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The case for reindustrialisation in developing countries: towards the connection between the macroeconomic regime and the industrial policy in Brazil

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The majority of economic literature tends to discuss economic development issues by analysing the industrial policy and other long-term development policies separate from short-term macroeconomic policy. However, development strategies require a close coordination of the macroeconomic regime with the industrial policy. In addition to Brazil, our analytical discussion and normative implications can be addressed to other developing countries also facing premature deindustrialisation. We propose an analytical discussion of the phenomena of industrialisation, deindustrialisation and reindustrialisation, including a discussion on the connection between the macroeconomic regime and industrial policy, both oriented to reindustrialisation and catching up. The main point is that both policy regimes must be closely coordinated with each other. Concerning the macroeconomic regime, we argue that consistent monetary, fiscal, wage and exchange rate policies are those which are able to not only keep price stabilisation, but also provide average real interest rates below the average real return rates on capital, a competitive real exchange rate and real wage rates increasing in accordance with labour productivity growth. As for industrial policy, theoretical and empirical evidence suggest strategies aimed at the diversification of production, processes and products, especially within the manufacturing sector and within tradable segments of the service sector.

Key words: Reindustrialisation, Catching up, Macroeconomic regime, Industrial policy, Brazil
JEL classifications: O1, O23, O24, O25

"On Margate Sands.
I can connect
Nothing with nothing.
The broken finger-nails of dirty hands.
My people humble people who expect
Nothing."

(T.S. Eliot, The Waste Land, 1922)

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1. Introduction

Brazil, one of the fastest-growing economies in the world after World War II, lost its vigour at the beginning of the 1980s due to the external debt crisis and the high and chronic inflation rates that followed. Only after joining the Brady Plan, in 1992, did the external debt crisis come to a definite solution. As for the high-inflation regime, it was brought under control in 1994 after launching the successful Real Plan (*Plano Real*). Since then, the economy has been experiencing a paradoxical situation where the relative price stability has not yet allowed the recovery of the real GDP growth rate at a pace sufficient to enhance capital accumulation and innovation, as well as to promote structural change and economic catching up. We will argue in this paper that the structural change towards a more sophisticated industrial base is a *sine qua non* condition for an emerging economy to converge with developed ones. Furthermore, our basic argument is that the main cause for the poor performance of the Brazilian economy in the past decades is dependent on its inability to efficiently combine short-term macroeconomic policy with long-term industrial and technological policies which would allow the country to carry on its process of industrialisation and catch up with more advanced economies.

The industrialisation of the Brazilian economy can be considered incomplete in the sense that since the mid-1980s a premature deindustrialisation process, which deepened from the 2000s on, has been taking place. Actually, the Brazilian manufacturing sector can be described as 'immature' in Kaldorian terms,[1] since it still presents a high degree of heterogeneity in productivity level compared with the other industries that compose it. In our view, this profile of the Brazilian manufacturing sector, despite the current scenario of premature deindustrialisation, leaves room for manoeuvring industrial and technological policies to promote structural changes towards upgrading the manufacturing sector to reach its maturity.

Broadly speaking, although inflation was stabilised in the mid-1990s (the *Plano Real*, 1994), Brazil has been experiencing an accelerating premature deindustrialisation process since then. This can be attributed to two main factors: first, to the long-term overvaluation of the Brazilian currency in real terms; and second, to the high real levels at which Brazil's Central Bank sets the basic interest rate.[2] The long-term overvaluation basically refers to the chronic trend of overvaluation of the real exchange rate, which derives, on the one hand, from a non-neutralised Dutch disease, and, on the other, from three 'habitual policies' that push the economy to high current-account deficits and an increasing foreign debt: the growth *cum* foreign indebtedness ('savings') policy, the exchange rate anchor policy to control inflation, and a high-level interest rate around which the monetary policy is practiced.[3] In Brazil, these three habitual policies

[1] An 'immature' economy is characterised by a large supply of labour (either in absolute or relative terms) in low-productivity sectors, which can be absorbed by the most-productive sectors as the industrialisation process spreads towards them. Countries would attain the 'maturity' phase when productivity levels become aligned between all sectors of the economy as a whole. For details, see Kaldor (1966).

[2] Like any other central bank, Brazil's Central Bank does not set the real, but only the nominal short-term interest policy rate. However, this latter has been reaching such high levels since the mid-1990s in Brazil that, compared with both ex-ante expected inflation rates and ex-post actual inflation rates, the Brazilian short-term real interest rates have been ranking (save in few exceptional episodes) as the first or the second highest in the world.

[3] As we shall discuss ahead, rather than exchange rate volatility, developing countries highly open to capital flows (especially those of a short-term nature) suffer from a chronic trend of nominal and real exchange rate appreciation—a problem rarely observed in developed countries whose currencies are internationally traded.

have been practiced since at least 1990—the year in which wide economic liberalising reforms began to dismantle the set of economic policy instruments that for decades had neutralised the Dutch disease.[4]

In addition, contrary to the recommendations of the economic literature,[5] trade liberalisation was jointly implemented with the liberalisation of the capital account. As a result of these structural and non-structural economic forces, the Brazilian real exchange rate has been kept at a non-competitive level for long periods of time, discouraging domestic investment and innovations and sharply inducing the substitution of foreign goods for domestic production. Moreover, as public savings became negative since the 1980s, the state has become unable to finance Brazilian investment, which, in light of the international experience, should be around 20% of the yearly total gross fixed capital formation.

Indeed, it is important to stress that during the period in which liberalising reforms emerged and consolidated in Brazil (1990–2002)—covering Fernando Collor de Mello's (1990–1992), Itamar Franco's (1992–1994) and Fernando Henrique Cardoso's (1995–2002) governments—industrial policy was not established as a priority in the set of economic policies. However, although three industrial policies with growing degrees of complexity were adopted during Luiz Inácio Lula da Silva's (2003–2010) and Dilma Rousseff's (2011–2014) governments (in this latter case, in her first term), their virtually null results can be explained, to a great extent, by the lack of a close coordination between those long-term policies and the macroeconomic regime.[6]

In this analytical perspective, a consistent macroeconomic regime closely coordinated with strategic industrial and technological policies is a necessary condition to reverse the premature deindustrialisation and the consequent low growth rates observed in Brazil from 1994 on. A consistent macroeconomic regime, aiming at promoting catching up, should follow some basic guidelines. First, the macroeconomic regime should adopt an exchange rate policy to prevent the Brazilian currency from chronically and cyclically appreciating.[7] Second, as to the monetary policy, a flexible inflation-targeting regime, different from the very tight regime that has characterized the Brazilian experience over the past decades, should be adopted to bring real interest rates to levels lower than the average rates of return on capital. Third, the fiscal policy, which is one of the bases for keeping the confidence of economic agents, should not only remain grounded in the Fiscal Responsibility Law, avoiding 'fiscal populism',[8] but also recover its countercyclical character in such a way that the pursuit of higher primary surpluses in the expansive cycles can give

[4] In 1990, Brazil began to adopt a rapid trade liberalisation program. However, differently from several Asian countries which have adopted liberalising reforms in a more cautious and pragmatic way, the Brazilian trade liberalisation was immediately followed by a set of additional liberalising programs that reached the state sector, the financial system and the capital flows. For a comparative analysis, see Amsden (2001) and Nassif (2007).

[5] See Krueger (1978) and Michaely *et al.* (1991).

[6] These industrial policies, whose details can be found on the website of Brazil's Ministry of Development, Industry and Commerce (https://www.mdic.gov.br), were entitled Foreign Trade, Technological and Industrial Policy (*Política Industrial, Tecnológica e de Comércio Exterior*, 2004–2008), Policy for Productive Development (*Política de Desenvolvimento Produtivo*, 2008–2010) and Major Brazil Plan (*Plano Brasil Maior*, 2011–2014).

[7] See Nassif *et al.* (2011, in press), and Bresser-Pereira *et al.* (2014).

[8] Bresser-Pereira and Nakano (2003) define 'fiscal populism' as the situation in which governments, with the goal of keeping their electoral popularity, tend to manage both the public budget and the ratio of the gross debt of the public sector to GDP in an uncontrolled way.

policymakers more room for reducing these surpluses or even operating with primary fiscal deficits in recessionary cycles. Finally, public savings should increase to allow the state to be responsible for a growing share of total gross investment in Brazil. Summing up, the combination of the macroeconomic policy instruments should put the main macroeconomic prices at the 'right' levels to induce capital accumulation and innovation, on the one hand, and allow policy space for the implementation of appropriate industrial and technological policies to accelerate the catching-up process, on the other.

The aim of this paper is thus to discuss mechanisms through which the connection between the macroeconomic regime and industrial policy[9] can be reclaimed, in order to advocate in favour of a reindustrialisation strategy to be pursued by the Brazilian economy. Therefore, in addition to this introduction, Section 2 proposes an analytical discussion of the phenomena of industrialisation, deindustrialisation and reindustrialisation, including a discussion on the connection between the macroeconomic regime and industrial policy, both focused on reindustrialisation and catching up. Although some details are specific to Brazil's actual economic policies (e.g. the inflation-targeting regime), this analytical discussion can also be addressed to other developing countries that have suffered from premature deindustrialisation. In this respect, many normative implications discussed in Section 2 can be used as a general guide to other developing countries. Section 3 presents the Brazilian case and makes propositions related to both a new macroeconomic regime and industrial policy oriented for reindustrialising the country. Section 4 briefly draws the main conclusions.

2. Industrialisation, deindustrialisation and reindustrialisation: an analytical approach

The importance of the manufacturing sector to economic development has been a well-accepted premise in economic literature since Adam Smith. This was also the main assumption of Classical Developmentalism, which defined growth as 'structural change' and strongly supported the Prebisch–Singer thesis on the long-term deterioration of the terms of trade.[10] Subsequently, Kaldor (1966, 1970), based on the propositions of his former professor at the London School of Economics, Allyn Young (1928), showed that, because static and dynamic economies of scale are more prominent in the manufacturing sector, aggregate productivity will improve the fastest, the more the manufacturing sector grows and diversifies. In this sense, industrialisation or, more broadly, the production of technologically sophisticated goods and services (which include the technologically sophisticated services that have high value added per capita and, like the manufacturing

[9] From now on, we will use the term 'industrial policy' to refer not only to long-term industrial and technological policies, but also to other long-term policies (such as infrastructure, education and others) which contribute to enhancing the systemic competitiveness of the economy and promoting structural change and long-term growth.

[10] Even some Structuralist economists (e.g. Ros, 2013A), highly impressed by the effects of China's phenomenal long-term growth on the improvement of the terms of trade of primary and industrial commodities exported by southern Latin American countries between 2000 and 2008, almost put in doubt the Prebisch–Singer classical hypothesis of the trend of deterioration of the terms of trade for those countries. However, it is always important to remember that the Prebisch–Singer hypothesis, rather than covering a few decades, refers to a secular trend (of fifty years or more). In this regard, it is very early to conclude that the Prebisch–Singer hypothesis should be rejected.

sector, pay relatively high wages),[11] works as a powerful mechanism to promote economic development and the process of relative convergence (catching up) of a country towards higher levels of per capita income compatible with developed economies.

Following this reasoning, the industrialisation process should accordingly evolve in a sequence of phases until it reaches its maturity, that is, when the economy can fully profit from the gains of the technological progress enhanced by the static and dynamic economies of scale observed in the manufacturing sector. Only when the highest stage of industrial development is reached and the economy is able to sustain a high level of per capita income growth in the long run can deindustrialisation—here understood as the relative loss in total value added of the manufacturing industry in relation to the service sector—be considered a natural phenomenon. Up to this point, industrialisation could be viewed as 'productive sophistication'—the transference of labour from agriculture to manufacturing. When a given economy reaches this high stage of development, deindustrialisation begins but productive sophistication continues.[12] Conversely, an economy that is unable to reach the final stages of the industrialisation process will fall behind in relation to the more advanced economies in terms of its per capita income growth.

Kaldor (1966) very clearly established the close relationship between long-term growth and structural change through the well-known Kaldor–Verdoorn law. In his writings concerning the relative stagnation of the British economy in the 1960s and 1970s compared with other developed economies, Kaldor showed that the empirical regularity observed by Verdoorn (1949) between the increase in labour productivity and output growth should be interpreted as a causal relationship, with the dynamics of growth determining the increase in productivity, and not the other way around. Strictly speaking, Kaldor (1966) originally argued that the Verdoorn law is characterised by two separate mechanisms. The first establishes that the labour productivity of the manufacturing sector depends largely on growth rates of the manufacturing output, in virtue of the presence of the static and dynamic returns to scale inherent to this sector. The second (later known as the third Kaldor law) establishes that aggregate labour productivity depends widely on manufacturing output growth.[13] By and large, as Kaldor (1966, p. 106) additionally pointed out, 'productivity tends to grow faster, the faster output expands; it also means that the *level* of productivity is a function of cumulative output (from the beginning) rather than of the rate of production per unit of time' (italics in the original).

Moreover, influenced by Myrdal's (1957) cumulative causation principle, Kaldor and his followers were able to develop a series of growth models in the 1970s and

[11] After the microelectronics revolution, many tradable services (such as software, information and communication industries—ICT, research and development, etc.) have been working together with the manufacturing sector in order to boost labour productivity, structural change and economic development. As shown by Zysman *et al.* (2010), such services are not dissociated from the manufacturing process itself. This means that, since those services are connected to the production strategies of firms and industries operating in the primary, secondary and tertiary sectors, the rigid separation between new tradable services, on the one hand—also subject to static and dynamic economies of scale—and the manufacturing sector itself, on the other, is neither possible nor desirable. In countries where these new tradable services are significant, rather than reducing the role of the manufacturing sector, they act as complementary driving forces in order to promote structural change, economic development and catching up.

[12] See Bresser-Pereira *et al.* (2014).

[13] The authors are thankful to one of the anonymous referees for calling our attention to these two separate mechanisms.

onwards where the dynamics of aggregate demand promoting a structural change towards a more technologically sophisticated industrial sector explains long-term growth.[14] In other words, in the Kaldorian, thus Keynesian, view (and we should also add in the Developmental tradition[15]), it is the insufficiency of aggregate demand, and not the lack of supply, that limits the long-term economic performance of the economies; and the successful enhancement of long-term growth rates depends on the structural change allowing the manufacturing sector to reach its full potential.

It should be noted that this does not mean that long-term growth might not be constrained by supply-side forces. However, as Kaldor (1966) clearly stressed, the capitalist system has internal strengths to relax supply-side constraints in the long run. Even assuming some shortage of resources, imports could overcome the problem for a period of time. In relation to the workforce constraint, according to Kaldor (1966), it tends to be relaxed by the introduction of technical change, which is induced, in turn, by competition and the capitalists' attempts at either keeping or increasing their profits. As Kaldor (1966, p. 117) reminded us, clearly influenced by Marx's (1887) hypothesis on the impact of technical progress on the long-term labour supply, 'all historical evidence suggests that … the main source of this labour has not been the growth of the working population, nor even immigration, but the reservoir of surplus labour, or "disguised unemployment" on the land'.[16]

The cumulative causality emerges as supply and demand forces interact over time, inducing either a virtuous cycle of high growth or a vicious cycle of low growth. In this respect, a distinctive characteristic of the Kaldorian–Developmental growth models is to underline the need to align short- and long-term economic policies in order to increase long-term per capita income.

The connection between structural change and growth offers important insights to the understanding of the long-term growth process of economies facing premature deindustrialisation, like the Brazilian economy.[17] Premature deindustrialisation may occur for many reasons. We will highlight the two most important cases, which are not exclusive. One case for premature deindustrialisation may occur when developing economies—which might have a rather diversified industrial base but have not yet completed their industrialisation process—are exposed to external competition without internal defence mechanisms of economic policy to continue the implementation of their structural change. This movement occurred in some Latin American economies in the 1990s and 2000s (especially Brazil and Argentina) following the economic opening according to the recommendations of the Washington Consensus (Medeiros, 2005). Since the economies are deprived of defence mechanisms (such as tariff barriers, subsidies for exporting manufactured goods, capital controls, among others),[18] their insertion in the global trade flows will push them to the specialisation of the production of goods with low technological sophistication, mainly commodities.

[14] See, for instance, Kaldor (1966), Dixon and Thirlwall (1975) and Thirlwall (1979), among others.

[15] Either in Classical Developmentalism (or Structuralism) or in New Developmentalism. For a distinction between these two traditions, see Bresser-Pereira (2010, 2016).

[16] In spite of our emphasis on the demand side, it is worth noting that the modern developmental literature on the topic has also stressed other forces on the supply side that act together with demand forces to boost economic development, such as knowledge and human capital accumulation, diversification and modernisation of institutions, etc. For more details, see Ros (2013A, especially Ch. 1).

[17] For a discussion on why the Brazilian economy is falling behind, see Nassif *et al.* (2015).

[18] See, for instance, Ocampo (2011) for a discussion of how policy space has been reduced in developing economies after liberalising economic reforms.

Another force pushing developing economies to become early specialised in the production of goods of low value added per person, trapping them in a low long-term growth rate, has been identified by Bresser-Pereira (2008) as the Dutch disease. He defines this phenomenon as the long-term overvaluation trend of the real exchange rate of a country that, by being rich in natural resources and benefiting from commodity price booms as well as Ricardian rents, may export such commodities at high profits. This is an unhealthy phenomenon because the commodities can be exported at an exchange rate substantially more appreciated than the one that would make competitive the other non-commodity tradable goods and services which the country produces or may produce using state-of-the-art technology.[19] A non-neutralised Dutch disease may either prevent developing countries from industrialising, as in the case of most oil and diamond exporters, or cause premature deindustrialisation when these countries, after adopting a mechanism that neutralised the Dutch disease in a certain moment, dismantled it in the name of rapid trade and financial liberalisation, as has been the case of Brazil since 1990.

In sum, to identify the causes of premature deindustrialisation and to envisage a reindustrialisation strategy imply observing that the evolution of the productive structure to promote catching up can be jeopardised when the growth stimuli of the aggregate demand induces the economy to specialise in the production of goods characterised by low labour productivity. At the same time, the growth potential of an economy also depends on the evolution of its productive structure, which should, in turn, develop an increasing degree of diversification towards both the manufacturing sector and the more technologically sophisticated segments of the service sector. Otherwise, not only will real GDP growth rates be below the world economic growth, but also the per capita income will be stagnant. In this analytical perspective, well-coordinated short- and long-term economic policies play an important role in promoting structural change to enhance long-term growth. The combination of these short- and long-term policy instruments should be translated into a reindustrialisation strategy (in opposition to the import-substitution strategy) for those economies facing premature deindustrialisation.

2.1 Reindustrialisation as a long-term growth strategy: looking at policy alternatives

As implicit in the Structuralist or Developmental theoretical perspective, short-term economic policies have long-lasting effects on the productive structure, meaning that potential output is endogenous to aggregate demand. In this regard, a reindustrialisation strategy requires the fine coordination of short-term macroeconomic policies, which are designed to deal with short-term business fluctuations and price stabilisation, with other long-term policies such as industrial and technological policies, infrastructure and education policy, job training, among others, which we will call industrial policy. In this subsection, we will discuss the basic analytical aspects concerning the macroeconomic regime and industrial policy, as well as how both should be coordinated to promote the reindustrialisation and catching up of economies facing premature deindustrialisation.

[19] Corden and Neary (1982) formulated the original model on the Dutch disease. It is a neo-classical model in which such a phenomenon happens only in the commodity price booms. Bresser-Pereira (2008) developed a new developmental model based on two real exchange rate equilibriums (the 'current' and the 'industrial equilibrium'). In his model, the commodity can be exported with a profit at an overvalued real exchange rate due to Ricardian rents, which may make the overvaluation trend a long-term one independent of price booms.

2.1.1 Macroeconomic regime. The main issue concerning an appropriate macroeconomic regime, whose goals are not limited to price stabilisation but also to promoting changes in the productive structure and accelerating long-term growth, is that it must pursue 'right' macroeconomic prices in order to reduce the opportunity costs of physical investments and innovation. Particularly, policymakers should pursue a satisfactory profit rate, a competitive real exchange rate, average real interest rates below average rates of return on capital, real wages increasing according to labour productivity growth, and low inflation rates.

Differently from most developed countries, the commitment to keeping at 'right' levels the macroeconomic prices as listed above poses special difficulties to policymakers in developing countries, for these economies are dependent on foreign savings. That is to say, they are unable to issue liabilities in their own currency. In fact, since many developing countries (as has been the case of Brazil in the past decades) are highly dependent on foreign savings and more vulnerable to the volatility of international liquidity and capital flows, the real exchange rate emerges as the most important macroeconomic price to manage, for it tends to be overvalued in the cycles of significant net capital inflows and sharply depreciated in the aftermath of capital flights and sudden stops. The role of the real exchange rate as a key macroeconomic price has been emphasised by Bresser-Pereira *et al.* (2014, p. 49), according to whom

> [although] there are several cases in which aggregate demand has initially been guaranteed, investment opportunities have nevertheless failed to materialise whenever the real exchange rate is overvalued. In this situation exporters' profit margins are reduced or even negative, and entrepreneurs have no incentive to invest; or imported goods are much more competitive than domestic goods, inasmuch as aggregate demand leaks away (domestic demand will be partially met by foreign competitors) and, again, there is no incentive to invest.

In the mainstream approach, the real exchange rate is evaluated as the price that ensures both short- and long-term balance of payments adjustments. However, the Mundell–Fleming model, which endorses such a conclusion, rules out a critical aspect of the adjustment mechanism: the way this adjustment occurs over time under free capital movements and high asymmetry between the currencies. Following Mundell–Fleming, a balance of payments deficit would be automatically adjusted because as it tends to depreciate the currency in real terms, the increase of net exports (since the Marshall–Lerner condition is assured) would shift the IS curve (investment-savings) to the right, ensuring, therefore, both the balance of payments adjustment and economic growth.

However, this reasoning assumes the validity of the uncovered interest rate parity hypothesis—that the interest rates differential should reflect expectations of depreciation of the domestic currency—but actually this market condition is violated for most developing countries. In practice, due to the high dependence on foreign capital and in the absence of capital controls, monetary authorities of developing economies react to the threat of currency depreciation by raising the domestic interest rate to attract foreign capital. Despite the fact that the capital account of the country is showing an increasing net foreign debt, foreign creditors continue to make loans or foreign direct investments in the framework of a credit bubble. As long as the capital inflows continue, the national currency will remain overvalued in the long term, and investments in the non-commodity tradable industries will continue to be blocked. But given that the foreign debt ratio to GDP cannot increase indefinitely, sooner or later the foreign

creditors will come to the conclusion that the large current account deficits are causing the deterioration of the economy and that the foreign debt has become too risky. They then suddenly suspend the rollover to the debt. In consequence, the country will face a balance of payments crisis, and the national currency will sharply depreciate, forcing the economy to fight against both inflation and recession.[20] In other words, in a context of openness of capital movements and in the absence of an appropriate exchange rate policy, rather than volatility, currencies of developing countries engaged in 'growth *cum* foreign savings' will tend to be chronically and cyclically appreciated in real terms, and subject to sharp depreciation.

Given the chronic overvaluation trend of the real exchange rate, countries should neutralize the Dutch disease preferably through the adoption of a variable export tax according to the international price of the commodity. But the Dutch disease just brings the real exchange rate from the 'industrial' to the 'current equilibrium'.[21] To prevent a developing country from plunging into current account deficits, its government should firmly reject the three above-mentioned 'habitual policies': foreign savings, real exchange rate anchor (that is to say, overvaluation) for maintaining low inflation rates and a high level of the real interest rates policies.

Since the main obstacle to economies facing premature deindustrialisation is to overcome the overvaluation trend of their currencies, one of the challenges of short-term macroeconomic policies in these countries is to widen policy space aiming at a higher and stable economic growth. In this analytical perspective, fiscal policy should play a prominent role. Rather than a pro-cyclical fiscal policy, a countercyclical fiscal policy that generates primary fiscal surpluses during expansions and allows for a reduction of these results (or even primary deficits) during recessions is perfectly in tune with the responsibility of public budgeting and the management of the trajectory of the gross public debt to GDP ratio in the long run.

As to monetary policy, even authors aligned with mainstream thinking have suggested that it should have more than two goals, rather than the one goal of maintaining low and stable inflation rates (see, for instance, Blanchard *et al.*, 2010; Yellen, 2014). Particularly in countries that adopt an inflation-targeting regime, monetary policy should be able to, together with other macroprudential policies, provide an economic environment in which average real interest rates hold below the average real rate of return on capital.[22] At the same time, an appropriate wage policy that neither worsens income distribution nor causes inflation is one that provides increasing wages according to the growth in labour productivity.

[20] On the short-term effects of depreciations on inflation and recessions, see Krugman and Taylor (1978).

[21] The theoretical concepts of 'industrial equilibrium' and 'current-account equilibrium' real exchange rates were pioneeringly introduced by Bresser-Pereira (2008, 2010) and estimated first by Marconi (2012). The 'industrial equilibrium' real exchange rate (which necessarily incorporates a small undervaluation of domestic currency) is defined as the one that would be able to encourage entrepreneurs to adopt state-of-the-art technologies in their respective industries. Yet the 'current-account equilibrium' real exchange rate is one that is able to ensure the intertemporal equilibrium of the current-account balance of payments. For a deep discussion on both concepts, see Bresser-Pereira *et al.* (2014, especially Ch. 7).

[22] In countries where short-term nominal interest rates have remained at high levels for many decades, as has been the case of Brazil, a way of widening the room for reducing these rates is to augment the period of time to reach the inflation target (for instance, following the experience of the majority of countries that have adopted the inflation-targeting regime, the use of more than one calendar year to reach the inflation target). For details, see Heenan *et al.* (2006).

Following the normative implications of the theoretical literature in the context of the new developmental approach (Bresser-Pereira, 2016), as well as recent empirical studies that emphasise the relationship between a small undervaluation of a domestic currency and long-term growth (Rodrik, 2008; Berg and Miao, 2010), policymakers should maintain the real exchange rate at the level of 'industrial equilibrium', which means that the domestic currency should keep a marginal depreciation in real terms.[23] Capital controls would be an important additional tool to the management of short-term macroeconomic policy, despite our assumption that this is a difficult alternative to be implemented in countries where the capital account has been highly opened, as in the case of Brazil.

2.1.2 Industrial policy. Industrial policy should be seen as an important complement to the macroeconomic policy regime aiming at a reindustrialisation strategy to reverse premature deindustrialisation. In this regard, industrial policy is defined beyond the need to correct any kind of 'market failure' (be it market, coordination or even information failures). In the Structuralist or Developmental approach, industrial policy is defined as the combination of a set of governmental incentives at the sectoral level (tariff protection on imports, subsidies allowed by the World Trade Organization–WTO, long-term public credit for investment projects and innovation, among others) with horizontal policies (especially infrastructure, and research and development–R&D). When the industrial policy focuses on some industries, incentives should be directed to those with greater capacity to generate and spread productivity gains to the whole economy.

Rodrik (2004) correctly argues that, contrary to what the term suggests, industrial policy should not only consider the manufacturing industry, but all activities powerful enough to produce dynamic effects on the economy as a whole. Nonetheless, the scope of industrial policy aiming at reindustrialisation should avoid the excessive use of tariff protection on imports, which was the main instrument in the import substitution strategy. Hausmann and Rodrik (2003) argue that the use of tariff protection is not efficient to separate true innovators from imitators, and in this case, it would be better to use public credit as an incentive to support innovative firms. They correctly argue that tariff protection can stimulate premature entry of imitators in industries subject to economies of scale before the first innovative firms have had, on the one hand, enough time to recover sunk costs related to previous activities of R&D, and, on the other, time to reach the minimum efficient scale necessary to remain competitive in the market. The problem with Hausmann and Rodrik's arguments is that the early introduction of a free-trade tariff (e.g. zero), by stimulating imported goods that are close substitutes for goods introduced by innovators, can drain the technological efforts of the innovative firms before they have had enough time to pursue all paths of the learning curve. Then, since the real exchange rate is at the level of the 'industrial equilibrium', import tariffs in innovation industries targeted by the industrial policy must be at a moderately low level that is sufficient for accelerating the learning curve of innovators and avoiding excessive entry, be it inefficient imitators or close import substitutes. Needless to say that in order to prevent rent-seeking activities, tariff protection to innovators must be gradually reduced until it is totally eliminated over time.

[23] The theoretical concept of 'industrial equilibrium' real exchange rate was introduced by Bresser-Pereira (2010). A real exchange rate reaches the 'industrial equilibrium' level if it is able to push firms to adopt technologies aligned with the state of the art prevailing in their respective industry.

Besides the moderate use of import tariffs, an industrial policy focusing on the reindustrialisation strategy should aim at the development and maintenance of a diversified productive structure. This might be the most difficult goal to be attained nowadays, considering the trend towards the fragmentation of the global value chains by multinational enterprises that has been observed from the early 1980s on. This movement has been inducing firms in developing economies to take part in the global productive process by specialising in supplying intermediate goods and services of low technological level. The issue is that if such an engagement in global markets really implies excessive productive specialisation in a developing country, the dynamic gains expressed in the faster growth of its per capita income are far from being assured. Indeed, as documented by Imbs and Wacziarg (2003) in a well-known empirical study based on a large sample of countries, the catching-up process is highly correlated with the diversification of the productive structure. The authors also concluded that the diversification process is only reduced when the economy has reached a high level of technological development and per capita income, challenging the assumptions supporting the theory of comparative advantage. According to Imbs and Wacziarg's conclusion, the relationship between the degree of productive concentration and per capita income would be better represented by a U-shaped curve.

Thus, according to our discussion, industrial policy aiming at the reindustrialisation strategy should deal with two main challenges: first, supporting innovation; and second, increasing the diversification of the productive structure. Rodrik (2004) argues that industrial policy should focus mostly on supporting innovation activities because it is in this sort of activity where insufficient demand for firms is more visible. Bresser-Pereira (2014, p. 154–59), in turn, has shown that in developing economies, where the real exchange rate is overvalued in the long term, firms in general not only may suffer from insufficient demand, but even when demand is satisfactory may also lose access to it. Industrial policy should not be thought of as a substitute for the right macroeconomic prices, but both Rodrik's and Bresser-Pereira's arguments reinforce the importance of industrial policy for economic growth. Particularly in the case of industrial policy, Rodrik (2004) advocates that two main pillars should be supporting it. On the one hand, the role of the government should be to help entrepreneurs 'find' innovative activities with the highest potential for success and return, as well as to solve the problems of credit rationing. On the other hand, the government's focus should be on activities with high potential to increase productivity and generate positive economic externalities, such as education, infrastructure, health, urban mobility and logistics.

With regard to this last focus, we should recall that, as mentioned before, in the Structuralist or Developmental theoretical approach, industrial policy should be both horizontal and sectorial. As emphasised by Ocampo (2005), the dynamic of productive structures results from the interaction between activities, firms, **sectors** and institutions (emphasis added). That is so because, in practice, in contrast with Rodrik's (2004) assumption, most technologies overlap several sectors. Take for example the electronics industry, which is commonly referred to as the electronic complex, since it includes a set of traditional industries (consumer electronics) and others that have emerged after the microelectronics revolution (information technology, including hardware and software, electronic components, telecommunications equipment, etc.). The argument in favour of sectorial policies should also consider that, in economies endowed with vast and diverse natural resources, the economic exploitation of these resources requires

some moderate degree of intervention to stimulate the sectors related to them, such as chemical, biochemical and pharmaceutical, through a combination of horizontal measures, as well as direct stimuli to the mentioned sectors.

Summing up our main arguments presented in this section, we can draw two key lessons from countries which were successful either in catching up (such as South Korea) or in steadily sustaining their catching-up process (such as China and India since the mid-1980s): i) these countries continue to adopt active industrial policy, replicating, within their specificities, protection mechanisms of local industry and other government stimuli that had been used by most countries that developed after England;[24] and ii) all of them have adopted short-term macroeconomic policies aiming at keeping 'right' the main macroeconomic prices. As a result, the management of aggregate demand in those countries has been becoming part of the industrial policy, which focuses on the diversification of the productive structure, on the increase in absolute and relative productivity and on a major share of exported goods with higher technological sophistication and high income elasticity of demand for the majority of their total exports.

3. The Brazilian premature deindustrialisation and policy alternatives for reindustrialisation

The development of the Brazilian manufacturing sector in the past thirty years can be interpreted as following a premature deindustrialisation path. As shown in Figure 1, the loss of weight of manufacturing value added in total GDP started after 1980, and continued in the 1990s, when wide liberalising reforms were implemented. Comparing with the values of 1970 and 1980, the share of manufacturing output in 2015 was almost half that of the previous decades. The acceleration in the premature deindustrialisation process occurred in the second half of the decade of the 2000s when the

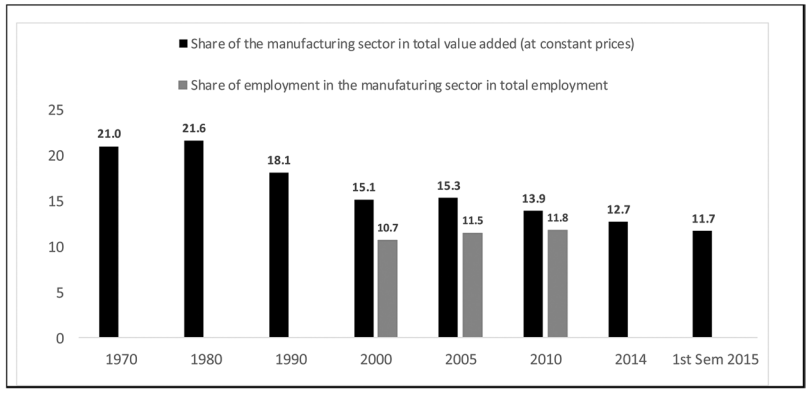

Fig. 1. *Share of manufacturing value added in total GDP at 1995 prices and of manufacturing employment in total employment—selected years, in percentage.*
Source: Brazilian Institute of Geography and Statistics/*Contas Consolidadas da Nação* (until 1990) and Quarterly National Accounts (until 2015).

[24] The difference is that after the Uruguay Round negotiations, which resulted in the establishment of the World Trade Organization (WTO) in 1995, various stimuli became prohibited or subject to disputes under the new multilateral rules.

real exchange rate showed a more clear overvaluation trend, with the exception of a few months after the 2008 global financial crisis, some months in 2013, and again in 2015 when a sharp depreciation of the Brazilian real restored the competitive level of the real exchange rate.[25] The correlation between premature deindustrialisation and real appreciation of the domestic currency, according to Bresser-Pereira's arguments, implies that industrial firms have limited access to domestic and foreign markets. The deleterious consequence of an overvalued real exchange rate for a long period of time is that it jeopardises the catching-up process.

Figure 1 also shows the behaviour of the share of manufacturing employment that did not follow the decrease in the relative weight of manufacturing output in total GDP. This result suggests that the rapid premature deindustrialisation was accompanied by a sharp decrease of relative labour productivity in the Brazilian manufacturing sector.[26] Indeed, as shown in Table 1, in the 2003–2010 period, the yearly average growth rate of labour productivity was negative, and considering a larger period (1996–2013), it was virtually zero.

Most Brazilian academic economists credit the inability to boost labour productivity growth as one of the major economic challenges hindering the country from resuming a sustainable long-term growth rate. However, there is no consensus about the causes of the long-lasting period of stagnation in labour productivity of the manufacturing sector in Brazil. Mainstream economists argue that the real GDP growth rate has been low because labour productivity growth in the whole economy is low.[27]

Table 1. *Annual average growth of labour productivity in Brazil's manufacturing sector (in percentage): selected periods*

	Real Value Added	Employment	Labor Productivity
1996–2002	2.6	1.7	0.9
2003–2010	3.7	4.9	–1.2
2011–2013	3.1	1.7	1.3
1996–2013	3.1	3.1	0.0

Notes:
i) Labour productivity as a ratio between the growth of the real value-added and employment growth rates.
ii) Real value-added obtained from Britto (2015, p. 100), based on current value added from Annual Industrial Survey by the Brazilian Institute of Geography and Statistics (IBGE).
iii) For deflation procedures, see Britto (2015, p. 22).
Source: Britto (2015, p. 100) for the real value added and Annual Industrial Survey by Brazilian Institute of Geography and Statistics (IBGE) for employment.

[25] Nassif *et al.* (In press) estimate that the real exchange rate reached its 'industrial equilibrium' level in January 2016, after having been tendentiously overvalued since 2004. See also Nassif *et al.* (2011) and Marconi (2012).

[26] According to Kaldor (1966), the phenomenon of premature deindustrialisation can materialise either by a drop in the share of the manufacturing sector in the aggregate value added or a decrease in the share of the manufacturing employment in the total employment, or both. In the case of Brazil, at least in the past two decades, such a phenomenon has been occurring through a sharp contraction of the share of the manufacturing sector in total real GDP, rather than a decrease of the share of the manufacturing employment in the total employment.

[27] Between 1980 and 2013, the Brazilian economy showed a real GDP growth rate of only 2.4% a year, below the world economic growth rate of 2.8% a year. WDI for world estimates (GDP at 2005 US dollars), and Brazilian Institute of Geography and Statistics for Brazilian estimates.

For the Structuralist economists, the causal relationship works in the opposite way.[28] This debate is not sterile, though, because it has important implications for economic policy recommendations. If the mainstream interpretation prevails, the policy recommendation should follow an agenda of economic reforms that predominantly focus on supply-side economic policies, such as improvement in infrastructure, education and labour skills, increase in R&D expenditures, tax reform, among others. But, following the Developmental interpretation, though supply-side-oriented reforms can be necessary, they are not sufficient conditions for reindustrialisation and the resumption of economic growth on a long-term sustainable basis. They must be accompanied by appropriate industrial policy and a macroeconomic regime that seeks to put the three already-mentioned major macroeconomic prices at levels that favour capital accumulation and technological innovation. In particular, a macroeconomic regime should be built with the ability to not only sustain price stability, but also bring about real interest rates compatible with international standards, wage increases consistent with labour productivity growth and competitive real exchange rates at the level of the 'industrial equilibrium'.

3.1 Policy proposals: the macroeconomic regime for reindustrialisation

The reindustrialisation proposal for the Brazilian economy should consider that the evolution of the productive structure responds to stimuli of economic growth over time. Therefore, the combination of the key macroeconomic prices determines whether policy incentives are suitable for the purpose of sustaining economic growth. However, as already pointed out, following the Kaldorian literature, the potential growth rate of an economy also depends on its productive structure, in particular its degree of diversification and its ability to generate higher value added per capita. In this analytical perspective, since economic growth and the evolution of the productive structure are both connected, their cause and effect forces cannot be separated.

The main role of a consistent macroeconomic regime is, thus, to widen the policy space for seeding good results from the industrial policy. Consistent macroeconomic policies create an environment favourable to capital accumulation, innovation and structural change oriented to economic development and catching up. In this respect, in our view, Brazil's current macroeconomic regime—anchored in the so-called macroeconomic tripod (inflation-targeting regime, floating exchange rate regime and targets for primary fiscal surpluses)—should be greatly revised, for it has not been able to put the economy in a catching-up trajectory.

The inflation-targeting regime (IT) has been adopted since 1999 and has been producing questionable results, since in most years actual inflation rates were closer to the maximum limit of tolerance than to the central inflation rate targeted by the National Monetary Council (CMN).[29] In addition, IT has not been able to free the Brazilian economy from the low-growth-with-high-real-interest-rates-and-cyclically-appreciated-real-exchange-rate traps. The reason for that is because the manipulation

[28] In a recent theoretical and empirical survey, Ros (2014) shows econometric evidence supporting such a Structuralist hypothesis for Latin American countries, including Brazil.

[29] In Brazil, the National Monetary Council, formed by the Ministers of Finance and Planning as well as the President of Brazil's Central Bank (BCB), defines the annual inflation target which the Monetary Policy Council of the BCB has to pursue in the calendar year. The yearly inflation target is considered reached if the actual consumer inflation rate (the IPCA) is within the tolerance interval.

of interest rates—the main instrument for controlling inflation—is strongly influenced by capital flows (Bresser-Pereira and Silva, 2009; Oreiro, 2014; Nassif, 2015, among others). This is a specificity of the functioning of the IT regime in countries highly dependent on foreign savings, as these economies need to attract capital to meet their commitments in foreign currency. As a result, these economies tend to keep real interest rates at a higher level than those prevailing in developed or even several other developing countries. Even the ability to maintain a high level of international reserves, as a safeguard for sudden changes in capital flows, might not be a solution to sudden stops. International reserves are important for countries to 'take a breath' when they are under speculative attacks, but they are not enough to eliminate the risk of capital flight and sudden stops, which ultimately lead to total disruption of new net capital inflows and trigger an external debt crisis.

The most perverse consequence of maintaining a high real interest rate in a context of asymmetric financial integration is that the real exchange rate tends to appreciate for a long period of time. This trend can only be reversed when, faced with the deterioration of the current account balance, expectations about the exchange rate sustaining its initial path of real appreciation are changed. When this occurs, as has happened repeatedly in Brazil in recent decades, depreciation is sudden, violent and significant, leading in several cases to exchange rate overshooting.

Thus, contrary to the conventional wisdom, since the IT regime in economies that are financially integrated in the global economy and highly dependent on foreign savings results in loss of autonomy of the monetary economy, exchange rate becomes one of the main transmission mechanisms to control inflation. This explains why monetary authorities tend to be tolerant of currency appreciation, as it helps keep track of inflation (Bresser-Pereira and Nakano, 2003). Those authors accurately called this arrangement of monetary policy 'exchange rate populism', and reminded us that this kind of populism is as damaging as 'fiscal populism'.

Clearly, such a weak arrangement of monetary policy, associated with the non-neutralisation of the Dutch disease and the adoption of the mistaken three habitual policies mentioned above, increases external financial fragility. This is expressed in growing current account deficits, which can only be sustained as long as international liquidity is plentiful. Figure 2 illustrates the evolution of Brazil's current account balances and real effective exchange rate between 1990 and 2014. In periods of real exchange rate appreciation of the Brazilian currency, current account deficits increase dramatically. In periods of currency depreciation, the current account tends to show balanced or surplus balances, as happened in 2003–2007.

As shown by Bresser-Pereira (2014), it is important to stress that the Dutch disease was neutralised during the import substitution period (1930–1960) as well as during the manufacturing exports period (1967–1989) through the so-called 'exchange confiscation' mechanism that prevailed in the two periods. In the first period, this was achieved through high tariffs and multiple exchange rate regimes; in the second, through a combination of high import tariffs and export subsidies to manufacturing goods. The policymakers had no clear idea of the Dutch disease, but pragmatically neutralised it.[30] In the second period, the mechanism of neutralising the Dutch disease was embedded in

[30] See details in Bresser-Pereira (2014, p. 164). The expression 'exchange confiscation' was popularised because the coffee exporters were penalised with the most appreciated exchange rates during the system of multiple exchange rates that prevailed from 1953 to 1964.

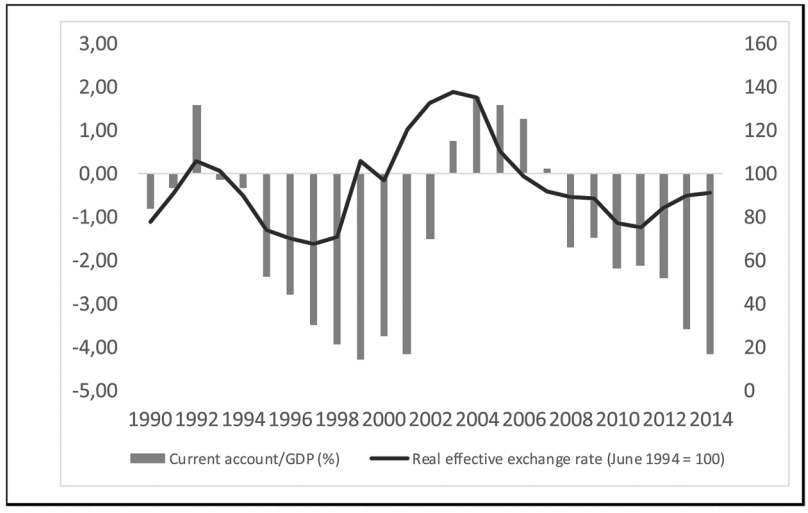

Fig. 2. *Brazil: Current account balance as a percentage of GDP and real effective exchange rate 1990–2014 (June 1994 = 100)*
Source: IPEA data (http://ipea.gov.br) and Brazil's Central Bank *(série 11752)*.

the international trade regime. With the rapid trade liberalisation in the 1990s and the recurring trend of overvaluation of the Brazilian currency, Brazilian exports deepened their specialisation in primary products and natural resources-based industrial commodities. Palma (2005, pp. 81–93) argues that the Brazilian case of the Dutch disease is neither explained by a sudden discovery of natural resources (as in the classic case that affected the Netherlands in the 1970s) nor by an exporter boom of tradable goods in the service sector. The author associates the 'new Dutch disease' that has been hitting Brazil from the 2000s onwards with the dramatic deepening of an international specialisation pattern based on the exploitation of natural-resources-based industries.

The commodity exports boom, which occurred during the second half of the 2000s, strongly contributed to improving the terms of trade, as did the appreciation of the Brazilian currency in real terms.[31] Assuming the Dutch disease to be a structural problem of the Brazilian economy,[32] Bresser-Pereira (2008, 2014) proposes the introduction of a variable export retention tax on each dollar of commodity exports. This tax should correspond to the severity of the disease, that is, to the difference between the real exchange rate of the 'industrial equilibrium' and the real exchange rate of the 'current-account equilibrium'. If the nominal exchange rate corresponds to the exchange rate of 'industrial equilibrium', the tax rate could be reduced to zero.

Otherwise, with regard to the IT regime, we do not believe that there is room for a radical change in monetary policy in Brazil in the short run. In fact, a change in the

[31] Nassif *et al.* (In press) showed econometric evidence according to which, among several variables explaining the long-term trend of the real exchange rate in Brazil between 1999 and 2015 (which was tendentially appreciated for most of this period), the per capita income, the terms of trade and the differential between Brazilian short-term interest rates and US short-term interest rates were the ones that showed the largest coefficient (at least 10% significance level) to explain that trend.

[32] The impact of the Dutch disease on the appreciation trend of the real exchange rate is considered a structural phenomenon, because by improving long-term terms of trade based on commodity exports and increasing the opportunity cost of the investments directed to the manufacturing sector, the income growth from the former sector tends to increase the demand for non-tradable goods, and so do their relative prices, thus appreciating the domestic currency in real terms. See Corden and Neary (1982).

monetary arrangement would increase the level of uncertainty and low confidence that has prevailed in Brazil since the presidential electoral campaign in 2014. In this regard, a more effective monetary policy aiming at Brazil's reindustrialisation should focus on two basic objectives: first, a low and stable inflation in the long run (around 3 to 4% per year); and second, a more significant and a sustainable real GDP growth rate. As has been largely discussed even by the mainstream theoretical literature, differently from the 'new macroeconomic consensus' that had prevailed until the 2008 global crisis, rather than focusing on the one goal of keeping low price levels, monetary policy should be designed to reach more than one goal, including low rates of unemployment (see, for instance, Blanchard *et al.*, 2010, 2013; Yellen, 2014; Woodford, 2014).

This new orientation of IT should start with the extension of the time horizon to accomplish the committed target. Nowadays in Brazil, the IT regime seeks to reach the target in just one calendar year. Given the resilience of the inflationary process, which resembles a cost-push process rather than a demand-pull process, the one-year commitment to reach the target is not reasonable and escapes from the rule followed by the majority of countries which base their monetary policy on an IT regime.[33] On the other hand, we should recall that the international literature on IT is rich in examples of successful experiences concerning this aspect of the regime (for instance, Svensson, 2010; Yellen, 2014). Moreover, the widening of the period to reach the inflation target would increase policy space and contribute gradually to bringing the real and nominal interest rates closer to average international standards. The gradual reduction in the real interest rate would help build entrepreneurial confidence and so create a more conducive environment for the resumption of private investment.

In relation to the exchange rate policy, in addition to the mechanisms already mentioned in the neutralisation of the Dutch disease, it will be necessary for Brazil's Central Bank to continue its ongoing intervention mechanisms to reduce exchange rate volatility. Moreover, assuming that the exchange rate reached its competitive level (or the 'industrial equilibrium' level) in January 2016, as shown by Nassif *et al.*'s (In press) econometric exercise, it will be necessary to adopt a mix of policies that prevent a new appreciation trend. Actually, this recommendation implies that the monetary authorities should work with an implicit competitive exchange rate target (meaning that this information should not be revealed to economic agents), which is one of the most important conditions for restoring and keeping the competiveness of the Brazilian manufacturing sector, as well as promoting structural change and the catching-up process. If necessary, Brazil's Central Bank should also improve the management of the floating exchange rate regime, by applying some ad hoc measures of capital controls, as has already been suggested in several official documents of the International Monetary Fund (see, especially, Blanchard *et al.*, 2010, 2013; Ostry *et al.*, 2012). In other words, assuming that the exchange rate already reached its 'industrial equilibrium' level in the beginning of 2016, the flexibility of IT as discussed above could work as an important element (but not exclusive) to avoid a new trajectory of appreciation of the Brazilian currency in real terms.[34]

[33] Heenan *et al.* (2006, Table 4:19) showed that, among the several countries that adopt an IT regime, Brazil is among the few that uses one calendar year as a time horizon for reaching the inflation target.

[34] Another measure for helping prevent the real exchange rate from deviating from its long-term competitive level is to encourage the internationalisation of Brazilian companies. This measure could be adopted by means of coordination between the Central Bank and the Ministries of Finance and Development, Industry and Trade. This measure was extensively used in India during the 2000s, in order to, along with other intervention policy instruments in exchange markets, prevent the India rupee from appreciating in real terms (Mohanty and Scatigna, 2005).

Targets of primary fiscal surplus, together with an IT and floating exchange rate regime, complement the current macroeconomic policy tools in Brazil. However, fiscal policy over the past decades has been pro-cyclical. This is an expected result, considering that the Brazilian growth strategy still relies on foreign savings, which tend to increase public spending in phases of high international liquidity and violently decrease it in the contraction phase of external liquidity (Ocampo and Vos, 2008). To recover the countercyclical nature of fiscal policy, our recommendation is to ensure the Fiscal Responsibility Law, in order to avoid the so-called 'fiscal populism' (Bresser-Pereira, 2014, 2015). In this regard, a wide debate about the role of fiscal policy as an instrument to boost long-term economic growth is urgently needed. In our view, the best way to stabilise public accounts is to establish targets for primary fiscal surpluses consistent with the economic cyclical phase of the economy. A suggestion already presented in Nassif and Feijo (2014) is to adopt a reform of the public budget, as recommended by Keynes (1982), that incorporates two types of budgets: the current budget and the capital budget. In the first one, current revenues and governmental expenditures would be recorded and this budget is supposed to be balanced all the time. The second budget would record expenditures on investment in infrastructure, housing and public works in general, and should remain balanced in the long term, but it could show deficits in periods of recession. By widening the space for countercyclical policies, this second budget could avoid the high volatility in the real GDP growth rate.[35]

The proposition of a more flexible, but by no means less rigorous, fiscal policy, on the one hand, and the easing of the IT regime, on the other, would demand a fine coordination between them, particularly in the aspects concerning the financing of the public debt. Nowadays, in Brazil, part of the public debt is indexed to short-term policy nominal interest rates, implying that increases in the basic interest rate (the SELIC, our policy rate) by the Central Bank aiming at controlling inflation immediately increase the burden of the public debt.[36] In the conventional literature, the way to reverse an accelerated growth trajectory of the gross debt of the public sector related to GDP is to decrease government expenditures, regardless of the stage of the business cycle. In our view, this is a short-sighted policy recommendation because it misses the important link between fiscal and monetary policies, and therefore the consequences to long-term growth. Thus, taking into account the commitment of long-term growth with structural change, in our interpretation, the debate about fiscal policy targets (assuming two separate budgets) should be broadened to include the financing of the public debt.

The last important macroeconomic price for entrepreneurial decision-making is the real wage rate. The long period of stagnant labour productivity growth, as shown in

[35] Unfortunately, the fiscal adjustment of President Michel Temer, who took power after the impeachment of President Dilma Rousseff in August 2016, is in opposition to our recommendations. According to Constitutional Amendment 55, approved by the Brazilian Congress in December 2016, for the next 20 years starting from January 2017, the total public primary expenditures will only be increased according to the consumer inflation rate (IPCA) of the previous year. Whether or not this draconian fiscal policy will be politically and socially sustainable is an open question.

[36] One should consider that the connection between the policy rate and the financing of the public debt in Brazil greatly benefits rentists in general, and the financial sector in particular. Not surprisingly the private bank system, although very efficient, does not provide long-term credit, which is only available through the Brazilian Development Bank (BNDES) and other public financial institutions. This means to say that private banks operate in the short-term segment of the market, with relatively low risk, and even so are able to benefit from high profitability. See, for instance, de Paula (2011).

Table 1, was followed by an increase in the average real wage.[37] Two negative consequences follow from this pattern. If, on the one hand, the increase in wages above labour productivity puts pressure on inflation, on the other, it reduces the return opportunities of entrepreneurs who, subject to competitive pressure, are forced to reduce their profit margins. Finally, the perverse combination of currency overvaluation and increase in real wages above labour productivity growth over the past decades was reflected in a considerable increase in the labour unit costs, jeopardising exports' competitiveness.

Since in a democratic political system, there is no reason for the government to interfere in contractual relations between workers and employers, the way to restore the average competitiveness of the Brazilian productive sectors lies in the expansion of the growth rates of labour productivity. This implies the resumption of investment in physical and human capital. In relation to the minimum wage policy, our proposal is that it should continue ensuring real increases, given the positive impact on improving income distribution. However, the minimum wage impact on public pension expenditure should be reassessed. In short, the central goal of the macroeconomic regime proposed here is—once confidence in the economic policy is restored—to create the conditions for the Brazilian economy to overcome the long period of semi-stagnation that has been ongoing since the early 1980s. Therefore, a consistent short-term macroeconomic regime should not only aim at price stability but also design and implement a policy arrangement able to bring domestic real interest rates close to the international standards, in order to prevent the appreciation of the real exchange rate and to increase labour productivity in line with real wages growth. These are the requirements for a favourable industrial policy *pro* reindustrialisation to be put in place.

3.2 Policy proposals: industrial policy for reindustrialisation

As previously evaluated, the loss of relative importance of the manufacturing sector means not only its weakening in the productive structure, but in many cases also the disappearance of entire supply chains. This process leads to a reduction in the complementarities between firms and sectors, with obvious adverse consequences on the productivity of the economy.

In order to illustrate the evolution of the degree of international specialisation of the Brazilian economy, Table 2 shows an indicator of a specialisation pattern based on Moreno-Brid and Caldentey's (2010) methodology. Each block of indicators shows, respectively: (i) the composition of Brazilian exports (the share of Brazilian exports of each group in total Brazilian exports); (ii) the composition of world imports (the share of world imports of each group in total world imports); and (iii) the division of the results between (i) and (ii), which indicates the degree ('coefficient') of adaptation of Brazilian exports to global demand.

Table 2 clearly shows a sharp reprimarization of Brazilian exports in the past decades. Between 2000 and 2014, the share of primary products and manufactured goods based on natural resources (industrial commodities) increased from 40.3% to 62.5%. In the same period, there was a significant drop in the share of both

[37] One explanation for that is associated with the governmental wage policy, in place since the mid-2000s, aiming at increasing the purchasing power of the minimum wage.

Table 2. *Composition of Brazilian exports and world imports according to factor intensity and technological sophistication (in percentage share) and coefficient of adaptation of Brazilian exports to world demand*

Brazilian exports classified according to factor intensity and technological sophistication

	2000	2005	2010	2014
Primary Products	8.0	7.7	10.5	16.4
Natural-resources-based manufactured goods	32.3	37.1	50.4	46.1
Labour-intensive manufactured goods	8.8	6.9	4.3	4.4
Scale-intensive manufactured goods	32.2	33.3	25.0	23.2
Science-engineering-and-knowledge-based manufactured goods	18.7	15.0	9.8	9.9
Total	100.0	100.0	100.0	100.0

World imports classified according to factor intensity and technological sophistication

	2000	2005	2010	2014
Primary Products	6.9	6.8	8.1	8.2
Natural-resources-based manufactured goods	12.1	14.8	16.1	17.2
Labour-intensive manufactured goods	8.1	7.3	6.6	6.7
Scale-intensive manufactured goods	16.5	18.4	17.7	17.8
Science-engineering-and-knowledge-based manufactured goods	56.4	52.7	51.6	50.2
Total	100.0	100.0	100.0	100.0

Coefficient of adaptation of the Brazilian exports to the world demand for imports

	2000	2005	2010	2014
Primary Products	1.16	1.12	1.30	1.99
Natural-resources-based manufactured goods	2.66	2.51	3.13	2.69
Labour-intensive manufactured goods	1.09	0.93	0.65	0.66
Scale-intensive manufactured goods	1.95	1.81	1.41	1.31
Science-engineering-and-knowledge-based manufactured goods	0.33	0.29	0.19	0.19

Note: Methodology based on Moreno-Brid and Caldentey (2010).
Source: Brazilian Exports: Ipeadata/FUNCEX Bulletin; World Imports: UN/Comtrade.

engineering-science-and-knowledge-based (from 18.7% to 9.9%) and scale-intensive manufacturing exports (from 32.2% to 23.2%). Even exports of labour-intensive manufactured goods had a significant reduction (from 8.8% to 4.4%). Considering the composition of the world demand in 2014, 68% of the total was related to engineering-science-and-knowledge-based and scale-intensive manufactured goods. Table 2 also confirms that, despite Brazil showing coefficients of adaptation to the world economy above 1 for the scale-intensive manufacturing group, the largest coefficients are related to primary and natural-resources-based goods. A first conclusion to be drawn is that the Brazilian economy, in order to reverse the actual regressed specialisation trend, must

Table 3. *Brazilian annual average trade balance for groups of products: 2000–2014(in US$ million)*

	2000–2004	2005–2010	2011–2014	2000–2014
Manufacturing Products				
Natural-Resources-Based				
Mineral Extraction	2813.9	12479.7	30955.1	14184.5
Oil Extraction and Natural Gas	-2938.6	-2706.9	-2371.2	-2694.6
Food	10163.9	25447.0	37052.1	23447.3
Beverages and Tobacco	904.4	1852.8	2139.9	1613.3
Wood Products	1895.1	2533.9	1833.0	2134.1
Paper, Cellulose and Paper Products	1657.1	3458.9	4868.1	3234.1
Non-ferrous Metals	620.1	960.5	-312.0	507.7
Sum	**15116.0**	**44026.0**	**74165.1**	**42426.4**
Labour-Intensive				
Textile	350.4	-129.9	-1171.8	-247.6
Clothing	162.2	-331.7	-2058.0	-627.4
Footwear and Leather Manufactures	2485.1	3076.4	2557.5	2741.0
Metal Products	-93.9	-518.6	-2208.1	-827.6
Furniture	530.5	651.7	117.9	468.9
Sum	**3434.3**	**2747.9**	**-2762.6**	**1507.2**
Scale-Intensive				
Chemicals, Pharmaceutical and Petroleum Refining	-8952.0	-18739.5	-44998.0	-22479.3
Rubber and Plastic Products	-238.2	-779.5	-3049.4	-1204.4
Iron and Steal	5282.1	9528.5	9738.4	8169.0
Motor Vehicles	4538.1	3734.5	-6984.7	1143.9
Sum	**630.0**	**-6256.0**	**-45293.7**	**-14370.7**
Science-Engineering-and-Knowledge-Based				
Machinery and Equipment	-2356.6	-5534.3	-14467.6	-6857.3
Electrical Machinery	-1566.6	-1707.2	-5962.4	-2795.1
Electronic Material, Computer Equipment and Optical Products	-5848.7	-14404.8	-24988.9	-14375.2
Other Vehicles	1763.6	1104.7	1979.2	1557.6
Sum	**-8008.2**	**-20541.6**	**-43439.6**	**-22469.9**
Subtotal	**11172.0**	**19976.3**	**-17330.8**	**7093.0**
Agricultural Products, Fishery and Forestry Products	**4283.2**	**12172.2**	**28533.8**	**13905.6**
Non-Classified	-681.5	1485.9	681.6	549.0
Total	**14773.7**	**33634.4**	**11884.7**	**21547.6**

Source: Ipeadata/FUNCEX Bulletin.

adopt an industrial policy that prioritises the diversification of its export basket towards more technologically sophisticated manufacturing groups. In order to complement the evidence from Table 2, Table 3 shows the results of trade balance for those same groups of products.

The statistics shown in Table 3 are important because, given that the priority of a strategic industrial policy for reindustrialisation should focus on the diversification of the export profile,[38] they signal the industries which should be targeted by the

[38] As Ocampo (2005) correctly argues, a strategic reindustrialisation policy should in general be a combination of i) introduction of innovations; ii) its diffusion accompanied by the learning process; and iii) the exploitation of complementarities between firms, activities, sectors and institutions that generate dynamic economies of scale, and specialisation and raise the productivity of the economy.

industrial policy. Following the Structuralist theoretical and empirical literature, the priority should fall on industries which, by being characterised by greater capacity to generate and spread technical progress to the rest of the economy, are able to boost the aggregate productivity.[39] In this respect, we can point out some scale-intensive (such as the chemical and pharmaceutical) and engineering-science-and-knowledge-based segments (especially some segments of the machinery and equipment industry and electronics). These are industries where the highest trade deficits are registered.

As to the instruments of industrial policy, they should combine horizontal (e.g. investments in infrastructure and R&D) with vertical instruments (such as moderate tariff protection, public credit for investment and innovation in specific sectors, subsidies supported by multilateral trade rules, government procurement policy, etc.).

There is an ongoing debate about the need to revise the current structure of tariff protection in Brazil. Indeed, such a revision is necessary, for the current structure of import tariffs not only ends up giving some industries a high degree of effective protection (e.g. the automotive industry, which held 127.2% in 2014) and others a negative effective protection (such as livestock and fisheries, with a level of –0.3% in the same year), but also presents a high degree of intersectoral dispersion (standard deviation of 28.1% in effective protection structure). Furthermore, as diagnosed by Castilho *et al.* (2015, p. 41), 'the tariffs of intermediate goods are, for most goods, relatively close to those of final goods industries that use them'. They also add that 'a high protection for intermediate goods ultimately compromises the competitiveness of downstream industries, be they other intermediate goods or final goods'.

In the light of such an evaluation, the tariffs structure in Brazil should be revised, but not through a linear reduction. The objective of this revision should be to reduce the high levels and degrees of dispersion of effective protection, and also to restore the principle of tariff escalation in the midst of the industrial policy proposed here: zero import tariffs for sectors with clear comparative advantage; near-zero rates for capital goods and intermediate goods not targeted by industrial policy; and moderate tariff import rates in segments prioritised by the industrial policy. In this case, assuming that the real exchange rate will be kept at the 'industrial equilibrium' level, instead of high tariff import rates as had prevailed in the import substitution era, the levels of import protection should be such that they are just necessary for avoiding imports of close substitutes during the time in which firms in the prioritised segments are pursuing the learning curve and, at the same time, for inhibiting the excess of firms in sectors subject to economies of scale. Needless to say that, by mirroring the experience of successful Asian countries (Amsden, 2001), firms should be disciplined and previously informed that import tariffs will decrease over time in order to avoid accommodation and rent-seeking activities.

Since the most urgent goal of an industrial policy in Brazil nowadays is to reverse the rapid and significant process of falling behind observed in the Brazilian economy in the past decades,[40] our final task is to indicate the strategic priorities. The first strategic priority is to focus on public investment in physical infrastructure (energy, railways, highways, ports, logistics, etc.), human capital (education and health) and innovation. The government should lead these sorts of investments, as they demand large sums of financial resources and their expected returns take a long time. In the case of

[39] For excellent theoretical and empirical evidence, see Dosi *et al.* (1990).
[40] See Nassif *et al.* (2015).

innovation, one should also add in the higher degree of uncertainty involved, which can be largely increased given its characteristics of non-rivalry and non-excludability.[41]

The second priority concerns the creation of new activities from the existing activities and segments that form the basis of the country's static comparative advantage. This industrial policy focus has been advocated by both liberal economists, like Justin Lin (2009), and neo-Schumpeterian economists, like Carlota Perez (2012). The latter author advocates that Latin American countries should take advantage of 'windows of opportunity' from their rich endowment of natural resources and stimulate the development of new high technologically sophisticated sectors which have close links to the basis of the countries' static comparative advantage. Although Perez is referring to activities and new segments that will probably constitute the next international technological frontier (e.g. biotechnology and new knowledge-based materials), there are also opportunities in less sophisticated segments. Take, for instance, the case of the food processing industry in Brazil, where the country has clear static comparative advantage. Following Perez, one might propose that the country take advantage of this differential to create segments in the machinery and equipment sector—those that are even nonexistent in the country—for the production, processing and packaging of various types of food.

In addition to focusing on sectors where the country presents static comparative advantage, industrial policy should also identify segments and productive chains that deserve the government's temporary stimulus. These segments should be the ones that, as well as having high potential for generating and spreading technological innovation, Brazil has shown the highest average annual trade deficits in recent decades: chemical, pharmaceutical, electronics and machinery and equipment. The difficulty of catching up in these sectors does not mean that Brazil may not be able (with appropriate policy instruments, such as import tariffs, public credit for long-term investment, subsidies for R&D, among others) to become competitive in some segments of the productive chain. Since each of these industries includes a wide range of segments and supply chains, it makes no sense to claim to achieve full control in each sector. Production diversification does not imply quasi-autarky. However, the big problem concerns precisely the identification of the segments and productive chains that deserve the government's temporary stimulus for industrial policy purposes. In general, such information depends on prior studies on technological and economic feasibility.

Industrial policy should also target tradable services related to the information and communication industries (ICT), particularly those subject to static and dynamic economies of scale (Zysman *et al.*, 2010). The priority targets should involve not only the creation of new activities as an extension of those in which Brazil already has some competitive segments (new types of software, new banking automation services, etc.), but also complementary services to products from manufacturing firms aiming at enlarging the market share of firms that compete in global markets (marketing, technical services, call centres, etc.).

Finally, but not less important, industrial policy should stimulate the exports of goods and services. The importance of exports to economic development is associated with two factors. First, since exports tend to expose local producers to exigencies from global markets, such as quality, healthy goods, environment control, etc., they

[41] Under market competition, innovative activities attract imitators, and true innovators may not fully recuperate the sunk costs resulting from the outcome of their activities in R&D (Arrow, 1962).

ease a rapid technological upgrade and learning. Second, considering all things equal, if exports increase above imports, sustained trade surpluses will relax balance of payments constraints to long-term growth (Thirlwall, 1979).

4. Concluding remarks

A strong pro-developmental convention prevailed in Brazil from the 1930s to 1980 (Erber, 2011). Yet the 1980–2014 period was characterised by the transition to democracy and the reduction in economic inequality, but with poor economic results (Bresser-Pereira, 2014). Specifically, after the successful price stabilisation plan in the mid-1990s (the *Plano Real*, 1994), the pro-development convention was replaced by a pro-stability convention, which, however, has not been able to restore the Brazilian capacity to sustain long-term economic growth.

In this paper, we have argued that to regain its growth capacity, a very close coordination between the short-term macroeconomic policy and long-term industrial policy should be put in practice. As also shown since the mid-1990s, the annual average growth in labour productivity has stagnated, average real wages have been systematically growing above labour productivity growth and the Brazilian currency has cyclically and chronically appreciated in real terms. As a result, Brazil's pattern of international specialisation has moved towards the production of low-income elasticity goods, and premature deindustrialisation has accelerated.

Given these poor indicators, this paper sought to provide a menu of policy recommendations, aiming at not only promoting reindustrialisation, but also redirecting the economy to its trajectory of catching up. The most important of the recommendations is to design and adopt a new consistent macroeconomic regime which can widen the space for industrial policy to show best results concerning dynamic economic change. With respect to the new macroeconomic regime proposed, we suggest a flexible inflation targeting regime, a countercyclical fiscal policy, an exchange rate policy that (combined with instruments that neutralise the Dutch disease) prevents a new cyclical and chronic trend of appreciation of the Brazilian currency and measures to boost aggregate labour productivity.

As for the industrial policy, we warned of the risks associated with the country joining the global value chains, as such a strategy would mean giving up autonomy to make strategic economic decisions concerning long-term development. Our suggestions cover the reasons for reviewing the current structure of import tariffs, as well as the indication of five strategic priorities for the industrial policy: i) public investment in physical infrastructure and human capital and innovation; ii) new production chains extending from the existing basis of Brazil's static comparative advantage; iii) new production chains in segments close to the international technological frontier; iv) new activities in some tradable services; and v) exports.

Summing up, we believe that the reindustrialisation of the Brazilian economy is an important step towards the catching-up process and its success depends on a new political, economic and social convention that replaces the current pro-stability convention for a pro-development one. Far from being implemented in a technocratic way, this new convention, which needs a fine coordination between a new macroeconomic regime and a strategic industrial policy, should result from a political consensus among social classes (especially entrepreneurs of all sectors and workers) concerning the support for economic and social development being made the top priority in Brazil.

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