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Severe Recession with Inflation: The Case of Brazil¹

September, 2020

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Abstract

Severe recessions usually occur in the company of deflation. However, Brazil displayed atypical results in 2015, with a severe recession and double-digit inflation at the same time. Fisher (1933) delivered the classical explanation for severe recession and dramatic price level variation. Inspired by Fisher's model, we elaborated on an explanation for the case of Brazil. The country displayed the essential elements of Fisher's model: debt disturbances and price-level disturbances. A contractionary fiscal policy triggered the recession, and once contraction started, the price level moved upwards dramatically. Among the government's spending cuts were subsidies to intermediate inputs. Once the prices of these inputs increased, the general price level followed. In the presence of a recession, nonfinancial corporations saw their costs soar. As a result, they could not entirely pass on the rise in production costs to retail prices. With fewer revenues and smaller profits, production was discouraged. The over-indebted companies decided to use their available resources to pay off debts and avoid bankruptcy, instead of increasing production. Thus, we concluded that a specific type of inflation and the companies' over-indebtedness could severely aggravate recession.

Keywords: Brazilian economy; recession; inflation; cost-push inflation

JEL: E30; E31; E32

Introduction

Severe recessions usually occur in the company of deflation. During the Great Depression in 1931, Great Britain had a recession of about 5% and deflation of more than 4%. In the same year, the United States experienced a recession of almost 6.5% and deflation of almost 9% (BLS 2019). In 2009, Portugal experienced a 3%-recession and deflation of 0.8%. That same year, Spain experienced a 3.6%-recession and deflation of 0.3% (World Bank 2019). Other countries have also experienced severe recessions with low inflation recently (e.g., the United Kingdom in 2009).

However, Brazil displayed atypical results in 2015, with a severe recession and double-digit inflation, where the decline in GDP was almost 4%, and inflation reached almost 11% (IBGE 2019).² An unprecedented scenario, with unexpected results. Fisher provided the classical explanation for the occurrence of severe recessions and dramatic price level variation in his well-known article "The Debt-deflation Theory of Great Depressions" (Fisher 1933). However, the author explained the recession in the presence of deflation, so another reference was needed to help explain the recent case of Brazil.

Inspired by Fisher's model, we have suggested an explanation for the Brazilian case. Although facing inflation, Brazil displayed the essential elements of Fisher's model. The country went through a recession process featuring two elements Fisher called "big bad actors": debt disturbances and price-level disturbances. Companies in Brazil were facing over-indebtedness, while a few specific prices increased extraordinarily.

In Fisher's model, deflation results from entrepreneurs' attempts to find buyers for their goods and revenue needed to pay off their banking debts. A fall in prices, however, causes debts to increase in real terms. As the real value of debts increases, desperate

² In 1981, Brazil faced a severe recession of 4.25%, with a yearly inflation rate of around 100% (IBGE 2019). Such a case does not bear any resemblance to what happened in 2015. From the mid-1960s until 1994, the Brazilian economy lived under a high inflation regime, where the relationship between inflation and output was unclear or rather tenuous. In a high inflation regime, changes in relative prices become autonomous and are nearly related, to some degree, to their past and expected changes. For more details on the high inflation regime in Brazil, see Carvalho (1993).

entrepreneurs reduce even further the prices they manage. The fall in revenues and profits, combined with an increase in the real value of debts, discourages production. This way, the economy would slide from recession into a depression.

A similar phenomenon happened in Brazil in 2015. Recession reached Brazil initially triggered by government policies of expenditure cuts aimed at reducing the budget deficit. Once contraction started, the price level moved upwards dramatically. Among the government's spending cuts were subsidies to intermediate inputs (electricity and diesel fuel). Once the prices of these inputs increased, prices followed in general. In reaction to this, the Central Bank of Brazil (CBB) raised the base rate (Selic rate) to control inflation. Consequently, the interest rate on short-term credit for production also increased.

Facing recession, Brazilian firms saw their costs (intermediate inputs and interest rates) increase. Due to the recession itself, they could not entirely pass on the increase in production costs to retail prices. With fewer revenues and smaller profits, production was discouraged. To aggravate the situation, the over-indebted companies decided to use their available resources to pay off debts and avoid bankruptcy, instead of increasing production. Therefore, in Brazil, the recession was quite severe. Some authors suggest that the Brazilian economy may have slipped into a depression, like the former president of the Central Bank of Brazil, Afonso Celso Pastore (see Pastore et al. 2019).

We have built an approach inspired by Fisher's model to explain the Brazilian case. Similar to what happened during the U.S. Great Depression, as Fisher explained it, in 2015 Brazil, price level variations are crucial to the deepening of the recession. In both situations, firms were over-indebted and decided to pay their debts when faced with uncertainty and hardship to generate revenues. In Fisher's model, business owners are the ones who pull the trigger on prices, but in Brazil, it was the government that did it. In both cases, price dynamics, production decisions, and the attempt to liquidate debts have led to an acute worsening of the recessive scenario.

Fisher named his model the debt-inflation, while ours can be named the debt/cost-push inflation. Whereas Fisher stressed the relationship between deflation and corporate indebtedness, in our approach, cost-push inflation and nonfinancial corporate indebtedness are the focus. In the latter, the government played a central role as the player

who jumpstarted the process by causing the initial recession and, at the same time, raising companies' operating costs. Companies reacted and made the situation worse – thus plunging the economy into a severe recession.

Our purpose was to build a theoretical approach to explain Brazil's unprecedented phenomenon: severe recession with inflation. We will first provide a brief description of Fisher's debt-deflation model, and then deliver a detailed explanation of our theoretical approach. As we apply this approach to the Brazilian economy, it will prove useful to explain the following. Where companies are over-indebted, a sharp increase in manufacturing costs aggravates an ongoing recession even further. We shall see that the Brazilian economy might have slid from a severe recession into a depression. However, this is not decisive to prove the validity of our approach. Our purpose is to build a framework capable of explaining the deepening of a recession. Whether or not the economy has plunged into a depression is mere speculation. We have reached such conjecture following Fisher's track since his model showed that the deepening recession led the American economy into the Great Depression. In the end, we summarize the main conclusions of the article.

Fisher's model

In his classic article "The Debt-deflation Theory of Great Depressions," Fisher described an economy's slip into a depression (see Fisher 1933), using creative metaphors to describe the economic cycle. For example, he explained situations in which a stick, bent under strain, eventually breaks and cannot return to its original state. The other metaphor Fisher used was a ship in the ocean. When excessively tipped beyond a certain angle, it would capsize, and nothing would be able to return it to its original equilibrium (Fisher 1993, 339).

To Fisher, what "broke" or "capsized" an economy was over-indebtedness and deflation. In his words, "... the big bad actors are debt disturbances and price-level disturbances" (Fisher 1933, 341). Disorders in other variables were considered effects or symptoms arising from the action of the two "big bad actors."³ If they had been absent, disturbances in other variables might not have led the economy to a depression. According to Fisher, "...if debt and deflation are absent, other disturbances are powerless to bring on crises comparable in severity to those of 1837, 1873, or 1929-33" (Fisher 1933, 341).

There is a logical sequence in Fisher's description, which he deemed different from the chronological sequence. Following a chronological order, an economy would not linearly slip into a depression. It is a complex phenomenon with multiple interactions between variables: one variable affects another, while also being affected by it. Also, one variable could affect a few other variables that would then affect others – which would, in turn, affect the first ones.

Aiming for a more precise understanding, however, it is useful to describe Fisher's logical sequence. The "breaking of the stick" or the "capsizing of the ship" started when companies were over-indebted⁴ and decided to pay off their debts. To this end, they would

³ "I have, at present, a strong conviction that these two economic maladies, the debt disease and the price-level disease (or dollar disease), are, in the great booms and depressions, more important causes than all others put together" (Fisher 1933, 341).

⁴ "The over-indebtedness hitherto presupposed must have had its starters. It may be started by many causes, of which the most common appears to be new opportunities to invest at a big prospective profit, as compared

make sales in a desperate situation (distress selling), reducing prices to generate revenues that would settle their excessive debts.⁵ As a result, the price level would fall, and profits would follow. Therefore, production, trade, and employment would decrease as well.⁶ Consequently, pessimism and a lack of confidence would follow. Starting from a general condition of over-indebtedness, this logical sequence⁷ (see Fisher 1933, 342) would cause a real interest rate hike - because deflation effects would be larger than the effects of a

with ordinary profits and interest, such as through new inventions, new industries, development of new resources, opening of new lands or new markets. Easy money is the great cause of over-borrowing. When an investor thinks he can make over 100 per cent per annum by borrowing at 6 per cent, he will be tempted to borrow, and to invest or speculate with borrowed money. This was a prime cause leading to the over-indebtedness of 1929” (Fisher 1933, 348). Fisher’s description might be further enriched with Keynes words: “The later stages of the boom are characterised by optimistic expectations as to the future yield of capital-goods sufficiently strong to offset their growing abundance and their rising costs of production and, probably, a rise in the rate of interest also. It is of the nature of organised investment markets, under the influence of purchasers largely ignorant of what they are buying and of speculators who are more concerned with forecasting the next shift of market sentiment than with a reasonable estimate of the future yield of capital-assets, that, when disillusion falls upon an over-optimistic and over-bought market, it should fall with sudden and even catastrophic force” (Keynes 1973, 315-316).

⁵ Minsky criticized and further enriched Fisher’s approach: “[he] emphasized over-indebtedness as the initial condition for a debt deflation without explaining how this initial condition was generated, what was a measure of excess indebtedness and where the excess debt was” (Minsky 1994, 2). Minsky then offered his own explanation: “In particular, over a protracted period of good times, capitalist economies tend to move from a financial structure dominated by hedge finance units to a structure in which there is large weight to units engaged in speculative and Ponzi finance. Furthermore, if an economy with a sizeable body of speculative financial units is in an inflationary state, and the authorities attempt to exorcise inflation by monetary constraint, then speculative units will become Ponzi units and the net worth of previously Ponzi units will quickly evaporate. Consequently, units with cash flow shortfalls will be forced to try to make position by selling out position. This is likely to lead to a collapse of asset values” (Minsky 1992, 8).

⁶ Minsky argued that companies could go on a distress selling of assets (securities or bonds), which would be offered for sale, thus reducing their prices and forcing new rounds of distress selling. Minsky pointed out that the difference from his theory to that of Fisher's was that "... money is more directly linked to asset prices than to either output prices or money wages" (Minsky 1994, 3). Besides, Minsky used the expression "to sell position to make position" (Minsky 1992, 8) to describe indebted companies' behaviour. Therefore, at the end of the process, there would be the destruction not only of real assets (highlighted by Fisher) but also of financial assets. Minsky thus concluded that "Fisher's debt-deflation theory of great Depressions is a special case of the Keynes-Minsky financial instability hypothesis" (Minsky 1994, 3).

⁷ The logical sequence described by Irving Fisher also included impacts of deflation on banking and monetary variables, which have not been presented here because they are unnecessary for our purposes.

possible decline in the nominal interest rate resulting from the general economic weakening.

Fisher identified the relationship between the two “big bad actors” and came to the conclusion that one strengthened the other, and that together, in the end, they represented more than the sum of the initial parts, that is, real indebtedness and deflation would increase. Using metaphors, he described the possible relationships between the two factors:

The two diseases act and react on each other. Pathologists are now discovering that a pair of diseases are sometimes worse than either or than the mere sum of both, so to speak. And we all know that a minor disease may lead to a major one. Just as a bad cold lead to pneumonia, so over-indebtedness leads to deflation. (Fisher 1933, 344)

Each fall in the price level would cause real indebtedness to increase, and each increase in indebtedness made business owners more desperate to make their sales.⁸ Thus, the economy would slip into a depression: "the more the economic boat tips, the more it tends to tip. It is not tending to right itself, but is capsizing" (Fisher 1933, 344). One should note that the deflation arising from a need to sell goods to liquidate excessive debts would trigger the process.

Keynes made a vital remark about such a situation: changes in income distribution would aggravate the problem. Under these conditions, rentiers would earn more, and entrepreneurs would earn less. In Keynes' words:

⁸ A few years after Fisher had published his ideas, Keynes, dealing with a potential decline in wages and prices in a situation of acute contraction of the output, stated that: “Indeed if the fall of (...) prices goes far, the embarrassment of those entrepreneurs who are heavily indebted may soon reach the point of insolvency, – with severely adverse effects on investment. Moreover the effect of the lower price-level on the real burden of the national debt and hence on taxation is likely to prove very adverse to business confidence” (Keynes 1973, 264).

... some redistribution of real income (...) from entrepreneurs to rentiers to whom a certain income fixed in terms of money has been guaranteed. (...) [and] if rentiers represent on the whole the richer section of the community and those whose standard of life is least flexible, then the effect of this also will be unfavorable. (Keynes 1973, 262)

Keynes' conclusion is that such an effect would be unfavorable because it "is likely to diminish the propensity to consume" (Keynes 1973, 262) in a community, thus intensifying the fall in output.

Debt/cost-push inflation approach

When an economy is facing a recession and, instead of deflation as described by Fisher, a specific type of inflation occurs, the logical sequence presented by him describes similar processes and outcomes. Changes in the price level would not result from corporate action aimed at liquidating the excessive debts, but rather from external factors. For example, to balance its budget, the government might remove subsidies that compound intermediate inputs' prices. Corporations would also be in a situation of over-indebtedness, but flags would not yet have been raised by debtors (corporations) or creditors (banks).⁹ In this case, the event to trigger the price movement would not be Fisherian or Minskyan: the trigger to price level increases would not come from the economy itself, but from outside. The government would fire that shot.

In this new approach, which we call the debt/cost-push inflation, the price of inputs increases due to the withdrawal of government subsidies and, consequently, production costs increase accordingly. The first reason is the increase in the prices of inputs. Nevertheless, there is still another cost-increasing factor. Corporations need (short-term) bank credit to finance production.¹⁰ Therefore, an increase in the interest rate of short-

⁹ According to Fisher, this is how the malign sequence initiates: "... at some point of time, a state of over-indebtedness exists, this will tend to lead to liquidation, through the alarm either of debtors or creditors or both" (Fisher 1933, 341-342).

¹⁰ "If a firm decides to employ workers to use the capital equipment to produce output, it must have enough command over money to pay the wages of the workers and to purchase those goods which it has to purchase from other firms during the period which must elapse before the output can be, conveniently and economically, sold for money" (Keynes 1979, 64). Banks advance these resources. Keynes argued that companies' dependence on banks is not the result of weakness. It is instead a time- and resource-allocation problem. In general, strong companies have resources invested in bonds or other liquid assets that yield a higher interest rate than the one charged by banks for working capital credit. Thus, they prefer to keep their liquid assets and take short-term bank loans. Banks would be interested in offering this kind of credit because of its high liquidity – since companies expect to sell what they produce; this credit is, therefore, a fast-returning asset for banks. In Keynes' words: "In the first place, loans for working capital are more 'liquid' in the sense that the borrower will be frequently turning the goods, financed by such loans, into money, so that the lender will not be 'locked up' in security which never comes on to the market as is the case with most fixed capital. In the second place, the needs of individual businesses for working capital are far more variable in amount than their needs for fixed capital, and fluctuate for seasonal and other reasons, even in times of stable output when the requirements of business as a whole are averaging out. Thus, the

term production credit ("working capital") can represent a second factor behind the increasing costs.

Rising prices of intermediate inputs impact inflation. Therefore, rising prices of inputs would cause inflation to rise. Nowadays, most economies adopt the inflation targeting regime.¹¹ As a result, the central bank would raise the base rate to maintain price stability (or meet the inflation target). In other words, by cutting subsidies on prices of intermediate inputs, the government pulled a second trigger: it made the central bank react and raise the base rate.

If the central bank reacts to a rise in inflation by raising the base rate, then an increase in the interest rate of the loans that companies must take up to finance production will consequently follow. Therefore, the prices of the two relevant inputs would rise: inputs and working capital. Here as well, the two "big bad actors" are (i) disturbances in prices of inputs and in the interest rate charged over the loans that finance production, and (ii) the over-indebtedness of companies (as in Fisher's original model).

If the government is taking measures to balance its budget – by cutting spending, including the subsidies already mentioned – one assumes that such actions will cause the cooling of the economy. Corporations will then find it hard to pass the rise in production costs on retail prices thoroughly. So the debt/cost-push inflation approach relies upon the following condition: the rise in costs is not entirely transmitted to retail prices. Then, the same sequence of events indicated by Fisher occurs: following a change in prices (in this case, an upward movement in prices of intermediate goods, not a downward movement in retail prices) comes a fall in profits and a reduction in production, trade, and employment. The result would be the same: pessimism and a lack of confidence.

banks are able to perform a useful service by providing a pool of floating resources which can be placed at the disposal of now this business and now that. Moreover, a banker prefers for obvious business reasons a class of account which involves constant turnover and frequent transactions and combines individual variability with aggregate stability, to business which, once done, means a prolonged lock-up of the bank's resources and does not involve any further consequential transactions" (Keynes 2013b, 84-85).

¹¹ This does not mean that the authors are favorable to the adoption of an inflation targeting regime, but only that this institutional arrangement is currently quite common.

In the debt-deflation model, the revenues that feed the companies' cash flow must be sufficient to settle liabilities. With deflation, this becomes more difficult or even impossible. Although Fisher did not explain it this way, the economy slows down towards situations that are not self-reversible because company balance sheets suffer paralyzing pressures over business activity. Such pressures also emerge in the debt/cost-push inflation approach.

There is intense pressure to reduce profit in the debt/cost-push inflation approach, discouraging ongoing production due to rising costs of both financing and inputs. In line with the debt-deflation model, there will also be a fall in profits in the debt/cost-push inflation approach, but this will occur because of increased expenditure on production costs – and not due to the fall in retail prices. The same negative pressure over profits present in the debt-deflation model would emerge in the debt/cost-push inflation approach: the same paralyzing pressure reduces companies' profits. However, the source of the reduction in the companies' cash flow is the increase in the expenditure flow.

In the debt-deflation model, pressure comes from a general reduction in retail prices, controlled by business owners. However, in the debt/cost-push inflation approach, the paralyzing pressure would come from the rise in prices of specific inputs: intermediate inputs and the interest rate of short-term credit for production (both influenced by the government). Therefore, in the case of debt/cost-push inflation, the cause of cycle reversal is exogenous, an external shock. In the debt-deflation model, however, the cause is endogenous. In Minsky's words:

The financial instability hypothesis is a model of a capitalist economy which does not rely upon exogenous shocks to generate business cycles of varying severity (...) As such it incorporates the debt deflation of great depressions as a part of the interactive process that characterizes a modern capitalist economy. (Minsky 1994, 9)

Another comparison worth making between the two approaches is that, in Fisher's original model, the more corporations try to obtain revenues by deflating the prices they control, the more their real debts increase, making it harder for them to pay them off. In the debt/cost-push inflation approach, the same could happen: when the government cuts

spending and withdraws subsidies to balance its budget, the result would also be a severe contraction of the output. Government revenue would then be lower, and the budgetary imbalances would increase.

Such an effect on government revenues reflects that which would be happening to companies' revenues. The more the government cuts subsidies, the more production costs rise; the fewer revenue companies generate, the fewer taxes they pay.

Both in the Fisher model and our approach, the processes and the effects are cumulative. In the debt-deflation model, the process generates cumulative effects on the companies' balance sheets; in the debt/cost-push inflation approach, the process emerges cumulatively in the companies' balance sheets. There would also be effects on government revenue in both cases since those processes lead the economy into a severe recession, which necessarily implies a reduction in total tax revenues.

In the debt-deflation model, at some point, over-indebtedness triggers distress selling and deflation. In the debt/cost-push inflation approach, the difficulty of making profits (imposed by cost increases) causes business owners to attempt to reduce their over-indebtedness. At first, they reduce the credit flow that feeds their debt stock: both what is needed to finance production and investment. Besides, companies that need to refinance their debt would have to do so under more unfavorable conditions, facing even higher interest rates, which would aggravate their future financial problems.

The decrease in profits discourages production; it reduces or even paralyzes production. Soon, there would be a decrease in demand for short-term financing. The general cooling of the economy is, on the other hand, a brake on investment decisions and, thus, on borrowing for investments. The rise in interest rates, including that of government bonds (via yield curve), diverts business resources from capital assets to more liquid assets.

In short, after the government has triggered the cut in subsidies and the rise in interest rates, corporations decrease current production and begin to reduce their level of indebtedness. Furthermore, if corporations' profit rate falls below the interest rate of outstanding debt, they will seek the amortization of such debts and even sell assets. They

would then have "to sell position to make position," in Minsky words, and in some cases might even go into distress selling of liquid assets.

As in Fisher's model, in the debt/cost-push inflation approach, a reduction in government spending and investments might only cause a slowdown or a mild recession. Nevertheless, both could be reversible: "the ship tipped," but it would return to its original equilibrium. However, when companies are doubly affected by reduced profits (due to increased costs) and reduced sales (due to a decline in demand), self-reversal is no longer possible (since companies are also over-indebted). In this case, all companies would be affected, and their decisions would affect each other's decisions.

The spread of such an effect would depend on how firms relate and depend on one another. Unemployment would rise dramatically, which would, in turn, affect government revenues. Therefore, the government would need to adopt further contractionary policies (as in the chronological sequence described by Fisher). The combination of real and financial effects would lead to a fast and steep decline in production and a corresponding rise in unemployment (with a fall in government tax revenues).

Both in Fisher's model and our approach, sequential dynamics describe an economy capsizing to paralysis. In the debt/cost-push inflation approach, the government initially reduces its spending in a general way (including the withdrawal of subsidies). Subsequently, companies decrease input purchases, reduce the amount produced, lay off workers, and reduce credit demand (both for production and investment). As the "ship capsizes," i.e., unemployment increases, companies would have more difficulty selling their products.

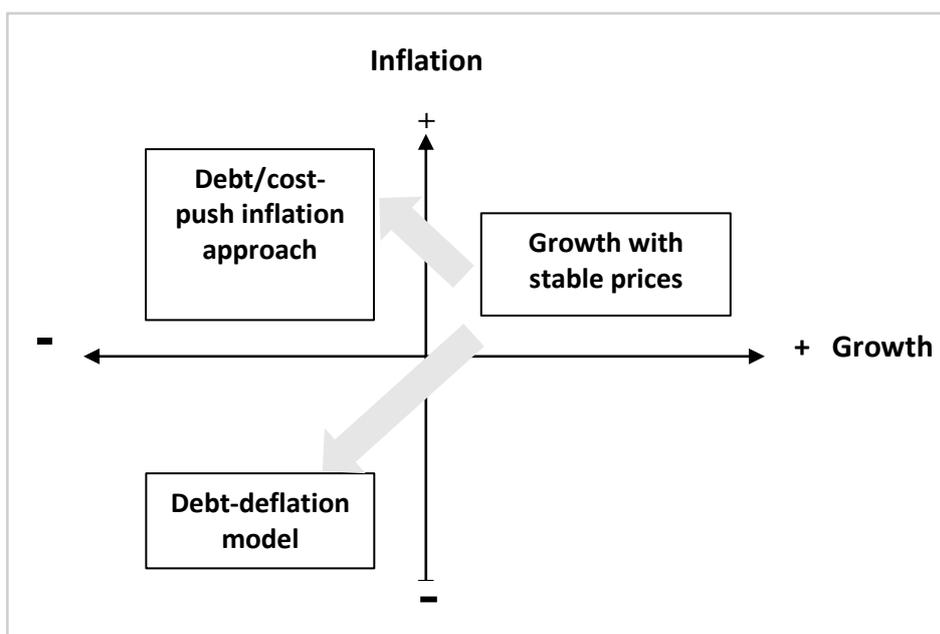
With declining sales, pressures once limited to increased costs now escalate: there will also be a fall in corporate revenue due to the decrease in quantities sold. No cycle (re)reversal is to be expected by the companies' initiative in this case. They would not increase their production or invest again, where pessimism prevails, and confidence lacks.

After the first fall, others would come until general paralysis prevails, thus shaping a depression. Fisher believed that "...the ways out are either via laissez faire (bankruptcy) or scientific medication (reflation), and reflation might just as well have been applied in

the first place" (Fisher 1933, 349). He also emphasized that "... the important corollary, of the debt-deflation theory, that great depressions are curable and preventable through reflation and stabilization" (Fisher 1933, 350).¹²

In short, Fisher's model and our approach both describe paths an economy can follow to reach a severe contraction in output (with either deflation or cost-push-inflation, respectively). An economy can pass from a situation with stable growth and moderate inflation to another with severe contraction in output – as shown in chart 1. The United States, in the 1930s, left the first quadrant and entered the third. The debt-deflation model can explain this offset. Our purpose in the next section is to demonstrate that Brazil has recently departed from the first quadrant and reached the second – using the debt/cost-push inflation approach as an explanation.

Chart 1 – GDP Growth Versus Inflation



¹² Keynes concluded that the fastest and most efficient way out would be through government intervention by investing in public works. For further details on the need for such intervention, see, for example, Keynes (2013a 148).

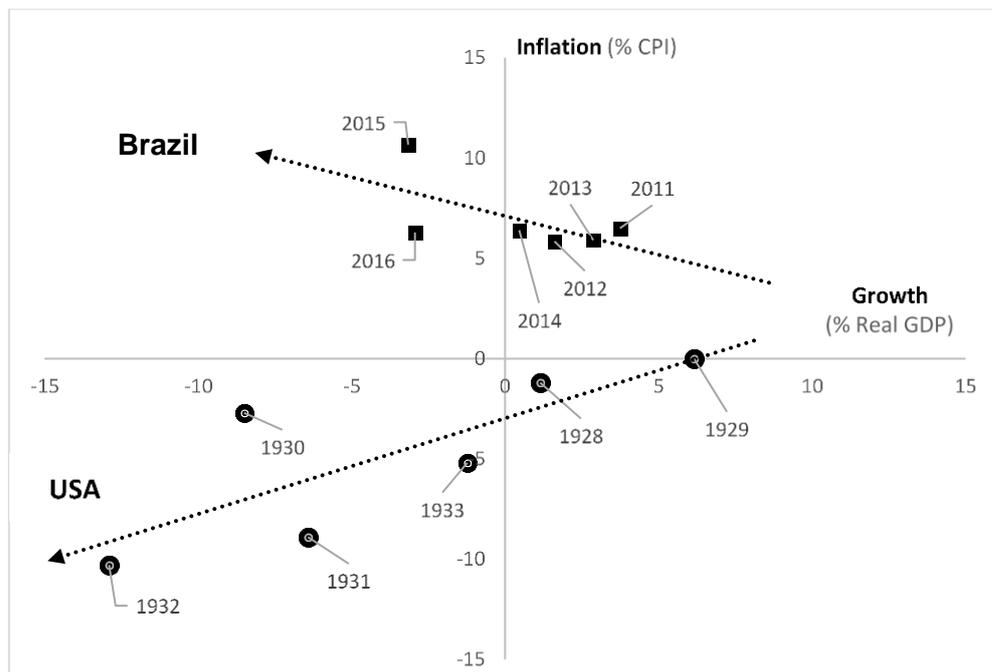
Severe slump with cost-push inflation in Brazil

In the 2011-2014 period, the Brazilian economy grew at an average rate of 2.9% per year. Average inflation was 6.2% per year for the same period – which is an acceptable inflation rate in Brazil.¹³ In Graph 1, which corresponds to Chart 1, the Brazilian economy was in the first quadrant during the 2011-2014 period. In 2015, it entered the third quadrant. Although this is not our current focus, in Graph 1, the U.S. economy was in the first quadrant before the Depression of the 1930s. Fisher explained the U.S. economy's trajectory from the first to the third quadrant based on his debt-deflation model.

Our goal is to explain the Brazilian economy's trajectory from the first to the second quadrant of Graph 1. The trend line for the Brazilian economy trajectory between these two quadrants shows an acceleration of inflation associated with a recession scenario. Therefore, as the Brazilian economy showed sharp contractions of the output and an acceleration of inflation, we applied the debt/cost-push inflation approach described in the previous section to explain this movement.

¹³ Between 2006 and 2016, the National Monetary Council (NMC) set the inflation target at 4.5%, with a fluctuation range of +/- 2%. The NMC is the official government body that sets targets and (upper and lower) limits for Brazilian inflation targets.

Graph 1 – Annual Real GDP Growth (%) and Consumer Inflation (%) – Brazil: 2011-2016 and US: 1928-1932



Source: Author’s elaboration based on IBGE, Johnston and Williamson (2019), and BLS.

The manufacturing production was used as a proxy to explain the behavior of the Brazilian economy.¹⁴ By the end of 2014, nonfinancial corporations experienced shocks as the government withdrew subsidy on electricity and authorized a price increase for diesel fuel.¹⁵ Both measures aimed at reducing the budget deficit. Diesel fuel is essential for the transportation of inputs and goods in Brazil since it does not have a railway network compatible with its continental size. In 2015, the industry's electricity prices rose by 52%, and the price of diesel fuel rose by 13% (IBGE 2019). The combined weight of diesel and petroleum products, electricity, and gas in manufacturing cost (intermediate consumption) is 11% (IBGE 2019).

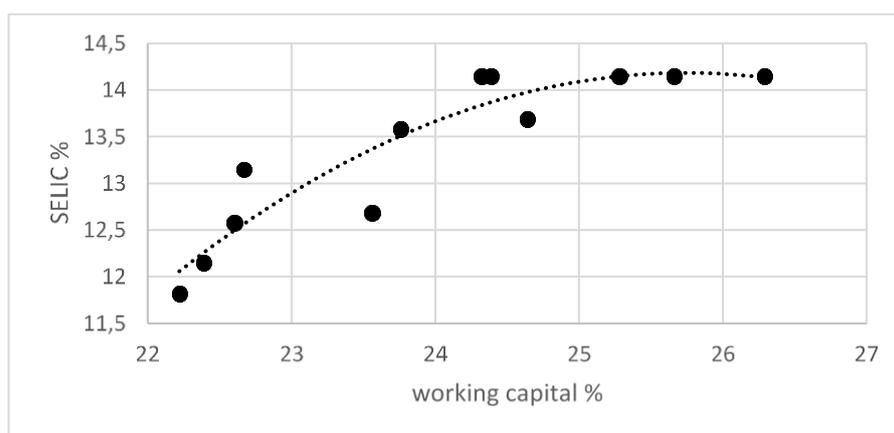
¹⁴ The use of manufacturing production as a proxy for GDP is well established in Brazilian literature. See Belaisch (2003) and Manella *et al.* (2003).

¹⁵ As for diesel fuel, the rise in prices aimed at improving Petrobras' (a state-owned company) results and the consequent transfer of its profits to the government. Actually, such measures amount to a cut in subsidies.

Inflation was at the level of 6% a year but then increased to 10.7% in 2015. (IBGE 2019). The variation in diesel fuel prices, electricity, and gasoline (subsidies for this item were also cut) contributed with 2.35 percentage points of this increase. Such escalation in prices accounted for more than half of the increase in the inflation rate.

In 1999, Brazil introduced an inflation target regime according to which the Central Bank raises the base rate (Selic rate) when faced with inflation-raising scenarios. So with rising inflation, the Central Bank raised the Selic rate from 11.75% (Dec/2014) to 14.25% (Dec/2015) (CBB 2019). Consequently, the interest rate on working capital loans increased from 21.93% (Dec/2014) to 25.66% (Dec/2015) per year (CBB 2019). Graph 2 shows the strong correlation between the Selic rate and the interest rate on Working Capital Revolving Credit lines.¹⁶

Graph 2 – Base Rate (SELIC) and Working Capital Revolving Credit – Brazil: Jan/2014- Dec/2015



Source: Author’s elaboration based on CBB data.

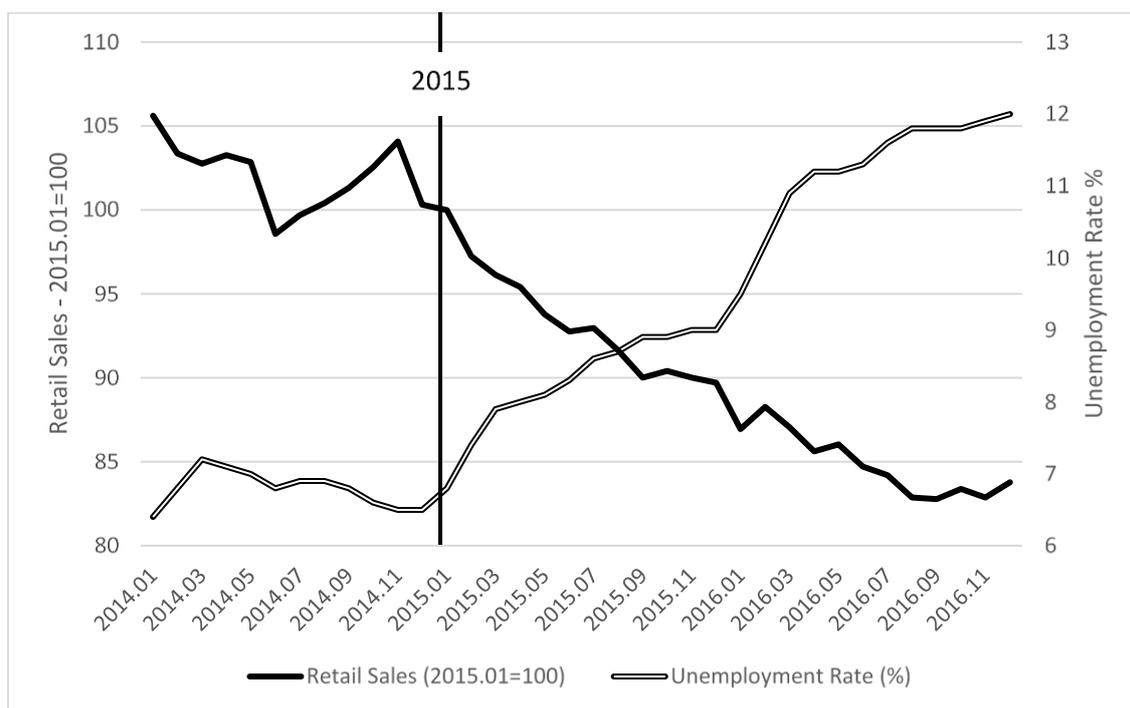
The first event required for the debt/cost-push inflation approach was there: an increase in intermediate inputs prices and inflation and a rise in the base rate and the working capital's. Expenditure flows related to production costs (both input and financing) increased, which reduced the net income flow. Companies could not entirely pass on the

¹⁶ The “Working Capital Revolving Credit” is the name given by Central Bank of Brazil for short term maturity (up to 365 days) production-related loans.

cost increases to retail prices due to a general cooling of the economy caused by (i) the government's economic policies and (ii) the companies' reaction to it (as we shall soon discuss).

In addition to withdrawing subsidies, the Brazilian government promoted widespread spending cuts. It reduced investment by 28%, from R \$ 246.7 billion to R \$ 177.4 billion between 2014 and 2015 (Orair 2016). The goal was to reduce the budget deficit. Besides, the Central Bank of Brazil raised the base rate. Consequently, unemployment increased, and retail sales declined. This way, companies could hardly pass the rise in costs on to retail prices (of manufactured goods). Graph 3 shows that the unemployment rate and the retail market's sales volume experienced strong shocks in early 2015. The unemployment rate increased from 6.8% to 9%, and sales volume fell by 11.5% in 2015 (IBGE 2019).

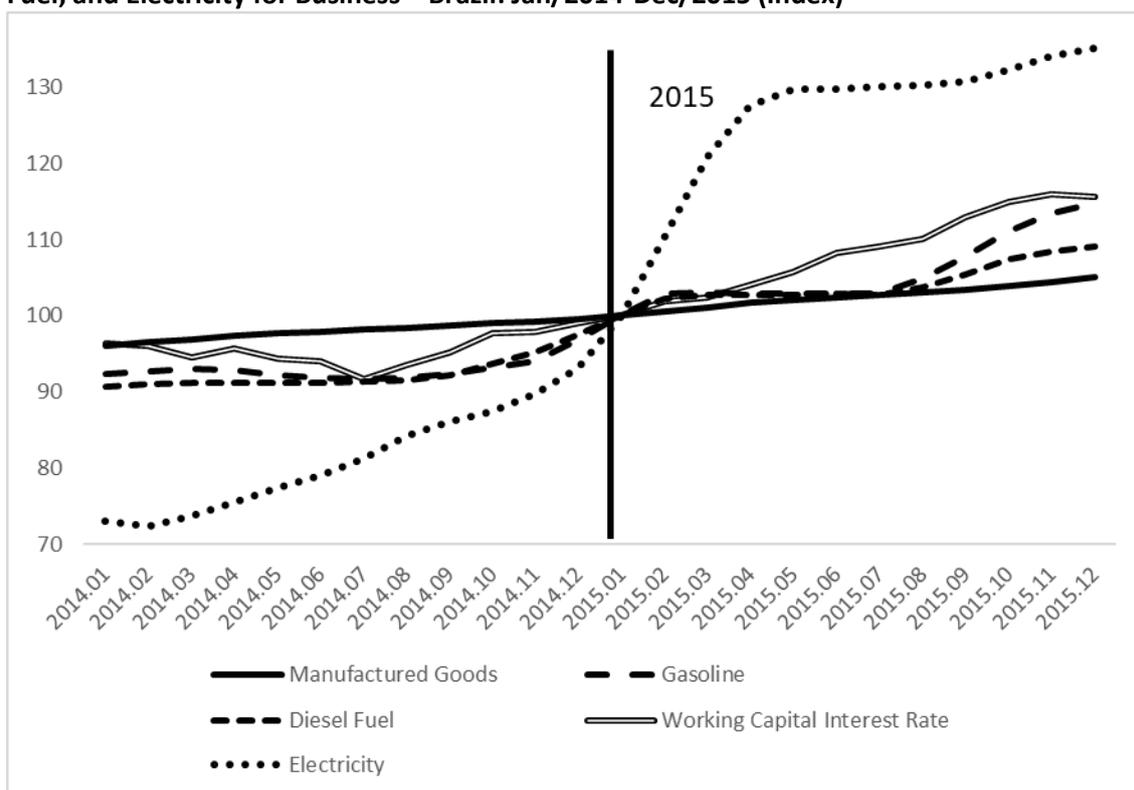
Graph 3 – Retail Sales (left, Index) and Unemployment Rate (right, %) – Brazil: Jan/2014-Dec/2015



Source: Author's elaboration based on IBGE data.

Graph 4 shows the cost-push shock that hit corporations at the end of 2014 and throughout 2015. It becomes clear that cost increases were much higher than the shocks in retail prices. Among the 55 largest non-financial companies listed in the Brazilian stock exchange market, profits fell by 99% (Economática 2019). Throughout much of 2016, the situation was the same. Therefore, reduced cash flows and profits put intense paralyzing pressure on business activity. Cash flows reduced due to (i) increased production costs and (ii) reduced sales. Thus, the companies' balance sheet was doubly affected. What differentiates this event from the 1930s American crises described by Fisher is that the leading cause here was a specific type of inflation affecting prices of intermediate inputs and not deflation affecting retail prices. In both cases, demand dropped, but price shocks occurred (in the opposite direction).

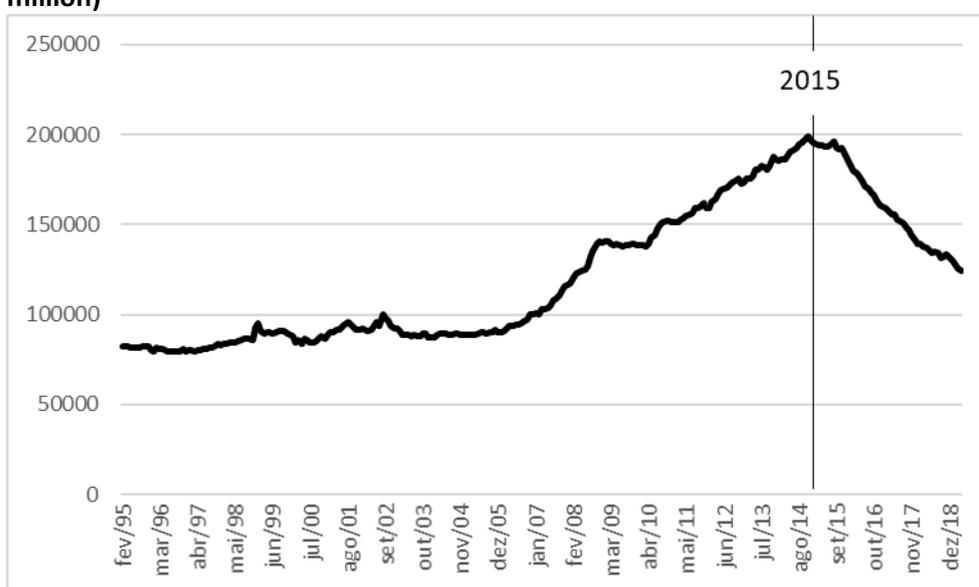
Graph 4 – Working Capital Interest Rate and Prices of Manufactured Goods, Gasoline, Diesel Fuel, and Electricity for Business – Brazil: Jan/2014-Dec/2015 (Index)



Source: Author's elaboration based on IBGE data.

In the debt/cost-push inflation approach, as in Fisher's original model, there are two big bad actors: fluctuations in costs and companies' reaction to their own over-indebtedness. Graph 5 shows the real volume of debt of nonfinancial corporations (loans) during the analysis period. By the end of 2014, indebtedness was increasing. In 2015, companies decided to reduce their indebtedness levels with the worsening economic conditions, as shown in Graph 5.

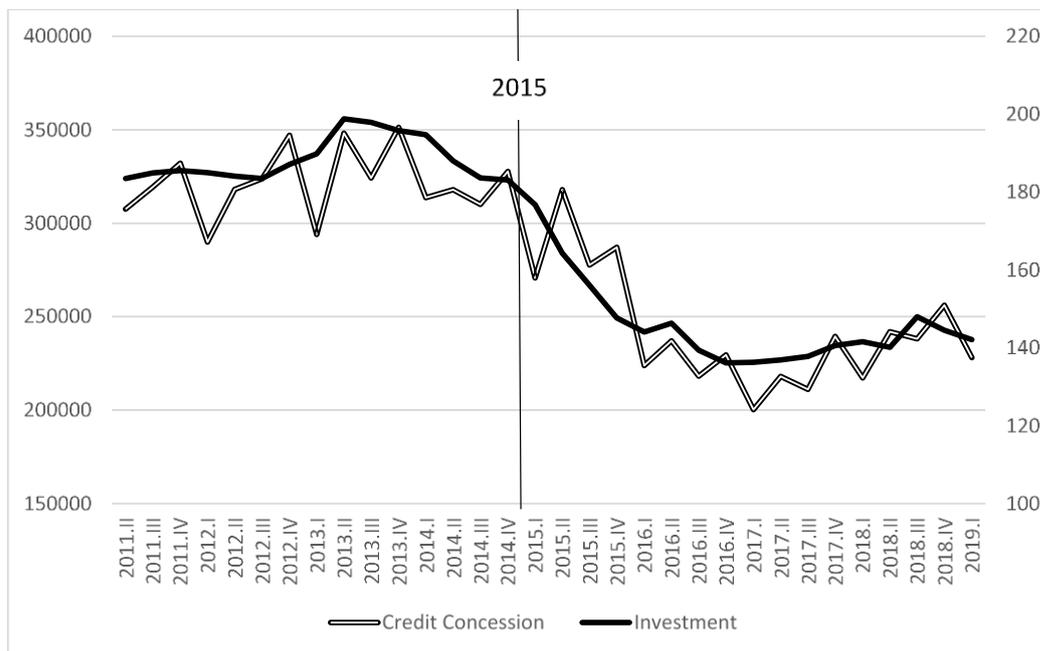
Graph 5 – Debt of Nonfinancial Corporations (loans) Jan/1995-Dec/2018 (Brazilian Real, million)



Source: Author's elaboration based on CBB and IBGE data.

One can then speculate that the reversal of the indebtedness trajectory occurred because companies had realized they were excessively indebted in a scenario of reduced net flows of revenues and profits. On the one hand, they lessened the taking of new loans to finance investment – Graph 6 shows the correlation between new loans and investments (gross capital formation).

Graph 6 – Credit Concession (left, Brazilian Real, million) and Investment, Gross Capital Formation (right, index) – Brazil: 2011-2018



Source: Author’s elaboration based on CBB and IBGE data.

Companies also reduced borrowings to finance production as production volume itself decreased. They then speeded up the amortization of debts, possibly because they needed to save money to increase the net income flow and recover lost profits. Moreover, their expectations for future revenues are prone to be negative in such a setting, considering a sharp decline in GDP had already happened. Therefore, companies deleveraging sought to increase profits and restore corporate cash holdings, but above all, this posture sought to protect the companies' very existence. After all, companies could incur significant losses.

Against the backdrop of major setbacks in 2015, profits may have become negative for individual companies. In that case, cash flow tends to evaporate, and losses arise. They may have had to sell assets to settle their liabilities, thus avoiding bankruptcy. Many

companies asked for court-supervised debt negotiation¹⁷ since the net earnings and the funds raised from selling the liquid assets did not prove enough to settle their liabilities on the due dates. These companies seem to have assumed a Ponzi posture, under well-known Minsky's classification. Table 1 shows a 50% increase from 2014 to 2015 in the number of companies with potential Ponzi posture and more than 100% from 2014 to 2016 (Serasa Experian 2019).

Table 1 – Court-Supervised Debt Negotiation (Judicial recovery)

	2013	2014	2015	2016
Judicial recovery	874	828	1287	1863

Source: Author's elaboration based on SERASA Experian data.

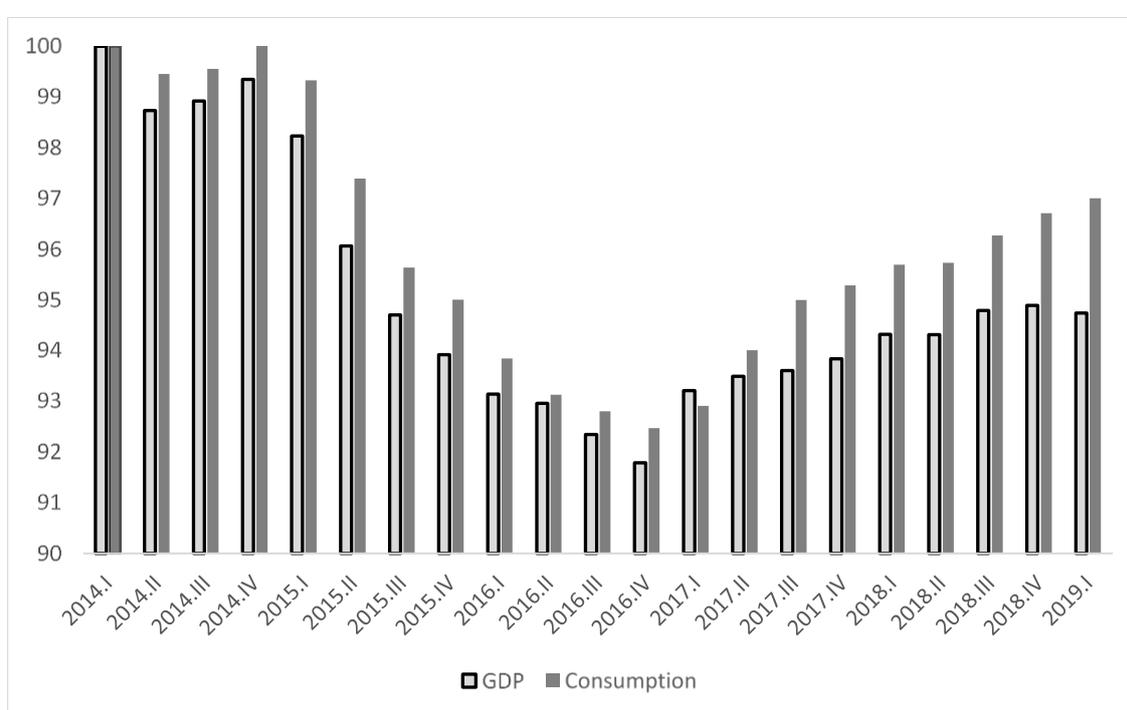
The process of reducing corporate indebtedness meant that profits earned, or funds raised from selling liquid assets, did not make it to agents that could eventually consume, produce, or invest in capital assets. Those funds came out from the corporations straight to banks. As nonfinancial corporations' cash holdings transformed into banks' cash holdings, those resources no longer served to boost the real economy. Hence, reducing nonfinancial indebtedness also contributed to weakening aggregate demand. While industrial companies reduced their indebtedness, the banks' cash flow increased, further reinforcing the falling output trend. The reason is that banks' propensity to save is higher than companies' propensity to save – as told in Keynes' words in the previous section.

The GDP then started to drop. It fell 3.6% in 2016 following a 3.8% recession the year before (IBGE 2019). Corporations saw their costs increase, while their net earnings decreased, which discouraged production. Sales also faced challenges because first, the

¹⁷ In Brazil, judicial recovery is the economic, administrative, and financial reorganization of a company conducted with court supervision to avoid bankruptcy.

government cut spending (as revenues declined), then corporations followed (for the same reason, reduced net incomes), thus weakening aggregate demand. However, companies also cut expenditures because of over-indebtedness and decided to use their resources to reduce it. All of that led to a decline in investment (Graph 6), consumption, and output – as shown in Graph 7.

Graph 7 – GDP and Consumption (Index: 2004 = 100) – Brazil: 2014-2019



Source: Author's elaboration based on CBB and IBGE data.

The process became cumulative. The more the government cut spending, the more its revenue was reduced. For example, in 2014, the Brazilian **government budget deficit ratio** was 6.04% of GDP (CBB 2019). As a result, the government cut spending in all areas in 2015. Consequently, its revenue fell 5.62% in real terms, and the **budget deficit** increased to 10.34% of GDP that year (CBB 2019). The same happened to corporations, which spent more and more on debt amortization and less and less on production and investment.

One can imagine that if corporations had not been hit with rising costs and over-indebtedness, the initial spending cut promoted by the government might not have resulted in a recession so deep in 2015 that it persisted through 2016. As suggested by Fisher, the policy of cutting government spending in Brazil could have been "powerless to bring on crises comparable in severity (...) 1929-33." The severe recession of 2015-2016 occurred solely because the "two big bad actors" were present. In other words, the recession might have been much milder if the "two big bad actors" were not there.

One could also argue that if companies' costs had not increased, profits would have fallen only due to problems in sales imposed exclusively by the cut in government spending. If companies were not over-indebted, they might not have withdrawn resources from the real economy and transferred to banks. In other words, the "two big bad actors" were in action, reinforcing the adverse effects of government spending cuts. Such a policy first reduced the demand for goods, then reduced production (as expected). Eventually, in the presence of the "two big bad actors," it directly mitigated supply-side decision making related to production or investment in capital assets.

That point is critical. Corporations' net revenue flow was supposed to compress as a result of government spending cuts reducing demand. A steep rise in production costs also reduced net revenue flow, which should happen amid a recession. Corporate profits fell significantly, and when net revenue flows drastically diminish, corporations seek to reduce expenditures to recompose them. Deleveraging means searching for (financial) cost reduction. Corporations transferred resources – which should have been advanced to production or even investment – to debt amortization. While the initial goal was recomposing net revenue flow, the ultimate goal was preserving the corporations' own existence since negative revenue flow is the first step towards bankruptcy.

Brazilian economy might be in a depression

Irving Fisher illustrated his debt-deflation theory with the depression in the 1930s in the United States (see Fisher 1933, 345-357). In other words, the key factors behind that depression were deflation and over-indebtedness. The debt/cost-push inflation approach and Fisher's original model have the same purpose, as demonstrated in the previous sections. So one could argue that Brazil might be in a depression. According to Fisher, "the debts of 1929 were the greatest known, both nominally and really, up to that time. They were great enough not only to 'rock the boat' but to start it capsizing" (Fisher 1933, 346). Something similar happened in Brazil: nonfinancial corporations' debts had never been as high as 2014 (see Graph 5).

In the U.S., the "internal debt" reduced 20% in nominal terms in 1929-1933 (see Fisher 1933, 354, chart V). In the same period, deflation was 24.6%. In Brazil, from 2015 (January) to 2016 (December), the debts of nonfinancial corporations reduced by 17% in real terms.¹⁸ The increase in diesel fuel and electricity prices in 2015 was 13% and 52%, respectively. The two big bad actors were present in both economies: price disturbances and debt disturbances.

There is no such thing as a depression theory (see Cardim de Carvalho 2016), that is, a theory describing a set of formal characteristics that can be verified in an economy to reach an accurate diagnosis. Therefore, one cannot state that the Brazilian economy is, in fact, in a depression after the sharp recessions of 2015 and 2016. Furthermore, that is not the purpose of this article. However, due to the mechanisms that operated in the debt-deflation or debt/cost-push inflation approaches, we strongly suspect that the Brazilian economy may be in a depression.

In the absence of a depression theory, one can only observe that today's Brazilian economy displays some of the features of the U.S. economy of the 1930s. The key features are: (i) a sharp fall in output, (ii) a dramatic rise in unemployment, (iii) prolonged demand deficiency that prevents items (i) and (ii) from being reversed, and (iv) low and

¹⁸ Authors' calculation based on Graph 5 data.

volatile positive and negative GDP growth rates. Features (i), (iii), and (iv) can be seen in Graphs 6 and 7, while (ii) is in Graph 3.

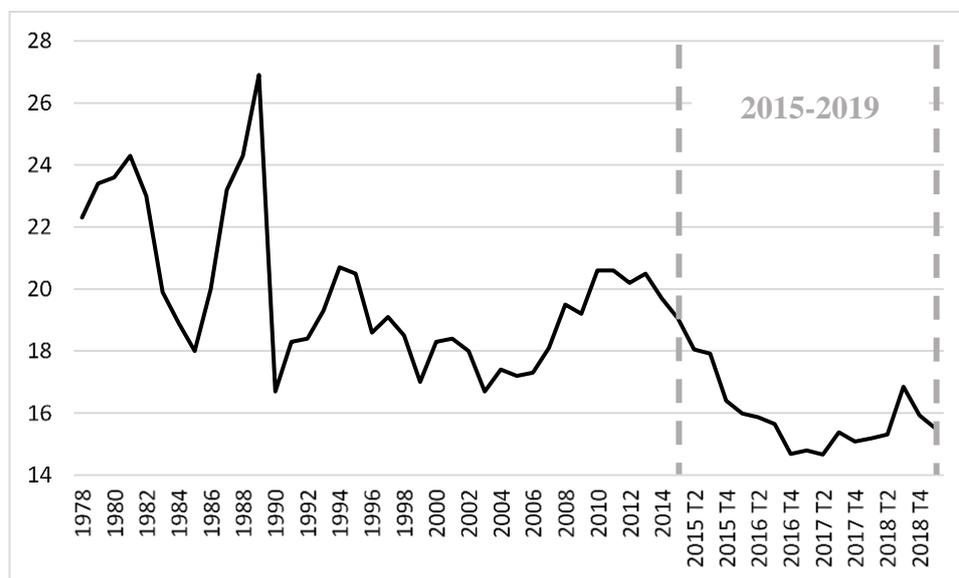
Some economists have suggested that the Brazilian economy might be in a depression. The study "*A depressão depois da recessão*" ("Depression after the recession") (Pastore, Pinotti, Gazzano, and Magalhães 2019) has been published recently with that suggestion. It claims that: "Considering that per capita income has been 8% below the previous peak for three years, all that is to be done is define the present situation as typical of a depression (...)" (Pastore et al. 2019, 2). Afonso Celso Pastore, one of the economists who authored that study, stated in Brazilian newspaper Folha de S. Paulo that: "The country is standing still. We still have not seen any recovery after the recession. The people are impoverished, and their income level is not being recovered. If that is not a sign of depression, I don't know what else it can be" (Folha de S. Paulo 2019). In his analysis of the 1930s Depression, Keynes highlighted that investment was the key variable for assessing the crisis and solving it. In his view, the machine stopped due to a malfunction in what he dubbed its magneto, i.e., investment in capital assets. "We have a magneto trouble," said Keynes (2010, 129), and because of that one might not expect to get back "in a rumbling wagon and that a motoring is over" quite soon. In case the engine could not be restarted, according to Keynes: "...the slump [would] pass over into a depression (...) which [could] last for years, with untold damage to the material wealth and to the social stability..." (Keynes 2010, 133).

Our purpose is not to point out solutions for the Brazilian case. We are only interested in strengthening suspicion that the Brazilian economy may be in a depression. There has also been a severe problem in the Brazilian economy's magneto, as proposed by Keynes. Graph 8 shows that investment to GDP ratio has dropped dramatically since 2015. It has never been this low in the last 40 years.

Brazil went through two other severe recessions during these last 40 years: at the beginning of the 1980s and the beginning of the 1990s, when investment dropped abruptly. Nevertheless, recovery from both crises was quite fast, as well. In the current situation, besides being at a level lower than ever, investment has remained at such level for more than four years – a fact that is also unprecedented in the last four decades. The

investment/GDP ratio trajectory shows that investment drops have been much higher than falls in GDP.

Graph 8 – Investment/GDP ratio (%) – Brazil: 1978-2019 (annual from 1978 to 2014 and quarterly from 2015 to 2019)



Source: Author’s elaboration based on CBB, and IBGE data.

The Brazilian economy is likely to be in depression. After all, it shares key features with the 1930s American economy. Investment, the variable deemed as the soul of capitalism, is at a level so low it demonstrates intense business dismay - which only strengthens that suspicion. The motivation for profit is disappearing. Irving Fisher said it accurately: “A depression is a condition in which business becomes unprofitable. It might well be called The Private Profits disease” (Fisher 1932, 19).

Finally, one should remind the countless contributions of economist Luiz Carlos Bresser-Pereira on the causes of the Brazilian economic crisis and its challenges. Bresser-Pereira has pointed out that the Brazilian economy has been in a state of semi-stagnation since the 1980s. In his view, the country has numerous problems: it has extraordinarily high interest rates and an overvalued exchange rate; the economy is financially open; it suffers from the well-known Dutch disease and is in deindustrialization. Therefore, for Bresser-Pereira, wicked structural elements and inappropriate economic policies led the economy to the current crisis. These evil elements have all made the economy fragile to absorb shocks and recovery extremely difficult. For example, in "The reconstruction of the

Brazilian industry: the connection between the macroeconomic regime and the industrial policy," Bresser-Pereira, Nassif, and Feijó describe measures for a reindustrialization combined with a new macroeconomic regime (see Bresser-Pereira et al. 2016).

Concluding Remarks

In 2015, Brazil presented an uncommon economic situation: an inflation increase worsened the recessive picture. Such an inflation increase was mainly due to shocks to domestic intermediate input prices. The Brazilian corporations were over-indebted, which aggravated the situation.

Using Fisher's debt-deflation model as a reference, we have built an approach to explain the Brazilian case. We concluded that, in the context of a recession, a sharp (upward) price variation in inputs has the same effects as those found by Fisher, that is, recession can get worst and make the economy slip into depression. However, one should note that in Fisher's model, price variation was general and downward.

In Brazil, the recession was driven by government spending cutting policies that led to a sharp increase in diesel fuel and electricity prices and interest rates for working capital loans. As a result of such policies, profits for corporations were virtually nonexistent. The pressure then mounted on the supply-side (with increased costs) and the demand-side (with a drop in sales due to recession and unemployment). Ultimately, business dismay worsened the recession.

Facing desperate conditions, business owners stopped taking new loans (to finance production and, logically, new investments). They went beyond that, nevertheless. In an attempt to save their corporations, business owners entered into an indebtedness-reduction mode. By paying the banks (their main creditors), they transferred resources from the realm of production and consumption to the financial realm – where the propensity to save is higher. Such intense indebtedness settlement was the second Fisherian factor that aggravated the Brazilian recession.

Our approach, called debt/cost-push inflation, showed that Fisher's two big bad actors were present in 2015 Brazil: price level variation (specifically, input prices) and corporate over-indebtedness. When they appear in a recession picture, the situation inevitably deteriorates. Based on the evidence, we argue that Brazil may have already entered a depression that shares key features with the U.S. in the early 1930s. Brazil had a sharp drop in output and a drastic rise in unemployment. It is plunged into a situation where

output and investments grow at low and volatile rates (positive and negative) for a long time.

Finally, the most important lesson Fisher's debt-deflation model taught is the following. Price and output dynamics, together with the corporations' indebtedness level, should be the main focus of policymakers' and researchers' attention when it comes to understanding recession and making decisions. The two Fisherian big bad actors may drive an economy from a recession to a depression.

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