IS THE TREND OF OUR ECONOMY MAKING LUXURIES AFFORDABLE AND NECESSITIES COSTLY? THE SPANISH CASE

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Degree in Finance and Accounting

2016-2017

SUMMARY

The objective of the paper is remembering the existing aggregate macro-models, explain price inflation, present the problems that may arise in aggregate models and carry out a study to understand the breakdown of price inflation in Spain in the last 15 years.

In order to do that first we're going to describe the article that will be our starting point to carry out the paper and also the meaning of the different named concepts. The macro-economic problems generated by aggregation in economy will be presented. Moreover, an economic study about price evolution will be carried out, in order to better understand the breakdown of annual headline inflation. After the study will be carried out one can better observe the differences and similarities of the American case.

In the Spanish case the good that increased its price the most were cigarettes, that is, they have increased or decreased necessary goods as well as leisure ones. However, in the American case, only the necessary ones increased.

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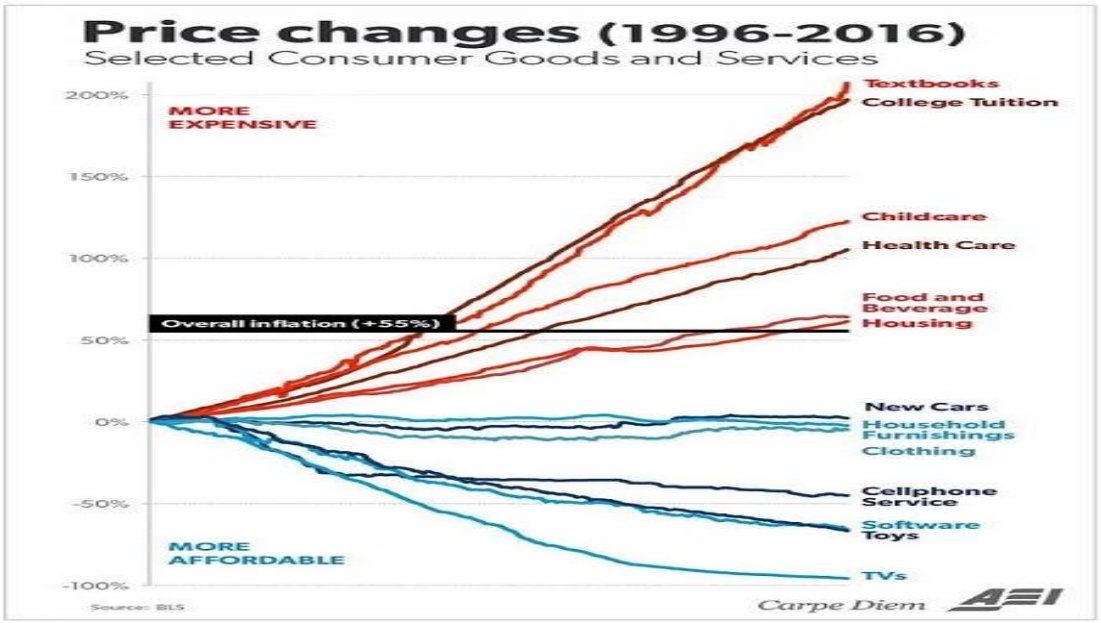
1. INTRODUCTION

According to the article written by Ingrahan (2016) in the World Economic Forum, he states that, according to a diagram of the economy Mark Perry created from the data of the US Bureau of Labor Statistics, the evolution of prices of the different products has varied in the last two decades from 1996 to 2016.

This article shows the idea that the prices of necessary goods like school books, university fees, health and housing, among others, are more expensive. For example in the case of medical care or education, as they're not produced in a factory, their cost has increased as they don't get competition from the outside.

On the other hand, in the case of manufactured products like toys, televisions and mobile services, they have been decreasing their price in the last two decades. This is due to on one side to the improvement of technology, as it increases the productivity level of companies and lowers the manufacturing price. On the other hand, world trade has increased and transactions among different countries have increased, with a higher degree of competition, because foreign products have an easier access, they have a lower production cost due to lower labour costs. As a consequence, North American manufacturers are more competitive in the market; they lower their prices and offer a higher quality and better service.



Graphic 1 Evolution of Inflation for different products in the United States during 1996 to 2016

Source: World economic forum

After appreciating what the article states about the American case, an analysis is going to be carried out about how the economic market and the different models act.

In order to do that, the different macroeconomic models that have been reviewed during the university degree will be defined: the aggregate supply and aggregate demand model and IS-LM model.

Another aspect that will be explained for the understanding of the performance of economy will be the definition of inflation, the existing types of inflation, their causes and the effects that they produce in the economic market.

Once the theory part is analysed, what is shown afterwards are the different problems that are created in aggregation. In which when the aggregated model is used, relevant information is hidden and good and services are affected by other goods or different services.

In order to understand in more detail the origin of price inflation, through its breakdown a study will be carried out about price indexes about the different groups that constitute Spanish economy. A period of 15 years will be taken, and it includes the time that goes from 2002 to the present day, using data of the National Statistical Institute (INE, Spanish acronym) database.

The study consists of conducting an analysis that will include all the price indexes obtained from the INE and first we'll calculate the average annual increase to see how much it has gone up year after year from 2002 to the present day. After that, we'll calculate the accumulated increase of the prices of the different groups in which the Spanish economy is divided and finally we will create a diagram where the price increase and decrease of the prices of the different goods and services will be seen.

Once the study is carried out, with the obtained result the observations will be presented after carrying out the analysis and a brief explanation will be given about the reasons for these situations, together with a comparison with the American case.

Therefore, the objective of this paper is to take notice of the macroeconomic models, breakdown the inflation by groups of good and products to have a better understanding of inflation and deflation of prices in Spain in the last 15 years and see the differences and similarities between the American and the Spanish case.

2. PHILIPS CURVE, AS-AD MODEL, IS-LM MODEL, MACROECONOMIC EQUILIBRIUM AND INFLATION

2.1. Philips curve

According to Caballero (2016) Phillips curve is a principle of the economic theory that creates a reverse relationship between unemployment and the inflation of a country. It is one of the many links established between the economic and monetary prospects of economy.

Phillips curse is grounded on the principle that the money supply quantity, that is, money circulating, has real effects over economy short-term. This way, an increase of circulating money will have a beneficial effect over aggregate demand, generating an increase of spending due to the increase of nominal wages. This will create a more favourable framework for investment. The reason for this is that the prospect of increasing prices will result in a higher economic growth and at the same time it will create new employment opportunities. This is the way the inverse relationship between inflation and unemployment is established.

Following, the AD-AS model, the IS-LM model and inflation will be shown.

2.2. AS-AD Model and IS-LM Model

2.2.1. Utilities of the AS-AD Model

One of the most frequent tools to explain what's happening in economy on an aggregate scale is the aggregate demand- aggregate supply model.

According to the University of Murcia (2017) some of the theoretical utilities of the supply and demand model that we can find are the following:

- It produces useful tools for dealing with economic crisis short-term.

- It allows positioning before the singularity of crisis, its origin can come from supply or demand.

- It generates relations between economic variables with the purpose of stabilizing the economy and deal with cycles.

- The analysis of individual markets (supply-demand) is carried out in economy and it has a great explanatory capacity of the economic reality.

- It is the fundamental base of fiscal and monetary macroeconomic policies.

2.2.2. The aggregate supply

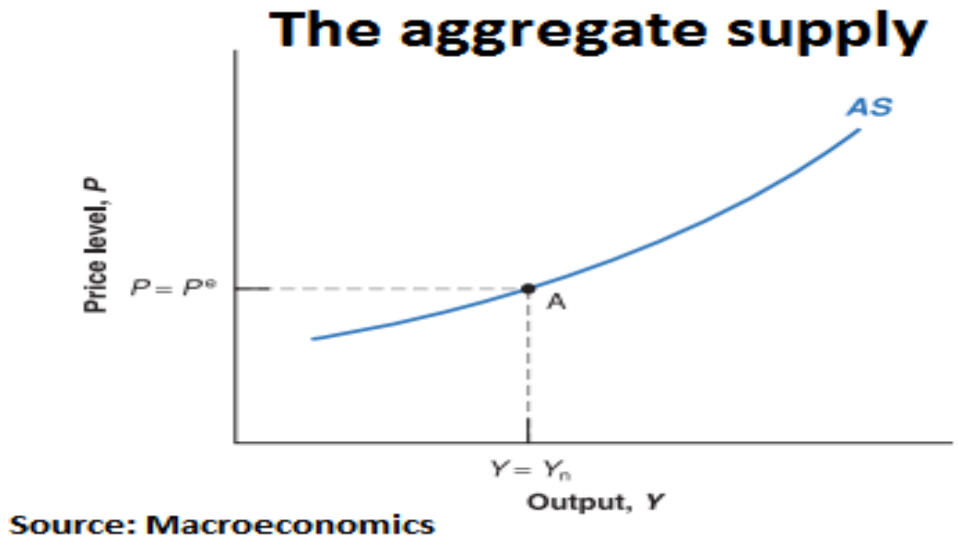
Firstly, to find out about the base of the model, the aggregate supply will be explained in detail.

According to Blanchard et al. (2010) it is the total quantity of good and services in which they include the imports and exports that companies can produce and sell inside a national economy, in a given period of time. It will be affected by productive capacity, market conditions, costs, new technologies and market changes.

In relation with aggregate supply, it has important properties. The first would be: the increase of production involves an increase of the price level. This is due to a series of consecutive effects: the increase of production raises employment, this increase reduces unemployment rates and that's why nominal wages rise which results in the companies rising their prices.

Another property would be a rise of the price level due to an increase of the expected level. In other words, if whoever decides on the salary thinks the price level will be higher, they will increase the salary of workers and that leads to a rise of costs in the companies that have to increase their prices.

Its curve has a positive slope, that is, an increase of production (Y) leads to an increase of the price level (P).

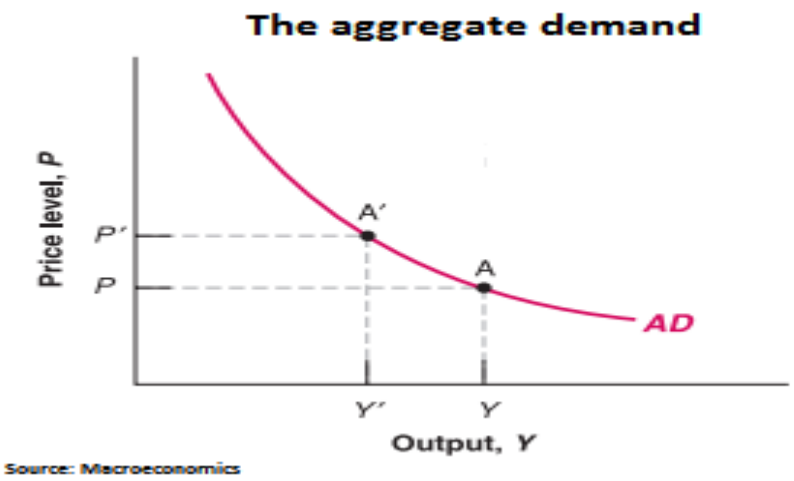


Graphic 2: Curve of the aggregate supply

2.2.3. The aggregate demand

On the other hand, according to Blanchard et al. (2010) aggregate demand is the total level of goods and services that are desired by all the residents of a national economy. It includes the result of the various expenses in the national economy like public spending, consumption expenditure and net exports, which would be the exports done in this period, minus imports.

Its curve has a negative slope, that is, there's a negative relationship between the price level and production. If the price increases, production will decrease and the other way around.

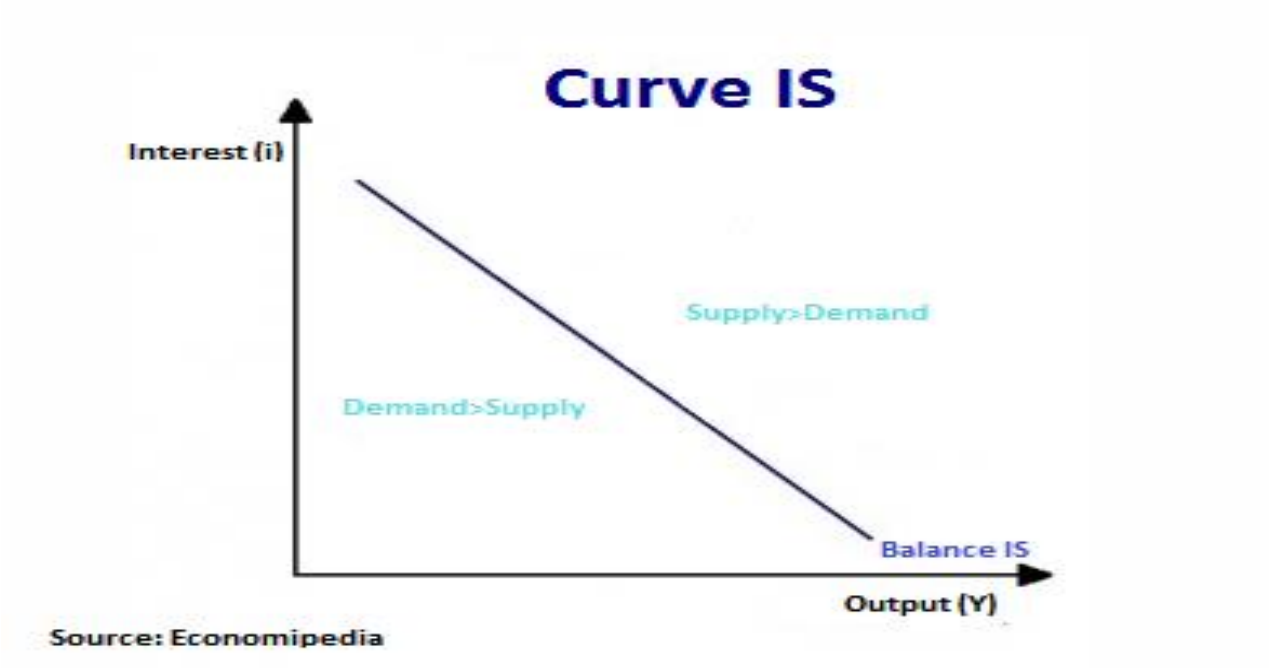


Graphic 3: Curve of the aggregate demand

Production is affected by price level. The price level is obtained from the equilibrium of the goods and services market (IS= Investment and saving equilibrium) and financial markets (LM= Liquidity preference and Money supply equilibrium).

2.2.4. Curve IS

According to Blanchard et al. (2010) the IS Curve shows the equilibrium of the goods and services market between all the possible income combinations and real interest rates. This equilibrium is achieved when it reaches a point in which the quantity produced in the economy equals what it consumes, that is, when investment equals saving.



Graphic 4: Curve of the Investment and Saving equilibrium

The IS Curve shows a downward slope, that is due to an inverse relationship between the type of interest and the income level or the production of economy. That is, an increase in the interest rate will result in a higher cost of indebtedness, that will lead to a drop-in investment at an aggregate level in economy or, on the contrary, if the interest rate drops, investment will increase.

Another important aspect would be Pigou's wealth effect, in which when interest rates drop, inflation drops too and buying power increases. This means consumers can buy more products with the same cash they have available increasing aggregate demand.

The IS Curve is very important for aggregate economy of a country and central banks use this variable as an economic policy measure to shrink or boost economy.

According to Marco (2016) the IS Curve is calculated with the following formula, that changes depending on the variables that constitute it:

$$\boldsymbol{Y = C + c(Y - T) + I(r) + G}$$

Y = Income or production C = Consumption

c = Marginal Propensity for Consumption T = Taxes

I = Investment r = Type of interest G = Spending

Variables like taxes, consumption and expenses are exogenous variables. This means they are not determined by the model. If any of these variables changes, they will produce a shift of the IS Curve. That won't happen if the interest rate is the one suffering a change because movements would happen in the IS Curve. Finally, the slope shifts will be determined by the investment sensitivity.

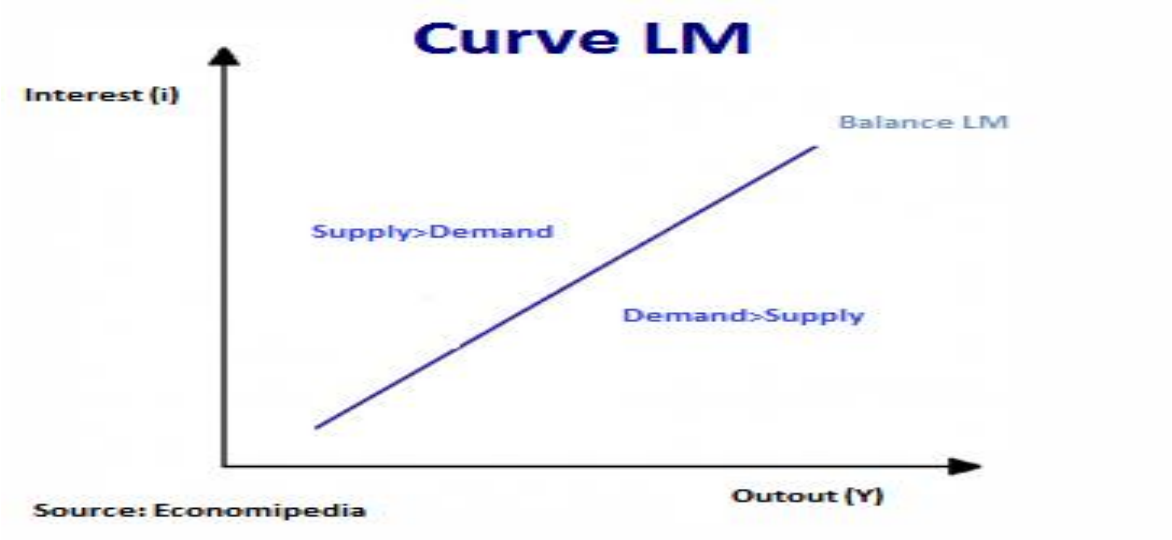
According to Marco (2016) one example of how a change in the interest rate affects the IS Curve is the case in which a businessman wants to make an investment project in a new industrial plant for its company, and he goes to a bank to ask for a loan with the purpose of acquiring finance. If the interest rate is very high, the businessman will prefer to postpone the project because he will think he can do that project in any other moment with a lower interest rate.

This analysis can be extended at an aggregate level and influence the distorting effect of interest rate in the investment. That's why central financial institutions take it into account when they increase or decrease interest rates applying a measure of economic policy depending on the economy of the country at any time.

2.2.5. Curve LM

According to Blanchard et al. (2010) the LM Curve represents the geometric location in which all the income combinations and the nominal interest rates are located in an equilibrium situation of the money market. This would happen when all the money demanded in an economy equals the money offered in this economy.

The LM Curve has a positive slope due to the positive relationship between the income level and the money demand. That is, if the income level increases with a stable interest rate and a rigid money supply, the public will demand more money to transact business. For this reason, in order to maintain the equilibrium in the money market the interest rate has to increase.



Graphic 5: Curve of the Liquidity preference and Money supply equilibrium

According to Marco (2016) the LM Curve is calculated with the following formula, which changes depending on the variables that constitute it:

$$\frac{\boldsymbol{M}}{\boldsymbol{P}} = \boldsymbol{L}(\boldsymbol{i}, \boldsymbol{Y})$$

M = Monetary amount in the economy

P = Price level in the economy

L = Demand for money in the economy

i = Nominal interest rate

Y = Income level of the economy

Income increase is what produces an increase in the interest rate, being the interest rate an independent variable and the income, a dependent variable. Depending on the sensitivity of demand of money to an interest rate, the curve slope will be more or less steep.

According to Marco (2016) the effect in the LM Curve if the central bank of a country wants to reduce the expansive cycle by reducing the money supply is explained next. The type of interest will increase making debt costs higher and investments of the economic agents of this country will be more costly, and that will generate a drop of the income level and the country's economy will cool.

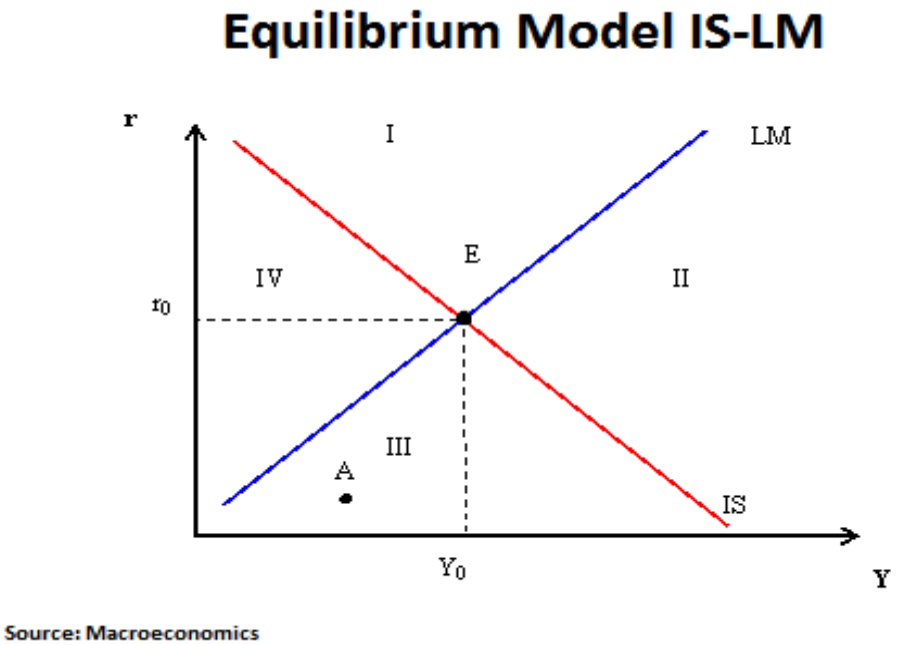
2.3. IS-LM Model and Macroeconomic Equilibrium

2.3.1. IS-LM Model and Equilibrium Model

According to Blanchard et al. (2010) the IS-LM Model is a macroeconomic tool that refers to the relation between market real production of goods and services and interest rates. There are self-adjusting mechanisms in the price level or in the interest rate which balance markets.

The money market needs the interest rate and the goods and services market needs the income level, that's why both markets interact and are mutually affected as the interest rate will affect the investment demand, income and real production. In addition, the income level will define the demand and the money cost or the interest rate. This model rejects the neutrality of money and a simultaneous equilibrium in both markets.

In order to get a simultaneous equilibrium in both markets it is necessary to work jointly with all the information available to incorporate it in the IS-LM functions. Point E of the figure shown below would represent the equilibrium point between the two markets, which is a stable one. If there were a temporary situation of disequilibrium the position would shift to a different point, but market forces would make it go back to the equilibrium point.



Graphic 6: Equilibrium in the Model IS-LM

In the previous figure, it can be seen how the curves intersection is divided into four sections in which the disequilibrium would be found.

- In **sector I** the market would have an excess of money supply and an excess goods and services supply.
- In **sector II** it would have an excess of money demand and an excess of goods and services supply.
- In **sector III** the market would have an excess of money demand and an excess of goods and services demand.
- In **sector IV** all the points in this sector would have an excess of money supply and an excess goods and services demand.

2.3.2 Macroeconomic equilibrium

According to Sánchez (2017) macroeconomic equilibrium is the equality between aggregated supply and aggregated demand in the same economic system. That is, it is a price level and production that meets the expectations of companies and consumers in the market of a country in which there's an intersection between the curves of aggregate supply and aggregate demand.

The achievement of equilibrium situations at a monetary aggregate level usually refers to periods of growth or economic success. When there's inequality there are different consequences in economic life, particularly deficits.

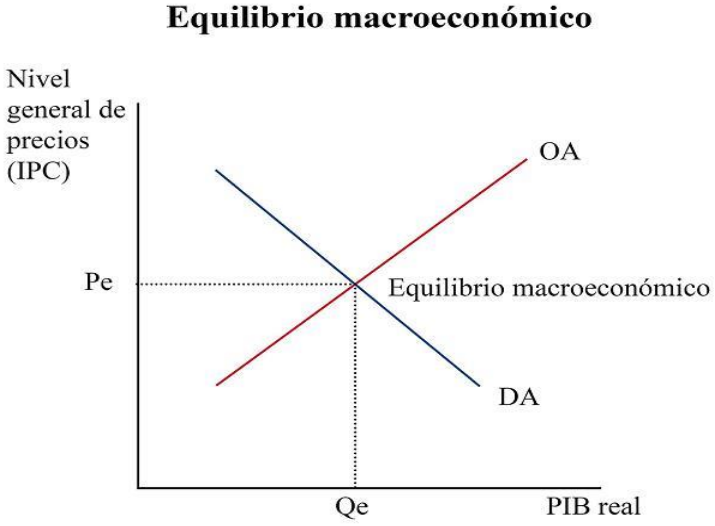
Macroeconomic equilibrium is simulated and interpreted graphically through the model AD-AS, that analyses the behaviour of aggregated supply and aggregated demand of an economy and its interaction.

According to Sánchez (2017) there are two types of macroeconomic equilibriums:

On the one hand, we have the short-term one. In this point aggregate demand would equal aggregate supply: This is generated when the quantity demanded of the real GDP equals the quantity offered by the real GDP, in other words, the intersection of the curve of the aggregate supply and the curve of the aggregate supply short-term.

On the other hand, we would find the long-term. It happens when the aggregate supply doesn't reflect real production, it shows another potential production or long-term. In this case, aggregate demand and potential production are the variables that set the level of prices and therefore affect the nominal wage rate.

The variables that are observed in the macroeconomic equilibrium and affect it are the real GDP and the general level of prices. In the diagram shown below one can see the intersection point, which is the equilibrium point.



Graphic 7: Macroeconomic equilibrium in the market

Source: Economipedia

According to Sánchez (2017) any change that affects the variables that constitute both aggregate supply and demand except for the level of prices, usually create a shift in the functions and generates new equilibrium points. The production of aggregate demand would be affected by the level of prices obtained from the equilibrium in the IS-LM Model.

Some examples of the variables that can produce these changes can be:

- Draught periods in agricultural production.
- An increase or decrease of the quantity of money available in the economy of a country.
- Decisions of the institutions in public expenditure.
- Political conflicts.
- Technological improvements.
- Future economic prospects.
- Alterations in the price of fuel.
- Changes in the preferences of people of savings over spending.

According to Baena (2010) a shift of the curve of AS towards the left explains a situation of recession; this creates a decrease in the level of production and an increase of unemployment. On the other hand, a shift to the right indicates recuperation, with an increase of production and employment. If demand had shift to the right year after year, it would mean the economy is growing. Therefore, cycles of economic upturn and downturn are seen in the repeated shift of the curves of aggregate supply and aggregate demand in one sense or another.

To see the relation of Phillips curve between aggregate demand and inflation, following we explain the concept of inflation, causes, types and effects of inflation.

2.4. Inflation

According to Sevilla (2016) inflation is the continuous and generalized increase of prices in the goods and services of a country over a permanent period of time, normally a year. An increase in the generic level of prices causes that with each money unit one can purchase less quantity of goods and services reducing the spending power of the money. That is, there's a loss of the unit of measure and of the real valuation of the exchange in-house environment in the economy of a country.

Inflation is calculated universally through the variation rate of the price index in time, generally through the Consumer Price Index (CPI). It is obtained comparing the index of a month of a given year with the same month of the previous year.

According to Sevilla (2017) price increase can happen because of various reasons, both the increase of demand and an increase of raw materials affect the price.

2.4.1. Causes of inflation

According to Sevilla (2016) inflation causes can happen because of different points:

- **Cost push inflation:** the process of inflation in this case would start in the construction market, which includes the companies' costs, with an increase of the price of raw materials, an increase of the cost of labour force or an increase in taxes that produce a reduction of the financial profitability of the company. This way, the companies affected try to recuperate the declined profitability level by transferring the increase of those costs to the price of goods and services.
  This is the way the first point of inflation happens and following an inflationary spiral giving way to an increase of inflation of prices of other good because it is a system of interrelations. Another reason would result in the situation of oligopolies and monopolies in which few companies control the market and can determine a raise of prices to increase their benefits. That would shift the curve of aggregate supply to the left, reducing production and increasing price.
- **Inflation by demand:** it originates when the general demand of goods and services goes up. When this demand is higher than the available supply in the productive sector, they can't deal with demand. This effect is called the demand pull over prices. Excess demand and the raise of prices can come up by different reasons: an increase of trust by consumers, in which consumers are used to spending more; a drop of the currency exchange rate of the country with respect to the foreign currency, creating an increase of imported goods and a drop of

exported goods making the price of local goods to go up. One example would be today, the increase of practice of Triathlon that has increased the price of road bikes. That would shift the demand curve to the right producing a new point of macroeconomic equilibrium.

- **Build-in inflation:** that is generated in countries with a high level of inflation where workers demand an increase of wages to deal with the effects of inflation. That makes the businessmen raise the prices, entering the vicious circle of inflation. The increase of prices by businessmen first due to their expectations of prices, results in an increase of goods and services price as they predicted with their expectations. The expectation of inflation is one of the most important variables of economy. That would shift the curve of the aggregate supply to the left.
- **Inflation by the increase of the monetary base:** which means there's an increase in the quantity of money there is in a country's economy. An increase of the goods and services demand is generated more quickly than the delivery of goods of the supply, thus generating an increase of prices.

$$P = \frac{D}{S}$$

As we can observe, according to the previous formula, an increase of Demand (D) will increase the Price (P) if the Supply (S) remains constant. If the supply were constant and the monetary base increased the curve of the aggregate demand it would shift to the right, increasing production and prices.

- **Other causes** that can produce an increase of the inflation rate are armed conflicts, limiting the international trade of the country, increasing the price of goods and services in a country because they will be scarce long-term. Another factor would be natural disasters producing similar situations to those of war, as the general cycle of production and consumption would be affected. Or a shortage of raw materials and natural resources that increase the price. In all these situations, the curve of aggregate supply would shift to the left.

2.4.2. Types of inflation

According to Sevilla (2017) inflation can be classified according to the magnitude of its increase.

It would be a **subdued inflation** when the increase of prices is slow, in a situation in which prices are indefinitely constant. This generates an increase of trust of the people that deposit money in bank accounts, through current accounts or in savings deposits

with poor performance, as that will make their money have the same value in a month or in over a year. That is, people agree to enter into long-term contracts with their money because they think the price of the goods and services that they can sell or buy won't have a sudden change of value. In this group, we would find the prices that go up less than 10%.

Galloping inflation would develop when prices increased two-digit and three-digit rates, for example, a 30.120 or 240%, in an average period of a year. This generates big changes in the economy. People try to have the minimum quantity of money because money loses its value very quickly. They also try to purchase real goods and properties to get rid of the money that is losing value.

In **hyperinflation**, we would find annual taxes that are higher than 1000%, in this cases money would almost have no value. It happens when a country is suffering a great economic crisis, when the spending power declines sharply. In this situation, the monetary system is on the verge of bankruptcy and they even would go back to a situation in which bartering would work, that is, the exchange of goods for goods or goods for services. This level is sometimes reached because governments finance expenses with emissions of inorganic money with no control or because there isn't a correct system that regulates the State's revenues.

A situation of **stagflation** combines inflation with an economic process in recession. This process goes against the Phillips curve, which shows the inverse relation between the unemployment rate and inflation. In this case, it can only be solved acting over aggregate demand, that is, by increasing public expenditure, reducing taxes or reducing interest rates.

Finally, a case that is contrary to inflation could come up; it would be the case of **deflation.** This concept describes a drop of the inflation level because of failure of goods and services demand. This case would also constitute a vicious circle in which businessmen lower the prices of goods and services to at least cover the costs, which generates a reduction of inflation. When consumers see this effect, they don't buy and wait for prices to drop even more, generating businessmen to sell at a loss, but they try to recuperate some at least.

2.4.3. Effects of inflation

According to the Blog diary (2009) inflation can weigh down for the productivity of companies, which have to reduce capital of the production of goods and services to face costs and recuperate the losses caused by inflation.

It generates uncertainty in society as it affects the spending power because you can buy fewer goods because of the price increase.

The main effect of inflation is that it destroys the economy's system of prices in a country. It generates uncertainty, at an investor and consumer's level, and it creates doubts whether money will have a relative effect. That is, whether it will affect a product or if it will be an absolute increase, in which all the products will increase its price. So, it creates barriers to a country's economy growth

3. PROBLEM OF AGGREGATION IN THE ECONOMY

3.1. Theoretical explanation

According to professor Doménech (2015) the problem with aggregation is a theoretical one. In the first place, when one speaks about macroeconomic aggregate as the gross domestic product or national income, they are usually referred to as in terms of value. For example, the Spanish gross domestic product is around one billion Euros. That happens because of the aggregation of units of different physical goods, that is, goods of a different nature. As, for example, you can't join units of housing with car units or food units. To solve the problem of aggregation, in macro economy it is taken into account that each one of these goods have a different price, so heterogeneous goods can be added.

However, there's an additional conflict, the problem of comparability of magnitudes over time due to inflation. In other words, the problem comes as prices are not a stable reference of a good's value due to the price change they undergo over time.

3.2. Problems of the macroeconomic model

According to Urrutia (2013) aggregate macroeconomic models reflect different imaginary worlds depending on the way of aggregating in each model. When aggregating financial assets in the model, they lead to contradictory effects of the economic policy in the imaginary world. These contradictions, together with the real world's resources, lead to biases in real economy.

Mainly, it is started by creating a simple model with a temporary equilibrium, and they add different additional variables, like expectations, money, dynamic effects, work, and income. So, the model gradually becomes a complex model in which additional markets are added.

The problem of models comes when all the individuals are supposed to be equal, eliminating the distribution effect of any measure in economic policies.

3.3. Information hiding issues

According to Galles (2015) macro economy is normally explained as a form of control and direct in aggregate terms, reflecting aggregates as a relevant measure. But, in reality, macro economy has a series of constraints.

One of its constraints is that no macroeconomic variable can be exactly measured, and they have to carry out evaluations of more of an imperfect measure to see if data are coherent, to estimate how much trust can have an event in particular.

The biggest problem of aggregation is that it hides a lot of information and it distorts important findings. A practical example would be net taxes, which makes reference to the taxes paid to the government minus payments done by the government to the recipients in the family sector. This can originate great concealment of quantities of income distribution over production incentives. For example, let's suppose the government would tax3 billion to a subgroup of the population and gave 2 billion as payments in transfers like food coupons, Social Security or unemployment benefit, among others; or to a different subgroup. In this case, the net effect of the families' income available would equal a 1 billion reduction. However, accepting this net figure in an analysis is ignoring very important considerations in economy.

According to Galles (2015), another effect that is hidden in this aggregation models are the ones we would find in redistribution. For example, when the rich are taxed so the poor receive, that produces a reduction of the production incentives in both sides of the society. This happens because they impose a tax interest rate to people that obtain a higher level of income, making people maintain their money more, carrying out fewer purchases due to its higher reduction of available income and generating a growth reduction of the market and liquidity.

According to Galles (2015) another case would be the one in which policies support there will be a higher minimum wage, not taking into account the approach on how it would affect each sector. For one of them would imply an increase of wages, but for the other the loss of employment of low skilled workers or in time reduction. Those effects can't be seen in aggregation, just the income increase.

Aggregation omits a great quantity of valuable information. Specific circumstances of time and place that allow the creation of value and only some people know can only be used by decentralizing decisions for those who are the experts in these details together with the combination of the information that others provide through market decisions. But these variables can't be considered appropriate in statistics because of its nature.

According to Galles (2015) if the government granted a person a subsidy of 40% to purchase a good, the value for each unit exceeds 60% of its price for the buyer. There's not an implication that these sales are worth what it was paid for them, including the subsidy. And the areas in which the government uses or produces goods, like defence costs, almost nothing is known about their price.

Another sin of aggregation is the way in which employment and unemployment data is aggregated, because there are situations in which people have jobs, but they are not officially employed, like it would be the case of workers under the age of 16; or workers

that have a job, but they appear as jobless, they work in the hidden economy. Furthermore, some people can have several jobs, so employment and unemployment rates can move in the same direction in the same period of time.

In other words, the main and biggest problem of aggregation would be found in the concealment of relevant data. A final effect that we would find is that when increasing the price of a type of good, as everything is grouped in general, it produces an increase of prices of the rest of goods. Therefore, one can't specifically know the value of each good in the group.

For example, in the case of the food grouping, let's imagine a kilo of apples increased its price. That would imply an increase of the rest of products because of the problem of grouping all of them, producing an inflation of prices of all the goods in the food group, when maybe only one product increased its price.

Another example we could find with respect to the problem of aggregation is when the news or press say this year inflation went up X%, this means that the price of goods and services has increased its value. And that is a mistake because not everything goes up. But in the overall mix it shows an inflation increase because all the goods and services are grouped

Graphic 8 Evolution of headline inflation annual during 2002 to 2016

Source: Banco Mundial

As it can be seen in the previous diagram, when they speak about inflation they speak about the General CPI in which all the goods and services of the market are included and people don't know what goods and services have increased their inflation or how they increased their prices individually.

Another observation is that the annual inflation up to the year 2008 (the moment when crisis originated in Spain) was constant at 3%. From 2008 is when a series of economic highs and lows started in inflation until from 2011 on, there's a deflation year after year until 2016 that had a negative percentage in the Spanish market.

According to Salvatierra (2017) inflation in Spain has surged this year in the month of January in 3% due to the sharp increase of electricity prices, as well as fuels like diesel and gasoline.

In order to better understand what grouping and inflation means, a study has been carried out to see how the total inflation or deflation of the different subgroups that constitute it is detailed. In the following points, we'll see the evolution rates of prices of the different subgroups of the Spanish market and the inflation increase.

4. DATA OF THE STUDY OF THE EVOLUTION OF PRICES IN SPAIN

In order to carry out the study, we have used historical data of the evolution of prices from 2002 to the present day, from the National Statistical Institute (INE, acronym in Spanish).

The study will be carried out about 25 groups[1], those will include different subgroups that will be specified next.

The groups about which the study has been carried out are the following:

- **Foods:** This group would consist of food such as bread, cereals, meats, fish, fruits and non-alcoholic drinks such as coffee, infusions, soft drinks.
- **Alcoholic Drinks:** It would consist of all drinks such as liqueurs, wines, beers, spirits.
- **Tobacco:** It would encompass tobacco.
- **Dress:** It would consist of clothing and accessories.
- **Footwear:** Footwear and footwear repair.
- **Housing rental:** This group would be formed by the rent of the houses.
- **Home Maintenance:** It would encompass the conservation of the house.
- **Supplies:** electricity, gas, water and other fuels.
- **Household products:** it would consist of furniture and other appliances.
- **Textile products:** Textile articles for the home.
- **Home appliances:** Appliances and kitchen utensils would form part.
- **Medical equipment**: It would encompass drugs, therapeutic material and other pharmaceutical products.
- **Medical services:** It would consist of medical services, dental services and hospital services.
- **Acquisition of vehicles:** Would be the vehicles purchased.
- **Use of personal vehicles:** It would consist of the quantity of relative goods of automobiles and fuels consumed.
- **Transport services:** It would consist of all public transport, whether by sea, land or air.
- **Postal services:** would encompass all postal services.

[1] In the study the housing group has not been considered, since the INE report information just from 2007 when the real-estate bubble was about to crash. We think this fact may disturb our conclusions about accumulated inflation

- **Audiovisual equipment:** This group would consist of all the products of image and sound, computers, photographic equipment, cinematographic and information processing.
- **Gardening articles:** other articles and equipment for leisure, gardening and for products related to pets.
- **Leisure:** It would include two subgroups, the one of recreational, sports and cultural services with the subgroup of press, books and articles of stationery.
- **Tourism and accommodation:** Tour packages, accommodation services and hotels, bars and restaurants would form part.
- **Higher Education:** It would consist of university and higher education.
- **Normal Education:** It would encompass the rest of education excluding the higher education.
- **Personal care:** the goods and services for personal care, along with articles of personal use.
- **N.C.O.P.:** The latter group would cover insurance, financial services, personal effects and other services n.c.o.p.

Some of the annual data of the CPI that we obtained from the National Statistical Institute are the ones showed next.

	Tobacco	Supplies	Foods	Medical Services	Vehicle Acquisition	Audiovisual Equipment
Years	IPC	IPC	IPC	IPC	IPC	IPC
2002	42,79	74,47	74,47	79,76	88,43	388,55
2003	44,42	77,37	77,37	83,17	89,92	351,43
2004	46,90	79,55	79,55	86,24	91,32	319,50
2005	50,01	81,40	81,40	89,77	92,96	290,86
2006	50,75	84,34	84,34	93,89	95,09	267,58
2007	55,20	87,23	87,23	97,23	96,33	235,85
2008	57,15	91,95	91,95	100,72	95,78	203,56
2009	63,82	92,51	92,51	102,29	92,06	180,47
2010	73,42	91,37	91,37	102,44	91,01	168,41
2011	83,17	93,74	93,74	103,01	93,69	151,90
2012	89,18	96,09	96,09	102,44	94,77	136,65
2013	95,65	98,05	98,05	101,87	92,84	124,66
2014	97,76	97,70	97,70	100,91	93,61	114,14
2015	99,59	98,70	98,70	100,66	96,55	106,37
2016	100,00	100,00	100,00	100,00	100,00	100,00
2017	102,02	100,38	100,38	100,39	102,14	97,01

Table 1 Annual IPC data for the INE during 2002 to 2017

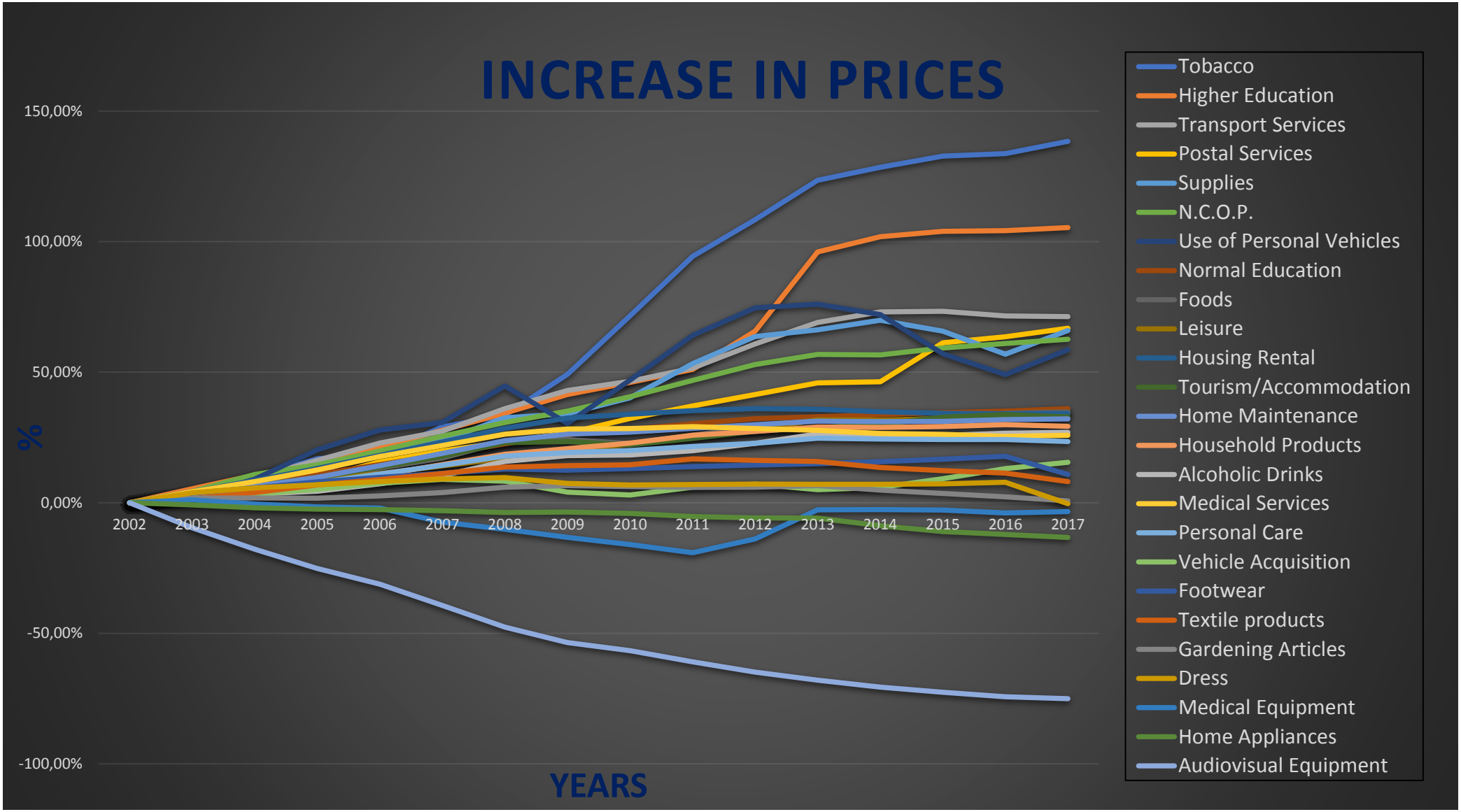
Source: Own development

With the data previously shown, together with other we have obtained from the INE, we have calculated how accumulated inflation has been rising from 2002 to the present day. The cumulative increase of the groups previously specified would be.

	Tobacco	Supplies	Foods	Medical Services	Vehicle Acquisition	Audiovisual Equipment
Years	Increase	Increase	Increase	Increase	Increase	Increase
2002	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
2003	3,82%	2,26%	3,90%	4,28%	1,68%	-9,55%
2004	9,61%	5,72%	6,82%	8,13%	3,26%	-17,77%
2005	16,87%	11,78%	9,31%	12,55%	5,12%	-25,14%
2006	18,61%	19,71%	13,26%	17,71%	7,53%	-31,13%
2007	29,01%	23,72%	17,13%	21,91%	8,94%	-39,30%
2008	33,57%	32,54%	23,48%	26,27%	8,31%	-47,61%
2009	49,15%	34,11%	24,23%	28,25%	4,10%	-53,55%
2010	71,59%	40,20%	22,70%	28,44%	2,91%	-56,66%
2011	94,36%	53,25%	25,88%	29,15%	5,94%	-60,91%
2012	108,41%	63,66%	29,03%	28,43%	7,17%	-64,83%
2013	123,54%	66,22%	31,67%	27,72%	4,98%	-67,92%
2014	128,46%	69,90%	31,20%	26,52%	5,86%	-70,62%
2015	132,75%	65,69%	32,54%	26,20%	9,18%	-72,62%
2016	133,71%	56,89%	34,29%	25,38%	13,08%	-74,26%
2017	138,42%	65,93%	34,80%	25,87%	15,50%	-75,03%

Table 2 Increase in accumulated inflation from 2002 to 2017

Source: Own development



Graphic 9: Evolution of Inflation for different products in Spain during 2002 to 2017

Source: Own development

5. OBSERVATIONS OF THE SPANISH STUDY

As we can see in the previous diagram, the groups mentioned before could be divided into three sections depending on the cumulative increase of inflation in the last 15 years.

In the first section, we would find a situation in which product inflation would be a lot higher than the average annual inflation rate. In this group we would find cigarettes, higher education, transport and insurances, among others. These products would have a cumulative increase of prices that is higher to 55%. A figure that is higher than the 3% annual that is calculated with the following formula:

$$\%_{anual} = (1 + incremento\ acumulado)^{(\frac{1}{15})} - 1$$

	Tobacco	Higher Education	Transport Services	Postal Services	Supplies	N.C.O.P.	Use of Personal Vehicles
%annual	5,96%	4,92%	3,65%	3,47%	3,43%	3,29%	3,12%

Table 3 Set of groups with a higher average annual increase of inflation

Source: Own development

In the second section, we would find a situation in which inflation has increased in a controlled way. As we see in the diagram, this group would be constituted by normal education, food, tourism, medical services and personal care, among others. In this section, we would find products that have increased 1-2% approximately.

	Normal Education	Foods	Leisure	Tourism	Alcoholic Drinks	Medical Services	Personal Care
%annual	2,07%	2,01%	1,99%	1,91%	1,60%	1,55%	1,41%

Table 4 Set of groups with a normal average annual increase of inflation

Source: Own development

Finally, in the third section we would find products that have increased its price less than 1% or that have suffered a deflation. In this section we would find vehicles, footwear, clothing, domestic appliances and audiovisual equipment.

	Vehicle Acquisition	Footwear	Dress	Medical Equipment	Home Appliances	Audiovisual Equipment
%annual	0,97%	0,69%	-0,02%	-0,23%	-0,95%	-8,84%

Table 5 Set of groups with a lower average annual increase of inflation or decrease of inflation

Source: Own development

Next, we´re going to analyse the possible causes of these sharp increases of price inflation or deflation.

According to Gines (2017) the sharp increase of cigarettes that we see in the diagram, happened because of an increase of special taxes, as approximately 80% of its price is used to pay taxes. That is, it is due to an increase of taxes coming from the government.

According to Olías (2014) in the case of higher education, this increase is due to the reform of the educational model that was established years ago, that took the British model as a reference, and it is one of the most expensive and in which university students face higher costs.

According to Alonso (2007) the sector of audiovisual equipment has had a great deflation price comparing it to 2002. This happened because the audiovisual sector is in a constant process of transformation and evolution. This means it has been developing quickly and more technological advances come up and are better than previous models, so it's cheaper to buy these products. For example, in 2002 it was difficult to buy a plasma TV because it was very expensive, but as research and development grew, previous models got cheaper. For this reason, currently, if you want to buy a TV you'll find its price with better benefits and lower than before. This is also due to the technological growth and to the high competition of foreign products in the market.

According to Sánchez (2016), the European Central Bank (ECB) uses the amortized consumer price index as an indicator of the evolution of prices in the Euro zone. The objective of the ECB is to increase the price of goods and services at a close level, but under 2% annually. As it can be seen in the diagram, most of goods and services have an inflation of around 2% annually, so it has been regulated and controlled. There we find the groups that include normal education, food, tourism, medical services and personal care, among others, but basic needs fundamentally.

According to Berbis et al. (2010) fiscal policy, which is the only policy in the hands of the Spanish state, is limited by the Stability and Growth Pact that demands the fiscal deficit to be under 3%. However, because of the crisis, the demanded limit has been exceeded.

In order to lower inflation, central banks tend to increase the interest rate of public debt, with the objective of slowing down the demand of goods and services. Therefore, it can also affect the economy negatively, as it could originate an economic slowdown and unemployment growth

6. COMPARISON THE SPANISH STUDY WITH THE AMERICAN STUDY

According to the American article on which the study is based, it showed that in the USA the price of necessary goods like textbooks, university fees, health and housing, among others, are more expensive. For example, in the case of medical care or education, as they're not producers in a factory, their costs have been increasing because there's not foreign competition. On the other hand, manufactured goods like toys, TVs or mobile services have been reducing their price in the last two decades.

Once the study has been carried out for the Spanish case, we can see in some cases there are similarities but in others they don't coincide with the American case.

We would find the first case in Spain in cigarettes, although in the article the same variable is not shown. We can say cigarettes are not a basic need but a commodity that people decide to have.

For example, in the case of university fees there would be an excessive increase of inflation in both cases, and the reason the article gives is that as they can't be produced in a factory, the government has no control over its price increase.

In comparison, healthcare of the United States has had an excessive increase of inflation, whereas in our study it implies a "natural" increase of inflation.

In the study of the United States, they have selected the groups according to necessities and manufactured goods and the result was that necessities had increased its price. On the contrary, here in Spain, in general, subgroups have been going up in a stable level of inflation: both necessities and manufactured goods. You could say that necessary goods and services have increased, whereas products that don't belong to the first needs group have lowered, like it happened with cars, clothing, footwear, audiovisual equipment, that have stayed in the group that is under the economic growth. This happened because they reduced its price; they didn't change or have changed very little with respect to the value growth of annual income with the previous ones. In this group, both the American and the Spanish case would coincide and that is due to, as the American article says, the growth of the world market and global competition that is easier today with the supply of manufactured goods from other countries.

7. CONCLUSIONS

After carrying out the study about the evolution of prices of the Spanish economy during a period of 15 years (between 2002 and 2017) it can be determined that when in the news, they talk about an increase of inflation in the market of goods and services they are concealing a lot of valuable and useful information to understand what's happening in the market.

The main function of aggregation is creating a tool in which goods and services take their level of prices as a value, with the objective of being able to compare and group the different goods and services from the same sector. But this option is not a completely specific system as the basis is the prices of goods and services. And these prices are changing all the time, both up and down.

Grouping created a relation among the products in which all affect the other. For example, when a product changes its price, it will affect the total group of the products generating an inflation or deflation in this group.

Thanks to the study carried out one can see the goods whose prices the government can change have increased well above the general inflation like it happened with cigarettes, higher education reform with the application of Bolonia plan at universities, public transport and supplies, among others.

On the other hand, it can be seen that products labelled as leisure have kept a constant price or have lowered generating deflation. This can happen due to, for example, an increase of the technologies that generate a decrease of production costs resulting in prices getting lower or due to the world trade among the different countries, increasing competition and generating a higher quantity of substitute goods in the market.

After carrying out the comparison with the American case it can be appreciated that in the American market the prices of necessary products have increased or they can't be manufactured over a general inflation of prices, whereas the goods that can be produced have lowered their cost. In the Spanish market there's a mixture of all the goods, that is, in the case of necessary goods, some of them have increased its prices exceeding the inflation rate and others have increased in general. On the contrary, the ones that have grown the most are the leisure ones and the most affected ones that had to lower their price are the ones that have foreign competition, or the ones related to technology.

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