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Universal Basic Income: inevitable future

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Mestrado em Economia Monetária e Financeira

Orientadora:

Doutora Sofia de Sousa Vale, Professora Auxiliar
ISCTE-IUL

Setembro, 2021



CIÊNCIAS SOCIAIS
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Escola de Ciências Sociais e Humanas - ECSH

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RESUMO

A tecnologia vem se desenvolvendo fortemente nos últimos anos com impactos no mercado de trabalho ainda a serem avaliados. Esta dissertação enfoca em modelos teóricos para demonstrar como o desenvolvimento da tecnologia pode levar a uma substituição da mão de obra humana e que, por conseguinte, pode comprometer o rendimento e o consumo das famílias. Mostra-se que para lidar com esse novo cenário, a sociedade terá que encontrar soluções como o Rendimento Básico Universal (RBU) que garanta a manutenção e equilíbrio da procura. Em conclusão, demonstra-se que, no futuro, uma vez que a participação salarial tende a ser reduzida porque o trabalho humano se torna menos necessário, pode ser completamente impossível manter o equilíbrio da Procura Agregada e da Oferta Agregada sem um RBU.

Palavras-chaves: Rendimento Básico Universal; automatização; Desemprego Estrutural.

JAL: D63; D60; I38; J20; J30; E24; J64; J6

ABSTRACT

Technology has been developing strongly in the last years, with impacts on the job market still to be appraised. This dissertation focus on theoretical models to show how the development of technology may lead to a replacement of labor used in production that may compromise income and consumption. We show that to deal with this new scenario, society will have to find solutions such as the Universal Basic Income (UBI) that will guarantee demand maintenance. In conclusion, it is demonstrated that in the future, once the wage share tends to be reduced because human labor becomes less necessary, it may be completely impossible to maintain the equilibrium of Aggregate Demand and Aggregate Supply without an UBI.

Key Words: Universal Basic Income; automatization; Structural unemployment

JAL: D63; D60; I38; J20; J30; E24; J64; J6

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GLOSSARY

A = Technology

AD = Aggregate Demand

AS = Aggregate Supply

C = Private Consumption; Consumption of the families

c = Credit to the families

DIEESE = Departamento Intersindical de Estatística e Estudos Socioeconômicos

G = Public Consumption; Government Expenses

GDP = Gross Domestic Product

I = Private Investment; Investment of the companies

IBGE = Instituto Brasileiro de Economia e Estatística

K = Capital (way of production)

L = Labor (the Human Work)

LRAS = Long Run Aggregated Supply

NR = Natural Resource

NX = Net Export

OECD = Organization for Economic Co-operation and Development

QE = Quantitative Easing

r = revenue of the families

UBI = Universal Basic Income

USD = American Dollars

w = Wages

Y = GDP

Y or "q" = OutPut

1. INTRODUCTION

Recently, the rise of automatization and robots has inflamed the discussion on the effect expected increase in the technology and productivity can have in jobs, and not necessarily only low-skilled ones. Authors such as Harari(2018) claim that this will represent an unprecedented change that will destroy many uncalculated job position. While others have ideas like automation just create job positions more than eliminated old ones. Therefore, this idea that technology creates more jobs is no longer valid, as we want to show in this dissertation

In a context of job destruction, there emerges a problem: where will the income needed to consume and purchase the products that are manufactured by the companies that own the robots? Many authors have come out with an answer: a Universal Basic Income (UBI) will have to be given to all who are pushed out of the labor market by automatization.

This thesis builds a simple theoretical model to represent an economy where technology grows at a high rhythm leading to the destruction of job vacancies. We discuss how this can cause income to decrease, undermining the demand for goods produced by robots. To contradict the decline in demand, it may be necessary to introduce a UBI.

The research questions chosen were:

In a much more productive world fueled by unstoppable technological improvements and with fewer job positions available, would it be possible to settle a Universal Basic Income (UBI) responsibly? And how could it be done?

The Hypotheses underpinning this question is:

It is possible to settle an UBI, but it will depend on the features of the country where this is done and on how much this income would be, especially in what future moment it will be. It should be done at the crucial right moment to

maintain the equilibrium between the aggregate supply (AS) and aggregate demand (AD). The economic and social authorities should carefully determine the right moment to settle the correct income value to keep the AS and AD equilibrium stable avoiding deflation and/or a high unemployment rate.

A ballastless currency works as a public debit but with no term for payment and no interest rate. So there is no properly a debit to be paid by the government in the future.

Another question would be, in a world where the currency is no longer ballasted in any metal but is just fiduciary (no metal as ballast), would it be possible to settle an UBI that does not increase the public debt?

The Hypotheses for this question is:

The currency was ballast in gold; since the Vietnam War, the currency became no-ballasted in metal, however still ballast in some kind of confidence about the state that issued such currency. Thus, the limit of monetary expansion is based objectively on each economy's capacity to deal with such money (it implies maintaining an outstanding balance between AS and AD). Nowadays, Quantitative Easing (QE) has shown that monetary expansion does not necessarily mean inflation and that sometimes this economic policy becomes essential to keep the previous equilibrium and sustainable growth.

Our results show that the lack of a necessary AD or this reduction may cause a deflation process. For this reason, the UBI is necessary to maintain this delicate equilibrium of AS and AD.

The remainder of this dissertation is organized as follows. Chapter 2 provides an overview of the context, shows where we are and how society is dealing with this. Chapter 3 is a theoretical framework and papers reviews when it is possible to see what some papers or others studies have already researched and concluded about this subject; Chapter 4 is about methodology and dates where it is possible to have more details of the theoretical scenery was based in to project a future,

Chapter 5 shows the results of the research-based in what has been shown. Finally, the conclusion shows the hypothesis if it was true or false, personal analysis of the content concludes with appointments about misunderstood questions and points for further researches.

2. OVERVIEW OF THE CONTEXT

Technologies have been increased a lot, especially in the last few decades in a world with such already great developed technology. As a result, it is widely known that many jobs have vanished, and other jobs have emerged.

However, until the years past, we just had seen a replace of jobs, like carter drivers becoming car drivers. It means one old job becoming one new job. Just replace the work from one job position to another job position. The staff just have to learn a new skill, and everything else goes on with no reducing of the human labor force.

Until now, the development has been significant to humankind, but it does not seem to continue to be as great as it has been. Concerning this example of the replace are carters drive to car drivers Harari (2018) adds that, in a not very distant future, the cars will be autonomous. At this time, it will no longer be useful to develop a new skill to maintain a job position, and human workers will be get rid of as the horses were during the period into car transition.

From the perspective of labor economics, it is possible to see that work, the fact of having a job, plays an essential element in the lives of each one and their family and plays a relevant position inserted in economic growth and maintenance of daily living expenses.

In the near future, it may be possible to see such news forms of insertion of the people in the economy by reason of the disruptive changes, like with the creation of brand new job positions that never had existed before.

The reason for the existence of economic organizations and rules is to provide wealth, not just for a few persons, but for the whole society. So, studying about what will happen to the less privileged mass of the people matters. A high unemployment rate is bad for the whole system and worse for a family's daily life that it depends on economic conditions.

According to macroeconomics, at each moment, the level of production and unemployment are connected and depend on confronting aggregate demand (AD)

and aggregate supply (AS). Aggregate demand represents total planned expenditures in an economy and is the sum of private consumption (C), private investment (I), public consumption (G), and net exports (NX), that is, the difference between exports and imports and can be represented as

$$Y = C + I + G + NX \quad (1)$$

Where Y represents GDP.

The long-run aggregate supply represents total output produced by firms using inputs such as technology (A), natural resources (NR), labor (L), and capital (K). On aggregate, this would amount to total GDP and can be represented as:

$$q = A(NR, L, K) \quad (2)$$

The equilibrium between supply and demand determines output and, consequently, employment.

In the big picture, may be able to say that a Universal Basic Income (UBI) is fundamental to maintain a decent life for those who are no longer available to set a new job position. By this, the inflation pressure will not be seen once the UBI may just replace the wage before earned for those who now cannot get a job anymore. As will be shown, a jobless future is not a question of if it will happen but is a question of when it will happen and up to the society to deal with it providing reasonable welfare to the population.

Self-service has become more popular even if people no longer perceive it. Some decades ago, people had to go to the bank and speak to the institution's employee to check the bank account and do a simple bank transition. Now, it is just needed to use a personal mobile phone. Nevertheless, it is faster, easier, and cheaper to use the mobile than go physically to the bank in this case and others. However, after this just rhetoric question, what going to be of the bank workers?

The bank goes to donate the wage saved of bank workers not hired or the bank going to improve the profit rate? Pretty easy to say the profit rate will raise in contrast workers that will have no job.

By this already seen scenery of disruptive change in the job market, it is possible to wonder: who will receive the benefits of the technology? Society has considerable inequality, and by this, it may increase the gap of inequality with poor poorer and riches richer. More technology, by itself, does not seem to solve this trouble.

With less wages, aggregate demand tends to decrease, which eventually leads to a reduction in the "y" level and a new equilibrium point between aggregate supply and aggregate demand. Finally, the firms that have benefited from technology in order to reduce their personnel costs end up having problems when several firms do the same. For this reduces the mass of consumers with the money to maintain the previous level of consumption in an economy.

It may be quickly clear to see that the inequality may reach a most unwished level with part of the population with no job and others much richer than already used to be.

Also, considering the contemporary world, it is impossible to bypass the fact that the world's financialization has become more present in everyday life, just live automation is.

As a relevant case of modern financialization, we can see the case of Japan. Since the crisis of 2008, the occident imported from Japan the idea of making a Quantitative Easing (QE). Notwithstanding there was threats of inflation made by the idea that a significant emission of money could raise inflation.

Once the money was, in a big picture, given to the big players and applied in the production sector, helping to improve the production growth of AS (Aggregated Supply) shows a reason why QE was not so inflationary. Meanwhile, another part of the money was applied in the capital market that helped raise the price of the stocks.

By this precedent worldwide known, may we admit the world economy will not face inflation crises even if QE is settled as a form of public policies to help afford the UBI for whose need it once the AD curve already tends to go left with more unemployment.

New technologies make new sceneries, and these new sceneries come together with new problems or strengthen and update old problems, and these new problems may just be solved with new solutions that never had been needed before.

One of these old problems strengthened and updated by automation is the rise of inequality that is still a great problem for humankind to solve. However, UBI may be the only solution to provide dignity for all independently of where the money comes from.

When people think about inequality, may the picture that comes to mind is about a lack of money, whomever the words have never been so wealthy, the GDP per capita, according to Word bank (2020), is around 10.925 USD yearly, so it is about 910 USD monthly for each person. This value is around the same as the minimum wage of a country like Portugal; we can affirm that the most significant trouble is not lack of money but bad distribution.

May the UBI can work as these policies resettle the misdistribution of income and, in some cases, inject money in a cooled economy.

3. THEORETICAL FRAMEWORK AND PAPERS REVIEW

As a Theoretical Framework, choose papers relevant, and some entire assignments of some recognized authors are demonstrated below.

To Saviotti, Pyka, and Vermeulen (2020), Robots have been increasingly present in the production process. However, with the current evolution of robotics, it is observed that it will be possible to replace a large part of the human labor force more than the sustainable one toward maintaining the necessary balance of consumption. The authors graphically demonstrate in models the relationship between wages and the economic cycle. Authors point out possibilities about what could be done, in the UBI case, in addition to the taxation of machines. They go further and comment on the possibility of multi-occupying people and developing other skills for workers to be able to stay active.

Another article that also has an umbilical connection to the present work is the work of Louise Haagh and Barbara Rohregger (2019). The authors deal with UBI in a particular way, both theoretical aspects, and practical examples. They deal with financing methods, models of UBI projects, and study practical cases.

By Evelyne Huber and John D. Stephens (2014), There is the distribution of income and the redistribution made by the Government in Luxembourg. The GINI of families is analyzed, and the methodology used is the Goldin-Katza hypothesis. It was observed that the main determinants for inequality are: family structure, deindustrialization, unemployment, and education. In comparison, redistribution increases mainly because the population's needs for consumption increase. They also refer to some American public service problems that fall short concerning other prosperous economies, especially the European ones.

Kosta and Novica (2018) see the increase in inequality in rich countries results from a weakening of the unions and a strengthening of the elites. It is also necessary to take into account the changes in the economy that are facing. It is observed that the elite is increasing,

as in the past, hereditary. Furthermore, it appears that the middle class of OECD countries is increasingly concerned with maintaining their standard of living without declining into poverty.

Daruich and Fernández (2021) develop in a recent paper a mathematical model is developed that OLG (Overlapping generations models) in which it seeks to observe the following variables to make its balances: The credit market, taxation, and its regressivity, wage evolution throughout life, and the function of productivity over time. Based on the scenario of lifetime view: birth, education, university, working period, retirement, and following death. It was elasticity that should occur regarding the labor market since people will have to reinvent themselves. Finally, it is concluded: "the intergenerational connections play a significant role in well-being. loss: parents substantially reduce investments of time and money in their children's skills and significantly decrease their transfers to them. [...] Motivated by current fears of automation/robotization, we also examine how increased job destruction affects the convenience of UBI. Model automation as an increase in the likelihood of being shocked outside of work. Found that the UBI becomes more active on average for cohorts of adults who are alive when the policy is introduced, with its desire increasing at the level of automation.

To Levin-Waldman, (2018), UBI may be inevitable. As Schumpeter observed in 1975: "the old and the obsolete are replaced by the new and technologically more advanced" - so the mark of progress is replacing old jobs by those looking for more skilled or own machines. Although Schumpeter assumed the displacement of this process would be only temporary, and may no longer be a valid assumption in a world where there is widely spread globalization. We may have reached the point where an UBI is required if maintaining capitalist markets remains our goal. As much as an ideal potential customer seems, it could put an end to the scourge of underpaid work. As workers no longer feel compelled to accept any available jobs, workers no longer are subject to exploitation, and because they work more functioning because they choose, UBI has the potential to force base wages to rise. The level at which it is defined perhaps is determined through the democratic process and represents the collective will of the general public.

Beyond these specific papers, there are many other prominent authors in the area, which is impossible to pass by without getting some of their contributions spread over in many assignments.

Philippe Van Parijs is the most prominent research on this subject in Europe. Based in Belgium, he tends to show the importance of UBI as a Social Justice Instrument, as a tool to maintain human dignity, a way to keep the balance of the whole economics in the future. He started to write about it in the '80s. Nevertheless, as a philosopher, he also has a much humanists view beyond only numbers.

Ladislav Dowbor is a former professor of Coimbra University in 70's years, which is still attentive to the contemporary issue of social inequality and lack of income of the poorest bunch of the global population. He has many collaborations to try to understand this question. His attention to the last wealthy people and worldwide view gives us an honest view of the troubles we are going to face.

Ricardo Antunes is one of the most prominent professors about the question of labor relations in Brazil. He has been studying the “precarization” of the working class for many years, and now he is paying more attention to the phenomenon of the “uberization” that may be based on the extinction of many jobs and the 4.0 industry. His most recent assignment is "the privileges of service: the new proletariat of service in the digital era” (translated)

Suplicy Matarazzo is a former senator in Brazil and the most notorious research of UBI in this country. He has worked a lot on this idea and already in the '90s had proposed an UBI in Brazil, his work has been teaches of this area. He has one of the most notorious fights about concern inequality.

Thomas Piketty is known for his research about inequality also helps to complete the theoretical referential once he clearly demonstrates one of the essential components to support the UBI: Inequality. His massive econometric studies show how the concentration of wealth and revenue has increased and will be very useful to construct the argument of this assignment.

Each of them has many papers which give some contribution to economics science.

Notwithstanding, the comprehension of UBI also passes through the comprehension of MMT (Modern Monetary Theory), which may be helpful to understand how value is attributed to a national currency. Andre Lara Rezende has a vast assignment about the concept this theory of MMT used in this assignment. His studies of MMT show the actual value of money and may make it possible to see that money by itself does not cause inflation, but what causes inflation is the lack of AS (Aggregated Supply). As well as a non-conventional monetary policy, he teaches about monetary emission that is not the guilt to the inflation. Also, he has a robust social influence to fight against poverty.

Stephanie Kelton says about the myth of the public debt, summarized, she says the debt is just an illusion in the MMT era, and the limit for money issue is just the real economic capacity.

In a complementary way, Harari (2018) says money is a "greater fiction of human history" once everyone believes that pieces of paper or digital dates in a bank account are really useful to exchange for services or goods.

To Acemoglu and Robinson in 2013 (Why Nations Fail: The Origins of Power, prosperity, and poverty), the central thesis is that the nations prosper because they have inclusive institutions and the failure because they have just autocratic institutions of the state. So, the state plays a strong variable to make their people get rich or poor.

As a foundation is impossible to skip Gregory Mankiw once he has a strong focus on the bare essential elements of the economic ones are important to develop many complex thoughts and theories. His views are important for this assignment when we study the composition of GDP (especially the consumption of the families) and microeconomic aspect as well.

4. METHODOLOGY AND DATA

This master dissertation is majority theoretical; by this, the exposition of the results will be focused on the theoretical models and how it works that will be able to demonstrate the relevance of UBI.

In a subject like UBI, where the analysis is based in a future jobless make sense not project econometric models based in the past and project to the future once is expected an exogenous shock that break the tendency.

4.1 Question and the Problems

Now to give a big picture of the scenery about concerns of the model will be shown the relevant models related to macroeconomics and microeconomics.

4.1.1 GDP and Wages

As already shown, GDP (y) is equal to the sum of private consumption (C), private investment (I), public consumption (G), and net exports (NX). By this, we can assume that.

$$y = G + C + I + NX \quad (3)$$

The model measures society's wealth in a time period (not an accumulation of wealth –goods–, but shows the trade of it, the flow). It is based on these four factors of exchanging goods/services and money. So it is not about the assets or natural resources of an economy but is about the trade flow of wealth (goods and services), by this reason make clear as a picture of the moment.

An assumed date known is how vital consumption is in the GDP account. In almost all countries, aggregate consumption represents around 2/3 (66%) of the whole GDP product (CEIC DATA, 2021) In countries like the USA, consumption may represent even more than 2/3 of the GDP (68,5% in USA). Consumption is, in the modern economies, the foundation of

capitalism. Exceptions of it would be Luxemburg, Singapore, and others of this kind. Beyond this specific case, we can say that:

$$C \sim \frac{2}{3}GDP \quad (4)$$

It is crucial to understand how households get money to afford their daily life spending. Which implies understanding where does the revenue of the families come. It can be seen in this model:

$$C = \theta \cdot (c + r + w) \quad (5)$$

θ = coefficient of consumption

c = Credit

w = wages

r = others revenues (like dividends, rents received, and others)

Standard people tend to spend according to their wages; just exceptionality, they take a loan. Many families do not have any additional revenue beyond their wages. The most significant part of the families lives of no more than the revenue they receive from their profession of workers of his member. By this, we can assume.

$$C \sim w \quad (6)$$

After this, we can see how wages maintain the economies and how vital it is to the GDP. Nowadays, it may be relevant to look at the macroeconomic and how it makes sense in the argument of the relevance of the Basic Income.

4.1.2 Output Production and the Future

This equation can show the output (Y)

$$Y = A(NR; L; K) \quad (7)$$

A = Technology

NR = Natural Resources

L = Labor

K = capital

This equation states that at a macroeconomic level, production is the result of the use of inputs available in an economy. It is widely known that technologies have been developing daily by this we can express like this:

$$A^{t+0} < A^{t+1} \tag{8}$$

The perception of the development of technology is accurate. There are many examples that show it. According to Gordon More (1998), the technologies used to double within two years (but is no longer valid); however, it keeps developing.

All along humankind's history, we have seen the development of technologies. Since the arising of ancient society, like the Egyptians passing by Greeks and Romans, technology has developed almost in a linear progression; of course, there are some exceptions, like the middle age when technology did not evolve considerably.

However, since the first industrial revolution, may the technology has no longer follow a linear progression but exponential progression, because in the last two hundred years, what has been seen is a great development of all kinds of technologies.

The scenery from here to forward might look quite similar because, with more investment worldwide in science and technology with investments from the public sector and investment from the private sector, the logical consecutive is the increase of technologic which can be represented like this $A^{t+0} < A^{t+1}$

Assuming hypothetically that "K", "NR" and especially "Y" are constants and identical in present time (t+0) and in the future time (t+1), we have:

$$K^{t+0} = K^{t+1} \tag{9}$$

$$NR^{t+0} = NR^{t+1} \tag{10}$$

$$q^{t+0} = q^{t+1} \tag{11}$$

The reason of the chosen of NR (natural resource) may be considered in this assignment as constant in the present and in the future is because with the trouble of global warming and all other kinds of troubles amplified of the half environment may not be possible to use more NR in this equation. It is possible that many natural Resources we frequently use in our daily life become much scarce. As well, arable lands have almost reached a limit of expansion. Project a scenery with more extensive use of natural resources, it means $NR^{t+0} < NR^{t+1}$ would be naïve, one for the environmental issue another for the political issue. According to Food and Agriculture Organization has for many years alerted about the new canary of lack of natural resources in the pretty near future.

The “K” (Capital) has been chosen to be constant in the present and in the future because it is related to the fact of the stability or even in the degrowth of the population (except for the Islamic world and poor parts of the African countries). Based on this fact, it may no longer be necessary to make the capital bigger than it is now.

Capital represents the equipment, the way of production of some sector, like in a car industry “K” would be the factory, the internal equipment of this company. On a farm, "K" would all stuff used for gliding and harvesting. Even if it is needed to update this equipment with new technologies, the capacity of production of this would not have to modify once it is supposed to keep "q" or “y” (output) constant.

The reality of population is a notorious data. When in the past people was afraid of an increasing exponential of the population within an only geometric growth of the food production, nowadays, no one more is afraid with the population growth of many countries, in the other way around, the struggle is about the degrowth of the population like Portugal, even before CoViD19 decreased the population in 0,39% in 2019 according to UN.

The “Y” (output) has been chosen to be constant in the present and in the future because the exact reason of "K" and "NR" was chosen to be constant. However, in a much detailed point, "Y" is constant in present and future because an oversupply in an economics would affect the equilibrium of AS and AD. This imbalance with an over-supply more than an appropriated demand would cause a deflation crisis (decries of the prices) and GPD (y) reduction.

Just working with this equation “ $Y=A(NR;L;K)$ ” where “ Y ,” “ NR ” and “ K ” are constants and just “ A ” and “ L ” can be changed, it may be assumed that this will show the future of this:

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (12)$$

It is possible to see that human work in the future tends to be reduced. The output, meanwhile, will stand at the same level or even more prominent than it used to be in years past.

With the new industrial revolution (industry 4.0) and the most developed technologies, jobs will be as rare as never before had been. However, many examples prove it is not just theoretical, but it is true-to-life and has been seen in the last few decades, but will be even much unmistakable in the future.

So, on the one side we have aggregate demand given more significantly by the private consumption (C) in: $Y = C + I + NX + G$ and on another side we have aggregate supply depending on inputs: $Y = A(NR;L;K)$. Consumption depends firstly on wages that are obtained as a return to using labor in the production of output.

Again have the reference of $A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1}$. It is necessary to get an alternative to get the maintenance of the economy with a mass unemployment rate.

Outthought as a base of UBI is economic, may as relevant as the economic, is the social part. However, it is necessary to get some way to afford a way to set it.

4.1.3 Contemporary Currency and Modern Monetary Theory

The first international reference currency was gold. It was the gold standard. Years after the dollar-gold standard, it has replaced the old international reference for exchange. After Vietnam’s War became a dollar-dollar standard. By this moment, the currency had no ballast in gold; the ballast would be more moral than real.

The ballast changed from metal guarantee to ballast more subjective, like the size of the economy which issues such currency, military power, diplomatic relations, national industries, and technologies. The uses of the currency are wealth stored, count unit and way of payment, by this there is no necessary limit to issue more money, the only limit is the capacity of the economy to deal with this new money printed with a suitable aggregated supply.

Lara Rezende also refers to a currency like a public bond but with no interest to be paid and no expiry date, by those the only limit to the monetary expansion would be the capacity of the economy to absorb this money without generating inflation rate. (M0, M1, M2, M3, M4, and M5)

4.2 Common Issues, Relevant Points to the Construction of the Methodology

After a review of the literature, many common points have been shown by some of the papers or, for a considerable part of it, could stress more:

- **Raise of Inequality:** It means that it is not an economic issue but a social question or a question of social justice; more people are losing their standard of life as they used to have just a few years past.
- **Structural Unemployment:** What could be done to solve that? How could help the people still spending even if they have no more jobs?
- **The imbalance between Aggregate Demand and Aggregate Supply:** Fewer jobs, consequently fewer wages, determine less money to be spent. So, at least, we will probably have, if not, an imbalance in AS (Aggregate Supply) and AD (Aggregate Demand) reduction of the size of the economy where they will equilibrate in a lower point of Figure 1.

Also demonstrated in Figure 1 is a LRAS line that shows the long-run equilibrium of AS and AD. This is the theoretical equilibrium of AS and AD that is sought by the economy.

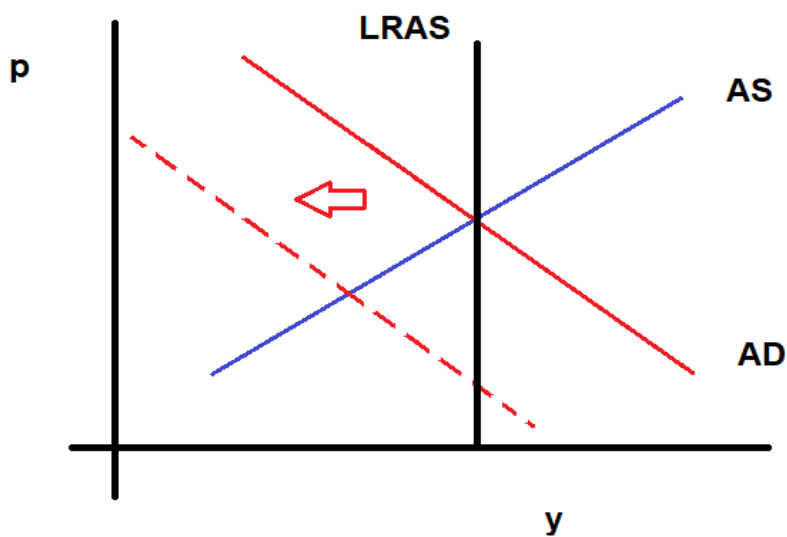


Figure 1: equilibrium between aggregate demand and aggregate supply (Source: author)

4.3 What Is the Gap in this Issue?

The most prominent gap about this issue concerns whether it would be possible is settled in the whole world (poor countries, rich countries, and developing countries) the issue of a structural unemployment and how countries would be able to deal with it if the debit or the monetary emission could be useful to support this kind of program as UBI.

A great issue refers to the fact that human work be unnecessary is not a reality yet. Notwithstanding, models show that in the future human work will be useless; even if nowadays, it still is relevant.

In a different mode than chemistry or physical science, sciences like economic and history have many limitations to test their hypotheses. There is no laboratory where we could test and replies this test at another time in another place.

By this, what could be done in this dissertation concerned about keep thinking about how the future will be like with an economic model to try to project how the scenery of a jobless work will be and how public politics could support this new reality.

As shown in Figure 1, industry 4.0 may be a trouble to keep the balance of AS and AD putting the AD line more to the left.

May at the first time the industry (it means, all sectors of production of an economy) will experience a great benefit of reducing expenses in wages and be able to lift profit rate, meanwhile, the unemployment rate will start to rise, and the population unemployed will no longer be able to settle a new position as a consequence of it, in the long term view, the industry will also suffer from this because the consumption market will drop dramatically.

4.4 Other Methods of Analysis

It is necessary to recover the history to check if something like it has occurred in the past. Then make forecast *ex-ante* by an analysis *ex-post*. May, for this case, will not be possible to use econometric data because may there is a lack of precision and sometimes even are not available or so challenging to find it. For an *ex-ante/ex-post* analysis of a scenery that happened years ago is necessary a historical context to set in on the discussion.

4.4.1 Proto-robotization in the Past the Case of Brazil Slaves

According to Cortela (2016), the etymology of slave comes from the proto Slavic language (something like the old Russian language). Thus, the first slaves in Europe used to be the Slavic people, and there has come from the root of the word slave in English and in many other European languages.

Important to pay attention that slave in proto Slavic language was something like "robot." Even nowadays, in Bosnian language and Servian language, the word for slave is "rob."

About this, we can have the idea that robots nowadays work as the slaves used to worked in the past, demanding the bare essential. Now we have no more human slaves, but going to have an autonomous machine that does not receive a salary to spend in the economy.

May is possible to make a comparison between contemporary industry 4.0 and the old slavery because there are many semblances that may be useful to understand whom society deal with it in the past.

4.4.2 UK and the Slavery Worldwide Extinction

The black slavery in Brazil occurred between 1500-1822, made by the Portuguese government, and 1822-1888 supported by the Brazilian government. In 1888 it was abolished entirely.

As told by Laurentino Gomes (2019), around the years 1850 until 1888 started a great movement worldwide to abolish slavery. The United Kingdom captained this movement. The bigger goal of the UK was not to abolish slavery for humanity's reason but do it so, mainly because slave works have no wage, so they are not able to afford buying manufactured products. It also had a makeup of human rights protection, but, indeed, it was not. Even in the XIX century was already observed how necessary is paid labor to the found and growth of an economy.

If we make an *ex-ante* / *ex-post* analysis of the case of slavery in Brazil with the parallel of contemporary world robotization we can see that the similarities are not negligible.

Nineteenth century English economists realized that contemporary capitalism is based on the consumption of a considerable part of the population, and that slavery would be a major obstacle to having Brazil as a large consumer market for English manufactured goods.

As happened in time past, when the British government forced the world to abolish slavery to increase the private consumption with paid workers and avoid an oversupply, now may something disruptive like this (Economic Policy) will happen to guarantee some kind of protection for the consumer's continuum to be able to afford to spend.

In the end, reality imposed itself. Not only for humanitarian reasons, but also for economic reasons, since it was impossible to sustain the growth of a country without internal consumption, which was reduced by the considerable number of slaves in the productive sector.

5. RESULTS OF THE DISSERTATION

As a theoretical dissertation of Master's degree, the results of the research also will be theoretical but based on the reality and the facts

The most notarial result reached concern about this:

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (13)$$

If we still working on this idea of $L^{t+0} > L^{t+1}$ and also keep watching in mind the idea that $C \sim w$ has already shown but this:

$$C = \theta \cdot (c + r + w) \quad (14)$$

$$C \sim w \quad (15)$$

We can conclude that "w" (wages) plays a robust correlation with "L" (labor) because the only justification for a corporation to hide unemployment is to get the results of his work and do not do that just to pay a salary to the unemployed.

May had already been clear that the future would bring us a jobless moment.

As already shown is important to have a look again at figure 1.

With fewer jobs will happen what is shown above, less salary less Aggregate Demand, so the point of equilibrium will be settled in a lower point in the left of the graphic in a lower point of the yield- GDP (y) and lower point in the price (p).

By itself, technologies reduce the cost of production. The reduction of the cost of production by itself tends to create a deflation trend.

May there is a reason why UBI be necessary to stop a deflation trend. Furthermore, sometimes even used to get the desired inflation rate in the projected of the central bank.

It is possible to see another example in Figure 2

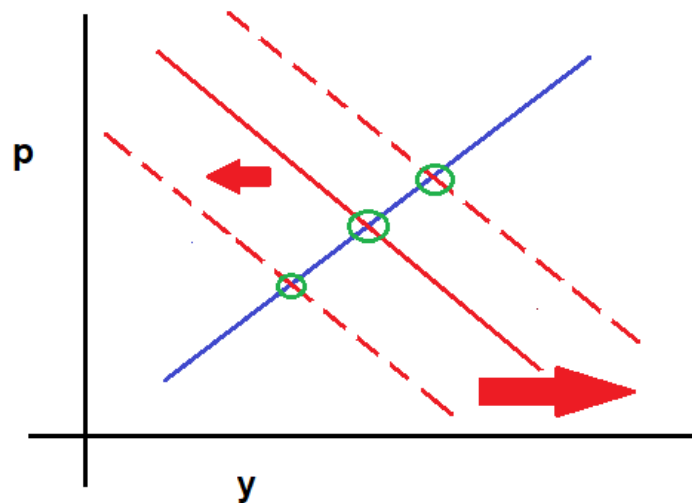


Figure 2: new points of equilibrium of AS and AD (source: the author)

If we have a look at the first arrow pointed in the upper part of the dashed line at left, it represents what a lack of jobs will cause in the economy by the reduction of the wage mass.

Automation, as already told, tends to move the AD to the left and made a new lower point of the yield - GDP (y) and price (p)

On the other hand, UBI tends to put more liquidity into the economy, so as a contra point of the movement of the AD going to the left like shown above. So UBI may move the life to this point also dashed but in the right part of the graphic creating more ways of private consumptions.

Also, by the LRAS line, the central goal in this graphic is to maintain a stable the " p " and the " y ", even if just in a theoretical field.

Central banks do not want to eliminate inflation. They just want to settle it at a rate around a projection that generally tends to be worldwide around 1-5% yearly. (OECD, 2021). A controlled inflation rate, always positive, never negative, is good for the economy, and UBI can help with that.

UBI is not a conventional polices. Instead, it is an alternative to keep growing the economics in momentous of low growth.

When prices go to the left and down, the lower point of the graphic, UBI may be a great alternative even better than reducing the interest rate of public bonds, especially now with many bonds with interest rate negative, when there is no more logical space to reduce it.

5.1 Equilibrium of A (technology) and L (Jobs)

To demonstrate it may, we can make a theoretical graphic developed by the author of this dissertation in Figure 3.

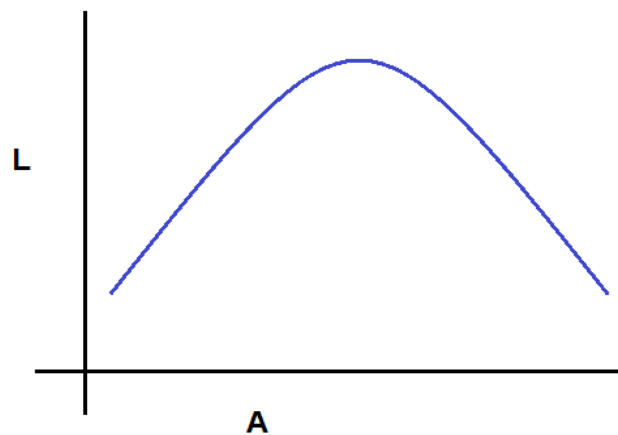


Figure 3: Probable Correlation Between A and L (Source: the author)

L represents labor – jobs- human work-

A represent technology

According to the result, $A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1}$ may be possible to design this graphic shown above especially in the part of reducing of human work (exactly demonstrated in the part of the middle do the right in figure 3 and figure 4).

Also, the first part of the graphic shows a different result. It is an upper line more technology (A) creates more jobs (L).

This Upper line was thought because some authors just say technologies only create new jobs position as an example when people started to use cars in instead of horses this process created many jobs position like in the car industry of production, gas industry (whole chain of petrol) machine and engineering jobs and education to them and so on.

For this reason, an up line until the middle and then down the line from the middle high part do the right part. Just like a parole line, let us have close attention to that in Figure 4.

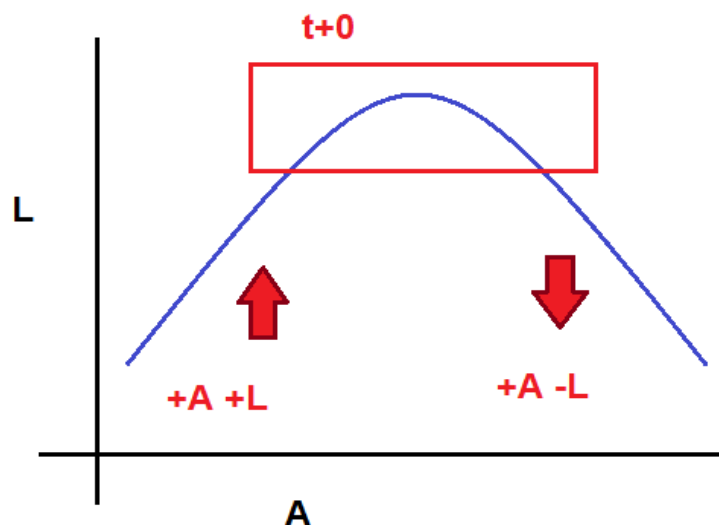


Figure 4: probable correlation between A and L with temporal indication of the present time somewhere in the red indication. (Source: the author)

Technology was not the most significant issue of job killer in the world in the past time, but from no (t+0) to the future it may become, and in many industries, it is possible to see how big the impact already has been made on labor positions.

In Figure 4, the author tends to imagine we are at this point marked in $t+0$. From here to further, technology will destroy jobs and do not replace them anymore and, above all, maybe the most significant challenge to humankind will face in all history.

May we are not precisely in the middle, it tends to say we are already a bit to the right of the graphic because there are many dates that may prove this. It is possible to see many examples in the reality of extinguished jobs that do not be replaced by a new position.

5.2 Jobless by Technology

All industries need labor force to produce their output, however, they have been reduced as we can see in some examples.

5.2.1 Agriculture Sector

As the main example, it is possible to see the case of employment in the agriculture sector in Brazil. According to Brazilian National Public Statics Center (IBGE), from 2012 to 2020, around 1,8 million jobs positions were lost in the agribusiness in the country.

Just in 2019, 174 thousand jobs in agriculture area industries were eliminated in cooperation to 2018. But, on the other hand, the productivity of 2019 was 2,39% bigger than the former year.

From 2012 to 2019, 1,8 million jobs position was lost. It represents 17.2% of reduction of workers force in this area meanwhile the agriculture productivity raised 4.3%, and cattle farming raised 8,1%.

May, it proves, as shown in the parabola in Figure 4, that A (technology) and L (jobs) may really be in the second moment when job has been lost forever. As another struggle of the

high use of technology in agriculture mass production is the fact they generally only the big and rich farmers can afford it. So it almost always tends to raise the level of inequality in the rural sector.

5.2.2 Financial Sector Example of Employment Reducing

According to the statistic department of Unions of Brazil (2019) (DIEESE- departamento intersindical de estatística e Estudos socioeconômicos), in 2018 there were 450 thousand workers in the bank sector, and in 1990, this number used to be 732 thousand words in the bank institutions back office and agencies.

Important to mention that this date includes works of all kinds of banking institutions which also may include some bigger fintech because the most notarial of these fintechs are registered as a bank. It shows that even if new jobs have been created in the industry of banking, it has experimented a reducing undoubted

Other relevant information settles about the GDP growth a lot and also the population as well as can be seen in Table 1 below.

Table 1: GDP, Population and Bank Employeess

	Year 1990	Year 2018	Δ%
*GDP	1.568.593	3.007.877	+91,76
**Population	149.003.225	209.469.320	+40,58
***bank employees	732 thousand	450 thousand	-38,52

- . * Source: Fred Saint Louis Real GDO at constant prices in US Million Dolars
- . ** Source: Fred Saint Louis
- . *** Source: DIEESE (departamento intersindical de estatística e estudos sociais)

By this is clear the effects of technologies in the job market. Even with population growth and GDP growth, both at a high level and length, many sectors just are losing job positions meanwhile growing. It means it is a growth jobless.

5.2.3 Manufactory Center with much fewer Workers

One notarial case of a high-tech manufactory in Austria. According to the Financial Times (2021), this plan will count with ten people on the factory floor. This reduced number of only ten workers is a highly reduced number of employees for a factory. It just functions as another example of reducing the number of jobs.

5.3 Summarization of the Results in the Theoretical Models

Already shown in the graphic is important to put it again it makes much clear putting Figures 1 and 2 together as in Figure 5.

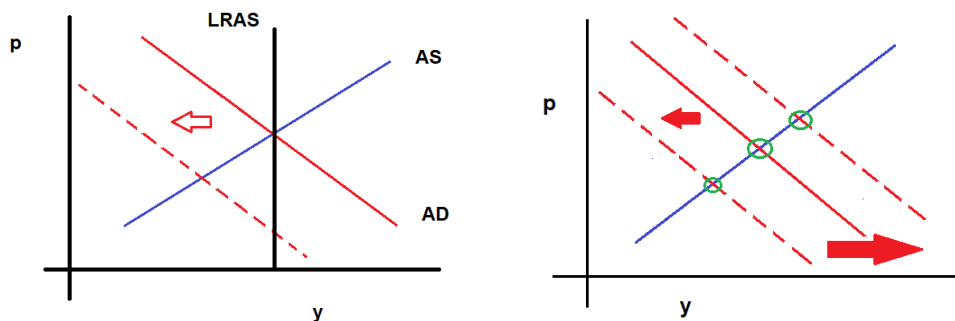


Figure 5: Equilibrium between aggregate demand and aggregate supply (left) and new points of equilibrium of AS and AD (right) when is possible to see the new point of equilibrium (source: the author)

By this, we can say one important goal may be:

$$(AS \text{ and } AD)^{t+0} = \text{or} \sim (AS \text{ and } AD)^{t+1} \quad (16)$$

Important to pay attention to the LRAS line, which can demonstrate the theoretical goal of remaining stable AS and AD, which not always can be possible; however, we could also say:

$$LRAS^{t+0} = LRAS^{t+1} \quad (17)$$

Considering private consumption (C) the most prominent point to maintain the AD (agreed demand) and “Y” (output) the most prominent point to maintain the AS (aggregated supply)

We can express like this.

$$C^{t+0} = C^{t+1} \text{ and } Y^{t+0} = Y^{t+1} \quad (18)$$

Also assuming:

$$C = \theta \cdot (c + r + w) \quad (19)$$

θ = coefficient of consume
 c = Credit
 w = wages
 r = other revenues

We can say:

$$[\theta \cdot (c + r + w)]^{t+0} \text{ and } [\theta \cdot (c + r + w)]^{t+1} \quad (20)$$

We also have to assume that:

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (21)$$

And a look at a graphic demonstration in the part of it is Figure 4

If $L^{t+1} < L^{t+0}$, this microeconomics analysis tends to affect the macroeconomics of w (wages)

So, in a full model, we can have

$$[(AS \text{ and } AD)^{t+0} = \text{or } \sim (AS \text{ and } AD)^{t+1} \rightarrow \text{so } C^{t+0} = C^{t+1} \text{ and } Y^{t+0} = Y^{t+1}] \quad (22)$$

$$[C^{t+0} = C^{t+1}] = \{[\theta \cdot (c + r + w)]^{t+0} = [\theta \cdot (c + r + w)]^{t+1}\}$$

Also

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \rightarrow \text{so tends to } w^{t+0} > w^{t+1} \quad (23)$$

To remain = must have $r^{t+1} > r^{t+0}$

By this, we can explain the main importance of UBI. Once the amount of salaries reduce, to remain the private consumption is important to increase other revenues the people receive in order to maintain theirs expands contributing to the maintenance of AS/AD.

6. CONCLUSION

In a summarized view, we could say that in a jobless world, which seems to be the future, to keep an acceptable balance between the aggregated supply with its respective aggregated demand, an UBI is a must.

The tag questions have been confirmed.

A growing aggregated supply (caused by the new technologies, makes everything faster and cheaper with fewer workers) combined with a decreasing aggregated demand (by workers on the dole) will result in a scenery where the poor share will become poorer, and the rich share will also become less prosperous or even impoverished because of they have no more consumption to stand what they sell. Thus, it will be a vicious circus of poverty.

As shown many times by the model, it is hard to imagine a different world that's not with such kind of an UBI.

Another issue strongly related with the tag questions is about Quantitative Easing or other kind of monetary expansion to keep the stability and equilibrium of AS and AD once it may not cause inflation because will just replace salaries for such kind of whose ones used to received wages and by the families by the time, they start to face the emergence of job-wageless life.

Even with all this upcoming emergence of a real need UBI, nevertheless, each society has its own struggle problem.

As, if we have a look nowadays in Europe all talk about environmental questions as the big issue that afflict society.

In the Americas, one of the greeted issues of debate is about gender, LGBT+ rights, and black lives matter (civil rights for black people). This agenda is so strong in countries like the USA and Brazil.

In Africa, the question may be the issue of decolonization studies and how it affects the presence of the continent.

Each continent at this moment has there one agenda; however, the question of UBI is not central in nowhere now, even if it should be considering the global emergency that will be faced for structural changes with disruptive technologies.

Beyond all this, CoViD19 is still a relevant cause for concern, until now, in the whole world. A very contemporaneous and global cause.

According to the Brazilian wright Nelson Rodrigues, this has a good quote that can be fitted in this context. : “just the prophets can see the future”. May, after these studies, we are able to say now we can see the future not because we are prophets but because we look with attention to the obvious. It is scary how this subject has been neglected by the mainstream politics, with just some exceptions.

Even with this upcoming emergence, there are already many people who will keep saying it is impossible to set an UBI.

It remembers Greek mythology. Exactly the Drama of "Edipo King" written by Sophocles; there is a character called Ismene. Ismene once said: "The impossible should not even be tried." In a reverse analogy, we could say that the impossible is that the UBI does not become a reality soon.

May Ismene would say now that the impossible that we cannot try is not set a UBI.

Another trouble UBI may be concern about is the fact that many people may have some resistance to this idea of someone receive money and do not have to work for that.

For whose insist in say UBI is not correct once the people did not work do not deserve to receive anything. It resembles such elite view of the reality may from people of other time when it was easy to get a good job.

Simone de Beauvoir says: “The oppressor would not be so strong if they did not have so many accomplices among the downtrodden."

It is possible in the middle or even short period of time the society pay more attention to this issue which may be soon central theme of human life.

Our way of thing life will change dramatically. The idea of studying and getting a job will stay in the past because never more people will have a job.

The condition of life of each one will depend very much on which country this person lives or have citizenships, and of course the previous asset they have.

Developed countries like the Europeans ones will be in the vanguard of the defense of UBI, and more Europe resembles to be the best place to live when it happens, once EU countries have a tradition of providing social rights and benefits for their citizens.

Theory models or econometric models generally tend to go wrong once it is impossible to ponder all variables, especially because there is some disruptive exogenous impact imponderable.

However, if nothing else stops the cause of the development of technology, there is no different scenery to project than this.

A universal Sabotage to stop the development of technology is not even thinkable because a great part of the capital ("K") of production consists of information stored in the clouds. Sabotage comes from the French word "sabot" in English; it means clog. Because French workers used it through their clog in the British machines to destroy the other's way of production ("K").

As a close is important to remember Karl Marx:

"The man do these once story. Nevertheless, do not do as they wish, do not do by circumstances of their free choice. Do it with the legacy of the past. The traditional of all death generations oppress as a nightmare the brain on whose still alive."

Furthermore, Ortega y Gasset: "the man is the man and his circumstances."

We did not choose this circumstance, but we have to manage to deal with the new reality we will face by the technology legacy left by old generations.

The new circumstance will need new updated studies to keep watching what will be needed in the future.

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APPENDIX

Equations

$$Y=C+I+G+NX \quad (1)$$

$$q=A(NR,L,K) \quad (2)$$

$$y=G+C+I+NX \quad (3)$$

$$C \sim 2/3 \text{GDP} \quad (4)$$

$$C=\theta.(c+r+w) \quad (5)$$

$$C \sim w \quad (6)$$

$$q=A(NR;L;K) \quad (7)$$

$$A^{t+0} < A^{t+1} \quad (8)$$

$$K^{t+0} = K^{t+1} \quad (9)$$

$$NR^{t+0} = NR^{t+1} \quad (10)$$

$$q^{t+0} = q^{t+1} \quad (11)$$

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (12)$$

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (13)$$

$$C=\theta.(c+r+w) \quad (14)$$

$$C \sim w \quad (15)$$

$$(AS \text{ and } AD)^{t+0} = \text{or } \sim (AS \text{ and } AD)^{t+1} \quad (16)$$

$$LRAS^{t+0} = LRAS^{t+1} \quad (17)$$

$$C^{t+0} = C^{t+1} \text{ and } q^{t+0} = q^{t+1} \quad (18)$$

$$C=\theta.(c+r+w) \quad (19)$$

$$[\theta.(c+r+w)]^{t+0} \text{ and } [\theta.(c+r+w)]^{t+1} \quad (20)$$

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \quad (21)$$

$$[(AS \text{ and } AD)^{t+0} = \text{or } \sim (AS \text{ and } AD)^{t+1} \rightarrow \text{so } C^{t+0} = C^{t+1} \text{ and } q^{t+0} = q^{t+1}] \quad (22)$$

$$[C^{t+0} = C^{t+1}] = \{[\theta.(c+r+w)]^{t+0} = [\theta.(c+r+w)]^{t+1}\}$$

$$A^{t+0} < A^{t+1} \rightarrow L^{t+0} > L^{t+1} \rightarrow \text{so tends to } w^{t+0} > w^{t+1} \quad (23)$$

To remain = must have $r^{t+1} > r^{t+0}$

Charts

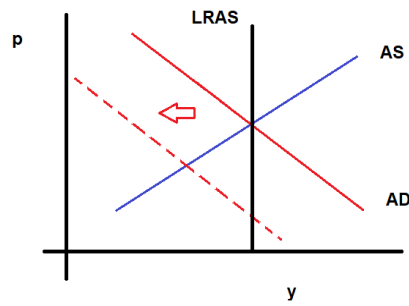


Figure 1: equilibrium between aggregate demand and aggregate supply (Source: author)

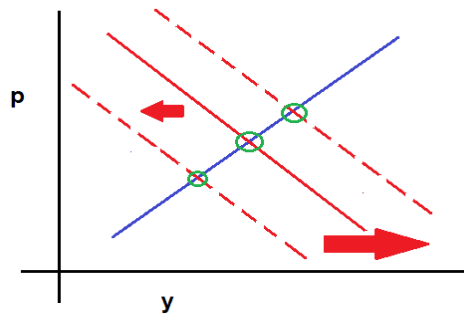


Figure 2: new points of equilibrium of AS and AD (source: the author)

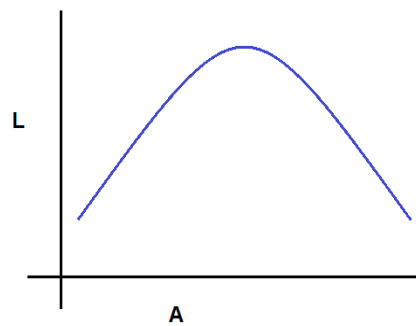


Figure 3: Probable Correlation Between A and L (Source: the author)

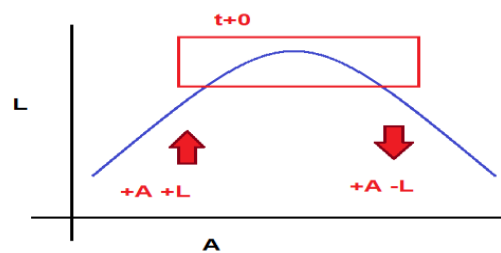


Figure 4: probable correlation between A and L with temporal indication of the present time somewhere in the red indication. (Source: the author)

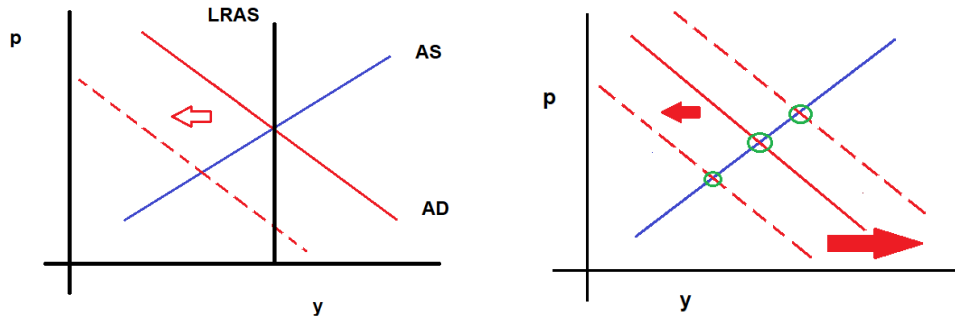


Figure 5: Equilibrium between aggregate demand and aggregate supply (left) and new points of equilibrium of AS and AD (right) when is possible to see the new point of equilibrium (source: the author)

Table

Table 1: GDP, Population and Bank Employeess

	Year 1990	Year 2018	$\Delta\%$
*GDP	1.568.593	3.007.877	+91,76
**Population	149.003.225	209.469.320	+40,58
***bank employees	732 thousand	450 thousand	-38,52

. * Source: Fred Saint Louis Real GDO at constant prices in US Million Dolars

. ** Source: Fred Saint Louis

. *** Source: DIEESE (departamento intersindical de estatística e estudos sociais)