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## THE CAUSE OF BRAZILIAN INFLATION IN THE MODERN ERA IS POVERTY

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**Abstract:** This work presents a new conception of inflation, due to poverty. The shorter family budget also changed the consumption of items such as breaded chicken and fish in the year 2021. Inflation concepts are presented, and a derivative calculation is applied for the marginal propensity to consume and save as a real explanation for inflation for poverty.

**Keywords:** Inflation; Poverty; Derivative

**Sommaire:** Cet ouvrage présente une nouvelle conception de l'inflation, due à la pauvreté. Le budget plus court des ménages a également modifié la consommation d'articles tels que le poulet pané et le poisson en 2021. Des concepts d'inflation sont présentés et un calcul dérivé est appliqué pour la propension marginale à consommer et à épargner comme explication réelle de l'inflation de la pauvreté.

**Mots clés:** Inflation; La pauvreté; Dérivé..

### 1 INTRODUCTION

The economic literature, despite its greatness, has not yet brought any approach to the phenomenon of inflation caused by poverty. Perhaps because this event occurs exclusively in underdeveloped countries and does not arouse interest in developing a solid literary base with the aim of understanding, solving and preventing this problem.

Inflation is defined as the continuous and general increase in prices in the economy. This is a process known as the inflationary process, which extends to all economic goods.

Inflation is measured by so-called price indices. These indexes are the weighted average of the prices of a basket of chosen goods, in a certain period and in certain regions.

### 2 THEORETICAL FOUNDATIONS

The drop in income in rich countries is not structural and is soon corrected with the increase in the productivity of the means of production and with positive effects on society's income, generating balance in the demand and supply curves. In the fight against inflation, remedies are applied based on diagnoses based on causes such as demand pressure, increased production costs and preventive speculation by producers passing on future

costs. So, if the symptom does not solve the pathology by chance it points to something unknown, obviously the disease is incognito (ARAÚJO, 2021).

## 2.1 CAUSES AND CONSEQUENCES OF INFLATION

Second, OLIVO, 2008, the inflationary process distorts the price system and affects the proper functioning of the market. The main consequences are:

- Imposing costs to society of issuing and controlling currency;
- Increase income concentration, as the rich are usually better able to protect themselves from inflation than the poorest;
- Decrease economic growth, as economic instability reduces domestic and foreign investment

The causes of inflation are diverse, but there are three main types:

- Demand inflation;
- Cost inflation;
- Chronic inflation;

### 2.1.1 Demand inflation

Every economy has a certain productive capacity determined by its number of factories, workers, machines, equipment, etc. There is even an index that measures the use of this capacity, known as the installed capacity utilization index. When, for some reason, demand reaches values close to or even higher than the productive capacity utilization rate, it is not possible to produce enough goods to meet all demand. This excess demand puts pressure on prices, which increase and generate inflation. (OLIVO, 2008).

There are two remedies for fighting demand inflation:

- Increase the interest rate (restrictive monetary policy) – by increasing the interest rate, private consumption and investment are discouraged, reducing demand and inflation;
- Increase taxes and/or cut public spending and investment (restrictive fiscal policy), decreasing private demand (more taxes) and public demand (public spending and investment).

## 2.1.2 Supply inflation

Second OLIVO, 2008, supply inflation, also known as cost inflation, “is related to a strong increase in the price of important inputs in the economy. This sharp increase in prices is called a supply shock.”

These input price increases are transformed into cost increases for entrepreneurs and are passed on to final prices, generating inflation. This process is more severe in oligopoly and monopoly markets, which have greater control over prices. Some are wars in the Middle East, which increase the price of oil; frosts and pests, which destroy large food crops and even a large increase in the exchange rate, impacting imports of raw materials.

The remedies to combat supply inflation are:

- Stimulate competition by combating oligopoly and monopolies;
- Decrease costs for entrepreneurs (tax exemptions, benefits).

## 2.1.3 Chronic inflation

OLIVO, 2008, teaches us that “the public sector is the cause of chronic inflation.” The financial result of the public sector can be defined in a simplified way as:

$$\text{Public Sector} = (RI - G - I - J)$$

- RI = Taxes
- G = Spending
- I = Investments
- J = Interest paid on debt

- ✓ If RI is greater than G, I, J, the public sector has a fiscal surplus;
- ✓ If RI is less than G, I, J, the public sector has a fiscal deficit;

When the public sector runs a fiscal deficit (which it most often does), financing options are:

- Increase RI or cut G and I;
- Borrow money, increasing debt and J;
- “Printing” money, increasing the amount of money in the economy and inflation.



In Brazil, to protect themselves from chronic inflation, economic agents developed price indexation, reinforced by monetary correction. This phenomenon became known as the inflationary spiral and was only overcome with the advent of the Real Plan, in July 1994, which managed to end indexation in the economy and, since then, the country's only concern has been supply inflation and inflation. demand (OLIVO, 2008).

ARAÚJO, 2021, says:

“In practice, businessmen, in order to defend themselves against economic instability, adopt their defense strategies such as: preparing sales prices in US dollars, reducing production to eliminate the risk of inventory, establishing a long term for delivery of finished products. There are countless changes that even provoke the phenomenon of “reduction”, that is, reducing the product in order not to increase the price. Unfortunately, these movements break links in the productive chains, reducing the efficiency of suppliers.”

## 2.2 POVERTY INFLATION

Observing the reaction of agents that seek adaptation to the hostile environment, it is characterized that the cause of inflation in underdeveloped markets is the lack of sales scale resulting from sudden fluctuations in the income of social groups.

NACKSTRAND, 2019, reported that “the 2019 Nobel Prize in Economics went to Abhijit Banerjee, Esther Duflo and Michael Kremer for their experimental approach to alleviating global poverty.” Banerjee and Esther are from the Massachusetts Institute of Technology (MIT) in the United States, while Kremer is from Harvard University, also in the US. According to BANERJEE and DUFLO, 2007, “the poor have few real options for spending their money. These people live on less than \$1 a day.

In Brazil, according to AGENCIA ESTADO, in 2019, 10.4 million people (5% of the population) survive on R\$ 51 per month, on average, in September 2021 with the exchange rate at more than 5 reais, this is equivalent to 10 monthly dollars, or less than 1 dollar a day; on the other hand, 1% had income above R\$ 16,297. Income inequality in the country reached a record level in 2018 within the historical series of the Continuous National Household Sample Survey (Continuous PNAD), initiated in 2012 by the Brazilian Institute of Geography and Statistics (IBGE).

The poorest half of the population, almost 104 million Brazilians, lived on just R\$413 per month, considering all sources of income. At the other extreme, the richest 1% - only 2.1 million people - had an average

income of R\$16,297 per person. That is, this small, more affluent slice of the population earned almost 40 times more than half of the bottom half of the population pyramid.

The price increase for the poorest Brazilian families was more than 10 times greater than the increase felt by the richest people from January to September 2020. The explanation for this difference in the weight of inflation for rich and poor families lies mainly in the significant increase of food prices.

### 2.2.1 High inflation makes consumers switch from meat to breaded food

According to, AGÊNCIA ESTADO, 2021, pressured by the combination of inflation, high unemployment and lower coverage and availability of emergency aid resources, Brazilians reduced the purchased quantities of food, beverages and hygiene and cleaning products in the first half of 2021. There was a decrease in volumes in practically all baskets. Priority in daily consumption was concentrated on basic foodstuffs: rice and beans.

The shorter budget of families has also changed the consumption of items that until then were not considered so basic, breaded chicken and fish, for example. In the first half, the product debuted in 3.4 million households as a cheaper animal protein alternative to red meat, which rose 31.31% in 12 months through August, according to the IPCA-15 of the month - an indicator that is a prior to official inflation in the country, the Extended National Consumer Price Index. It is equivalent to three times the general inflation in the same period (9.30%) according to the previous inflation indicator (AGÊNCIA ESTADO, 2021).

As presented by MUROLO and BONETTO, 2008, when analyzing the behavior of the economy in a market, it is noticed that the family income is the factor that most influences the consumption and savings of these families.

In a simplified way, it can be said that for families, consumption plus savings equals income, i.e.,

$$\text{Income} = \text{Consumption} + \text{Saving}$$

Or

$$y = c + s$$

Naturally, household savings are given by the difference between income and consumption, i.e.,

$$\text{Savings} = \text{Income} - \text{Consumption}$$

Or

$$s = y - c$$

As consumption  $c$  is a function of income  $y$ , it is common to analyze the variation in consumption corresponding to the variation in income; in other words, the rate of change of consumption in relation to income; in a practical way, the derivative of consumption in relation to income. MUROLO and BONETTO, 2008, says that such derivative is also known as Marginal Propensity to Consume, which measures how much consumption increases when there is an increase of one unit in income. Symbolizing  $c = f(y)$ , there are some ways to symbolize the marginal propensity to consume:  $C_{mg} = c'(y) = \frac{dc}{dy}$

Similarly, saving  $s$  is a function of income  $y$  and it is common to analyze the change in saving corresponding to the change in income; in other words, the rate of change of savings in relation to income; in a practical way, the derivative of savings in relation to income. This rate is also known as the Marginal Propensity to Save, which measures how much savings increase when there is a one-unit increase in income. According to MUROLO and BONETTO, 2008, symbolizing  $s = f(y)$ , There are some ways to symbolize the Marginal Propensity to Save:  $S_{mg} = s'(y) = \frac{ds}{dy}$

It is observed that  $y = c + s$  and in this expression, differentiating with respect to  $y$ , we have

$$\frac{d}{dy}(y) = \frac{dc}{dy} + \frac{ds}{dy}$$

$$1 = \frac{dc}{dy} + \frac{ds}{dy}$$

that is, the sum of the Marginal Propensity to Consume with the Marginal Propensity to Save results in 1:

$$C_{mg} + S_{mg} = 1$$

As the functions  $c$  and  $s$  are increasing, the indicated derivatives are positive, so we have  $0 < \frac{dc}{dy} < 1$  e  $0 < \frac{ds}{dy} < 1$ , with  $\frac{dc}{dy} = 1 - \frac{ds}{dy}$  or  $\frac{ds}{dy} = 1 - \frac{dc}{dy}$ , that is,

$$C_{mg} = 1 - S_{mg} \text{ or } S_{mg} = 1 - C_{mg} \quad (\text{where } 0 < C_{mg} < 1 \text{ e } 0 < S_{mg} < 1)$$

In general, it is customary to use first-degree functions to express consumption and saving functions. It is known that, in relation to consumers, the demand for a product can be associated with its price.

Finally, if the price increases, the demand decreases.

### 2.3 PRICE ELASTICITY OF DEMAND

For different products, there are different demand changes behaviors in relation to price changes. For example, if there is a considerable increase in the price of salt, consumer demand practically does not change, since such a product is indispensable and has little weight in the household budget; however, if there was a considerable increase in the price of beef, the demand will change, since this product can be replaced by other types of meat, in addition to having a large weight in the domestic budget.

Thus, in different ways, the demand for a product is “sensitive” to changes in prices. According to MUROLO and BONETTO, 2008, the “sensitivity” of demand in relation to price changes is evaluated with the aid of the concept of price elasticity of demand. In this context, measuring the “elasticity” of demand means measuring the “sensitivity” of demand in relation to price variation.

For calculations in this work, if there is a change in demand, then the percentage change in demand  $q$  in relation to the previous demand will be

$$\text{Percentage Change in Demand} = 100 \frac{(\text{change in quantity})}{(\text{previous quantity})}$$

Remembering that the derivative of  $f(x)$  is also written as

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x}$$

and rewritten with the symbols for the function  $q(p)$ , we have

$$q'(p) = \lim_{\Delta p \rightarrow 0} \frac{\Delta q}{\Delta p}$$



We can say that, approximately, the derivative is given by

$$\Delta q \cong q'(p) \cdot \Delta p$$

Rewriting  $\Delta q$  in percentage change, we have, approximately,

$$\text{Percentage Change in } q = 100 \frac{q'(p) \cdot \Delta p}{q}$$

Or, using Leibniz's notation, we write  $q'(p) = \frac{dq}{dp}$ , getting in the previous expression

$$\text{Percentage Change in } q = 100 \frac{\frac{dq}{dp} \Delta p}{q}$$

Such an expression can be used to evaluate the elasticity of demand with respect to price. However, managers often measure the change in demand against a 1% increase in price, which gives a price change  $\Delta p = 0,01p$ , soon

$$\text{Percentage Change in } q \cong 100 \frac{\frac{dq}{dp} 0,01p}{q}$$

$$\text{Percentage Change in } q \cong \frac{100 \cdot \frac{dq}{dp} 0,01p}{q} = \frac{\frac{dq}{dp} p}{q} = \frac{dq}{dp} \cdot \frac{p}{q}$$

In summary,

$$\text{Percentage Change in } q \cong \frac{dq}{dp} \cdot \frac{p}{q}$$

The right side of the approximation of the percentage change in what is known as the price elasticity of demand. Denoting the elasticity of demand by the letter  $E$ , we have

$$E \cong \frac{dq}{dp} \cdot \frac{p}{q}$$

And such a measure gives approximately the percentage change in demand with a 1% increase in price. The path adopted to arrive at the results is presented below, detailing the procedure.

### 3 METHODOLOGY

In this work, we sought to identify poor people's consumption propensity. From these it was possible to establish an objective and its hypotheses. A bibliographic survey was carried out regarding the researched subject. An attempt was made to find examples that would elucidate the issue.

From the state of the art, we sought to collect data through practical application in the real world. With the data in hand, he went after tabulating and understanding it. The research is exploratory and the method is quantitative. The practical study took place in a popular market. Next, the results and discussions are presented.

### 4 RESULTS AND DISCUSSIONS

According to the works of BENERJEE and DUFLO, 2007, the poor population lives in order not to die of hunger. In this work, it will be adopted that a certain population consumes 70% of its income with items X and saves another 30% for food Y, having a minimum of R\$ 210 per month, given that the poorest half of the Brazilian population, almost 104 million Brazilians live on less than R\$420 per month on average, considering all sources of income. Thus, it is possible to establish that the budget constraint is implicitly given by the dependence between consumption  $c$  and income  $y$ . We can make this dependence explicit by isolating  $c$  or  $y$ , thus obtaining

$$c = 0,7y + 210$$

In all expressions, the dependence is linear, which characterizes the 1st degree function.

One can determine the saving function  $s$ . Since savings = Income – Consumption, that is,  $s = y - c$ , we have  $s = y - (0,7y + 210)$

$$s = y - 0,7y - 210$$

$$s = 0,3y - 210$$

The marginal propensity to consume will be given by the derivative

$$C_{mg} = c'(y) = 0,7$$

And the marginal propensity to save will be given by

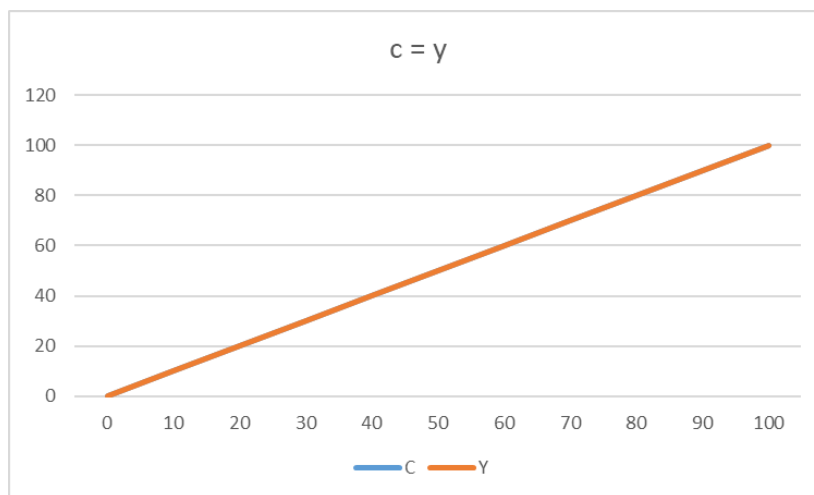
$$S_{mg} = s'(y) = 0,3$$

Since  $C_{mg} = 0,7$  an increase of one unit in income  $y$  leads to an increase of 0.7 in consumption. Similarly,  $S_{mg} = 0.3$  indicates that a one-unit increase in income  $y$  leads to a 0.3 increase in saving.

It is worth noting that  $C_{mg} + S_{mg} = 0,7 + 0,3 = 1$

Sketching the graph 1 of the function  $c = y$ , we have a line that passes through the origin and divides the first quadrant in half. This graph indicates levels where consumption is equal to income, that is, all income is directed towards consumption; so, for example, if income is  $y = 100$ , consumption will be  $c = y = 100$ .

Graph 1: function  $c = y$



Source: The authors, 2023

Consumption  $c = 0.7y + 210$  is represented by the line whose slope is 0.7 (marginal propensity to consume) and which cuts

- the  $y$  axis, when  $c = 0$ :  $c = 0$ , so  $0.7y + 210 = 0$ , so  $y = -300$
- the  $c$  axis, when  $y = 0$ :  $y = 0$ , so  $c = 0.7 \cdot 0 + 210$ , so  $c = 210$

Savings  $s = 0.3y - 210$  is represented by the line whose slope is 0.3 (Marginal Propensity to Save) and which cuts

- the  $y$  axis, when  $s = 0$ :  $s = 0$ , so  $0.3y - 210 = 0$ , so  $y = 700$
- the  $s$  axis, when  $y = 0$ :  $y = 0$ , so  $s = 0.3 \cdot 0 - 210$ , so  $c = -210$

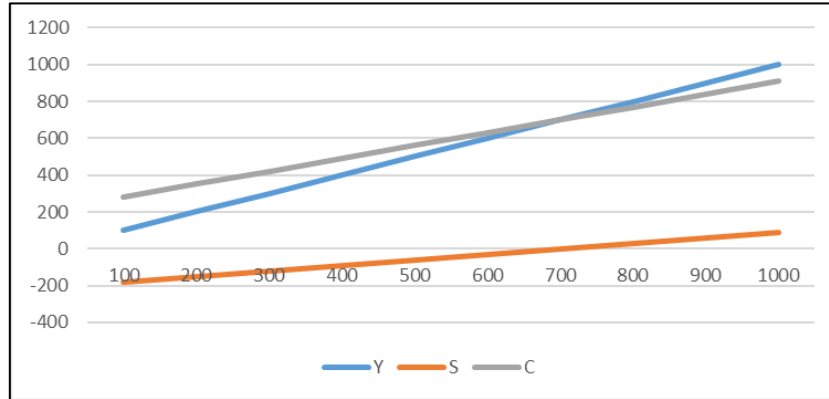
Note also that the graph  $c = y$  finds the consumption  $c = 0.7y + 210$  in

$$y = 0.7y + 210, \text{ so } y - 0.7y = 210, \text{ so } 0.3y = 210, \text{ so } y = 700$$

Below the graphs of superimposed outlines of the consumption, saving and income functions shows the

point where the graph of consumption meets the line  $c = y$ .

Graph 2: consumption, savings and income



Source: The authors, 2023

In the table below, it is possible to observe that  $y = 700$  represents the income level where consumption is equal to income, that is, where savings are zero (savings crossing the y axis in the graph above). For income levels below  $y = 700$ , consumers are consuming more than they have in income, that is, saving is negative (consumers are spending saved resources). For income levels above  $y = 700$ , we have positive saving, indicating that the income surplus is saved in relation to consumption. Table 1.

Table 1: income data  $y$ , consumption  $c = 0.7y + 210$ ; and savings  $s = 0.3y - 210$

Y	S	C
100	-180	280
200	-150	350
300	-120	420
400	-90	490
500	-60	560
600	-30	630
700	0	700
800	30	770
900	60	840
1000	90	910

Source: The Authors, 2023

In order to understand the savings of the poor with food basket Y, this study sought to visit neighborhood supermarkets where the researched food basket is purchased at prices ranging from R\$ 50 to R\$ 150 reais. In conversation with traders, it was verified as an example for this study that the demand for a certain product is



given by  $q = 1000 - 5p$ , where the price varies in the interval  $0 \leq p \leq 150$ .

Thus, it is possible to establish the function that gives the price elasticity of demand for each price:  $E \cong \frac{dq}{dp} \cdot \frac{p}{q}$ , so calculate the derivative  $\frac{dq}{dp}$  and replace  $q = 1000 - 5p$  in the expression  $E$ :

$$E = \frac{d}{dp} \cdot (1000 - 5p) \cdot \frac{p}{1000-5p} \cong$$

$$E = (0 - 5) \cdot \frac{p}{1000-5p} = -5 \cdot \frac{p}{1000-5p} \cong$$

$$E = -\frac{5p}{1000-5p}$$

In this way, it is possible to obtain the elasticity for prices  $p = 50$ ,  $p = 100$  and  $p = 150$ , simply substituting in the function  $E = -\frac{5p}{1000-5p}$ :

$$p = 50; E = -\frac{5 \cdot 50}{1000-5 \cdot 50} \cong -0,33$$

$$p = 100; E = -\frac{5 \cdot 100}{1000-5 \cdot 100} \cong -1$$

$$p = 150; E = -\frac{5 \cdot 150}{1000-5 \cdot 150} \cong -3$$

For  $p = 50$  we have the elasticity  $E \cong -0,33$ , which indicates that if there is a 1% increase in the price  $p = 50$ , demand will decrease approximately 0.33%. already for the price  $p = 100$ , the elasticity is  $E \cong -1$ , indicating that if there is a 1% increase in price, demand will fall by approximately 1%. for the price  $p = 150$ , the elasticity is  $E \cong -3$ , indicating that if there is a 1% increase in price, demand will fall by approximately 3%. In this way, it is evident that a higher price affects the demand for these popular products among the poorest in society.

## 5 FINAL CONSIDERATIONS

In this work there is mathematical proof that income up to R\$ 700 affects savings for consumption by Y food items, by the poor, in the proposed equation. This savings could be helped with emergency aid from the federal government, given that the poorest half of the population, almost 104 million Brazilians, live on just R\$ 413 per month, considering all sources of income. Emergency aid can be useful in terms of price-demand elasticity.

In a market economy, social stability also depends on access to income by the entire community and

economic development is conditioned to the productivity of the means of production, something possible through a universal pedagogy that is sensitive to the transformations of globalized society.

Brazil has the sixth largest population on the planet and has enough resources to move forward, but it faces the difficulty of producers in getting off the defensive and preparing long-term planning, due to the various risks, the most serious of which is the impoverishment of workers and the inability of the State in offering quality basic public services, which are essential to form a solid society.

Full employment of factors is a function of productivity, once it is at a continued rise, it generates demand for goods and services, stimulating an increase in the supply capacity of the production set and an increase in direct investments and, consequently, an increase in the level of income. Generally, the government adopts stimulus policies to balance aggregate demand variables.

Only a minority has taxable income and low risk to make loans and financing viable. This scenario is already enough to make productive investment unfeasible, which would give dynamism, as it is the fuel that makes the wheel of the capitalist economy turn. In the current situation, it is more rational to tax the export sector and exempt the import of technology to correct imperfections in the production chains and recover the efficiency of important sectors.

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