A new developmentalist model of structural change, economic growth and middle-income traps*

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Abstract

Over the past decade, the so-called *Brazilian New Developmentalist School* has provided an original interpretation for why several developing countries seem to have fallen in a middle-income trap. It must be noted, however, that a coherent formalization of its main propositions is still missing. Our purpose in this article is to fill such a gap in the literature. We assess, analytically and trough numerical simulations, how the discovery of natural resources and the adoption of an external savings growth strategy may lead to the appearance of the Dutch disease. In both cases, a real exchange rate overvaluation emerges as the ultimate consequence of a class coalition between workers and rentiers. An overvalued real exchange rate is responsible for maintaining inflation low while artificially increasing real wages, on the one hand, and financial incomes, on the other. The model combines features of the classical development theory and demand-led growth being to some extent a synthesis between those traditions.

Keywords: New Developmentalism, Demand-led growth, Structural change, Exchange rates.

JEL: O11; O14; O04

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1 Introduction

It is common practice in modern growth theory to distinguish between *immediate* and *fundamental* or *deep determinants* of economic development (e.g. Maddison, 1988). Immediate factors are those most directly responsible for the object under analysis whereas deep factors are related to its background and origins. Hence, while the existing amount of physical and human capital is an immediate determinant of per-capita income, the reasons why countries are different in terms of the availability of such elements is related to its deep determinants. Natural resources and the level of technical or scientific knowledge are further examples of immediate determinants. Geography, institutions, income distribution, and policy regimes are frequently included in the second group (see Ros, 2013, pp. 15-17).

The *Brazilian New Developmentalist School* can be understood as an approach to the deep determinants of economic development in which the macroeconomic policy regime has a key role in explaining international growth rate differences, notably among middle-income countries (Bresser-Pereira, 2009; Bresser-Pereira et al., 2015). Recent contributions include Bresser-Pereira et al. (2020) who defined new developmentalism as a set of proposals for institutional reforms and economic policies, whereby middle-income countries seek to achieve the per-capita income level of developed countries.

Its main contribution to the literature on growth and structural change is perhaps the diagnosis that economies such as Brazil and Argentina suffer from a chronic real exchange rate overvaluation resulting from the combination of a Dutch disease with a growth strategy based on external savings. As a result, the recommended strategy consists in the adoption of an export-led growth regime in which the promotion of the manufacturing sector induces the acceleration of capital accumulation and the adoption of modern production techniques. The basic theoretical propositions can be summarize in seven principles:

1. Economic development is a cumulative process of raising real wages and living standards. It depends on the increase in labor productivity that stems from technical progress incorporated in new machinery and equipment. It is also linked to a process of structural change in which labor moves from sectors with the lowest to the highest value-added per worker.

2. The rate of growth of output is determined by non-creating capacity autonomous demand. However, in an open economy that does not have an international reserve currency, it can only be sustainable if export-led. Relying on domestic autonomous demand, such as government spending, means that growth will be sooner or later interrupted by a crisis in the balance-of-payments.

3. Long-run growth cannot be supply-side determined because capital accumulation, the workforce, and labor productivity adjust to non-creating capacity autonomous demand. It also cannot be balance-of-payments constrained because foreign trade income elasticities are not constant, adapting to the evolution of the productive structure. More complex productive structures are related to a higher ratio between the income elasticity of exports and imports, thus allowing for a higher rate of growth compatible with equilibrium in the balance-of-payments.

4. In the case of economies with abundant natural resources, long-run growth is constrained by a chronic tendency of exchange rate overvaluation that stems from a Dutch disease and foreign capital inflows. Such an overvaluation interrupts and reverses the

process of productive sophistication being the main cause of the middle-income trap in developing countries like Brazil and Argentina.

5. Domestic savings and external savings are substitutes, rather than complements. Aggregate savings are determined by investment but its composition depends on the level of the real exchange rate. An appreciation of the exchange rate increases the wage-share as mark-ups over unit costs fall. Given that the propensity to save out of profits is greater than out of wages, an increase in external savings – due to an appreciation of the exchange rate – is associated with a reduction in domestic savings.

6. The abundance of natural resources makes the *industrial equilibrium exchange rate* to be greater than the exchange rate compatible with a balanced current account. In this way, the long-term sustainability of economic growth in countries with abundant natural resources requires that they have a surplus in current account.

7. The adoption of an external savings growth strategy is another source of real exchange rate overvaluation. Growth with external savings requires policymakers to set domestic interest rates at a level higher than the sum between international interest rates and the country risk premium. The interest rate differential induces foreign capital inflows, resulting in a surplus in the balance-of-payments' capital account and a real exchange rate appreciation relative to the level of current account balance.

Based on such principles, new developmentalism can also be considered as an explanation for the so-called middle-income trap. According to Glawe and Wagner (2016), such a situation usually refers to countries that have experienced rapid growth, quickly reaching a middle-income status, but have failed to further catch-up to developed countries. That was precisely the case of several Latin American nations.

New developmentalists have argued that a middle-income trap might occur under two very specific circumstances. Either under the discovery of natural resources, such as Brazil after finding new petroleum reserves in 2006, or through the adoption of an external savings growth strategy. In both cases, an overvalued currency is the ultimate consequence of a coalition between workers and the rentier class that leads to an exchange rate appreciation. This is responsible for maintaining inflation low while artificially increasing real wages, on the one hand, and financial incomes, on the other (Bresser-Pereira, 2015). Despite its long-run high costs, the short and medium-term effects sustain such a political arrangement, making it very difficult to be overcome by a developmentalist coalition.[1]

Although it has received growing attention, both in academic and policy circles, a coherent formalization of those propositions is still missing. Our purpose in this article is to fill such a gap in the literature. We assess, analytically and trough numerical simulations, how the discovery of natural resources and the adoption of an external savings growth strategy may lead to the appearance of the Dutch disease. We show that the adoption of an inflation targeting regime is equivalent to growing with external savings. Such strategy implies an overvaluation of the exchange rate that is proportional to the current account deficit, leading to a gradual disappearance of manufacturing activities. Given that sustainable long-term growth depends

[1] The term class coalition comes from Bresser-Pereira (2015) and refers to a political (implicit) alliance between groups that belong to different social classes. Class coalitions are possible because social classes are not homogenous, diverging with respect to their goals and political strength. A *developmentalist coalition* consists of industrial entrepreneurs, manufacturing workers and politicians aiming to eliminate the sources of the real exchange rate overvaluation.

on the existence of a robust and dynamic modern sector, the resulting equilibrium point will be Pareto-inferior to the developmentalist alternative in terms of both investment rates and labor productivity performance.

Moreover, we also propose an innovative definition for the so-called industrial equilibrium exchange rate. Previous studies have defined it as the real exchange rate that makes those firms operating in the technological frontier to be competitive in both domestic and international markets. The main limitation of this concept is that firms in countries such as Brazil or Argentina in general do not function with a "state of the art" technology. Hence, redefined it as the one that makes domestic firms to be internationally competitive for a given technological gap. Though a deeper discussion of the dynamics of the gap itself goes beyond the scope of the paper, our modelling exercise makes explicit how the macroeconomic policy regime, as a deep determinant of economic development, might be responsible for the middle-income trap.

The remaining of the article is organised as follows. Section 2 briefly revisits the theoretical foundations of new developmentalism. Section 3 introduces the main building blocks of our model. The model combines features of the classical development theory and demand-led growth being to some extent a synthesis between those traditions. In Section 4, we discuss in detail the conflict between the level of real exchange rate required for industrial equilibrium and the one compatible with a target for the current account deficit. We show under which conditions a middle-income trap might arise, resulting in a premature deindustrialization, on one hand, and lower inflation and a higher wage-share, on the other. Some final considerations follow.

2 From classical development to demand-led growth

The purpose of this Section is to revisit some of the main elements of classical development and demand-led growth theories. To the extent that they both provide solid ground to stand on (Bresser-Pereira, 2019), we consider this to be a necessary first step in our endeavour. However, for a deeper and systematic presentation of each approach, the reader is invited to refer to Agarwala and Singh (1958) and Rodriguez (2009), as well as Lavoie (2014) and Blecker and Setterfield (2019).

2.1 Classical roots

The classical theory of economic development, understood as the systematic and specialized study of the problems of developing countries, began after the Second World War with the emergence of Keynesian interventionism, the experience of the Soviet Union, and the movements of decolonization. Authors in this tradition include A. Lewis, R. Prebisch, A. Hirschman, C. Furtado, among others. They shared the view that economic development is a consequence of industrialization and capital accumulation. Underdevelopment was seen as a sub-optimal equilibrium caused by factors such as low savings rates, high population growth and low incentives to investment. The economy was frequently depicted as a dual system in which industrial and subsistence sectors coexisted, the latter being the source of a structural labor force surplus.

On the political plan, they showed how economic development strongly depends on a coalition of classes involving the national bourgeoisie, the public bureaucracy, and urban workers. At the economic level, they introduced the concept of structural change, with industrialization as the vehicle of productive and societal transformation. A poor country was to develop and close the gap relative to developed countries only under a significant increase in the investment rate and the development of one or more relevant sectors in the manufacturing industry. Furthermore, as argued by Rostow (1956), it was required the rapid emergence of political, social and institutional structures capable of exploring the expansion of the modern sector.

Such a process demanded the ability to mobilize capital from domestic sources, that is, an increase in the domestic savings rate. Indeed, one of the main concerns of the classical theory of economic development was precisely to explain how countries undergoing a rapid industrialization process could increase their savings rate from 4-5% of Gross Domestic Product (GDP) to levels above 15% within a few years (Lewis, 1954). The explanation given by Lewis was that in the early stages of industrialization, the existence of surplus labor in the subsistence or traditional sectors allowed employment in the modern or industrial sector to expand at larger rates, with virtually no effects on the supply price of labor. In other words, the modern sector initially faces an infinitely elastic labor supply at the subsistence wage (plus a wage premium to compensate workers for the hassle of urban life).

Given that productivity is higher in the modern sector than in the subsistence sector, it follows that transferring labor from the latter to the former would result in an increase in the average productivity of the economy, without increasing real wages. Consequently, there is an increase in the profit-share. As the propensity to save from profits is higher than the propensity to save from wages (see Kaldor, 1956), an increase in the savings rate follows. In short, during the process of industrialization, a positive correlation between savings, profits and the share of manufacture on income should be observed.

Structural change becomes the key to understand economic development. Increases in productivity lead to an increase in income, resulting in higher profits and allowing capital accumulation to further increase production. On the other hand, there is a direct impact on the demand structure (Furtado, 1952). It is well-known that demand patterns tend to diversify following increases in income. Since new investments are largely aimed at satisfying future demand, the latter complements and reinforces the initial supply-side impulse.

Although a shortage of savings cannot be considered an ultimate obstacle to economic development, the international division of labor or center-periphery division of the world, might impose a balance-of-payments constraint to the rate of growth in developing economies. In a standard representation of this relationship, the center is responsible for the production of manufactures while the periphery supplies primary products. The periphery is at the same time a specialized and heterogeneous structure. The center is instead a diversified and homogeneous structure.[2]

As the periphery industrializes, the outward orientation of its development is replaced by an inward orientation, based on the expansion of industrial production for import substitution. It is the existence of a specialized and heterogeneous structure during the industrialization process that gives rise to structural balance-of-payments problems. This occurs because the periphery's exports basically consist of primary goods with a relatively low income elasticity while imports are made up of intermediate and capital goods with a high

[2]In the periphery, the exporting sector is made up of firms specialized in the production of primary goods (for example, coffee, cotton, cocoa, iron ore and cooper) while consumption goods are almost entirely imported from abroad. Heterogeneity comes from the large differences in productivity between exporting and traditional activities. On the other hand, the center is a diversified structure due to the multiplicity of consumption, capital and intermediate goods that are produced. Moreover, it is an homogenous structure due to the fact that productivity differences between sectors are small or non-existent (Kaldor, 1967).

income elasticity. As a result, the capacity to pay for imports does not grow at the same rate of the import requirements of industrialization (Prebish, 1959).

This problem could be amplified by a deterioration of the terms-of-trade due to the asymmetric effect of technological progress over prices of primary and manufactured goods. In the center, due to the nonexistence of a structural labor surplus, productivity gains are appropriated by workers in the form of higher wages, making prices of manufactured goods constant through time. In the periphery, however, the existence of a labor surplus implies that productivity gains only lead to lower prices of primary goods. Hence, a deterioration of the terms-of-trade can potentially increase the per-capita income gap between center and periphery.

2.2 Demand-led growth

The starting point of demand-led growth theory is that the means of production used in a modern capitalist economy are themselves goods produced within the system (Kaldor, 1988). Their supply should never be taken as given and independent from demand. In this framework, the fundamental economic problem is not the allocation of a given amount of resources between alternative uses but the determination of the rate of creation of these resources:

> "The use of produced means of production implies that the 'scarcity of resources' in processing activities cannot be thought of as being independent of the level of activity in the economy. What is chiefly important in processing activities is the dynamic propensity of the economy to create resources (that is, to deepen and/or widen its stock of capital) rather than the static problem of resource allocation" (Setterfield, 1997, p. 50).

For example, the quantity of capital that exists in a point of time, i.e. the productive capacity of an economy, is the result of past investment decisions. Investment, on the other hand, depends on at least two sets of variables: (i) the opportunity cost of capital, mainly determined by the short-term interest rate set by the Central Bank, and (ii) the expectations about the future growth of sales and production. If entrepreneurs expect a strong and sustainable increase in demand, as it would be expected in an economy that shows persistent growth, then they will make large investment expenditures.

It is true that in the short and in the middle-run, production should not increase beyond a certain threshold given by the maximum productive capacity of the economy. In the long-run, however, such capacity must be increased in order to meet the increase in aggregate demand:

> "Since under the stimulus of growing demand capacity of all sectors will be expanded through additional investment, there are no long-run limits to growth on account of supply constraints; such constraints, whether due to capacity shortage or to local labor shortage, are essentially short-run phenomena – at any one time, they are a heritage of the past" (Kaldor, 1988, p. 157).

A very common objection to this reasoning is the idea that the supply of capital would be limited by the share of real income that society does not want to consume, so that, any increase in investment expenditures require a previous increase in savings. However, it is simply not true that investment requires previous savings in order to be realized. In fact, it only requires the creation of liquidity by commercial banks (Davidson, 1968; Carvalho, 1992). If commercial banks are ready to increase their credit operations in favorable terms, then it will be possible for firms to start their investment projects, buying new machines and equipment from the capital goods producers.

Once an investment plan is executed, extra income is generated in such magnitude that, at the end of the process, aggregate savings adjust to the new value of aggregate investment. Extra savings generated in this way are used for funding short-term debts with commercial banks and long-term debts in capital markets. More specifically, firms could sell shares or long-term bonds in capital markets in order to raise the required funds to pay all their debts to commercial banks. These operations will not necessarily decrease the price of bonds or shares since families will be looking for new assets to store their extra saving.

There are, however, financial limits to increases in productive capacity. In fact, firms are able to match the expected growth of demand only if the expected rate of return of new investment projects is higher than the opportunity cost of capital. In a first approximation, the cost of capital corresponds to the average interest rate that firms must pay to get funding for their investment projects. The firm has three sources of funding: retained earnings, debts and equity. The cost of capital is the weighted average of the cost of each of them. If costs are too high – for instance, due a very tight monetary policy that increases the short-term interest rate – new investment projects may not be profitable and investment expenditures will not adjust to the level required by the expected growth of aggregate demand.

The supply of labor also cannot be considered a limit to long-run growth. On the one hand, the number of working hours can be easily increased to adjust the level of production. On the other hand, participation rates – defined as the ratio between the labor force and total population in working age – can also increase in response to a strong increase in demand for labor (Thirlwall, 2002, p. 86). In fact, during boom times, the opportunity cost of leisure increases, stimulating a strong increase in participation rates.

It follows that the growth rate of the labor force accelerates during boom times because some people may decide to enter in the labor force as a response to the incentives created by a booming labor market. Moreover, one should notice that population and labor force are not a datum from the viewpoint of the economy. A shortage of labor – even of qualified workers – can be solved by immigration from other countries. For example, countries such as Germany and France managed to sustain high growth rates during the 1950s and 1960s due to immigration of workers from countries in the periphery of Europe (Spain, Portugal, Greece, Turkey and Italy).

A last element to be considered is technological progress. Is technological progress a restriction to long-run growth? If the rate of technological progress is exogenous to the economic system, then growth will be limited by the pace at which technological knowledge increases. However, this is not the case. On the one hand, given that a large part of technological innovations are embodied in new machines and equipment, the pace at which firms introduce innovations is largely determined by the rate of capital accumulation. On the other hand, disembodied technical progress is determined by learning-by-doing processes associated with the presence of dynamic economies of scale. As a result, the rate of growth of labour productivity responds positively to the rate of growth of output and to the capital stock.[3]

Consequently, concepts such as potential or full-employment output become meaningless.

[3]This idea was originally presented in Kaldor (1957) who proposed the existence of a structural relationship between the growth rate of output per-worker and the growth rate of capital per-worker. Empirical evidence on the so-called Kaldor-Verdoorn's law has been provided for different samples of countries by McCombie and De Rider (1984), Magacho and McCombie (2017), Romero and Britto (2017), among others.

To the extent that the supply factors of production and the rate of technological progress are demand determined, "full-employment" is essentially a short-run concept that ignores the endogeneity of the natural rate of growth in the long-run:

> "Full employment of an industrial region or a country is therefore essentially a short-run concept, which ignores the long-run mobility of labor and the possibility of an increase in training which responds to demand in much the same way as capital investment" (Kaldor, 1988, p.157).

Demand-led growth scholars have argued for a long time that the ultimate determinant of economic growth is autonomous demand. In open economies, nonetheless, there are two components of autonomous demand: exports and government consumption (Park, 2000). This means that the long-run output growth rate is a weighted average of the two of them. Investment expenditures are not a component of autonomous demand since they are basically determined by entrepreneurs' expectations about future growth of production and sales, according to the so-called principle of acceleration of investment theory (Harrod, 1939, for a detailed review see Zambelli, 2011).

In a small open economy that does not have a convertible currency, exports become the only exogenous source of demand. If the rate of growth of government consumption is higher than the latter, output will increase faster than exports. For an income-elasticity of imports sufficiently high, as it is usually the case in open economies, imports will grow faster than exports, generating an increasing trade deficit. Such a process is simply unsustainable in the long-run.

3 Building the *New Developmentalist* model

We are now ready to present a formalization of the main propositions of the *New Developmentalist School*. The model is conceived for a small open economy. For expositional purposes, we divide it into seven blocks of equations: (i) supply conditions, (ii) effective demand, (iii) technical progress, (iv) structural change, (v) price setting, (vi) distributive conflict, and (vii) the real exchange rate.

3.1 Some general supply-side conditions

Suppose the following Leontief production technology:

$$pY = \min\left\{\frac{upK}{\vartheta}, eNpy\right\} \tag{1}$$

where output, Y, results from a combination of capital, K, and labor, N. The level of capacity utilization, u, is given by the ratio between current to full-capacity production with ϑ standing as the optimal capital-output ratio. On the other hand, the labor force is weighted by the participation rate, e, and labor productivity, y. Finally, p stands as the aggregate price index.

The Leontief efficiency condition, states that:

$$pY = \frac{upK}{\vartheta} = eNpy \tag{2}$$

Assuming that the labor force grows at an exogenous rate, n, changes in the demand for each factor of production adjust to the growth rate of output:

$$\frac{\dot{e}}{e} = \frac{\dot{Y}}{Y} - \frac{\dot{y}}{y} - n \tag{3}$$

$$\frac{\dot{u}}{u} = \frac{\dot{Y}}{Y} - \frac{\dot{K}}{K} \tag{4}$$

where a dot over a variable indicates time derivatives.

A constant participation rate, $\dot{e}/e = 0$, results from output growing at the same rate as the sum between labor productivity and the supply of workers, i.e. the so-called natural growth rate. Furthermore, a constant capacity utilization, $\dot{u}/u = 0$, requires that capital accumulation follows the rate of growth of output. Firms adjust utilization rates accordingly to the difference between the growth rate of demand and capital accumulation. If the former is higher than the latter, one should expect increases in capacity utilisation. On the contrary, if demand is growing relatively less, one should expect that firms will operate with some extra degree of idle capacity.

Define h as the marginal propensity to invest, being equal to investment, I, over output. Manipulating Eq. (2) making $\dot{K} = I$, we have that the rate of growth of the capital stock responds to current demand conditions:

$$\frac{\dot{K}}{K} = \frac{hu}{\vartheta} \tag{5}$$

3.2 Effective demand and capital accumulation

Aggregate demand is divided between consumption, C, investment, government expenditures, G, and international trade:

$$pY = pC + pI + pG + pX - qM \tag{6}$$

where X stand as exports, M corresponds to imports, and q is the real exchange rate.

With the exception of exports, all remaining components are induced by the level of economic activity, so that:

$$\begin{aligned} pC &= cpY \\ pI &= hpY \\ pG &= gpY \\ pM &= mpY \end{aligned} \tag{7}$$

where $c > 0$ is the propensity to consume, $g > 0$ corresponds to the size of the government being determined by society through different institutional mechanisms, and $m > 0$ is the propensity to import.[4] Finally, recall that the propensity to invest is given by $h = I/Y$.

In a small open economy, exports are the only truly exogenous component of demand. Such a statement, for instance, is in line with a Kaldorian perspective on demand-led growth:

[4]Notice that we are implicity assuming that the income elasticity of imports is equal to one. Even though such a hypothesis is not very accurate from an empirical point of view, it allows us to simplify the algebraic steps without compromising the main message of the model. For a recent assessment of foreign-trade income elasticities, see Gouvea and Lima (2013).

"Exports differ from other components of demand (...). Exports are the only true component of demand in an economic system, in the sense of demand emanating from outside the system. This is very important to bear in mind. The major part of consumption and investment demand is dependent on the growth of income itself" (Thirlwall, 2002, p. 83).

Hence, making use of Eqs. (6) and (7), the level of output can be written as:

$$Y = \sigma X \tag{8}$$

where $\sigma = 1/\left[s + qm - h\right] > 0$ is the Harrod-Hicks super-multiplier of autonomous expenditures while $s = 1 - c$ is the marginal propensity to save. To maintain our representation as simple as possible, we postpone any considerations on income distribution to the subsection dealing with the price setting.

Taking logarithmic time derivatives of Eq. (8), the rate of growth of real output is given by:

$$\frac{\dot{Y}}{Y} = \frac{\dot{X}}{X} + \frac{\dot{h}}{s + qm - h} \tag{9}$$

In the long-run, real output is determined by the growth rate of exports. This means that the growth regime of the *Brazilian New Developmentalist School* is export-led.

Finally, following Freitas and Serrano (2015, p. 266), it is assumed that adjustments of the marginal propensity to invest are smooth and continuous over time being compatible with the so-called flexible accelerator of investment. The introduction of the flexible accelerator in the realm of the super-multiplier was first done by Dejuán (2013) and, for the purposes of this article, we adopt a simple dynamic specification:

$$\frac{\dot{h}}{h} = \mu\left(u - u_n\right) \tag{10}$$

where $\mu > 0$ is a parameter that captures the response of the marginal propensity to invest to deviations of capacity utilization from its normal level.

3.3 Economic development and the technical progress function

Economic development is a process whereby capital accumulation and the systematic incorporation of technical progress allow the persistent increase in labor productivity and population standards of living (Bresser-Pereira et al., 2014). Once the so-called "Lewis point" has been overcome, increases in labor productivity enable a persistent rise in real wages (Lewis, 1954). At that point, the unlimited supply of labor, characteristic of the first phase of capitalism is exhausted (Kaldor, 1980). Further increases in labor demand result in wages raising at approximately the same pace as labor productivity. Growing wages, in turn, make possible to increase the population's standard of living.

Capital accumulation and technical progress are the fundamental sources of increases in labor productivity. Indeed, technical progress enables, on the one hand, an increase in production efficiency while, on the other hand, leads to the development of increasingly sophisticated products and services. They incorporate not only a larger but also a more diversified amount of technical and scientific knowledge. Being produced by highly skilled workers in companies in the neighborhood of the technological frontier, such products also have a high value-added per unit of labor. Thus, technical progress stems not only from the advancement of the "state of the art" but also through a process of structural change (see Botta, 2009; Gabriel et al., 2016).

Capital accumulation is an important element in the process of diffusion of technical and scientific knowledge. As emphasized by Hidalgo (2015), physical capital is nothing more than technical and scientific knowledge embodied in machines and equipment. Thus, it is impossible to separate the increase of labor productivity that results from the advance of the "state of the arts" and the share resulting from a greater "mechanization" of the workforce. The relationship between labor productivity and capital accumulation was pioneered by Kaldor (1957) as the technical progress function. We propose the following modified version:

$$\frac{\dot{y}}{y} = \alpha_0 + \alpha_1\gamma\left(\frac{\dot{K}}{K} - \frac{\dot{L}}{L}\right) + \alpha_2 e \tag{11}$$

where α_0 is an arbitrary constant, $\alpha_1 > 0$ captures the capacity of the economy to transform technical and scientific knowledge capital embodied into increases of productivity, and α_2 stands as the labour market effect on productivity.

The expression above establishes a positive correspondence between per worker capital accumulation and labor productivity conditional to the manufacturing share on real output. This is due to the fact that the manufacturing industry is the *loci* of increasing returns to scale (Kaldor, 1967; and more recently Szirmai, 2012; Szirmai and Verspagen, 2015). Thereby a higher γ is suppose to allow faster productivity growth for a given rate of increase in capital per-worker. Empirical evidence suggests $0 < \alpha_1\gamma < 1$.

On the other hand, the existence of a labor market effect has a twofold motivation. First, given that to a great extent technical progress is capital embodied, labor must be used for productivity gains to be effectively incorporated. Accumulating capital is of little good, for instance, under high levels of unemployment. Moreover, high participation rates mirror low unemployment rates, improving the fallback position of workers and, consequently, their bargain power. Given that this could potentially lead to increases in real wages above productivity gains (Tavani and Zamparelli, 2017; Dávila-Fernández, 2020), firms respond by increasing their search for labor saving production techniques. As a result, one should expect an increase in the rate of growth of labor productivity.

Empirical evidence seems to show that technical progress is neutral in Harrod's sense. This means that the output-capital ratio is relatively constant in the long-run and $\dot{y}/y = \dot{K}/K - \dot{L}/L$. Accordingly, we can rewrite Eq. (11) as:

$$\frac{\dot{y}}{y} = \frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1\gamma} \tag{12}$$

where $\partial\frac{\dot{y}}{y}/\partial\gamma > 0$ so that increases in the manufacturing share on real output will produce an increase in the long-run growth rate of labor productivity. This is a formal representation of the one of the most important new-developmentalist propositions. The productive structure matters for long run growth (see, for example, Gala, 2017).

3.4 Structural change, technology gaps and the exchange rate

As highlighted in the previous Sections, the share of manufacturing industry in real output is a key element of productivity growth, making industrialization the engine of long-term growth. This is a key element of the Kaldorian and structuralist literature, which emphasize the fundamental role of industry as a source of dynamic economies of scale and increasing returns (see, for instance, Kaldor, 1957 and more recently McMillan and Rodrik, 2014).

The share of manufacturing over time is influenced by price as well as non-price competitiveness factors. In what concerns price competitiveness, an overvalued exchange rate, i.e. a real exchange rate below some long-run equilibrium value, may lead to a progressive reduction of the share of manufacturing industry in GDP. This is because, by artificially increasing domestic costs, there is an increased transfer of productive activities to other countries. The value of the real exchange rate that makes those firms operating with the state of the art technology to be competitive in both domestic and international markets has been defined as the *industrial equilibrium exchange rate* (Bresser-Pereira and Gala, 2010; Bresser-Pereira et al., 2015).

An overvalued exchange rate is associated with a negative process of structural change. In the context of developing economies, we may refer to it as premature deindustrialization (for a discussion of this concept, see Palma, 2008 and Rodrik, 2016). On the other hand, an undervalued exchange rate, that is, above its industrial equilibrium level, would have the opposite effect, inducing the transfer of productive activities to the domestic economy. This is expected to increase, thereby, the share of the manufacturing industry in production.

The problem is that firms in countries such as Brazil or Argentina generally operate behind the technological frontier. Therefore, we redefine the industrial equilibrium exchange rate as the one that, for a given level of technological gap, makes the share of manufacturing industry constant over time. Furthermore, it must be noticed that the existence of such a technological gap negatively affects the non-price competitiveness of manufacturing firms. Manufactured goods produced in such countries are frequently of inferior quality and/or lower technological intensity (Verspagen, 1993).[5]

From the discussion above, we formalize the dynamics of the share of manufacturing industry in real output as:

$$\frac{\dot{\gamma}}{\gamma} = \beta_0 + \beta_1 q - \beta_2 Gap \tag{13}$$

where Gap stands as the technology gap, $\beta_0 < 0$ is a parameter that captures the effect of a "mature deindustrialization" as per-capita income rises and the demand for manufacturing goods stabilizes (Rowthorn and Ramaswamy, 1999), β_1 represents discretionary policies that directly address industrial development through the exchange rate, and β_2 captures the sensitivity of the productive structure to the gap. Parameter β_1 implicitly captures the effects of trade-tariffs on the manufacture sector. A high level of tariffs reduces the response of γ to q because it implies a lower substitutability between domestic and foreign goods.

From Eq. (13), the exchange rate that guarantees a constant share of manufacturing output, q^I, is defined and given by:

$$q^I = \frac{\beta_2 Gap - \beta_0}{\beta_1} \tag{14}$$

The industrial equilibrium level of the real exchange rate is an increasing function of the technological gap. Though a deeper discussion of the dynamics of the gap itself goes beyond the scope of the paper, it is important to notice that the higher the distance of a developing

[5]Following Verspagen (1993), the technological gap between the North, or developed economies, and the South, or developing economies, is defined as $Gap = \ln(T_N/T_S)$, where T_N is the stock of knowledge of the north and T_S is the knowledge in the south. If $T_N/T_S = 1$ then $Gap = 0$, which means that developing economies have made a successful catching-up with the developed economies.

country to the technological frontier, the higher the real exchange rate required to hold γ constant over time. Finally, q^I is also a negative function of the level of trade tariffs, captured by the coefficient β_1.

Manipulating Eq. (13) using Eq. (14), we can easily show that the dynamics of the manufacturing share can be rewritten in terms of deviations of the real exchange rate from the industrial equilibrium level:

$$\frac{\dot{\gamma}}{\gamma} = \beta_1 \left(q - q^I\right) \tag{15}$$

becoming, thus, clear that an exchange rate overvaluation will produce a cumulative decrease in the manufacturing share on real output.

The arguments of the engine of growth hypothesis are a combination of theoretical and empirical observations. We conclude this block of equations by allowing the rate of growth of exports to respond to γ in a simple linear fashion:

$$\frac{\dot{X}}{X} = x_0 + x_1\gamma \tag{16}$$

where x_0 captures all variables that might influence exports but are not taken into account in our model, and x_1 corresponds to the sensitiveness to the manufacturing share. This relationship is in line with a large empirical literature suggesting that industrialization is a key driver of sustained growth, especially in developing countries (Rodrik, 2013; Szirmai and Verspagen, 2015; Marconi et al., 2016).

3.5 Price setting, income distribution and real exchange rate

In our economy, output is divided between the wage-bill and profits:

$$pY = wL + rpK \tag{17}$$

where w stands as the nominal wage and r is the profit-rate. The share of wages in income can be written as:

$$\varpi = \frac{w/p}{y} \tag{18}$$

As mentioned in previous Sections, we are considering a small open economy that produces a homogeneous output, which is an imperfect substitute for goods produced abroad. Firms in domestic markets are supposed to fix prices with a mark-up over labor costs. The price setting rule is given by:

$$p = (1+z)\,\frac{w}{y} \tag{19}$$

where z is the mark-up rate. In this way, income distribution is determined at the microeconomic level (see Lavoie, 2014, chapter 3; Oreiro, 2016, chapter 5).

Since the final good produced by domestic firms is an imperfect substitute for final goods produced abroad, trade does not impose the law of one price in international markets. This means that purchasing power parity does not apply. However, the monopoly power of domestic firms is affected by the price of imported goods. More specifically, the ability of domestic firms to fix a price above direct unitary production costs depends on the real exchange rate. In this setting, a currency depreciation allows domestic firms to increase the mark-up in line with the decrease in competitiveness of the final goods imported from abroad (Bresser-Pereira et al., 2015, pp. 86-87).

Hence, we may express the mark-up rate as a function of the real exchange rate:

$$z = \xi_0 + \xi_1 q \tag{20}$$

where ξ_0 stands as the part of the mark-up that is independent from q, while ξ_1 corresponds to the marginal response of z to changes in the exchange rate. From Eqs. (18) to (20), it follows that:

$$\begin{aligned} \varpi &= \frac{1}{1+z} \\ &= \frac{1}{1+\xi_0+\xi_1 q} \end{aligned} \tag{21}$$

with $\partial\varpi/\partial q < 0$.

Let $z^I = \xi_0 + \xi_1 q^I$ and $\varpi^I = 1/\left(1+\xi_0+\xi_1 q^I\right)$ be the mark-up and the wage-share resulting from a real exchange rate equal to its industrial equilibrium level, respectively. Subtracting the last expression from both sides of Eq. (21), we can represent deviations of functional income distribution in terms of deviations in the real exchange rate:

$$\varpi - \varpi^I = \frac{\xi_1}{(1+z)\left(1+z^I\right)}\left(q^I - q\right) \tag{22}$$

A side effect of a real exchange rate overvaluation is that the wage-share will be higher with respect to the level that would prevail if there was no exchange rate misalignment.

3.6 Distributive conflict, wage indexation and inflation

It is well known that inflation rates in most developing countries are higher than in developed ones. *New Developmentalism* explains this stylized fact by differentiating between: (i) factors that accelerate inflation, (ii) factors that sustain inflation, and (iii) factors that sanction inflation. The first component corresponds to the struggle between firms and workers to increase or recover their income shares. The second refers to the conflict of firms and workers to preserve their income shares through indexation mechanisms to adjust prices and wages in face of past inflation. Finally, there is an endogenous increase in the money supply through which the economy maintains its real liquidity, preventing the ongoing high inflation from reducing the real amount of money that is needed for economic transactions.

In this representation, we will focus on the distributive conflict dimension of the problem. Taking logarithmic derivatives of Eq. (19) we have that, for a constant mark-up, the rate of change in domestic prices, π, is equal to the rate of change of nominal wages minus the growth rate of labor productivity:

$$\pi = \frac{\dot{w}}{w} - \frac{\dot{y}}{y} \tag{23}$$

Following Dutt (1994), it is assumed that over time the money wage changes accordingly to the difference between current and target wage share, $\bar{\varpi}$. Because the wage-share is by definition equal to the ratio between real wages and labor productivity, $\bar{\varpi}$ can be understood as the proportion between those two variables considered by workers to be "fair". For $\bar{\varpi} > \varpi$, workers feel they are not being paid "fairly" and ask for wage increases. On the other hand, when $\bar{\varpi} < \varpi$, they are willing to accept a reduction in the rate of growth of the nominal wage. That is:

$$\frac{\dot{w}}{w} = \pi^e + \varepsilon_1 (\bar{\varpi} - \varpi) + \varepsilon_2 e \tag{24}$$

where π^e is expected inflation, $\varepsilon_1 > 0$ stands as the response of wages to deviations of the wage-share with respect to the target, and $\varepsilon_2 > 0$ captures increases in the bargain power of workers when participation rates are high.

Substituting Eqs. (12), (21), and (24) into Eq. (23), we obtain changes in prices in terms of the real exchange rate and the share of manufacturing activities in production:

$$\pi = \pi^e + \varepsilon_1 \left(\bar{\varpi} - \frac{1}{1 + \xi_0 + \xi_1 q} \right) + \varepsilon_2 e - \left(\frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1 \gamma} \right) \tag{25}$$

Suppose the Central Bank has an inflation target, $\bar{\pi}$. Moreover, let the credibility of the monetary authority be measured by a parameter $\rho \in (0, 1)$, such that $\pi^e = \rho \bar{\pi}$. Rearranging Eq. (25), the level of the real exchange rate compatible with such a rate of inflation is given by:

$$\bar{q} = \frac{1}{\bar{\varpi} - \frac{1}{\varepsilon_1} \left[(1 - \rho) \bar{\pi} - \varepsilon_2 e + \left(\frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1 \gamma} \right) \right]} - 1 \tag{26}$$

Increases in $\bar{\pi}$ are, thus, associated with a more depreciated exchange rate, i.e. $\partial \bar{q} / \partial \bar{\pi} > 0$. This means that any attempt to reduce inflation *ceteris paribus* implies a currency appreciation. As we will show in what follows, Eq. (26) establishes an important link between an inflation targeting policy and a growth strategy based on external savings.

3.7 Balance-of-payments (dis)equilibrium and the exchange rate

One of the most important propositions of the *New Developmentalist School* is the idea that the main obstacle for a middle-income economy to successfully develop lies in a tendency of the real exchange rate to be overvalued. This is the result of two main sources: (i) the Dutch disease and (ii) the adoption of an external savings growth strategy.

The so-called Dutch disease is caused by the exploitation of abundant natural resources. Since production costs in these activities are much lower than in manufacture, the real exchange rate compatible with "normal profits" is bellow the industrial equilibrium level (Bresser-Pereira et al., 2015, p. 57). Essentially, it corresponds to a market failure that generates negative externalities in the non-commodity tradable sectors, reducing their price competitiveness. In countries that have previously developed a strong manufacturing sector, the result is deindustrialization. Still, if exploitation of natural resources comes prior to industrialization, it prevents the development of manufactures in the first place. Notice, however, that the overvaluation caused by the Dutch disease is not *per se* incompatible with equilibrium in the current account of the balance-of-payments.

The other source of an exchange rate overvaluation results from a political economy problem. Many developing countries, mainly in Latin America, adopted in the 1990s the propositions of the so-called Second Washington Consensus (see Bresser-Pereira, 2002). With the support of the International Monetary Fund, it was part of the consensus the idea that external savings are complements, rather than substitutes, to domestic savings and thus should be attracted by developing countries in order to increase their investment rate and long-term growth. The problem with this idea is that external savings is just a "beautiful name" for the current account deficit (Ocampo et al., 2009).

In order to have positive external savings, it is necessary to produce a real exchange rate appreciation sufficient for running a current account deficit. Developing countries were required not only to open their capital accounts, but also to set the domestic interest rate at a level higher than the international rate adjusted for the country risk premium. The result was a real exchange rate overvaluation that exceeded the one caused by the Dutch disease.

Define d as the ratio of current account deficit to real output. We suppose such ratio responds to the real exchange rate:

$$d = \phi_0 - \phi_1 q \tag{27}$$

where ϕ_0 captures all variables that determine the current account deficit besides the exchange rate, and $\phi_1 > 0$ stands as the response of d to changes in q. The intuition behind this relationship follows closely the so-called Marshall-Lerner condition. A more depreciated exchange rate allows an increase in net exports reducing the current account deficit. The exchange rate compatible with a zero current account deficit, q^{CAB}, is such that:

$$q^{CAB} = \frac{\phi_0}{\phi_1} \tag{28}$$

The level of the current account equilibrium exchange rate depends inversely on the response of the deficit to q. The higher is such level, the lower will be q^{CAB}.

A Dutch disease occurs when $q^I > q^{CAB}$. From Eqs. (14) and (28), we can determine the threshold level of the technological gap, Gap^T, above which an economy might fall in such a situation:

$$Gap^T = \frac{\beta_1}{\beta_2}\left(\frac{\phi_0}{\phi_1} + \frac{\beta_0}{\beta_1}\right) \tag{29}$$

An economy adopting an external savings growth strategy follows a target for the current account to output ratio, $\bar{d} > 0$. It is possible to show that pursuing an inflation target is equivalent to implicitly adopting $\bar{d}$. Indeed, we know from, from Eq. (26), that $\bar{\pi}$ implies $\bar{q}$. As a consequence, using Eq. (27), we have that not only $\bar{d}$ is determined but that the exchange rate compatible with such a policy can be rewritten as:

$$\bar{q} = q^{CAB} - \frac{\bar{d}}{\phi_1} \tag{30}$$

For the purposes of this paper, we will refer to it as the target external savings real exchange rate. Any attempt to grow with external savings will produce an overvaluation relatively to the current account equilibrium level, $\bar{d}/\phi_1$. In fact, any attempt to further reduce inflation has similar implications. This does not mean that the monetary authority actually has an explicit target for q. Still, adopting an inflation targeting regime implies the existence of a $\bar{q}$ and, consequently, of $\bar{d}$. Reducing $\bar{\pi}$ will lead to a currency appreciation increasing the deficit in current account.

On the other hand, let ca be the capital account surplus as a ratio to output. We suppose it can be represented by the following relationship:

$$ca = \psi\left(i - i^f - \rho\right) \tag{31}$$

where i is the level of the domestic interest rate, i^f is the international interest rate, ρ is the country-risk premium, and ψ is the sensitivity of capital flows to interest rate differentials, which mainly depend on the level of capital controls. Under imperfect capital mobility, capital inflows depend on the different between interest rates. The greater the difference, the higher the amount of capital inflows.

Recall that the counterpart of a deficit in the current account is a surplus in the capital account. Making use of Eq. (31), the interest rate compatible with the current account target, $ca = \bar{d}$, is given by:

$$i = i^f + \rho + \frac{\bar{d}}{\psi} \tag{32}$$

As long as $\bar{d} > 0$, the real exchange rate that equalizes the capital account and the current account target requires that the domestic interest rate is higher than the international interest rate adjusted for a country-risk premium. This means that the necessary counterpart of growing with external savings is a high level of interest rates in developing economies.

To show that a real exchange rate overvaluation is the joint result of a Dutch disease and an external savings growth strategy, let us make some algebraic manipulations in Eq. (30). Subtracting q^I from both sides and recalling that $q^{CAB} - \bar{q} = \bar{d}/\phi_1$, we have:

$$\bar{q} - q^I = \underbrace{\left(q^{CAB} - q^I\right)}_{\text{Dutch disease}} - \underbrace{\left(q^{CAB} - \bar{q}\right)}_{\text{External savings strategy}} \tag{33}$$

4 On the dynamics of the new developmentalist model

Substituting Eqs. (9), (12), and (16) into Eq. (3), we obtain the dynamics of participation rates. Making use of Eqs. (4), (5), (9) and (16), we have a dynamic relation for capacity utilization. Finally, changes in the marginal propensity to invest are determined by Eq. (10). The system is given by:

$$\begin{aligned}
\frac{\dot{e}}{e} &= x_0 + x_1\gamma + \frac{h\mu\left(u - u_n\right)}{s + qm - h} - \left(\frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1\gamma}\right) - n = j_1\left(e, u, h\right) \\
\frac{\dot{u}}{u} &= x_0 + x_1\gamma + \frac{h\mu\left(u - u_n\right)}{s + qm - h} - \frac{hu}{\vartheta} = j_2\left(u, h\right) \\
\frac{\dot{h}}{h} &= \mu\left(u - u_n\right) = j_3\left(u\right)
\end{aligned} \tag{34}$$

In steady-state, $\dot{e}/e = \dot{u}/u = \dot{h}/h = 0$. This gives us the following equilibrium conditions:

$$\begin{aligned}
x_0 + x_1\gamma &= \frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1\gamma} + n \\
x_0 + x_1\gamma &= \frac{hu}{\vartheta} \\
u &= u_n
\end{aligned}$$

Some important results are worth to stress. In equilibrium, the so-called natural growth rate follows the rate of growth of exports, which in turn determines the rate of expansion of aggregate demand. Capital accumulation also adjust to the growth rate of expenditures. Last but not least, capacity utilization is equal to its normal level, being determined by the optimal choice of technique.

4.1 Equilibrium points and local stability analysis

New Developmentalists have argued over the past years that the main explanation for why several developing countries seem to have fallen in a middle-income trap lies in a tendency of the real exchange rate to be overvalued. Recalling Eq. (15), two main cases deserve a careful analysis. The first one corresponds to a situation in which the real exchange rate is equal to the industrial equilibrium:

$$q = q^I$$

such that the share of manufacturing activities in GDP remains constant, $\dot{\gamma}/\gamma = 0$. Still, a country might implicitly adopt a external savings growth strategy:

$$q = \bar{q}$$

As discussed in the previous Section, adopting an inflation targeting regime implies the existence of a $\bar{q}$.

When $q = q^I$, the dynamic system (34) can be rewritten as:

$$\begin{aligned} \frac{\dot{e}}{e} &= x_0 + x_1\gamma + \frac{h\mu\left(u - u_n\right)}{s + q^I m - h} - \left(\frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1\gamma}\right) - n \\ \frac{\dot{u}}{u} &= x_0 + x_1\gamma + \frac{h\mu\left(u - u_n\right)}{s + q^I m - h} - \frac{hu}{\vartheta} \\ \frac{\dot{h}}{h} &= \mu\left(u - u_n\right) \end{aligned} \tag{35}$$

The adoption of $q = \bar{q}$ implies an overvaluation of the exchange rate proportional to the current account deficit. In this case, the manufacturing sector slowly disappears, $\dot{\gamma}/\gamma < 0$ and $\gamma \to 0$. The system is this case becomes:

$$\begin{aligned} \frac{\dot{e}}{e} &= x_0 + \frac{h\mu\left(u - u_n\right)}{s + \bar{q}m - h} - \alpha_0 - \alpha_2 e - n \\ \frac{\dot{u}}{u} &= x_0 + \frac{h\mu\left(u - u_n\right)}{s + \bar{q}m - h} - \frac{hu}{\vartheta} \\ \frac{\dot{h}}{h} &= \mu\left(u - u_n\right) \end{aligned} \tag{36}$$

Thus, we can state and prove the following Proposition regarding the existence and uniqueness of an internal equilibrium solution under each regime.

Proposition 1 *When $q = q^I$, the dynamic system (35) has as a unique internal equilibrium point $E^I = \left(e^I, u^I, h^I\right)$ that is defined and given by:*

$$\begin{aligned} e^I &= \frac{\left(1 - \alpha_1\gamma\right)\left(x_0 + x_1\gamma - n\right) - \alpha_0}{\alpha_2} \\ u^I &= u_n \\ h^I &= \frac{\vartheta\left(x_0 + x_1\gamma\right)}{u_n} \end{aligned}$$

On the other hand, when $q = \bar{q}$, the dynamic system (36) admits a unique equilibrium solution $\bar{E} = \left(\bar{e}, \bar{u}, \bar{h}\right)$ such that:

$$\bar{e} = \frac{x_0 - \alpha_0 - n}{\alpha_2}$$
$$\bar{u} = u_n$$
$$\bar{h} = \frac{\vartheta x_0}{u_n}$$

Proof. See Mathematical Appendix A.1. ■

Adopting an exchange rate compatible with a constant share of manufacturing in output has two crucial implications in comparison to the alternative. First, the participation rate might be higher. The final effect is conditional to the interaction between dynamic economies of scale and increases in exports competitiveness. This is because while the former is associated with a higher rate of labor productivity, the latter increases the rate of growth of output. Second, the rate of investment as a proportion of GDP will always be Pareto superior, as more investment plans are required to match demand. Notice, however, that in both cases, capacity utilization is equal to its normal rate.

To provide a more concrete view of our main results, we rely on a numerical example. In order to choose plausible parameter values, we have considered the evidence provided in a number of empirical studies and well-known macroeconomic regularities (see Bresser-Pereira et al., 2015; Szirmai and Verspagen, 2015; Dávila-Fernández, 2020). Our selection has an illustrative purpose only and similar qualitative results are observed for wider ranges. Our reference values are:

$$x_0 = 0.015,\ x_1 = 0.1,\ \mu = 0.01,\ u_n = 0.7,$$
$$s = 0.2,\ q = 3,\ m = 0.2,\ \alpha_0 = -0.019,\ \alpha_1 = 3,$$
$$\alpha_2 = 0.05,\ n = 0.01,\ \vartheta = 4.666$$

Fig. 1 provides a graphical representation of the main mechanisms in the model. Adopting a developmentalist growth strategy, such that $q = q^I$, stabilizes the manufacturing share. In this numerical example, we suppose $\gamma = 0.15$. The alternative, $q = \bar{q}$, implies the disappearance of manufactures so that $\gamma = 0$. Because the rate of growth of exports and increasing returns to scale are a positive function of γ, we have that $\dot{Y}/Y$, h, and $\dot{y}/y$ will be lower under growing with external savings. On the other hand, it becomes quite clear that participation rates form an inverted-U with respect to the share of manufacturing activities. In any case, the overvaluation of the real exchange rate has as a side effect an undesirable reduction in e.

In what regards the unique internal equilibrium point, we can now state and prove the following Proposition about its local stability.

Proposition 2 *In the neighbourhood of the internal equilibrium points E^I and $\bar{E}$, the dynamic systems (35) and (36) are locally asymptotically stable provided that:*

$$\vartheta \sigma \mu < 1$$

Proof. See Mathematical Appendix A.2. ■

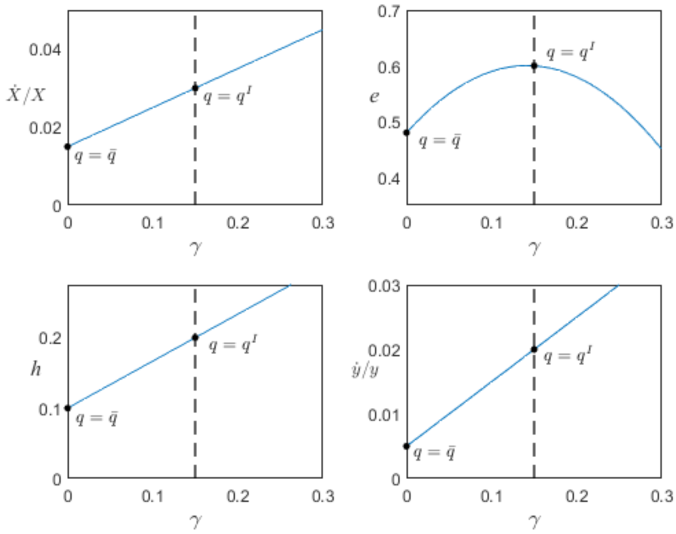

Figure 1: The manufacturing share in output determines the rate of growth of exports, the participation rate, the propensity to invest and the rate of growth of productivity. Adopting $q = q^I$ instead of $q = \bar{q}$ potentially leads to a Pareto superior equilibrium point.

This last Proposition is equivalent to the stability condition obtained in Freitas and Serrano (2015), generalized to an open economy. Fig. 2, on the left, shows how different initial conditions converge to the respective equilibrium points. We depict, in blue, those trajectories corresponding to the case in which $q = q^I$, for initial conditions

$$(e_0, u_0, h_0) = (0.7, 0.8, 0.25), (0.45, 0.6, 0.15), (0.5, 0.8, 0.25), (0.65, 0.6, 0.15)$$

On the other hand, in red, we have a representation of the middle-income trap for

$$(e_0, u_0, h_0) = (0.58, 0.8, 0.15), (0.33, 0.6, 0.05), (0.38, 0.8, 0.15), (0.53, 0.6, 0.05)$$

We proceed by comparing in Fig. 2, on the right, the time series of an economy with a non-negligible manufacturing sector, in blue, with a situation in which $\gamma = 0$, in red. In this case, however, the initial conditions are the same $(e_0, u_0, h_0) = (0.7, 0.8, 0.25)$, continuous line, and $(e_0, u_0, h_0) = (0.45, 0.6, 0.15)$, dashed line. It thus becomes evident the long-run costs of adopting an inflation targeting regime, for instance, in terms of investment and productivity growth rates.

4.2 Falling in the middle-income trap

New developmentalism understands that economic policy is a deep determinant of economic development. Hence, changes in the macroeconomic policy regime that interrupt a process of industrialization or lead to premature deindustrialization are frequently responsible for such traps. In the context of the model developed in this paper, we argue that the experience of many Latin American countries between 1970 and 1990 is an example of how the adoption of an external savings growth strategy might lead to a middle-income trap.

In the case of Brazil, such strategy was adopted after 1973 in the context of the 2nd National Development Plan in the government of General Ernesto Geisel. This plan was

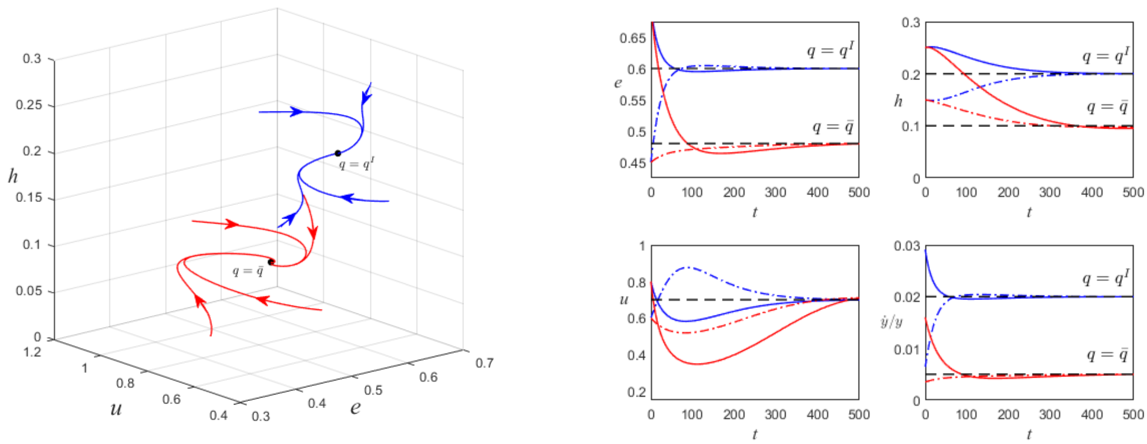

Figure 2: Convergence to the unique equilibrium solution when $q = q^I$, in blue, and $q = \bar{q}$, in red, for different initial conditions. While capacity utilization in both cases is equal to the normal rate, the participation rate, the marginal propensity to invest and the rate of growth of labor productivity are higher under the developmentalist growth regime.

designed to be a massive program of government investment expenditures in oil exploration and production of capital goods, required to complete the process of import substitution that had started in the beginning of 1930s. The program generated a huge current account deficit and a fast accumulation of external debt, that increased from US\$ 7.947 million in 1971 to 71.788 million in 1981, a 10 time increase in a decade (see Oreiro et al., 2018).

The evolution of external debt was clearly unsustainable and resulted in a debt crisis in the early 1980s, causing an immediate slowdown of the rate of growth throughout the whole decade. However, the fully adoption of an external savings growth strategy was only possible in the 1990s during the Fernando Collor administration, who started a process of financial liberalization, increasingly opening the capital account. Finally, under Fernando Henrique Cardoso's government, the external savings growth model was converted into an official policy. Indeed, Plano Real managed to successfully control inflation introducing an exchange rate anchor, which required a very high domestic interest rate to attract foreign capital inflows. A permanent overvalued currency, incompatible with industrial equilibrium, started a process of premature deindustrialization, slowing down aggregate demand and labor productivity.

Such negative effects were downplayed by political actors due to its effects over inflation and income distribution. As we have seen in Section 3, a real exchange rate overvaluation is associated with lower levels of inflation and a higher wage-share. In other words, in the short-term, it pays to adopt a sort of exchange rate populism (Bresser-Pereira, 2009, chapter 4). On the other hand, a currency overvaluation is also associated with high levels of domestic interest rates, increasing financial incomes of the rentier class. This means that both workers and rentiers may benefit, at least in the short to medium-term. In the long-term, however, workers are damaged by deindustrialization, since the high-wage jobs are in the manufacturing industry.

The political economy problem to get out of the middle-income trap requires a significant exchange rate depreciation (Oreiro and Dagostini, 2017). This, in turn, implies an initial reduction in real wages. Adopting a real exchange rate slightly above the industrial equilibrium level is a necessary step to revert deindustrialization, allowing a recovery of productivity and growth rates. This will made possible for real wages to grow at a faster rate, recovering the initial losses in some years. The key is how to convince workers and political actors that the long-term gains compensate the short-term losses. The Brazilian experience in the past ten years suggests this might be an impossible task.

5 Final considerations

This article developed a very simple *New Developmentalist* model of growth and structural change. We showed how this school of though can be understood as a synthesis between classical development and demand-led growth theories as well as an explanation for the middle-income trap. The main diagnosis is that countries such as Brazil or Argentina suffer from a chronic real exchange rate overvaluation that comes from the combination of Dutch disease effects and an external savings growth strategy. In terms of policy implications, it is recommended the adoption of an export-led growth regime in which the promotion of the manufacturing sector induces the adoption of modern production techniques and virtuous structural change.

As a synthesis between classical development and demand-led growth theories, we showed that exports are the engine of long-term growth. If the exchange rate is at the industrial equilibrium level, both the investment and the participation rate will adjust to the growth rate of exports. The resulting process of structural change is capable of eliminating the capacity and balance-of-payments constraint to economic growth.

In what concerns the middle-income trap, the model indicates that such a case might be the result of adopting an external savings growth strategy combined with a Dutch disease. For a given technological gap, the immediate consequences are a premature deindustrialization, a slowdown in labor productivity and output, a reduction of investment and possible of participation shares. These negative results, however, can be downplayed by political actors due to the positive effects that a real exchange rate overvaluation has on inflation and income distribution. Both workers and rentiers benefit from an appreciated currency, at least in the short to medium term. In the long-term, however, workers will be damaged by deindustrialization, since high-wage jobs are in the manufacturing industry.

The political economy problem to get out of such a trap requires a consistent exchange rate devaluation plan. The fundamental issue is to convince workers and political actors that the long-term gains compensate the short-term losses. This could be an impossible task.

A Mathematical Appendix

A.1 Proof of Proposition 1

Regarding the general dynamic system (34), recall that in steady state the equilibrium conditions are given by:

$$\begin{aligned} x_0 + x_1\gamma &= \frac{\alpha_0 + \alpha_2 e}{1 - \alpha_1\gamma} + n \\ x_0 + x_1\gamma &= \frac{hu}{\vartheta} \\ u &= u_n \end{aligned}$$

Define (e^*, u^*, h^*) as the equilibrium point for which those conditions are satisfied. It immediately follows that capacity utilization is equal to the normal rate, $u^* = u_n$. Substituting into the second expression and rearranging, we obtain the marginal propensity to invest:

$$h^* = \frac{\vartheta\left(x_0 + x_1\gamma\right)}{u_n}$$

Finally, rearranging the first equilibrium condition, we have that:

$$e^* = \frac{\left(1 - \alpha_1\gamma\right)\left(x_0 + x_1\gamma - n\right) - \alpha_0}{\alpha_2}$$

When policy makers adopt a real exchange rate such that $q = q^I$, then it follows that $\gamma > 0$, and $E^I = (e^I, u^I, h^I) = (e^*, u^*, h^*)$ corresponds to the first equilibrium point. On the other hand, when $q = \bar{q}$, the manufacture sector disappears, $\gamma = 0$. Hence, we have that $\bar{E} = (\bar{e}, \bar{u}, \bar{h})$ is equal to:

$$\begin{aligned}
\bar{e} &= \frac{x_0 - \alpha_0 - n}{\alpha_2} \\
\bar{u} &= u_n \\
\bar{h} &= \frac{\vartheta x_0}{u_n}
\end{aligned}$$

A.2 Proof of Proposition 2

Given that the local stability properties of systems (35) and (36) around the unique non-trivial equilibrium solution are the same, we will refer to the general case in which the equilibrium point is (e^*, u^*, h^*). Linearizing the dynamic system around the internal equilibrium point, we obtain:

$$\begin{bmatrix} \dot{e} \\ \dot{u} \\ \dot{h} \end{bmatrix} = \underbrace{\begin{bmatrix} J_{11} & J_{12} & J_{13} \\ 0 & J_{22} & J_{23} \\ 0 & J_{32} & 0 \end{bmatrix}}_{J^*} \begin{bmatrix} e - e^* \\ u - u^* \\ h - h^* \end{bmatrix}$$

where the elements of the Jacobian matrix J^* are given by:

$$\begin{aligned}
J_{11} &= \left.\frac{\partial j_1\left(e, u, h\right)}{\partial e}\right|_{(e^*, \varpi^*, u^*)} = -\frac{\alpha_2 e^*}{1 - \alpha_1\gamma} < 0 \\
J_{12} &= \left.\frac{\partial j_1\left(e, u, h\right)}{\partial u}\right|_{(e^*, \varpi^*, u^*)} = \frac{h^*\mu e^*}{s + qm - h^*} > 0 \\
J_{13} &= \left.\frac{\partial j_1\left(e, u, h\right)}{\partial h}\right|_{(e^*, \varpi^*, u^*)} = 0
\end{aligned}$$

$$\begin{aligned}
J_{21} &= \left.\frac{\partial j_2\left(u, h\right)}{\partial e}\right|_{(e^*, \varpi^*, u^*)} = 0 \\
J_{22} &= \left.\frac{\partial j_2\left(u, h\right)}{\partial u}\right|_{(e^*, \varpi^*, u^*)} = \left(\sigma^*\mu - \frac{1}{\vartheta}\right) h^* u^* \gtreqless 0 \\
J_{23} &= \left.\frac{\partial j_2\left(u, h\right)}{\partial h}\right|_{(e^*, \varpi^*, u^*)} = -\frac{u^{*2}}{\vartheta} < 0
\end{aligned}$$

$$J_{31} = \left.\frac{\partial j_3(u)}{\partial e}\right|_{(e^*,\varpi^*,u^*)} = 0$$

$$J_{32} = \left.\frac{\partial j_3(u)}{\partial u}\right|_{(e^*,\varpi^*,u^*)} = \mu h^* > 0$$

$$J_{33} = \left.\frac{\partial j_3(u)}{\partial h}\right|_{(e^*,\varpi^*,u^*)} = 0$$

so that the characteristic equation can be written as

$$\lambda^3 + b_1\lambda^2 + b_2\lambda + b_3 = 0$$

where the coefficients are given by:

$$\begin{aligned} b_1 &= -\operatorname{tr} J^* = -(J_{11} + J_{22}) \\ &= \frac{\alpha_2 e^*}{1-\alpha_1\gamma} - \left(\sigma^*\mu - \frac{1}{\vartheta}\right) h^* u^* \gtreqless 0 \end{aligned}$$

$$\begin{aligned} b_2 &= \begin{vmatrix} J_{22} & J_{23} \\ J_{32} & 0 \end{vmatrix} + \begin{vmatrix} J_{11} & J_{13} \\ 0 & 0 \end{vmatrix} + \begin{vmatrix} J_{11} & J_{12} \\ 0 & J_{22} \end{vmatrix} = -J_{23}J_{32} + J_{11}J_{22} \\ &= \frac{u^{*2}}{\vartheta}\mu h^* - \left(\frac{\alpha_2 e^*}{1-\alpha_1\gamma}\right)\left(\sigma^*\mu - \frac{1}{\vartheta}\right) h^* u^* \gtreqless 0 \end{aligned}$$

$$\begin{aligned} b_3 &= -\det J = J_{11}J_{23}J_{32} \\ &= \left(\frac{\alpha_2 e^*}{1-\alpha_1\gamma}\right)\frac{u^{*2}}{\vartheta}\mu h^* > 0 \end{aligned}$$

The sufficient condition for the local stability of (e^*, ϖ^*, u^*) is that all roots of the characteristic equation have negative real parts, which, from Routh-Hurwitz criteria, requires:

$$b_1 > 0,\ b_2 > 0,\ b_3 > 0 \text{ and } b_1 b_2 - b_3 > 0.$$

Hence, the last condition for local stability is such that:

$$\begin{aligned} b_1 b_2 - b_3 &= -(J_{11} + J_{22})(-J_{23}J_{32} + J_{11}J_{22}) - J_{11}J_{23}J_{32} \\ &= -\left[J_{11}^2 + (J_{23}J_{32} + J_{11}J_{22})\right] J_{22} \\ &= -\left(J_{11}^2 + b_2\right)\left(\sigma^*\mu - \frac{1}{\vartheta}\right) h u^* \gtreqless 0 \end{aligned}$$

We thus conclude that the unique non-trivial equilibrium point is locally asymptotically stable as long as:

$$\vartheta\sigma^*\mu < 1$$

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