
**Economic Growth, Inflation and Unemployment,
The Three Great Macroeconomic Problems**

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5th Edition.

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Economics Book.

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I. INTRODUCTION

I. INTRODUCTION

Too much has been written and spoken about three major macroeconomic issues (economic growth, inflation and unemployment) that attract the attention of economists, although from different perspectives. Neo-Keynesians are mainly concerned with economic growth and unemployment, neo-Classics focus on economic growth and inflation, and Monetarists deal only with inflation.

Obviously, a country only can reach and maintain a satisfactory living standard, if there is an acceptable economic growth process, and inflation and unemployment are reduced.

Despite the fact that most economists are aware of this reality, they differ in postulates and ways of addressing these problems, mainly due to the fact that they don't have the same priorities.

The neo-Keynesians consider that it is more important to attend income per capita and employment. While neo-Classics, who also take into account GDP per capita, believe that it is essential to stabilize inflation. And Monetarists are convinced that macroeconomic stabilization and control of monetary emissions is enough to reduce inflation, because this fact will subsequently allow the process of economic growth, and reduce unemployment to a natural level.

However, these topics (economic growth, inflation and unemployment) are not simple and have been subject of

multiple investigations. In this regard, the purpose of this literary work is to provide an overview of these macro-economic issues, comparing the approaches of these three economic schools (neo-Keynesians, neo-Classics and Monetarists), as far as possible.

The main chapters are the following:

II. Economic Growth.

III. Inflation.

IV. Unemployment.

V. The Macroeconomic Problems.

The Chapter II. Economic Growth is divided into these sections: a) II.1 Economic Growth and Development (What are the differences between the two concepts?), b) II.2 The Mystery of Economic Growth (Why is the economic boom difficult to explain?), c) II.3 The Theories of Economic Growth (What are they?), and d) II.4 The Economic Dilemmas (Why is it so difficult to apply economic policies?).

The Chapter III. Inflation contains these sub-chapters: a) III.1 Brief History of Money (How has it evolved throughout history?), b) III.2 The Relevance of Money (Why is this medium so important?), and c) III.3 The Value of Money (What is its true value, in opposition with inflation?).

The Chapter IV. Unemployment presents these parts: a) IV.1 Economic Visions of Unemployment (What are the neo-Keynesian and neo-Classical perspectives?), b) IV.2 Economic Models and Investigations of Unemployment (What are the main ones?), c) IV.3 Milton Friedman's Innovative Approach (How did he develop the natural rate of unemployment hypothesis?), and d) IV.4 The Great Mistakes of Neo-Keynesians (Why has the natural rate of unemployment not been refuted?).

The Chapter V. The Macroeconomic Problems explains the problems associated with: a) V.1 Economic Growth, b) V.2 Inflation, and c) V.3 Unemployment.

Certainly, the main macroeconomic problems are related to: a) insufficient economic growth (or even its decline), b) great inflation, and c) high unemployment. While there is no magic recipe of economic policies that can solve all these problems (the situation and the historical moment of each country is different), and some policies generate negative impacts, and are extremely vulnerable to the expectations of citizens.

Finally, despite their differences, economists of various trends recognize the need to promote economic growth and reduce inflation and unemployment. Furthermore, in this globalized world, governments and central banks are prone to combine various approaches, in order to achieve the best results and act over the expectations of citizens.

II. ECONOMIC GROWTH

II.1 ECONOMIC GROWTH AND DEVELOPMENT

These two notions are different.

On the one hand, economic growth is the increase in production, in a region, country, state, city, municipality or locality, during a specific period, which reflects variations in the quantity, value and quality of goods and services, measured through Gross Domestic Product (GDP) and GDP per capita. Although economic growth is extremely beneficial for society, since it contributes to improving the life quality of citizens, it doesn't guarantee economic development.

And on the other hand, there is no consensus on the exact definition of economic development. In general terms, it includes the successful process of economic growth (the emerging country becomes industrialized or developed), as well as the ability to create, maintain and optimize the generation of wealth, well-being and life quality. It encompasses these principles:

- a) effectiveness of the national productive apparatus: which has agricultural, industrial and advanced service sectors,
- b) functioning of a democratic government: the institutions are autonomous and efficient, and there are freedoms, human rights and legal and economic guarantees,

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- c) an economic and geopolitical leadership of the country: which includes presence in international markets and operations in other nations,
 - d) a stable macroeconomic environment: the currency is strong, international reserves are at high levels and financial markets are developed. In addition, there are considerable investments in education, health, technology and infrastructure,
 - e) national identification and rapport: a certain degree of commitment and satisfaction with the homeland prevails. Most citizens can fulfill their main personal and professional aspirations,
 - f) high level of income and development: annual GDP per capita is greater than or equal to US. \$. 20,000 and the Human Development Index (HDI), based on the average of the aforementioned income per capita, education and health, is 85% or higher¹.

¹ The values of these indicators are approximate. It is not known exactly the precise quantitative boundary between a developing and a developed country. Also, this value of GDP per capita of US. \$. 20,000 can be adjusted to GDP PPP (modified by purchasing power parity).

Concluding, economic growth is not the same as economic development. The first notion is precise, within the limits of the economic area, while the second is broad, complex and subjective; being social and humanistic. Even a country with high economic growth isn't necessarily a developed one.

II.2 THE MYSTERY OF ECONOMIC GROWTH

The economic boom is an extremely complex, fascinating and mysterious process. It is not easy to explain why there are differences between the income per capita of different nations (short-term) or within a country over long periods (long-term). Likewise, it is difficult to justify why some nations have grown considerably during certain lapses, and in other stages, their rate of expansion notably decreases.

The economic growth theories have attempted to identify the main causes of the economic boom and to analyze discrepancies in incomes (short and long-term). These have been oriented towards the factors of production (capital, labor, technology, and even land and natural resources), and since the mid-1980s, research on economic growth has emphasized on determinants that are difficult to specify and evaluate (knowledge or technology, human capital, institutions, freedoms, human rights, legal framework, legal guarantees, protection of private property, innovation, competitiveness, policies, etc.).

Concluding, there are currently no definitive answers on the mystery of economic growth. The economists recognize that the main determinants of economic boom are: a) physical, financial, natural and human capital, b) labor, c) knowledge or technology, d) the institutional-legal framework, and e) policies.

II.3 THE THEORIES OF ECONOMIC GROWTH

The history of economic growth theories is as long as that of the economic thought.

Since the 18th century, the founders of the Classical school, the Scottish economist and philosopher Adam Smith (1723-1790), the English economist David Ricardo (1772-1823) and the British economist, demographer and priest Thomas Malthus (1766-1834) examine the causes of economic expansion.

Adam Smith argues that the division and specialization of labor is the fundamental cause of economic growth. David Ricardo indicates that the accumulation of capital (productive investments) is the determinant of the economic boom. Thomas Malthus states that the presence of the necessary resources for subsistence, and population growth, allow the long-term economic expansion.

At the beginning of the 20th century, the British mathematician and philosopher Frank Ramsey (1903-1930), and the American economist Allyn Young (1876-1929), analyzed the determinants of economic growth rates and technological progress.

Ramsey's economic growth model is based on consumption and saving. While Allyn Young, supporter of the ideas of Adam Smith, states that the economic boom depends on: a) the increase in the size of the markets, b) the increase in demand (consumption), and c) the division of

labor.

Although the approach of the classical school is oriented mainly towards the reason of being of the economy and not to the causes of economic expansion.

At the end of the 1930s and during the following decade, two Keynesian economists from the United Kingdom, Roy Harrod (1900-1978) and Evsey Domar (1914-1997), independently developed the Harrod & Domar model, which is mainly characterized by:

1. Incorporate some instability and uncertainty in the production process.
2. Assume the existence of a series of difficulties that impair the possibility of reaching an equilibrium².
3. Propose that in equilibrium all the machineries are used and all workers are hired. However, this prevents substitution in capital and labor. Therefore, the economy tends to grow with missing equipments and unemployed people. This confirms that the balance, without government regulations or controls, is unsustainable in the long-term³.

² Broadly speaking, a macroeconomic equilibrium is characterized by: a) the optimal use of production factors, b) an acceptable economic growth (in most cases), c) a low rate of inflation, and d) full employment (unemployment between 4% and 6%).

³ The Harrod & Domar equilibrium is not ideal, since in this case: a) the use of production factors is not optimal, and b) full employment (unemployment between 4% and 6%) is replaced by hyper-employment (unemployment less than 4%).

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4. Conclude that uncertain and unpredictable events lead to an economic depression, which stimulates the underutilization of resources and unemployment.
 5. Being based exclusively on the Keynesian Theory, rejecting the classical postulates, justifying government interventions to reactivate the process of economic growth, and achieve or maintain an ideal situation of macroeconomic equilibrium.

In 1956, the Classical economists, Robert Solow⁴ (American) and Trevor Swan (Australian, 1918-1989), implemented the first analytical model that explains the long-term economic growth, with extraordinary results:

Although this conception does not contradict the Keynesian Theory (there can be multiple equilibriums), it refutes the foundations of the Classical school, because:

a) it is not feasible to use all the machineries and hire all the workers. In this regard, it is impossible to reach a balance of this nature, unless the government forces employers to use more equipments and employ more personnel, and the public sector also acquires more machineries and increases its workforce,

b) assuming that all industrial equipments are used and all workers are hired, the overuse of resources would create economic distortions (exaggerated manufacturing of new machineries and atypical generation of more jobs or simply “artificial demands”). In this sense, as some producers have incentives to build unnecessary equipments and others must employ people that they don’t require (economic inefficiency), the equilibrium situation ends. Therefore, it is impossible to maintain a balance of that nature.

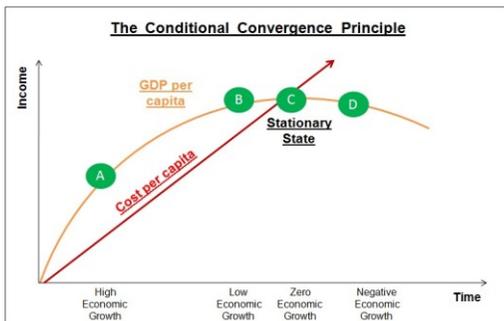
Summarizing, in equilibrium, the agents don’t have incentives to change their attitudes and behaviors (Classical microeconomic principle). However, in this situation (use of all machineries and employment of all workers), there will be incentives to manufacture more industrial equipments and obligations to hire more personnel (change in the behaviors of producers and employers), which would lead to higher costs and a deterioration of productivity, losing the condition of equilibrium.

⁴ Winner of the Nobel Prize in Economics 1987.

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1. The economic expansion depends on capital, labor and factor A (a broad and diffuse variable that can be: knowledge, technology, specialization or the effectiveness of work).
 2. The US economic expansion (1900-1950) is mainly due to the contribution of the controversial determinant A (87%). Or in other words, US economic growth is based mainly on knowledge or technology (87%), more than on other factors such as capital and labor (13%).
 3. The principle of conditional convergence (developed later by Robert Solow): an economy grows faster when it is far from its stationary state⁵, and as it approaches to this stagnant situation, its rate of expansion decreases, as presented in the following graphic:

⁵ It is called that way because at that time the idea of Harrod & Domar was accepted (there is a certain paralysis in the equilibrium).

The stationary state is a situation of atypical equilibrium, in which the economy reaches the maximum of its productive capacity. In it, the GDP growth rate is equal to that of the population growth. For this reason, the GDP per capita or average income per inhabitant doesn't grow (it remains constant).



Cost per capita = (population growth rate + growth rate of factor A + capital depreciation rate) x capital per capita.

Source: Own construction based on the Solow & Swan model.

(A) High Economic Growth: low GDP per capita and low cost per capita => GDP per capita grows rapidly.

(B) Low Economic Growth: high GDP per capita and high cost per capita => GDP per capita increases slowly.

(C) Zero Economic Growth: the steady state is reached. GDP per capita is equal than cost per capita => GDP growth rate is equal than population growth rate => GDP per capita remains constant. The economic boom stops and there is no possibility of improving the average income per capita. Furthermore, the trend is to decrease (D), instead of returning to another stage of economic expansion (A or B).

(D) Negative Economic Growth: the economy goes into recession. GDP per capita is less than cost per capita => GDP per capita decreases.

Although conditional convergence is not accepted by many economists (especially the neo-Keynesians), it sensa-

tionally explains why, since the 1970s, the industrialized nations have grown at low rates, while some emerging economies have expanded rapidly.

Also this assumption is logical and intuitive. Obviously, a country with an extremely high annual GDP per capita (greater than US \$. 40,000) tends to grow at a low rate (less than 2%), while an emerging one, with a low annual GDP per capita (less than US \$. 6,000), can expand at a high rate (between 6% and 10%).

This instrument, commonly known as the Solow model, was the benchmark by excellence in future economic growth research.

However, in 1986, several neo-Classical American economists, led by Paul Romer, Robert Barro and Robert Lucas⁶, expressed their dissatisfaction with the results of the Solow model, indicating that the economic boom can't be explained by factor A, since this is a diffuse and exogenous determinant⁷.

On the occasion of this debate, academics and researchers rescued those studies, which since the 1960s include technology as an integral part of the economic boom

⁶ Winner of the 1995 Nobel Prize in Economics.

⁷ From the economic point of view, exogenous variables are those that can't be controlled or affect prices or demand for goods and services, without having a direct relationship with these products or market conditions. For example: technology is an exogenous variable because it depends on designers and manufacturers, without being directly linked to the functioning of markets.

(not as an exogenous variable) and developed other models, giving rise to the New Theory of Economic growth. A division was established between the economic expansion models:

1. Exogenous: the variable A (knowledge, technology, specialization or work effectiveness) is diffuse and exogenous. Some representative models are the following: a) Economic Growth of Solow & Swan, b) Ramsey's Infinite Horizon, and c) Diamond's Overlapping Generations.
2. Endogenous: they incorporate factor A as an endogenous variable, define it precisely as knowledge or technology, and argue that it can grow in an unlimited way (unlike capital). These models stand out: a) AK (absence of reduced returns of capital), and b) Research and Development (R&D).

The economic growth models of both approaches try to answer these questions:

Why are there differences in GDP per capita between various countries (short-term)?

Why are there discrepancies in GDP per capita, of one nation, in prolonged periods (long-term)?

Explanations of the exogenous models:

These show that economic growth is due to: a) the diffuse factor A, b) capital accumulation, and c) labor (in order of priority). Therefore, the differences in production and incomes, in the short and long-term, are explained more by the effect of an exogenous and imprecise variable than by the accumulation of capital or the intensive use of the labor force.

Explanations of endogenous models:

Taking into account the aforementioned weakness of the exogenous models, the endogenous ones try to correct this unsatisfactory result, based on these premises: a) the engine of economic growth is the accumulation of knowledge and technological advance, b) the accumulation of capital also boosts the economic boom (this concept is broadened to include human capital or specialized workforce or distinctive quality of the labor factor), and c) another essential element is the social, political and legal structure (influence of institutions, freedoms, human rights, legal framework and legal guarantees).

In this sense, the correct combination of several relevant factors (knowledge, technology, physical, financial,

natural and human capital, institutions, freedoms, human rights, legal framework and legal guarantees) promotes economic growth, and can justify differences in production, and incomes in short and long-term.

Two relevant investigations also stand out:

1. The neo-Classical American economist Charles Jones (2002) used an exogenous model (Solow & Swan, 1956), and an endogenous model (I&D, Romer, 1987 and Rebelo, 1991), with information from one hundred and nine countries (years 1960-1997). Some of his conclusions are the following:
 - a) throughout history, the economic boom is sporadic and inconsistent, b) in previous centuries, property rights were not well defined (as there were no incentives or investments in research activities and development, then discoveries and inventions were not frequent), c) currently, this situation (diffuse or non-existent intellectual property rights) continues in several poor countries, and d) in developed nations there are institutions and an appropriate social, political and legal structure, which allows the development of inventions that make up the fundamental engine of economic growth.

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2. The American economist William Reed (2006) constructed an exogenous model to evaluate US economic growth (period 1970-1999), and concludes that economic expansion depends on: a) traditional determinants (capital, employment and population), and b) non-traditional (size and structure of the public sector and tax collection).

Concluding, unlike microeconomics (a branch of economics, whose principles and theories have been fully formulated), macroeconomics and theories of economic growth continue being developed. In this regard, the latest discussions on the determinants of the economic boom are directed towards the influence of human capital, the institutional environment, innovation and competitiveness as engines of economic expansion.

II.4 THE ECONOMIC DILEMMAS

Immersed in the process of economic growth, certain dilemmas persist, because economics is an inexact social science, the results of economic measures depend on people's behavior and expectations, the application of the same policies is not always successful (influenced by internal and external circumstances at a given time), and there is no universal set of infallible postulates to reactivate economic expansion.

Many times, policy makers and economists are not sure what actions to design, propose and implement, also considering their potential detrimental impacts.

In this regard, the main dilemmas associated with the economic boom are the following:

1. How can the economy be stabilized?
2. When should the public deficit be reduced?
3. Should the economic growth strategy be based on consumption or saving?
4. Should higher inflation or higher unemployment be generated?
5. What are the priority policies (monetary or fiscal)?
6. Is it necessary to consider the impact of money on the economic boom?
7. How to determine or modify the expectations of society?

1. How can the economy be stabilized?:

The stabilization of the economy is the basis of the proposals of the International Monetary Fund (IMF), a position supported by the American economist, statistician and professor Milton Friedman (1912-2006)⁸ and the Monetarists.

Obviously, if a stable macroeconomic environment can't be generated and maintained, economic policies will hardly succeed, and it will be extremely difficult to reactivate production and the economic boom.

However, economists do not agree on the best practices to stabilize the economy, while governments are prone to prioritize social and political objectives over economic ones (mainly in electoral times), increasing public spending, favoring employment, maintaining subsidies to public services and social programs, granting tax cuts and keeping interest rates low, among other populist measures.

There are three positions to stabilize the economy:

- a) activism: policies and regulations must be implemented to stimulate economic growth, reduce inflation and unemployment. This is the approach of the neo-Keynesians and of some Neo-Classics and Monetarists,

⁸ Winner of the Nobel Prize in Economics 1976.

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- b) passivism: government interventions should be minimal, considering that agents require freedoms, which will allow all markets (goods and services, labor, banking, financial, monetary, etc.) to return to their natural equilibriums. This is the position of some neo-Classics and Monetarists,
- c) intermediate: the economy works properly based on certain rules or fixed policies that do not vary in the long-term, regardless of unexpected events. This approach was proposed by Milton Friedman and is supported by some neo-Keynesians and Monetarists. Notable examples of rules are:
- c.1) setting interest rates very low, expecting to maintain them that way for at least five years. This rule is used by the Federal Reserve and other central banks, and c.2) restricting monetary liquidity and inflation with a money growth rate lower than GDP growth rate. This rule is used successfully by most central banks in developed nations.

Considering the differences between these three positions (activism, passivism and intermediate) and the particular situation of each country, at a certain moment. Then: When is it best to use any of these approaches? How can the economy be stabilized?

2. When should the public deficit be reduced?:

If public spending exceeds tax collection, a deficit is generated in public accounts, which forces the government to get into debts.

Nonetheless, a high level of public spending and indebtedness considerably harm economic expansion. Even if the Public Debt/GDP ratio is high, the economy suffers from various imbalances, economic growth stagnates and the government's inability to meet obligations, in the short and medium-term, can propitiate that part of the debts will be assumed by the next generations.

Some economists state that paying debts with future surpluses isn't a problem, while others reject this argument, taking into account that future incomes aren't reliable (almost all of these estimates are imprecise and unrealistic), and it isn't ethical to transfer debts to descendants.

In addition, economists of different tendencies consider that the public deficit is uncontrollable if the Government Debt/GDP ratio exceeds 50% and some neo-Keynesians, such as the American economist Kenneth Rogoff, place this limit at 90%⁹.

As it is not known exactly when the public deficit creates macroeconomic distortions (each case is different,

⁹ Japan is the most indebted country on the planet. Its Public Debt/GDP ratio is 235% (year 2017). **Source:** World Bank (WB).

This huge debt is one of the determinants of the Japanese economic stagnation.

there aren't two equal economies) and it is feasible to transfer debts to future generations. Then: What is the maximum debt limit? When should the public deficit be reduced?

3. Should the economic growth strategy be based on consumption or saving?:

Considering that resources are limited, there is an inverse relationship between consumption and saving¹⁰:

- a) a higher consumption generates lower saving: the consumption stimulates production, generating more inflation. If the demand of certain goods and services increases, producers will take advantage of these opportunities to increase their incomes, and therefore, they will try to satisfy customer requirements, raising production (with higher costs and new product prices). And citizens, who don't have incentives to save or ways to protect their incomes against rising inflation, will use their financial and monetary resources to purchase more products (greater consumption), reducing the amounts of money previously "saved" and the capacity to save in the future (lower saving),

¹⁰ Which is logical and intuitive: $GDP = Consumption + Saving$.

b) a lower consumption generates higher saving: saving or “deferred consumption” generates the necessary resources to deal with unforeseen events or pay for expensive goods and services (long-term consumption). It also allows to invest in productive activities (banking institutions lend their surplus resources to investors and entrepreneurs). However, the fall in consumption discourages production (contracting inflation), forcing producers to decrease production, and also reduce their profit margins and the prices of goods and services, in order to sell them. As the majority of citizens have decided to cut their expenses, for various reasons influenced by economic policies (lower consumption), they will look for ways to preserve and improve their wealth. In this sense, there are incentives to save (especially if interest rates exceed low inflation rates) and therefore, people will try to maintain their monetary resources in bank accounts that pay interests (greater saving) and/or invest in bonds or low risk financial instruments.

Both determinants (consumption and saving) are essential to guarantee economic growth. Frank Ramsey indicated that an economy grows optimally if consumption is equal to $\frac{2}{3}$ of GDP and saving to $\frac{1}{3}$ of GDP.

Although on this topic, there is no consensus among economists. On the one hand, the US economy is based on consumption (with a strongly developed domestic market and a low investment rate¹¹), while the European and Asian economies are based on saving (taking advantage of external markets and low domestic consumption¹²).

Considering that some successful economies are based on consumption and others on saving. Then: Why does a certain model (consumption or saving) work properly in some countries and fails in others? Should the economic growth strategy be based on consumption or saving?

4. Should higher inflation or higher unemployment be generated?:

There is an inverse relationship between inflation and unemployment, which is strengthened as the economy stabilizes and is easy to explain by the impacts of interest rate adjustments:

¹¹ 19% of GDP.
Validity: 2018.
Source: WB.

¹² Investment rates in emerging Asian countries exceed 25% of GDP. The highest is China's (45% of GDP).
Validity: 2018.
Source: WB.

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- a) a higher inflation generates lower unemployment:
as interest rates fall, saving decreases (it is not profitable to have money in bank accounts or invest in low-risk financial instruments) and consumption increases (it is preferable to buy products and acquire assets, and it is convenient for individuals and companies to borrow with low real interest rates that perhaps are lower than inflation rates). The increase in consumption (demand) raises production with higher inflation. This new rhythm (greater supply-demand and growth in production) requires an increase in the labor force. Therefore, more jobs are created, reducing unemployment,
- b) a lower inflation generates higher unemployment:
as interest rates rise, saving increases (it is profitable to have money in bank accounts and invest in low-risk financial instruments) and consumption decreases (it is no longer preferable to buy so many products or purchase assets, and it is not convenient to go into debts because real interest rates can exceed inflation rates). The fall in consumption (demand) reduces production. This new rhythm (lower supply and demand of products and decrease in production) declines the price variations of various goods and services, decreasing

inflation. Nonetheless, the reduction in production destroys some jobs (they are no longer needed), which creates more unemployment.

The neo-Keynesian economists prefer to prioritize job creation. They argue that reaching an optimal employment situation is only achieved through government intervention and the use of appropriate policies that contribute to economic expansion (increasing public spending, consumption, investment and tax collection).

While the neo-Classics are prone to seek a decrease in inflation, but expecting that unemployment will not increase considerably.

On the other hand, the Monetarists deny that there is an inverse relationship between inflation and unemployment, stating that market distortions occur in the short-term, and that priority should be given to reducing inflation (once the monetary system is stabilized, unemployment will decrease and the natural rate of unemployment will be reached).

Furthermore, empirical evidence confirms that the reverse inflation-unemployment link is not accurate:

- a) there are countries that have experienced episodes of stagflation (high inflation and high unemployment). Although this is due to: “weak” or non-existent institutions, the absence of guarantees for

investors, the destruction of the price system¹³, ineffective policies and market failures, among other reasons. However, the neo-Keynesians have not been able to satisfactorily explain why this adverse phenomenon occurs,

- b) in some cases, inflation depends more on the price level of previous periods and on expectations about its value in the future than on economic policies or labor market conditions (demonstrated in models of the Modern Phillips Curve),
- c) unexpected events (significant variations in the prices of food, commodities, hydrocarbons, raw materials and minerals, terrorist attacks, war conflicts, stock market crises, natural disasters, etc.) can considerably raise the prices of various products,
- d) when the unemployment rate exceeds 8% or inflation is high (close to or greater than 20% per year), this relationship is destroyed, mainly due to uncertainty, lack of stability in the macroeconomic environment, asymmetric information problems,

¹³ Values of goods and services with respect to others.

Milton Friedman insisted on the relevance of preserving the price system (in order to stabilizing the macroeconomic environment and reducing inflation). While Robert Lucas, in his model of the Islands or of the Erroneous Perceptions, indicated that in a nation there are several markets and sub-markets of goods and services, and because of this, many times the producers of a certain segment do not know how to react to increases in prices in other areas, which ratifies the importance of maintaining the price system.

errors in expectations and structural failures in the markets,

- e) it is not always possible to combine the two preferred instruments of monetary policy (interest rates and monetary emissions) to balance the inflation-unemployment relationship. The American Keynesian economist William Poole analytically demonstrated, in the 1970s, that in conditions of instability it is detrimental to the economy to intervene simultaneously in interest rates and the circulation of money. Its conclusions are as follows: e.1) if there are liquidity problems (deficiency or excess) and/or the value of the currency fluctuates considerably, it is necessary to act only on interest rates and allow the exchange rate to fluctuate freely, and e.2) when production, consumption and employment decrease, it is indispensable to act only on the circulation of money, without controlling interest rates. The main schools and economic currents recognized these results. Several investigations have confirmed that during the crisis stages, fixing interest rates is ineffective to reactivate economic expansion and cushion inflationary impacts.

Despite these objections, there is certain relationship between inflation and unemployment, making it impossible to eliminate both problems. Furthermore, at the other extreme, a very low or negative inflation rate (deflation) and a negligible unemployment, less than 4% (hyper-employment) significantly harm the economic boom. Then: What is the lesser of the two evils? Should higher inflation or higher unemployment be generated?

5. What are the priority policies (monetary or fiscal)?:

After the Second World War, the economies of the developed nations, supported by Keynesian policies, grew impressively. During periods of economic expansion, governments raised interest rates and decreased public spending, while recession stages were counteracted with reductions in interest rates and increases in investment, public spending and domestic consumption.

At that time, the stable and inverse relationship between inflation and unemployment was precisely fulfilled. Economic growth was accompanied with certain levels of inflation and the expansion of employment. In addition, in periods of crisis, despite rising unemployment, inflation fell markedly.

These situations were relatively easy for government authorities to handle. In that sense, the Keynesianism beca-

me the main world economic doctrine, displacing the influence of the Classical school.

However, since the mid-1960s, several industrialized countries, which continued applying Keynesian policies, unprecedentedly faced problems of high inflation and unemployment (stagflation). While in 1971, the US suffered its first trade deficit of the 20th century.

These events marked the end of the gold standard and the stable exchange bands of several European currencies, which fluctuated approximately around 1% for each dollar, the main financial markets also became “internationalized”, derivatives trading started and appeared shocks that are still persistent: a) instability in the price of gold and in the value of currencies, and b) slowdown in the growth rates of developed nations.

Currently, some academics and researchers have stated that Keynesian postulates work efficiently in economies with stable currencies and restrictions on the movements of capital flows and imports, in which macroeconomic conditions depend more on internal events than those of the international environment. Therefore, the Keynesian Theory is not suitable for a globalized world.

The inability of Keynesianism to stop the simultaneous excessive growth of inflation and unemployment, in industrialized countries, led to the creation of a new economic trend: the Monetarism, led by Milton Friedman, the

Swiss economist Karl Brunner (1916-1989) and the American economist Allan Meltzer (1928-2017), who confirmed that the failure of the Keynesian Theory was fundamentally due to the underestimation of monetary policies.

In general terms, Monetarists support the following points:

- a) the main economic policy is monetary. It can't be subordinated to others, and its effectiveness depends on the autonomy of the central bank,
- b) in the long run there are no stable links between inflation and unemployment,
- c) the inappropriate monetary policies can be inflationary and job-destroying,
- d) optimal monetary policies are required to mitigate inflation and stabilize the economy,
- e) inflation is caused primarily by a rapid expansion of money (in a broad sense: coins, bills, bonds, stocks, financial assets, etc.) higher than GDP growth,
- f) unlike inflation that requires measures by the monetary authorities, unemployment will return to its ideal level (hypothesis of the natural rate of unemployment),
- g) the Keynesian policies can't eliminate stagflation or contract very high inflation. In this case, it will be

counterproductive to raise or lower public spending and adjust interest rates,

- h) the Theory of Business Cycles (expansions and decreases) is questionable. There are recessions due to incidents not controlled by economic policies.

Although the Keynesian revolution dictated the economic guidelines after the Second World War, the Monetarism displaced Keynesianism, approximately between 1975 and 1989, changing the strategies of the developed nations. With the implementation of Monetarist policies, exercised by independent central banks, these countries managed to stabilize inflation at low limits.

The empirical evidence broadly favors the Monetarist Theory. Several economic studies corroborate that the only common characteristic, in countries with high inflation rates, is the colossal monetary expansion.

However, Monetarism is a heterogeneous, diffuse and complex doctrine, aimed at reducing inflation, which relegates other macroeconomic aspects (economic growth, employment, theories and fiscal policies, etc.) to the background.

Additionally, Keynesianism was not completely defeated. In contrast to Monetarism, socially and politically, it is easy to sell, based on this premise: governments can take

advantage of interest rates, investments and public spending to reactivate economies and reduce unemployment (quick solutions and not in long-term).

Another fact that harmed Monetarism was the distrust of academics towards this current and their growing support towards the neo-Classical school, which stimulated Keynesians to react against the criticisms of Monetarists and the neo-Classics, founding the movement of the neo-Keynesians, in the early eighties. These economists questioned certain Monetarist foundations: a) subordination of economic policies to monetary policies, b) inexistence of a stable and inverse relationship between inflation and unemployment, c) broad definition of money, d) priority to fixed rules or policies, oriented to long-term over short-term stabilization, and e) rejection of the Theory of Business Cycles.

They accepted the errors of the Keynesian Theory, reformulating it based on these assumptions:

- a) recognizing the need to adopt appropriate monetary policies and that inflation is contracted by restricting monetary issues (Monetarist postulate). Nonetheless, fiscal policies prevail and the essential macroeconomic objectives are: reduce unemployment, promote economic growth and contract inflation,

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- b) accepting the hypothesis of the natural rate of unemployment,
 - c) rescuing the relationship between inflation and long-term unemployment (developing the Modern Phillips Curve),
 - d) confirming the effectiveness of short-term monetary policies,
 - e) justifying the need to act by active policies, instead of applying rules,
 - f) ratifying that central banks should be autonomous, with a double role: f.1) execute monetary policies, and f.2) ensure that governments implement appropriate fiscal policies.

Paradoxically, the neo-Keynesian counterrevolution was successful. Since the 1980s, neo-Keynesians have published countless books, studies, and opinion articles, and hold the majority of managerial positions in the central banks of industrialized and emerging countries, supporting Monetarist and Neo-Keynesian policies.

It should be noted that Monetarists maintain that the main economic policies are monetary (first the monetary system must be stabilized to strengthen the currency and reduce inflation). While neo-Keynesians and neo-Classics reject this position, stating that fiscal policies are the most relevant to effectively address the problems of: insufficient

economic growth, unemployment and inflation, among others.

Taking into account the role of monetary policies to stabilize the monetary system, strengthen the currency and reduce inflation, it is not clear whether these should prevail over other economic policies. Then, the dilemma is: What are the priority policies (monetary or fiscal)?

6. Is it necessary to consider the impact of money on the economic boom?:

Some economists argue that money is “neutral”, although it alters the price level, it has no effect on economic growth, employment and the other real macroeconomic variables (consumption, investment, interest rates, etc.). Nor does it modify the price system¹⁴.

However, the British economist John Keynes (1883-1946) rejected the aforementioned principle of neutrality of money and the neo-Keynesians also question it¹⁵, indicating

¹⁴ Milton Friedman supported this principle using this explanation: for example, if in an economy the money supply doubles, and at the same time, the wages and prices of all goods and services double. Then, even though prices have changed (100% inflation), the price system is the same, economic growth will be the same, and there will also be no change in the unemployment rate. In that sense, money is neutral.

¹⁵ Friedman's example is objectionable because of the monetary illusion (erroneous perception about the value of money; for short periods, days or few weeks, it tends to be considered that its value has not changed significantly).

Even though citizens receive a 100% wage increase, they will not accept a 100% increase in the prices of many goods and services.

They will continue to think that money has the same value as before and will be reluctant to pay for several products with duplicate prices, which may force producers to lower

that in the short-term it does influence on GDP, employment and other real macroeconomic variables, considering these aspects:

- a) an increase in the money supply can influence interest rates, generate more investments and jobs, which contributes to raise production,
- b) as economic policies affect the income and wealth of citizens, they also affect consumption and saving habits (which determine the level of economic activity),
- c) the inverse relationship between inflation and unemployment confirms that monetary policies act on economic growth, inflation and employment.

In addition, neo-Keynesian economists argue that short-term money distortions gradually disappear because GDP, employment, and other factors will return to their natural levels. Therefore, money can only be neutral in the long run or in an equilibrium situation.

Various economic studies of the last four decades have tried to corroborate this hypothesis of the neutrality of

production and prices, according to market requirements (new supply-demand rhythm) and not to the real purchasing power of agents (distorting the price level and the price system).

In this scenario, GDP would decrease (economic decline) and unemployment would increase. Therefore, as Keynesians and neo-Keynesians argue, money is not neutral in the short-term.

money and also establish whether it is a determinant of economic growth.

Analyzing the research of American economists Robert King & Charles Plosser (1984) on the impact of money on US business cycles, during the period 1953-1978, the results suggest that the neutrality of money works in a stable macroeconomic environment, in which monetary policies minimize the monetary emissions without support (seigniorage) and fiscal policies seek to balance the public budget.

Regarding other studies, their conclusions are not convincing. Some reject the neutrality of money, standing out that monetary flows impact GDP and employment, while others don't find robust relationships between money, economic growth and some macroeconomic variables (employment, consumption, investment, interest rates, etc.).

It is relevant to note that this discussion about the neutrality of money continues. The neo-Keynesians accept that money can be neutral only in the long-term or in equilibrium conditions, while some neo-Classics and Monetarists support this principle of the neutrality of money, indicating that as a medium of exchange and saving, it does not affect economic growth and other macroeconomic variables.

Considering that the level of the money supply affects the decisions of agents, modifies consumption and saving

habits, and it has not even been possible to prove the neutrality of money. Then: Is it necessary to consider the impact of money on the economic boom?

7. How to determine or modify the expectations of society?:

Since the eighties, economic theories reached an unprecedented development. It is almost impossible to calculate the amount of economic research and publications of this time, and the new economic orientations are also unpredictable, despite the fact that the latest studies and debates are aimed mainly at: a) explaining the determinants of economic expansion, b) justifying the origin of financial crises, and c) rescuing the role of monetary policies (specifying the influence of interest rates and money).

In this regard, what is the reason for this take-off of economic theories?

Some academics argue that technological advances and openings in global markets have led to this boom in economic research.

However, this explanation is insufficient and doesn't answer the real question: How have been reformulated various economic principles and paradigms?

The answers to these questions are related to the expectations or assumptions that people make about events in the past, present and future.

In the 1960s, given the failure of several economic models, researchers concluded that certain diffuse factors influence the behavior of citizens, corporations and institutions, managing to positively or negatively alter economic results. In this sense, personal, corporate and institutional decisions depend on expectations. For example:

- a) companies formulate budgets based on their income expectations,
- b) central banks adjust interest rates and control monetary issues according to their expectations of inflation, unemployment and economic growth,
- c) corporations arise from the expectations of profitability and growth of their shareholders,
- d) industries produce and set prices according to their sales expectations and profit margins,
- e) collective agreements are negotiated according to expectations of competitiveness (corporate criteria) and utility (by workers),
- f) purchases, savings and investments are based on inflationary expectations and the exchange rate,
- g) stock prices depend in part on the value and return expected by investors.

Therefore, the flaws of countless economic models and theories can be corrected by incorporating the effect of expectations.

This approach was applied exhaustively to the economic field, since the eighties, under two approaches:

- a) adaptive expectations (neo-Keynesian and Monetarist): it consists in the formulation of assumptions based on past events. For example: if last year's inflation was 20%, citizens may think that this year's inflation will be similar and under this premise, they will make decisions about their purchases, savings and investments. John Keynes, in The General Theory of Employment, Interest and Money (1936), raised an initial version (although weak): the demand for goods and services anticipated by entrepreneurs (effective demand) increases investment, production, employment and consumption, reactivating the economic boom,
- b) rational (neo-Classical) expectations: proposed by the American economist John Muth (1930-2005), in 1961, and developed by Robert Lucas in the mid-1970s. These assumptions do not depend on previous events, rather they are based on the optimizing behavior of the agents and the mate-

rialization of possible circumstances that improve the well-being of individuals, which encourages decision-making and actions that generate certain economic impacts. In other words, rational expectations are based on current or future events that will improve well-being. For example: if the central bank decides to increase interest rates, citizens may think that inflation will decrease (regardless of its values in previous years) and therefore, they will save more and consume less.

It should be noted that the expectations satisfactorily explain:

- a) the fact that monetary and fiscal policies are ineffective in reducing inflation, if the behavior of people who expect the continuation of episodes of high inflation doesn't change. Therefore, monetary policies are only effective when they manage to reduce inflationary expectations and successful economic policies are those that promote changes in expectations,
- b) the overwhelming impact of some surprise policies (these eliminate erroneous expectations),
- c) the gap between the policies and their results, which can be seen in the next quarter or semester,

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- d) the reduction of inflation through credible inflation targets and without substantial changes in policies,
 - e) the inverse relationship between inflation and unemployment. Some studies have confirmed that inflation in Latin American countries depends significantly on that observed in previous periods (adaptive), and that predicted by the next economic measures (rational),
 - f) the volatility of exchange rates and the values of stock exchange instruments,
 - g) exaggerated deviations in the prices of certain products, which do not respond to supply and demand in the markets.

Currently, a discussion persists between neo-Keynesians and neo-Classics about which is the best perspective (adaptive or rational expectations).

Various models have shown that adaptive expectations are stable, favor the fulfillment of government macroeconomic goals and the achievement of equilibrium situations (sustained growth, full employment, moderate inflation, etc.). While others have corroborated that rational expectations are unstable, because errors in predictions create distortions in the markets, and also can generate bubbles and financial crises.

Likewise, it is difficult to estimate precisely what the main expectations of citizens are, they may be different for several groups and even vary significantly between the members of each work team, organization, corporation or institution.

Although the validity of the second approach has been widely accepted (rational expectations, dependent on human rationality and the optimizing microeconomic behavior of agents), the models that incorporate the effect of lagged variables are based more on this adaptive vision, and most economists are prone to make estimates based on current and past conditions.

Considering that it is extremely difficult to know the expectations of citizens and the macroeconomic results depend on them. Then: How to estimate the impact of expectations on economic policies? How to determine or modify the expectations of society?

Concluding, applying the same policies doesn't always generate the best results. These can even be implemented in a certain country (different periods) or in several nations, presenting dissimilar results. Macroeconomics provides many ideas, but leaves issues unresolved. Although the neo-Keynesians have made impressive efforts to formulate satisfactory answers to the great economic dilemmas (stabilization, public deficit, consumption or saving, inflation or unemployment, priority to monetary or fiscal policies, role of money and expectations), those responsible for the policies are constantly confronted with the contradictions between economic ideas and postulates, and it is also difficult to forecast the effect of expectations and achieve substantial changes in the behavior of citizens.

III. INFLATION

III.1 BRIEF HISTORY OF MONEY

There is no consensus on when the money began to be used. Between the 30th and 25th centuries before Christ, in Sumer (Mesopotamia), precious metal ingots were used as means of payment.

In the Hammurabi code (written in the 18th century before Christ) reference is made to money. Even the Jewish patriarch Joseph (who lived between the 14th and 13th centuries before Christ) was sold as a slave for twenty pieces of silver¹⁶ (Genesis 37:28).

Since the 10th century before Christ, tiny gold, silver, and bronze knives and swords were used in China as money.

In the 7th century before Christ, the first coins were minted in the Asian kingdom of Lydia¹⁷ and in Greece. China and India also minted their own coins¹⁸. In the 6th century before Christ, the Phoenicians minted their coins and established payment deadlines (introducing the credit modality). Most historians consider that money originated during this time.

Later, in the 3rd century before Christ, the Romans minted their coins. While in the Middle Ages, the European

¹⁶ Possibly, these coins were not minted.

¹⁷ Currently, this territory is part of Turkey.

¹⁸ It is not known exactly if the first coins from these countries were made in the 7th or in the 6th century before Christ.