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Macroeconomic policies in Brazil before and after the 2008 global financial crisis: Brazilian policy-makers still trapped in the New Macroeconomic Consensus guidelines

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Even though the New Macroeconomic Consensus (NMC) guidelines have been under review by mainstream economists from developed countries since the 2008 global financial crisis, Brazilian policy-makers are still following these old recommendations. The NMC was adapted in Brazil in 1999 as a policy arrangement known as the macroeconomic tripod: a combination of inflation targeting, floating exchange rates and targets for the primary fiscal surplus. The theoretical basis of this policy arrangement is thus closely aligned to that of the NMC: a reduced (if any) role for fiscal policy and an exclusive focus on price stability for monetary policy. Particularly with respect to the experience of inflation targeting in Brazil, by implementing a vector autoregression model for the period 2000–17, we show that (i) inflation dynamics are mostly cost-push rather than demand-pull; (ii) inflation rates show low sensitivity to changes in interest rates; and (iii) the main variables negatively affected by an increase in the Brazilian policy rate are the nominal exchange rate (i.e. the Brazilian *real* tends to appreciate) and output growth. It follows that the macroeconomic tripod is unsuitable to the Brazilian economy, especially considering that, as it is also shown in this article, such arrangement has contributed to perpetuating trends of high real interest rates, domestic currency overvaluation and low economic growth in Brazil in the last two decades. The article ends calling for a new macroeconomic arrangement to reverse these adverse long-term trends.

Key words: New Macroeconomic Consensus, Brazilian macroeconomic tripod, real interest rate, real exchange rate, Brazil
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My love
All around is deserted
All is right
All is right like two and two are five

Like two and two, lyrics of a Brazilian song, by Caetano Veloso, 1971

1. Introduction

Since the end of the 1990s, after the inflation stabilisation in Brazil, Brazilian policy-makers have been following economic policy guidelines based on the New Macroeconomic Consensus (NMC). The NMC was adopted in Brazil in 1999 as a policy arrangement known as the macroeconomic tripod (a combination of inflation targeting, floating exchange rates and targets for the primary fiscal surplus).[1] The theoretical basis for such an arrangement is closely aligned to that of the NMC in that it has a reduced (if any) role for fiscal policy as well as an exclusive focus on price stability for monetary policy. Even assuming that inflation targeting could be an effective policy to fight inflation in developing economies, in the case of Brazil, it has been conducted in a very conservative way. In fact, as we will argue, such a policy arrangement has jeopardised Brazil's economic development. Moreover, even after the 2008 global financial crisis, when the role of monetary, fiscal and other policies became under review by mainstream economists from developed countries, Brazilian policy-makers continued to follow those old recommendations of the NMC.

One of the most significant conventional wisdoms of the NMC is that a neutral fiscal policy (in the sense that it should not be used as an instrument for boosting aggregate demand and output growth), an inflation-targeting rule and a flexible exchange rate regime are seen as powerful mechanisms for managing aggregate demand and price stability. Particularly with respect to monetary policy, the intent of an inflation-targeting regime is to allow the reduction of any future inflationary expectations and bring actual inflation to the target rate.[2] By controlling inflation to the target, monetary authorities would simultaneously bring the output gap to zero through a 'divine coincidence', as referred to by Blanchard and Galí (2007, p. 35), and thus sustain long-term growth. A flexible exchange rate regime, on the other hand, is intended to address the well-known 'impossible trinity' or 'trilemma' of economic policy, giving autonomy to monetary policy. Under these assumptions, monetary policy is understood as the main macroeconomic policy and the policy interest rate as the main instrument to be employed by policy-makers. In this framework, since fiscal policy should align with monetary policy, the former loses its role as a powerful macroeconomic instrument for the economy to reach full employment (Arestis *et al.*, 2009).[3]

[1] As we shall see ahead, since 2017, the Brazilian government has practised an additional fiscal rule, through which annual total public current expenditures can only increase according to the consumer inflation rate of the previous year. The problem with this new additional fiscal rule is that the economy has been more contractionary in the recent period.

[2] Even in countries where there is no explicit inflation targeting, the pursuit of an implicit target by central banks became an important part of the NMC policy menu, generally implemented through monetary policy rules.

[3] According to Arestis *et al.* (2009, p. 4), within the inflation-targeting regime, '…indeed, monetary policy is viewed as the most direct determinant of inflation, so much so that in the long run the inflation rate is the only macroeconomic variable that monetary policy can affect. Monetary policy cannot affect economic activity, for example output, employment etc., in the long run'. In other words, in order to prevent the acceleration of inflation in the long run, monetary policy should avoid focussing on short-term real output growth, as defended by Friedman (1968) many decades ago.

However, recent evaluations of the macroeconomic performance of financially integrated developing economies have shown that, by virtue of the high volatility and pro-cyclical pattern of capital flows, their monetary policy autonomy is much more constrained and their expansive cycles short lived, reducing their long-term growth rate (Ocampo and Stiglitz, 2008; Rey, 2015; De Paula *et al.*, 2017). Even those who advocate in favour of an inflation-targeting regime in Brazil recognise that 'factors' working in the Brazilian economy 'make inflation control more difficult and generate costs to society by causing inflation and interest rates to be, in general, higher and more volatile than necessary' (Volpon, 2016, p. 90).[4]

Assuming that the inflation-targeting regime has been at the heart of the macroeconomic tripod in Brazil, but has, however, been managed in a very orthodox and stringent way since it was adopted in 1999, this article has two main contributions: first, it critically questions the choice of Brazil's macroeconomic tripod, based on the NMC guidelines, as the most appropriate arrangement of economic policy to sustain long-term economic growth and price stability, and second, it presents empirical evidence that, by having perpetuated trends of high real interest rates,[5] domestic currency overvaluation and low economic growth in Brazil in the last two decades, the macroeconomic tripod has seriously jeopardised Brazilian economic development.[6] Although we discuss the Brazilian experience with inflation targeting, the analysis and conclusions on policy implications may be useful for policy-makers from other developing countries that are facing similar constraints.

The rest of the article is organised as follows. Section 2 briefly discusses the fundamentals on which the NMC is based and the mainstream self-critique that has been developing since the 2008 global financial crisis. Section 3 brings the discussion to Keynes' and the Post-Keynesians' theory on the role of monetary policy to fight inflation. It concludes that inflation in modern economies is a very complex phenomenon and should be fought using a combination of several instruments of economic policy. Section 4 analyses the Brazilian economic policy based on the macroeconomic tripod, with special emphasis on inflation targeting. It will be shown that as monetary policy has been conducted in a very stringent way, several negative externalities impacted the evolution of gross public debt (as a proportion of GDP) and the real exchange rate,[7] compromising long-term economic growth. Section 5 shows empirical evidence, including an econometric model testing the functioning of the inflation-target regime in Brazil, whose results highlight three traps into which Brazil has fallen in the last decades: high real interest rates, an overvaluation trend of its domestic currency and low long-term growth. Section 6 draws the main conclusions.

[4] The author lists the following 'factors' to explain why inflation is so high in Brazil: low degree of trade openness; high impact of commodity prices on domestic currency and inflation; large weight of regulated prices in the consumer price index (IPCA), and wage indexation and segmentation of credit markets. It is interesting to note that, even recognising such specificities, they are not seen as evidence against the experience of inflation targeting in Brazil.

[5] As we will show ahead, the high intensity of the 2015–16 economic recession as well as the sluggish economic recovery since then has prompted Brazil's Central Bank to reduce the nominal and real interest rates (policy rates) to relatively low levels (to 4.25% and 1%, respectively, by March 2019) in comparison to the much higher rates practised before. However, we will question the possibility of such low rates being kept in the medium term if the current macroeconomic regime in Brazil is not significantly changed.

[6] For econometric evidence on the overvaluation trend of the Brazilian real since the adoption of the inflation-targeting regime, see Nassif *et al.* (2017).

[7] In this article, the exchange rate is defined as the domestic price of a unit of foreign currency (e.g. the price of US$1.00 in Brazilian *reals*). Accordingly, an increase in the exchange rate signals a depreciation of the domestic currency, while a decrease signals an appreciation.

2. The New Macroeconomic Consensus (NMC) and the mainstream self-critique after the 2008 global financial crisis

Despite the methodological differences between the mainstream macroeconomic schools, from the mid-1980s to the mid-2000s, there was a growing consensus among Friedman's monetarists followers, Lucas' rational expectations supporters, New Classical economists of the real business cycles and even New Keynesians as to the role of monetary, fiscal and exchange rate policies for stabilising real output and inflation. As this long period corresponded to that of the Great Moderation, in which developed economies experienced satisfactory real output growth, low inflation and low unemployment rates, this economic environment contributed to the consolidation of the so-called NMC. This Consensus can be summarised by the following thinking and policy implications: (i) as there is no long-term trade-off between inflation and unemployment, both the Phillips curve and the real output level are vertical in the long run; (ii) in the short term, the trade-off between inflation and unemployment may occur and any fluctuation in the output associated with changes in aggregate demand are understood as a result of either money illusion (Friedman, 1968) or Lucas' price surprise argument (Lucas, 1973),[8] or even temporary price or wage rigidities (Akerlof and Yellen, 1985); (iii) since economic agents are guided by Lucas' rational expectations, the main policy implication is that the role of monetary policy is to pursue price stability and anchor inflation expectations, preferentially through an independent central bank, monetary policy rules (and not through discretion) and an explicit inflation-targeting regime; (iv) the countercyclical power of expansionary fiscal policy is rejected because of the assumption of Ricardian equivalence; and (v) free capital mobility and flexible exchange rates ease the adjustment of balance of payments disequilibrium as well as savings flows from rich to poor countries.[9]

It is ironic that the NMC was made sacred in an influential article by Blanchard and Galí (2007, p. 35) some time before the rise of the 2008 global financial crisis. In this article, the authors show that, in the absence of any real rigidity (especially real wage rigidity), the standard New Keynesian model implies that there is no 'trade-off between stabilising inflation and stabilising the gap between output and desired output'. This means that, since under such conditions that 'stabilising inflation is equivalent to stabilising the welfare-relevant output gap', the main political economy conclusion is that economic growth emerges as a 'divine coincidence', in Blanchard and Galí's (2007, p. 35) words.

After the 2008 global financial crisis, both macroeconomic theory and its monetary, fiscal, exchange rate and financial policy implications have been subjected to an intense debate. One of the first to criticise the previous state of macroeconomics was Paul Krugman (2009A).[10] For Krugman, the macroeconomics debate between the 1970s and 2008 was concerned with the fact that the 'anti-Keynesian counterrevolution went

[8] In Lucas' words (1973, p. 333), 'the alternative explanation of the same observed trade-off is that the positive association of price changes and output arises because suppliers misinterpret general price movements for relative price changes'.

[9] In theory, since developing countries have lower levels of capital per worker, most capital should flow from rich to poor countries. However, according to the Lucas paradox, this is not observable after the World War II. Neoclassical explanations for the Lucas paradox vary from international capital market imperfections to low economic fundamentals and poor quality of institutions in developing countries. See Lucas (1990), Gertler and Rogoff (1990) and King and Rebelo (1993).

[10] For many, economists such as Paul Krugman, Joseph Stiglitz, Robert Shiller, George Akerlof and Dani Rodrik are classified as mainstream, as most of their theoretical studies use neoclassical analytical tools. However, Lavoie (2011, p. 9) considers these authors 'orthodox dissenters'.

far beyond Friedman's position, which came to seem relatively moderate compared with what his successors were saying'. In this same article, Krugman reminds us that the macroeconomics that had prevailed in academia in this period resulted from theories based on unrealistic assumptions, such as Lucas' rational expectations hypothesis, Fama's financial efficient-market hypothesis and Prescott's association of business cycles with transitory responses to technological progress shocks. Taken all together in dynamic stochastic general equilibrium (DSGE) models, these hypotheses led to the false conclusion that recessions could not be caused by chronic insufficiency of effective demand and that financial markets could work well without regulation. In the economic policy area, these theories supported the irrelevance of monetary and fiscal policies as countercyclical mechanisms to reverse downturns.

In a similar criticism, Paul Romer (2016, p. 6) accused macroeconomic theorists of the 1970s and 1980s (especially those of real business cycles) of invoking the idea that 'fluctuations in macroeconomic aggregates are caused by imaginary shocks, instead of actions that people take'. The criticism does not stop here, but also extends to the excessive use of mathematics far from the real world as well as misleading empirical models derived from DSGE models.

Beyond the self-criticism, mainstream economists (notably New Keynesians) have tried to reconstruct macroeconomics and macroeconomic policy. In general terms, Blanchard and Summers (2017, p. 9) point out that there is a clear acceptance of the need for 'using demand policies more aggressively' to fight deep recessions. The authors state that, after the 2008 global financial crisis, New Keynesians have since formed a growing consensus as to the role of monetary, fiscal and financial policies,[11] which could be summarised as follows:[12]

(i) Monetary policy: there is an agreement with the use of 'aggressive' monetary policy as a countercyclical measure in deep and long-lasting recessions, which are generally accompanied by hysteresis through persistent higher unemployment and lower productivity since potential output is also negatively affected. However, mainstream economists are currently more worried about the reduced scope for managing the policy interest rates in future downturns, considering that the long-term Fed Funds rate is expected to be low (around 2.75% per year) for the next decade. Notwithstanding, Yellen (2017) recognises that central banks can use other non-conventional measures in a context of zero-bound rate, such as several forms of quantitative easing, forward guidance, together with higher yearly inflation-targeting rates (say from 3% to 4% for developed countries patterns), etc.

(ii) Fiscal policy: the countercyclical power of fiscal policy, especially through projects for public investment as well as discovering new kinds of automatic stabilisers, has been surprisingly supported by some mainstream economists. In severe downturns, Roubini (2014, p. 212) argues that 'fiscal stimulus (along with aggressive

[11] Since developed countries are less vulnerable to excessive exchange rate volatility and sudden stops, exchange rate policy discussion tends to be addressed to developing countries with high financial integration in foreign markets.

[12] See also the book organised by Akerlof *et al.* (2014), with discussions and suggestions on how macroeconomic policies (monetary, fiscal, financial, exchange rate and other policies) should be redesigned after the 2008 global financial crisis. Most of the policies suggested are quite different from those prevailing in the NMC.

monetary easing), rather than fiscal contraction, is the appropriate policy response to a private-sector-induced balance sheet crisis'. He also adds that 'empirical evidence suggests that fiscal stimulus is effective in stimulating growth, especially after a financial crisis, when the economy has a large slack and is in a liquidity trap; conversely, excessive front-loaded fiscal consolidation has a negative effect on growth'. The issue is that there still is an ideological anti-Keynesian position against fiscal policy as an important tool to push the economy towards full employment. Krugman (2009B, p. 187), for instance, reminds us that the fiscal package of only 1% of the US GDP in the aftermath of the 2008 financial crisis (according to him it was necessary to have been an additional 4% of the GDP) was too little to recover the economy quickly.

(iii) Financial policies: another ironic lesson from the 2008 downturn is that many orthodox economists finally recognised Minsky's financial instability hypothesis.[13] Minsky (1986, ch. 13) was clearly favourable to tight measures of financial regulation to prevent capitalist economies from financial crashes and depressions, especially by controlling both capital and reserve requirements in banks. The need for bank regulation seems, nowadays, to be the less controversial policy among mainstream economists, notwithstanding the recognition that there are political pressures from bank lobbies to revoke several measures of the 2010 Dodd-Frank Act, which imposed significant regulatory mechanisms on the US banking system.

3. Maynard alive again: Keynes and the Post-Keynesians

A consensus in the economic literature is that persistent inflation is damaging to economic growth. The interest rate, as a monetary policy tool, is also recognised as an important instrument to affect the inflationary process. However, the understanding on the causes of the inflationary process and its impact on economic growth, on the one hand, and the relationship between the interest rate and price behaviour, on the other hand, are far from being consensual in the economic literature. At the centre of the academic dispute in this literature is the role of money in macroeconomic modelling, especially how money affects economic decisions.

Since Keynes' theory has been strongly revived after the 2008 global financial crisis,[14] this section aims to discuss Keynes' theory on the interest rate and the role of monetary policy in closed and open economies as well as Post-Keynesians' analytical view on the role of macroeconomic policies (monetary, fiscal and other policies) for ensuring long-term growth and price stability.

3.1 Keynes' theory of the interest rate and the role of monetary policy

As debated in the Post-Keynesian literature, Keynes' monetary theory represents a fundamental break with the classical conventional analysis that assumes the non-neutrality of money in the short and long run. In Chapter 17 of the *General Theory* (Keynes, 1936), the model of portfolio choice details the attributes of the assets that

[13] As Blanchard and Summers (2017, p. 5) finally recognised, 'Hyman Minsky had warned for decades about the consequences of build-ups in financial risk'.

[14] See Skidelsky (2009) and Taylor (2010).

jointly determine their 'own interest rate' or their total expected real return.[15] In this theoretical view, the demand for each asset would depend on the expected monetary return at a future date and a premium in the form of liquidity preference.[16] Under the assumption of non-neutrality of money, the theory of liquidity preference is Keynes' theory of the interest rate.[17]

As pointed out by Carvalho (2005),[18] the determination of the short-term interest rate by the central bank affects long-term interest rates through the yield curve. According to the author, a sufficiently diversified financial system in terms of markets and institutions would transmit the adjustment in the portfolio of the banking sector induced by open market operations to the longer maturity segment of the market.[19] The longer the tail of the yield curve, the more efficient will be the transmission mechanism of changes in the short-term interest rate to changes in the long-term interest rates—the one that matters for long-term investment decisions in fixed capital assets.

Changes in the short-term interest rate operating through the yield curve influence the demand for assets in the financial and industrial circulations. In such circumstances, a monetary policy that is committed to sustaining the long-term growth of aggregate output and employment should care about providing enough liquidity with the goal of keeping nominal and real interest rates at low levels throughout the yield curve. In this case, agents would be stimulated to exchange liquid holdings kept in the financial circulation for illiquid assets produced in the industrial circulation.

However, Keynes (1936, pp. 202–3) noticed that the efficiency of monetary policy, which means the ability to accomplish its objectives, depends on its credibility. Although claiming that interest rates should be low in the long term with the goal of boosting and sustaining output growth, he warned that: 'The short-term interest rate is easily controlled by the monetary authority (…). But the long-term rate may be more recalcitrant when it has fallen to a level which, based on past knowledge and present expectations of future monetary policy, is considered "unsafe" by representative opinion' (emphasis on the original). He continues: 'Thus a monetary policy which strikes public opinion as being experimental in character or easily liable to change may fail in its objective of greatly reducing the long-term rate of interest'. He concludes, then, that 'the rate of interest is a *highly conventional*, rather than a highly psychological phenomenon' (emphasis added). Indeed, in Keynes' terms, a conventional interest rate

[15] Taylor (2010, pp. 59–60) reminds us that the concept of 'own interest rate' of an asset was introduced by Fisher in the 1890s as equal to its expected price to the spot price ratio minus 1. If this result is positive, it means an expected capital gain. The concept introduced by Keynes (1936) in Chapter 17 of the *General Theory* is different from Fisher's.

[16] The formal presentation is read as follows: $i = q - c + a + l$, where 'i' stands for the own interest rate, 'q' is quasi-income, 'c' is the cost of retention, 'a' is the expected change in asset price and 'l' represents the liquidity premium.

[17] See also Keynes (1936, ch. 13) and Keynes (1937A, 1937B).

[18] See also Keynes (1936, ch. 15).

[19] See Arestis and Sawyer (2002) for a discussion about six transmission mechanisms of monetary policy. The authors give special emphasis to the two credit channels, the narrow credit channel and the broad credit channel, which are described as complementary ways whereby imperfections in financial markets might affect real magnitudes in the economy. According to the authors (op. cit., pp. 9–10), 'they are concerned with how changes in the financial positions of lenders and borrowers can affect aggregate demand in the economy, on the assumption of credit market frictions'. When considering all channels of monetary transmission of monetary policy on the inflation rate, the authors conclude that it is very difficult to identify the contribution of each channel as they are not mutually exclusive and that 'the overall response of the economy to changes in monetary policy incorporates the combined effects of all the channels' (op. cit., p. 10).

should be at a level that could allow for the functioning of the economy close to full employment over time. As Rogers (1989, p. 254) points out, 'in liquidity preference theory the conventional rate of interest plays a role akin to the natural rate in Wicksell's monetary theory because the direction of causation has been reversed and the conventional money rate acts as the centre of gravitation. Ignoring the role of conventional rate is to miss an essential element of the theory'.

Therefore, in Keynes' monetary theory, the level of the interest rate that influences the retention of assets at different degrees of liquidity premium must be accepted with enough conviction by private wealth holders. In Keynes' view, it is the responsibility of the central bank to set a convention on the 'normal' level of the interest rate, which will anchor portfolio decisions of private agents. Under the assumption of an economy working far below full employment, the level of the interest rate should be enough to stimulate output growth.

Up to until here, the theoretical discussion was restricted to closed economies. However, Keynes was one of the first economists Keynes was one of the first economists to stress the loss of monetary autonomy to fix the nominal interest rate in a financially opened economy. Kregel (2008) calls attention to the fact that Keynes, in Volume II of the *Treatise on Money* (ch. 36, 'The national policy autonomy'), had already criticised the deregulation of domestic capital markets and the openness of capital flows, arguing that these policies narrow the policy space to manage aggregate demand.

Notwithstanding, conventional macroeconomic models based on the Mundell–Fleming tradition conclude that monetary autonomy is an expected result for small economies under a floating exchange rate regime and free capital mobility. This conclusion is based on the interest rate parity hypothesis (Carvalho, 2009).[20] This hypothesis establishes a relationship between monetary policy and the international financial market, and as long as the monetary authority is willing to let the exchange rate bear the burden of the adjustment of the balance of payments, the monetary policy will pursue autonomy by setting domestic nominal interest rates. However, this reasoning would hold only if international capital flows were complementary to domestic savings, as remarked by Ocampo and Stiglitz (2008). Indeed, monetary autonomy to directly set the nominal interest rate and, given the expected inflation rate, to indirectly determine the real interest rate to control aggregate demand is very constrained. The discussion for open economies opens avenues to look into the particularities of developing countries. The link between capital flows and monetary policy in these countries should also consider that, within an environment of rising inflationary expectations, the raising of nominal interest rates by the central bank results in net capital inflows. Therefore, since nominal and real exchange rates appreciate, inflationary pressures will cool off.[21] Capital inflows will continue as long as the favourable perception by international financial markets about the prospects of the economy continues. Any reversal of such a perception will hit the economy severely, leading inevitably to a sudden and sharp currency depreciation.

[20] Carvalho (2009) recalls that the interest rate parity theorem (also identified as the uncovered interest rate parity in the literature) was first proposed by Keynes (1923) in his *Tract on Monetary Reform* as part of his criticism of the purchasing power theory of the exchange rate.

[21] Taylor and Taylor (2004) show empirical evidence that, due to short-term nominal price rigidity, changes in nominal exchange rates transmit one by one to the short-term real exchange rates.

As Kregel (1999) stresses, if an economy adopts inflation targeting, then the monetary authority will be more willing to tolerate the trend towards a real exchange rate appreciation because it contributes to keeping inflation low. But since this appreciation trend contributes to putting the current account deficits on an unsustainable trajectory, the economy is likely to recurrently face sudden domestic currency depreciations and inflationary pressure. Summing up, Keynes' theory sheds light on the links between interest rates and exchange rates in open economies, by remarking that the floating of exchange rates without policy instruments to regulate capital flows tends to constrain the autonomy of monetary policy. In other words, an inflation-targeting regime in open developing economies is neither able to stabilise inflation nor sustain growth in a long-term perspective.

3.2 A note on Keynes' interest rates and price formation

In Keynes' view, prices are basically determined by costs, and so, one of the main sources of inflationary pressure comes not only from the supply side, but also from the demand side as assumed by the monetarist view. In this sense, inflation is mainly a symptom of cost pressures and not its cause. According to Keynes (1936, p. 294, emphasis from the original), 'the more significant change [in the price level] is the effect of changes in [aggregate] *demand* both on costs and on volume'. As Keynes (1936) emphasised in ch. 21 of his *General Theory*, even when the economy is below full employment, the price level rises in the expansive cycle as a result of nominal wage increases. This is one of the reasons why the interest rate should not be the only instrument to control inflation in Keynesian economics.

Although Keynes did not deny that increases in the interest rate could control inflation, he argued that this mechanism only hinders the move from rising costs to final prices. In fact, according to the principle of effective demand, if aggregate demand is constrained by increases in the short-term interest rate, both potential output and labour productivity levels tend to be reduced.[22] It follows that an economic policy of fighting against inflation that acts on aggregate demand may even aggravate the inflationary process.

Additionally, when the interest rate is used to control inflation, its impact on relative prices should also be considered. As pointed out by Hannsgen (2006, p. 216), when monetary policy uses the interest rate as the main (if not the only) instrument to control inflation, it raises the relative prices of goods in which interest payments are an important component of total cost. It should be added that inflationary pressure from different sources may occur simultaneously. In other words, the inflationary process is a complex phenomenon and should not be controlled by a single instrument of monetary policy.

3.3 Is inflation-targeting regime compatible with Keynesian and Post-Keynesian economics?

That presentation of Keynes' view on the determination of the interest rate in a monetary economy and its impact when used as the main instrument to control inflation is a necessary starting point to a critical evaluation of the theory that supports the

[22] This point was recently remarked by Blanchard (2018), who shows empirical evidence of such trends.

inflation-targeting regime. An important question to answer is if an inflation-targeting regime would be compatible with Keynesian economics. Above all, it is important to remember that inflation targeting is a by-product of the NMC. This monetary policy regime thus assumes that money is neutral in the long run, and, therefore, changes in the interest rate would have only a short-term impact on the economy. Price stability should, then, be the main objective of central banks, while costs imposed by monetary policy restriction, such as a rise in unemployment and loss in real output, would be short lived if monetary authorities implement credible policies and have a reputation to carry them out. However, as seen above, in Keynes' view, since the inflationary process is a very complex phenomenon, to limit its control to only one instrument generates additional distortions to price formation, not to mention that, under such circumstances, this can also generate serious distortions in the course of economic growth.

As Libânio (2004) argues, when inflation expectations rise, central banks pursue credibility by increasing short-term interest rates; however, such policy strategy tends to lower expectations about output growth. The commitment of the central bank to ensure the convergence of inflation to the target through the increase in the interest rate produces a positive correlation between increases in the current level of prices and the formation of current expectations of contractionary monetary policy. In Keynes' view, the formation of expectations in the described scenario will reduce the current investment in physical capital and consequently the growth potential and it will not ensure long-term price stability as discussed above. In this scenario, a 'convention' (to use Keynes' famous concept)[23] of high interest rates and low long-term growth is established and becomes policy-makers' norm.[24]

All this discussion leads to the conclusion that an inflation-targeting regime is not compatible with Keynes' theory of interest rate, money and inflation. It is worth noting that, since the early 2000s, Post-Keynesian economists have more strongly opposed the political economy of the NMC, especially the theoretical orthodoxy regarding inflation targeting and the (absent) role of fiscal policy. In a series of articles published in the 2000s, Arestis and Sawyer (2002, 2003, 2004, 2006) criticised the core propositions of the NMC, summarised by the authors in the following five topics: (i) the secondary role of fiscal policy; (ii) the support of inflation targeting as a nominal anchor for stabilising the economy; (iii) the acceptance of the classical neutrality of money; (iv) the agreement that the Phillips curve is vertical in the long run, which means that there is a Friedman's 'non-accelerating inflation rate of unemployment'; and (v) the use of the policy interest rate as the main economic policy instrument for stabilising both output gap and inflation.[25]

Nevertheless, we do recognise the political constraints to central banks and policy-makers from developing countries that operate monetary policy under inflation-targeting regimes in suddenly abandoning these regimes. In the meantime, the best choice for these policy-makers is, as suggested by Yellen (2014), to replace traditional inflation targeting (only one target and only one instrument) for flexible inflation

[23] See Keynes (1936, ch. 12).

[24] As we shall see in the next sections, such a convention is one of the main explanations for prevailing high real interest rates and low economic growth in Brazil in the last two decades.

[25] Several Post-Keynesian models were constructed with the aim of proposing alternative tools for operating macroeconomic policies (monetary, fiscal and other policies). See, for instance, Setterfield's (2009) model, which identifies three policy objectives (income distribution, inflation and the level of real output) to be pursued by three policy instruments (monetary policy, incomes policy and fiscal policy), then satisfying Tinbergen's (1952) principle that for each policy objective, only one instrument must be used.

targets (many targets and many instruments) as well as flexible institutional rules, such as an enlargement of the time horizon for reaching the target, use of core inflation, among others.

4. The Brazilian macroeconomic tripod in action: inflation targeting, primary fiscal surplus and exchange rate regime (1999 and onwards)

The so-called macroeconomic tripod—the combination of an inflation-targeting regime, targets for primary fiscal surplus and an exchange rate regime—has become the Holy Grail of Brazilian macroeconomic policy since 1999. Considering that the management of inflation targeting in Brazil has close connections with real interest rate and real exchange rate trends as well as with gross public debt behaviour,[26] IT is the core of the Brazilian macroeconomic tripod. In light of this, we will cover the Brazilian experience with inflation targeting from its implementation in 1999 to its present maturation, exploring its connections with those abovementioned macroeconomic policies.

The inflation-targeting regime was adopted in Brazil in June 1999, following the severe speculative attack against the Brazilian *real* and the replacement of a semi-fixed exchange rate regime for a flexible one between the end of 1998 and the first quarter of 1999. However, as both inflation expectations and actual inflation rates accelerated due to the sharp domestic currency depreciation that occurred during this period of high instability, Brazilian policy-makers urgently needed a new nominal anchor not only for preventing Brazil from returning to the very high inflation rates that had prevailed before the stabilisation plan (*Plano Real*, 1994), but also for managing inflation expectations and bringing long-term inflation rates to low levels.[27] As Bogdanski *et al.* (2000, p. 9) pointed out, '*inflation targeting was the most suited framework to achieve economic stabilisation under a flexible exchange rate regime, with the target itself playing the role of the nominal anchor*'.

In addition to inflation targeting and the replacement of the exchange rate regime, fiscal policy targets were also established.[28] This was a condition imposed by the International Monetary Fund (IMF) to access a preventive financial support package, totalling US$41.5 billion. The Brazilian Committee of Monetary Policy of Brazil's Central Bank (COPOM, in Portuguese) acknowledged that the fiscal adjustment was basically a long-term issue. Bogdanski *et al.* (2000, p. 8) recall that right after

[26] The management of gross debt of the public sector in developing countries must be concerned not only with the level of the stock, but also with other aspects, such as the maturity time of the total debt stock, characteristics of yield rates on public securities issued, the share of securities whose yields are subject to changes in exchange rates, inflation and so on. In the case of Brazil, for instance, in February 2019, the total gross stock of federal securities (corresponding to 77.4% of GDP) had an average maturity of only 30 months. Moreover, around 38.3% of this total was indexed to Brazil's short-term policy rate (the Selic), which is considered an anomaly in the structure of the public gross debt, a kind of yield that only exists in Brazil. See Brazil's Central Bank. http://www.bcb.gov.br/htms/Infecon/seriehistDLSPDivMobFed.asp and http://www.bcb.gov.br/pec/Indeco/Port/indeco.asp (date last accessed 7 April 2019).

[27] In such circumstances, the floating exchange regime introduced on 15 January 1999 was basically a reality imposed by financial markets. As recognised by Bogdanski *et al.* (2000, p. 7) 'in the absence of a well-defined guidance for monetary policy, the exchange rate averaged R$1.52/US$1 in January and R$1.91/US$1 in February, 1999, compared with R$1.21/US$1 prior to the change in regime. Inflation rose sharply: the wholesale price index increased 7.0% in February, while the consumer price index rose 1.4%. This led private analysts to foresee a huge deterioration of all macroeconomic fundamentals'.

[28] In 1999, the general government commitment to primary fiscal surpluses was 3.10% of GDP and this ratio increased to 3.50% of GDP for 2002.

COPOM's first meeting, its monetary report stated that '(i) in a floating exchange rate regime, sustained fiscal austerity together with compatible monetary austerity support price stability; and (ii) as fiscal policy is given in the short run, the control over inflationary pressures should be exerted by the interest rate'. These statements suggest that the construction of what would later be known as the tripod of macroeconomic policy in Brazil (inflation targeting, a floating exchange rate regime and annual targets for primary fiscal surpluses) was, since the beginning, closely aligned with the theoretical fundamentals of the NMC.

The management of monetary policy under inflation targeting in Brazil can be broken down into three phases: (i) the period 1999–2005, during which inflation targeting was constructed and policy-makers were learning how to manage it; this phase was marked by a very tight monetary and fiscal policies; (ii) the period 2006–11, which was characterised by the flexibility of both monetary and fiscal policies and the gradual reduction of real interest rates; and (iii) the period 2012 onwards, marked by the weakest degree of coordination between monetary and fiscal policies as well as by an economic environment of increasing inflationary expectations and rapid economic deceleration that put Brazil, from 2015 to 2016, into the deepest recession since World War II. It is worth stressing that the problem of weak coordination between monetary and fiscal policies became crucial to understanding and explaining the Brazilian economic recession that emerged in the third phase.

In the first phase (1999–2005), the high level of real interest rates (10.3% per year, on average) was justified by the need to anchor the high inflationary expectations resulting from several negative shocks that occurred in the period.[29] Since the real exchange rate of the Brazilian *real* to the US dollar was overshot in the beginning of 1999 as well as in 2002–03, very high short-term real interest rates were justified by the need to prevent the Brazilian economy from returning to the high inflation rates that had prevailed before the Real Plan (1994).[30] Real GDP growth (at 2.8% per year, on average) was sluggish in this first phase.[31]

In the second phase (2006–11), the reduction of real interest rates (to 6.5% per year, on average)[32] reflected the monetary policy response to two different episodes that

[29] Between 1999 and 2005, the Brazilian economy was affected by three shocks: (i) a speculative attack against the Brazilian *real* that occurred in the transition from a semi-fixed exchange rate regime to a floating exchange rate regime between the end of 1998 and beginning of 1999, as already commented on; (ii) the electric power crisis (*apagão*), which occurred in 2001, leading to a severe rationing of energy supply; and (iii) another speculative attack against the Brazilian *real*, which occurred between 2002 and 2003, due to financial markets' uncertainty about the economic policies that would be adopted by the then candidate to the presidential election, Luiz Inacio Lula da Silva, who was not considered a market-friendly politician on that occasion.

[30] Indicators on indices of the real exchange rate of the Brazilian real against the US dollar show that the Brazilian currency was undervalued at 40% between 2001 and 2004 (on yearly average). See indices of real exchange rate Brazilian real/US dollar (deflated by IPCA), June/1994 = 100 on Brazil's Central Bank website. https://www3.bcb.gov.br/sgspub/consultarvalores/telaCvsSelecionarSeries.paint (date last accessed 18 March 2019).

[31] Data on real GDP growth is available on the Brazilian Institute of Geography and Statistics (IBGE) website. https://www.ibge.gov.br/estatisticas-novoportal/economicas/contas-nacionais/9052-sistema-de-contas-nacionais-brasil.html?=&t=o-que-e (date last accessed 7 April 2019).

[32] It is worth noting that in spite of the significant drop in real interest rates observed in the second phase, this rate was still too high in comparison with other emerging countries: Brazil continued to alternate between the first and second place ranking for the country with the highest short-term real interest rate in the world in the period 2006–11. Barbosa-Filho (2017), in a recent newspaper article, commented on and confirm these results.

occurred in the period. The first one was the convergence of both inflation expectations and actual consumer inflation rates (IPCA) to annual targets, widening policy space for a significant decrease in real interest rates. Although the government commitment to the fiscal adjustment has contributed to anchor inflation expectations, the strong overvaluation of the Brazilian real is one of the most important factors to consider when explaining the relatively low inflation.[33] The second episode was the immediate recessive impacts of the 2008 global crisis on the Brazilian economy. Albeit with some time lag, Brazil's Central Bank's COPOM announced successive reductions in short-term policy interest rates from the first quarter of 2009 on. Between 2009 and 2010, there was more coordination between monetary and fiscal policies, which, in the face of a global downturn, was characterised by countercyclical measures. Particularly in relation to the fiscal policy, the countercyclical measures prioritised infrastructure investments as well as a successful state construction plan of housing for low-income families.[34] Given the nature of the construction plan, it combined the triple goal of promoting growth, employment and inequality reduction. In this phase, when fiscal policy instruments were slightly more aligned with Post-Keynesian recommendations,[35] Brazil registered the highest average annual growth rate of real GDP (at 4.4%) since 1980. In addition to the mentioned expansionist fiscal policy, the commodities price boom was also an important factor contributing to such performance (Carvalho, 2018).

The third phase (2012 onwards), during which the inflation-targeting regime has reached its adulthood, can be characterised as the one in which monetary and fiscal policies are marked by the lowest degree of coordination. While Brazil's Central Bank decided to continue decreasing short-term policy rates from January 2012 to April 2013,[36] the Ministry of Finance's economic team followed with a very expansive fiscal and credit policy, composed of credit stimuli to consumption as well as tax exemptions for firms in several sectors of the economy, with the goal of reversing the rapid deceleration of the Brazilian economy. It is worth noting that such expansionist monetary and fiscal policies were an attempt of government to break with the macroeconomic tripod.[37] However, even recognising that the replacement of this macroeconomic

[33] Nassif *et al.* (2017) show empirical evidence that the most significant explanatory factors responsible for the high overvaluation in this period were the high differential between Brazilian and external interest rates and favourable terms of trade. The first factor worked as an important attraction to significant net capital inflows in Brazil, which was also benefited by high international liquidity in the period.

[34] In fact, in the aftermath of the global crisis, even considering the significant drop, short-term real interest rates were still very high in Brazil (at 6.3% per year). One could ask how it was possible for the country, after registering a contraction of 0.3% of its real GDP, to get out of the crisis relatively quickly and exhibit 10.7% in 2010. The answer is that while a share of private investments realised after July 2009 was financed by subsidised interest rates in operations involving purchases of capital goods in the Program for Sustaining Investment (PSI) from the Brazilian Development Bank (BNDES), the other share was driven by public investment related to two governmental programs: the Program for Accelerating Investment (PAC in Portuguese), implemented in 2007, and My House, My Life (*Minha Casa*, *Minha Vida*, investment in housing for low-income families), adopted in 2009.

[35] It is worth emphasising, however, that, as the modus operandi of the IT regime and the management of the flexible exchange rates system remained unchanged in this second period, this expansionist monetary and fiscal policies did not necessarily mean a break with the macroeconomic tripod.

[36] See the series of short-term policy interest rates (SELIC) on the website of Brazil's Central Bank. https://www3.bcb.gov.br/sgspub/consultarvalores/consultarValoresSeries.do?method=getPagina (date last accessed 20 March 2019).

[37] As to monetary policy, by recovering the debate in the web press between 2012 and 2014, several economists accused Dilma Rousseff, Brazil's then president, of pressuring the central bank (which has *de facto*, but not *de jure* independence) to forcibly reduce short-term interest rates. However, this accusation has never been confirmed.

regime for another more appropriate for sustaining economic growth in Brazil was (and still is) necessary, those expansionist policies, known critically by orthodox Brazilian economists as 'New Economic Matrix', resulted from an incomplete diagnosis through which Brazil would be negatively affected by low world growth rates, the crisis in the Eurozone and the sharp drop in primary products and industrial commodities exported by the country.

If it is true that Brazil was being adversely affected by the worsening of the external environment, then the mechanisms of expansionist fiscal policy to deal with economic deceleration were the key problem. Indeed, by preferring tax exemptions for entrepreneurs and credit stimuli for households over Keynesian countercyclical fiscal policy through the reactivation of public investment, policy-makers engaged in low-quality supply-side economics.[38] Not by chance, as the real output did not respond to these stimuli and in the face of high uncertainty and rising inflation expectations, Brazil's Central Bank started increasing policy interest rates again from April 2013 onwards. In other words, the Brazilian government tried to change the modus operandi of the macroeconomic tripod by introducing policy instruments that ended up being misleading and contributed to the emergence of the Brazilian economic recession later on.

Besides being ineffective in reversing economic deceleration, as commented above, under this fiscal policy, the Brazilian government not only contributed to significantly reducing the primary fiscal surplus, but also to popularising the false narrative that the worsening of fiscal conditions resulted from a jump in government current expenditures.[39] Official indicators displayed by Brazil's Ministry of Finance (2018) registered that total government fiscal exemptions increased from 0.7% to 2.1% of GDP between 2010 and 2015. According to Carvalho (2018, p. 88), 'adjusted for consumer inflation rate (IPCA), total government current expenditures increased at 5.2% per year (on average) during Dilma Rousseff's government (2011–14), below the growth rates registered during the second term of Fernando Henrique Cardoso's government (1999–2002) and the two terms of Luiz Inácio Lula da Silva's government (2003–10), respectively at 5.6% and 7.2% per year (on average)'. Yet the results for public investments showed a distressing behaviour, for they increased (on average) at only 0.3% per year in real terms in the period 2011–14, against 7.2% and 10.7% per year, respectively, over the periods 1999–2002 and 2003–10.

In 2015, the increasing inflationary expectations and a dramatic drop in aggregate demand (especially private investment and household consumption) led Brazil into the deepest recession since World War II. In the period 2015–16, Brazil had an accumulated contraction of 7.5% in real GDP, representing a dramatic accumulated fall in per capita income of 9.2% in just these two years.[40]

[38] As Krugman (2009A, 2009B) reminds us, this kind of fiscal policy, usually supported by the US Republican Party (like during the George W. Bush government) and popularly known as 'voodoo economics', generally ends up in higher inflation and low economic growth.

[39] This narrative was daily repeated by the critics of the 'New Economic Matrix' in the press and blogs. See, for instance, Ferreira and Cardoso's (2016) book, which joined their several articles published in the Brazilian newspaper *Valor Econômico* over the period.

[40] See the Brazilian Institute of Geography and Statistics (IBGE), ftp://ftp.ibge.gov.br/Contas_Nacionais/Contas_Nacionais_Trimestrais/Fasciculo_Indicadores_IBGE/ (date last accessed 11 September 2017).

Since the end of Brazil's Great Recession in the last quarter of 2016, while economic recovery has been sluggish and unemployment rates have registered very high levels,[41] the Brazilian government has reinforced the practical fundamentals of the macroeconomic tripod. This signalises that the government is following a framework far from the macroeconomic policy approach and policy suggestions that have been critically reviewed by New Keynesian economists since the 2008 global financial crisis. That is to say, Brazilian policy-makers are still trapped in the NMC.

While the working of the exchange rate regime has been kept unchanged, the management of inflation targeting in Brazil, in contrast with most central banks in the world, has been characterised by extreme absence of flexibility. This confirms that Brazilian monetary authorities have clearly preferred to anchor inflation expectations and preserve price stability over other broader objectives, such as economic growth and full employment.[42] By March 2019, for instance, notwithstanding that inflation expectations were well anchored as well as below the annual target and estimations of the output gap varied from −4% to −5.8%,[43] Brazil still had the sixth highest short-term real interest rates (at 2.83% per year) among a sample of 40 developing and developed countries, of which more than half showed negative rates and the mean for the entire sample was around 0.36% per year.[44]

Regarding fiscal policy based on the targeting of primary fiscal surpluses—the other component of the macroeconomic tripod—, Congress approved a constitutional amendment (no. 95 of December 2016) adding a new fiscal rule through which changes in total government primary expenditures (excluding interest rates) over the next 20 years starting from 2017 will be yearly adjusted according to the annual consumer inflation rate of the previous year. In practice, as this reform neglects the role of expected fiscal revenues, long-term fiscal adjustment will be based on a freeze of total primary expenditures in real terms over the next 20 years.[45] Considering that this new additional fiscal rule is aligned with the controversial expansionist fiscal austerity hypothesis,[46] and is in contrast with the reconstruction of macroeconomic thinking after the 2008 global crisis and Post-Keynesian economics, this draconian fiscal adjustment will make it virtually impossible for fiscal policy to be used as an important instrument for boosting aggregate demand and employment. This conjecture is especially worrying, considering that during this third phase of inflation-targeting experience in Brazil, the real GDP grew at only 0.3% per year in the period 2012–19.

[41] After growing at 1.3% in 2017 and 2018, respectively, real GDP grew at only 1.1% in 2019, revealing that this has been one of most long-lasting recoveries in the aftermath of deep recessions in Brazil. And unemployment rate was still at 11.2% in January 2020. Both indicators were drawn from Brazilian Institute of Geography and Statistics (IBGE). See https://agenciadenoticias.ibge.gov.br/ (date last accessed 4 March 2020).

[42] Among all countries that adopted inflation targeting, Brazil is one of the few committed to reaching the annual target within only one calendar year. See Heenan *et al.* (2006, p. 19) and Araújo and Arestis (2019).

[43] See Borges (2019).

[44] See Infinit Asset Management. http://moneyou.com.br/wp-content/uploads/2018/12/rankingdejurosreais121218.pdf (date last accessed 29 March 2019).

[45] The Amendment incorporates the possibility of a revision of this rule within 10 years. It is important to note that, as inflation rates are dropping within a strong recessive environment (which implies decreasing fiscal revenues), the IMF estimates that Brazil will only be able to show primary fiscal surplus from 2020 on. See International Monetary Fund (2016).

[46] See Alesina *et al.* (2018).

5. Inflation targeting in Brazil: empirical evidence

This section is divided into two subsections. In Subsection 5.1, we will present empirical evidence of the Brazilian experience with inflation targeting that contradicts two conventional wisdoms about how the inflation-target regime should work. In Subsection 5.2, by implementing a vector autoregression (VAR) model for the period 2000–17, we will show the constraints of the transmission mechanisms of the inflation-target regime in Brazil.

5.1 Conventional wisdom, stylised facts and some empirical evidence on inflation targeting in Brazil

5.1.1 Conventional wisdom 1

For a given state of inflationary expectations, it is assumed that credible monetary policy is powerful enough to make inflation rates converge to an inflation target within a specified time horizon (in Brazil's case, a calendar year), acting through the manipulation of a short-term policy interest rate, which is assumed to function as a nominal anchor that guides the inflationary expectations of the public (Woodford, 2003).

5.1.1.1 Stylised facts and discussion

Central banks are aware that monetary policy can only reach its goals if the stimuli given through changes in the nominal policy rate produce the expected impact on aggregate demand by means of changes in real interest rates. The main transmission channels of monetary policy are the short-term interest rate by means of its effects on aggregate demand, credit channels, asset prices, the real exchange rate and inflation expectations. For monetary policy to be efficient in its goal of stabilising inflation rates, it is necessary that its transmission channels work efficiently. If they do not, higher real interest rates will be needed to offset the flaws in those transmission channels of monetary policy.

This has been the case of Brazil, where three of the four channels listed above do not work efficiently. The short-term interest rate is by itself the first channel to not efficiently transmit to aggregate demand because of the presence of regulated prices, which makes changes in interest rates have limited effect on the drop in price level in Brazil. Sicsú and Oliveira (2003), for example, suggest that regulated prices are rather insensitive to the conditions of supply and demand because they are established by contract or government agency and do not react to changes in interest rates. In Brazil, since approximately 28% of the consumer price index (IPCA) consists of regulated prices, monetary policy needs to be even more contractionary to induce inflation to reach the target.

Figure 1, which compares the evolution of the ex-post real interest rate and the consumer inflation rates, illustrates this issue, suggesting that there is a low correlation between them. This means that, *ceteris paribus*, when Brazil's Central Bank seeks to converge the actual inflation rate to the target, it must excessively increase the short-term policy interest rate to offset those prices less sensitive to changes in real interest rates.

The credit channel is the second traditional transmission mechanism of monetary policy that does not efficiently work in Brazil. Given the incomplete structure of the Brazilian long-term private financial system, monetary policy stimuli are not

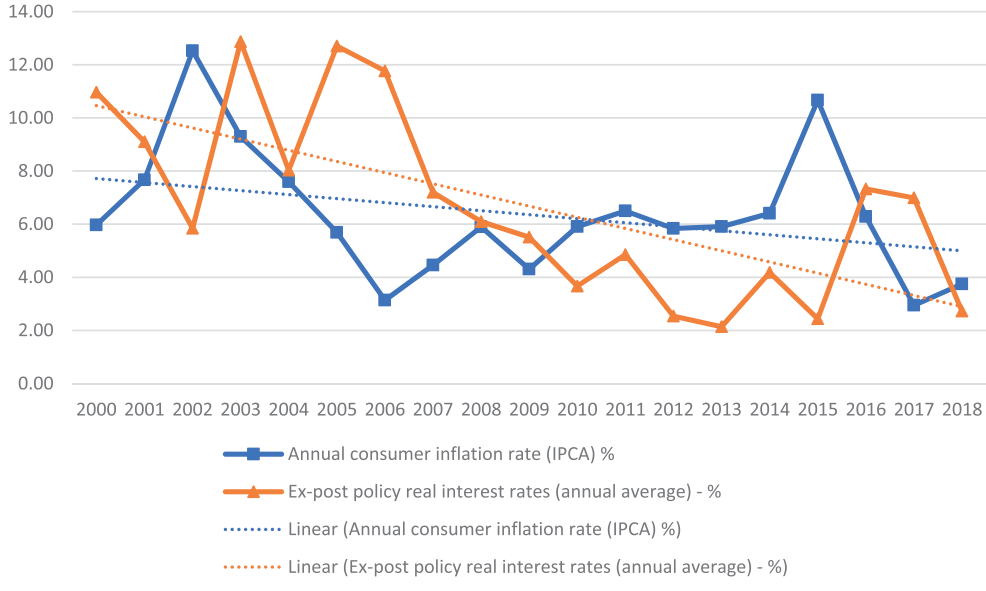

Fig. 1. *Ex-post real interest rates and consumer inflation rates in Brazil 1999–2018 (in %). Note: Ex-post real interest rates were calculated by the authors using Consumer Price Indices (IPCA) as deflator.*
Source: Brazil's Central Bank and the Brazilian Institute of Geography and Statistics (IBGE).

transmitted to the longer-term credit market, generating constraints to finance private investments (Carvalho, 2005). Regarding the transmission channel of monetary policy via credit, Souza-Sobrinho (2003) and Carneiro *et al.* (2006) presented empirical evidence that its effectiveness is questionable in Brazil, due to factors such as the reduced depth of the Brazilian financial system and the high share of government-driven credit in the total credit granted.[47]

The third inefficient transmission source of monetary policy emerges through its effects on Brazilian asset prices, assuming that an increase in interest rates should reduce the market price of securities and make the holders of such assets poorer. However, in Brazil there is a *sui generis* anomaly through which a significant share (38.3% in February 2019) of total gross public debt is indexed to the short-term policy interest rate (SELIC). This means that when Brazil's Central Bank's COPOM increases the

[47] The government-driven credit is segmented according to economic activities and policy goals. In Brazil, the most important public financial institutions are the Brazilian Development Bank (BNDES), which provides loans for financing long-term investments and exports, *Banco do Brasil* (a government-owned commercial bank), which provides financial funds for agriculture, and *Caixa Econômica Federal* (also a government-owned commercial bank), which manages a mortgage system directed to households. It should be mentioned that with the argument that the long-term interest rate (TJLP) from BNDES, by involving an implicit subsidy, reduces the effectiveness of monetary policy, Congress approved in 2017 the Provisory Measure No. 777 through which that rate will be replaced by the long-term rate (TLP). The TLP, which will be gradually implemented in the next five years, will be determined by the consumer inflation rate and the Treasury Notes interest rate (NTN-B) prevailing on the day when the loan contract is signed. This measure aims at making the TLP close to market interest rates. The main criticism against the new TLP is that the existence of government-driven loans is not the main factor explaining the abnormal high real interest rates in Brazil. Moreover, if the intention is to eliminate all implicit subsidies in Brazil, all government-driven loans should be changed, and not only those provided by BNDES.

policy rates, the financial income associated with Treasury bonds indexed to SELIC (the so-called LFT bonds) is raised, and so is the wealth of these bond owners. Therefore, the final effect of an increase in the policy rate is partially neutralised by the increase in the wealth of LFT owners (Nakano, 2014). Ultimately, this anomaly is a strong source of pressure for keeping both real interest rates and gross public debt (as a proportion of GDP) at high levels in Brazil. It also creates a perverse vicious cycle through which high real interest rates increase the ratio of the Brazilian gross public debt to GDP. This increase, in turn, by raising the country's risk premium, also tends to increase real interest rates, making it hard to identify what the cause and effect are in such a process. Theoretical and empirical analyses on this Brazilian anomaly can be found in Pastore (2006), Oreiro and Amaral (2008), and Andrade and Pires (2009).

5.1.2 Conventional wisdom 2

A floating exchange rate regime is considered the most appropriate mechanism for not only absorbing external shocks and promoting the automatic adjustment of the balance of payments, but also assuring the independency of monetary policy.

5.1.2.1 Stylised facts and discussion

This wisdom is associated, as mentioned in Section 2, with Mundell's (1960) classical 'trilemma' of economic policy, according to which it is not possible to simultaneously ensure price stability, exchange rate stability and free capital movements. According to Mundell's 'trilemma', a flexible exchange rate regime would restore monetary policy autonomy. However, Mundell (1960) had already observed that, since the internal stability of a model with a floating exchange rate and capital mobility depends on the manipulation of the interest rate, this latter variable affects the stability of domestic prices in an indirect way. With free capital movements, the change in the interest rate aimed at controlling aggregate demand and inflation affects first the short-term capital flows, which in turn affect—albeit with some time lag—the real exchange rate, which is then adjusted to restore the equilibrium in the market of goods and services as well as the balance of payments. In this way, in open economies with free capital movements, the transmission mechanism of monetary policy operates through the exchange rate.[48]

The uncovered interest rate parity states that the expectation of a depreciation in the domestic currency should reflect the differential between domestic and international interest rates. But as exchange rate expectation is affected by the country's risk premium, when this latter variable increases, the domestic currency is expected to depreciate. This means that when the foreign exchange market faces high instability, the threat of depreciation puts pressure on the domestic interest rate to keep the attractiveness of domestic assets. In theory, the uncovered interest rate parity suggests a positive correlation between the short-term interest rate differential and the nominal (and real) exchange rate.

In financially open emerging economies like Brazil, however, such positive correlation has not been confirmed. It has been observed that, after a period of exchange rate

[48] For specific transmission channels of monetary policy in emerging economies, see Bhattacharya *et al.* (2011). They found strong evidence that the exchange rate is the main transmission channel for monetary policy in India.

instability, as soon as the foreign exchange market is stabilised again, an appreciation trend of the exchange rate is expected following the announcement by the central bank of successive increases in the domestic policy interest rate. The goal is to reduce inflation expectations within an inflation-targeting context. The issue is that systematic increases in short-term policy rates represent an additional incentive to sustain the excessive flows of foreign capital, especially those of a speculative nature. In practical terms, this stylised fact suggests that, since foreign investors tend to bet on the appreciation trend of currencies in emerging economies over the *bonanza* period, the use of these currencies for carry-trade strategies implies that the uncovered interest rate parity is explicitly violated. Thus, instead of reflecting expectations of depreciation, such dynamics reveal that the higher the interest rate differential, the greater the expectation that the domestic currency will continue to appreciate. This tendency will only be interrupted by sudden stops that emerge after any domestic or international shock.[49]

The overvaluation trend of the real exchange rate in emerging economies has also been pointed out by Obstfeld (2008) and recently stressed by Rey (2015). According to Obstfeld (2008), considering the short-term nominal price rigidities, a collateral effect of the floating exchange rate regime with free capital mobility in emerging economies is that changes in international demand for their goods and assets are quickly translated into an overvaluation of their currencies.

Yet Rey (2015, p. 1) went further, questioning Mundell's classical trilemma—according to which if there is free capital mobility, it is possible to have monetary policy independence (and monetary stability) if, and only if, the exchange rate floats freely. By presenting empirical evidence on global financial cycles, Rey (2015) points out that such results have not been validated in the real world. In her words (Rey, 2015, p. 3), 'the global financial cycle transformed the "trilemma" into a "dilemma" or an "irreconcilable duo": *independent monetary policies are possible if, and only if, the capital account is managed, directly or indirectly via macroprudential policies*'. But if these latter policies are not sufficient, she adds that direct '*capital controls must also be considered*' (quotation marks from the original; emphasis added).

The quotation can especially be addressed to the experience of Brazil in the last decades. Given the country's significant differential between domestic and external interest rates as well as the high degree of capital mobility, Brazil has alternated periods of excessive capital inflows and an appreciation trend of its domestic currency with other periods of capital flights and sudden exchange rate depreciation throughout the global financial cycles.

Figures 2 and 3 illustrate these trends. Figure 2 displays the behaviour of the short-term policy interest rates differential in Brazil and the US (monthly rates) between 1999 and April 2017. It clearly shows that the positive correlation between the depreciation of the Brazilian real exchange rate and the increase in the interest rates differential is only observed in turbulent times like the period 2001–03 and, more recently, in 2015. The general trend has been high interest rate differentials and an appreciation

[49] On the use of the Brazilian currency (the *real*) in carry-trade strategies over the 2000s, see Kaltenbrunner (2010).

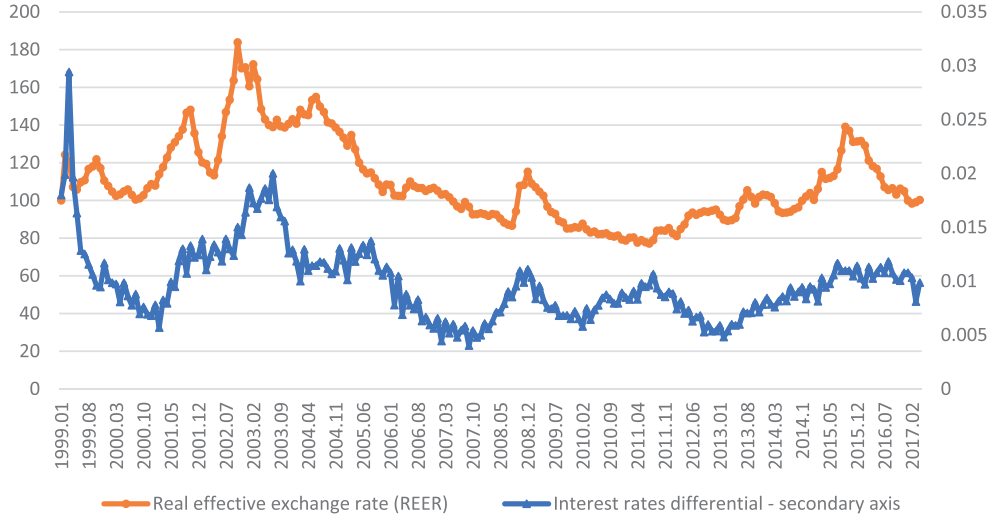

Fig. 2. *Interest rates differential and the real effective exchange rate in Brazil: 1999–2017 (respectively in % and index-number, 1994 = 100).*
Note: Interest rates differential obtained by the difference between the monthly Brazilian policy interest rate (SELIC) and the US Fed Funds interest rate (reference: IMF/IFS—IFS12_TJFFEUA12).

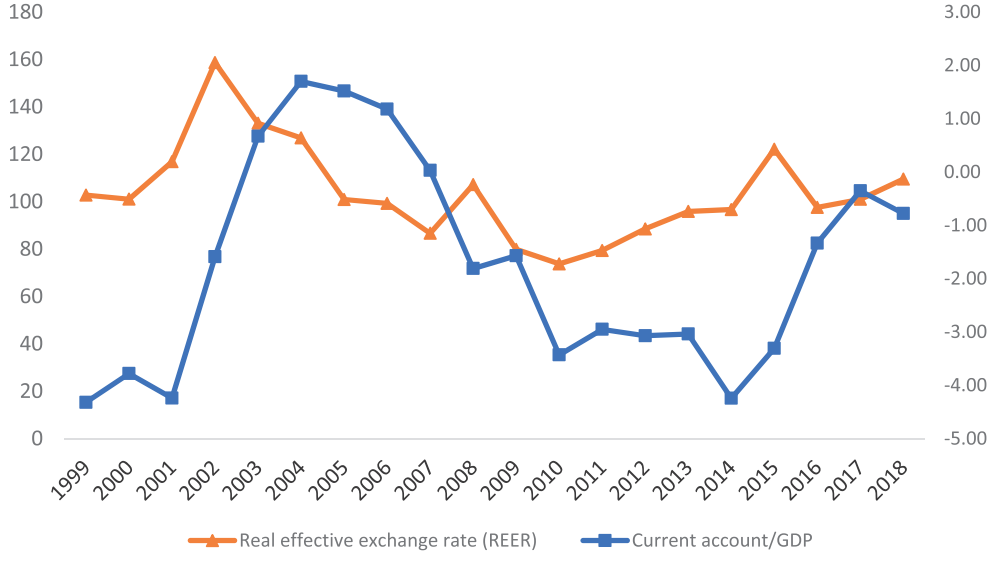

Fig. 3. *Real effective exchange rate and current account balance in Brazil: 1999–2018 (respectively in index-number, 1994 = 100, and in % of GDP). Current account/GDP - secondary axis.*
Source: Brazil's Central Bank.

of the Brazilian domestic currency in real terms, a sound violation of the interest rate parity hypothesis, as already discussed.

The perverse effects of the real appreciation of the Brazilian currency, a chronic trend observed since the mid-2000s, has been emphasised by several studies in the

last decade. Despite easing the convergence of actual consumer inflation rates to the annual targets, the first negative effect is that such a trend has been boosting premature deindustrialisation in Brazil, as shown by Bacha (2013), Nassif *et al.* (2015) and Rodrik (2016), among others. The second perverse effect of the recurrent trend of real exchange rate appreciation is to subject Brazil to unsustainable current account deficits, as illustrated by Figure 3.

Figure 3 suggests two trends: the first is that Brazil's current account deficits are closely associated with the trend of real appreciation of the Brazilian currency; the second is that, in the face of an unsustainable trajectory of such deficits, the adjustment is explained by either sudden depreciations of the domestic currency, as occurred in 1999, or a combination of depreciations with deep recessions, as occurred in the period 2015–16.

It is worth noting that these long-term trends are not restricted to the Brazilian experience with inflation targeting. In an special issue of Comparative Economic Studies, Ffrench-Davis (2015), Ocampo and Malagón (2015) and Ros (2015), respectively, reported that the inflation-targeting regimes in Chile, Colombia and Mexico have revealed an unequivocal capacity of keeping low inflation rates in these countries, but, by virtue of their high degree of capital account openness and exchange rate liberalisation, they have also implied trends of real appreciation of domestic currencies and extreme volatility in their current account balances.

5.2 Inflation targeting and monetary policy transmission in Brazil: econometric evidence

Considering that the inflation-targeting regime is at the heart of the Brazilian macroeconomic tripod and influences the behaviour of several variables affecting the economic performance, this subsection presents our results of an econometric exercise testing the effectiveness of this regime in Brazil. In the case of Brazil, as seen in Subsection 5.1, changes in monetary policy are not fully transmitted because of problems in the transmission mechanisms through interest rates yield curve, credit markets and asset prices. Such problems end up making the monetary policy effects highly dependent on the real exchange rate level. In fact, several authors, including Belaisch (2003), Minella *et al.* (2003) and Minella and Correa (2006), by estimating a significant exchange rate pass-through coefficient for the Brazilian economy, called attention to its importance for the price level.

To test the effectiveness of inflation targeting in Brazil in the period 2000–17, we implemented two empirical procedures: first, for investigating if the Brazilian inflation dynamics is predominantly a demand-pull or a cost-push phenomenon, we analysed if changes in price levels would be affected mainly by economic activity or by exchange rate movements, respectively, and second, for capturing the main transmission channels of monetary policy, we investigated the effects of monetary shocks on inflation, exchange rates and aggregate demand as well as their interaction with the gross public debt. To accomplish both objectives, we estimated a VAR model[50] with monthly time series of the Brazilian economy, from January 2000 to March 2017, on the following variables: annualised policy interest rates (*SELIC*); consumer inflation rates (*IPCA*), measured by the monthly accumulated index in 12 months of consumer price indices; the monthly and seasonally adjusted index of industrial production (*IND*); the

[50] For details on the methodology, see Enders (2014).

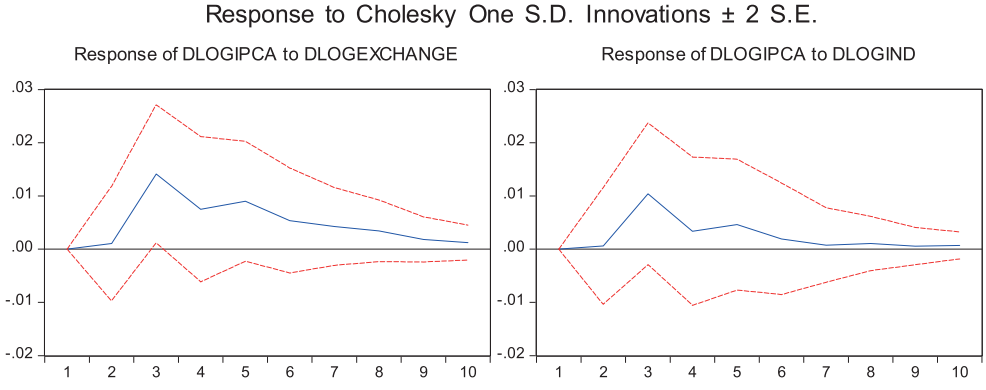

Fig. 4. *Transmissions of monetary policy through aggregate demand and exchange rates.*
Note: Estimated VAR with variables at first difference and three lags.

domestic federal gross public debt as a proportion of GDP (*DEBT*); and the Brazilian real/US dollar nominal exchange rate index (*EXCHANGE*). Data sources are described in Appendix.

The first step is to verify whether the time series follows a stochastic stationary process over time. As the Augmented Dickey–Fuller and Phillips–Perron tests indicated that the series are non-stationary and, therefore, have a unit root, we estimated a VAR model with the variables in the first difference.

The results of the econometric investigation on how changes in aggregate demand and the exchange rate are transmitted to inflation are shown in Figure 4.

The response of inflation to an increase in the level of economic activity (right graph), as measured by industrial production (*IND*), is relatively small. Inflation accelerates and peaks in the third month after the shock in *IND*. From the third period, it slows down and its effect dissipates.[51] Yet an exchange rate *(EXCHANGE*) depreciation is transmitted to prices (left graph) from the second month after the shock and its accelerating effect on inflation shows considerable persistence: seven months after the shock in exchange rate, inflation still remains above the initial level.

As the shock is symmetrical, it can be observed that the exchange rate is an important transmission channel of monetary policy. This variable has been not only an unwanted by-product of monetary policy but also has proven to be one of the most significant transmission mechanisms to the price level in Brazil in the period 2000–17. In other words, the econometric exercise shows that inflation in Brazil has predominantly been a cost-push phenomenon.

Figure 5 shows the effect of a rise in the policy interest rate (*SELIC*) on the other variables of the model, which include the exchange rate (*EXCHANGE)*, gross public debt (*DEBT*), industrial production (*IND*) and price indices (*IPCA*).

It is initially observed that the inflation response to a *SELIC* shock (left graph on the top) configures a typical price-puzzle situation (Walsh, 1988). In fact, after a monetary

[51] The low inflation response to a shock in the industrial production index may stem from the fact that industrial activity may not be a good proxy for GDP. However, the large correlation between these two variables makes the first variable traditionally used as a proxy for economic activity in analyses of monetary policy shocks and their effects on the economy.

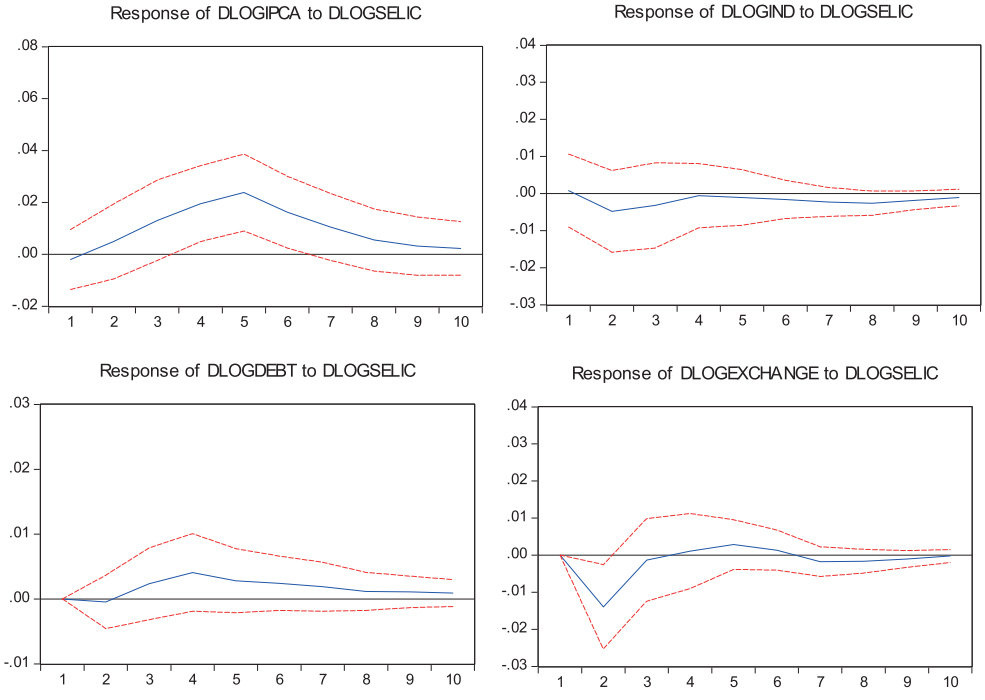

Fig. 5. *Effects of monetary shocks.*
Note: Estimated VAR with variables at first difference and three lags.

shock, inflation accelerates, reaching its peak in three months, and declining from then on. For the orthodox approach, the more conventional explanation is that it is a problem of misspecification: the variables included in the model do not exhaust the set of information available to the central bank (Sims, 1992). For the heterodox approach, however, this phenomenon occurs because a rise in interest rates, by increasing firms' total costs—the amount depending on their market power and demand conditions, tends to be transmitted to prices. This view is based on the contribution of Kalecki (1954), Palley (1996, ch. 11) and Arestis (1992, ch. 6). Despite this, the model suggests that Brazilian inflation has low sensitivity to the interest rate. This means that an increase in the policy interest rate has reduced the deflationary impact.

Regarding the effects of the interest rate on the other variables, we highlight the negative effect of an increase in the interest rate on industrial production (*IND*) and on exchange rate (*EXCHANGE*)—right graphs on the top and on the bottom—respectively. Gross public debt (*DEBT*) also grows in response to an increase in interest rates (left graph on the bottom).

In summary, the empirical evidence shows that a rise in the Brazilian policy interest rate (*SELIC)* generates a relatively small benefit in terms of reducing inflation. Increases in the *SELIC* rate generate non-negligible economic and social costs, especially the fall in the level of economic activity and an increase in the gross public debt to GDP ratio. In addition, increases in the policy interest rate tend to appreciate the Brazilian currency, undermine the competitiveness of export tradable goods and deteriorate the current account balance. In this sense, the management of monetary policy since the 2000s has imposed a heavy sacrifice on

the Brazilian economy. In short, the low sensitivity of inflation to the policy interest rate results in weak transmission mechanisms of monetary policy and explains why maintaining price stability in Brazil requires setting the nominal and real interest rate at relatively high levels.[52]

In the theoretical and empirical debate investigating the main possible causes of high real interest rates in Brazil in the last decades, the explanatory factors vary from the jurisdictional uncertainty hypothesis (Arida *et al.*, 2005)[53] and insufficient fiscal adjustment (Pinheiro and Giambiagi, 2006; Pastore and Pinotti, 2006)[54] on the orthodox front, to several institutional features of the Brazilian economy on the heterodox front, as extensively discussed in this article (see also Barbosa-Filho, 2006).

Nonetheless, our stylised facts and empirical results suggest that the excessively high levels of real interest rates in Brazil resulted from a convention that, by virtue of the loss of monetary autonomy in the face of high external financial openness, imposes a significant floor for the nominal and real policy interest rates compared with other developing countries with similar economic fundamentals. This interpretation is in line with Bresser-Pereira and Nakano's (2002, p. 169) argument, according to which, 'due to the fear of losing reputation, it became a convention for monetary authorities to maintain the real interest rates at excessive levels in Brazil'. Since this convention has been spread by the economic agents (especially throughout financial markets), our results are also in line with Keynes' view (1936, p. 202–3), for whom 'the rate of interest is a highly conventional phenomenon'. Especially in the case of Brazil, differently from several developing countries, we should remark that a significant share of prices (around 28%) that compose the consumer inflation index (IPCA) is still indexed to past inflation due to our long experience with indexation of monetary contracts. While widespread indexation across most prices contributed to avoiding dollarisation in Brazil during the high inflation period (1980–94), it imposed and still continues imposing a higher floor for the real interest rates in Brazil than in other developing countries.[55] This explanation is supported by several empirical studies, such as Feijó and Carvalho (1992), Segura-Ubiergo (2012), Modenesi and Araújo (2013) and Carvalho (2016).[56]

[52] For details, see Modenesi and Araújo (2013).

[53] This hypothesis is associated with the idea that, as legal rules concerning the relationships between lenders and debtors tend to be continuously changed by the government, the Brazilian courts tend to exert an anti-creditor bias whenever a debt is contested by debtors. As most creditors are banks, they tend to increase the interest rate premium to cover the jurisdictional risk.

[54] As Arida *et al.* (2005, p. 267) pointed out, this hypothesis is based on the view that, in spite of high fiscal primary surpluses prevailing in most of the period 1999–2013, 'the burden of public debt is very high and puts pressure on the interest rate (…). Government spending crowds out private investment and prevents the economy from growing'.

[55] As an illustration, according to the Bank of International Settlements (BIS) database, the average real interest rate (policy rate) in Brazil (6.3% per year) was significantly higher than several developing countries in the period 2000–19, such as Turkey (2.4%), Mexico (2.1%), South Africa (1.8%), Russia (1.5%), Argentina (1.3%), India (1.0%), Peru (0.8%) and Chile (0.6%). These data are available at https://www.bis.org/statistics/cbpol.htm and https://stats.bis.org/#ppq=CBS_C_AND_OTH_EXP_UR;pv=11~10,5,6~0,0,0~name (date last accessed 4 March 2020).

[56] Segura-Ubiergo (2012), e.g., states that real interest rates in Brazil still well above the average of emerging market inflation-targeting regimes are highly explained by 'inflation inertia generated by still pervasive indexation practises'.

6. Concluding remarks and policy implications

After two years of severe recession between 2015 and 2016, Brazil experienced a rapid reduction in inflation as well as the convergence of the actual consumer inflation index (IPCA) and inflation expectations to levels below the targets in 2017 and 2018. The reduction in actual inflation rates below the target has been achieved at the cost of a historical depression. In this article, we argued that the effectiveness of inflation targeting in Brazil has been very poor. This is so because the inflation-targeting regime is inadequate to fight inflation in developing economies dependent on foreign capital flows. Additionally, in the case of Brazil in the 2000s and 2010s, it has been conducted in a very conservative way. Brazilian economic authorities did not substantially change the way of conducting economic policy, ignoring the international academic debate after the 2008 global financial crisis, which has been raising doubts about the effectiveness of relying on a single instrument—the interest rate—to control inflation and deliver sustained growth. In fact, the inflation-targeting regime, after 20 years of experience, has kept the Brazilian real interest rate among the highest in the world. Meanwhile, the observed price stability has not generated the expected externalities in terms of economic growth, job creation and increase in aggregate productivity.

As our empirical econometric exercise showed, most of the inflationary pressures have their roots in the supply side, because inflation has predominantly been a cost-push phenomenon in Brazil. Additionally, we argued that the traditional transmission mechanisms of monetary policy have been very inefficient in Brazil. As the real exchange rate has been the main transmission channel of the Brazilian monetary policy in the last decades, a perverse combination of high real interest rates and real exchange rate appreciation trends has been observed since inflation targeting was implemented in 1999. In Keynes' terms, Brazil's Central Bank has established a convention of very high real interest rates, which has had relatively little impact on price dynamics. In addition, a convention for a high level of the real interest rate implies, on the one hand, the perpetuation of the real exchange rate appreciation trend and the acceleration of the gross public debt dynamics, and, on the other hand, the discouragement of investment and lower economic growth.

Similarly to other recent studies (Modenesi and Araújo, 2013; Fonseca, 2018), our empirical results also showed that the real exchange rate overvaluation has been the main factor to stabilise inflation in Brazil in the last two decades. Even considering that the recent decline in the real interest rate between 2018 and the beginning of 2020 has represented a novelty in macroeconomic policy in Brazil, the sustainability of this trend will depend, in our view, on how long the Brazilian economy can sustain the balance of payments equilibrium, since external constraint has long been the main cause impairing sustained output growth and provoking inflationary pressures.

In addition to inflation targeting, a pro-cyclical fiscal policy, based on targets for primary fiscal surplus, and flexible exchange rates complete the Holy Grail of the orthodox macroeconomic arrangement that has governed economic policies in Brazil since 1999. Paraphrasing Keynes, orthodox macroeconomics conquered Brazil as completely as the Holy Inquisition conquered Spain.

Although it goes beyond the scope of this article to detail the main policy implications, it is necessary to suggest three essential steps for Brazil to recover its capacity to sustain long-term economic growth: the first is to urgently adopt a flexible inflation-targeting regime along the lines suggested in Section 3; the second is to adopt

a countercyclical fiscal policy through which governments would commit to a rational and gradualist long-term fiscal adjustment, but following Keynes' recommendation of operating with two separate budgets: a current budget (current revenues minus current expenditures), within which the targets for primary fiscal surplus throughout the expansive cycle would be planned, and a public investment budget (current revenues minus public investment expenditures, including infrastructure, health and education), which must be always balanced, except during recessions, and the third is, with the aim at keeping the real exchange rate at competitive levels as well as avoiding overvaluation, for Brazil's Central Bank to adopt ad hoc capital controls along the lines suggested in several official documents of the IMF (Blanchard *et al.*, 2010; Ostry *et al.*, 2012, among others) and followed by several developing Asian countries (Subbarao, 1914). After all, capital controls are no longer a rebellious measure. As Helène Rey (2014, p. 312) clearly stressed, 'capital controls can be used to avoid major capital losses for households and companies that borrowed in foreign currency and are heavily exposed to [of course, after a long period of real appreciation] further exchange rate depreciation'. Since the mid-1990s, Brazil has recurrently repeated such trends.

Post Scriptum

The coronavirus (Covid-19) crisis in the beginning of 2020 seems to have represented a temporal break with the orthodoxy related to the macroeconomic tripod in Brazil. Like most countries in the world, the Brazilian government immediately introduced Keynesian and Minskyan measures to mitigate the Covid-19 shock on the real side of the economy. This included the permission for Brazil's Central Bank to buy public and private bonds in the secondary markets, as well as the Treasury to assume additional current and public investments for fighting the pandemic (Constitutional Amendment 10/20, March 3, 2020). Even though all these measures were approved by the Brazilian Congress, their duration has been restricted to only the period marked by social distancing and the interruption of most economic activities. All these additional expenditures will be accounted for as an extraordinary fiscal and financial budget (the so called 'War Budget'), separately from the usual governmental budget. Brazilian policymakers have insisted that as soon as the most dramatic effects of the Covid-19 crisis are over – independently of how long this crisis will last, as well as the intensity of the economic downturn – the recovery of the economy will depend on the continuity of the fiscal adjustment based on the Spending Cap Amendment (that is to say, based on the expansionist fiscal austerity hypothesis). Therefore, we do not expect the macroeconomic tripod to be abandoned in the medium term. This suggests that policymakers will probably continue to be trapped in the New Macroeconomic Consensus guidelines in Brazil in the aftermath of the crisis.

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Appendix

Data source and methodology of the econometric model

Acronym and variable	Methodology and source
SELIC—short-term policy interest rate	Drawn from Brazil's Central Bank (BCB) and annualised by the authors.
IPCA—consumer inflation rate	Measured by the monthly accumulated index in 12 months of consumer price indices provided by the Brazilian Institute of Geography and Statistics (IBGE).
IND—index of industrial production	The monthly and seasonally adjusted index of industrial production provided by the Brazilian Institute of Geography and Statistics (IBGE).
EXCHANGE—exchange rate index	The Brazilian real/US dollar nominal exchange rate index provided by Brazil's Central Bank (BCB).
GROSS PUBLIC DEBT—public debt	Gross public debt stock provided by the National Treasury. Debt/GDP ratio was calculated by the authors.