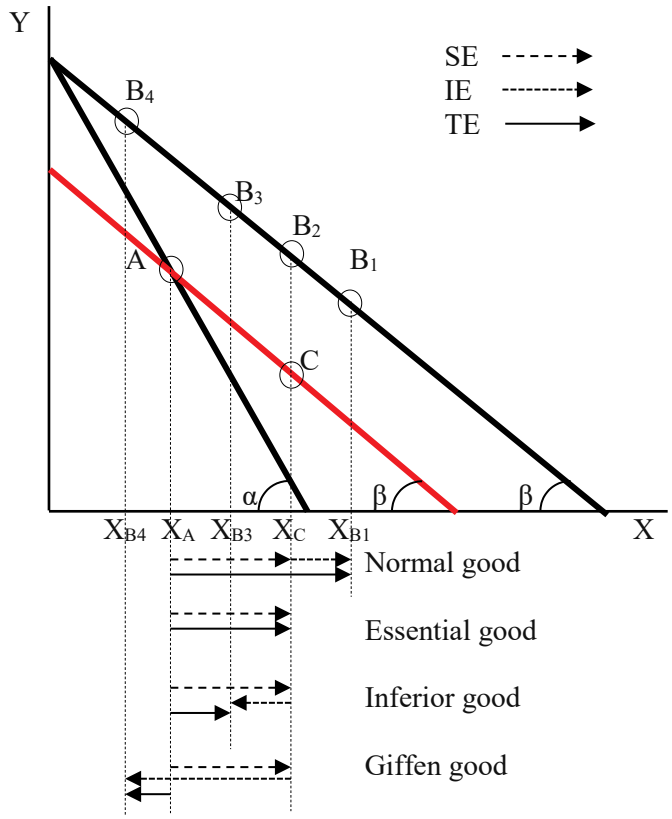
The substitution effect moves the individual from point A to C. In this step, and as a result of the cheaper price of good X compared to Y, the individual substitutes Y for X: reduces the consumption of Y by $Y_A - Y_C$ and increases the consumption of X by $X_C - X_A$. As a consequence of the substitution effect, the consumption of X increases by this amount.

The increase in real income shifts the intermediate budget line to the final budget line. As a result of this shift, the consumption of all goods increases[58], particularly good X. The increase in the consumption of X for this reason ($X_B - X_C$) is due to the income effect.

Therefore, when the price of X decreases, its demand increases by $X_B - X_A$. Of this increase, $X_C - X_A$ is due to the substitution effect, and $X_B - X_C$ is due to the income effect.

The substitution effect is always opposite in sign to the price change: if the price of a good decreases, its demand, as a result of this effect, increases, and if the price increases, the demand decreases. In our case, when the price of X decreases, due to this effect, we move from point A to C, increasing consumption $X_C - X_A$.

[58] The graph assumes that, for this reason, the consumption of Y increases by $Y_B - Y_C$. Since this increase is greater than the decrease in Y caused by the substitution effect ($Y_C - Y_A$), the final consumption of good Y is higher than the initial one. Logically, this does not have to be the case; the final consumption of Y can be greater, smaller, or equal to the initial one.



On the other hand, the income effect depends on the type of good[59]. If it is assumed that the price of the good decreases:

- If X is a normal good (as assumed so far): as the price decreases, the individual's real income increases, and the demand for the good increases due to the income effect; the transition is from C to B_1. The income effect would be ($X_{B1} - X_C$), and the total effect ($X_{B1} - X_A$).
- If the good is an essential good: demand remains unchanged when real income varies; the transition would be from C to B_2, and the income effect would be null[60]. In these goods, the total effect coincides with the substitution effect ($X_C - X_A$).
- If the good is inferior: its demand moves in the opposite direction to income. Therefore, as the price decreases and, consequently, real income increases, the demand for the good decreases. The substitution effect has one sign, and the income effect has another, but the substitution effect *prevails* because, in absolute value, it is greater than the income effect. Due to the income effect, the transition would be from C to B_3. In this case, the income effect is negative ($X_C - X_{B3}$), and the total effect would be ($X_{B3} - X_A$).
- Finally, it may happen that the income effect exceeds, in absolute value, the substitution effect. As a result of the income effect, the transition would be from C to B_4, reducing consumption due to this effect ($X_C - X_{B4}$) and the total effect ($X_A - X_{B4}$). If this occurs, a decrease in the price of the good would lead to a decrease in demand and vice versa, contradicting the law of demand. No good typically behaves this way, but some may do so under very particular conditions. When this phenomenon occurs, it is said that the good behaves like a Giffen good, as observed and studied by Giffen in Ireland in the late 19th century, with potatoes.

[59] The indifference curves, which would indicate the different consumer equilibria, have been omitted in the graph for clarity.

[60] If the real income increases, the consumption of other goods (in our case, Y) also increases.

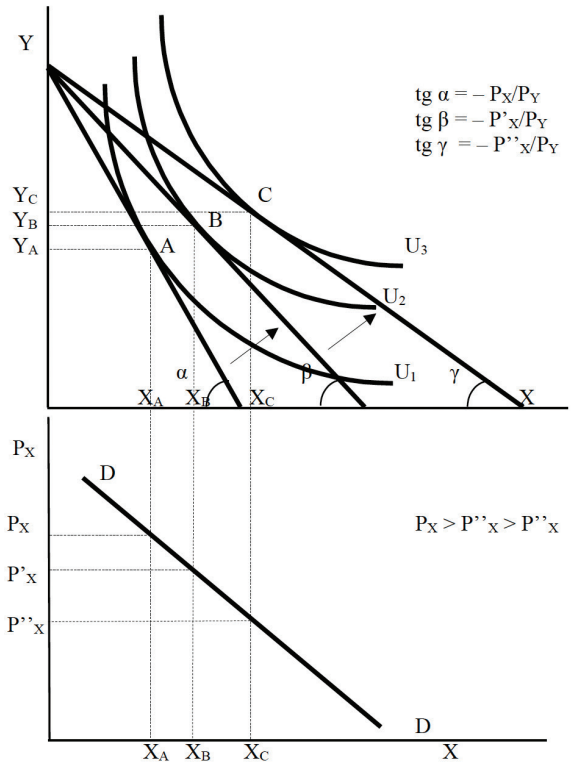
Good	PRICE	SE	IE	TE
Normal	Rises	-	-	-
	Falls	+	+	+
Essential	Rises	-	0	-
	Falls	+	0	+
Inferior god	Rises	-	+	-
	Falls	+	-	+
Giffen	Rises	-	+	+
	Falls	+	-	-

7. DEDUCTION OF THE CONSUMER'S DEMAND FUNCTION

The successive equilibrium points of the consumer as the price of one of the goods varies allow deducing the demand function that the consumer has for that good. Consider a consumer with a utility function U and income M, who purchases goods X and Y at prices P_X and P_Y. The initial equilibrium would be at point A, with a consumption of X_A for X and Y_A for Y.

If, *ceteris paribus*, the price of X decreases to $P'_X < P_X$, the new equilibrium would be at point B, consuming quantities X_B and Y_B. If the price of X decreases again to $P''_X < P'_X$, the equilibrium would shift to C, with consumptions of X_C and Y_C.

Transferring the successive consumptions of X for each price to the corresponding coordinate axis yields the consumer's demand function for this good.



8. GLOSSARY OF TERMS

Budget Line or Budget Constraint: Shows the consumption possibilities accessible to an individual, considering their income and the prices of the goods they acquire.

Consumer Surplus: It is the difference between the satisfaction that an individual derives from the consumption of a good and the market value of that good. The surplus is what the consumer receives above what they pay. It is the reason for the demand for a good; if there is no surplus, the consumer does not buy the good.

Income Effect: It is the change in the demand for a good as a result of the variation in the individual's real income. When the price of a good decreases, the individual's real income increases, allowing them to purchase more quantity of all goods and, in particular, the good that has decreased in price.

Income-Consumption Function: It is the combination of successive consumer equilibriums when the individual's income changes.

Indifference Curve: Set of consumption combinations in which the individual finds the same level of satisfaction.

Law of Diminishing Marginal Utility: Indicates that, after consuming a certain number of units of a good, the addition of successive units is associated with progressively smaller marginal utilities, potentially reaching zero marginal utility when the individual becomes saturated with the good. For many goods, this law begins to apply from the first unit consumed.

Marginal Rate of Substitution (MRS): Indicates how much of one good the consumer is willing to give up in exchange for a certain amount of the other, to keep utility constant.

Marginal Utility: It is the change in utility as a result of consuming an additional unit of a good.

Price-Consumption Function: It is the combination of successive consumer equilibriums when the price of one of the goods changes.

Substitution Effect: The reduction in the price of a good makes this good cheaper compared to others (or, equivalently, makes others more expensive in relation to it), causing a shift of monetary units towards the cheaper good and an increase in its consumption.

Total Utility: It is the satisfaction that an individual obtains from the set of units consumed of a good.

Utility: The satisfaction that an individual obtains from the consumption or possession of a good, or from receiving a service. Utility is, therefore, the quality that makes a good or service desirable. Individuals value and, therefore, demand a good to the extent that they find utility (satisfaction) in it.

CHAPTER V. MACROECONOMICS AND MACROECONOMIC AGGREGATES

1. MACROECONOMICS. OBJECTIVES AND TOOLS

In economics, two main sections are distinguished. Microeconomics, which deals with the behaviour of individual entities (people and companies), their aggregates, and the relationships between them, always referring to particular markets (of a good, service, or factor), and macroeconomics, which studies the economy as a whole.

An aspect of economic analysis, therefore, is framed within the scope of micro or macroeconomics for a conceptual reason, not based on the number of monetary units affected. Thus, for example, the analysis of the vehicle market of a country falls under the study of microeconomics, as it is the study of the market of a particular good, regardless of the amount of money involved in that market. In contrast, the study of the production of a municipality is macroeconomic, as it analyses an economy, no matter how big or small it may be.

Clearly, micro and macroeconomics are not two "isolated" and unrelated parts of the economy. Anything that happens in one affects the other. If the demand for vehicles is reduced and, as a consequence, production and employment in car factories decrease — a microeconomic issue — the overall production and employment level of the country (or region) — a macroeconomic aspect — are also affected. If the central bank reduces the interest rate — a macroeconomic issue, as it affects the entire economy — companies in this or that sector will tend to invest more — an aspect that falls under the microeconomic domain.

The main objectives of macroeconomics are production, employment, prices, the external market, and the public sector.

1. **Production.** The analysis of the evolution of goods production and service provision in an economy is a primary objective, as it is an index of the performance of that economy. In fact, production macroeconomic aggregates, particularly the Gross Domestic Product (GDP), are often used to indicate a country's growth.

2. **Employment**. It studies and deals with the employment of resources that the economy possesses, especially the labour factor, and its possible deficiencies. The goal is to achieve high resource employment.

3. **Prices**. The objective is to achieve an evolution that favours economic growth. Both excessive price growth and a fall in prices destabilize a country's economy.
4. **External Equilibrium**. Generally, economies are open and interact with others: they import and export goods and services, capital flows in and out, etc. The objective is to ensure a proper balance between the country's economy and the rest of the world.

5. **Public Sector Equilibrium**. This aims to achieve a proper balance between public sector revenues and expenditures, which does not mean that the budget for each fiscal year must have a zero balance. It may be advisable for the budget to have a deficit in some years, to cover certain expenses (such as infrastructure), as long as there is a plan for financing that deficit in subsequent years.

To achieve the above objectives, macroeconomics has a series of tools that are under the control of the economic authority and can be grouped around the following policies:

a) **Fiscal Policy.** It is structured around two main components: public spending and taxes.

- Public spending is the expenditure on goods and services by the public sector (from the construction of roads and dams to the purchase of vehicles or helicopters, hiring of public employees, subsidies to companies, or transfers to household economies).

- Through taxes, the public sector takes a portion of income from households and companies; on one hand, it reduces their disposable income and, therefore, their consumption possibilities, and on the other hand, it finances its expenditures with these taxes.

b) **Monetary Policy.** This encompasses a series of instruments that facilitate or hinder economic agents' access to money. Some instruments are designed to increase or decrease the money supply, or the amount of money in an economy; among these are legal reserve requirements and loans to the banking sector. Another instrument is the interest rates of money, which, by making it more expensive if they rise, or cheaper if they fall, deter or encourage economic agents to take out loans.

c) **Supply-Side Policy.** These are instruments aimed at encouraging work and production; for example, by promoting technological improvements, productivity increases, etc. Among these measures are all those that favour competition and market liberalisation.

d) **Foreign Policy.** The instruments available for this policy can be divided into two categories:

- Trade Policy Instruments. These are controls on foreign trade. They include tariffs (which are taxes on imports), quotas (which set the physical volume or economic value of imports for certain goods), export subsidies, etc.
- Actions on the exchange rate. The exchange rate of a currency is the price of that currency expressed in the units of other countries' currencies. A devaluation of the currency, which is a reduction of its price, encourages exports as it makes them cheaper, but at the same time, it makes the country's imports more expensive.

All sectors of the economy are interconnected, and any measure that affects one will have repercussions on the others. This interconnection necessitates constant vigilance to assess and counteract the “side effects” that the use of a particular instrument may create.

If a country, for example, is producing below its capabilities and has idle resources, the economic authority can act to move towards full employment and potential output. This action can take various forms, one of which is through fiscal policy, utilizing public spending as a tool. If public spending increases, demand also rises, and companies will tend to produce more to meet it. To increase production, they will likely need to hire more workers, thereby boosting both production and employment. However, alongside these positive outcomes, negative ones may also occur. If appropriate measures are not taken, the increase in public spending can lead to an imbalance in public accounts if revenues do not grow proportionately with expenses, thus deteriorating the goal of achieving a proper balance in the public sector accounts. Additionally, the pressure of increased demand can cause prices to rise more than desired, worsening the goal of price containment with all the problems that this entails: distrust, reduction in purchasing power, and erosion of external competitiveness, among others.

Macroeconomic objectives are not society's ultimate goals, but they assist in achieving them. Increased production, stable prices, and employment are inadequate if a society lacks freedom, justice, or suffers from marked inequalities.

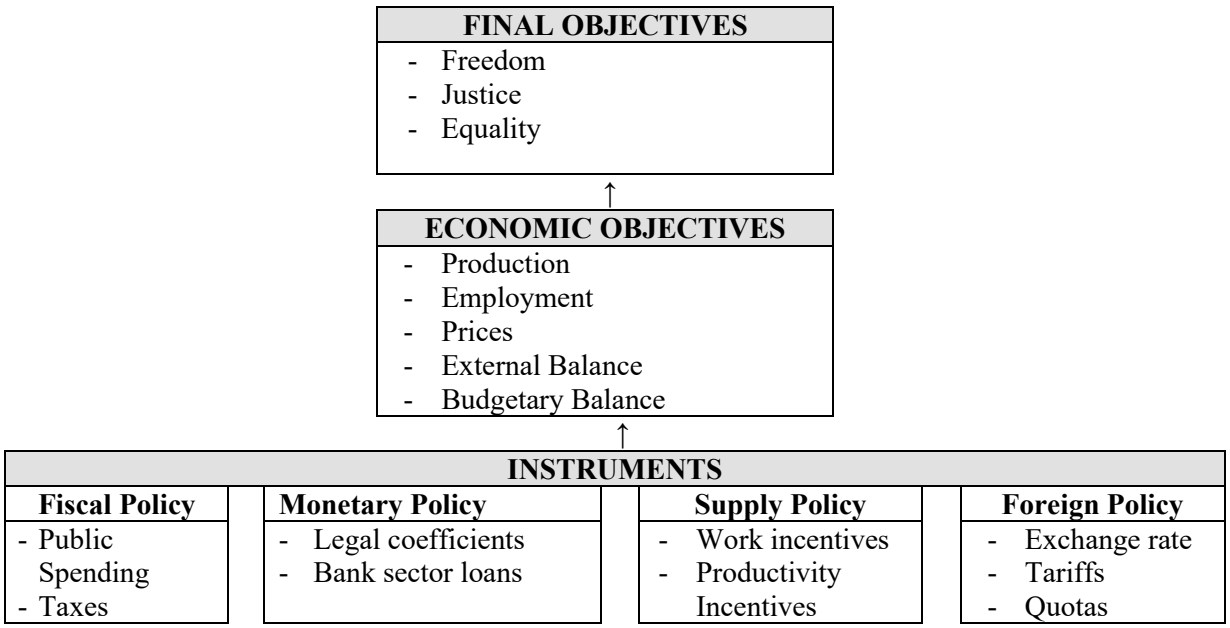
TWENTY YEARS OF THE CORRALITO: THE ENDURING ECONOMIC AND SOCIAL CRISIS IN ARGENTINA

03/12/2021
https://www.rtve.es/noticias/20211203/claves-del-corralito-del-argentina-no-se-recuperado-20-anos-despues/2235666.shtml

Twenty years ago, Argentina faced a severe economic and social crisis that forever altered its course and from which recovery remains elusive. The corralito was a desperate measure to stop the hemorrhaging of capital from Argentina's finances, but it was too late. The structural problems of the economy surfaced, and the illusion that an Argentine peso was equal to a US dollar was shattered. On December 1, 2001, a decree was published by the neoliberal Economy Minister Domingo Cavallo, containing unprecedented restrictions on currency circulation:

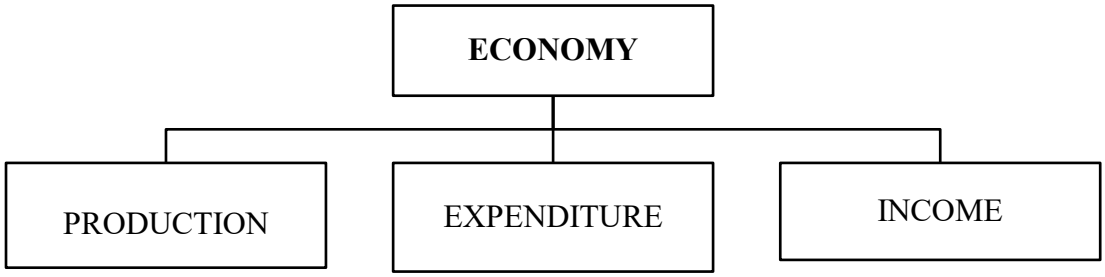
1. Withdrawals of cash from bank accounts were capped at 250 pesos or dollars per week.
2. Cash withdrawals could be in pesos or dollars, with banks forbidden from charging currency exchange commissions.
3. Transfers between bank accounts remained unrestricted.
4. International transfers were banned unless approved by the Central Bank of Argentina (BCRA).

At that time, the use of debit and credit cards for daily purchases was not widespread; many retailers did not accept them or imposed surcharges. The corralito abruptly halted the payment chain, severely impacting the informal economy. The incomes of small businesses, taxi drivers, and domestic workers, which depended on cash transactions, led to closures, bankruptcies, and increased unemployment. Taxes were raised, and public spending was cut, pushing the economy from recession into complete collapse. Consequently, over half of Argentina's population fell below the poverty line.

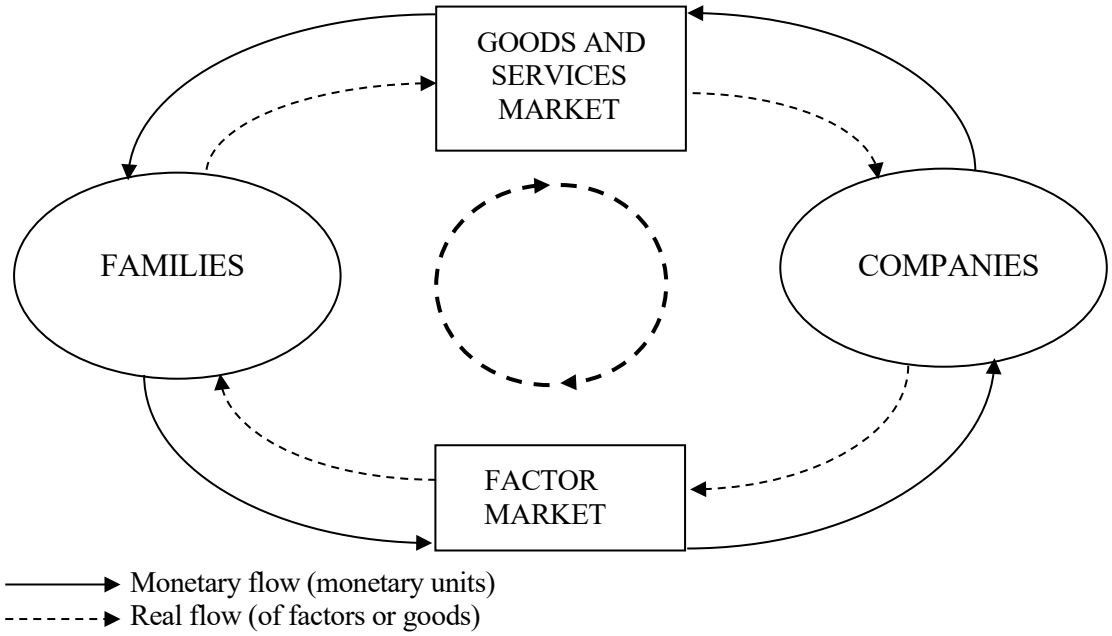


2. MACROECONOMIC AGGREGATES. PERSPECTIVES OF PRODUCTION, EXPENDITURE, AND INCOME

Macroeconomic aggregates are the broad figures of an economy, viewed from three perspectives: production or supply, expenditure or demand, and income. These perspectives numerically coincide, analogous to observing a mountain from different angles – the scenery differs, but the mountain's height remains constant.



The circular flow of income, studied in Topic 1, explains why the value of macroeconomic aggregates from each perspective is equal. The value of what companies produce (production perspective) essentially matches the remuneration of the productive factors – land, labour, and capital – (income perspective), which is then used for purchases (expenditure perspective)[61].



[61] The measurement of a country's economic activity is carried out by National Accounting. National Accounts provide data on various macroeconomic variables with the aim of obtaining GDP or Gross National Product (GNP), which is the basic measure of an economy's performance. They also provide the conceptual framework for describing the relationships between three fundamental macroeconomic perspectives: production, income, and expenditure.

2.1 Production or Supply Macroeconomic Aggregates

GDP

The most important production aggregate is the GDP. It's the value of final goods and services produced within an economy over a specific period and is commonly used to analyse economic growth. It reflects the monetary value of final goods and services, not the total value of all company outputs, avoiding double-counting.

As highlighted, it is the value in monetary units of the final goods and services. Therefore, it is not the sum of the value of the production of all the companies that make up an economy, but only of the final products. The GDP does not take into account the intermediate consumption of companies; it can be calculated by adding the value that each company contributes to the production process. This method avoids counting the production more than once.

Calculating the GDP of an economy presents some challenges:

- Goods like cars, furniture, or agricultural products are easily valued, whereas activities like police work or public service are harder to value and are typically assessed based on their cost, namely, the salaries paid to public servants. This leads to the paradox where the value of work in a public office is based on the salary, regardless of the actual work done.
- Non-market activities do not contribute to GDP. So, a household employee, newspaper delivery, or gardening adds to GDP if paid for, but not if done by oneself.
- Similarly, the informal economy, significant in many countries, is not included in GDP.
- Everything counts positively towards GDP, which is a flow variable representing the value of goods and services produced over time, not reflecting the wealth stock like natural resources unexploited within a country.
- Another paradox is that in GDP calculations, everything counts positively. Unlike other indicators, such as the Human Development Index, which take into account various facets of a country's development (education, healthcare, the environment, etc.), GDP measures only economic aspects. Therefore, it not only fails to account for—much less negatively value—the environmental degradation a company may cause during its production process, but it also adds to the GDP if another company subsequently restores the degraded environment. GDP is a “flow” variable, as it refers to the outcome of activity within an economy over a period of time. It does not indicate the wealth that an economy may have in the form of “stock”. There can be, and indeed are, countries with abundant natural resources that they do not exploit, and therefore, this wealth is not reflected in the GDP.

EXERCISE

Consider a farmer who grows wheat and sells it for 100 monetary units to a flour mill. The mill then sells flour to a baker for 250 monetary units, and the baker sells bread to a retail shop for 360, which the shop sells for 450 monetary units.

	Purchases	Production (sales)	Added Value
Farmer (wheat)	0	100	100
Flour mill	100	250	150
Baker	250	360	110
Retail	360	450	90
Total	710	1.160	450

The sum of each company's production amounts to 1.160 monetary units, but this figure double-counts the wheat, flour, and bread. The mill's production already includes the wheat's value; the baker's production includes that of the mill... The final production is the result of subtracting intermediate consumption (710) from the total production (1.160), which matches the sum of the added values at each production stage.

GDP = Final production = Total production – Intermediate consumption = 1.160 – 710 = 450

GDP = Σ Added values = 100 + 150 + 110 + 90 = 450

Gross Domestic Product (GDP) and Net Domestic Product (NDP)

GDP is the value of final production without taking into account the wear and tear of capital goods that have been used to carry it out. During the production process, capital goods (buildings, machinery, etc.) experience wear and tear, which is referred to in various ways: depreciation, amortization, etc. If depreciation of capital goods is subtracted from GDP, we obtain NDP.

GDP – Depreciation (D) = NDP

Gross Domestic Product and Gross National Product

Gross Domestic Product (GDP or NDP) is the value of goods and services produced by an economy within its territory. It refers, therefore, to the location where goods are produced or services are provided; it answers the question: where is the production of goods or the provision of services carried out? Gross National Product, on the other hand, answers the question: who carries out the production? It focuses on the status of individuals or legal entities that produce goods or provide services. The Gross National Product includes the value of production carried out by individuals or legal entities that are residents of the country, regardless of whether it occurs within or outside the economy's territory.

To convert from GDP (or NDP) to GNP (or GNN), one must add to it the income of residents of the country earned abroad (RNN) and subtract from it the income of foreigners (non-residents) earned within the country (RNE).

GDP (or NDP) + NNI - NFI = GNP (or GNN)

Magnitudes Valued at Market Prices (mp) and Factor Costs (fc)

Macroeconomic magnitudes can be valued in two ways: at factor cost and at market price. A magnitude expressed at factor cost is valued based on the compensation of factors used to carry

out the production process. Valuation at market price is done, as the name suggests, based on the market price of the produced goods.

To convert a magnitude expressed at factor cost to a market price valuation, taxes on production are added, and subsidies on production are subtracted.

GDP fc + Taxes on production - Subsidies on production = GDP mp.

From the aforementioned production macroeconomic magnitudes, a series of other magnitudes are derived that carry the word "income" in their name, and they are as follows:

National Income (NI)

The GNNfc is called National Income (NI). NI is the sum of compensations (wages, rents, interests, etc.) received by the factors of production in an economy over a period of time. It is a magnitude expressed in national terms because it refers to the residents of the country; it is a net magnitude because it excludes depreciation, which is not income; and it is valued at factor cost, meaning it considers only the compensation of the factors of production.

GNNfc = NI

Disposable National Income (DNI)

If net transfers with the rest of the world (received minus given) are added to NI, Disposable National Income is obtained.

NI + net transfers with the rest of the world = DNI

Personal Income (PI)

If undistributed profits by companies, taxes on profits, and social security contributions of companies are subtracted from DNI, and transfers from the government to households and public debt interests are added, Personal Income is obtained.

DNI - Undistributed profits by companies - Taxes on profits - Social security contributions of companies + Transfers from the government to households + Public debt interests = PI

Disposable Personal Income (DPI)

Finally, if direct taxes and social security contributions paid by workers are subtracted from PI, DPI is obtained. It is the income available to households for consumption or savings.

Personal Income - Direct taxes - Social security contributions paid by workers = Disposable Personal Income (DPI)

DPI = Consumption (C) + Savings (S)

2.2 Expenditure or Demand Macroeconomic Magnitudes

The goods and services produced are destined for sale. Expenditure macroeconomic magnitudes are the components of an economy's aggregate demand and are as follows: private consumption, government consumption, investment or gross capital formation (forming domestic demand), and net external balance (or net exports, which are exports minus imports). Their sum is GDP from the expenditure side.

Private Consumption (C)

It is the consumption undertaken by households, domestic economies, in perishable goods (food, clothing, etc.), services (insurance, financial, transportation, etc.), and durable goods (cars, furniture, etc.); housing is not part of this component of demand. Private consumption is the largest component of aggregate demand and the most stable.

Government Consumption (G)

It is the expenditure of the public administration. It includes expenses incurred by the public sector, both in current expenditures on goods and services (including the compensation of public employees) and in expenditures on investment goods (hospitals, infrastructure, etc.). Although it is a public sector expenditure, transfers (unemployment, pensions, public debt interests) are not included in this concept as they are not given in return for something.

Gross Capital Formation (I)

Essentially, Gross Capital Formation (I) is the investment expenditure of businesses and, for the most part, it consists of spending on capital goods. Part of the goods produced by an economy extends beyond the economic period to which a macroeconomic magnitude refers. Gross capital formation has two components:

- Gross Fixed Capital Formation (GFCF): It is the expenditure on capital goods, which are used as means of production over multiple periods. This includes buildings, machinery, or transportation equipment. GFCF also includes investment in housing (even though it is an investment by households).

- Changes in Inventories (CI): It reflects the difference between the value of inventories (raw materials, goods in the process of production, and finished products) at the end and at the beginning of the period.

Net External Balance (XN)

It is the difference between a country's exports and imports; it is also called net exports (XN):

- Exports (X): These are the external demand for domestic goods and services.
- Imports (M): This is the domestic demand for goods and services from other economies.

Net External Balance (or XN) = Exports - Imports

Gross Domestic Product (GDP), from the perspective of demand, is the sum of the aforementioned macroeconomic magnitudes. As it is a demand-driven magnitude, it is typically valued at market prices.

GDP at market prices = Private Consumption + Government Consumption + Gross Capital Formation + Exports - Imports = C + G + I + (X - M)

2.3 Income Macroeconomic Magnitudes

Finally, the economy can also be viewed from the perspective of the income it generates, that is, the compensation of the factors of production used in the production of goods and the provision of services. Incomes are divided into two magnitudes:

- Compensation of Employees: It reflects the compensation for labour; it includes wages and salaries, fringe benefits, commissions, employer contributions to Social Security (as it is part of the worker's compensation, even if not directly received), etc.

- Gross Operating Surplus: These are the incomes of property and business (capital). It is what remains (or exceeds) once the entrepreneur has paid for the materials used in production (intermediate consumption) and labour costs. This surplus is the compensation for land and capital factors: payment of interests, dividends distributed by corporations, undistributed profits, rental payments, etc.

GDP from the income perspective is typically valued at factor cost because it reflects the compensation of the factors.

GDP at factor cost = Compensation of Employees + Gross Operating Surplus

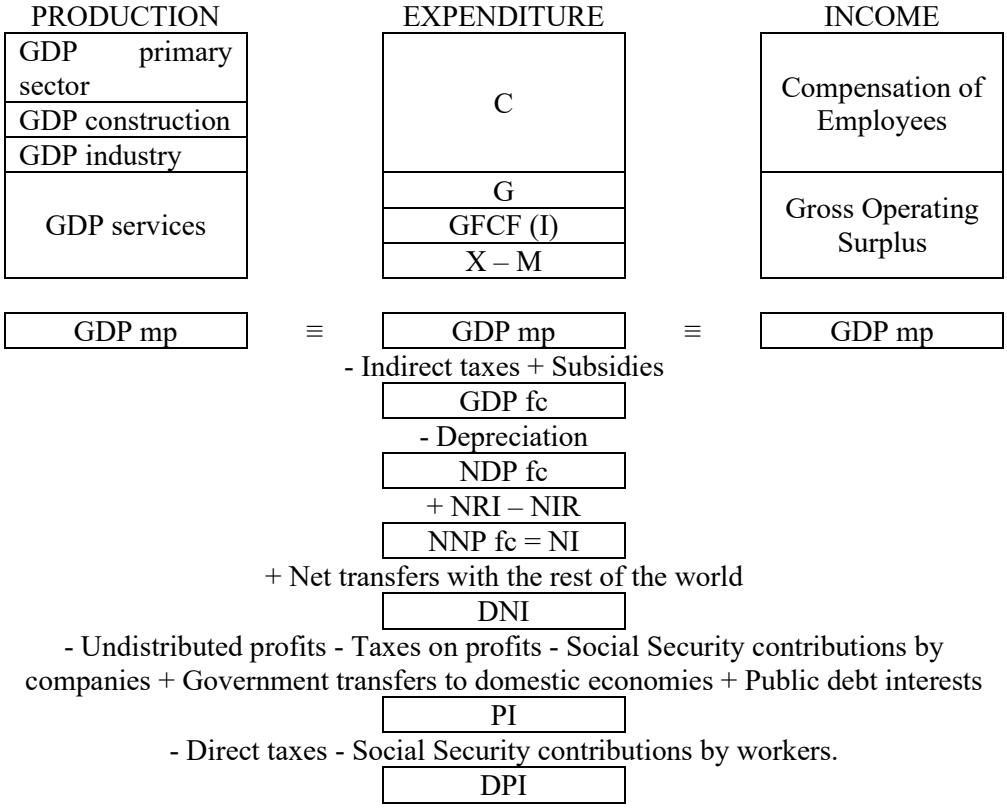
2.4 Relationship between the Three Perspectives and Calculation of Macroeconomic Magnitudes

As noted above, the three perspectives—production, expenditure, and income—observe the same thing from different angles. Therefore, the sum of the macroeconomic magnitudes composing each of them, valued in the same way (at factor cost or market price), yields the same result. Logically, for the GDPs of the three perspectives to match, they must be valued in the same manner, either all at market prices or all at factor costs.

Logically, for the GDPs of the three perspectives to match, they must be valued in the same manner, either all at market prices or all at factor costs.

GDP from the production perspective is the result of summing the GDPs of the economic sectors within an economy: agriculture, livestock, and fishing (primary sector), construction and industry (forming the secondary sector), and services (tertiary sector). Although the percentage each of these sectors represents in the total production value depends on the characteristics of each economy, in a developed economy, the service sector usually accounts for around 60%, the primary sector around 5%, and the rest (35%) is divided between industry and construction.

Regarding expenditure, private consumption typically represents more than half of total expenditure, with the remainder split among the other components. In terms of income, compensation of employees tends to be slightly higher than gross operating surplus.



2.5 Nominal and Real Magnitudes

This distinction refers to the monetary units in which economic magnitudes are expressed.

- Nominal or Current Value: A magnitude is valued in terms of nominal or current prices when it is expressed in monetary units of the year to which it refers.
- Real or Constant Value: A magnitude is valued in terms of real or constant prices when it is expressed in monetary units of a base or reference year. Expressing magnitudes from different years in real terms means valuing them all in the same monetary units, those of the base year, which allows for easy comparison by eliminating distortion caused by price variations.

Suppose an economy had a nominal GDP of 800 million monetary units in a certain year and 832 million the following year; in nominal terms, the economy experienced a growth of 4%, but how much has this economy really grown?

To find out, it is necessary to know the deflators (which is an index indicating how much prices have changed between those years and, therefore, allows for comparison of monetary units from different years).

If prices have remained constant, then indeed, the GDP has actually grown by 4%; the same rate as in nominal terms. But if prices have risen, for example, by 2%, then the real increase in GDP is no longer 4% because part of the nominal increase is not due to real growth, but to the increase in prices.

To calculate real GDP, it is useful to construct a table, where the column of deflators is key. This column indicates the equivalence between the monetary units of the years being compared. The deflator of the base or reference year takes the value of 100 and that of the following year indicates the monetary units of that year equivalent to 100 of the previous year. In our example, as prices

have risen by 2%, in the second year, 102 monetary units are needed to buy what in the first year would be acquired with 100. In other words, 102 monetary units of the second year are equivalent, in real terms, to 100 of the first year.

Year	nominal GDP	Δ nominal GDP	Δ prices	Deflator	Real GDP	Δ real GDP
1	800	-	-	100	800	-
2	832	4%	2%	102	815,68	1,96%

Expressing a magnitude from one year in monetary units of another is resolved with a simple rule of three. If 102 euros from year 2 are equivalent to 100 euros from year 1, then 832 will be equivalent to 815,68. The real increase in GDP has therefore been 15,68 million monetary units, which represents a real increase of 1,96%. Once the distortion caused by price increases is eliminated, the real increase in GDP is less than it initially appeared.

Comparing the real GDP of one year to another allows us to determine whether the economy has produced more or fewer goods and services, a question that nominal GDP analysis does not answer. An increase in nominal GDP may be due to a rise in prices, which elevates the value of goods and services produced without any real increase in production. Conversely, an increase in real GDP means that the production of goods and services has expanded.

If an economy produces 1.000 tractors valued at 30.000 euros each, and in the following year production remains the same but each tractor is valued at 33.000 euros, the nominal GDP for the first year is 30 million euros and for the second year it is 33 million. Nominal GDP has grown by 10%, but real GDP has not grown at all (since production has remained constant: 1.000 tractors); in this case, the entire increase in nominal GDP is due to an increase in prices.

Another way to calculate the deflator is through changes in the value of production. Suppose that, in a given year, an economy produces 2.000 vehicles, 5.000 washing machines, and 50.000 pens, with the value of vehicles being 12.000 euros, washing machines 300 euros, and pens 3 euros. These same products in the immediately preceding year were valued at 11.500 euros, 290 euros, and 2,5 euros respectively.

		Year 2		Year 1	
	Production (units)	Prices	Production value (thousands)	Prices	Production value (thousands)
Vehicles	2.000	12.000	24.000	11.500	23.000
Washing Machines	5.000	300	1.500	290	1.450
Pens	50.000	3	150	2,5	125
			25.650		24.575

The nominal GDP of this country in year 2 was 25.650 thousand euros, and the real GDP of year 2 based on year 1 (or, equivalently, at prices of year 1) was 24.575 thousand euros. The GDP deflator from year 1 to year 2 is:

$$\text{GDP deflator} = \frac{\text{Nominal GDP of year 2}}{\text{Real GDP of year 2 based on year 1}} \text{ x } 100 = \frac{25.650}{24.575} \text{ x } 100 = 104{,}37$$

Therefore, the prices between these two years have increased by 4,37% (since the deflator of the base year is 100).

EXERCISE

The real GDP of a country in 2002 was 12,500 monetary units (m.u.), and in 2003 it was 13,000 m.u. Knowing that the GDP deflator for 2003 with a base of 2002 is 115, calculate the nominal GDP for the years 2002 and 2003.

	Nominal GDP	Deflator	Real GDP
2002	(1)	100	12.500
2003	(2)	115	13.000

The nominal GDP and the real GDP of the base year, which in this case is 2002, are equal. Therefore, the nominal GDP for 2002 (1) is 12.500. The real GDP for 2003 is expressed in monetary units of 2002 since it is the base year. As the deflator column indicates the equivalence between the monetary units of 2002 and 2003, it is easy to calculate the nominal GDP for 2003 (2):

If 100 m.u. from 2002 → Are 115 in 2003
13.000 → (2)

$$(2) = \frac{13.000 \cdot 115}{100} = 14.950$$

3. BASIC CONCEPTS ABOUT PRICES AND EMPLOYMENT

3.1 Prices

As seen above, two of the macroeconomic objectives are price stability and maximum utilization of factors of production, particularly labour.

The evolution of prices is measured through various indices, the most well-known being the Consumer Price Index (CPI), which is a statistical measure of the change in prices of goods and services consumed by the population residing in households in Spain. The basket of goods and services that make up the consumer basket (food, housing, clothing, etc.) is primarily derived from household consumption, and the importance of each item in the CPI calculation is determined by this consumption.

The change in the Consumer Price Index is called inflation and reflects the increase or decrease in the prices of that basket of goods from one period to another. The inflation rate from one year to the next is given by the expression:

$$\text{Inflation rate} = \frac{\text{CPI (year 2)} - \text{CPI (year 1)}}{\text{CPI (year 1)}} \text{ x } 100$$

As detrimental to the economy is an excessive growth in prices as it is their decrease. High inflation generates uncertainty and distrust, reduces people's purchasing power (especially affecting those with fixed incomes in nominal terms, such as retirees and pensioners), increases fiscal pressure, disrupts the external market by deteriorating competitiveness... and tends to create more inflation. Negative inflation (deflation) reduces consumption in anticipation of lower prices, and if companies do not sell, they end up closing, reducing production and increasing unemployment. The economic situation in which there is both intense and widespread price increase (inflation) alongside economic stagnation (very low or negative GDP growth rate) is termed stagflation.

The Harmonized Index of Consumer Prices (HICP) is a “adjusted” CPI intended to serve as a common measure of inflation among the countries of the EU, enabling the comparison of price trends among its member states.

Core inflation captures the price variation excluding energy products and unprocessed food. By excluding products whose prices are highly sensitive to exogenous factors (international conflicts, droughts, etc.), it aims to provide a more stable index, more closely linked to the "controllable" economic situation of the country.

A CENTURY OF CPI

Prices in Spain have multiplied by 329 over the last eight decades.

14/03/1997 https://elpais.com/diario/1997/03/14/economia/858294004_850215.html

"For you, the fat coin". A phrase that few use today, because the 10-cent coin has long since become history, just as is happening now with the peseta itself. The inflationary process that all countries have experienced has eroded the purchasing power of money. Specifically, in Spain, prices have multiplied by 329 times in the last 80 years, according to calculations by Julio Alcaide, one of the founding figures of Spanish statistics. And yet, well into the Spanish postwar period, the "perra gorda" (fat coin) was still enough to buy a candy or fill a kid's pocket with sunflower seeds. The metro in Madrid cost four "perras gordas" (...) and grandparents still remembered that, before the war, the daily wage was three pesetas (...).

The economic history of the 20th century has been marked by major events, but behind any milestone, an economic factor has hovered in the background and hindered development in both rich and poor countries: inflation.

In Spain, starting from 1913, the then Directorate General of Statistics began publishing a wholesale price index that has served Alcaide, along with other indices, to reconstruct the evolution of prices since the beginning of the century. According to this economist, Spanish inflation shows well-defined stages.

The first, from 1900 to 1913, is marked by the aftermath of the loss of the last colonies. Prices decreased by 0.3%. The period from 1913 to 1920 coincides with World War I. The strong demand from the warring countries forced a 123% increase in Spanish prices, but the post-war Great Depression (1920-1935) led to a 26.5% decrease.

The Spanish Civil War indelibly marked the next stage (1935-1940), in which prices grew by 75.9%. Precisely in 1935, the National Institute of Statistics (INE) began to compile the Consumer Price Index (CPI), although it did not become popular until the early 1970s. Spaniards preferred to talk about the shopping basket and the cost of living.

The lack of raw materials and industrial goods marked the Spanish postwar period (1940-1951). Prices grew by 323.6%. The next phase, 1951-1960, marked the end of autarky, with the Stabilization Plan. Prices rose by 63.8%.

But since the end of the Civil War, wages recorded decreasing rates until the decision of the then Minister of Labour, José Antonio Girón, to double salaries in the late fifties to prevent the explosion of a social crisis that could erode the dictatorship. It is not surprising that millions of Spaniards took the opportunity to emigrate to Germany, France, and other countries that offered opportunities. Alcaide recalls the worsening of income distribution, which became more concentrated. "The rich got richer and the poor became poorer," he says.

The period from 1960 to 1975 marked the birth of dual inflationary tensions - the price of services increased even more than the price of physical goods that have survived to this day. Wholesale prices increased by 132.6% and the cost of living rose by 221.4%. It was the beginning of the consumer society, which a population until recently hungry began to glimpse through television advertisements. Utility cars could be bought for less than 100,000 pesetas. Of course, an average salary at the time did not exceed 10,000 monthly, even though wages increased by 9.6% annually.

"Until 1960, Spanish inflation was demand-driven, due to insufficient resources as a result of external isolation, slowing down the economic growth of a society eager to improve its development and well-being," explains Alcaide. "But from 1960 onwards, the inflationary culture appeared, which consisted of stimulating the growth of production factor prices, especially wage costs, in such a way that any circumstance that raised prices was automatically incorporated into wage increases". Since 1973, the Bank of Spain had begun to design a monetary control scheme, setting final objectives for each year - growth of prices and real economy - and systematically controlling the growth of money in the hands of the public, sight deposits, savings deposits, and time deposits, the so-called liquid assets.

The last stage, from 1975 to the present day, is marked by the return of democracy to Spain, after Franco's death. Already in 1973, the first energy crisis caught the dictatorship unaware. While all European countries took drastic energy-saving measures, in some cases even limiting the use of private vehicles, in Spain the price of gasoline remained at 12 pesetas per liter, when the price of a barrel of oil had risen from $1,63 in January of that year to $14 in early 1994.

By mid-1977, inflationary tensions reached their peak, with a 40% growth compared to the same month of the previous year, "threatening to bring Spanish prices to a situation of hyperinflation, something that would have thwarted our future European integration and threatened the process of democratic consolidation," says Alcaide. The Moncloa Pacts (October 1977) allowed the UCD to introduce a set of stabilizing measures of monetary and fiscal policy, while wage increases based on forecasted inflation began to be applied, instead of those based on past inflation as had happened in previous years. Salaries had grown by 27,4% in 1977 and by 24,3% in 1978. Thus, the historical record of the annual CPI growth, 26,4% in 1977, gave way to 16,6% in 1978. But it would not be until six years later, in 1984, when Spanish inflation dropped to single digits.

At the end of the seventies and the beginning of the eighties, prices continued to rise, but economic activity began to decline, and with it unemployment rose. The economy entered into recession, and Spaniards began to familiarize themselves with another term from economic jargon: stagflation! As if that weren't enough, the second energy crisis largely thwarted the downward trend in prices, with the price of a barrel of oil at $30.

With the arrival of the PSOE to power in 1982, the fight against inflation continued to be one of the top priorities. Since then, both in the expansionary phase of the economy (1985-1990) and in the recessive one (1990-1993), the different adjustment programs had managed to reduce the upward pressure on prices, but not enough to achieve, until now, nominal convergence with Europe according to the Maastricht criteria.

EXERCISE

Calculate the year-on-year variation rate of the CPI if in December 2021 and December 2022 the CPIs were 103.965 and 109.734 respectively (source: INE).

$$\text{Annual CPI variation rate} = \frac{\text{CPI of the following year} - \text{CPI of the previous year}}{\text{CPI of the previous year}} * 100$$

$$= \frac{\text{CPI December 2022} - \text{CPI December 2021}}{\text{CPI December 2021}} * 100$$

$$= \frac{109.734 - 103.965}{103.965} * 100 = 5{,}549\ \%$$

EXERCISE

Calculate the monthly variation rate of the CPI if in November and December 2022 the CPIs were 109.899 and 109.734 respectively (source: Spanish National Institute).

= (CPI December 2022 - CPI November 2022) / CPI November 2022 * 100

= (109.734 - 109.899) / 109.899 * 100 = -0,150%

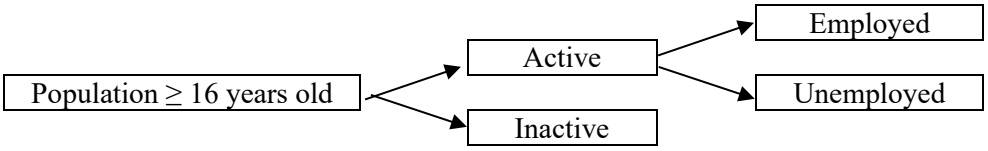
$$\text{Monthly CPI variation rate} = \frac{\text{CPI of the following month} - \text{CPI of the previous month}}{\text{CPI of the previous month}} * 100$$

$$= \frac{\text{CPI December 2022} - \text{CPI November 2022}}{\text{CPI November 2022}} * 100$$

$$= \frac{109.734 - 109.899}{109.899} * 100 = -0{,}150\ \%$$

3.2 Unemployment

From an employment perspective, the population aged 16 and over is divided into active and inactive. The active population consists of both employed individuals and unemployed individuals actively seeking employment (the unemployed). The inactive population is those who are neither employed nor seeking employment (for various reasons such as household work, discouraged workers, etc.).



Unemployment is measured by the unemployment rate, which is the percentage of the active population that is unemployed.

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Active population}} \text{ x } 100$$

There are two basic sources for determining unemployment figures: labour market surveys and unemployment registers. In Spain, the Active Population Survey (EPA) is based on a survey conducted by the National Statistics Institute and serves as an indicator of the imbalance between supply and demand in the labour market. Registered unemployment, on the other hand, is based on claims registered at employment offices on the last day of each month; it serves to implement unemployment protection policies: unemployment benefits, training programs for the unemployed, etc. The criteria for compiling the data provided by these two sources (ultimately, the decision of who is considered unemployed and who is not) can change for various reasons (for example, how to consider certain students, retired people who are seeking employment, people seeking employment to change their current job, job seekers without immediate availability to join the workforce, etc.). Some changes are logically advised by the evolution of the labour market itself, but others should not be discarded as they may be motivated by political reasons aimed at improving statistics.

THE "REAL" UNEMPLOYMENT RATE IN SPAIN IS 34,2%: THE ALTERNATIVE RATE THAT SKYROCKETS EUROPEAN UNEMPLOYMENT

24/10/2014 https://www.eleconomista.es/espana/noticias/6185774/10/14/Cual-es-la-tasa-real-de-paro-en-Espana-un-342-si-se-usa-un-conocido-indicador-de-EEUU.html

Yesterday, the eagerly awaited data for the third quarter of the Active Population Survey (EPA) were released. Unemployment fell by 195.200 people to 23,67%, initially excellent news. But what if we change the criteria for calculating unemployment and use the widely used U6 indicator in the US? The result is that the unemployment rate in Spain exceeds 34%.

In Spain, the National Statistics Institute (INE) calculates the unemployment rate following the criteria of the International Labour Organization (ILO). (…) But there are other formulas that can adjust the real unemployment rate much more, such as the U4, U5, and U6 indicators used in the US. The most widely used formula in Spain, for example, does not consider discouraged workers as unemployed, "nor is it enough to wish to work, you have to actively seek employment. Nor does it consider 'part-time unemployment or underemployment, that is, people who only work part-time even though they want to work full-time". That is why it can be said that the unemployment rate data in Spain is somewhat incomplete.

What are U3, U4, U5, and U6?

By using the indicators used in the United States, a different unemployment rate can be obtained depending on what is being analyzed. Indicator U3 performs the same calculation and criteria as those of the ILO (…). To calculate indicator U4, you have to add to U3 the workers who are not looking for employment because they believe they will not find it, that is, the so-called 'discouraged' in Spain. Additionally, this indicator also includes those affected by employment regulation. Moving forward, we encounter U5, which is like indicator U4, but you have to add the rest of the available people who are not actively looking for employment in the last month but are available and want to work, although they are not actively seeking it. Finally, and therefore the most comprehensive of the indicators, there is U6, which is U5 plus people who are working but only part-time because they have no other choice, meaning they would prefer to have a full-time job.

4. GLOSSARY OF TERMS

Active population: Set of people of working age, who have a paid job or are seeking employment.

Change in inventories (CI): Difference between the value of raw materials, goods in process, and finished products at the end and the beginning of the period.

Circular flow of income: Simple model that explains the movement of money, goods, and services passing through the hands of different economic agents present in an economy; households, the state, and private companies.

Consumer Price Index (CPI): Indicator used to measure the evolution of prices of goods and services consumed by households.

Contingents: Quantitative limitation (maximum amount) imposed by a country as a limit on the imports of a product.

Cost of factors: Value of a macro magnitude depending on the remuneration of the factors used to carry out the production process.

Deflation: General and continuous fall in prices in the economy.

Deflator: Index that indicates how prices have varied between different years and, therefore, allows the comparison of monetary units from different years.

Depreciation: Periodic decrease in the value of a tangible or intangible asset.

Disposable income: Total income received by the household during the specified reference period, after deducting income tax, property taxes, and social security contributions and including received transfers.

Disposable National Income (DNI): Part of the national income that households can consume or save.

Disposable Personal Income: Income that individuals effectively have for consumption and saving.

Employed population: Set of people who have a paid job or engage in independent activity and have worked at least one hour during the reference week and those who, having not done so, maintain a formal link with their job.

Exchange rate: The price of that currency expressed in the currency units of other countries.

Exports: Foreign demand for domestic goods and services.

External balance: Situation in which the balance of payments of a country is balanced.

Factors of production: Resources used to produce goods and services that satisfy human needs (land, labour, and capital).

Fiscal policy: Branch of economic policy that shapes the State Budget as a control variable to ensure and maintain economic stability and avoid situations of inflation or unemployment.

Flow variable: Variable that captures the variations experienced by a stock variable in a given period of time.

Foreign policy: Set of decisions and public actions taken by the government of a state directed in the international environment according to national interests.

Full employment: Situation where the entire active population of a country is employed.

Government spending: Expenditure on goods and services by the public sector.

Gross capital formation: Expenditure by companies and, for the most part, it is expenditure on investment goods.

Gross Domestic Product (GDP): Value of final goods and services generated within the territory of an economy during a specified period of time.

Gross fixed capital formation (GFCF): Expenditure by companies on investment goods, which are used as means of production over several periods.

Gross operating surplus: Surplus generated by operating activities once labour is compensated.

Human Development Index (HDI): Indicator that measures the human development of a country through dimensions of health, education, and economy.

Idle resources: Those factors of production that, for certain reasons, are not being used in production processes.

Imports: Domestic demand for goods and services from other economies.

Inactive population: Set of people aged 16 or over, not classified as employed, unemployed, or separately counted population during the reference week.

Inflation rate: Records the price variation of an economy in a given period and place.

Inflation: Generalized rise in the prices of goods and services in an economy over a period of time.

Intermediate consumption: Value of those goods and services, the purpose of which is their use in the production of other goods and services.

Legal ratios: Monetary policy instrument that allows the Central Bank of a country to control the liquidity of the economy, through changes in the level or amount of the ratio.

Macroeconomic Aggregates: Quantified measurement of the facts and data of economic significance of a country or region.

Market for factors of production: Confluence of suppliers (households or the state and private companies) and demanders (households or the state and private companies) of production factors (land, labour, capital).

Market for goods and services: Confluence of suppliers (private companies) and demanders (households or the state) of goods and/or services produced in the economy.

Market prices: Value of a macro magnitude depending on the market price of what is produced.

Monetary flow: Circulation corresponding to the value of factors or goods or services expressed in monetary units.

Monetary policy: Set of actions carried out by central banks aimed at controlling interest rates and the amount of money, with the aim of influencing the financial conditions of an economy and achieving certain objectives.

National Income (NI): Sum of the incomes generated by all goods and services of a country within a certain period, deducting the goods and services that were required to produce them.

National Product (NP): Value of production carried out by individuals or legal entities that have the status of residents of the country, regardless of whether they are produced within or outside the territory of the economy.

Net Domestic Product (NDP): Value of final production taking into account the depreciation of the capital goods that have been used to carry it out.

Net foreign balance (or net exports): Difference between the exports and imports of an economy.

Nominal value (or current): Magnitude valued in terms, or at prices, when expressed in monetary units of the year to which it refers.

Open economy: Any economy that engages in trade interactions with the outside world.

Potential production: It is the production that an economy can reach, given the available resources and existing technology, without generating inflationary pressures.

Private consumption: Consumption carried out by households, domestic economies, on perishable and durable goods, and services.

Production: Economic activity that adds value by transforming inputs into goods and services.

Public consumption: Expenditure of the public administration, comprising current expenditure on goods and services, and expenditure on investment goods.

Public sector balance: When the sum of revenues equals the total expenditure of public administrations.

Purchasing power: Amount of goods or services that can be obtained with a fixed amount of money depending on the price level.

Real flow: Movement of both production factors and goods and services.

Real value (or constant): Magnitude valued in terms, or at prices, when expressed in monetary units of a year that serves as a base or reference.

Stagflation: Economic situation in which there is both high inflation and economic stagnation with very low or negative GDP growth rates.

Stock variable: Variable whose quantity is measured at a specific point in time.

Supply-side policy: Measures aimed at modifying cost structures, prices of production factors, degree of competition in markets, among others.

Tariffs: Taxes imposed on goods and services that are imported into a country.

Trade policy: Set of regulations determining how economic relations between local businesses or individuals and foreign agents will develop.

Unemployed population: Set of people who have not had wage or self-employment during the reference week.

CHAPTER VI. THE BASIC KEYNESIAN MODEL

1. INTRODUCTION AND MODEL CHARACTERISTICS

Economics utilises models to explain reality. The basic Keynesian model is very simplistic; as such, it simplifies many aspects of economic reality, thereby diverging from it, but at the same time, it explains in an acceptable manner how the economic system operates and how fiscal policy acts to guide the economy towards desired production and full employment.

Perhaps the most notable simplification of the model is its assumption of constant prices, thereby adjustments between supply and demand occur via production. Income and production are, in the model, synonymous concepts, a point that, as we have studied in the previous topic, does not deviate from what occurs in reality.

We will study the model in several phases, completing it step by step. Initially, we will consider a closed economy with no public sector, then we will introduce the public sector, and finally, we will open the economy to external factors.

2. CLOSED ECONOMY WITH NO PUBLIC SECTOR

In the first phase of the model, the only components of economic spending or aggregate demand are private consumption and investment. Since there is no public sector, there are neither public spending nor taxes; as a result of this, the income received by the owners of the productive factors is not reduced by taxes, meaning income and disposable income coincide in value. Considering a closed economy, without external relations, implies there are neither exports nor imports. Therefore, initially we have:

AGGREGATE DEMAND = PRIVATE CONSUMPTION (C) + INVESTMENT (I)

2.1 Consumption, Saving, and Investment Functions

Consumption Function

Household consumption is the most significant and stable component of an economy. In a developed economy, it accounts for more than 60% of total spending. Its stability is attributed to families allocating a percentage of their received income towards consumption, which, barring extraordinary situations, experiences few changes[62].

Household consumption depends on various factors, among which we can highlight the following:

1. Received Income. As received income grows, consumption increases in absolute terms, and the percentage of income consumed decreases.

Income	Consumption	Savings	% income consumed
1.000	1.000	0	100%
2.500	2.000	500	80%
4.000	3.000	1000	75%

2. Expected Income. Consumption also depends on the short- to medium-term expected evolution of income. If an increase in salary is expected, it is very likely that the increase in consumption

[62] It is worth noting that household consumption does not include investment in housing. It consists of a relatively stable set of goods and services that a family does not change significantly unless it experiences a significant setback.

will be brought forward in time to the increased received income; if one's employment contract is ending in a few months, one does not wait until that moment to reduce consumption.

3. Taxes. Their variations affect the disposable income of households. An increase in taxes reduces disposable income and leads to a fall in consumption.

4. Interest Rate. They influence consumption through savings. High-interest rates encourage household savings and, as a consequence, reduce consumption. On the other hand, high-interest rates discourage financing expenses through loans or credits, thereby also reducing spending on durable goods requiring such financing.

To approximate the consumption function of the basic Keynesian model, we assume that consumption depends on income and adheres to three hypotheses:

First: Increases in income generate increases in consumption that are lower than the increases in income that have generated them.

If the consumption function is $C = f(Y)$, where C is consumption and Y is income (or production), its slope is positive and less than unity:

$$0 < \frac{dC}{dY} < 1$$

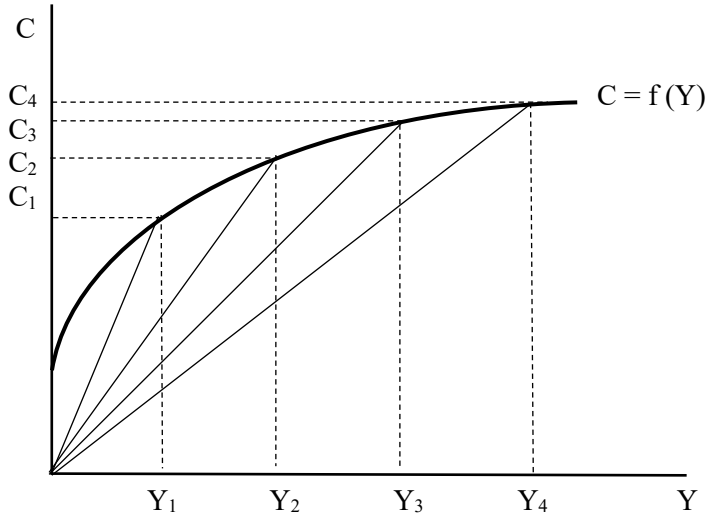
That $\frac{dC}{dY} > 0$ assumes that variations in income lead to variations in the same direction in consumption (increases in income result in increases in consumption). That $\frac{dC}{dY} < 1$ means that increases in consumption are less than increases in income.

Second: Successive and equal increases in income produce successive but decreasing increases in consumption. That is, the slope of the consumption function becomes progressively smaller.

Third: As income increases, the proportion of income consumed decreases:

$$\frac{C}{Y} \text{ decreases as income increases.}$$

Graphically, the consumption function that fits the above hypotheses is shown as follows:



For which, indeed:

1. Increases in income lead to increases in consumption:

$$\Delta Y \Rightarrow \Delta C \text{, but } \Delta C < \Delta Y$$

2. Successive and equal increases in income lead to successive but diminishing increases in consumption:

$$\begin{array}{ccccc} Y_2 - Y_1 & = & Y_3 - Y_2 & = & Y_4 - Y_3 \\ \downarrow & & \downarrow & & \downarrow \\ C_2 - C_1 & > & C_3 - C_2 & > & C_4 - C_3 \end{array}$$

3. The proportion of income consumed for each income level $\left(\frac{C}{Y}\right)$ coincides with the slope of the ray connecting the origin with the corresponding consumption function point for each income level. It is easy to see in the graph that the following holds true:

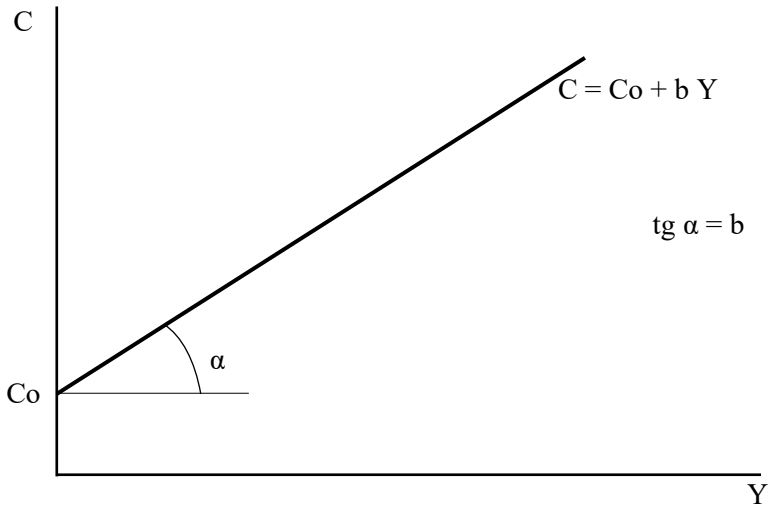
$$\frac{C_1}{Y_1} > \frac{C_2}{Y_2} > \frac{C_3}{Y_3} > \frac{C_4}{Y_4}$$

The basic Keynesian model further simplifies this function, considering it linear, hence not fulfilling the second hypothesis. With the linear consumption function, equal and successive increases in income generate equal increases in consumption. The expression of this function is:

$$C = Co + bY$$

Where C is consumption, Co is autonomous consumption, which is the planned and desired consumption if income were zero (it is the point at which the consumption function intersects the ordinate axis), and b is the slope of the consumption function.

Graphically, the function would be:



Marginal Propensity to Consume (MPC)

The marginal propensity to consume indicates how consumption varies as income changes.

$$MPC = \frac{\Delta C}{\Delta Y}$$

In the limit, when the increase in Y tends to zero, we have:

$$\text{MPC} = \lim_{\Delta Y \to 0} \frac{\Delta C}{\Delta Y} = \frac{dC}{dY} = b \quad \text{(Pending the consumption function)}$$

Since the consumption function is linear, the marginal propensity to consume is constant and theoretically, its value ranges between zero and one [63]:

$$0 < MPC < 1$$

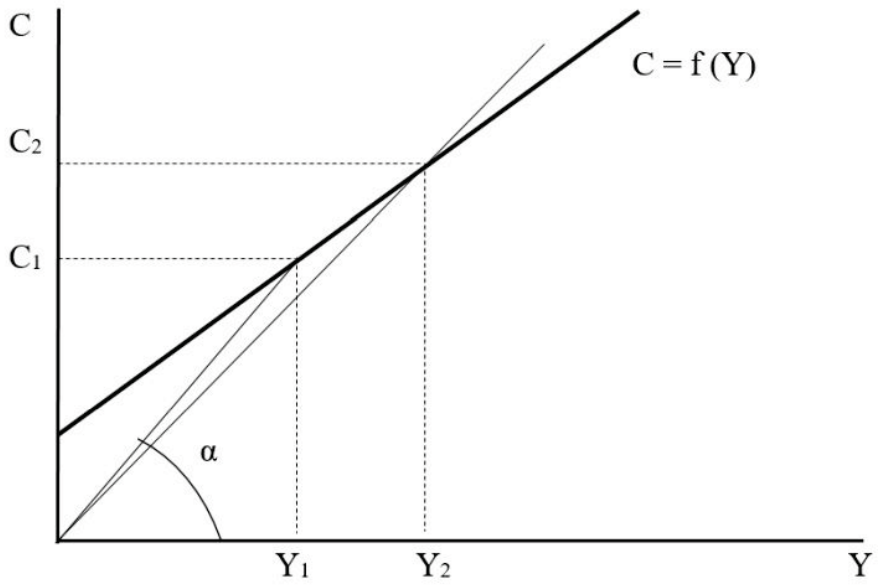
In the real economy, the marginal propensity to consume takes values close to one. For example, if it were 0,8, it would mean that for every unit of increase in income, 0.8 is allocated to consumption.

Average Propensity to Consume (APC)

The average propensity to consume indicates consumption per unit of disposable income.

$$APC = \frac{C}{Y}$$

As we have seen, the average propensity to consume coincides with the slope of the ray that joins the origin of coordinates with the point of the consumption function corresponding to each level of income.



[63] A value below zero would imply that an increase in income leads to a decrease in consumption. A zero value would indicate that consumption is not related to income. If the marginal propensity to consume (MPC) is equal to one, it indicates that increases in income lead to increases in consumption of the same amount. A value above one would indicate that the increases in consumption are greater than the income increases that generated them.

The average propensity to consume decreases as income increases; it is easy to see in the graph that the slope of the ray reduces as income grows.

Saving function

In a simple economy, like the one we are studying in the model, all the income received by families is allocated to consumption (C) or saving (S).

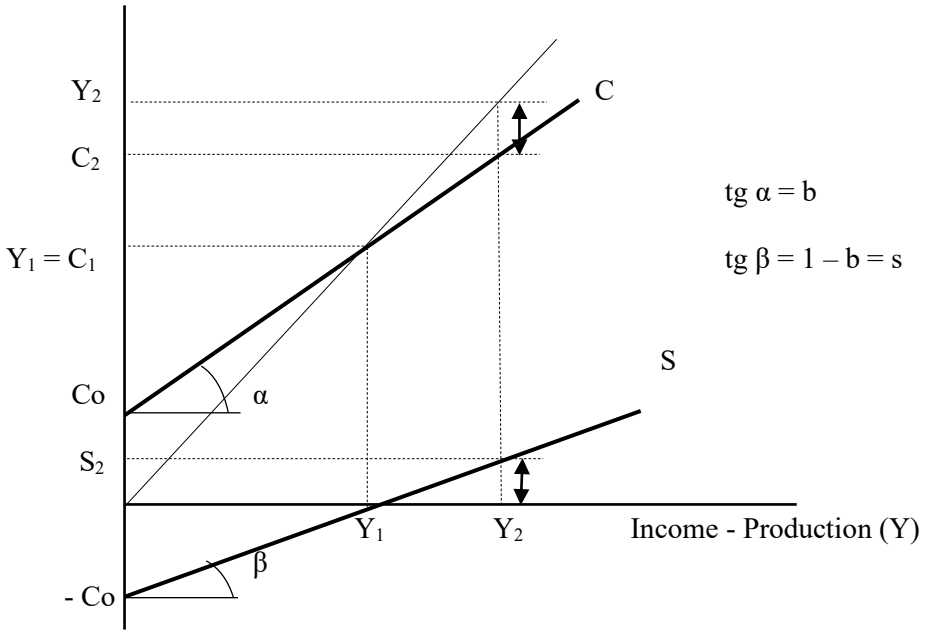
$$Y = C + S$$

Thus, saving is allocated the part of the income that is not consumed. Deriving the saving function is straightforward:

$$S = Y - C = Y - (Co + bY) = -Co + (1 - b)Y = So + sY$$

Where S is saving, So is autonomous saving, which is the planned and desired saving if income were zero (it is the point at which the saving function intersects the ordinate axis, and its value is -Co), and s is the slope of the saving function, which is (1 - b), one minus the slope of the consumption function.

Graphically, deriving the saving function from the consumption function is also straightforward:



If income is zero, savings are -Co, as all that is consumed (Co) is dissaving. If income is Y1, all of it is allocated to consumption ($C_1 = Y_1$) and savings are zero; for this income, the saving function intersects the x-axis. If income is Y_2, consumption would be C2, less than income; savings S2 correspond to the income not consumed ($Y_2 - C_2 = S_2$).

Marginal Propensity to Save (MPS)

The marginal propensity to save indicates how saving varies as income changes.

$$MPS = \frac{\Delta S}{\Delta Y}$$

In the limit, when the increase in income Y tends to zero, we have:

$$\text{MPS} = \lim_{\Delta Y \to 0} \frac{\Delta S}{\Delta Y} = \frac{dS}{dY} = s \quad \text{(Pending the savings function)}$$

Since the saving function is linear and increasing, the marginal propensity to save is constant and ranges between zero and one:

$$0 < MPS < 1$$

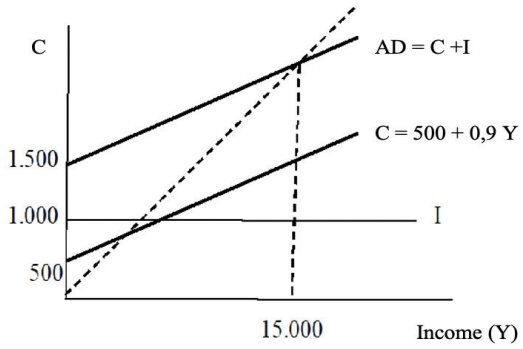
EXERCISE

The expression for the consumption function of an economy, without the public sector or external sector, is C = Co + b · Yd. If autonomous consumption is 500 monetary units and the marginal propensity to consume is 0,9, determine the equilibrium output, knowing that investment is 1.000 monetary units.

The functions are: C = 500 + 0,9 Y
I = 1.000

The equilibrium output will be:

$$Y = C + I = (500 + 0{,}9Y) + 1.000 \;\rightarrow\; 0{,}1Y = 1.500 \;\rightarrow\; Y = \frac{1.500}{0{,}1} = 15.000$$

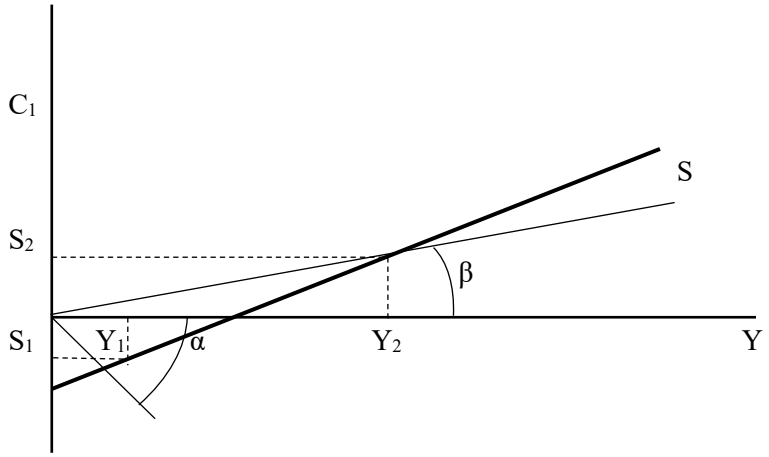


In the real economy, the marginal propensity to save, being one minus the MPC, takes values close to zero. If the MPC were 0,8, the MPS would be 0,2, meaning that for every unit of increase in income, 0,2 is allocated to saving.

Average Propensity to Save (APS)
The average propensity to save indicates saving per unit of disposable income.

$$APS = \frac{S}{Y}$$

The average propensity to save coincides with the slope of the ray that joins the origin of coordinates with the point of the saving function corresponding to each level of income.



$$APS\ (Y_1) = \frac{S_1}{Y_1} = tg\ \alpha \qquad APS\ (Y_2) = \frac{S_2}{Y_2} = tg\ \beta$$

The average propensity to save increases as income increases. It is negative up to the income level for which saving is zero and positive from that level of income onwards.

If we assume the income and consumption data collected in the following table, the corresponding columns for saving, MPC, MPS, APC, and APS would be as follows:

Income (Y)	Consumption (C)	Savings (S)	MPC	MPS	APC	APS
0	6,000	- 6,000	-	-	-	-
10,000	12,000	- 2,000	0.6	0.4	1.2	- 0.2
20,000	18,000	2,000	0.6	0.4	0.9	0.1
30,000	24,000	6,000	0.6	0.4	0.8	0.2
40,000	30,000	10,000	0.6	0.4	0.75	0.25
50,000	36,000	14,000	0.6	0.4	0.72	0.28

Savings: S = Y – C = 0 – 6.000 = - 6.000

$$MPC = \frac{\Delta C}{\Delta Y} = \frac{12.000 - 6.000}{10.000 - 0} = \frac{6.000}{10.000} = 0{,}6$$

$$MPS = \frac{\Delta S}{\Delta Y} = \frac{-2.000 - (-6.000)}{10.000} = \frac{4.000}{10.000} = 0{,}4$$

$$APC = \frac{\mathrm{C}}{Y} = \frac{12.000}{10.000} = 1{,}2$$

$$APS = \frac{\mathrm{S}}{Y} = \frac{-2.000}{10.000} = -0{,}2$$

As we have seen, since all income is allocated to consumption and saving, the sum of the MPC and the MPS equals one:

$$Y = C + S \Rightarrow \frac{dY}{dY} = \frac{dC}{dY} + \frac{dS}{dY} \Rightarrow 1 = MPC + MPS$$

The same applies to the sums of the APC and the APS: their sum is one:

$$Y = C + S \Rightarrow \frac{Y}{Y} = \frac{C}{Y} + \frac{S}{Y} \Rightarrow 1 = APC + APS$$

Investment Function

The second component of private spending is investment (the spending of businesses) which, unlike household consumption, is very sensitive to a wide range of factors and easily undergoes changes due to shifts in the evolution of these factors. Some of the factors that affect investment are easy to measure and predict their impact on businesses, while others are difficult to foresee and evaluate (international conflicts, political and social situation of one's own country and of others, labour conflicts...). Some of the variables with a straightforward impact on investment include:

1. Interest Rate on Loans and Credits. Since a significant portion of investment is usually financed with loans, the cost of money or interest rate directly affects it. If the interest rate decreases, the cost of investment is reduced, its yield increases, and it is expected that investment projects will increase.

2. Taxes. Fiscal incentives stimulate investments as they reduce their cost and increase the yield. Conversely, a fiscal tightening would negatively influence investments.

3. Level of Capacity Utilisation. If, due to demand pressure, the installed capacity of companies is fully utilised, entrepreneurs have a clear incentive to increase productive capacity by carrying out new investments, allowing them to sell more or do so at a reduced unit cost.

4. Expectations. Investment is a bet on the future, such that even with high-interest rates or with partially utilised capacity, if expectations are positive (about the expected evolution of demand, for example) entrepreneurs will tend to invest to position themselves adequately in the market.

We will analyse the relationship between investment and the interest rate, *ceteris paribus*; in essence, we will examine the relationship between the demand for money and its cost (since, as we have seen, most investment is carried out with external financing, paying an interest rate for the money received[64]).

Let's assume that an economy has the possible investment projects listed in the following table, ordered by their expected yield:

Projects	Investment (million €)	Yield	Interest rate 5%		Interest rate 10%	
			Cost	Benefit	Cost	Benefit
A	25	45%	5%	40%	10%	35%
B	10	37%	5%	32%	10%	27%
C	75	25%	5%	20%	10%	15%
D	40	18%	5%	13%	10%	8%
E	35	13%	5%	8%	10%	3%
F	20	9%	5%	4%	10%	- 1%
G	50	6%	5%	1%	10%	- 4%
H	30	4%	5%	- 1%	10%	- 6%

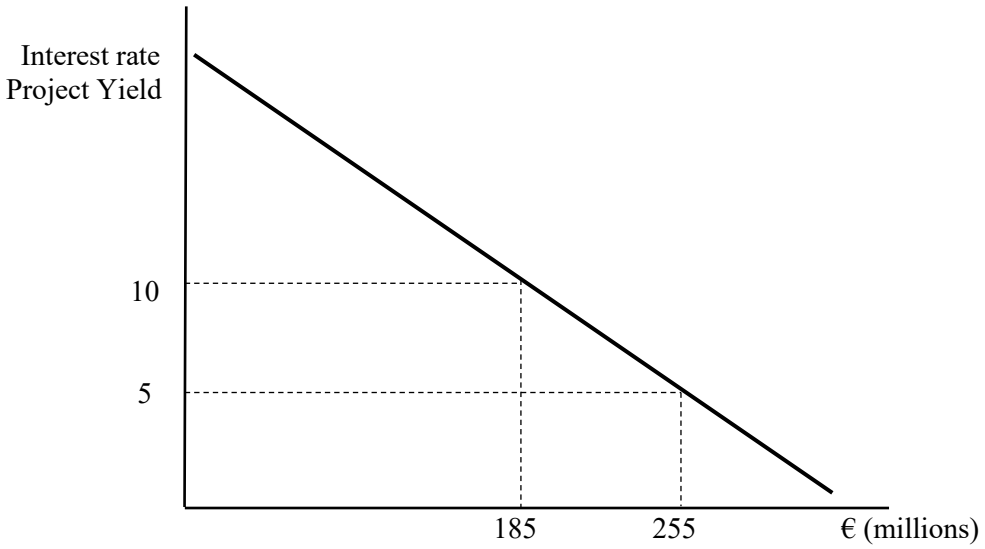
[64] Although companies may have their own means to finance their investments, whether these investments are carried out depends on interest rates. If the interest rates on money are higher than the expected returns on an investment, it will not be undertaken: a company with its own resources will invest in financial assets to receive as return the interest these assets yield, instead of carrying out the investment in real assets with a lower (or uncertain) expected return.

If the cost of money is 5%, only those investment projects with an expected yield equal to or higher than this interest rate will be undertaken; in our table, project H with a yield of 4% would be excluded. If the interest rate is 5%, there will be a demand for money of 255 million euros, the sum of the investment required by projects A to G.

If the interest rate rises to 10%, projects F and G will also be excluded. In this case, the demand for money would be 185 million euros.

The investment demand function, which relates the demand for money and the interest rate, like the demand function for any good, is decreasing: as the price of money rises, the demand for investment falls, and as the price falls, the demand rises. The investment demand function provides dual information:

- The demand for money for investment for each interest rate: if the interest rate is 10%, the demand is 185 million euros.
- The volume of investment required by projects with an expected yield equal to or higher than a given one: in the example economy, there are investment projects worth 255 million euros with a yield equal or superior to 5%.

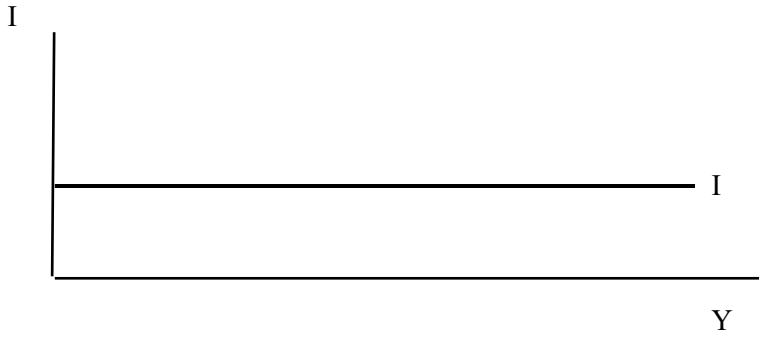


If some factor other than interest changes, the investment demand function would shift upwards or downwards. If, for example, *ceteris paribus,* business expectations improve or the government grants a series of fiscal incentives, the function would shift upwards, so that for each interest rate, the demand for money increases.

As we saw with the consumption function, the basic Keynesian model greatly simplifies the investment function, considering investment as an exogenous variable to the model (therefore, given to it, not determined by the model itself) and independent of income. Another simplification of the model is that in the economy, there is no depreciation; capital goods do not deteriorate; with depreciation being null, no distinction is made between gross and net magnitudes.

$$\text{Net Investment} = \text{Gross Investment} - \underset{\downarrow \\ \text{Null}}{\text{Depreciation}} = \text{Gross Investment}$$

Graphically, the investment function will be a horizontal line, indicating constant investment, independent of production.



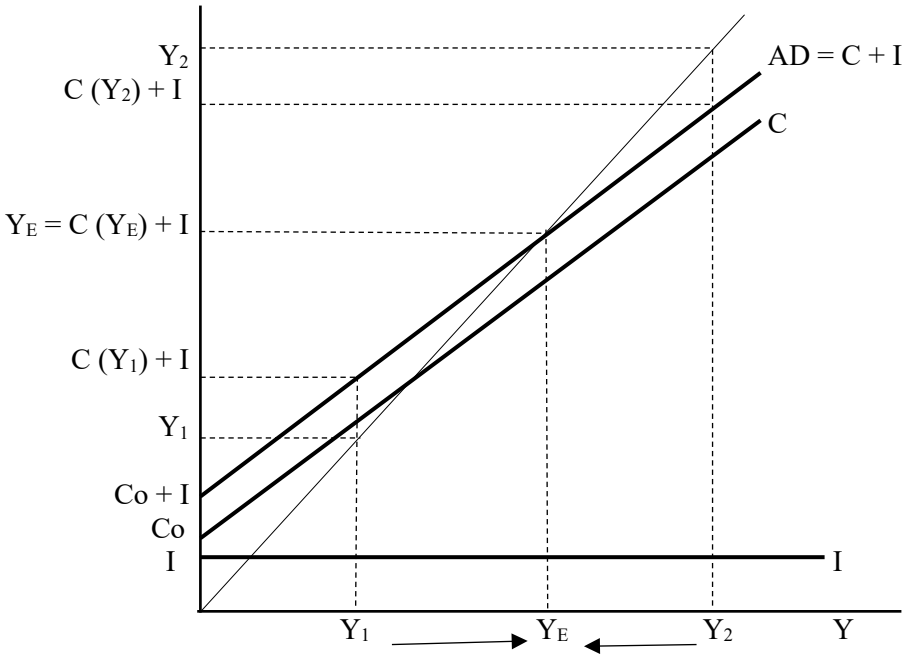
2.2 Equilibrium in the Closed Model without a Public Sector

The equilibrium income or output can be determined by two methods: from the equality of "expenditure (or demand) = production" or from the equality of "savings = investment".

- In the closed model without a public sector, the only two components of aggregate expenditure, or aggregate demand, are household consumption (C) and investment (I). Aggregate demand is the sum of these two macro magnitudes: AD = C + I. Graphically, it is the consumption function shifted upwards by the amount of investment.

Equilibrium is reached for the production (income) that exactly satisfies the total expenditure of the economy. It is the Y_E production corresponding to the intersection point of the total expenditure function with the bisector; this production exactly satisfies the domestic consumption corresponding to that income [C (Y_E)] plus investment (I). In this situation, neither buyers nor suppliers have reason to change their behaviour, as exactly what is sold is produced.

For a production Y1, lower than Y_E, total demand [C (Y_1) + I] exceeds production (Y_1), leading to an unwanted reduction in company stocks, which will lead them to increase production, tending towards Y_E.

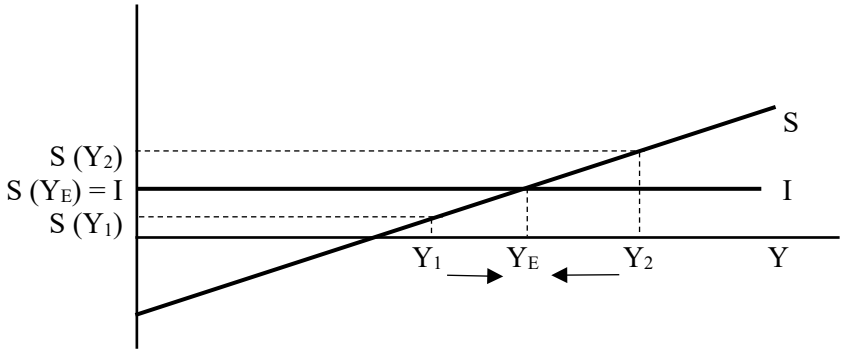


If production were Y_2, higher than Y_E, total demand [C (Y_2) + I] would be lower than production, leading to an unwanted increase in company stocks, which will lead to a reduction in production, also tending towards Y_E.

- From the perspective of the savings-investment equality approach, the equilibrium income is that corresponding to the intersection point of these two functions. It is, therefore, the income (Y_E) for which savings [S (Y_E)] exactly finance the investment (I) that companies wish to make.

On the income side: Y = C + S, as all income is either consumed or saved. On the demand side, AD = C + I. When production satisfies demand:

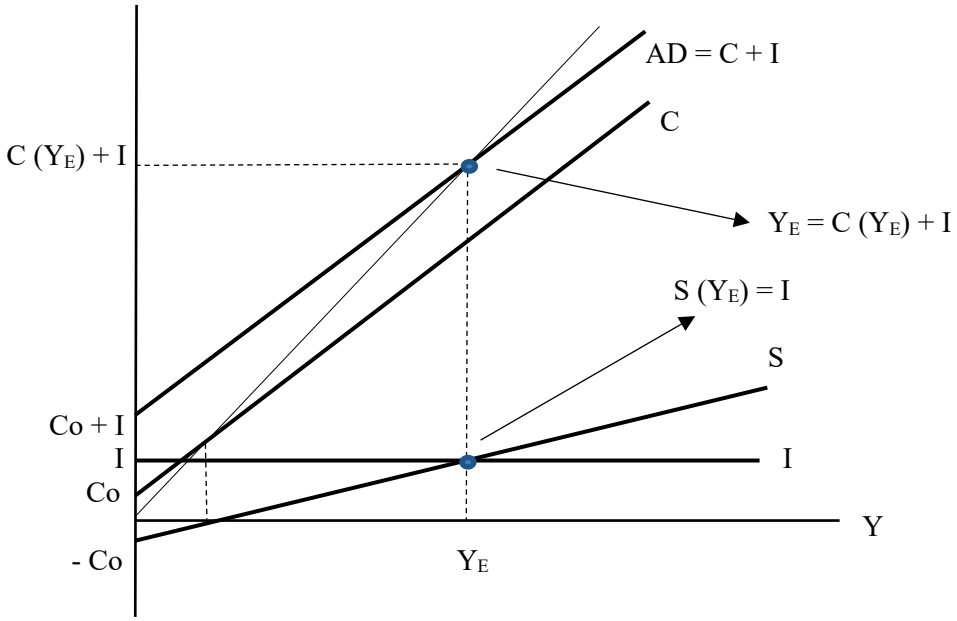
$$Y = AD \quad \rightarrow \quad C + S = C + I \quad \rightarrow \quad S = I$$



For a production level Y_1, lower than Y_E, savings [S (Y_1)] are lower than expected by firms - firms, when deciding on the investment they are going to make, expect households to save enough to finance it -, which implies that consumption is higher than expected (since all income is either spent on consumption or saved); if consumption is higher than expected, an undesired reduction in firm inventories occurs, leading them to increase production, tending towards Y_E.

For production level Y_2, higher than Y_E, savings [S(Y_2)] are higher than expected and consumption, therefore, will be lower than expected, resulting in an undesired increase in firm inventories, leading to a reduction in production, tending towards Y_E.

Logically, both approaches lead to the same result:



EXERCISE

An economy has autonomous consumption of 700 m.u. and an investment of 2.000. Calculate the equilibrium output if the marginal propensity to save is 0,25.

If the marginal propensity to save is 0,25, the marginal propensity to consume is: MPC = 1 – MPS = 1 – 0,25 = 0,75.

The consumption function would be: C = 700 + 0,75Y.

The equilibrium:

$$Y = (700 + 0{,}75Y) + 2.000 \;\rightarrow\; 0{,}25Y = 2.700 \;\rightarrow\; Y = \frac{2.700}{0{,}25} = 10.800$$

2.3 Multiplier

A multiplier indicates the relationship between two economic variables and shows how one is affected by changes in the other. The multipliers in the basic Keynesian model show how income is affected by changes in exogenous variables. In the case at hand, the investment multiplier — the only exogenous variable at this level of the model (although autonomous consumption can be characterised in the same way) — indicates how much income varies as a result of a change in investment.

$$m \cdot \Delta I = \Delta Y \Rightarrow m = \frac{\Delta Y}{\Delta I}$$

In the limit, when ΔI tends to zero:

$$m = \lim_{\Delta I \to 0} \frac{\Delta Y}{\Delta I} = \frac{dY}{dI}$$

As:

$$Y = C + I = (Co + bY) + I = Co + bY + I \Rightarrow Y = \frac{Co}{1-b} + \frac{I}{1-b}$$

Then (and knowing that b is the MPC):

$$m = \frac{dY}{dI} = \frac{1}{1-b} = \frac{1}{1-MPC} = \frac{1}{MPS}$$

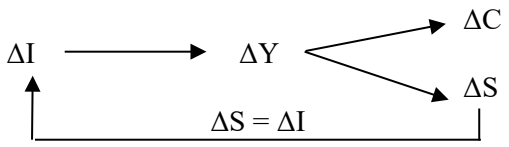
Which is the usual expression for the investment multiplier (or for exogenous variables in the case of a closed model without a public sector[65]). The value of the multiplier depends on the marginal propensity to consume; the greater the MPC (or, equivalently, the steeper the consumption function), the greater the value of the multiplier.

A quick analysis of the effect of an increase in investment on equilibrium income or production may lead to a wrong answer. One might think that since equilibrium production is that which satisfies total demand, it would be enough for production to vary by the same amount as the investment has varied to achieve the final equilibrium, but this is not the case:
A quick analysis of the effect that an increase in investment has on equilibrium income or output can lead to a mistaken conclusion. It might be thought that since equilibrium production is that

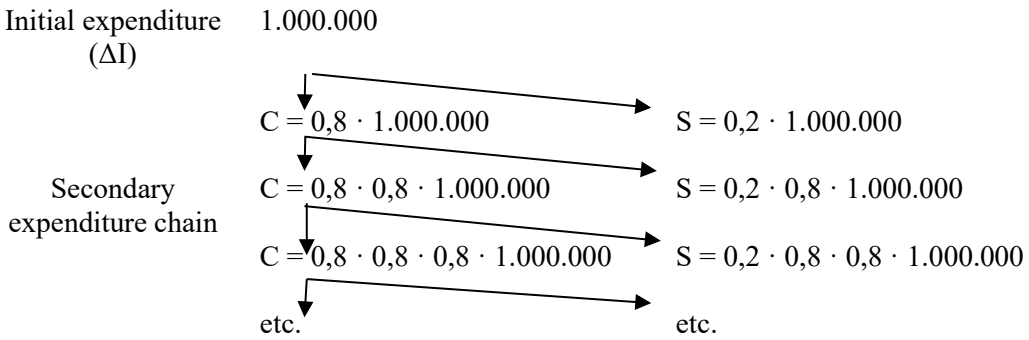
[65] This multiplier is valid for examining how changes in exogenous variables affect income. At this point in the model, we have two exogenous variables: investment (I) and autonomous consumption (Co).

which satisfies total demand, it would be sufficient for production to change by the same amount as the investment has changed to achieve the final equilibrium, but this is not the case:

- On the one hand, because the increase in expenditure (assuming the change in investment is positive) is greater than the increase in investment, since the increase in investment generates a chain of secondary expenditures that production must also meet.
- On the other, to reach a new equilibrium, savings must increase by the same amount as the investment has increased, since in equilibrium savings and investment must be equal. And since not all the increase in income is allocated to savings, but a part is consumed, income must increase enough so that the part of it that is saved is equal to the increase in income that has generated the change.



Suppose that in an economy, which has a marginal propensity to consume of 0,8, investment increases by 1.000.000 monetary units. The initial increase in investment generates a chain of secondary expenditures, as that 1,000,000 monetary units will go to people (engineers, architects, construction companies, machinery sellers…) who will spend a part (determined by the value of the marginal propensity to consume) and save another part (indicating the marginal propensity to save). And what they spend goes to other hands (car dealers, furniture stores, travel agencies…) who act in the same way (spending part and saving part), and so on. The resulting chain is as follows:



The total increase in expenditure, which production must satisfy, is the sum of the initial expenditure and the chain of secondary expenditures.

ΔY = Initial expenditure + secondary expenditures

$\Delta Y = 1.000.000 + (0,8 \cdot 1.000.000 + 0,8^2 \cdot 1.000.000 + 0,8^3 \cdot 1.000.000 + \ldots)$

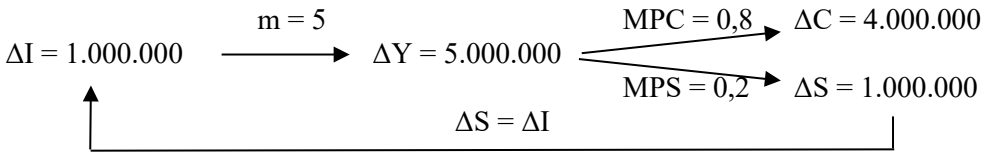
$$\Delta Y = 1.000.000\,[1 + 0,8 + 0,8^2 + 0,8^3 + \ldots] = 1.000.000\,\frac{1}{1 - 0,8} = 1.000.000 \cdot 5 = 5.000.000$$

Where: - 1.000.000 is the ΔI
- 5 in the multiplier[66]:

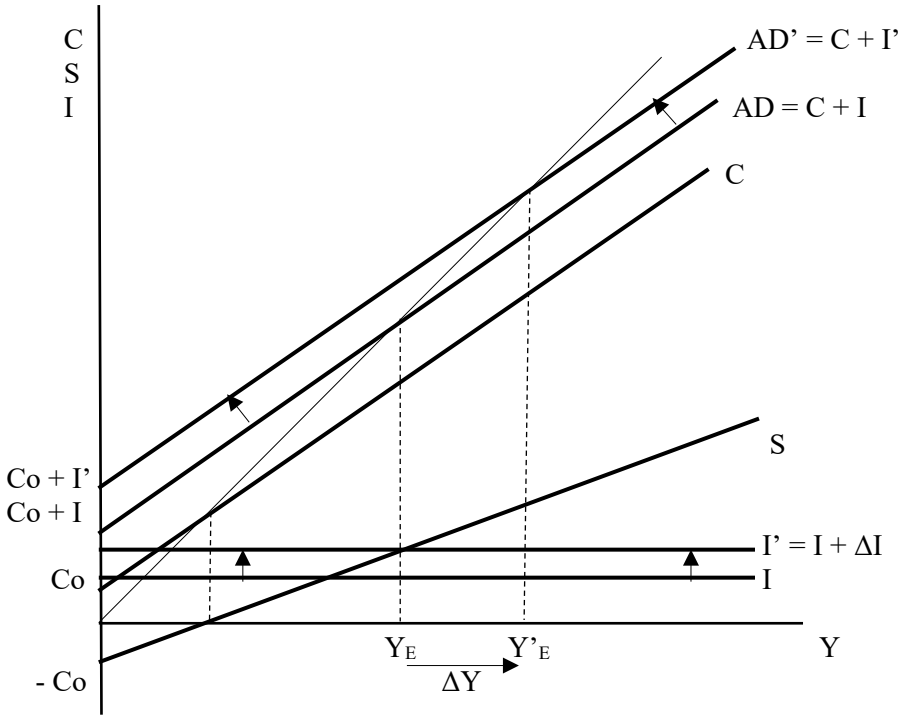
[66] It is worth remembering that $[1 + 0,8 + 0,8^2 + 0,8^3 + \ldots]$ is the sum of a geometric progression with a common ration less than one, which is $S = \frac{a_1}{1 - r}$, where a_1 is the first term of the progression and r is the ratio, which in this case is the marginal propensity to consume (MPC).

$$m = 5 = \frac{1}{1 - 0{,}8} = \frac{1}{1 - MPC}$$

Therefore, an increase in investment of 1.000.000 monetary units generates a total expenditure of 5.000.000 monetary units (1.000.000 initial and 4.000.000 from the chain of secondary expenditures), which production (income) must meet. On the other hand, an increase in income of 5.000.000 monetary units generates an increase in savings of 1.000.000 (since the MPS is 0,2), which is the savings needed to finance the increase in investment[67].



Graphically, the variation in investment shifts the aggregate demand upwards, and the new equilibrium occurs for a higher income (Y'_E). For that income, the saving function intersects the new investment: the final level of saving [S (Y'_E)] finances the total investment (I' = I + ΔI).



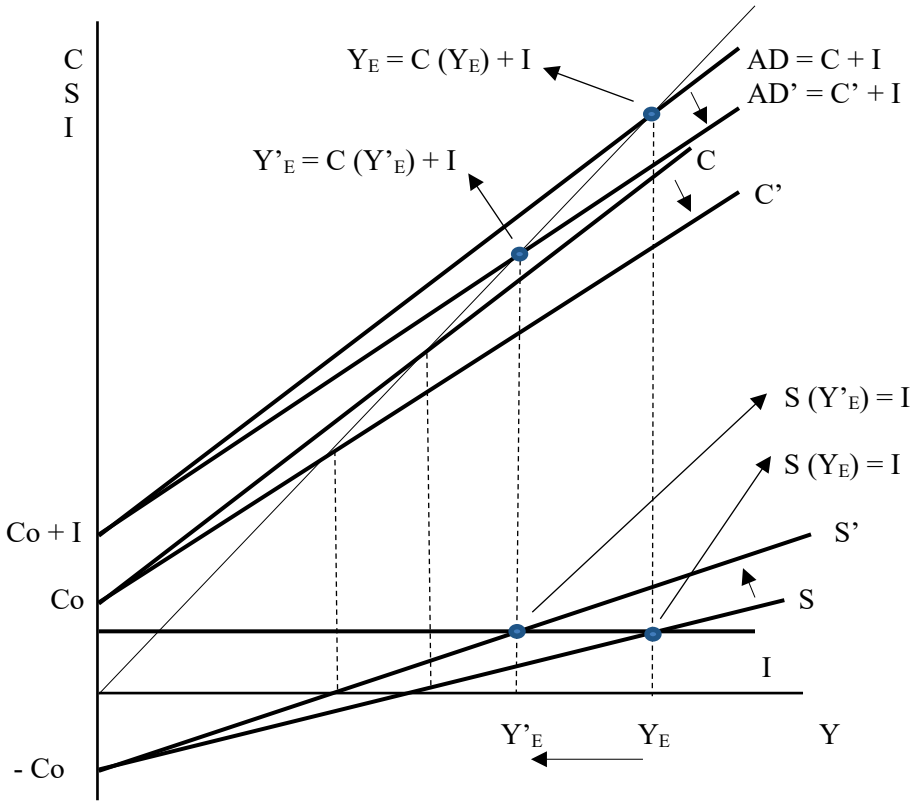
2.4 Paradox of Thrift

Being frugal means consuming with moderation, with measure. A frugal person consumes what they need and, therefore, saves a higher percentage of their income than average. But what may be good for one person or family may not necessarily be good for the whole economic system, and this is precisely what the paradox of thrift refers to. It is called a paradox because people think it is generally good because it is good for one, and this may not be so if certain conditions are not met.

[67] Savings can also be calculated by adding up the successive savings from the chain in the example.

The paradox of thrift states that if, starting from a situation of equilibrium in an economy, the propensity to save of the individuals composing it increases, *ceteris paribus*, the final equilibrium is reached for a level of income (and, therefore, of production and employment) lower than the initial one and for a global saving equal to the starting one

Graphically we would have:



If individuals increase their propensity to save, the marginal propensity to save rises, and, concurrently, the marginal propensity to consume (which is one minus the marginal propensity to save) decreases. This causes the consumption function to rotate downwards and, with it, the total expenditure function (consumption plus investment), reaching —if everything else remains constant— a new equilibrium situation for a production lower than the initial one (as it must satisfy a lower demand, since consumption has dropped) and maintaining constant the level of savings (necessary to finance investment, which has not changed).

Starting situation	Variations	Final Equilibrium
C, I	↑ MPS → ↓ MPC	C', I
MPC		MPC' < MPC
MPS		MPS' > MPS
Equilibrium		Equilibrium
$Y_E = C(Y_E) + I$		$Y'_E = C(Y'_E) + I$ [$< Y_E$]
$S(Y_E) = I$		$S(Y'_E) = I$ [$= S(Y_E)$]

If the propensity of individuals to save decreases, the result would be the opposite: as the marginal propensity to save reduces, the marginal propensity to consume increases, causing the consumption function to rotate upwards dragging the total expenditure function in the same direction. If everything else remains constant, the new equilibrium occurs for a production higher

than the initial one (as it must meet a higher demand) and for the same savings (as the investment that must be financed has not changed).

The effects of a greater propensity to save by the subjects composing an economy depend on the situation:

- In a recessionary situation, where the economy has idle resources, an increase in savings (*ceteris paribus*) deepens the recession: the reduction in consumption leads to a reduction in production and employment. To avoid this, it will be necessary to compensate for the lower consumption with a higher investment.
- If the economy is in a full employment situation, and it is anticipated that demand might press creating tensions in the equilibrium, the greater desire to save will curb these tensions, though it may also result in, if the reduction in consumption is not compensated with more investment, resources being unemployed.
- Finally, in a situation of clear pressure from demand on supply (if demand asks for more than the resources can produce), encouraging saving will help reduce tension.

SAVINGS AND BUSINESS DISTRUST SOAR IN CÓRDOBA AMIDST CRISIS

Cordobans' savings reach record levels amid price hikes and crisis

News, 25/10/2022
https://sevilla.abc.es/andalucia/cordoba/ahorro-desconfianza-empresarial-disparan-cordoba-plena-crisis-20221025083814-nts.html?ref=https%3A%2F%2Fwww.google.com%2F

According to the statistical bulletin from the Bank of Spain, as of last March, banks held a total of €15.559 billion in deposits in the province of Córdoba, almost 14 percent more than when the coronavirus started in March 2020.

This capacity to save economic reserves has been a constant during times when mobility and the economy have been curtailed due to restrictions that have led to a serious crisis, which has already rebounded but has collided with high inflation and the Ukraine war. A scenario that is fostering a new wave of cutbacks and even interest rate hikes, suggesting that the savings capacity may increase further.

One last important element of the economic situation remains to be analyzed: the business confidence indicator produced by the Institute of Statistics and Cartography of Andalusia, which measures entrepreneurs' outlook on their own businesses in the short and medium term, in other words, how they see the future. The data for the third quarter of 20200 show that Córdoba has the worst value in all of Andalusia in terms of the estimation of the current situation, with a 19,4 percent drop in confidence (only Málaga presents a positive value of 20,3 percent).

3. INTRODUCTION OF THE PUBLIC SECTOR INTO THE MODEL. FISCAL POLICY

The inclusion of the public sector into the model introduces the instruments of fiscal policy, public spending, and taxes, which the economic authority uses to achieve the major macroeconomic objectives.

3.1 Public Spending

Public spending is the expenditure of the public sector or the Public Administration. The basic Keynesian model considers it an exogenous variable, as it is determined by the government. Public spending (G) is a new component of aggregate demand, added to the two initial components: private consumption (C) and investment (I). Being an exogenous variable, it is graphically represented as a horizontal line, independent of the income level, and raises the value of the aggregate demand or total expenditure function.

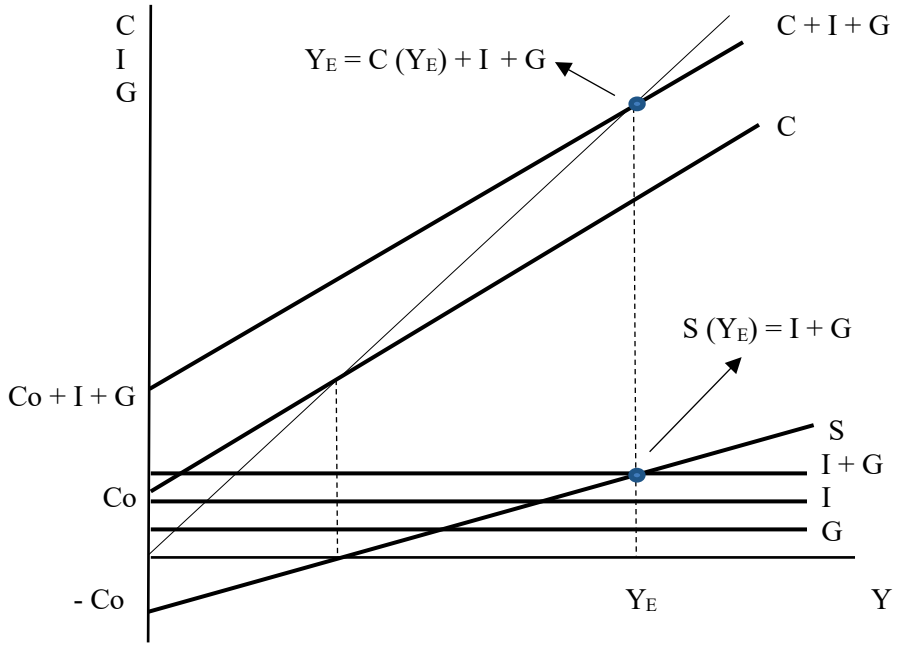
$$AD = C + I + G$$

Equilibrium of the model with public spending

The equilibrium after the introduction of public spending into the model must meet two conditions:

- The equilibrium production must exactly satisfy the demand corresponding to that income: $Y_E = C(Y_E) + I + G$
- Savings (the only exit from the circular flow of income) in equilibrium must finance investment and public spending (which are the entries in the current situation $S(Y_E) = I + G$

Graphically, the equilibrium would be as follows:



Multiplier of Public Spending

The impact of a variation in public spending on equilibrium income is given by the multiplier, which has the same expression as that of investment, since public spending and investment are exogenous variables and the slope of the total expenditure function, on which the multiplier depends, is not affected by the introduction of public spending into the model.

The expression of the public spending multiplier, in an economy without taxes, is as follows:

$$m \cdot \Delta G = \Delta Y \Rightarrow m = \frac{\Delta Y}{\Delta G}$$

In the limit, when ΔG tends to zero:

$$m = \lim_{\Delta G \to 0} \frac{\Delta Y}{\Delta G} = \frac{dY}{dG}$$

As:

$$Y = C + I + G = (Co + bY) + I + G = Co + bY + I + G \Rightarrow Y = \frac{Co + I + G}{1 - b}$$

Then (and remembering that b is the MPC):

$$m = \frac{dY}{dG} = \frac{1}{1 - b} = \frac{1}{1 - MPC}$$

Public Spending as a Fiscal Policy Instrument

So far, we have talked about the equilibrium income Y_E as if being in it was the ideal situation: production exactly satisfies demand and savings finance investment and public spending. However, we must not confuse the equilibrium situation with the full employment situation. Full employment production Yfe corresponds to an economy that has employed all its resources. It is evident that an economy can be in an equilibrium that does not correspond to full employment. The difference between full employment production and the current (equilibrium) production is called the "production gap".

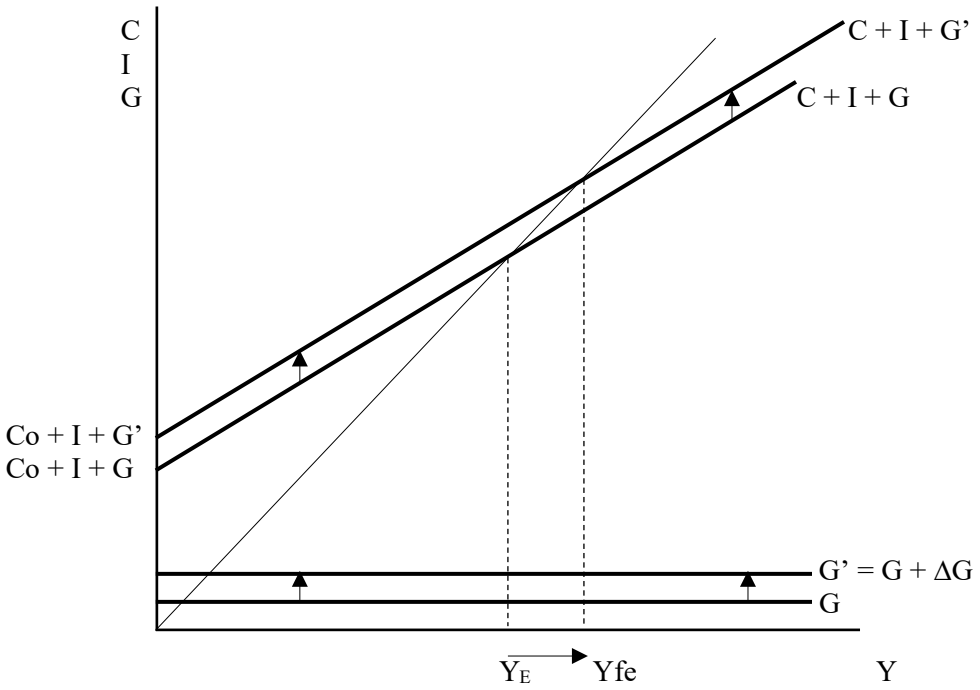
Public spending, as a component of aggregate demand, affects the equilibrium income and turns it into an instrument in the hands of the government to steer the economy towards macroeconomic objectives. Thus:

- When the equilibrium income is lower than the full employment income ($Y_E < Yfe$), the economy has unemployed resources. Production satisfies demand, but this demand is insufficient to employ all resources; the economy is in an equilibrium situation with idle resources.

In this case, the government can carry out an expansive economic policy, using public spending, to move towards full employment, improving the production and employment objectives. If the government increases public spending, demand rises and the new equilibrium will occur for a production and employment higher than the initial ones:

$$\uparrow G \rightarrow \uparrow AD \rightarrow \uparrow Y_E \ (Y_E \rightarrow Yfe)$$

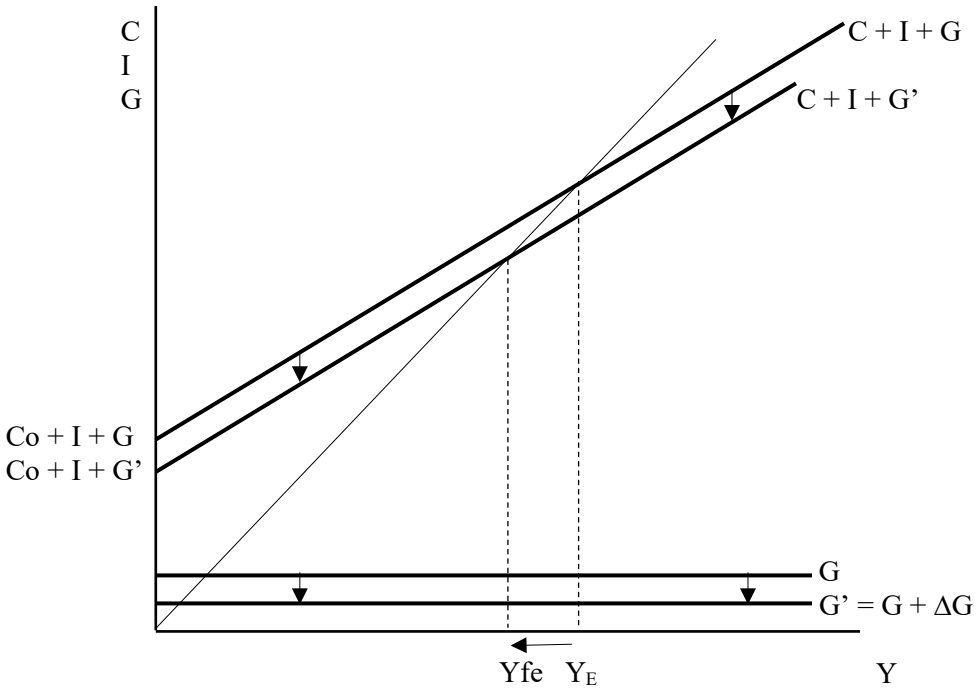
Graphically:



- If the equilibrium income is higher than the full employment income (Y_E > Yfe), demand is asking the supply for more than it can produce. As in the previous case, production satisfies demand, but the economy is above its possibilities: productive resources are overexploited. If the model did not assume that prices are constant, this situation of excess demand would lead to an increase in prices.

In this case, the government would carry out a contractionary economic policy, to reduce demand and not overexploit the resources; improving the production and employment objectives (and avoiding tensions in prices). If the government reduces public spending, demand decreases and the new equilibrium occurs for a production and employment below the initial ones:

$$\downarrow G \rightarrow \downarrow AD \rightarrow \downarrow Y_E \ (Y_E \rightarrow Yfe)$$



3.2 Taxes

The public sector primarily finances its expenditures through taxes. Taxes, in the basic Keynesian model, affect aggregate demand through private consumption, as consumption depends on income and this decreases when taxes are introduced.

Until now, we have not made a distinction between income (Y) and disposable income (Yd), as if there were no taxes, households could dispose of all the income they receive. Incorporating taxes changes the situation, and households can only allocate the remaining income after paying taxes to consumption (C) and savings (S). Thus:

$$Yd = Y - T \qquad \text{(where T is tax revenue)}$$

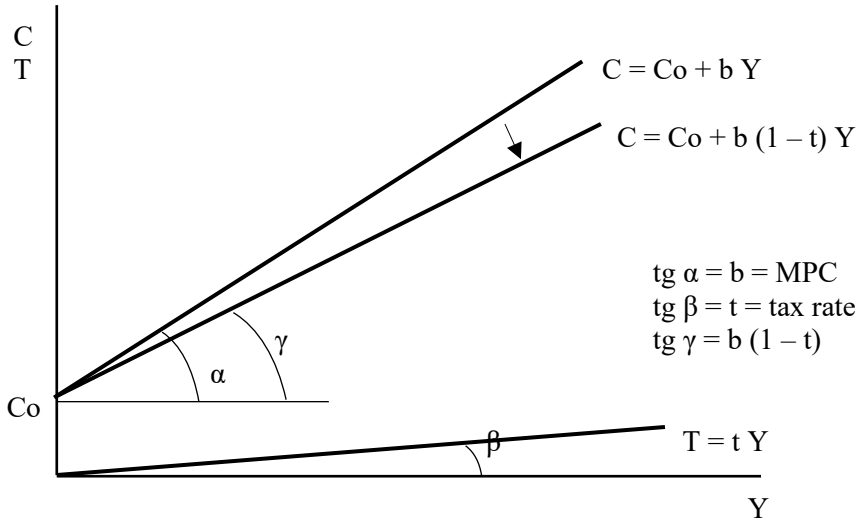
The model assumes that taxes are a percentage of income, and as consumption is the only component of expenditure that depends on income, it is the only one affected:

$$T = t \cdot Y \qquad \text{(where t is the tax rate)}$$

The introduction of taxes affects the consumption function:

$$C = Co + b\,Yd = Co + b\,(Y - T) = Co + b\,(Y - t\,Y) = Co + b\,(1 - t)\,Y$$

The consumption function reduces its slope, rotating downwards around its intercept with the ordinate axis. Graphically:

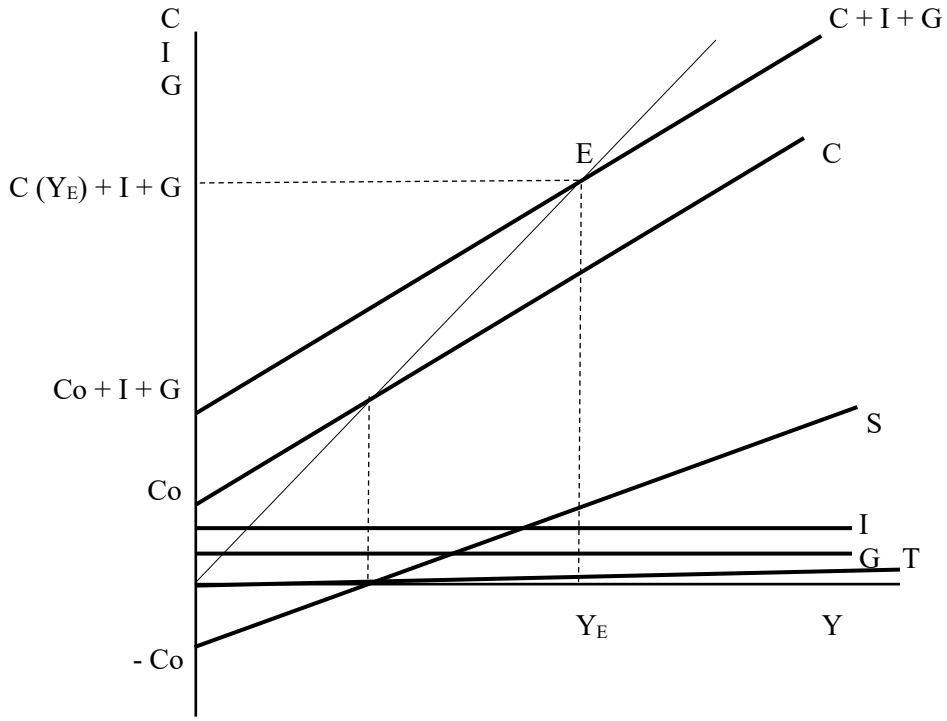


3.3 Equilibrium of the Model

The conditions that must be met for equilibrium after the introduction of taxes do not change substantially:

- The equilibrium production must satisfy the demand corresponding to that income: $Y_E = C(Y_E) + I + G$, with the only difference being that now the consumption function incorporates taxes and, therefore, the income available for consumption is different from the total income received ($Y \neq Yd$).
- Taxes are a new exit from the circular flow of income, joining savings. Savings and taxes must finance investment and public spending (which are the entries): $S(Y_E) + T(Y_E) = I + G$

Graphically, the equilibrium would be as follows:



Where: $Y_E = C(Y_E) + I + G$

$S(Y_E) + T(Y_E) = I + G$

EXERCISE

A closed economy has the following functions:

C = 2.500 + 0,85 Yd G = 1.250

I = 1.500 T = 0,2 Y

Calculate the equilibrium income.

The equilibrium income will be:

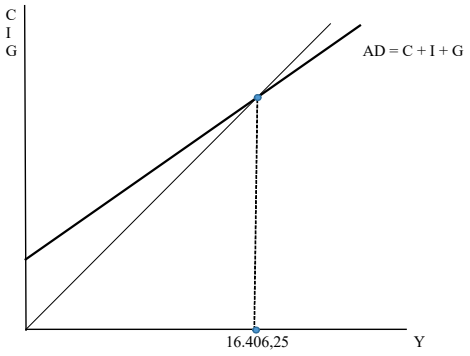
$$Y = C + I + G = (2.500 + 0{,}85 \cdot Yd) + I + G = \left[2.500 + 0{,}85(Y - T)\right] + I + G$$

$$Y = \left[2.500 + 0{,}85(Y - 0{,}2 \cdot Y)\right] + 1.500 + 1.250$$

$$Y = 2.500 + 0{,}85 \cdot 0{,}8 \cdot Y + 2.750 = 5.250 + 0{,}68 \cdot Y$$

$$0{,}32 \cdot Y = 5.250 \quad \rightarrow \quad Y = \frac{5.250}{0{,}32} = 16.406{,}25$$

Graphically:



Multiplier of Tax Revenue

The impact on equilibrium income of a variation in tax revenue (T) —in the assumption of non-proportional taxes to income— is given by the tax revenue multiplier. The expression of this multiplier is as follows:

$$m_T \cdot \Delta T = \Delta Y \Rightarrow m_T = \frac{\Delta Y}{\Delta T}$$

In the limit, when ΔT tends to zero:

$$m_T = \lim_{\Delta T \to 0} \frac{\Delta Y}{\Delta T} = \frac{dY}{dT}$$

As:

$$Y = C + I + G = (Co + bYd) + I + G = Co + b(Y - T) + I + G = Co + bY - bT + I + G$$

$$Y = \frac{Co - bT + I + G}{1 - b}$$

Then:

$$m_T = \frac{dY}{dT} = \frac{-b}{1-b} = \frac{b}{b-1} = \frac{MPC}{MPC-1}$$

Unlike the multipliers seen so far, this one is negative, as a variation in tax revenue in one direction produces a variation in income in the opposite direction.

Multiplier of Exogenous Variables in the Closed Model with Public Sector

The incorporation of the public sector into the model, and particularly the consideration of taxes, by affecting the slope of the consumption function and, as a consequence, the slope of the aggregate expenditure function, also changes the expression of the multiplier of the exogenous variables (investment, public spending, and autonomous consumption).

The new expression of the multiplier, for example, of public spending is as follows:

$$Y = C + I + G = (Co + bYd) + I + G = Co + b(Y - T) + I + G = Co + b(Y - tY) + I + G$$
$$Y = Co + b(Y - tY) + I + G = Co + b(1-t)Y + I + G$$
$$Y = \frac{Co + I + G}{1 - b(1-t)}$$

Therefore:

$$\boxed{m = \frac{dY}{dG} = \frac{1}{1 - b(1-t)}}$$

The denominator of the multiplier is 1 minus the slope of the total expenditure function —which, for now, coincides with the slope of the consumption function— and, as we have seen, once taxes are introduced, it is reduced, mitigating the multiplier effect of the variations of the exogenous variables.

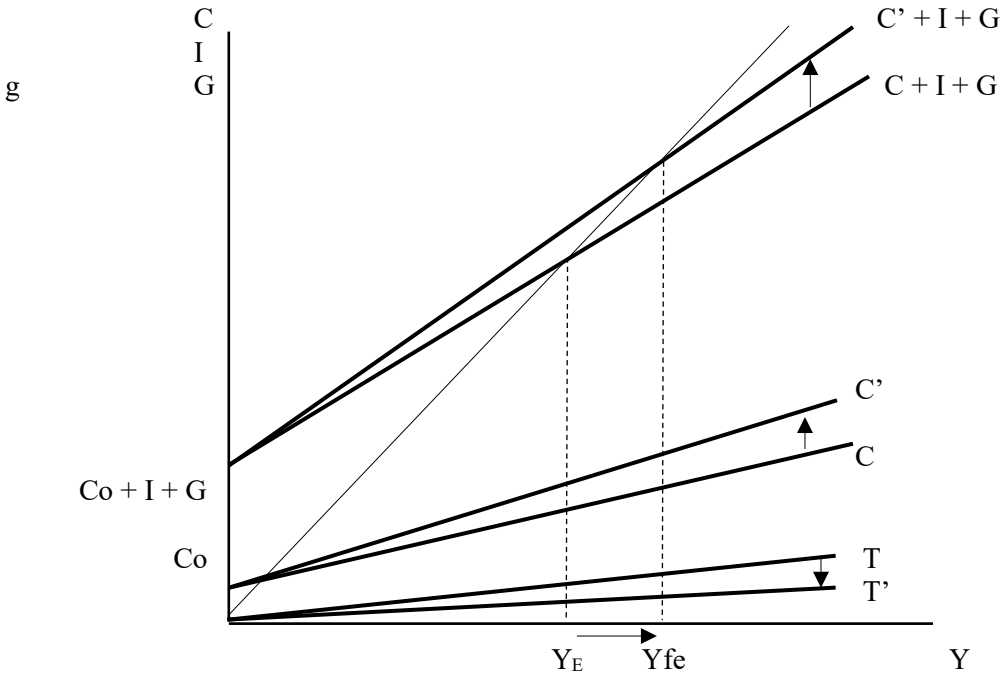
Taxes as a Fiscal Policy Instrument

To achieve macroeconomic objectives, the economic authority can use taxes to influence aggregate demand through household consumption. Thus:

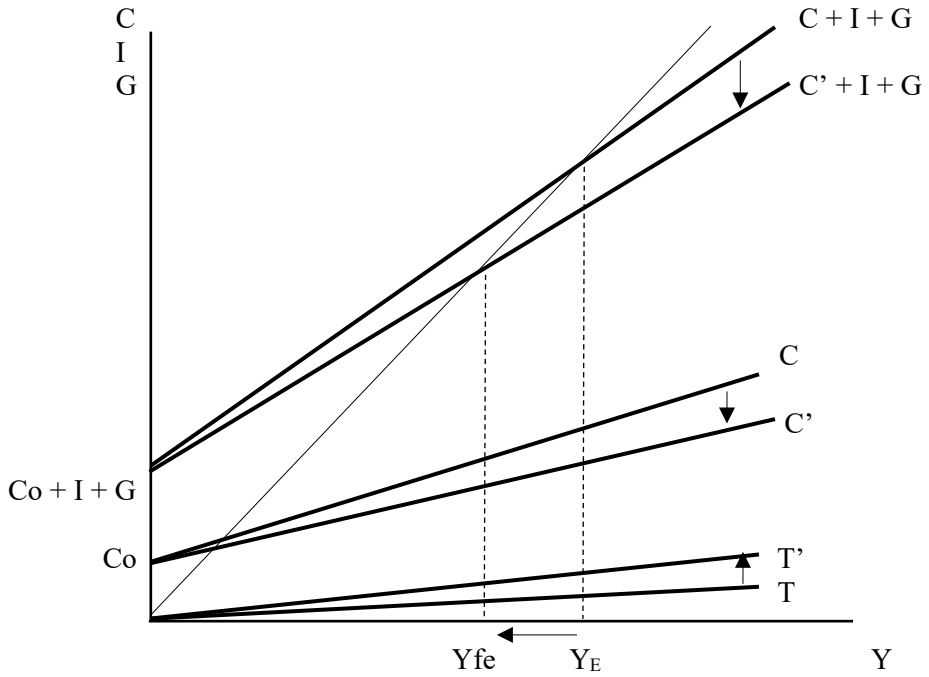
- When the equilibrium income is lower than the full employment income ($Y_E < Yfe$), an expansive fiscal policy aimed at increasing production and reducing unemployment would be articulated by means of a reduction in taxes that, by increasing disposable income, would boost household consumption (with an upward rotation of the consumption function) and, with it, increase global demand (C + I + G). The new equilibrium would occur for a production and employment higher than the initial ones:

$$\downarrow T \rightarrow \uparrow Yd \rightarrow \uparrow C \rightarrow \uparrow AD \rightarrow \uparrow Y_E \ (Y_E \rightarrow Yfe)$$

Graphically:



- If the equilibrium income is higher than the full employment income (Y_E > Yfe) and demand is asking for more than what the productive factors can produce without being forced, the government could carry out a contractionary fiscal policy, aimed at reducing demand, using taxes.



An increase in the tax burden reduces disposable income, households spend less, aggregate expenditure decreases, and the new equilibrium occurs for a production and employment below the initial ones:

$$\uparrow T \rightarrow \downarrow Yd \rightarrow \downarrow C \rightarrow \downarrow AD \rightarrow \downarrow Y_E \ (Y_E \rightarrow Yfe)$$

EXERCISE

Let's consider an economy with the following functions:

$$C = 1.000 + 0{,}8\ Yd \qquad G = 2.000 \qquad I = 1.000 \qquad T = 0{,}2\ Y$$

The equilibrium income would be:

$$Y = C + I + G = (1.000 + 0{,}8\ Yd) + 1.000 + 2.000$$
$$Y = [1.000 + 0{,}8\ (Y - T)] + 1.000 + 2.000$$
$$Y = [1.000 + 0{,}8\ (Y - 0{,}2\ Y)] + 1.000 + 2.000$$

Solving for Y, the result is a value of 11,111.11.

Let's see how equilibrium income is affected by a change in government spending and tax revenue by the same amount, for example, 200 monetary units.

- If G increases by 200 monetary units, we have:

$$Y = C + I + (G + \Delta G) = (1.000 + 0{,}8\ Yd) + 1.000 + (2.000 + 200)$$
$$Y = [1.000 + 0{,}8\ (Y - T)] + 1.000 + 2.200$$
$$Y = [1.000 + 0{,}8\ (Y - 0{,}2\ Y)] + 1.000 + 2.200$$

This results in a final equilibrium Y of 11.666,66.

- If instead of increasing G, we reduce tax revenue by the same amount (200 monetary units), we would have:
Tax revenue in the initial situation is: $T = 0{,}2\ Y = 0{,}2 \cdot 11.111{,}11 = 2.222{,}22$

Which would decrease to: $T' = T - \Delta T = 2.222{,}22 - 200 = 2.022{,}22$

This would cause the tax rate to change from 0,2 to: $t' = \dfrac{2.022{,}22}{11.111{,}11} = 0{,}18$

The equilibrium income after this change would be:

$$Y = C + I + G = (1.000 + 0{,}8\ Yd) + 1.000 + 2.000$$
$$Y = [1.000 + 0{,}8\ (Y - T)] + 1.000 + 2.000$$
$$Y = [1.000 + 0{,}8\ (Y - 0{,}18\ Y)] + 1.000 + 2.000$$

This results in a final equilibrium Y of 11,574.07.

Therefore: $\Delta G = 200 \rightarrow \Delta Y = 555{,}55$
$\Delta T = -200 \rightarrow \Delta Y = 462{,}96$

The variation in government spending, with the data from the example, achieves an increase in income of 92,59 units more than the same variation in taxes.

The effectiveness of the two fiscal policy instruments differs. Public spending, by directly affecting aggregate demand, is more effective than taxes, which influence aggregate demand through private consumption and hence, its effectiveness is tempered by the marginal propensity to consume. For an identical variation, the direct action of public spending is more effective than

the indirect action of taxes; for a tax variation to produce the same effect as a variation in spending, it must be greater.

To achieve the same objective (e.g., to increase production by a certain amount), fewer monetary units need to be mobilised if public spending is used rather than taxes. However, the temporal perspective, in which spending generally has a longer delay than taxes, must also be considered. From the decision to increase public spending (e.g., to build a highway) to its implementation, several years can pass (decision, inclusion in the state budget, budget approval, preliminary studies, tender processes, construction, etc.). Taxes require less time, though they also demand extensive periods (decision, approval, implementation, etc.). Other instruments, like the interest rate, are quicker; from the moment the Central Bank decides to lower interest rates, the cost of money is reduced, thereby making loans cheaper and incentivising investment.

Automatic Stabilisers

Stabilisers are tools aimed at smoothing economic cycles and preventing fluctuations from having extreme peaks and troughs. An instrument is an automatic stabiliser when it "on its own" adjusts to economic fluctuations, smoothing them out; it automatically does what would be expected of the economic authority if it were to take active measures.

And this is what happens with taxes:

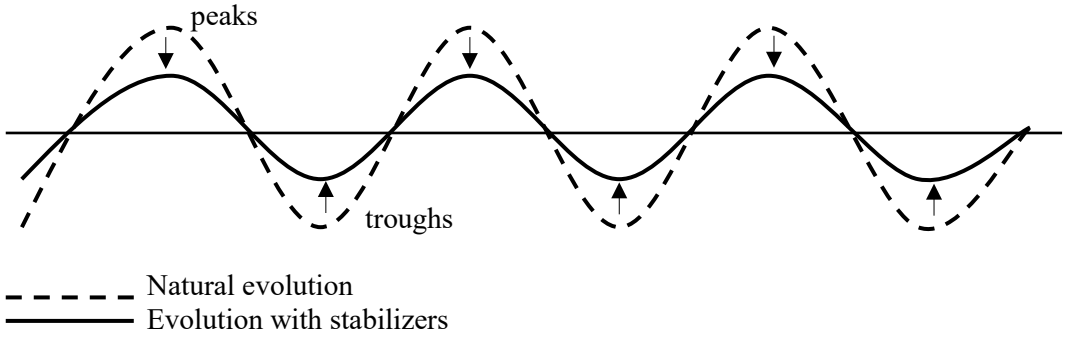
- If demand grows more than desired and threatens to exceed the economy's production capabilities, taxes, being proportional to income, automatically increase, reducing disposable income and curbing consumption, which thus becomes less than it could be if taxes did not act in this manner.

$$\uparrow Y \rightarrow \uparrow T \rightarrow \downarrow Yd \rightarrow \downarrow C \rightarrow \downarrow AD$$

- Conversely, if demand decreases excessively, forcing companies to reduce production and cut jobs, taxes decelerate with income, pulling up disposable income and consumption, so that consumption is greater than it would be if taxes remained constant.

$$\downarrow Y \rightarrow \downarrow\uparrow T \rightarrow \uparrow Yd \rightarrow \uparrow C \rightarrow \uparrow AD$$

In this manner, taxes automatically adjust to economic variations, without the need for explicit action. The degree of automatic stabilisation by taxes depends on the tax rates and their progressiveness.



Another automatic stabilizer linked to the public sector is unemployment benefits. Once this benefit is established in a country, it operates on its own. During a recession and an increase in unemployment, the number of people receiving benefits automatically grows as they join the unemployment rolls, ensuring a minimum income and a certain level of consumption. Although this consumption may not be high, it is higher than it would be without the benefit.

As the economy recovers, people find employment and leave the unemployment rolls, automatically losing the right to benefits. This leads to an increase in consumption, but it grows less than if, along with the income earned from work, the benefits were maintained.

Savings also act as a private automatic stabilizer. When incomes are high, the percentage of income saved increases, slowing down consumption. Even though consumption is higher than with lower incomes, it is lower than it would be without this effect. On the other hand, when incomes are low, savings decrease and the proportion of income consumed increases (even resulting in dissaving); thus, the decline in consumption is slowed, resulting in consumption higher than what would correspond to the new income level.

TAX CUTS BY THE REGIONAL GOVERNMENT SINCE 2019 HAVE RESULTED IN SAVINGS OF €925,85 MILLION

The majority of the tax cuts have benefited individuals with middle and low incomes, representing two out of every three euros of tax savings for Andalusians.

News, 25/02/2023
https://www.lavanguardia.com/local/sevilla/20230225/8783676/espana-destaca-bajadas-impuestos-junta-2019-han-supuesto-ahorro-925-85-millones.html

In this regard, 32,9% of the total savings (€304,85 million) is concentrated in the Personal Income Tax (PIT), a progressive tax with the greatest redistributive capacity. This is a state tax partially delegated to the autonomous communities, on which the Regional Government has reduced the regional portion of the rates, introduced new deductions, expanded some existing ones, and adjusted the first brackets of the regional tax schedule and personal and family exemptions, exempt from taxation. After the PIT, Minister Carolina España highlighted in a statement the reductions applied by the Government of Juanma Moreno on the Transfer Tax and Stamp Duty (ITPAJD), which has resulted in savings for Andalusians of €289,8 million, representing 31,3% of the total savings generated by fiscal measures implemented in the last four years for Andalusians.
The elaboration of this Strategy is going to be fundamentally participatory, insisted the minister, who encouraged companies, scientific and research societies, as well as society in general, to participate in the preparation of this diagnosis on everything related to the blue economy today. The blue economy, according to the data currently available to the Ministry of Sustainability, is a section that encompasses 300.000 jobs, contributes €17 billion, 10,5% of the Andalusian GDP, and, in addition to having large companies, also comprises between 3.000 and 5.000 SMEs.

Fiscal Drag

The automatic adjustment of some stabilisers, precisely because they smooth economic oscillations, may sometimes be negative. For instance, increasing tax revenue associated with a recovery phase after a recession may prevent demand from growing sufficiently, hindering the exit from the crisis. In these cases, the automatic effect of taxes is detrimental and is referred to as “fiscal drag”.

If real economic growth is coupled with a price increase, a “double fiscal drag” occurs, as higher monetary incomes cause progressive tax revenue to grow even more, acting as a real brake on economic recovery.

This suggests that, although automatic stabilisers contribute to reducing economic oscillations, vigilance and active intervention by economic authorities are necessary to make timely

corrections (active stabilisers) when required. Some measures the government could apply include:

- Public works programs, which, as economic stimulators, suffer from significant time delays between decision-making and actual expenditure.
- Employment promotion programs: social security contribution bonuses, prioritising certain types of contracts (permanent, part-time, etc.).
- Social expenditures: increased unemployment benefits, extension of benefit duration, etc.
- Variations in tax rates, with the aim of increasing or decreasing tax revenue.

3.4 Public Sector Budget. Full Employment Budget

The public sector budget includes the revenues and expenditures of public administrations. Like any other budget, it can be:

- Balanced: Public revenues = Public expenditures
- Deficit: Public revenues < Public expenditures
- Surplus: Public revenues > Public expenditures

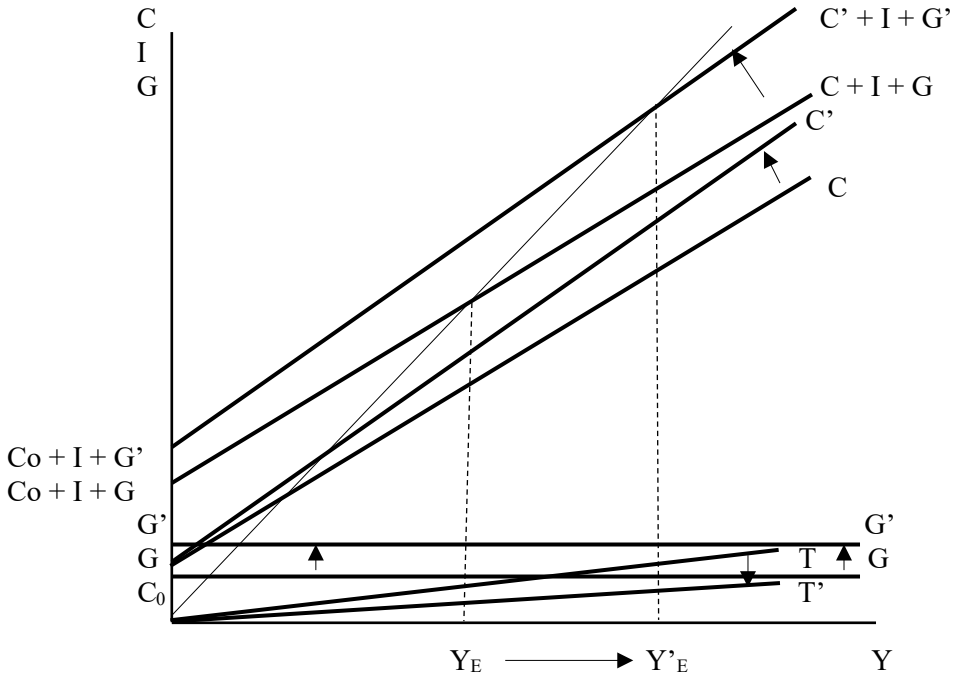
Maintaining a certain balance in the state's accounts, like those of any institution (public or private), is desirable, as continued imbalance has a perverse effect on the economy. Therefore, ensuring an appropriate relationship between revenues and expenditures, with a medium-to-long term view, is one of the major macroeconomic goals. The implementation of fiscal policy, through public spending and taxes, to steer the economy towards its major goals, affects the budgetary situation of the public sector.

In case of recession, reactivating demand calls for an expansive fiscal policy, which would consist of an increase in public spending (G) and/or a reduction in taxes (T). The impact of these measures on the budgetary situation would depend on the starting situation:

Expansive fiscal policy (↑ G and/or ↓ T)	
Starting situation	Final situation
Surplus	Reduction of surplus, balance or deficit
Balanced Budget	Deficit
Deficit	Larger deficit

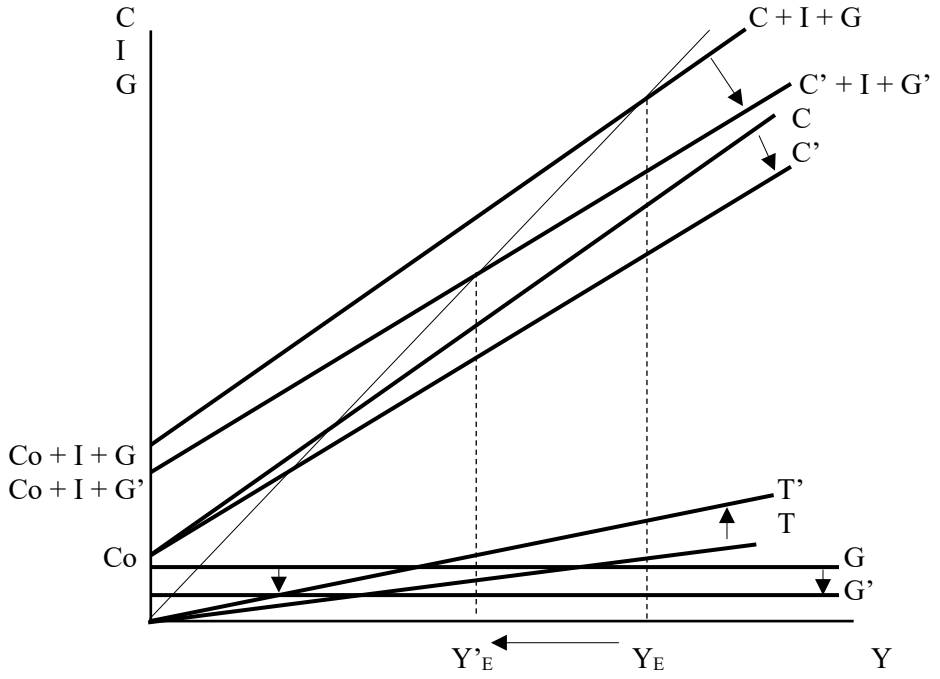
Assuming a balanced starting situation for an income Y_E, lower than full employment, for which there is a budgetary deficit [$G > T\ (Y_E)$].

The increase in public spending (from G to G') raises overall demand and the reduction in the tax rate (changing the collection from T to T'), by increasing disposable income, shifts the consumption function upwards (from C to C'), which also shifts the total demand in the same direction, eventually being C' + I + G'. The final equilibrium will be for an income Y'_E, higher than Y_E and closer to full employment, and with a larger budgetary deficit [$G' > T'\ (Y'_E)$] than the starting one [$G - T\ (Y_E) < G' - T'\ (Y'_E)$].



If, on the other hand, the situation requires the application of a contractionary fiscal policy (reduction in public spending and/or increase in taxes), the impact on the budgetary situation would be:

Contractionary fiscal policy (↓ G and/or ↑ T)	
Starting situation	Final situation
Surplus	Increase in surplus
Balanced Budget	Surplus
Deficit	Smaller deficit, balance or surplus



Assuming now that the initial equilibrium income Y_E is higher than full employment, and that there is a balanced budget [$G = T(Y_E)$].

The reduction in public spending (from G to G') causes a fall in aggregate demand and the increase in the tax rate (shifting the tax function from T to T'), by reducing disposable income, shifts the consumption function downwards (from C to C'), dragging the total demand in the same direction, eventually being C' + I + G'. The final equilibrium will be for an income Y'_E, lower than Y_E, assumed to be without inflationary pressures, but occurring in a budgetary deficit situation [$G' > T' (Y'_E)$].

Changes in the Budget

Changes in public spending and taxes result in alterations in the budgetary situation.

- The change in the budget resulting from a variation in public spending is given by the expression:

Change in the budget = $\Delta T - \Delta G$

A variation in public spending of ΔG produces a change in income ΔY (depending on the value of the multiplier: $\Delta Y = m \cdot \Delta G$), and the change in income affects tax revenue. The change in revenue as a result of the change in public spending is given by the expression:

$$\Delta T = t\, \Delta Y = t \cdot (m \cdot \Delta G)$$

Therefore, the change in the budget will be:

Change in the budget = $\Delta T - \Delta G = t \cdot (m \cdot \Delta G) - \Delta G = \Delta G\, (t \cdot m - 1)$

- If the economic authority implements a fiscal policy using only taxes, the change in the budget is the change in tax revenue, since public spending, being an exogenous variable, remains unchanged.

Change in the budget = $\Delta T - \Delta G = \Delta T$

From the analysis above, one might wonder whether it is worthwhile to act to improve production and employment objectives when the measures taken adversely affect the budget balance objective. The answer to this question should be provided from a normative economics perspective. Positive economics explains “what happens if”, normative economics must assess whether, knowing the effects of those measures, it is worth carrying them out or not.

Classical school economists were not in favour of state intervention in the economy. They believed that public sector spending should be minimised and financed with strictly necessary taxes, seeking a balanced budget. Followers of this line of thought do not consider public spending and taxes as valid instruments for acting on the economy.

The Keynesian school, however, strongly advocates for the economic authority to use public spending and taxes to steer the economy towards its major objectives. In their view, the priority is full employment, relegating budget balance as a secondary objective. Since the use of these instruments is expected to generate deficits in times of recession (as expansionary measures would lead to increased expenditures and reduced revenues) and surpluses in times of expansion (where revenues grow and expenditures tend to moderate), this school advocates for seeking a cyclical balance of the budget, attempting to offset deficits in some years with surpluses in others. Clearly, this can lead to serious financing problems if long periods of recession occur, forcing the state to incur debt beyond what is desired, for example, through public debt issuance.

Full Employment Budget

Assuming an economy is not in a state of full employment, the "full employment budget" refers to the budgetary situation that would exist when full employment is reached if no changes are made to tax legislation and public spending. It is an indicator of the direction of a government's fiscal policy.

LESSONS FROM THE GREEK BANKRUPTCY

Institute of Economic Studies (2019). *Public Debt in Spain. Implications for Economic Policy*. Reports Collection, December 2019, pp. 15-17.

In the years leading up to the crisis, Greece experienced significant economic growth and a sharp reduction in unemployment, exceeding the average of EU countries. However, behind this apparent prosperity lay a series of underlying structural problems in the Greek economy. The Greek productive sector faced a clear competitiveness issue, ranking at the bottom of Europe in this regard, due to, among other reasons, excessive regulation reflected in rigidities in factor and product markets. Additionally, the Greek state was characterized by its hypertrophy, lack of productivity based on market criteria, a high degree of bureaucratization, and a structural corruption problem. Furthermore, the Greek pension system guaranteed a replacement rate of 95% at a retirement age of 58, an unparalleled generosity within the OECD destined to progressively drain public finances.

But the rampant economic growth, typical of boom periods, eliminated any possibility of initiating a reformist agenda to address the aforementioned problems. Instead, this vigorous growth was accompanied by very high levels of public deficits. The engine of the Greek economy was running at full throttle, but relied on external savings channeled through public spending. Greek public debt had been increasing in recent decades, although the robust growth in the pre-crisis years allowed for a very limited increase, which remained at very high levels, close to 105%. In this context, and despite the accumulation of deficits, the risk premium remained at moderate levels, reflecting investors' lack of concern. At that time, it was practically unthinkable to anticipate any disturbances, even occasional ones, in the spread between Greek sovereign bonds and German ones.

With the onset of the crisis, public deficits worsened even further, leading to a greater increase in Greek debt, which reached levels close to 180%. However, savings willing to finance the Greek fiscal imbalance were increasingly scarce, especially in the absence of reform prospects. Thus, the market virtually closed for the Greek treasury, triggering negotiations for a bailout. The risk premium soared, reaching over 4.000 basis points at the worst moments of 2012, a year in which Greece had to negotiate two defaults on its public debt.

The capitulation of the Greek treasury perfectly illustrates the nonlinear effects of debt on growth, the problems of not shoring up debt sustainability through fiscal consolidation, and relying entirely on growth and the availability of future financing, as well as the relative speed with which these episodes can manifest. In this regard, the rating of the Greek sovereign just three years before defaulting was, according to Standar&Poor's, an A-, a rating that, in principle, denotes high quality (…).

The rescue of Greece finally led to the forced and relatively urgent implementation of measures to address the aforementioned problems, which had been postponed for more than a decade and could have been gradually addressed with favorable cyclical support. Improvements in the ease of doing business, liberalization of professional activities, privatization of some sectors showing operational problems under public management, and reform of the pension system stand out, although there is still room for improvement in all these areas. On the other hand, fiscal consolidation relied partially on some spending cuts but was primarily based on tax hikes, which negatively impacted growth, delaying the recovery.

Although with significant differences, Greece serves as an example of neglecting the reforms needed by the economy and delaying fiscal consolidation during the expansionary cycle, with the underlying legacy of high public debt. However, this was not evident, at least to the market, until the global collapse and the deterioration of the cycle occurred. Until then, Greece was unaware that it was about to face the most severe recession in the last 80 years, with no fiscal policy maneuverability and a sclerotic economy.

Spain is not the same case. Our country has been an international reference for some of the reforms it undertook during the worst years of the crisis and has made a gradual adjustment to the deficit. However, the reformist momentum has waned in recent periods, to the extent that some political groups are even considering reversing some of them, while the pace of fiscal consolidation has been neglected during a period of significant economic growth that is now facing a slowdown. Although economic slowdown is not synonymous with recession, it is a sign that the cycle is more mature. Therefore, the Spanish economy must prepare to face a less favorable scenario in the future, addressing the pending reforms and making a true commitment to fiscal consolidation to ensure that debt sustainability is not jeopardized when the cyclical factors that currently support it dissipate.

4. INCORPORATION OF THE EXTERNAL SECTOR

4.1 Imports and Exports

All economies interact with the outside world, selling to other parts what they produce and acquiring from abroad part of what they consume. A country's foreign trade depends on multiple factors: the relationship between the prices of goods that can be traded among different countries, currency prices, barriers or incentives to international trade, etc.

The basic Keynesian model assumes that a country's imports (M) are directly related to its income, so if the latter grows, the former increase, and if income decreases, imports decrease. Autonomous imports are those that would be made if income were zero. The relationship between income and imports is given by the slope of the imports function, which is the marginal propensity to import.

$$M = Mo + m_i\, Y \qquad\qquad MPM = \frac{dM}{dY} = m$$

Exports (X), on the other hand, are considered an exogenous variable, as being purchases made by other economies, they do not depend on the country itself.

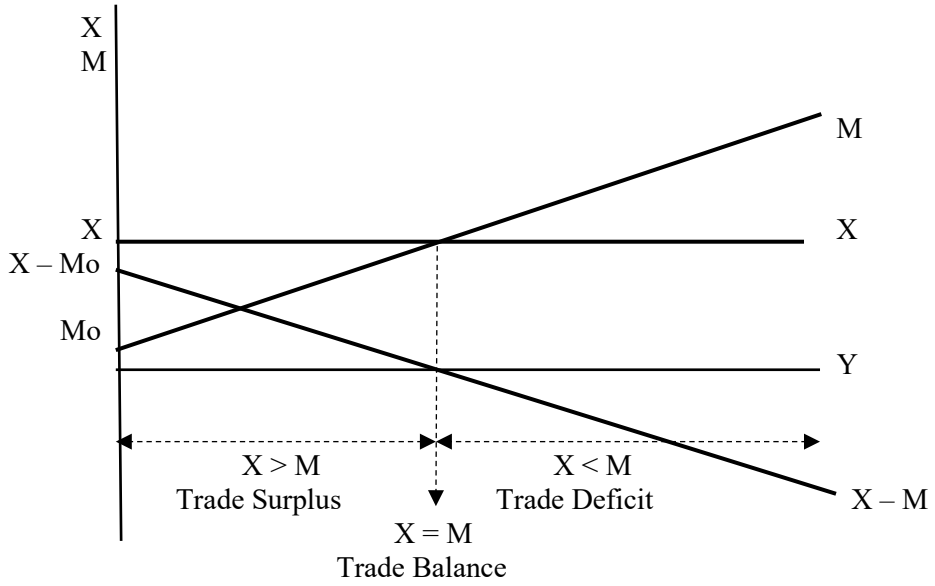
Net exports are known as the difference between exports and imports. This difference can be positive, null, or negative. In the first case, there would be a trade surplus, in the second a trade balance, and in the third a trade deficit.

X > M	Positive net exports	Trade surplus
X = M	Null net exports	Trade balance
X < M	Negative net exports	Trade deficit

Once the economy is opened to the outside, aggregate demand is altered, as the demand we had until now must be added to exports (since demand that other countries make of our production) and subtract imports (which is demand that the economy makes of the production of other countries and, therefore, non-demand of the country itself).

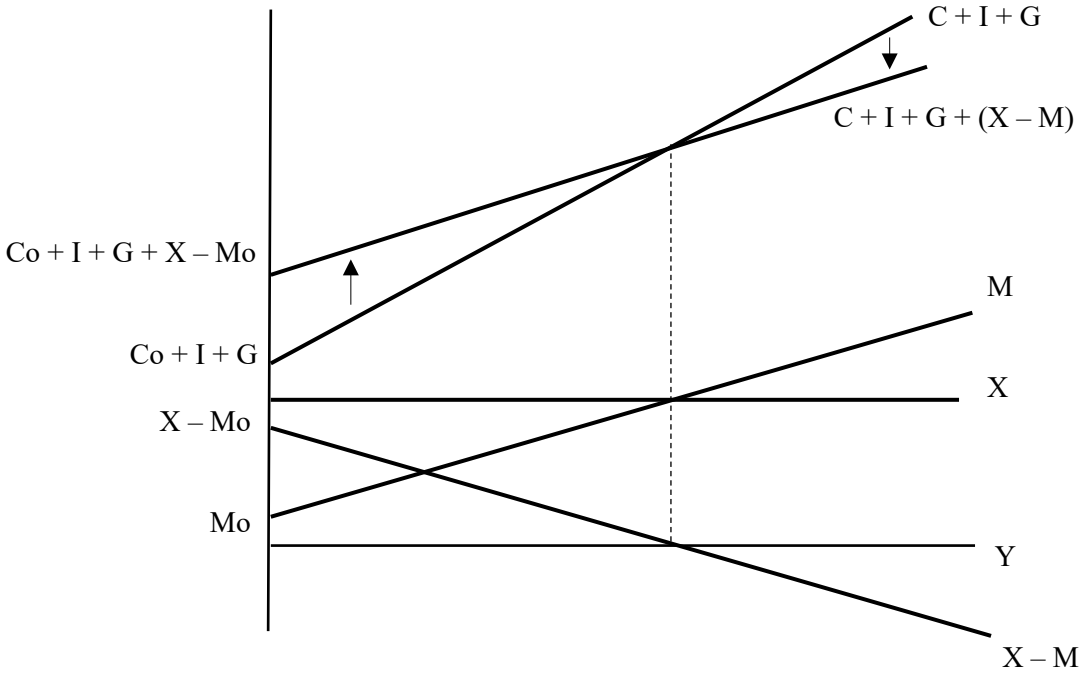
$$AD = C + I + G + (X - M)$$

Graphically, the export, import, and net export functions would be as follows:



4.2 Equilibrium and New Multiplier

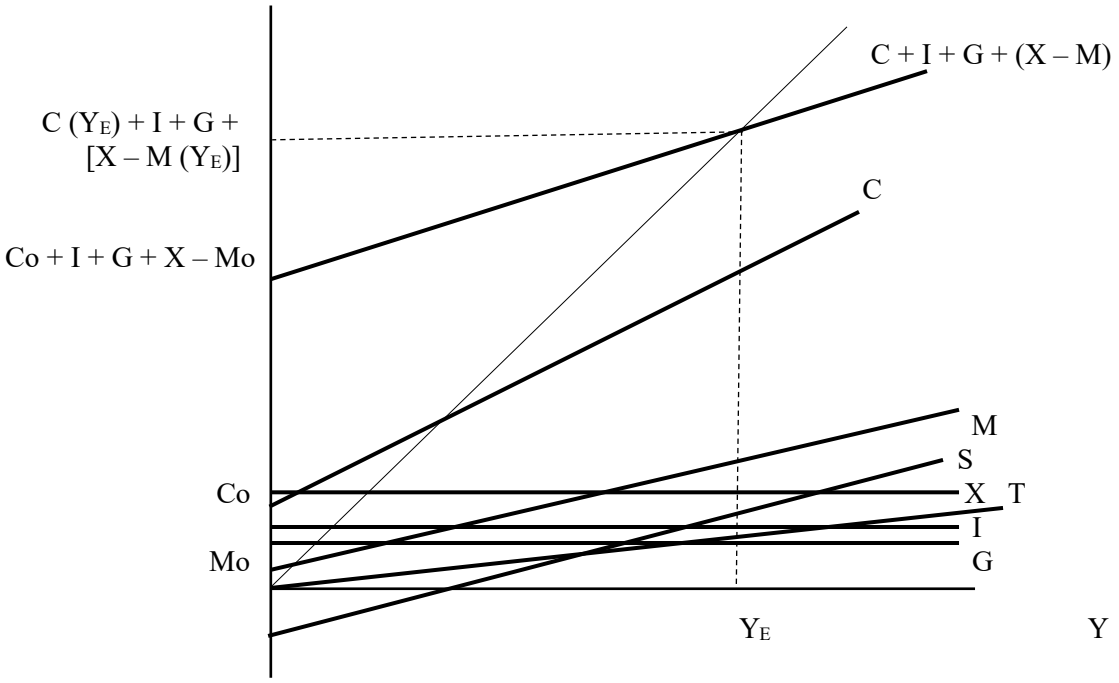
The introduction of the external sector changes the slope of the total expenditure function: it rotates clockwise, taking the income corresponding to trade balance as the centre of rotation.



Just like in the previous stages, equilibrium occurs for the production (income) that satisfies global demand, so that:

$$Y_E = C\ (Y_E) + I + G + [X - M\ (Y_E)]$$

Graphically, this production corresponds to the intersection point of the total expenditure function with the bisector.



On the other hand, for that level of income (Y_E), it must be met that the outflows of the circular flow of income (saving, taxes, and imports) finance the inflows (investment, public spending, and exports):

$$S(Y_E) + T(Y_E) + M(Y_E) = I + G + X$$

The incorporation of the external sector changes the slope of the expenditure function and, therefore, affects the repercussions that changes in the exogenous variables: investment (I), public spending (G), and now, exports (X), will have on the equilibrium income.

$$Y = C + I + G + (X - M) = [Co + b(1-t)Y] + I + G + \left[X - (Mo + m_i Y)\right]$$
$$Y = Co + b(1-t)Y + I + G + X - Mo - m_i Y$$
$$Y = \frac{Co + I + G + X - Mo}{1 - b(1-t) + m_i}$$

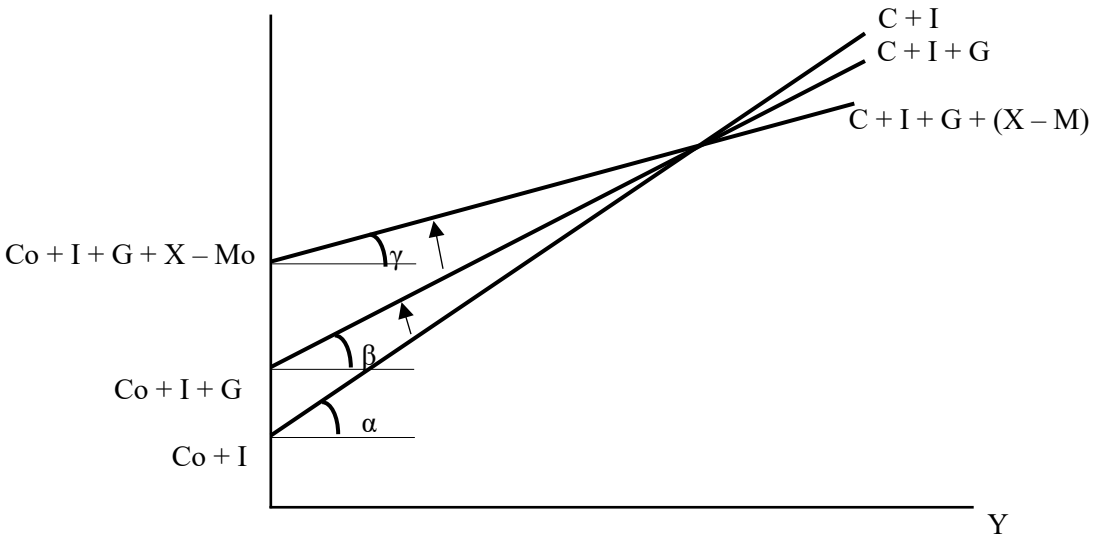
Therefore, the expression for the complete model's multiplier (with public sector and external sector) is:

$$\boxed{m = \frac{dY}{dI} = \frac{dY}{dG} = \frac{dY}{dX} = \frac{1}{1 - b(1-t) + m_i} = \frac{1}{1 - \left[b(1-t) - m_i\right]}}$$

In summary:

Model	Equilibrium		Multiplier of exogenous variables
	Production = Demand	Outputs = Inputs	
Closed and without public sector	$Y_E = C(Y_E) + I$	$S(Y_E) = I$	$m = \frac{1}{1-b}$
Closed with public sector	$Y_E = C(Y_E) + I + G$	$S(Y_E) + T(Y_E) = I + G$	$m = \frac{1}{1-b(1-t)}$
Open	$Y_E = C(Y_E) + I + G + [X - M(Y_E)]$	$S(Y_E) + T(Y_E) + M(Y_E) = I + G + X$	$m = \frac{1}{1-[b(1-t)-m_i]}$

The multiplier depends on the slope of the aggregate demand function in each situation. What is subtracted from unity in the multiplier's denominator is precisely the slope of that function.



tg α = b tg β = b (1 – t) tg γ = b (1 – t) – m_i

5. GLOSSARY OF TERMS

Automatic Stabilizers: Tools that, once incorporated into an economy, tend on their own to smooth out economic cycles, preventing fluctuations from having extreme peaks and valleys.

Autonomous Consumption: Planned and desired consumption if income were zero.

Autonomous Savings: Planned and desired savings if income were zero.

Average Propensity to Consume: Consumption per unit of disposable income.

Average Propensity to Save: Savings per unit of disposable income.

Budget Balance: When public revenues equal public expenditures.

Budget Deficit: Situation in which public revenues are lower than public expenditures.

Budget Surplus: Situation in which public revenues exceed public expenditures.

Capacity Utilization Rate: Percentage of production by firms compared to what they could have if operating at full capacity.

Economic Cooling: Reducing the pressure exerted by demand on supply in an economy to prevent or reduce its consequences (e.g., price increases).

Expansionary Fiscal Policy: Consists of using fiscal policy instruments to help the economy grow. It is mainly carried out by increasing public spending and/or reducing taxes.

Expectations: Individuals' opinions about the evolution of economic variables.

Expected Income: Income expected to be received in the short and medium term.

Exports: Foreign demand for domestic goods and services.

Fiscal Drag: Effect that taxes can produce, under certain circumstances, by slowing (dragging) down economic growth undesirably.

Full Employment Production: It is the production of an economy when all available resources are employed.

Full Employment: Situation in which all of a country's resources are employed. This term is often used with reference, especially, to the labour factor.

Imports: Domestic demand for goods and services from other economies.

Interest Rate: Price of money, i.e., the price to be paid for using a sum of money for a period of time.

Investment: Action of placing capital or money into an economic activity, project, or operation with the aim of obtaining long-term economic returns. Investment also refers to business spending.

Marginal Propensity to Consume: Indicator that shows how consumption changes when income changes.

Marginal Propensity to Save: Indicator that shows how savings change when income changes.

Multiplier: Indicator that relates two economic variables and indicates how one is affected by changes in the other.

Paradox of Thrift: Developed by John Maynard Keynes, it states that, at an aggregate level, if households decide to increase saving (*ceteris paribus*), income tends to decrease.

Perceived Income: The income that is actually received.

Private Consumption: Consumption undertaken by households, domestic economies, on goods and services.

Public Spending: Spending by the public sector.

Restrictive Fiscal Policy: Consists of using fiscal policy instruments to curb economic activity. It is mainly carried out by reducing public spending and/or increasing taxes.

Tax: Levy paid to the state to support public expenditures.

Trade Balance: When exports equal imports.

Trade Deficit: Occurs when a country's imports exceed its exports.

Trade Surplus: Occurs when exports exceed imports.

CHAPTER VII. MONEY, BANKS, AND MONETARY POLICY

1. MONEY

Different forms of maintaining wealth are referred to as assets. These can be divided into two types:

- Real assets. These are physical goods (land, real estate, jewellery, etc.). From a purely economic standpoint, these assets are a way of maintaining wealth for those who own them and are not a liability for anyone[68].
- Financial assets. These are assets that involve a credit: they are a way of maintaining wealth for their holders and, at the same time, a liability for the economic unit that generated them. They represent a right for some and an obligation for others. Examples of financial assets include stocks (an asset for the holder and a liability for the company issuing them), government debt (a liability for the state), a bank deposit (a liability for the bank), etc.

Money is a financial asset that, in addition to being a store of value (like other assets, it is a way of maintaining wealth), has a series of very special characteristics:

- Medium of exchange. It is the only financial asset accepted as a means of payment by the majority of parties to conduct transactions and settle debts. It eliminates barter and, therefore, facilitates agreements between parties.
- Unit of account. Money is a measure of value to express the worth of goods. Goods and services are valued in terms of money.
- Deferred payment standard. The future value of an asset is also expressed in money.

Other characteristics of money include:

- Maximum security. An asset is as secure as the guarantee that wealth will not be lost when converting it into money. Unlike any asset other than money, if the owner has to sell it hastily to convert it into money and meet obligations, a loss of wealth may occur (as it might not be a good time to sell, and it has to be done at a value lower than the acquisition cost). This does not happen with money since, obviously, it does not need to be sold to be converted into money.
- Total liquidity. Liquidity is the ease with which an asset can be converted into money. Money has immediate availability and is therefore the most liquid asset[69].
- Zero return. This is one of the disadvantages of holding cash. Other financial assets yield interest or are expected to be sold at a price higher than the acquisition cost.
- Loses value in the face of price increases. For this reason, if price inflation is expected, holding cash is not the best option as a store of value; in such cases, individuals preserve their wealth in other financial assets or real assets[70].

---

[68] From an ethical standpoint, which should never be overlooked, all assets carry a social responsibility. Although global analyses highlight worldwide issues and specific studies are necessary to determine the solution for each case, it is highly likely that something is not functioning properly when, for example, many individuals accumulate ownership of numerous homes while many others lack a roof over their heads.

[69] If a person acquired a home in 2006 for 200.000 euros (before the severe economic-financial crisis that began in 2008) to preserve part of their wealth in that fixed asset with the intention of selling it in 2010 to gain returns needed for a specific purpose, they likely faced significant challenges in selling the property in 2010 (essentially, converting that real asset into cash). If they did manage to sell it, it was probably at a significantly reduced price, thereby failing to achieve the expected returns from the initial acquisition or even experiencing a loss of wealth (uncertain security).

[70] In the case of deflation (falling prices), holding wealth in money is more beneficial than holding it in real assets whose value decreases.

Types of money:

- **Commodity money.** The material value of the good used as money coincides with its exchange value. Throughout history, various materials have been used as commodity money[71].

  To qualify as money, a good must meet several conditions, and the better it aligns with them, the more effectively it serves its function as money:

  - Divisible: to facilitate payments, both large and small.
  - Uniform: to serve as a unit of account, each unit of the good must be equal to the others.
  - Easily identifiable by all: otherwise, many may not accept it.
  - Easily transferable: for making payments in both nearby and distant locations.
  - Durable.

  Some goods reasonably fitting these characteristics include, for example, oil and wheat. The early coins had the same exchange value as the value of the metal they were made of. These coins reasonably met the five conditions mentioned earlier. Coinage ensured the quality and quantity of the metal composing the currency (gold, silver, copper...).

- **Fiat money.** The material value does not coincide with the exchange value. Logically, the material value must be lower than the exchange value. It makes no sense to create a 2-euro coin with a metal worth more than 2 euros, as people would melt the coin to sell the metal.

Fiat money has undergone various stages throughout history. Briefly:

→ Initially, it was "full-bodied money". Its value was fully backed by precious metals and could be exchanged for them. For instance, if a person owned 100 grams of gold and, for security, delivered them to the goldsmith, the goldsmith would provide 100 documents, each stating a commitment to exchange the document for one gram of gold. Initially, these documents were nominative, but they soon became bearer documents, allowing them to be used as a means of payment, trusting that, if necessary, the goldsmith would exchange the document (paper) for gold.

→ Later, it became "nominally convertible". Goldsmiths soon realized that only a small percentage of people requested to exchange the paper for gold. This led them to issue documents exceeding the gold they had on deposit, lending out this surplus and making a profit from it. With this step, although theoretically the document could be converted into gold (as specified on the paper), in practice, this was not the case, as there were more documents in circulation than the gold held by the goldsmith. The system worked well, as long as people didn't rush to withdraw gold beyond what the goldsmith had, which could happen in times of danger or if trust in the goldsmith deteriorated.

[71] Before commodity money, the barter system was followed. Barter has the difficulty of requiring a "double coincidence of wants": if a person is willing to exchange a sheep for five chickens, they must find another person who has the five chickens and wants a sheep, and is willing to exchange the five chickens (and not four) for the sheep. The use of goods as a medium of exchange eliminates the "double coincidence of wants" and facilitates the transaction. The sheep is valued in liters of oil or kilograms of wheat, which can be used for personal consumption or for other transactions.

→ Since the 1970s, money has not been backed by precious metals. The system operates based on trust (as it did in the previous era). People accept a piece of paper that says 20 euros because they trust that it will be accepted when presented as a means of payment.

- **Legal tender.** It is issued by the institution responsible for this function in each country, usually the central bank. Commodity money consisting of gold or silver coins minted by the king or corresponding authority is legal tender, and so is fiat money issued by the European Central Bank.

- **Bank money.** It consists of indirect financial assets issued by certain financial intermediaries that are accepted as a means of payment. These are assets created by banking intermediaries that are accepted as a means of payment. They consist of sight deposits held in banks, which are mobilized through checks, cards, etc., serving as payment orders directed to the bank by the deposit holder ("Pay the bearer the sum of..."). Bank money is not the checks or cards themselves but the deposits; the former are only instruments to mobilize the deposit.

On the other hand, checks are different from credit cards. Checks do not create money because it cannot be accessed if there is no balance in the deposit. Credit cards do create money when payments are made without a balance and generate credit (access to money not possessed); if there is a balance in the linked deposit, they serve the same function as a check.

2. THE FINANCIAL SYSTEM

The financial system is composed of the set of institutions that act as intermediaries between those who demand and those who offer financial resources. It encompasses all financial flows between individuals and economic sectors.

Most financial flows do not go directly from those with excess funds to those in need of financing (for investment or consumption). Instead, they take an indirect path through financial intermediaries for several reasons:

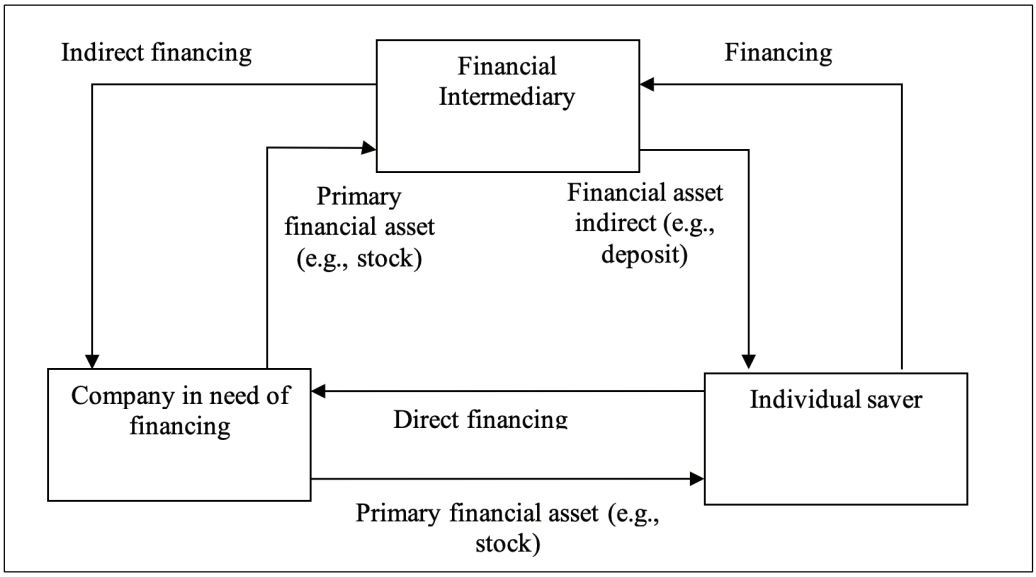
- Security. If the relationship is direct, the provider assumes the risk of the operation (recovering the loan and obtaining a return). However, if the provider deposits funds with an intermediary who lends, the intermediary assumes the risk. Additionally, the intermediary's risk is reduced as it is diversified by lending to many.
- Expertise. In most cases, individual providers lack the necessary expertise to judge the viability of the proposed financing operation. The intermediary, being in that profession, possesses the required expertise.
- Pooling of funds. Many investment projects require significant amounts of money, which may not be easily obtained from many small savers. The intermediary receives funds from savers, aggregating them, enabling it to meet significant financing demands.

The functioning of the financial system can be explained using the following scheme: A company issues, for example, shares, which are "primary financial assets" (primary because they are issued directly by the economic unit in need of financing). These shares can be acquired by individual savers or financial intermediaries.

Financial intermediaries, to meet the financing needs of the government, companies, or individuals (acquiring public debt, stocks, granting loans, etc.), must attract funds from savers, acknowledging the debt they acquire with them through "indirect financial assets" (indirect in the sense that they are created by an intermediary). An example of such assets is deposits.

Indirect financial assets have lower returns than primary ones; their appeal to savers lies in being safer and more liquid. The difference between the returns on funds they attract and those they lend is referred to as the "intermediation margin", and it represents the typical income of pure banking business.

THE FINANCIAL SYSTEM



Not all financial flows occurring within the system originate from the financing needs of spending units. A significant portion results from the exchange of financial assets, seeking liquidity, higher returns, etc. If an economic agent needs money or is unsatisfied with the performance of the assets they hold, they will seek to reduce their portfolio and acquire other, more profitable assets.

When deciding to invest in financial assets (i.e., to hold wealth in these assets), money suppliers must consider and weigh various factors:

- Liquidity. The ease and certainty of converting the asset into cash in the short term when necessary. Hence, as seen, legal tender is the most liquid asset.
- Profitability. The ability to generate interest and thus increase wealth.
- Risk. The likelihood that the issuer will meet its commitments by the maturity date of the asset.

It is important to highlight the direct relationship between profitability and risk: the higher the expected return, the greater the risk assumed.

Financial intermediaries can be divided into two broad categories:

- Banking. Among the assets they can issue are those accepted as money (as a means of payment). In this category, you find:
    - Private banks.
    - Savings banks.
    - Credit cooperatives.

- Non-banking. The assets they issue are not accepted as a means of payment. Some examples of non-banking financial intermediaries include:
    - Insurance companies. They obtain resources by generating policies, which are relatively illiquid financial assets that they invest in the capital market.

- Pension funds. These are funds created exclusively to fulfil pension plans. They are managed by a fund manager. In a way, they are a specific type of investment fund that collects funds from members during their working lives and invests them for the long term.
- Securities and real estate investment funds. Securities investment companies are joint-stock companies that trade in financial assets to offset risks and returns of other companies without holding a majority stake. Real estate investment funds are assets owned by investors, whose property right is a participation certificate. Their purpose is to invest in various types of financial assets.

VICTIMS OF PREFERENCE SHARES

News, 07/07/2014.
https://www.eleconomista.es/banca-finanzas/noticias/4101636/07/12/Victimas-de-las-preferentes.html

"The 80.000 euros that were my lifelong savings and what my father had left me, I invested in preference shares. Now, I live on 400 euros", explained Rosa from Vigo to Efe, an example of the million people affected by an irregular practice that has generated around 30.000 million for some Spanish banks and savings banks. (...) Spanish banks and savings banks sold nearly 30.000 million in preference shares to their clients from 1999 until early 2011 without warning them of the risk of not being able to recover 100% of their investment and enticing them with higher returns than those of deposits, according to ADICAE. (...) "They are not experts, they don't even know this type of complex and high-risk financial product. The deception lies in them thinking it was a guaranteed and high-yield product. Of course, they have not taken the test required by the CNMV, and if they did it at some point, it was clear that they did not fit the profile of a highly qualified investor", she added.

There can be various classifications of financial asset markets that are not mutually exclusive:

- Based on the assets involved in transactions:
  - Credit market. Set of transactions with financial assets carried out by intermediaries that obtain most of their resources through deposit collection. It is a market between credit institutions and entities in need of financing, where the former lend the resources deposited by individuals and companies. It is a market of direct negotiation between two parties, where one of them has a privileged position (the financial intermediary). Individuals can obtain funds in this market.
  - Securities or capital market in the strict sense. Group of transactions involving a wide range of assets, from stocks and bonds to public debt and currencies. It is an open trading market without a disadvantageous position for the borrower. Only companies and the government can obtain funds.

- Based on timeframes:
  - Short-term, money, or monetary market. Short-term assets are traded.
  - Capital market. Assets with medium and long-term maturity are traded.

- Based on the origin of the assets:
  - Primary or issuance market. When the assets are newly created (for example, a company increases its capital and issues stocks).
  - Secondary market. No new debt is created; instead, there is a transfer of existing assets (for example, the buying and selling of stocks already in circulation).

- Based on the relationship between the parties:
  - Direct market. There is a direct relationship between fund suppliers and demanders.
  - Intermediated markets. When at least one of the participants is a financial intermediary.

- Based on the type of return:
  - Fixed-income market. Assets remunerated with a constant interest rate (for example, public debt, bank deposits).
  - Equity market. Assets whose remuneration depends on the profitability and dividend policy of the issuing entity (for example, company stocks).

The stock market is a securities market specialized in equities, but where all types of securities are traded: short and long-term, primary and secondary, fixed-income, and equity.

WHAT ARE CRYPTOCURRENCIES?

https://www.santander.com/es/stories/guia-para-saber-que-son-las-criptomonedas

A cryptocurrency is a digital asset that employs cryptographic encryption to ensure ownership, secure transaction integrity, and control the creation of additional units. Cryptocurrencies have distinguishing characteristics compared to traditional systems: they do not exist physically, are not regulated or controlled by any institution, and do not require intermediaries in transactions. For transaction control, a decentralized database, shared ledger, or blockchain is used. Once a cryptocurrency transaction is conducted, meaning when the asset is bought or sold, it is not possible to cancel the operation because the blockchain does not allow data deletion. Reversing a transaction requires executing the opposite. Blockchain technology functions as a large ledger where vast amounts of information can be recorded and stored, shared across the network, and protected to prevent alteration or deletion of data.

Cryptocurrencies are not considered legal tender, lack the backing of a central bank or other public authorities, and are not covered by customer protection mechanisms. To store, send, and receive cryptocurrencies, one must use a digital wallet service, which is not regulated. What is actually stored in wallets are the keys that grant ownership and rights over the cryptocurrencies and allow transactions with them. Knowing the keys is sufficient to transfer cryptocurrencies, and the loss or theft of the keys can result in the loss of cryptocurrencies, with no possibility of recovery. There are two types of wallets: hot wallets and cold wallets. Hot wallets are connected to the internet, while cold wallets are not. Within hot wallets, there are web wallets, mobile wallets, and desktop wallets. Within cold wallets, there are hardware wallets and paper wallets, which simply involve printing the private key on paper.

The value of cryptocurrencies varies depending on supply, demand, and user commitment. The value is formed in the absence of effective mechanisms preventing manipulation, as present in regulated securities markets. Often, prices are formed without public information to support them. Currently, there are thousands of cryptocurrencies, including, for example, bitcoin or ether. Bitcoin is the first cryptocurrency, which emerged in 2008, created by a person or group of people who called themselves Satoshi Nakamoto, employing blockchain technology developed by themselves.

It is important to know that cryptocurrencies are complex instruments that may not be suitable for individuals without sufficient knowledge, and their prices entail a high speculative component that may even result in the total loss of the money paid for their purchase. In February 2021, the Bank of Spain and the National Securities Market Commission issued a statement warning about the risks of buying cryptocurrencies.

3. BANKS AND MONEY CREATION

The goal of banks, like any other business, is to achieve maximum profit. They primarily generate revenue from the interest charged on loans and credits granted, as well as from the securities they hold. Costs mainly consist of interest paid for received funds (customer deposits, loans from other financial institutions, loans from the central bank...) and expenses related to operating costs (salaries, rents, furniture...).

Focusing on the core banking business, a financial intermediary would maximize profit by:

- Attracting the highest possible volume of deposits and remunerating them at low-interest rates.
- Lending the majority of these deposits at high-interest rates.

The key is to find the right balance in these parameters because:

- If the interest rate on deposits is low, the bank will attract few deposits, and the funds available for lending will be limited.
- Lending at high-interest rates may attract fewer borrowers, and those who come may seek financing for risky operations.
- If the bank lends too much without maintaining adequate reserves, it may face liquidity problems, leading to distrust or forcing it to borrow, increasing costs.

Banking operations must meet three characteristics to ensure the proper functioning of the system:

- Liquidity: The bank must be able to convert customer deposits into cash when demanded.
- Profitability: It must achieve the required profitability for its shareholders, as dividends depend on the bank's profits from its operations[72].
- Solvency: The bank must have assets and rights greater than its debts and obligations.

A simplified balance sheet of a commercial bank helps understand the operations it performs:

Commercial Bank Balance Sheet	
Assets	Liabilities
- Reserves: o Cash in its vault o Deposits with the central bank - Profitable assets: o Portfolio of securities o Credits and loans granted - Real assets: o Buildings, furniture…	- External resources: o Customer deposits (sight, savings, time deposits...). o Loans received (from the central bank, other banks...). - Own resources: o Capital (bank's own shares).

Banks cannot lend all the funds they possess. They must maintain a portion as reserves for two reasons:

[72] There are banking financial intermediaries that, due to their legal structure, do not have shareholders and, therefore, do not have these types of demands in their management.

- To meet the withdrawal requests of customers.
- To comply with the requirements of the monetary authority, which mandates maintaining minimum reserves—legal or required reserves—for security reasons and as a means of controlling the amount of money in the system. Therefore, legal reserves, in addition to ensuring liquidity, play a crucial role in the money creation process and are determined by the reserve ratio.

The process of money creation will be analysed in a system with n banks that adjust their reserves to the legal requirements, and where the public (individuals and companies) does not hold onto money in their hands.

Let's assume that the legal reserve requirement or mandatory reserve ratio is 10%, and 1.000 monetary units are introduced into the system, for example, because Company X exports. If it is assumed that people do not hold onto money, X deposits that entire amount into Bank A. If this bank does not engage in transactions with the money from that deposit, its balance sheet will be:

Bank A			
Assets		Liability	
Reserves	1.000	Deposit	1.000

But if the bank seeks to maximize the profitability of this new deposit, the scenario is very different. The bank will keep 100 monetary units as reserves (10% of the 1.000 it has received) and will lend the remaining 900. The balance sheet will then be:

Bank A			
Assets		Liability	
Reserves	1.000	Deposit	1.000
Loans	900		

The person or entity Y, who has received the loan of 900 monetary units, pays for some services they have received, and the recipient deposits the money into their account at bank B. The initial balance of bank B will be:

Bank B			
Assets		Liability	
Reserves	900	Deposit	900

Bank B will also try to maximize the return on the deposit it has received and will lend as much as possible (everything except the 90 monetary units corresponding to the 10% reserve requirement). The balance after doing this is:

Bank B			
Assets		Liability	
Reserves	900	Deposit	900
Loans	810		

The one who borrowed the loan of those 810 monetary units pays for a purchase he made, and the recipient deposits them in his bank C, which will follow the steps of the two previous ones. The overall process would be as follows:

Bank	New deposit	Loans	Reserves
A	1.000	900	100
B	900	810	90
C	810	729	81
D	729	656,1	72,9
…	…	…	…
…	...	…	…
Whole system	10.000	9.000	1.000

The chain of the deposit is:

$$\Delta \text{ Deposits} = \text{Created money} = 1.000 + 900 + 810 + 729 + \ldots =$$

$$\Delta \text{ Deposits} = \text{Created money} = 1.000 + 1.000 \text{ x } 0,9 + (1.000 \text{ x } 0,9) \text{ x } 0,9 + \ldots =$$

$$\Delta \text{ Deposits} = \text{Created money} = 1.000 \text{ x } (1 + 0,9 + 0,9^2 + \ldots) =$$

$$\Delta \text{ Deposits} = \text{Created money} = 1.000 \frac{1}{1-0,9} = 1.000 \frac{1}{0,1} = 10.000$$

$$\text{Where } \frac{1}{0,1} = \frac{1}{cash\ reserve\ ratio} = \text{money supply multiplier}$$

$$\Delta \text{ Total change in deposits} = \text{Initial deposit x multiplier} = 1.000 \text{ x } 10 = 10.000$$

Therefore:

Δ total deposits, Created Money or Money Supply	=	Δ initial deposits or Monetary base[73]	x multiplier

The deposit creation chain ends when total reserves equal the initial deposit. This process is called the money creation or credit expansion process, as both are counterparts of each other. In the case of the previous example:

Money creation: it goes from 1.000 to 10.000 units.
Credit expansion: it goes from 900 to 9.000 units.

The entire process for the entire banking system is:

Banking system			
Assets		Liability	
Reserves	1.000	Deposit	10.000
Loans	9.000		

If the system were comprised of a single bank, the expansion of deposits and loans would occur in the same way.

[73] As will be seen later, changes in the monetary base are the origin of the money creation (or destruction) process, which ultimately results in variations in the quantity of money or money supply.

The case examined is the simplest one. Banks only retain legal reserves, and the public (individuals and companies) does not hold money in their hands. If these conditions are not met, the process slows down, which happens if:

- Banks retain reserves above the legal requirements for security reasons or due to a lack of lending opportunities.
- Individuals and companies retain part of the money instead of depositing it in banks.

Logically, the process can also occur in reverse. For example, if an import is made or the central bank withdraws money from the system, a process of "destruction" of money and credit contraction occurs.

EXERCISE

If, as a result of an export, 100.000 monetary units enter the system, and the legal reserve requirement is 10%, what is the total change in deposits that occurs?

$$\Delta\ Deposits = Initial\ injection \cdot Multiplier = Initial\ injection \frac{1}{cash\ reserve\ ratio}$$

$$\Delta\ Deposits = 100.000\ \frac{1}{0{,}1} = 1.000.000$$

4. THE CENTRAL BANK

The central bank is the monetary authority in each country and is responsible for implementing monetary policy. Although its primary objective is price stability, it does not neglect other macroeconomic goals. The central bank conducts both banking and non-banking operations, advises the government, and supervises the country's financial institutions. It is an autonomous body and, therefore, is not subject to the government's directives[74].

In the specific case of the Eurozone, the Treaty on European Union (TEU) assigns the functions of designing and executing monetary policy to the European System of Central Banks (ESCB). The ESCB consists of the European Central Bank (ECB) and the national central banks of the member states.

As a member of the ESCB, the Bank of Spain has the following functions, among others:

- Define and implement monetary policy for the Eurozone, with the primary objective of maintaining price stability across the region. Monetary policy decisions are made in the ECB's Governing Council, which includes the governors of the central banks of the member countries.
- Conduct foreign exchange operations in accordance with the TEU.
- Promote the smooth functioning of the payment system in the Eurozone and nationally.

As a national central bank, the Bank of Spain performs the following functions:

- Safeguard and manage reserves of foreign exchange and precious metals not transferred to the ECB.

[74] This characteristic is typical in developed democratic countries. Naturally, in totalitarian regimes, the central bank is just another institution at the service and under the orders of the government.

- Once authorized by the ECB, the Bank of Spain issues and circulates banknotes and coins.
- Serve as the state's bank, handling treasury functions, collections, and payments on behalf of the state, and acting as the financial agent for public debt.
- Function as the banks' bank, safeguarding their reserves, supervising the solvency and compliance with regulations by credit institutions.
- Promote the proper functioning of the financial system.
- While its primary objective is price stability, the central bank also addresses other economic goals such as production and employment.
- Compile and publish statistics related to its functions.
- Provide advice to the government and produce reports and studies.
- Represent Spain in international economic organizations, institutions, and forums related to its functions.

EURO

On January 1, 2002, the euro was introduced in the countries that are part of the Economic and Monetary Union (EMU) as the common currency for all of them.

The authorization for the issuance of euros belongs to the European System of Central Banks (ESCB), which is composed of the European Central Bank (ECB) and the central banks of the member states.

For the countries of the EMU, having a single currency has both advantages and disadvantages. Among the most notable advantages are:

- Facilitates commercial transactions among the countries of the eurozone.
- Allows for an immediate comparison of prices for the same product in different countries.
- Avoids risks associated with fluctuations in the exchange rate.
- Eliminates the need to pay commissions for currency exchange.
- As a currency of a developed and extensive area, it holds more weight globally than the individual currencies of the countries in the eurozone (mark, franc, lira, peseta, etc.), facilitating transactions between these countries and the rest of the world.

Among the disadvantages, we can mention:

- With a unified monetary policy, its instruments are no longer useful for achieving the specific macroeconomic objectives of each country. The European System of Central Banks (ESCB) makes decisions on monetary policy.
- The exchange rate, as a macroeconomic instrument, is no longer in the hands of each member country, and therefore, it is not possible to use it to pursue major economic goals.
- Membership in the eurozone requires fiscal discipline, affecting the use of fiscal policy instruments to achieve macroeconomic objectives.
- The stability of the currency can be disrupted and harm the entire system due to the irresponsible behaviour (despite existing regulations) of some member countries.

The balance sheet of a central bank reflects the banking operations it carries out. Simplified:

<table>
<tr><th colspan="3">Central Bank Balance Sheet</th></tr>
<tr><th>Assets</th><th colspan="2">Liability</th></tr>
<tr><td rowspan="2">- Gold and foreign exchange reserves.
- Securities acquired in financial markets.
- Loans to the banking system.
- Other asset accounts.</td><td>- Cash:
o Held by the public.
o In the vaults of banks.
- Deposits of banks at the central bank.</td><td>Monetary Liability or Monetary Base</td></tr>
<tr><td>- Deposits of the public sector.
- Other liability accounts.</td><td>Non-monetary Liability</td></tr>
</table>

5. MONEY BASE AND MONEY SUPPLY

As mentioned earlier, changes in the money base are at the origin of the money creation process, a process that results in variations in the quantity of money or money supply.

The money base (B), which represents the central bank's monetary liabilities held by individuals and banks, is—as can be seen in the central bank's balance sheet—the sum of cash (held by the public plus in the vaults of banks) and the deposits of banks at the central bank. Or, in other words, the cash held by the public plus the reserves of the banking system.

$$B = \left| \text{Cash in the hands of the public} \right| + \left| \text{Cash in the bank vaults} \right| + \left| \text{Bank deposits in the central bank} \right|$$

$$B = \left| \text{Cash in the hands of the public} \right| + \left| \text{Reserves of the banking system (cash in their vaults + deposits in the central bank)} \right|$$

In accordance with the asset = liability identity:

$$B = \left| \text{Monetary liabilities of the central bank held by individuals and banks} \right| = \left| \text{Total Assets} \right| - \left| \text{Non-monetary Liabilities} \right|$$

$$B = \left| \text{Gold and foreign exchange reserves} \right| + \left| \text{Securities acquired in financial markets} \right| + \left| \text{Loans to the banking sector} \right| + \left| \text{Other asset accounts} \right| - \left| \text{Non-monetary liabilities} \right|$$

Therefore, an increase in foreign exchange (as a result, for example, of an export), the central bank's purchase of securities in financial markets (e.g., government debt), or loans to the banking sector lead to an expansion of the monetary base and, through it, the liquid assets of the banking system. Conversely, movements such as imports, the sale of securities, or a reduction in loans contract the monetary base.

Factors affecting the monetary base can be grouped into:

- Autonomous factors: These are factors not directly controlled by the central bank and therefore cannot be used by the central bank to intervene in the monetary base. The most notable ones include:
    - External sector: Many variations in foreign exchange depend on the country's economic relations with the outside world (exports, imports, the country's investments abroad or foreign investments in the country, etc.). These operations do not depend on the central bank, even if it intervenes due to currency changes.
    - Public sector: The revenues and expenses of the public sector largely depend on the government, which formulates budgets, even though they require negotiation for approval. The issuance of public debt is also within the government's purview. The central bank, as the state's bank, is limited to performing operations imposed upon it.

- Controllable factors: These are factors that the central bank can use to directly influence the evolution of the monetary base and, through it, the money supply:
    - Loans to the banking sector: Directly affect the monetary base, either increasing or decreasing it.
    - Open market operations: The central bank's purchase or sale of securities also directly affects the monetary base.
    - Legal ratios: Do not affect the monetary base directly, but a change in the reserve ratio affects the value of the multiplier and, through it, the money supply resulting from a change in the monetary base.

The quantity of money or money supply (M) is defined as the sum of cash held by the public—banknotes and coins held by individuals and businesses—plus deposits in banks. It is represented by the letter M[75].

$$M = \left| \begin{array}{c} \text{Cash held by} \\ \text{the public} \end{array} \right| + \left| \begin{array}{c} \text{Deposits in the} \\ \text{banking system} \end{array} \right| = C + D$$

The relationship between the monetary base and the money supply allows us to determine the amount of money (money supply) created from a certain change in the monetary base:

[75] According to the type of deposit included, different monetary aggregates are distinguished:
- M1 = Cash held by the public + Demand deposits.
- M2 = M1 + Savings deposits.
- M3 = M2 + Time deposits. M3 is referred to as “liquid assets held by the public”.
- M4 = M3 + Quasi-money. Quasi-money refers to high-liquidity assets. M4 is also known as “Liquid Assets held by the Public” (LAPs).
Some manuals include only M1 (cash plus demand deposits) and M2 (M1 + quasi-money), considering quasi-money as everything not included in M1 in this case.

B =	Cash held by the public	+	Reserves of the banking system (cash in their vaults + deposits in the central bank)	=	C	+	R

Dividing both expressions:

$$\frac{M}{B} = \frac{C + D}{C + R}; M = \frac{C + D}{C + R} B$$

Dividing by D, numerator and denominator:

$$M = \frac{{}^{C}/_{D} + {}^{D}/_{D}}{{}^{C}/_{D} + {}^{R}/_{D}} B \; ; M = \frac{e + 1}{e + l} B$$

Where ${}^{C}/_{D} = e$ → Ratio between cash in the hands of the public and deposits

${}^{L}/_{D} = l$ → Reserve ratio of the system = System bank reserves relative to deposits

Therefore, the relationship between the monetary base and the money supply depends on the public's habits—the proportion of cash held by individuals and businesses (represented by "e")—and the behaviour of banks (represented by "l").

The expression seen above, while studying the money creation process by banks, is the same, in the particular case where:

- The public does not hold cash and deposits everything in banks. In this case, as cash in the hands of the public is zero, e = 0.
- Bank reserves are adjusted to meet the required reserve ratio, which means l = reserve ratio. Or, in other words, the system's reserves are identified with legal reserves.

Under these assumptions:

$$M = \frac{e + 1}{e + l} B = \frac{0 + 1}{0 + cash\ reserve\ ratio} B = \frac{1}{cash\ reserve\ ratio} B$$

The multiplier is greater than one, as

$$l = \frac{L}{D} = \frac{System\ reserves}{Total\ deposits} < 1$$

Always $e + 1 > e + l$

The new multiplier allows us to determine the money supply (the amount of money) created as a result of a change in the monetary base. For this reason, and as already mentioned, e (cash in the hands of the public) and l (banking system reserves) are referred to as the monetary base, as they are the foundation of the money creation process.

EXERCISE

In the scenario where individuals and businesses in an economy do not hold cash in their hands, and in addition to the legal reserve requirement of 10%, the system maintains additional or voluntary reserves of 5%, what is the final variation in deposits that occurs in the entire system if the central bank, in an open market operation, sells government bonds worth 2.000 million units of currency?

The sale of government bonds worth 2.000 million units of currency implies removing that amount of money from the system; therefore, there is a reduction in the monetary base. In the multiplier, the percentage of cash in the hands of the public (e) is zero, and the percentage of reserves in the banking system (l) is the sum of the mandatory (10%) plus the voluntary (5%).

$$\text{Variation in deposits= Initial variation x Multiplier = Initial variation } \frac{e+1}{e+l}$$

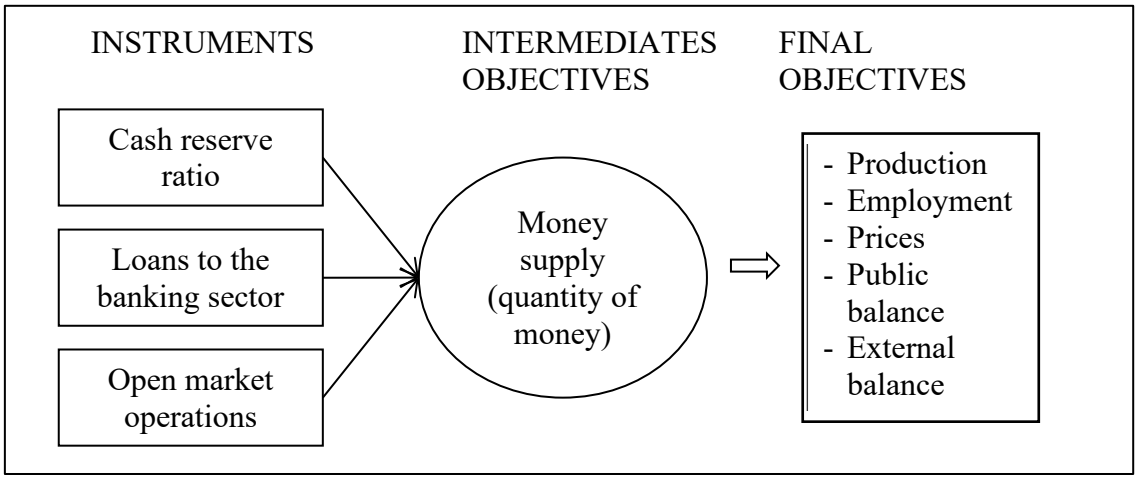
$$\text{Variation in deposits= } -2.000\,\frac{0+1}{0+(0{,}1+0{,}05)} = -2.000\,\frac{1}{0{,}15} = -13.333{,}33$$

6. MONETARY POLICY: OBJECTIVES AND INSTRUMENTS

The ultimate objectives of monetary policy are those of macroeconomics in general: economic growth, full employment of resources, price stability, public balance, and external balance. Although decisions made in the field of monetary policy affect all these objectives, the most direct one is related to prices.

Monetary policy employs instruments that serve to achieve the final objectives through intermediate goals.

On the other hand, the interest rate set by the central bank is the reference interest rate for financial institutions and the economy at large. If the central bank raises the interest rate at which it lends to banks, these, in turn, increase the interest rate at which they lend to each other (which, in the Eurozone, is the Euribor) and raise the interest rate for lending to businesses and individuals. Naturally, the increase in the cost of money reduces its demand, resulting in a decrease in investment and consumption, particularly of durable goods.



Legal reserve ratio

It is a percentage of the liabilities that financial institutions must cover. It requires institutions to maintain liquid funds above what their treasury financial management would demand.

- If the reserve ratio increases → mandatory reserves increase → lendable deposits decrease → money supply decreases (due to the reduction in the multiplier).
- If the reserve ratio decreases → mandatory reserves decrease → lendable deposits increase → money supply increases (as the multiplier increases).

Loans to the banking sector

These are loans that the central bank provides to financial intermediaries. Control is carried out through the official or reference interest rate, the volume of money lent, and the frequency of the loans.

- If the loans have a low interest rate, banks will access them more easily (to cover mandatory reserves, etc.) and will have more funds to increase loans to businesses and individuals, thus increasing the money supply.
- If the interest rate on these loans is high, banks will only resort to them in specific cases and will have fewer funds for loans to businesses and individuals, reducing the money supply.

Open market operations

Open market operations refer to the buying and selling of assets by the central bank to regulate system liquidity.

- If the central bank buys assets (e.g., participating in the public debt market), it injects money into the system, leading to an increase in the money supply.
- If it sells assets, or when the maturity date of the owned assets is reached without renewal, it withdraws money from the system, reducing the money supply.

Other instruments

In addition to the above instruments, which are the most common, there are others with more situational use, such as the mandatory investment ratio, which requires financial institutions to allocate resources to specific investments, establishing what is known as “privileged financing circuits”. These are typically strategic or development-oriented investments with low returns that financial institutions would not engage in if not obligated.

Another instrument, now obsolete, is rediscounting, which involves granting loans to banks with the guarantee of the effects they have discounted from businesses and individuals. If the rediscount rate is high, banks will not use this financing option (exchanging effects for money), reducing their lendable resources for the money creation process.

An expansionary monetary policy would use the above instruments to increase the monetary base and, through it, or changes in the multiplier, cause the money supply to grow. This could be achieved, for example, through an increase and cheapening of central bank loans to the financial sector and/or the central bank's purchase of securities and/or a reduction in the legal reserve ratio. Conversely, a restrictive monetary policy, aimed at cooling the economy, would use the above instruments in the opposite direction.

THE CORONAVIRUS PANDEMIC CRISIS IN 2020 REQUIRED EXCEPTIONAL MEASURES FROM CENTRAL BANKS

Business News, April 30, 2020
https://www.reuters.com/article/bce-politica-monetaria-idESKBN22C27Z

FRANKFURT, April 30 (Reuters) - The European Central Bank (ECB) said on Thursday that it would pay even more for banks to borrow money from the institution but reserved much of the rest of its monetary arsenal as it prepared for a long battle against the aftermath of the coronavirus, reaffirming its bond-buying scheme and allocating more funds to address the economic crisis.

After unveiling a series of stimulus measures in the past six weeks, including plans to buy 1,1 trillion euros in assets this year, the ECB said it would pay banks 0,50% for taking advantage of its multi-year auction and 1% if the money is transferred to the economy.

ECB President Christine Lagarde said the impact of the coronavirus pandemic is unprecedented, and the speed and scale of the recovery are "highly uncertain," implying that the central bank will be ready to provide more assistance if necessary.

The bank said it would cut interest rates on long-term loans to banks to -1% and launch a new credit program called the Pandemic Emergency Longer-Term Refinancing Operations (PELTRO). However, it did not alter its current asset purchase programs, such as the Pandemic Emergency Purchase Program (PEPP).

"The Governing Council is fully prepared to increase the size of the PEPP and adjust its composition, by as much as necessary and for as long as needed", the institution stated. "In any case, it is ready to adjust all of its instruments, as appropriate, to ensure that inflation moves sustainably towards its aim".

With much of Europe indefinitely confined to contain the COVID-19 pandemic, Lagarde said that ECB experts expect the euro area economy to contract between 5% and 12% this year. Governments are issuing debt at exorbitant levels to keep businesses afloat until restrictions are lifted.

7. THE MONEY MARKET

The demand for money

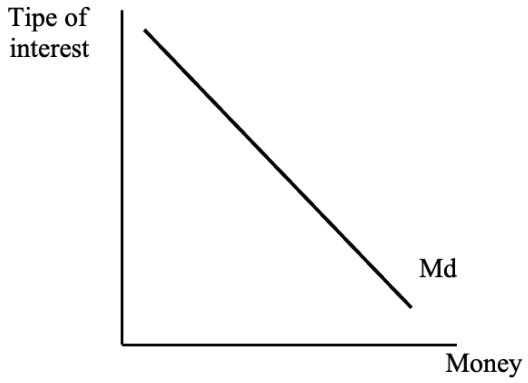
The demand for money — that is, the proportion of wealth one wishes to hold in the form of money (by individuals, businesses, and banks themselves) — depends primarily on three motives:

- Transaction. As money serves as a medium of exchange, individuals demand it for conducting transactions. Households and businesses require money to purchase goods and services.
- Security or precaution. Money is demanded to cope with unforeseen events or contingencies. The greater the uncertainty, the higher the demand for money.
- Speculation. This motive refers to individuals taking advantage of changes in asset prices to increase their wealth. If an individual holds part of their wealth in assets other than money and anticipates a decrease in the returns of these assets, they are inclined to sell

them. This results in a shift from holding wealth in those assets to holding wealth in the form of money. Conversely, if they expect an increase in the returns of those assets, they will reduce the amount of money they hold to acquire more assets.

Therefore, the demand for money depends on:

- Prices. If prices rise, the nominal value of goods and services increases, leading to a greater need for money to conduct transactions.
- Real income. If real income grows — indicating higher production — more money is required for transactions.
- Interest on alternative assets. A higher interest rate leads to a lower demand for money. The opportunity cost of holding wealth in the form of money is the return on alternative assets; if the returns on these assets increase, the demand for money decreases, as people are inclined to hold less money in their hands.



The money demand function (Md) indicates the amount of money desired for each price. As seen, money is a form of holding wealth with the drawback of having zero return. Maintaining wealth in the form of money results in a loss of potential earnings compared to holding that wealth in other assets. Therefore, the demand for money depends on the return on other assets:

- If the returns on assets are high, the opportunity cost of holding wealth in the form of money is also high, and individuals will tend to hold the smallest possible amount of money (as recommended by transaction and precautionary motives).
- If the returns on assets are low, the opportunity cost of holding wealth in the form of money is also low, and individuals will tend to hold more money.

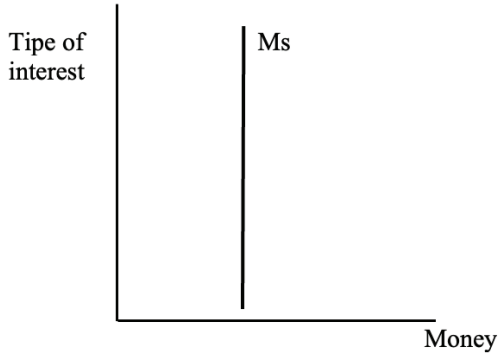
For this reason, the money demand function is also referred to as the liquidity preference function.

The money demand function can shift for various reasons, as long as something other than the interest rate changes. Since people hold part of their wealth in the form of money (demand money) to purchase goods, if the value of production increases, the demand for money also increases. People will want more money for each interest rate, causing the demand function to shift to the right[76].

[76] One must distinguish between the nominal demand for money and the real demand (i.e., the demand for money expressed in the goods that can be purchased with it). The latter does not change if only the price level is altered because individuals are not concerned with the number of banknotes and coins they possess, but rather with the quantity of goods they can acquire with them. The real demand for money is equal to the nominal demand divided by the price level. If the price level doubles, but production remains constant, the nominal demand for money will be twice as much... but to purchase the same. Therefore, the real demand remains constant.

Money supply

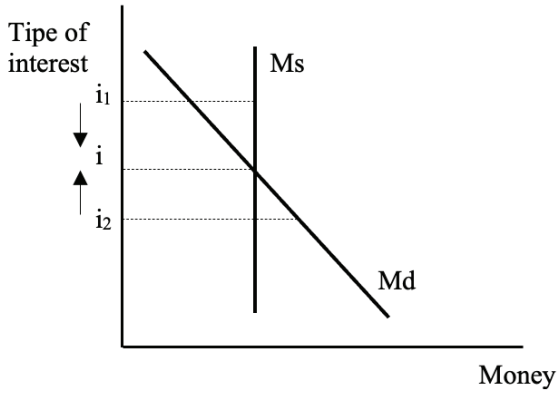
The money supply (Ms) is controlled by the central bank and is considered a fixed quantity, not dependent on the interest rate but on the decision of the monetary authority. Therefore, graphically, it is represented as a vertical function.



The equilibrium in the money market

Equilibrium in the money market occurs when the amount of money people can have (money supply) equals the amount of money people want (money demand), corresponding to the intersection point of the money supply and money demand functions.

For an interest rate higher than the intersection point of the Md and Ms functions ($i_1 > i$), there would be an excess supply of money. People would have more money than they desire — the money people have is the amount the central bank "wants" as it determines the money supply — and they would allocate part of it to the purchase of other assets. The demand for these assets would increase, causing an increase in their price and, consequently, a reduction in their returns, or, in other words, a decrease in the interest rate[77].



If the interest rate were lower than the intersection point of the Md and Ms functions ($i_2 < i$), the opposite effect would occur: the demand for money exceeds the supply, people want more money than they have — which is the amount the central bank "wants" — so they will sell assets they own. As the supply of assets increases, their price decreases, and their returns rise, consequently increasing the interest rate.

[77] For example, if a stock is purchased for 15 euros and the company distributes a dividend of 0.6 euros per share at the end of the fiscal year, the yield obtained is 4%. If the demand for shares of that company increases, the share price will rise; if, for that reason, the price rises to 20 euros and the same dividend per share is distributed, the yield would be 3%.

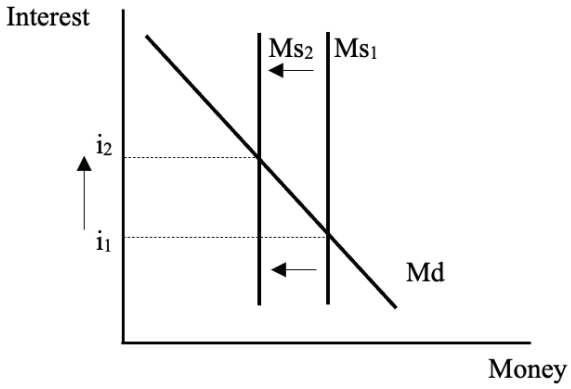
When, for a specific interest rate on alternative assets (opportunity cost of holding money), people have the amount of money they desire, no disruptions occur. Assets are not bought or sold to reduce or increase the amount of money, and the interest rate remains unchanged.

The interest rate on money and the returns on financial assets move in parallel.

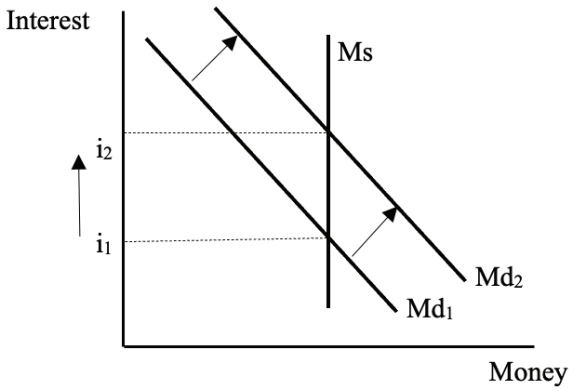
Changes in equilibrium

If, in order to control inflation, the central bank tightens monetary policy (restrictive monetary policy) — increasing legal reserve requirements, reducing and making bank loans more expensive, or selling securities — the money supply (Ms) would shift to the left, leading to a new equilibrium and an increase in interest rates.

By reducing the money supply, there is an excess demand for money (or a shortage of supply) at the initial interest rate, leading to the sale of other assets. As the supply of these assets increases, their price decreases, thereby increasing their returns (or, in other words, the interest rate).



If the value of production increases, the demand for money for each interest rate grows, and the money demand function (Md) shifts to the right, leading to an increase in interest rates. Similar to the previous case, an excess demand for money (or a shortage of supply) occurs, resulting in the sale of other assets. As the supply of these assets increases, their prices decline, thereby increasing their returns (or, in other words, the interest rate).

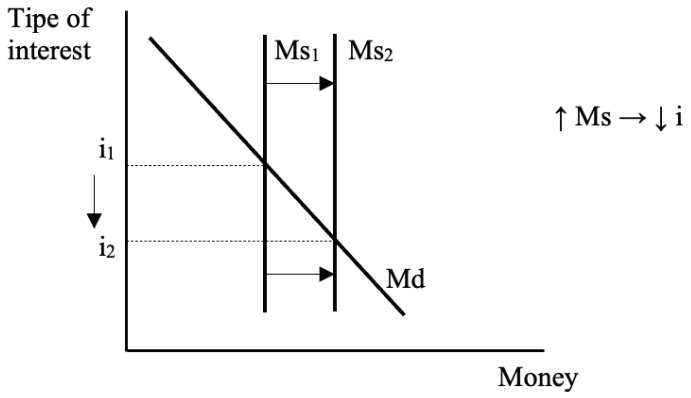


8. THE MONEY MARKET AND REAL EQUILIBRIUM

Changes in the quantity of money and interest rates influence the overall equilibrium. Above, we have seen how monetary policy instruments impact the money supply (intermediate objective). Now, we will examine how they affect the ultimate objectives.

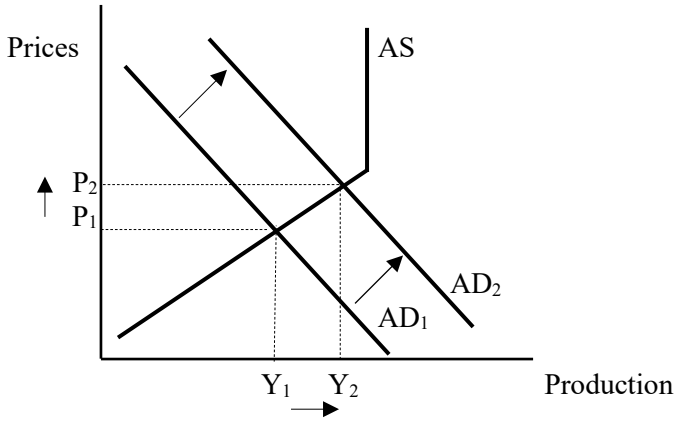
Impact on the overall equilibrium of an expansionary monetary policy

If an expansionary monetary policy is implemented — reducing legal reserve requirements, increasing and lowering the cost of loans to the banking system, or central bank acquisition of securities — the money supply (Ms) shifts to the right, and the new equilibrium occurs at a lower interest rate.



The reduction in the interest rate of alternative assets makes them less attractive, incentivizing investment and consumption. As a result, the aggregate demand shifts upward, and the overall equilibrium occurs at higher levels of production and employment than initially observed (and also at a higher price level).

↑ Ms → ↓ i → ↑ I y ↑ C → ↑ AD → ↑ Y, ↑ employment (↑ prices)



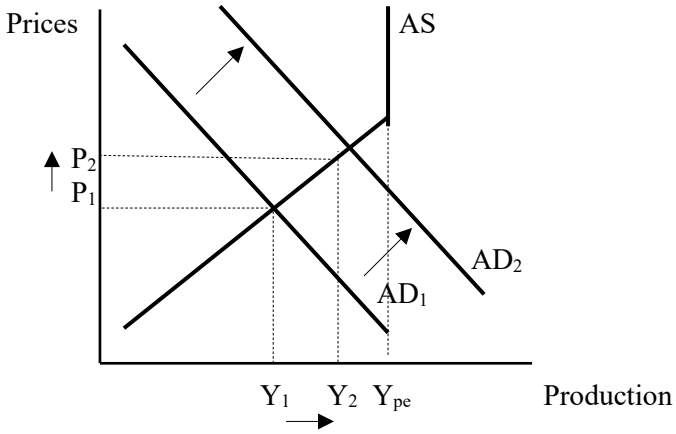
A restrictive monetary policy will produce the opposite effects:

↓ Ms → ↑ i → ↓ I y ↓ C → ↓ AD → ↓ Y, ↓ employment (↓ prices)

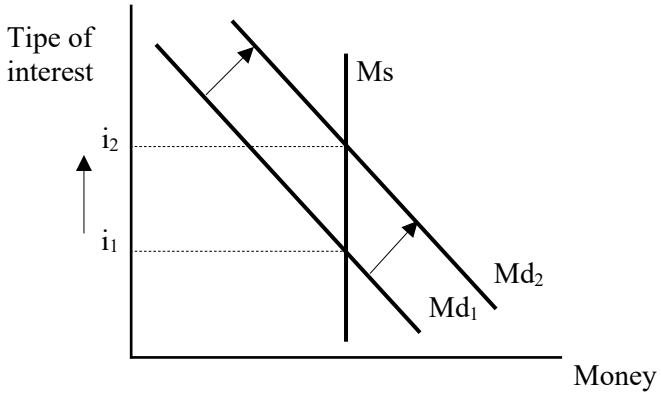
Impact of an increase in production value

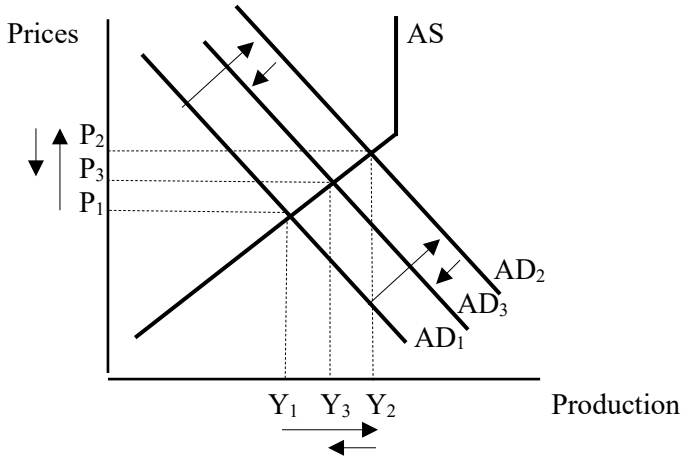
Suppose that, in order to achieve certain levels of production (Y_2) and employment closer to full employment production (Y_{pe}), an expansionary fiscal policy is implemented — manifested in an

increase in public spending (G) and/or a reduction in taxes (T). As a consequence of this fiscal policy, aggregate demand will shift upward (AD_2), and the new equilibrium occurs at a higher level of production and employment (although prices will also rise).



The transaction motive causes the increase in production to lead to a higher demand for money, shifting the Md function to the right. If measures have not been taken regarding the money supply, and Ms has remained constant, the interest rate will rise. The higher interest rate will curb investment and consumption, potentially preventing the desired initial growth in aggregate demand and making it difficult to reach the intended level of production and employment.

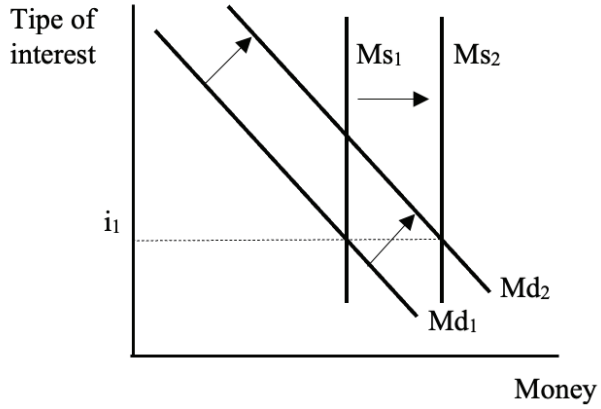




$$\begin{matrix}\uparrow G \\ \downarrow T\end{matrix} \rightarrow \uparrow AD \rightarrow \begin{matrix}\uparrow Y \\ \uparrow \text{Employment} \\ \uparrow P\end{matrix} \rightarrow \uparrow Md \rightarrow \uparrow i \rightarrow \begin{matrix}\downarrow I \\ \downarrow C\end{matrix} \rightarrow$$

$$\rightarrow \downarrow AD \rightarrow \begin{matrix}\downarrow Y \\ \downarrow \text{Employment} \\ \downarrow P\end{matrix}$$

To avoid the brake caused by the reduction in investment and consumption due to the increase in interest rates, it would be desirable for the expansionary fiscal policy to be accompanied by appropriate monetary policy measures. This would increase the money supply enough to "finance" the increase in production and prevent the higher demand for money from translating into an interest rate hike that reduces the effectiveness of the fiscal policy implemented.



9. GLOSSARY OF TERMS

Assets: Various ways of preserving wealth.

Autonomous Factors (monetary base): These are factors that the central bank does not control and, therefore, cannot use to influence the monetary base. The most notable ones are the external sector and the public sector.

Bank Money: It consists of indirect financial assets issued by specific financial intermediaries (banks) and accepted as a means of payment.

Banking Financial Intermediaries: Those that have the capacity to issue assets accepted as money (as a means of payment).

Banking System Reserves: Part of the deposits that the entity holds to meet customer fund withdrawals and regulatory requirements.

Capital Market: Market where assets with medium and long-term maturities are traded.

Central Bank Interest Rate: It is an instrument of monetary policy, as it is the reference interest rate for financial institutions and the economy at large. An increase in the cost of money reduces its demand, leading to a reduction in investment and consumption, especially for durable goods.

Central Bank: It is the monetary authority and responsible for implementing monetary policy. Its main objective, although not the only one, is price stability.

Commodity Money: The material value of the good used as money coincides with its exchange value.

Controllable Factors (monetary base): These are factors that the central bank can use to influence the evolution of the monetary base and, consequently, the money supply. Among them are credits to the banking sector, open market operations, and legal ratios.

Credit Market: Set of transactions with financial assets carried out by intermediaries that obtain most of their resources by attracting deposits.

Demand for Money: The proportion of wealth that individuals, businesses, and banks wish to hold in the form of money.

Direct Market: There is a direct relationship between suppliers and demanders of funds.

Equity Market: Market for assets whose remuneration is uncertain, depending on profitability, the dividend policy of the issuing entity, etc.

European System of Central Banks (ESCB): It has the functions of designing and implementing monetary policy in the euro area. It consists of the European Central Bank (ECB) and the national central banks of the member states.

Expansionary Monetary Policy: The use of monetary policy instruments to boost the economy. A reduction in the legal reserve ratio, an increase or lowering of central bank loans to the financial sector, or the acquisition of securities by the central bank results in an increase in the monetary base or the multiplier, and hence, the money supply.

Fiat Money: The material value of the good used as money is less than the exchange value.

Financial Assets: Assets that involve credit. They are a way for their holders to preserve wealth and, at the same time, a liability for the economic unit that generated them. Some examples include stocks, government debt, etc.

Financial System: A set of institutions that act as intermediaries between the demanders and suppliers of financial resources, channelling most financial flows.

Fixed-Income Market: Market for assets that are remunerated with a known interest rate in advance.

Indirect Financial Assets: Assets created by entities not directly in need of financing, generally by financial intermediaries.

Intermediated Markets: At least one of the participants is a financial intermediary.

Legal Reserve Ratio: A percentage of the liabilities that financial institutions must cover. It is an instrument of monetary policy, forcing institutions to maintain certain liquid funds, thus controlling the volume of lendable deposits.

Legal Reserves or Minimum Reserves: Reserves required by the monetary authority.

Legal Tender: It is issued by the institution with that function in each country; usually, the central bank.

Liquidity (referring to an asset): Greater or lesser ease of converting an asset into money.

Loans to the Banking Sector: Loans made by the central bank to financial intermediaries. Control is exercised through the interest rate, the volume of available loans, and the periodicity of loans. It is an instrument of monetary policy, as it facilitates or hinders the volume of funds that banks have available for lending to individuals and businesses.

Monetary Base (B): It is the sum of cash (both held by the public and in bank vaults) plus bank deposits at the central bank. In other words, it is the sum of cash held by the public (C) plus the reserves of the banking system (R). The monetary base includes the gold and currency reserves held by the central bank, securities acquired in financial markets, and loans to the banking sector. Changes in the monetary base are at the origin of money creation or destruction processes.

Money Creation: A process that occurs when money enters the system and banks, by increasing deposits, also increase their loans to individuals or legal entities in need of financing. The process can occur in reverse if money leaves the system.

Money Supply (S): It is the sum of cash held by the public (C) and deposits in banks (D). Depending on the deposits or assets considered, different types of money supply are distinguished, such as S1, S2, S3...

Money Supply Multiplier: The injection (or withdrawal) of a certain amount of money into the system generates a process of creating (or destroying) money. The money supply multiplier indicates the relationship between the initial injection (or withdrawal) and the total money generated (or destroyed).

Money: It is a financial asset that, besides being a store of value (like other assets), has other peculiar characteristics: a medium of exchange, a unit of account, and a deferred payment standard.

Non-Banking Financial Intermediaries: The assets they issue are not accepted as a means of payment.

Objectives of Monetary Policy: Although decisions made in the realm of monetary policy affect all objectives, the most direct one is related to prices.

Open Market Operations: The buying and selling of assets (particularly sovereign debt) by the central bank to regulate system liquidity. It is an instrument of monetary policy. For example, asset purchases inject money into the system, leading to an increase in the money supply.

Primary Financial Assets: Issued by the economic unit directly in need of financing (company, state, etc.).

Primary or Issuance Market: Market where newly created assets are traded.

Real Assets: Physical goods (land, real estate, jewellery, etc.). These assets are a way of preserving wealth for those who own them and are not a liability for anyone.

Required Reserve Ratio or Reserve Ratio: Ratio on deposits that financial institutions must maintain without lending.

Restrictive Monetary Policy: The use of monetary policy instruments to cool (slow down) the economy. An increase in the legal reserve ratio, a reduction or increase in the cost of central bank loans to the financial sector, or the sale of securities by the central bank results in a reduction of the monetary base or the multiplier, and hence, the money supply.

Secondary Market: Market where assets that do not represent new debt are traded. Previously issued assets change hands.

Securities Market or Capital Market in a strict sense: Group of transactions involving a wide range of assets, from stocks and bonds to public debt and currencies. It is an open trading market, without a disadvantaged position for the borrower. Only companies and the government obtain funds.

Security (referring to an asset): Greater or lesser assurance of not losing wealth when converting the asset into money.

Short-Term, Money, or Monetary Market: Market where short-term assets are traded.

CHAPTER VIII. INTERNATIONAL TRADE AND BALANCE OF PAYMENTS

1. INTERNATIONAL TRADE

Different countries possess various resources (natural, climatic, technological, human capital) that make some better equipped than others to produce certain goods: they produce them more easily and at a lower cost. The resources a country has determine its production and efficiency, pushing it towards specialisation. Indeed, the very reason for international trade lies in the advantages derived from this specialisation.

Each country tends to specialize in the production and export of products in which it has an advantage over others. If all countries were to act in this way, and no barriers were imposed on trade, global production of goods and provision of services would increase, and overall satisfaction would grow. The benefits of trade, as well as the most common obstacles that are typically placed to hinder it, will be examined next. The reasons for imposing these barriers, which aim to limit or prevent trade between nations, will also be discussed.

1.1 Benefits of International Trade

Absolute Advantage
Absolute advantage was introduced into economic analysis by Adam Smith. A country has an absolute advantage over other countries in the production of a good when it is able to produce a certain quantity of that good using fewer resources.

A simple example will help to understand this advantage. Suppose that, to obtain one unit of food, Spain needs to allocate one hour of labour, while France needs two hours. And for one unit of fabric, Spain needs two hours of labour, while France achieves it with one.

Product	Spain	France
1 unit of food	1 hour of work	2 hours of work
1 unit of fabric	2 hours of work	1 hour of work
Internal prices	1 unit of fabric for 2 units of food	1 unit of food for 2 units of fabric

Spain clearly has an absolute advantage over France in food production, as it requires fewer resources to produce each unit (i.e., it's cheaper). Conversely, France has an absolute advantage in fabric (fabric is cheaper in France than in Spain). If each country specializes in the product in which it has an absolute advantage, they can export these goods and with the profits generated from sales, they can trade with the other country to obtain the product in which they are not specialized, thus benefiting both countries.
By trading, both countries could consume a combination of food and fabric that would exceed their production possibilities frontiers (PPF) and therefore, beyond their capacity for autarkic production.

Comparing domestic prices and exchange prices with the other country, the advantage of foreign trade is evident. In Spain, one unit of food is exchanged for half a unit of fabric; however, if the holder of that unit of food goes to France, they will get two units of fabric for it (which is the internal exchange rate in France).

In France, one unit of fabric is exchanged for half a unit of food; however, if the holder of that unit of fabric goes to Spain, they will get two units of food for it (which is the internal exchange rate in Spain). In both cases, the external exchange is much more advantageous than the internal exchange.

Spain exchanges one unit of food	In domestic trade	½ unit of fabric (which is the domestic price)
	Trading with France	2 units of fabric (which is the price in France)
France exchanges one unit of fabric	In domestic trade	½ unit of food (which is the domestic price)
	Trading with Spain	2 units of food (which is the exchange rate in Spain)

Comparative Advantage

In the previous case, it was assumed that Spain has an absolute advantage over France in one of the goods (food) and that France has an absolute advantage in the other (fabric). The reason for trade is clear because both countries benefit. But what happens if one of the countries has an absolute advantage in both goods? In other words, if it produces both goods with fewer resources than the other country. Are there still reasons for trade or, if so, does trade make sense?

David Ricardo demonstrated that, regardless of absolute advantage, international trade benefits both countries if there is what he called comparative advantage. Comparative advantage exists when the domestic prices of the goods being traded are different in the two countries. In this case, comparatively speaking, one country has an advantage in one of the goods, and the other country has an advantage in the other.

For comparative advantage to exist, the opportunity costs of the goods being traded—i.e., their relative prices—must be different in the two countries. If one country produces one of the goods at a lower opportunity cost than the other, or in other words, to produce one more unit of that good, it has to give up less of the other, it has a comparative advantage in that good. If the former is true, the same will necessarily happen with the other country and the other good, and then trade will benefit both countries[78].

Now suppose that, to obtain one unit of food, Spain needs to allocate two hours of work and France three hours, and to obtain one unit of fabric, Spain needs one hour of work while France needs three.

Product	Spain	France
1 unit of food	2 hours of work	3 hours of work
1 unit of fabric	1 hour of work	3 hours of work
Internal prices, relative prices or opportunity cost	1 unit of food for 2 units of fabric	1 unit of food for 1 unit of fabric

In this example, Spain has an absolute advantage over France in both goods because it needs fewer productive factors to obtain them. However, if one looks at domestic prices, food is relatively more expensive in Spain than in France. If Spain wants to produce one more unit of food, it has to give up two units of fabric (because two hours of work are needed for food and one hour for fabric). In contrast, in France, to increase food production by one unit, only one unit of fabric needs to be given up (the production of one unit of both goods requires the same amount of work). Therefore, France—although Spain has an absolute advantage in both goods—has, comparatively speaking, an advantage in food.

On the other hand, Spain has a comparative advantage in fabric. The production of one more unit of fabric in Spain requires giving up half a unit of food, while in France, to increase fabric production by one unit, one unit of food needs to be given up.

[78] If the opportunity costs (or, in other words, the relative prices of goods) are equal in both countries, then there is no reason to trade, as trade does not improve the autarkic situation.

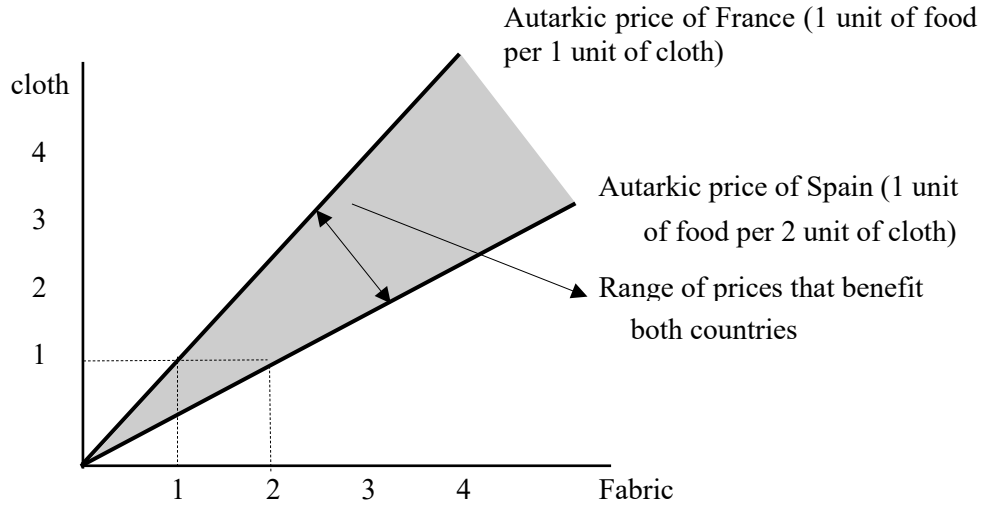
Comparing internal prices and external prices, the reason for trade is clear. In Spain, one unit of fabric is exchanged for half a unit of food; but if the holder of that unit of fabric makes the exchange in France, they will get one unit of food (which is the internal exchange rate in that country), which is more advantageous.

In France, one unit of food is exchanged for one unit of fabric; but if the holder of that unit of food makes the exchange in Spain, they will get two units of fabric for it (which is the internal exchange rate in Spain), improving their situation.

Spain exchanges one unit of cloth	In domestic trade	½ unit of food (which is the domestic price)
	Trading with France	1 unit of food (which is the price in France)
France exchanges one unit of food	In domestic trade	1 unit of cloth (which is the domestic price)
	Trading with Spain	2 units of cloth (which is the exchange in Spain)

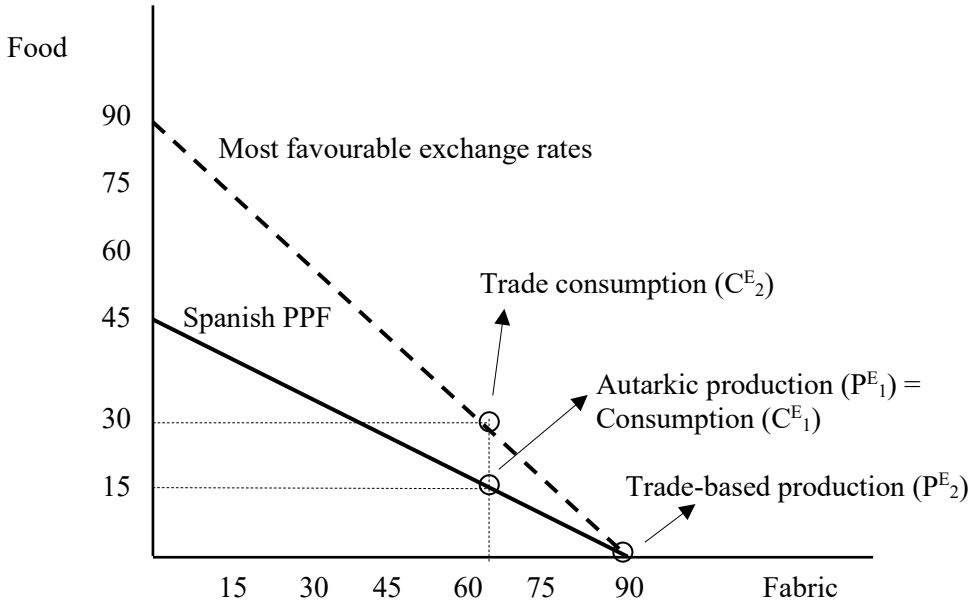
In both cases, the external exchange is much more advantageous than the internal exchange. Both countries will benefit if they specialize in the good in which they have comparative advantage and trade to obtain the other.

If represented on a coordinate axis, where the abscissa and ordinate are the goods subject to exchange, the functions of the autarkic relative prices of Spain and France, all exchanges made at a price that falls between the lines of autarkic prices benefit both countries, as trading with the other country yields more product than internal exchange.



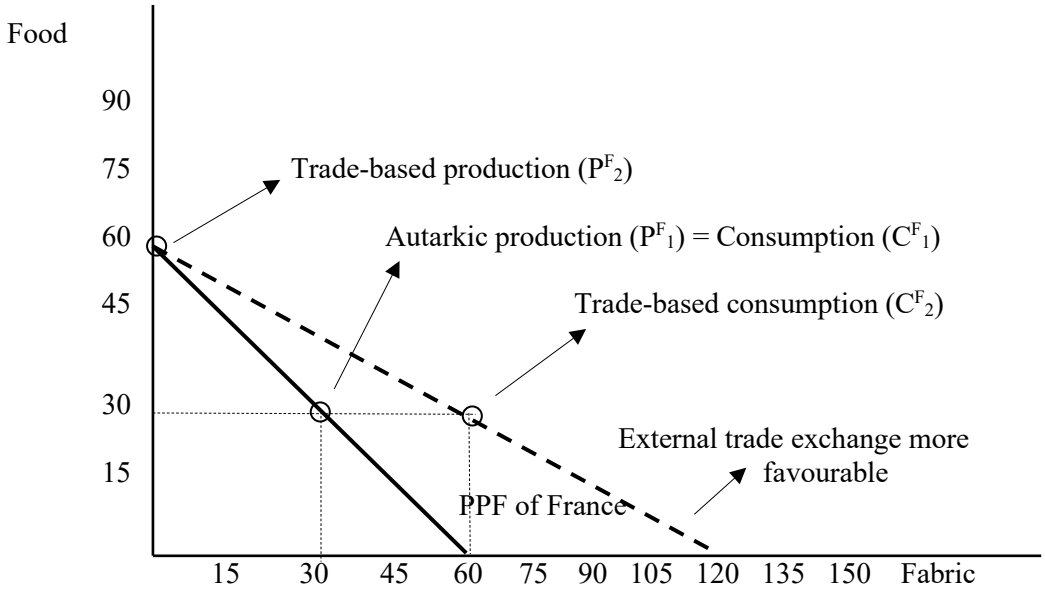
We are now going to analyse the advantage of trading, continuing with the previous data, and assuming that Spain has 90 hours of labour and France has 180.

Starting with Spain: its PPC intersects the food axis at 45 (the maximum amount of food it can produce if it allocates all labour to this good) and the cloth axis at 90 (the maximum amount of cloth it can produce if it allocates all labour to cloth).



If, initially, it is assumed that there is no foreign trade, with the productive factors it possesses, Spain, if it wanted to produce 60 units of cloth, could only produce 15 units of food. For the 60 units of cloth, it allocates 60 hours of work, and with the remaining 30, it produces 15 units of food (each requiring two hours of work). Spain would be situated at point P^E_1 on the PPC, which is also the consumption point C^E_1.

On the other hand, if Spain trades internationally, as it has a comparative advantage in cloth, it will specialize in this good, allocating all its resources to produce it; in this situation, it will produce 90 units of cloth (point P^E_2). In the international market—assuming the best-case scenario, where Spain, in trade with France, exchanges one unit of clothing for one unit of food—it can exchange 30 units of cloth for 30 units of food, positioning itself at consumption point C^E_2, which is a point above its PPC.
The same will happen with France. Its PPC intersects the food axis at 60 (the maximum amount of food it can produce if it allocates the 180 hours of labour it possesses to this good, as each unit of food requires 3 hours of work) and the cloth axis at 60 (the maximum amount of cloth it can produce if it allocates all labour to cloth).



If France does not trade internationally, with the labour hours it possesses, if it wanted to produce 30 units of food, it could only produce another 30 units of cloth. It allocates 90 hours of work to the 30 units of food and the remaining 90 to the 30 units of cloth. It would be situated at point P^F_1 on the PPC, which would also be the consumption point C^F_1.

On the other hand, if it trades, it will specialize in food, which is the product in which it has a comparative advantage; allocating all resources to produce it, it produces 60 units (point P^F_2). In the international market—assuming also the best-case scenario regarding the international exchange price, where France, in trade with Spain, exchanges one unit of food for two units of cloth—it can exchange with Spain 30 units of food for 60 units of cloth, positioning itself at consumption point C^F_2, which is a point above the PPC.

It is clear that, despite Spain having an absolute advantage in both goods, since the relative prices of these goods are different in the two countries, both improve by specializing and trading, as it allows them to achieve domestic consumption combinations that are above their PPCs.

1.2 Obstacles to Free Trade

Although it is acknowledged that free trade benefits the whole and raises the level of income and general welfare, the reality is that countries impose many barriers to trade for economic, political, and social reasons. Some of the reasons for imposing limits on international trade are:

EXERCISE

Based on the data in the table, between what prices should one unit of food be exchanged in the international market for trade to benefit both countries?

Product	Country A	Country B
1 unit of food	6 hours of work	5 hours of work
1 unit of cloth	3 hours of work	2 hours of work

Based on the data in the table, the domestic prices would be:

Product	Country A	Country B
1 unit of food	6 hours of work	5 hours of work
1 unit of cloth 3 hours of work	3 hours of work	2 hours of work
Domestic prices, relative prices, or opportunity cost	1 unit of food for 2 units of cloth	1 unit of food for 2.5 units of cloth

Therefore, if the exchange of one unit of food in the international market is between 2 and 2.5 units of cloth, it benefits both countries.
For example, if the international exchange rate is one unit of food for 2.2 units of cloth, it would be:

A exchanges one unit of food	In domestic trade	2 units of cloth (which is the domestic price)
	Trading with B	2.2 units of cloth (which is the international price)
B exchanges one unit of cloth	In domestic trade	0.4 units of food (which is the domestic price)
	Trading with A	0.45 units of food (which is the international exchange rate)

Then both countries gain by specializing in the good in which they have comparative advantage and exchanging it for the other in the international market. A would specialize in food [food is cheaper in A than in B: A has to give up less cloth (2 units) than B (2,5 units) to produce one more unit of food] and B in cloth [cloth is cheaper in B than in A: B has to give up less food (0,4 units) than A (0,5 units) to produce one more unit of cloth].

- Protecting domestic companies and employment from more competitive foreign producers.
- Avoiding dependence on other countries, which can lead to shortages for various reasons (policy changes in the countries of origin, transportation issues, etc.).
- Protecting national industries considered strategic for the security or economy of the country.
- Promoting industrialization through a policy of import substitution that also prevents or reduces the trade deficit.

There are various measures to intervene in trade and reduce it. The most prominent ones are tariffs, quotas, export subsidies, and non-tariff barriers.

GLOBALIZATION PERSISTS DESPITE MULTIPLE CRISES HOLDING IT BACK

Experts warn of globalization's slowdown, although they caution that announcing its death is an exaggeration. The 2008 financial crisis marked the moment of slowdown, from which the phenomenon has become asymmetric with China as the main beneficiary of being the world's factory.

17/12/2022
https://cincodias.elpais.com/cincodias/2022/11/17/economia/1668681462_660792.html

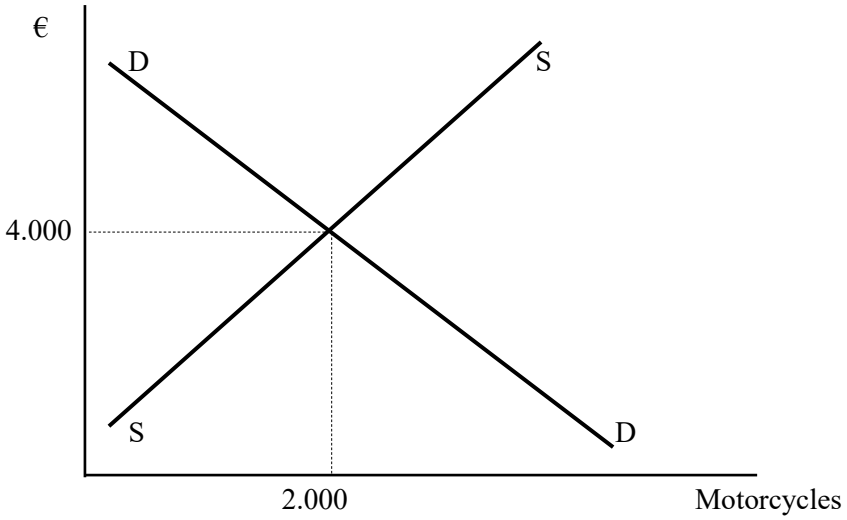
Globalization has stalled. There are many fires burning around the world and others that, although extinguished, continue to make themselves felt. The 2008 financial crisis, Brexit, the government of Donald Trump, the pandemic, and now, the invasion of Ukraine. The heat from these frictions has called into question what used to be categorical assertions: that China would be the world's factory, that services would be the key sector in the West, or that protectionism would continue to dissolve. Even in Europe, where "belief in globalization is strongest," there are anti-globalization forces (...). These elements highlight a trend that more and more analysts are beginning to notice: a slowing pace of globalization (...). Although there are economic factors that explain the loss of momentum, such as the "tepid" economic growth of developed economies; there are other political factors and consequences of globalization that have raised suspicions in Western countries with what, until now, seemed an inevitable process.

Offshoring has led to losses of industrial jobs and purchasing power for middle classes in Europe and the United States, creating a comparative grievance with the financial world, which undergoes an even "larger" globalizing process than that of products and services (...). Increases in inequality have given rise to protectionist ideals, as evidenced by Trump's victory in the US or Brexit in the UK. This, coupled with the increasing awareness that the globalization of the economy brings harmful effects to the environment, has gradually slowed down globalization processes until the arrival of two major shocks: the pandemic and the invasion of Ukraine.

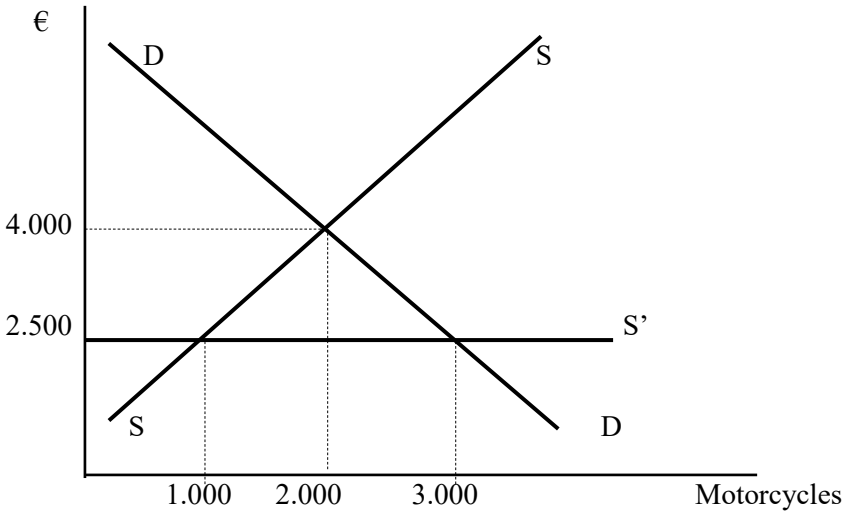
Tariffs

Tariffs are taxes imposed on products from third countries when they enter a country. The operation of a tariff is best understood with an example.

The supply (S) and demand (D) functions for motorcycles in a country, which does not trade with the outside world for this product, are depicted in the graph. Equilibrium occurs at 2.000 motorcycles and a price of 4.000 euros per unit.

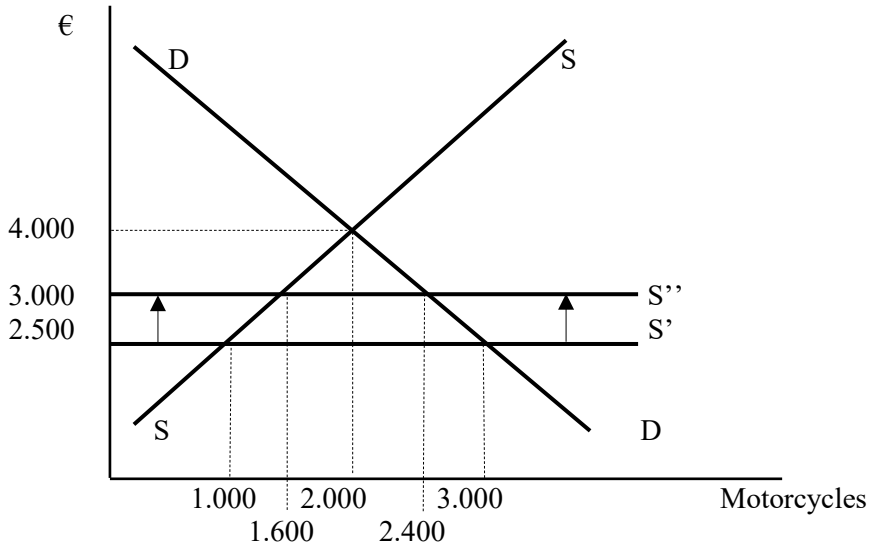


Suppose that the price of the motorcycle in the international market is 2.500 euros and that the country opens its market for this good. It can be considered that, once the market is open, the supply is horizontal (S') at the international price of the good, as it is wide enough for the domestic market to buy all the units it wants at that price. The result would be as shown in the following graph.



In this situation, 3.000 motorcycles would be demanded: domestic supply covers 1.000, and the remaining 2.000 come from abroad. The opening of the market has forced a reduction in domestic supply by 1.000 units, negatively impacting domestic production and employment (less efficient companies disappear, those unable to compete with the international price of the good).

One of the instruments to protect domestic industry and prevent job destruction is the tariff. For example, if a tariff of 20% is established on motorcycles, the result would be as shown in the following graph.



The tariff increases the product's price upon entering the country by 500 euros, so the new supply (S") is above the previous one. At this price, the demand is for 2,400 units, of which 1,600 are provided by domestic companies and 800 are imports.

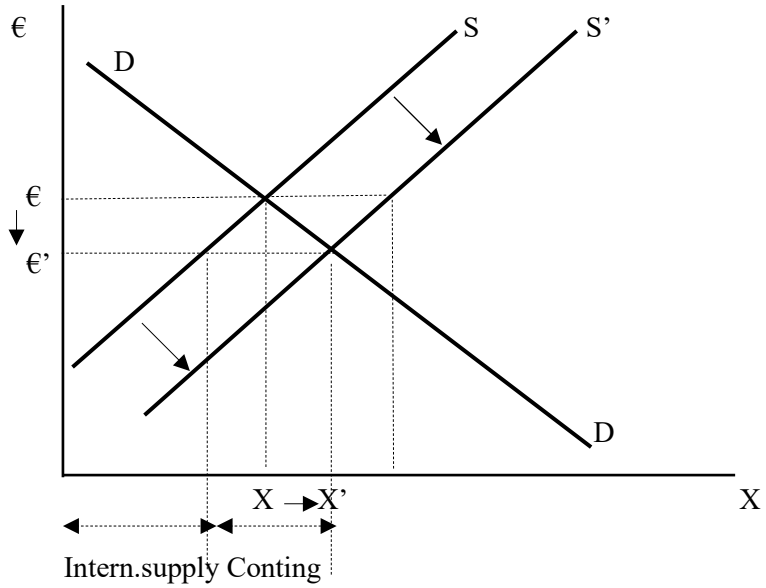
The effects of the tariff are as follows:

- It increases domestic production, at the expense of allowing inefficient companies to remain in the market. This entails a social cost, as the resources used by these companies could be allocated to producing other goods more efficiently.
- It penalizes foreign companies, which are more efficient than domestic ones.
- It raises the price of the product, thereby penalizing domestic consumers.
- It generates revenue for the state. At the macroeconomic level, this revenue is not a loss because the state allocates it to public spending that benefits the country.
- It discourages business investment in R&D because domestic inefficiency takes precedence over foreign efficiency.

Contingents

The contingent is a limitation on the imports of a certain product. Generally, a physical limit is set, but it can also be established in monetary units.

This instrument has the advantage of precisely determining the quantity of the good that will enter from abroad.



Initially, without imports, the equilibrium occurs at quantity X and price €, where domestic supply (S) and demand (D) intersect. The contingent increases the supply for each price: the supply function shifts to the right, to S', by the amount of the contingent (the horizontal distance between S and S' represents the quantity of X set by the contingent).

THE WORLD TRADE ORGANIZATION

https://www.wto.org/

From 1948 until 1994, the General Agreement on Tariffs and Trade (GATT) established the rules applicable to a large part of world trade, and during this period, some of the highest rates of growth in international trade were recorded. Despite its appearance of solidity, the GATT was, during those 47 years, a provisional agreement and organization.
The establishment of the World Trade Organization (WTO) on January 1, 1995, marked the most significant reform of international trade since the end of the Second World War. While the GATT had mainly dealt with trade in goods, the WTO and its agreements also cover trade in services and intellectual property. The creation of the WTO also led to new procedures for dispute settlement.
The overall objective of the WTO is to assist its members in using trade as a means to raise living standards, create jobs, and improve people's lives. The WTO administers the global system of trade rules and helps developing countries build trade capacity. It also serves as a forum for its members to negotiate trade agreements and resolve trade issues among themselves.

Improving people's lives. The fundamental goal of the WTO is to increase the welfare of people worldwide. The Marrakesh Agreement Establishing the WTO recognizes that trade should aim to raise living standards, achieve full employment and an increasing level of real income, and expand the trade in goods and services, while allowing for the optimal use of global resources.

Negotiating trade rules. The WTO was born out of five decades of negotiations aimed at progressively reducing barriers to trade. When countries have faced trade barriers and wanted them reduced, negotiations have helped open markets to trade. However, under certain circumstances, WTO rules advocate for maintaining trade barriers, for example, to protect consumers or the environment.

Monitoring agreements. At the core of the Organization are the agreements, negotiated and signed by the majority of countries participating in world trade. These documents, which are essentially contracts, establish the rules of international trade and require governments to keep their trade policies within agreed limits. Their purpose is to help producers of goods and services, exporters, and importers carry out their activities, with a view to raising living standards, while allowing governments to achieve social and environmental objectives.

Maintaining trade openness. The primary purpose of the system is to contribute to the freest possible flow of trade because that stimulates economic growth and employment and supports the integration of developing countries into the international trading system. Its rules must be transparent and predictable so that individuals, businesses, and governments know what the rules are governing trade in different parts of the world, and can be assured that policies will not undergo abrupt changes.

Dispute settlement. Trade relations often involve conflicting interests. Agreements, including those laboriously negotiated at the WTO, often need to be interpreted. The most harmonious way to resolve these differences is through an impartial procedure based on agreed legal foundations. That is the purpose of the dispute settlement system built into the WTO agreements.

The new equilibrium occurs for a quantity higher than the initial one (X') and a lower price (€'). Part of the quantity is supplied by domestic supply (which is reduced as a result of market opening), and another part (the one set by the quota) is supplied by imports.

The effects of the quota are similar to those of the tariff, with the difference that, unless the quota is accompanied by a tariff, it does not generate revenue for the state.

Export Subsidies

These are aids to domestic manufacturers of certain goods to enable them to export them at more competitive prices. Some of the effects of this instrument are as follows:

- Stimulates exports by favouring domestic production and employment.
- Helps less efficient domestic companies that are unable to produce the good at competitive prices in the international market.
- Penalizes companies in the countries where the product is destined.
- The subsidy has an internal social cost, as it is "lost" when the product is sold below its actual cost abroad. Those who benefit are foreign consumers.
- Reduces or eliminates seasonal imbalances in domestic demand.
- Promotes the inflow of foreign exchange into the exporting country.

Export subsidies can lead to "dumping", which involves selling the product abroad below costs or below the selling price in the domestic market, in order to dispose of product that has no outlet in the domestic market or to increase penetration in foreign markets.

Non-Tariff Barriers

Sometimes, international pressure to open markets and facilitate international trade, and the control of international organizations over the aforementioned instruments, lead countries to limit trade through other more subtle and difficult-to-control means, known as non-tariff barriers.

Some of these barriers include:

- Complex and costly customs procedures.
- Very strict quality and/or health standards, which may require compliance checks that halt goods at customs.
- In general, the use of administrative regulations for discriminatory purposes.

These barriers are often used to limit or hinder trade without violating international agreements on tariffs, subsidies, etc. Developing countries are most affected by these measures.

2. EXCHANGE RATES AND TRADE POLICY

Transactions between the currencies of different countries are conducted in the foreign exchange market. The exchange rate is the price of a currency expressed in units of another currency. Although, as will be seen later, there are exceptions, the exchange rate arises, like any other good, from the interaction between supply and demand.

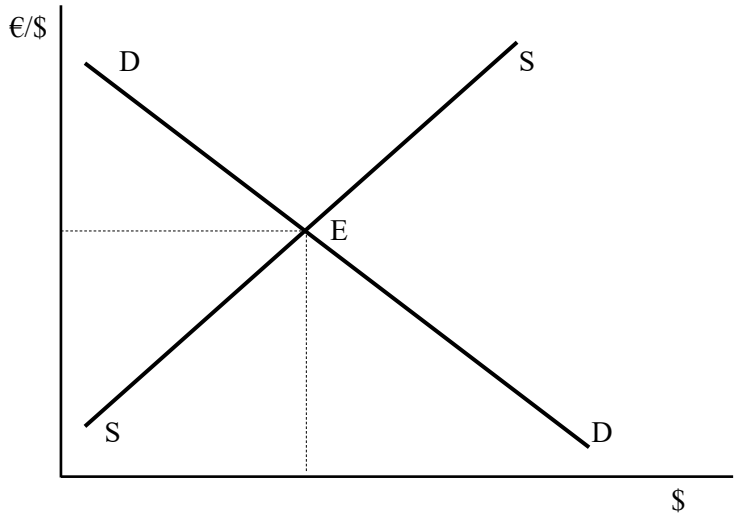
The different ways in which exchange rates are determined are as follows:

2.1 Flexible Exchange Rate, Freely Fluctuating or Clean Float

It is the exchange rate determined by the free play of supply and demand, without intervention by the central bank of the country in question.

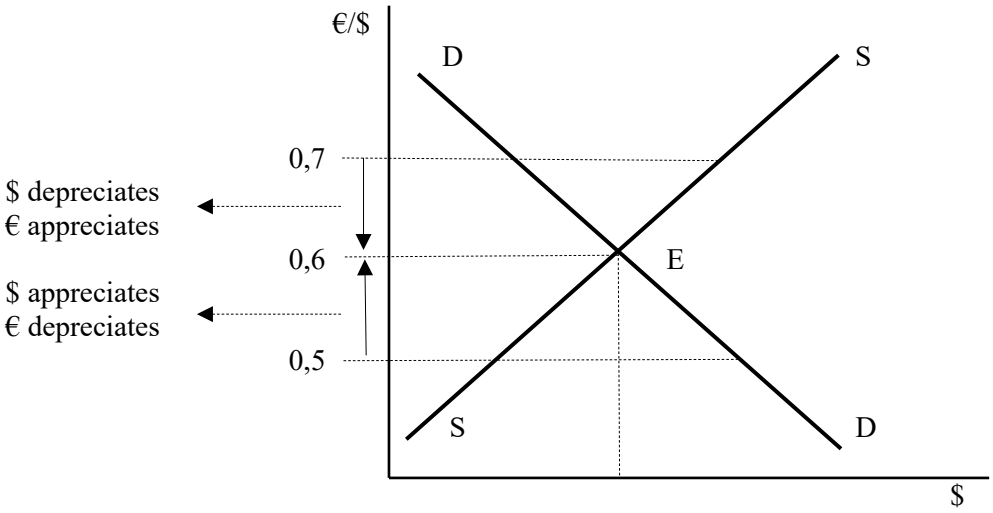
Pay attention to the dollar ($) and its exchange rate with the euro (€). The dollar is placed on the x-axis of the coordinate system, which is the axis of the good; on the y-axis appears the price of the dollar expressed in euros (€/$).

The supply of dollars consists of all those who have dollars and want to sell them in exchange for euros: American families and companies wishing to buy products or services in countries of the European Monetary Union (to pay for them, they need to buy euros with the dollars they own), American investors in the EMU, etc. The supply of dollars is increasing (like the supply function of any other good): the more euros received for a dollar, the greater the willingness to sell dollars. There will be an increased tendency to purchase products in EMU countries, as they are cheaper for dollar holders. The supply of dollars is, at the same time, demand for euros.



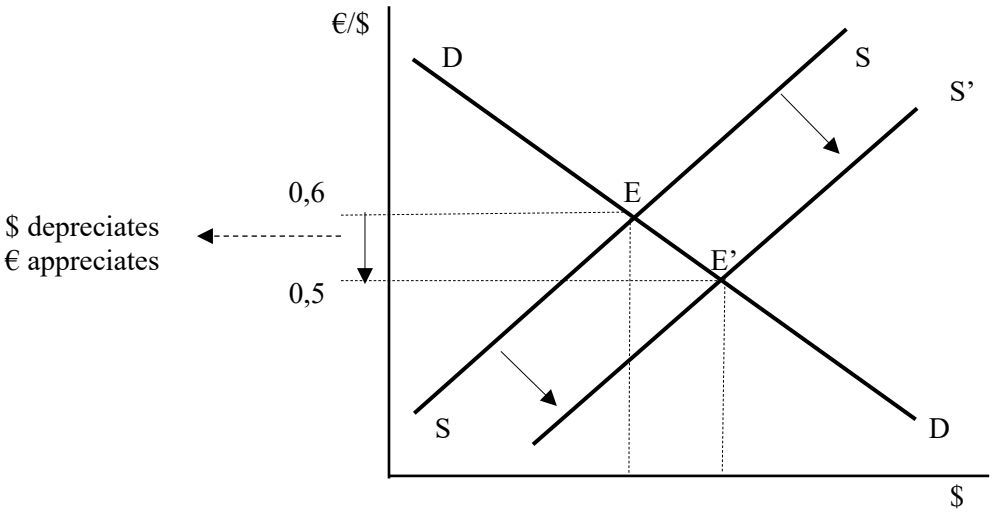
The demand for dollars consists of individuals and companies that need dollars to pay for goods and services acquired in the United States, to make investments in this country, etc. It is a decreasing function (like any demand function), because the more euros have to be paid for a dollar, the more expensive American products become for Europeans, and therefore they will purchase less. The demand for dollars is, at the same time, the supply of euros.

The intersection of the supply and demand for dollars indicates the price of the dollar (expressed in euros): the exchange rate of the dollar with respect to the euro. For an exchange rate above equilibrium, there is an excess supply of dollars, which would lead to a reduction in the price of the dollar (depreciation) — and an increase in the price of the euro (appreciation). For an exchange rate below equilibrium, there is an excess demand for dollars, which leads to an increase in the price of the dollar (appreciation) and a reduction in the price of the euro (depreciation).



As with any other good, changes in price (in the exchange rate) entail movements to other points on the supply and demand functions. But if something other than price changes (if something other than the exchange rate changes), the supply and/or demand functions shift.
Some of the factors that shift the supply function of dollars to the right include:

- Increase in the national income of the United States. This leads to an increase in the demand for European goods and, therefore, an increase in the demand for euros and the supply of dollars.
- Reduction in the relative price of goods in Europe compared to the United States, which also leads to purchasing more goods and services in Europe due to their relative cheapening.
- Rise in interest rates in the Economic and Monetary Union, which attracts American investors, who must sell dollars to invest in euros.
- Expectations of a depreciation of the dollar, leading to selling off of this currency.



The aforementioned factors shift the supply of dollars to the right (more dollars are offered for each exchange rate), causing the new equilibrium to occur at a lower exchange rate and thus leading to a depreciation of the dollar. As with any other good: an increase in the supply of the good ($) leads to a decrease in its price (it depreciates). Logically, movements opposite to those considered would produce opposite effects.

Now, turn attention to the demand function. Some of the factors that shift it to the right are:

- Increase in the national income of the countries in the Economic and Monetary Union. This results in increased demand for American goods and, consequently, an increase in the demand for dollars (and the supply of euros).
- Increase in the relative price of goods in Europe compared to the United States, leading European companies to acquire more goods and services in the United States due to their relative cheapness.
- Rise in interest rates in the United States, attracting European investors.
- Expectations of an appreciation of the dollar, leading to a demand for this currency.
- American products become trendy.

EXERCISE

At the beginning of 2017, one euro (€) was exchanged in the foreign exchange markets for 0.95 British pounds (£) and one dollar ($) for 0.80 pounds. One year later, one pound was equivalent to 1.25 euros and 1.40 dollars. Determine the exchange rate between the euro and the dollar at those two moments and the appreciation and depreciation relationships that occur between these currencies during the period considered.

In 2017: 1 € = 0,95 £ 1 $ = 0,80 £

0,95 £ ---------- 1 € X = 1 / 0,95 = 1,05 €
1 £ ---------- X 1 £ = 1.05 €

0,80 £ ---------- 1 $ Y = 1 / 0,80 = 1,25 $
1 £ ---------- Y 1 £ = 1,25 $

Therefore: 1,25 $ ---------- 1,05 € Z = 1,05 / 1,25 = 0,84 €
1 $ ---------- Z 1 $ = 0,84 €

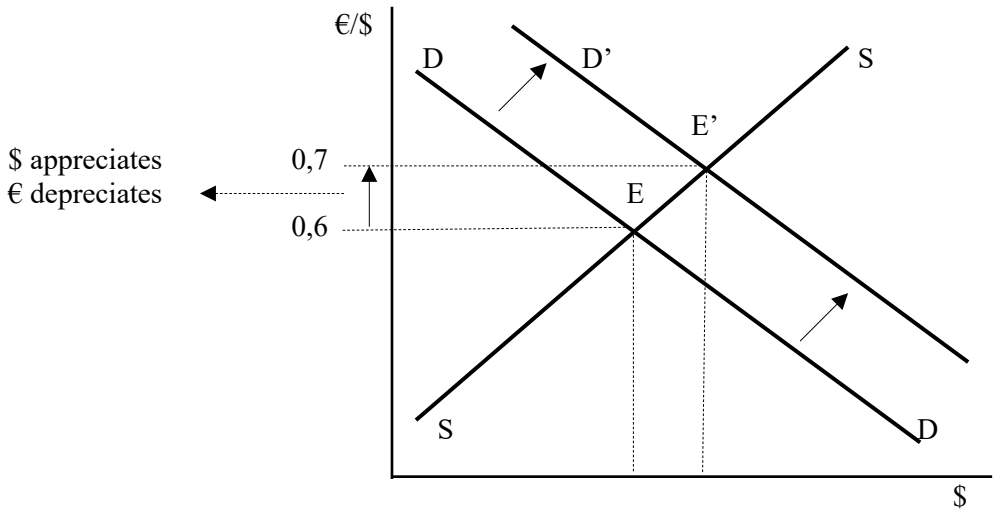
In 2018: 1 £ = 1,25 € 1 £ = 1,40 $

Therefore: 1,40 $ ---------- 1,25 € A = 1,25 / 1,40 = 0,89 €
1 $ ---------- A 1 $ = 0,89 €

In summary

2017	2018
1 £ = 1,05 €	1 £ = 1,25 €
1 £ = 1,25 $	1 £ = 1,40 $
1 $ = 0,84 €	1 $ = 0,89 €

During the period considered, the pound has appreciated against both the euro and the dollar. At the beginning of 2018, it takes 1,25 euros to buy one pound, whereas a year earlier, only 1,05 euros were needed. In 2018, one pound was exchanged for 1,40 dollars, compared to 1,25 in 2017. The dollar has appreciated against the euro; in 2017, one dollar was exchanged for 0,84 euros, whereas in 2018, 0,89 euros are needed.



The factors considered shift the demand for dollars to the right (more dollars are demanded for each exchange rate), causing the new equilibrium to occur at a higher exchange rate than the

initial one, thus resulting in an appreciation of the dollar. As with any good: if the demand for the good ($) increases, its price rises (it appreciates). Contrary movements would produce opposite effects.

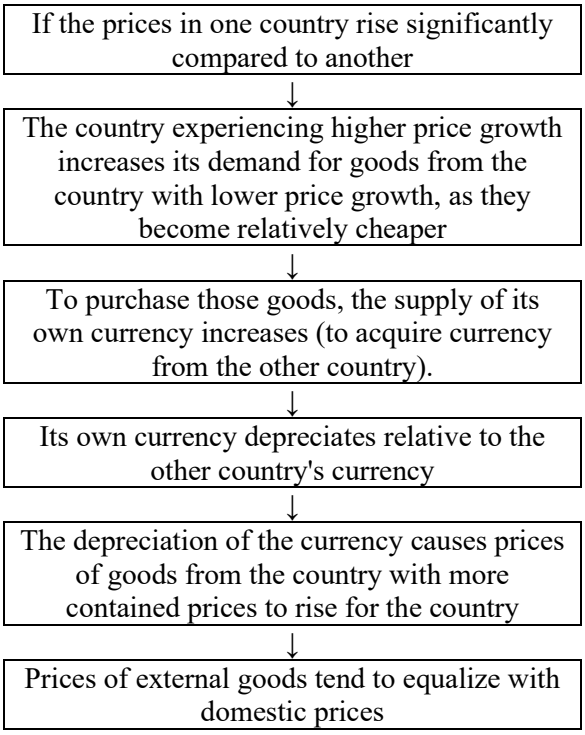
Changes in exchange rates affect international trade. For example, a depreciation of the currency:

- Boosts exports, as it makes the country's goods cheaper.
- Hinders imports, as it makes products from third countries more expensive.

The influence of various factors on exchange rates depends on many variables, one of which is timing. Thus:

- Very short term: The dominant factors on the exchange rate are relative interest rates and expectations about the exchange rates themselves.
- Medium term: The exchange rate is affected by economic fluctuations. A country with rapidly growing GDP increases its foreign purchases, leading to an increase in the supply of its currency (to acquire the currencies of the countries of origin of those imports) and, therefore, a tendency towards depreciation.
- Long term: According to the theory of purchasing power parity (PPP), in the long run, the exchange rate between two countries adjusts until the average price of goods is approximately the same in both countries.

According to this theory, one of the most important causes of variations in exchange rates is generated by differences in relative prices between countries:



For this reason, if there is clean floating, the currency of a country with high inflation tends to depreciate relative to that of another country with lower inflation.

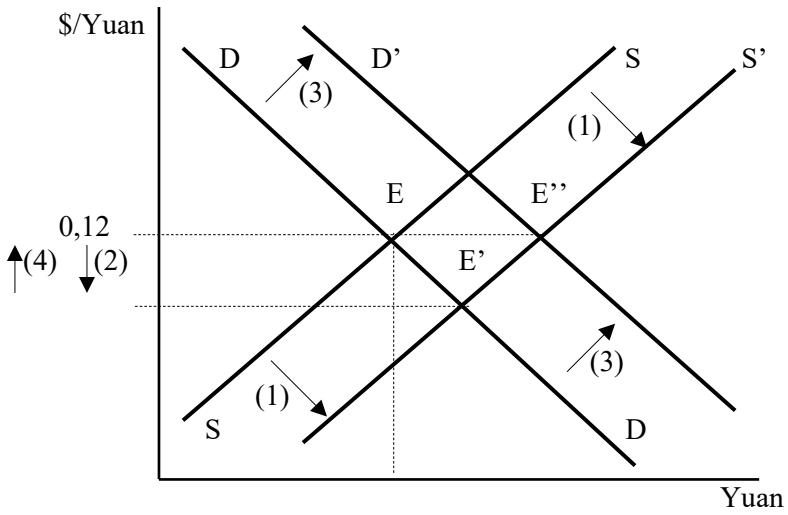
In any case, it is necessary to qualify the assumptions of the PPP theory. For example, there are goods and services that are very difficult for other countries to access no matter how cheap they are (hairdressing service, for example), the greater or lesser influence of costs related to trade (transportation, insurance...), the existence of trade barriers (tariffs, quotas...), etc.

2.2 Fixed Exchange Rate

The exchange rate is determined by the monetary authority, which intervenes in the foreign exchange market to maintain the currency's price. Intervention is carried out through the purchase or sale of foreign currency or the domestic currency.

If the supply of the country's currency increases — for example, because companies purchase products abroad — the currency will tend to depreciate. The central bank will intervene by increasing the demand for the domestic currency — buying currencies of the country with the foreign currency it holds — as necessary to counteract the increase in supply and maintain the exchange rate[79].

Suppose the Yuan (Chinese currency) has a fixed exchange rate with the dollar of 0,12: one Yuan costs 0,12 dollars (or one dollar costs 7,7 Yuan). An increase in the supply of Yuan leads to a rightward shift (1) of the supply function, which would result in currency depreciation: the new equilibrium (E') would occur at a lower exchange rate (2). To prevent this, the Chinese central bank intervenes by buying Yuan, which increases the demand for the currency and shifts the demand function to the right (3), aiming for the final equilibrium (E") to occur at the established exchange rate (4).



The central bank's intervention is conditioned by the domestic currency and foreign currencies it holds. To buy domestic currency (increase demand for its own currency), it must have foreign currency (currencies of other countries) to pay for it. To offer domestic currency, it must possess it.

When, for whatever reason (for example, because the central bank lacks the capacity to act in the foreign exchange market, or to adjust the currency price to the situation of external markets), a country with a fixed exchange rate varies the price of its currency, it is referred to as devaluation and revaluation (instead of depreciation and appreciation, which are terms reserved for changes in value in a flexible exchange rate system). Devaluation is a reduction in the value of the currency as a result of an official decision (not as a result of market forces); revaluation is an increase in the value of the currency.
Sometimes, instead of a fixed exchange rate, a fluctuation band is established. The central bank does not intervene if the exchange rate remains within the established range, and only does so if there is a danger that market forces will push it out.

[79] It should be noted that a country with a fixed exchange rate for its currency will also have strict controls over the rest of its external economic relations (exports, imports, capital inflows and outflows, etc.).

THE EURO HITS ITS LOWEST LEVEL IN 20 YEARS AGAINST THE DOLLAR

13/07/22 https://www.bbc.com/mundo/noticias-62129903.

The European currency plunged to its lowest level in 20 years, reaching a historic parity with the dollar (…). Gone are the years when the euro was so strong (1.6 times the dollar during the 2008 global financial crisis) that many Europeans went on vacation to the United States for the low prices in hotels and food, returning home with suitcases full of electronics and clothing. But now the situation is completely different, with Europe suffering the economic consequences of the war in Ukraine and the decision of the European Central Bank to maintain interest rates.
The depreciation of the euro occurs amid an energy crisis in Europe caused by the Russian invasion of Ukraine (…).

To this conflict is added the blow that the currency has received because interest rates are rising much faster in the United States, attracting capital to the world's largest economy. "The most important cause of the fall of the euro is the different speed in the monetary policy of the Federal Reserve of the United States and the European Central Bank," argues Juan Carlos Martínez, professor of Economics at IE University, in dialogue with BBC Mundo. For investors, U.S. Treasury bond yields are higher than those of European debt, making them prefer the dollar over the euro.

From this perspective, the European Central Bank is in a difficult position, trying to curb inflation and, at the same time, cushioning a decelerating economy. "The eurozone has not yet started raising interest rates. It will do so presumably at its late July meeting, but it will do so more slowly," adds Martínez.

What are the consequences?
With inflation in the eurozone at its highest level since records began (8.6%), the depreciation of the euro increases the cost of living by raising the cost of imports. At other times in history, a weaker currency is not necessarily bad news, because governments use it as a way to stimulate economic growth, since exports become more competitive. However, that is not the case now. "Every time the dollar keeps appreciating, it costs us more in euros to buy a barrel of oil. That's the big problem we see now," explains the economist.

That is why a weak euro has contributed to fuels reaching historical highs, hitting consumers' pockets. The situation is worrying for countries in the region, considering that close to 50% of eurozone imports are denominated in dollars.

If the war in Ukraine were to end soon, something that experts consider unlikely, the depreciation of the euro could stop. The second alternative to curb devaluation is for interest rates in the eurozone to rise. "A more aggressive policy from the European Central Bank would be necessary, something that for the moment does not seem to be on the table," says Martínez.

In the case of Latin America, the parity between the euro and the dollar "does not have a direct impact on the region," Elijah Oliveros-Rosen, senior economist at the Latin America Global Economics & Research division, tells BBC Mundo. What this situation reflects, he adds, is that there is an appreciation of the dollar in general. "The strength of the dollar is not only against the euro, but also against most emerging market currencies, including Latin America". In fact, Argentina, Chile, and Colombia are the three countries that have suffered the worst devaluations of their currencies so far this year against the dollar.

2.3 Dirty Float

Dirty float occurs when, in a flexible exchange rate system, the central bank intervenes occasionally if the exchange rate moves in an undesirable direction, harming the country's economy. It buys its own currency to prevent excessive depreciation or sells it to prevent it from appreciating too much.

CENTRAL BANKS DON'T ALWAYS WIN: SOROS DEFEATED ENGLAND TWENTY YEARS AGO

15/09/2012 https://www.elconfidencial.com/economia/2012-09-15/los-bancos-centrales-no-siempre-ganan-soros-derroto-a-inglaterra-hace-veinte-anos_423684/

This Sunday marks twenty years since George Soros speculative attack on the pound sterling, against which the Bank of England could do nothing. This anniversary coincides with a crucial moment for the euro, with the European Central Bank ready to do "whatever it takes" to ensure its future. As demonstrated back then, central banks don't always win. The fundamental difference between both crises is that the ECB does have an unlimited potential for debt purchases.

On September 16, 1992, the famous attack by Hungarian-born investor George Soros on the pound took place. Soros forced the devaluation of the British currency by selling over 10 billion pounds in the markets. Soros's move, which earned him 1 billion dollars, was followed by other managers, and the defense mounted by the Bank of England proved futile.

The British authority spent up to 50 billion dollars in its attempt to stem the collapse of the currency's value. But the organization's foreign exchange reserves had a limit, and the market prevailed. Then-Spanish Economy Minister Carlos Solchaga said after devaluing the peseta as a result of this market move, "When speculation intensifies, no central bank can withstand the drain of reserves. "

3. THE BALANCE OF PAYMENTS

The balance of payments is an accounting document that records economic transactions between residents of a country and those of the rest of the world. As seen in Chapter 5, achieving a balanced balance of payments is one of the major macroeconomic objectives that is attained through foreign policy and the instruments associated with it. The International Monetary Fund (IMF) defines a unit as a resident when it has an economic interest centre within the country's territory, regardless of nationality.

Entries in the balance of payments are made on a double-entry basis, so that it always remains balanced as a whole.

The balance of payments is composed of three balances:

1. Current account balance

- Trade balance or goods balance: records exports (X) and imports (M) of goods. Its balance is one of the most commonly used when studying a country's foreign trade: a trade surplus if X > M or a trade deficit if X < M. The coverage rate indicates the percentage by which exports finance imports:

$$\text{Coverage rate} = \frac{\text{X}}{\text{M}}\ x\ 100$$

- Services Balance: Includes income and payments related to tourism, travel, transportation, communications, insurance, financial services, etc.
- Income Balance: Divided into two types of income:

  - Labour income: Remuneration of border, seasonal, and temporary workers.
  - Investment income (capital): Interests, rents, and dividends.

- Current Transfers Balance: Includes all transfers that are not capital transfers (which are recorded in the capital account). Generally, these transfers are without counterpart: remittances from emigrants, private donations, development aid for current expenses, etc.

2. Capital Account

Main origins:

- Unilateral capital transfers without counterpart: Can be from the private sector (reflecting fund movements due to the liquidation of emigrant assets due to change of residence) or from the public sector (capital transfers from public administrations to the EU, such as Regional Development Funds (FEDER), Cohesion Funds, etc.).
- Acquisition and disposal of non-productive non-financial assets: Tangible assets that can be used to produce goods and services (land and subsurface resources) and intangible assets (patents, rights, etc.).

3. Financial Account
- Direct or Portfolio Investments: Includes the country's investments abroad or foreign investments in the country, both direct investments (effective participation in a company) and portfolio investments (negotiable securities that cannot be considered direct investments).
- Loans and Deposits: Abroad or in the country.
- Reserve Changes.

4. Errors and Omissions

The sign of the combined balance of the current and capital accounts is important. If the balance is:

- Positive: The country increases its assets compared to the rest of the world[80] and has financing capacity relative to the rest of the world, generated by non-financial operations of the economy. This financing capacity is reflected in the financial account: investments abroad, foreign loans, or reserve changes. For example, if reserves increase, that growth is an asset of the country's central bank and a liability (debt) of the central banks of the countries that issued them.
- Negative: The country's assets decrease compared to the rest of the world; its situation deteriorates relative to the rest of the world. This financing need can simply result in a reduction of reserves (fewer assets from the rest of the world), or the country may borrow to finance the current account deficit, which would be reflected in the same reserves and in more loans received from abroad.

Reserves are liquid assets of the central bank denominated in currencies other than its own. The change in reserves in the financial account reflects the growth or decrease of official reserves as a result of international operations during the period.

[80] When a country exports a good, the buyer must pay for it in the currency of the selling country (the company selling a product abroad receives payment in its own currency, not in the currency of the buyer's country). Therefore, to make this purchase, it is necessary to acquire currency from the exporting country, which is "paid" for with the currency of the buying country. This transaction causes currency from the importing country to arrive in the exporting country (through corresponding entries by central banks), resulting in an inflow of foreign exchange into the exporting country and an increase in its reserves. This increase, to balance the balance of payments, is recorded with a negative sign in the financial account, as the export has been recorded with a positive sign in the trade balance.

A negative sign in the change in reserves means an increase in reserves (foreign exchange) or, conversely, an increase in assets against the outside world; a positive sign indicates a reduction in reserves.

4. GLOSSARY OF TERMS

Absolute advantage: A country has an absolute advantage over other countries in the production of a good when it can produce a certain quantity of that good with fewer resources. It was introduced in economic analysis by Adam Smith.

Autarky: Economic policy that restricts imports and relations with other countries, focusing on the welfare and prosperity through the use of domestic resources and self-sufficiency.

Balance of payments: Accounting document that records economic transactions between a country and the rest of the world.

Capital account balance: Originating from two main sources: unilateral capital transfers without counterpart and the acquisition and disposal of non-financial non-productive assets.

Comparative advantage: Comparative advantage exists when the domestic prices of goods subject to trade are different in trading countries. For this to occur, the opportunity costs of the goods subject to trade must be different in the two countries. It was introduced in economic analysis by David Ricardo.

Coverage rate: Percentage in which exports finance imports.

Currency appreciation: Increase in its price relative to other currencies.

Currency depreciation: Reduction in its price relative to other currencies.

Current account balance: Includes the balances of trade in goods, services, incomes, and current transfers.

Current transfer balance: All transfers that are not capital transfers (recorded in the capital account). Generally, they are transfers without counterpart: remittances from emigrants, private donations, development aid for current expenses, etc.

Dirty float: Occurs when in a flexible exchange rate system, the central bank occasionally intervenes if the exchange rate moves in an undesired direction, harming the country's economy. It buys its own currency to prevent excessive depreciation or sells it to prevent excessive appreciation.

Exchange rate: Price of a currency expressed in units of another currency.

Export subsidies: Aid to national companies for exporting certain goods at more competitive prices.

Financial account balance: Direct or portfolio investments, loans and deposits, abroad or in the country, and changes in reserves.

Fixed exchange rate: The value of the currency is fixed based on the value of another (or a basket of others). The central bank intervenes in the foreign exchange market to maintain the fixed exchange rate, through the purchase or sale of currencies or its own currency.

Flexible exchange rate: Exchange rate determined by the free play of supply and demand, without intervention by the central bank of the country in question.

Foreign exchange market: Market where transactions between the currencies of different countries take place.

Income balance: Includes labour income and investment income.

International trade: Exchange of goods and services between countries. Countries possess different resources (natural, climatic, technological, human capital), which make some better equipped than others to produce certain goods. International trade is based on the advantages derived from specialization.

Non-tariff barriers: Measures that, without violating international agreements, restrict foreign trade and are difficult to control for international organizations. Some examples include complex and costly customs procedures, strict quality and/or health standards requiring controls that halt goods at customs, and the use of administrative regulations for discriminatory purposes.

Production Possibility Frontier (PPF): Indicates the maximum quantity of goods an economy can produce using its resources efficiently.

Purchasing Power Parity (PPP): It is a theory and an economic indicator that compares the standard of living between different countries. It shows the difference in the cost of living between two countries.

Quotas: Trade barriers that limit imports of a particular product, establishing a maximum in physical or monetary units.

Reserves: Liquid assets of the central bank denominated in currencies other than its own.

Service balance: Records income and payments for services: tourism, travel, transportation, communications, insurance, financial services, etc.

Tariffs: Taxes imposed by a country on products from third countries entering it. Tariffs increase the price of imported products, hindering trade.

Trade balance or merchandise trade balance: Records exports and imports of goods.

Trade deficit: Negative balance of the trade balance of the balance of payments (exports less than imports).

Trade surplus: Positive balance of the trade balance of the balance of payments (exports greater than imports).