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A New Developmentalist Model of Structural Change, Economic Growth and Middle-Income Trap♣ ♠

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ABSTRACT: Despite the growing literature on new developmentalism published in the last 5 years, which includes a textbook published in 2015, up to now the ideas of the *Brazilian New Developmentalist School* were no longer presented in terms of a coherent formal growth model. The main objective of the present article is precisely to fulfill this gap, presenting a formal model of structural change and economic growth according to the New Developmentalism theoretical propositions. The model to be presented here is, in a large sense, a synthesis between ideas presented by the Classical Development Theory and Post Keynesian Theory of Demand Led-Growth and can be used to explain the Middle-Income Trap (MIT), in which many developing countries seems to be stuck. According to Glawe and Wagner (2016) a MIT usually refers to countries that have experienced rapid growth and thus quickly reached middle-income status, but then failed to overcome that income range to further catch up to the developed countries. That was precisely the case of middle-income Latin American countries such as Brazil and Argentine. New developmentalism asserts that a MIT can occur in countries where Dutch disease suddenly appears due to the discovery of natural resources (for example, new petroleum reserves in Brazil after 2006) or ceased to be neutralized and/or the adoption of an external savings growth strategy. In both cases, real exchange rate overvaluation is the ultimate consequence of a *class coalition* between workers and the rentier class that favors exchange rate appreciation due to its positive effects over inflation and real wages, on one hand; and financial income, on the other (Bresser-Pereira, 2015).

KEY WORDS: New Developmentalism, Demand-Led Growth, Structural Change and Real Exchange Rate.

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1. Introduction

The Brazilian New Developmentalist School, also known as "consensus of São Paulo"[1], can be understood as an approach to the *deep determinants of economic development* in which *macroeconomic policy regime* has a key role in explaining the long-term growth differentials among countries, notably middle-income countries. The *modern theory of economic growth* distinguishes between the *immediate determinants* and the *fundamental or deep determinants* of the process of economic development (Maddison, 1988). The *immediate causes* are those most direct responsible for the object under analysis; Whereas the *deep causes*, more distant in time, are the underlying causes, that is, the determinants of background or origin of a given phenomenon. In the context of economic growth theory, the immediate causes are those directly related to the per-capita income level, namely: the existing amount of physical and human capital, the availability of natural resources, the efficiency in the use of existing productive resources and the level of technical and scientific knowledge existing at a given point of time. The deep or fundamental determinants, in turn, refer to the reasons why countries differ from each other in terms of the availability of factors that determine the level of per-capita income. Among the last determinants we can list geography, institutions, income distribution and economic policy regimes (Ros, 2013, p.15-17). For new developmentalism, economic policy regime is the deep cause of economic development.

The school was originated from the seminal works of Bresser-Pereira (2006, 2007 and 2009) who defined *new developmentalism* as a set of proposals for institutional reforms and economic policies, whereby the middle-income developing countries seek to achieve the per-capita income level of developed countries. This catching-up strategy is explicitly based on the adoption of an *export-led* growth regime, in which the promotion of exports of manufactured goods induces the acceleration of the pace of capital accumulation and the introduction of technological progress and structural change. In order to do that real exchange rate must be kept at a competitive level in the medium to long-term, what requires the design of a *macroeconomic policy regime* which neutralizes the chronic overvaluation of real exchange rate observed in these countries as a result of the combined

[1] See Bresser-Pereira (2009) and also Bresser-Pereira, Oreiro and Marconi (2015).

effects of Dutch disease and inflows of foreign capital due to the adoption of a external saving growth strategy.

The basic theoretical propositions of the Brazilian New-Developmentalist School are as follows (See Bresser-Pereira, Oreiro and Marconi, 2015 and Oreiro, 2018):

> 1 – Economic development is a cumulative process of raising real wages and the standard of living of the population that is made possible by the increase in the labor productivity that stems from the technical progress incorporated in new machinery and equipment and the Structural transformation of the economy, with the labor migration of sectors with the lowest value added per worker to the sectors with the highest value added per worker. The growth rate of productivity depends, therefore, on the growth rate of the capital stock per worker and the evolution of the productive structure over time.
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> 2 – The pace of growth of the real output is determined by the growth of autonomous demand that does not create capacity. The investment adjusts, in the long term, to the pace of demand growth, so that it cannot *lead* output growth; But it's *pulled* by it. In an open economy that does not have international reserve currency the output growth will only be sustainable in the long-term, if it is led by the growth of exports; If the growth engine of autonomous demand is domestic demand (e.g. government spending), the growth trajectory will be sooner or later interrupted by a crisis in the balance of payments.
>
> 3 – The pace of output growth is not limited by the supply side factors, since the pace of growth of capital stock, workforce growth and productivity growth adapt, in the long term, to the pace of growth of non-creating capacity autonomous demand.
>
> 4 – In the long-term the balance of payments is also not a restriction on long-term growth because the income elasticities of exports and imports are not constant; but adapt to the evolution of the productive structure of the economy[2]. As the productive structure evolves in the sense of greater sophistication or complexity, it follows that the ratio between the income elasticity of exports and imports

[2] Regarding the endogenous nature of income elasticities see Oreiro (2016a); Marconi, Araujo and Oreiro (2016) and Missio et al. (2017).

increases, thus allowing a higher growth rate compatible with balance of payments equilibrium.

5 – The restriction on long-term growth is given, in the case of economies that have abundant natural resources, by the chronic tendency of exchange rate overvaluation that stems from the Dutch disease and foreign capital inflows. This exchange rate overvaluation acts in order to interrupt and, in sequence, reverse the process of productive sophistication, which will produce a reduction in the rate of productivity growth; being the main cause of the *middle-income trap* for some developing countries like Brazil[3] and Argentine.

6 – Domestic savings and external savings are substitutes, rather than complementary. In fact, aggregate savings are determined by investment; but the composition of the savings depends on the level of the actual exchange rate. An increase in external savings – due to an appreciation of the real exchange rate – is associated with a reduction in domestic savings; because the appreciation of the real exchange rate produces a reduction in the share of profits in national income – as the actual wages increases with respect to the labor productivity. As the propensity to save from profits is greater than the propensity to save from wages; it follows that the reduction profit share due to an appreciation of the exchange rate will result in a reduction in domestic private savings.

7 – The abundance of natural resources in a given country makes the industrial equilibrium exchange rate – defined as that level of the exchange rate that makes domestic firms, for a given level of technological gap, to be competitive both in domestic and international markets – is greater than the exchange rate which guarantees balance in the current account. In this way, the long-term sustainability of the economic growth process of countries with abundant natural resources requires that they have surplus in the current account.

8 – The adoption of an external savings growth strategy by many middle-income developing countries, mainly in Latin America, in the 1990´s was another source of real exchange rate overvaluation. Growth with external savings requires policymakers to set the level of domestic interest rates at level higher them the one corresponding to the sum of international interest rate and country risk

[3] For the Brazilian case see Oreiro et al (2018) and Oreiro and D´Agostini (2017).

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. The adoption of such strategy requires financial liberalization, mainly capital account liberalization due to the elimination of capital controls.

Based in such principles, new developmentalism can also be considered as an explanation for the *Middle-Income Trap* – MIT hereafter - in which many developing countries seems to be stuck. According to Glawe and Wagner (2016) a MIT usually refers to countries that have experienced rapid growth and thus quickly reached middle-income status, but then failed to overcome that income range to further catch up to the developed countries. That was precisely the case of middle-income Latin American countries such as Brazil and Argentine. New developmentalism asserts that a MIT can occur in countries where Dutch disease suddenly appears due to the discovery of natural resources (for example, new petroleum reserves in Brazil after 2006) or ceased to be neutralized and/or the adoption of an external savings growth strategy. In both cases, real exchange rate overvaluation is the ultimate consequence of a *class coalition*[4] between workers and the rentier class that favors exchange rate appreciation due to its positive effects over inflation and real wages, on one hand; and financial income, on the other (Bresser-Pereira, 2015). Although the long-lasting effect of exchange rate overvaluation will be premature deindustrialization and falling behind; the short and medium-term effects of such overvaluation seemed to be enough positive for sustaining this political coalition, making very difficult or even impossible for a *developmental coalition* [5]to be formed in order to eliminate the MIT.

Despite the growing literature on new developmentalism published in the last 5 years[6], which includes a textbook published in 2015, up to now the ideas of the Brazilian New Developmentalist School was no longer presented in terms of a coherent formal

[4] The term *class coalition* is due to Bresser-Pereira (2015) and refers to a political (implicit) alliance between groups that belongs to different social classes that aim to reach some political and economic goals. Class coalitions are possible because social classes are not homogenous; but have internal divergences regarding their goals. Such divisions allowed the occurrence of political coalitions between groups that belongs to different social classes.

[5] A developmental coalition would be formed by industrial entrepreneurs, manufacturing workers and politicians in order to eliminate the sources of the real exchange rate overvaluation, allowing the economy to get rid of the MIT.

[6] See Bresser-Pereira, Kregel and Burlamaqui (2014), Bresser-Pereira, Oreiro and Marconi (2015), Oreiro and Marconi (2016), Oreiro (2016, 2018), Gala (2017), Bresser-Pereira (2018), among others.

growth model. The main objective of the present article is precisely to fulfill this gap, presenting a formal model of structural change and economic growth according to the New Developmentalism theoretical propositions. The model to be presented here is, in a large sense, a synthesis between ideas presented by the Classical Development Theory and Post Keynesian Theory of Demand Led-Growth. As already stated by Bresser-Pereira (2019) New Developmentalism can be understand as an attempt to overcome the theoretical difficulties of both Classical Development Theory (which largely ignores the demand side of the development process) and Post-Keynesian Macroeconomics (which is essentially designed for developed countries).

The paper is organized in five sections, including the present introduction. The second section will present a brief survey of the theoretical foundations of new developmentalism, which includes both Classical Development Theory and Post Keynesian Theory of Demand-Led Growth. Section three presents the seven basic building blocks of the new developmentalist model, that are: (i) Economic Development and Technical Progress Function; (ii) Employment share and Natural Rate of Growth; (iii) Effective Demand, Capital Accumulation and Capacity Utilization; (iv) Structural Change, Technological Gap and Real Exchange Rate; (v) Balance of Payments, Dutch Disease, Savings Substitution and Growth with External Savings Model; (vi) Price Setting, Income Distribution and Real Exchange Rate; and (vii) Distributive Conflict, Wage Indexation and Inflation. Section 4 presents the working of the model, showing the existence of a over-determination problem in the steady-state solution which is the result of the conflict between the level of real exchange rate required for industrial equilibrium and the level of real exchange rate required to reach the target level of current account deficit. This conflict will result in premature deindustrialization and stagnation of productivity growth, on one hand, and low inflation and a high wage share, on the other. Section 5 makes some final remarks.

2. Theoretical Foundations: Classical Development Theory and Post-Keynesian Theory of Demand-Led Growth.

a. Classical Development Theory

The Classical Theory of Economic Development, understood as the systematic and specialized study of the problems of the underdeveloped or developing countries, began after the Second World War with the emergence of Keynesian interventionism, state planning, the experience of the USSR and the movements of decolonization.

The main authors of the classical development theory were Rosenstein-Rodan, Arthur Lewis, Raúl Prebisch, Gunnar Myrdal, Hans Singer, Michael Kalecki, Albert Hirschman and Celso Furtado. According to these authors, economic development is a consequence of the industrialization process and capital accumulation, which allow a sustainable increase in labor productivity.

Underdevelopment is seen as a *low equilibrium* caused by factors such as low savings rates, high population growth rate and low incentives for investments due to the existence of external economies and economies of scale. In addition, the economy is seen as a dual system that has an industrial sector and a subsistence, predominantly agricultural, which is the source of structural surplus of labor force.

The main contribution of the Classical Development Theory, according to Bresser-Pereira (2019), was in the political plan namely, the understanding of economic development as a result of a *coalition of classes* involving the national bourgeoisie, public bureaucracy and urban workers; and, at the economic level, was to define economic development as structural change, that is, as industrialization that transforms the productive structure of society.

For a poor country to develop and make the catching-up with respect to developed countries a significant increase in the investment rate is needed, coupled with the development of one or more relevant sectors in the manufacturing industry, as well as the existence or rapid emergence of a political, social and institutional structures that explores the impulses of the expansion of the modern sector (Rostow, 1956). This expansion also requires the ability to mobilize capital from domestic sources, that is, an increase in domestic savings rate.

One of the concerns of the classical theory of economic development was precisely to explain how countries undergoing a rapid industrialization process can increase their

savings rate of 4-5% of GDP to levels above 15% of GDP within a few years (Lewis, 1954). The explanation given by Lewis was that in the early stages of the industrialization process, the existence of surplus labor in the subsistence or traditional sector allows employment in the modern or industrial sector to expand at larger rates with a virtually nil effect on the supply price of labor. In other words, the modern sector faces an infinitely elastic labor supply at the level of the labor supply price (equal to the subsistence wage plus a wage premium to compensate workers for the hassle of urban life). As productivity is higher in the modern sector than in the subsistence sector – the fact that production in the first is capital intensive while production in the second is labor - it follows that the transfer of labor from the subsistence sector to the industrial sector will result in an increase in the average productivity of the economy, without concomitantly increasing the level of the actual wage. This process of *structural change* will therefore produce an increase in the profit share. As the propensity to save from profits is higher than the propensity to save from wages (Kaldor, 1956) there will be an increase in the aggregate savings rate. In short, during the process of industrialization of developing or underdeveloped economies, a positive correlation between savings rate, profit and manufacturing share in income should be observed.

Structural change is therefore the key to understanding the process of economic development. The increase in social income made possible by the growth of labor productivity has also an impact on the demand structure (Furtado, 1952). In fact, the increase in productivity gives to the sector benefited an increase in income, this increase becomes a profit, allowing the accumulation of capital to increase future production. It is a fact evidenced by the experience that demand tends to change in the Sense of diversification, there is always an increase in the average real wage. The new inversions are largely aimed at future demand, with this diversifying demand, the production apparatus tends to modify its structure as the real income rises.

Although a shortage of savings could not be considered an ultimate obstacle to economic development according to Classical Development Theory, the international division of labor, namely the center-periphery division of the world - i.e. the idea structural heterogeneity prevails at world level, where some countries are specialized in the production and export of manufactured goods and others are specialized in the production and export of primary goods - can impose a balance of payments constraint to the growth rate of developing economies.

The balance of payments constraint occurs in *Phase Two* of the center-periphery relation. In the first phase, the Center is responsible for the production of manufactures, while the periphery supplies the center with primary products. The new techniques were only applied in the modern (exporting) sector of the periphery, thus coexisting sectors of high and low productivity. In this phase the periphery is at the same time a *specialized and heterogeneous structure*[7]; and the Center *is a diversified and homogeneous structure*[8]. The second phase is marked by the industrialization of the periphery from the 1930 years onwards. The *outward orientation* of periphery´s development in the first phase was replaced by an *inward orientation* in the second phase, based on the expansion of industrial production for import substitution. The existence of a specialized and heterogeneous structure during the industrialization process gives rise to structural balance of payments problems. This occurs because exports of periphery are made of primary goods that had a low elasticity of income; but imports are made up of intermediate and capital goods - that are required for the substitution of consumer goods imports for local production – which have a high income elasticity of imports. This means that the capacity to pay for imports (which is determined by exports) does not grow at the same rate of the import requirements for the industrialization process (Prebish, 1950).

This problem can be amplified by the trend deterioration of the terms of trade of periphery due to the asymmetric effect of technological progress over prices of primary and manufactured goods. In the center, due to the inexistence 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 surplus labor implies productivity gains will result in lower prices for primary goods. This will cause a deterioration in the terms of trade (TT) and thus an increase in the per-capita income gap between center and periphery, as we can see in the expression bellow.

[7] It is a specialized structure since the modern sector is made up of firms specialized in the production of primary goods (for example, coffee, cotton, cocoa, iron ore and cooper) and the consumption goods are almost entirely imported from abroad; and it is also a heterogenous structure due to the large productivity differentials between modern and traditional sectors.

[8] The center is a diversified structure due to the multiplicity of consumption, capital and intermediate goods that are produced in this area; and it is also a homogenous structure due to the fact that productivity differences between sectors are small or non-existent in the case of a mature economy (Kaldor, 1967).

Let us define the per-capita income gap Y_r as (Rodriguez, 2009, p. 89):

$$Y_r = \frac{l_i p_i}{l_p p_p} = \frac{l_i}{l_p} TT$$

Where: l_i is the productivity of work in the industrial sector, l_p is the productivity of work in the primary sector, p_i is the price of industrial goods and p_p is the price of the primary products and TT is the terms of trade.

b. Post Keynesian Theory of Demand-Led Growth

Neoclassical growth models take for granted that the fundamental limit to long-run growth is the supply of factors of production. Aggregate demand is relevant only to determine the degree of capacity utilization; but have no direct influence over the rate of expansion of productive capacity. In the long-run, Say's law is supposed to hold; i.e. supply creates its own demand.

But is it true that supply of factors of production is independent of demand? This question is originally raised by Kaldor (1988), originating the theory of demand-led growth. The starting point of demand-led growth theory is that means of production used in a modern capitalist economy are themselves goods produced within the system. The "supply" of means of productions should never be taken as given and independent from the demand for them. In this theoretical 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. In the words of Setterfield:

> "*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*" (1997, p.50).

In order to understand the long run endogeneity of factors of production, we will start with the supply of capital. The quantity of capital that exists in a point of time – or, in other words, the productive capacity that exists in the economy – is the result of past investment decisions. From this line of argument, we can conclude that the stock of capital is not a given quantity determined by "nature"; but is dependent of the rate at which entrepreneurs want to increase the stock of capital.

So, the fundamental determinant of the *capital stock* is investment decision. Investment, in turn, is determined by two set of variables: i) the opportunity cost of capital (mainly determined by the level of short-term interest rate set by the Central Bank); ii) the expectations about the future growth of sales and production. In this setting, if entrepreneurs expect a strong and sustainable increase in demand for the goods that they produce – as it would be expected in an economy that shows a persistent high growth rate – then they will make large investment expenditures.

In other words, investment is an endogenous variable that came in line with the expected growth of aggregate demand, since one fundamental restriction is met: the expected rate of return of capital had to be bigger than the cost of capital. If this condition is met, the "supply of capital" should not be considered a limit to long-run growth.

It is true that in the short and in the middle run, production should not increase beyond the maximum productive capacity of the economy. In the long-run, however, the productive capacity must be increased – by means of investment expenditures – in order to meet the increase in aggregate demand. In the words of Kaldor:

> "*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*" (1988, p.157).

A very common objection to this reasoning is the idea that investment needs *previous saving* in order to be realized; that is, any increase in investment expenditure requires a previous increase in the saving rate of the economy. According to this line of reasoning, the *supply of capital* is limited by the share of real income that society does not want to consume. Saving defined this way is determined by private sector saving, government saving and foreign saving.

It is not true that investment requires *previous saving* in order to be realized. In fact, investment expenditures require only the creation of liquidity by commercial banks (Carvalho, 1992; Davidson, 1968). 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 the investment expenditure is done, it will be generated an extra income of such magnitude that, at the end of the process, aggregate saving will adjust to the new value of aggregate investment. The extra saving generated in this way should now be used for

funding short-term debts with commercial banks in 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 debs 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 the increase in the productive capacity. In fact, firms must be ready to adjust their productive capacity to the expected growth of demand for their products if and only if the expected rate of return of the new investment projects is higher than the opportunity cost of capital. In a first approximation we can define the cost of capital as the average interest rate that firms must pay for the required funding for their investment projects. There are three sources of funds to finance the investment project of firms: retained earnings, debts and equity. So, the cost of capital is the weighted average of the cost of each of these sources of finance. If the cost of capital is too high – for instance, due a very tight monetary policy that increase the short-term interest rate, increasing the cost of borrowing – than new investment projects may not be profitable, and investment expenditure will not adjust to the level required by the expected growth of aggregate demand.

We will now turn our attention to the *supply of labor*. According to Post Keynesian Theory of Demand-Led Growth, the *supply of labor* should not be considered a limit to the growth of production in the long run.

Firstly, the number of work hours could be increased easily in order to increase the level of production.

Second, the participation rate – defined as the ratio between the labor force and total population in work age – could 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 the participation rate. So, we can conclude that the growth rate of labor force could accelerate during boom times dues to the fact that some people may decide to enter in the labor force as a response to the incentives created by a booming labor market.

Finally, we have to say 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 as Germany and France

could sustain high growth rates during the 1950's and 1960' due to immigration of workers from the countries of the periphery of Europe (Spain, Portugal, Greece, Turkey and south of Italy).

A last element to be considered is technological progress. Is it possible to consider the rate of 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 is increased. However, technological progress is not exogenous to the economic system.

Firstly, the pace at which firms introduce innovations is largely determined by the rate of capital accumulation; since a large part of technological innovations are embodied in new machines and equipment.[9]

Second, even that small part of technical progress that is disembodied is determined by *dynamic economies of scale* such as *learning-by-doing*. So, we can establish the existence of a structural relationship between the growth rate of labor productivity and the growth rate of output known as "Kaldor-Verdoorn law"[10][11]. In this setting, an increase in aggregate demand will cause an increase in the growth rate of labor productivity since the growth rate of output will be increased as a consequence of a greater demand growth.

Based on his reasoning we can say that there is no such a thing as potential or full-employment output for the long-run, since the supply of factors of production and the rate of technological progress is demand determined. "Full-employment" is essentially a

[9] This idea was originally presented in Kaldor (1957) by means of the "Technical Progress Function", which establishes the existence of a structural relationship between the growth rate of output per-worker and the growth rate of capital per-worker. According to Kaldor is not possible to isolate the growth of labor productivity due to introduction of new technologies from the growth of labor productivity due to an increase in capital per-worker. That is so because almost all technological innovations that increase labor productivity require the use of a biggest level of capital per-worker, since these innovations are embodied in new machines and equipment.

[10] Some econometric evidence about the validity of "Kaldor-Verdoorn's Law" for United States can be found in McCombie and De Rider (1984). More recent evidence for a sample of 70 developed and developing countries can be found in Magacho and McCombie (2017). See also Romero and Britto (2017).

[11] Ledesma (2002) estimates a demand-led growth model for 17 OECD countries (Germany, Australia, Austria, Belgium, Canada, Denmark, United States, Spain, Finland, France, Italy, Holland, Japan, Norway, Portugal, Sweden and United Kingdom) in the period 1965-1994. Based on his econometric evidences, we can establish the existence of a structural relationship between the growth rate of labor productivity and a set of other variables; in particular the growth rate of output. The estimated structural equation is:

$$r = -0.015 + 0.642\,y + 0.0002\,(I/O) + 0.617\,K + 0.021 GAP\,,$$

Where: r is the growth rate of labor productivity, y is the growth rate of real output, (I/O) is investment as a share of real GDP, K is an index of technological innovation and GAP is an estimate of the technological gap.

short-run concept that ignores that endogeneity of *natural growth rate* in the long-run. In the words of Kaldor:

> "*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*" (1988, p.157).

If supply of factors of production should not be considered a limit to long-run growth, what are the determinants of economic growth in the long-run? According to the Post-Keynesian Theory of Demand-Led Growth, the ultimate determinant of economic growth is aggregate demand. Firms will increase their production levels as a response to an increase in aggregate demand two conditions are satisfied: i) profit margins are high enough to give to entrepreneurs the rate of profit desired by then; ii) realized profit rate must be bigger than the cost of capital. If these two conditions are met, then the rate of growth of real output will be determined by the rate of growth of *autonomous demand*; i.e. the growth of that part off aggregate demand that is independent of the level and/or variations of the level of output and income.

For open economies there are two components of autonomous demand: exports and government consumption expenditures (Park, 2000). Investment expenditures are not a component of autonomous demand since investment decision in capital assets is 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). In other words, investment is not an exogenous variable from the viewpoint of growth process; since it is driven by output growth. So, long-run growth rate of real output is a weighted average of the rate of exports growth and the rate of government consumption expenditures.

For a small open economy that do not have a convertible currency, exports growth is the exogenous variable in growth process. If the rate of growth of government consumption expenditures is bigger than the rate of exports growth, then real output and income will increase faster than exports. Supposing an income-elasticity of imports bigger than one (as it is usual in open economies) then the rate of imports growth will be

bigger than the rate of exports growth, generating a growing trade deficit (assuming constant terms of trade), which will be unsustainable in the long run[12].

3. The Building Blocks of New Developmentalist Model

a. Economic Development and 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 standard of living (Bresser-Pereira, Oreiro and Marconi, 2014). The increase in labor productivity enables the persistent raise in real wages once the so-called "Lewis point" has been overcome; that is, once the labor force employed in the subsistence sector has been fully transferred to the modern sectors (Lewis, 1954). At that point, the unlimited supply of labor, characteristic of Capitalism's Phase I (Kaldor, 1980), is exhausted, causing the continuous increase in the demand for labor, due to the expansion of the activity level, to raise wages at approximately the same pace as labor productivity growth. The growth of wages, in turn, makes it possible to increase the population's standard of living.

Capital accumulation and technical progress are the fundamental sources of growth of labor productivity and population's standard of living. Indeed, technical progress enables, on the one hand, an increase in production efficiency, i.e. that the same goods and services are produced by using a smaller quantity of inputs, in particular labor; on the other hand, technical progress leads to the development of increasingly sophisticated or complex products and services, that is, products that incorporate not only a larger but also more diversified amount of technical and scientific knowledge. These more sophisticated or complex products are produced by highly skilled workers in companies operating at or near the technological frontier; which is why these products have higher added-value per unit of labor employed. Thus, technical progress stems not only from the advancement of the "state of the arts", but also through a process of structural change, in which productive resources and workers are transferred from the

[12] It is important to notice that a growth rate of exports bigger than the growth rate of government consumption expenditures is not a sufficient condition for a sustainable growth process in the long run. In fact, it is also necessary to be a balance of payments equilibrium. For open economies with zero-capital mobility this means that long-run growth rate will be equal to the ratio between the income elasticity of exports and the income elasticity of imports, being this ratio multiplied by the growth rate of world income, what is known as "Thirwall's Law" (Thirwall, 1997). The introduction of capital flows does not alter significantly the long-run equilibrium growth rate (McCombie and Roberts, 2002, pp.95-96).

activities with lower added-value per worker employed to activities with higher added-value per worker (more complex sectors).

Capital accumulation is an important element in the process of diffusion of technical and scientific knowledge to the whole economy, since a considerable part of this knowledge is incorporated in machines and equipment, making it impossible to separate the increase of the labor productivity that results from the advance of the "state of the arts" from the one that results from a greater "mechanization" of the workforce. As emphasized by Hidalgo (2015), physical capital is nothing more than technical and scientific knowledge embodied in machines and equipment. The relationship between the growth of labor productivity and the capital accumulation effort was pioneered by Kaldor (1957), and it was called a function of technical progress:

$$\hat{y} = \alpha_0 + \beta_0 \gamma \hat{k} \qquad (1)$$

Where: $\hat{y}$ is the growth rate of output per worker ; α_0 is the autonomous part of the labor productivity growth, that is, that share of productivity gains that is not directly attributable to the greater "mechanization" of the labor force; β_0 is a positive constant that captures the capacity of the economy to transform the increment of technical and scientific knowledge in increase of productivity through investment in machines and equipment, γ is the manufacturing share in output and $\hat{k}$ is the rate of capital growth per worker.

In equation (1) we can see that the effect of a higher growth rate of capital per-worker over the growth rate of labor productivity depends on the manufacturing share on real output. This is due to the fact that manufacturing industry is the *loci* of increasing returns to scale (Kaldor, 1967), thereby a higher share of manufacturing on output will allow a faster growth rate of productivity for a given rate of increase in capital per-worker.

The empirical evidence seems to show that technical progress is neutral in Harrod´s sense (see Kaldor 1957) so output-capital ratio is constant in the long-run. This means that we must take $\hat{y} = \hat{k} = g_y$ in equation (1) above. Then we get the following expression:

$$g_y = \frac{\alpha_0}{1 - \beta_0 \gamma} \qquad (2)$$

Taking the derivative of g_y in respect to γ, we get:

$$\frac{\partial g_y}{\partial \gamma} = \frac{\alpha_0 \beta_0}{(1-\beta_0 \gamma)^2} > 0 \qquad (3)$$

In equation (3) we can see that an increase in 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, that the productive structure matters for long run growth (See Gala, 2017).

b. Employment share and natural rate of growth.

We are considering an economy where the so-called "Lewis point" has been overcome; that is, one where the labor force employed in the subsistence sector has already been fully transferred to the modern productive sectors. This means that labor supply is no longer unlimited; but it is constrained by the growth rate of population and labor force. We will assume that labor force increases at a constant rate n, exogenously determined. Let us define $e = \frac{L}{N}$ as the employment share, i.e. the share of labor force that is employed, where *L* is the total labor employed and *N* is the labor force. The dynamics of the employment rate is given by the following equation:

$$\hat{e} = g_Y - g_y - n \qquad (4)$$

Where: $\hat{e}$ is the growth rate of employment share; g_Y is the growth rate of output; g_y is the growth rate of labor productivity and n is the growth rate of labor force.

In the long-run equilibrium we have $\hat{e} = 0$, so we get:

$$g_Y = g_y + n = g_n \qquad (5)$$

Equation (5) states that, in order to the employment share to be constant over time, is required for the real output to grow at a rate equal to the growth rate of labor productivity and the growth rate of labor force. The growth rate of real output for which employment share is constant over time is the so-called *natural growth rate.*

Substituting (2) in (5) we get:

$$g_n = \frac{\alpha_0}{1-\beta_0 \gamma} + n \qquad (6)$$

c. Effective demand, capital accumulation and capacity utilization.

Let us consider a small open economy that produces a homogeneous output, which is an imperfect substitute for goods produced abroad. The availability of goods in the

domestic market is given by the sum between domestic production and the actual value of imports. The aggregate demand for goods and services, in turn, can be decomposed in two parts. A first part, which we will call D, is constituted by those components of demand that are induced by the level of economic activity. In the economy in consideration the induced demand will consist of the sum between consumption and investment expenditures. The second part, which we will call A, is constituted by autonomous expenditures, that is by those components of aggregate demand that are largely independent of the level of economic activity. The autonomous demand is composed of the sum between government spending and exports.

The goods market equilibrium condition is given by the following expression:

$$Y + qM = D + A \tag{7}$$

Where : Y is the level of real output; qM is the real value of imports; $q = \frac{EP^*}{P}$ is the level of real exchange rate; E is the level of nominal exchange rate; P^* is the price of imported goods nominated in foreign currency; P is the price of domestic goods nominated in domestic currency; M is the quantity of imports.

The demand for consumption is originated entirely from wages, that is, the propensity to consume from the profits is supposed to be equal to zero. The government charges an income tax rate equal τ on working income, while capital gains are exempt from taxation. In this way, the consumption demand is given by the following expression.

$$C = c_w.(1-\tau).(1-\pi).Y \tag{8}$$

where: c_w is the propensity of consume out of wages; π is the profit share; C is real consumption demand.

Following Freitas and Serrano (2015), we will suppose that aggregate investment (I) is entirely done by private sector, being induced by the level of economic activity, as we can see in the equation bellow:

$$I = h.Y \tag{9}$$

Where: h is the average/marginal propensity to invest.

Autonomous demand is given by:

$$A = \bar{G} + \bar{X} \tag{10}$$

Where: $\bar{G}$ is the real government expenditures, $\bar{X}$ is the quantity of exports.

Finally, let us assume that the quantity of imports is determined by the level of economic activity, as we can see in the following equation:

$$M = m\,(q, \gamma).Y \qquad (11)$$

Where: m is the marginal propensity to import. We will assume that $\frac{\partial m}{\partial q} > 0$ and $\frac{\partial m}{\partial \gamma} < 0$. In words: the marginal propensity to import is a positive function of the level of real exchange rates and a negative function of the manufacturing share in real output.

Substituting equations (8)-(11) in (7) and solving for the level of economic activity we get:

$$Y = \sigma.A \qquad (12)$$

Where[13]: $\sigma = \frac{1}{s+qm(q,\gamma)-h}$ is the Harrod-Hicks super-multiplier of autonomous expenditures; $s = 1 - c_w(1-\tau).(1-\pi)$; $(s + qm(q,\gamma) - h) > 0$.

Taking time derivative in (12), we have:

$$\dot{Y} = \sigma\left(\dot{\bar{G}} + \dot{\bar{X}}\right) + \dot{\sigma}(\bar{G} + \bar{X}) \qquad (12a)$$

Dividing both side of (12a) by Y, we get the following equation:

$$g_Y = \alpha.g_g + (1-\alpha).g_x + \dot{h}\sigma \qquad (13)$$

Where: $g_Y = \frac{dY}{Y}$ is the growth rate of real output; $\alpha = \frac{\bar{G}}{A}$ is the share of government expenditures in domestic demand; $g_g = \frac{dG}{G}$ is the growth rate of government expenditures; g_x is the growth rate of exports and $\dot{h}$ is the rate of change of propensity to invest.

Equation (13) above shows that the growth rate of real output is the weighted average of the growth rate of government expenditures and the growth rate of exports.

In order to the growth path given by (13) to be sustainable in the long run is necessary for the growth rate of productive capacity to adjust itself to the growth rate of autonomous demand. The growth rate of capital stock is given by:

[13] In the following we will assume that wage (profits)-share in income is exogenous to the model, being determined at the microeconomic level from the rate of *mark-up* fixed by firms over unit cost of production, in order to determine the sales price of their products. For more details see Oreiro (2016b, chapter 5).

$$g_K = \frac{h}{v}.u - \delta \quad (14)$$

Where: g_K is the growth rate of capital stock; $v = \frac{K}{Y_p}$ is the capital (K)/ potential output (Y_p)[14] ratio; $u = \frac{Y}{Y_p}$ is the level of capacity utilization and δ is the rate of depreciation of capital stock.

The rate of change of capacity utilization is given by [15]:

$$\dot{u} = u\left(g_y - g_K\right) \quad (15)$$

Substituting (7) and (8) in (9) we get:

$$\dot{u} = u.\left[\alpha g_g + (1-\alpha)g_x + \delta + \dot{h}\sigma - \frac{h}{v}.u\right] \quad (16)$$

Following Freitas and Serrano (2015, p.266), we will suppose that the adjustments of marginal propensity to invest are made in continuous time rather than by "jumps"; being compatible with the so-called *flexible accelerator model* for induced investment[16]. Thus, the marginal propensity to invest changes according to the equation below:

$$\dot{h} = h.\mu.(u - u_n) \quad (17)$$

Where μ is a parameter that measures the growth rate of the marginal propensity to invest to the deviation of the actual to the normal level of capacity utilization.

Finally, the rate of change of the share of government expenditures in autonomous demand is given by:

$$\dot{\alpha} = \alpha.(1-\alpha).\left(g_g - g_x\right) \quad (18)$$

The existence of a long run or a balanced growth path for the economy at hand requires $\hat{\alpha} = \frac{dg_k}{dt} = \hat{u} = 0$.

From equation (18), we get:

$$g_g = g_x \quad (19)$$

[14] Potential output is defined as the level of output achieved when firms as operating with a level of capacity utilization that is equal to the normal long-run value. So, we have $Y_p = \frac{K}{v}$.

[15] This differential equation can be obtained by taking logs at the definition of capacity utilization $u = \frac{Y}{K}$, and taking time derivatives of the resulting expression.

[16] The introduction of the flexible accelerator in the realm of the SSM approach is due to Dejuán (2013).

In words: the balanced growth path requires that growth rate of exports to be equal to the growth rate of government expenditures. Since exports are the only true exogenous component of demand in a capitalist economy (Thirwall, 2002, p.53)[17]; it follows that the growth rate of government expenditures had to be taken as an endogenous variable in balanced growth path.

In order to make the growth rate of government expenditures adjust to the growth rate of exports, let us suppose that the government adopts the following fiscal rule:

$$\frac{dg_g}{dt} = \epsilon(\bar{g} - g) \qquad (19a)$$

Where: $g = \frac{G}{Y}$ is the share of government expenditures on real output, $\bar{g}$ is the target ratio for the share of government expenditures on real output, and $\epsilon > 0$.

For a steady-state equilibrium to exist is required that: $\frac{dg_g}{dt} = 0$, which implies: $g = \bar{g}$ $(19b)$; in other words, government will adjust its level of expenditures in order to keep constant the share of government expenditures on real output.

From equation (17) we know that in a balanced growth path the following condition must be true:

$$u = u_n \qquad (20)$$

Substituting (18) and (19) in (16), and making $\hat{u} = 0$, we get:

$$h = \frac{(g_x + \delta).v}{u_n} \qquad (21)$$

Equation (21) determines investment rate – investment as a share of real output - that is compatible with a balanced growth path, in which the growth rate of the productive capacity adjusts itself to the growth rate of the autonomous demand, which is determined by the growth rate of exports. In this equation we found that an increase in the growth rate of exports will lead to an increase in the investment rate that is compatible with the balanced growth path of the system.

Finally, substituting (19) in (13) and making $\dot{h} = 0$, we get:

[17] In Thirwall´s words: "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" (2002, p.83).

$$g_Y = g_x \quad (22)$$

In equation (22) we can see that the long run growth rate of real output is determined by the growth rate of exports. *This means that the growth regime of the new-developmentalist model is export-led*.

d. Structural Change, Technological Gap and Real Exchange Rate[18].

In the previous sections we highlighted that the share of manufacturing industry in real output is a key element of productivity growth, making industrialization as the engine of long-term growth. The emphasis on industrialization as engine of growth is a key element of the Kaldorian[19] and structuralist literature, which emphasize the fundamental role of industry as an increasing returns activity and the source of dynamic economies of scale. The latter refers to increasing returns posed by technological progress induced by learning by doing and economies of scale.

In the new developmentalist growth model, the dynamics of manufacturing share over time are influenced by the *price competitiveness* as well as *nonprice competitiveness*. With regards to the *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, since such a situation induces an increased transfer of productive activities to other countries. We will call this level of the real exchange rate of "industrial equilibrium level".[20] Thus, an overvalued RER is associated with a negative structural change on the economy, which we may call premature deindustrialization (Palma, 2005). An undervalued exchange rate, that is, above its industrial equilibrium level would have the opposite effect, to induce a transfer of productive activities to the domestic economy, thereby increasing the share of the manufacturing industry in the GDP.

A fundamental feature of developing economies is that these economies are far from the technological frontier and therefore their firms cannot operate with the state-of-art

[18] This section is partially based in Gabriel, Jayme Jr and Oreiro (2016).
[19] Kaldor (1957, 1966, 1970).
[20] See Bresser-Pereira and Gala (2010) and Bresser-Pereira, Oreiro and Marconi (2015) about the exchange rate at the industrial equilibrium level. Industrial equilibrium exchange rate is defined in these works as the level of real exchange rate that makes firms which operate with the state of art technology competitive both in domestic and international markets. The problem with this concept is that, for developing countries, firms in general operate behind the technological frontier. In order to overcome this conceptual problem, we will redefine industrial equilibrium exchange rate as the level of real exchange rate that, for a given level of technological gap, makes the share of manufacturing industry on real output constant over time.

technology. This technological gap negatively affects the *nonprice competitiveness* of manufacturing firms in developing economies, which produce manufactured goods that are of inferior quality and/or lower technological intensity than the manufactured goods produced in the developed economies (Verspagen, 1993). It follows that the existence of the technological gap is an aspect that acts to reduce the competitiveness of developing countries industries, thus contributing to a reduction in its share of the manufactured industry in real output.

From above discussion, we will assume that the dynamics of the share of manufacturing industry in real output is given by the following differential equation:

$$\hat{\gamma} = \gamma_0 + \gamma_1 q - \gamma_2 G \quad (23)$$

Where: $\hat{\gamma}$ is the growth rate of the share of manufacturing industry in real output ; q is the level of the real exchange rate; G is the technological gap[21]; $\gamma_1 > 0$ is a parameter that represents the discretionary policies that directly address the industrial development such as trade tariffs; $\gamma_2 > 0$ is a coefficient that captures the sensitivity of the productive structure to the technological gap and $\gamma_0 < 0$ is a parameter that captures the effect of "mature deindustrialization" due to the effects of the rising levels of per-capita income over the demand for manufacturing goods (Rowthorn and Ramaswamy, 1999).

In the long run equilibrium $\hat{\gamma} = 0$, thus we get:

$$q^i = \frac{\gamma_2}{\gamma_1} G - \frac{\gamma_0}{\gamma_1} \quad (24)$$

In equation (24) we can see that the industrial equilibrium level of real exchange rate is an increasing function of the technological gap, which means that the higher is the distance of a developing country to the technological frontier, the higher will be the real exchange rate required to hold manufacturing share constant over time. We can also see that industrial equilibrium exchange rate is a negative function of the level of trade tariffs, captured by the coefficient γ_1.

It can be easily shown that the dynamics of manufacturing share will be dependent on the level of real exchange rate overvaluation compared to the industrial equilibrium

[21]Following Verspagen (1993), the technological gap between the North (developed economies) and the South (developing economies) is defined as follows: $G = ln\left(\frac{T_n}{T_s}\right)$, where T_n is the stock of knowledge of the developed economies and T_s is the stock of knowledge of the developing economies. If $\left(\frac{T_n}{T_s}\right) = 1$ then G = 0, which means that developing economies have overcome the technological gal, making a successful catching-up with the developed economies.

level. In order to do so, let us make some algebraic manipulation in equation (23) as shown below.

$$\hat{\gamma} = \gamma_0 + \gamma_1 q^i + \gamma_1(q - q^i) - \gamma_2 G = \ \gamma_0 + \gamma_2 G - \gamma_0 + \gamma_1(q - q^i) - \gamma_2 G$$

$$\hat{\gamma} = \ \gamma_1(q - q^i) \quad (25)$$

In equation (25) we can see that a real exchange rate overvaluation – compared to the industrial equilibrium level – will produce a cumulative decrease in the manufacturing share on real output.

e. Balance of Payments, Dutch Disease, Savings Substitution with Growth with External Savings Model

One of the most important propositions of the new developmentalist literature is the idea that the main obstacle for a middle income developing economy to make a successful catching-up with the developed economies is that the former suffers from *a tendency of real exchange rate overvaluation* that are the result of two main sources: Dutch disease and the adoption of a growth with external savings model.

Dutch disease involves a chronic exchange rate overvaluation (compared to the industrial equilibrium level defined above) caused by the exploitation of abundant natural resources; since the production costs associated with the exploitation of these resources are much lower then the production costs of manufactured goods in developing economies, thus making the real exchange rate that is compatible with "normal profits" in primary sectors of these countries much lower than the industrial equilibrium level (Bresser-Pereira, Oreiro and Marconi, 2015, p.57). Dutch disease thus defined is essentially a *market failure* since it generates negative externalities for the non-commodity tradable sectors of developing economies, reducing their price competitiveness and therefore generating a *premature deindustrialization* of these economies, if they have developed a strong manufacturing sector before the exploitation of these natural resources; or preventing industrialization, if exploitation of natural resources are prior to any industrialization process. It is important to notice, however, that the real exchange rate overvaluation caused by Dutch disease is not per se incompatible with a reasonable equilibrium in the current account of the balance of payments.

The other source of exchange rate overvaluation is the result of a political economy problem. Many developing countries, mainly in Latin America, had adopted in the 1990´s

the propositions of the so-called Second Washington Consensus (See Bresser-Pereira, 2002), with the support of the IMF, which included the idea that external savings are complementary, rather than substitute, to domestic savings and thus must be attracted by developing countries in order to increase their investment rate and, therefore, their long-term growth. The great problem with this idea is that external saving is just a "beautiful name" for the current account deficit. In order to a country to have a positive external saving than it is necessary to produce a real exchange rate appreciation in the required magnitude for running a current account deficit. In order to do so, it is necessary for the developing country not only to open its capital account, but also setting the domestic interest rate at a level higher than the level of international interest rate (adjusted for the country risk premium). The *result* will be a real exchange rate overvaluation that exceeds the one caused by Dutch disease.

Let *d* be defined as the ratio of current account deficit to real output, that is $d = \frac{D}{Y}$, where *D* is the current account deficit. We will suppose that *d* is determined by the following equation[22]:

$$d = d_0 - d_1 q \qquad (26)$$

Where: d_0 is the "autonomous" component of the current account to GDP ratio, i.e. the one that is directed affected by the international price level of natural based commodities. The higher is such level, the lower will be the value of d_0.

The ratio of current account deficit to real output is, definition, given by the difference between investment share and the domestic saving ratio. So, we get:

$$d = h - \frac{S_w}{Y} - \frac{S_c}{Y} - \frac{S_g}{Y} \qquad (26a)$$

Where: $\frac{S_w}{Y}$ is the share of workers savings on real income; $\frac{S_c}{Y}$ is the share of capitalist savings on income and $\frac{S_g}{Y}$ is the share of government savings on income.

It can be easily shown that:

$$d = h + g + s_w - \pi(1 - s_w) \qquad (27b)$$

Where: s_w is the propensity to save out of wages.

Taking the derivative of *d* relative to π, we get:

[22] See annex 1 for the mathematical derivation of this equation.

$$\frac{\partial d}{\partial \pi} = -(1 - s_w) < 0 \quad (27c)$$

Equation (27c) shows that an increase in the profit-share is associated with a decrease in the current account deficit to real output. This occurs because an increase in the profit share will increase capitalist savings in a *magnitude higher* than worker and government savings will be reduced, thereby causing an increase in the domestic saving rate. An increase in the share of domestic savings to real output will reduce the external savings, i.e. it will reduce the current account deficit, for a given investment share. This means that *external savings are substitute*, rather than complementary, to domestic savings (Bresser-Pereira, Oreiro and Marconi, 2015, pp.78-82).

Making $d = 0$ in (26), we can solve for q. Then we get:

$$q^{CAB} = \frac{d_0}{d_1} \qquad (27)$$

In equation (27) q^{CAB} is the current account equilibrium real exchange rate. As we can see in the above equation, the level of the current *account* equilibrium real exchange rate depends inversely on the international price level of natural based commodities, the higher is such level, the lower will be the level of real exchange rate that is compatible with a balance of current account.

Dutch disease occurs when $q^i > q^{CAB}$. This situation will occur when:

$$G > \left(\frac{\gamma_1}{\gamma_2}\right)\left[\frac{d_0}{d_1} + \frac{\gamma_0}{\gamma_1}\right] = G^c \qquad (28)$$

Equation (28) defines the *threshold level of the technological ga*p (G^c) above which Dutch disease occurs.

Let $\bar{d}$ to be the target for the current account to GDP ratio defined by policy makers. Substituting $\bar{d}$ in (26) and solving for q we get:

$$q^{ES} = \frac{d_0 - \bar{d}}{d_1} = q^{CAB} - \frac{\bar{d}}{d_1} \quad (29)$$

Equation (29) presents the level of real exchange rate that is required for the policy makers to reach the target level for the current account deficit to GDP. We will call this level as the *target external savings real exchange rate*. As we can easily see, the attempt of policy makers to "grow with external savings" will produce a real exchange rate

overvaluation compared to the current account equilibrium level, that is given by: $(q^{ES} - q^{CAB}) = -\frac{\bar{d}}{d_1}$.

In order to the policy makers to set the real exchange rate at the level given by q^{ES} , it is necessary for the capital account of the balance of payments to have a surplus equal to $\bar{d}$. Let ca to be the capital account surplus as a ratio to GDP. Balance of payments equilibrium requires $ca = d$. We will suppose that capital account surplus as a ratio to GDP is given by:

$$ca = ca_0 + ca_1(i - i^f - \rho) \qquad (30)$$

Where: i is the level of domestic interest rate; i^f is the level of international interest rate, ρ is the country-risk premium; $ca_1$is the sensitivity of capital flows to interest rate differential, which mainly depends on the level of capital controls; ca_0 is the autonomous component of *capital flows* (as a ratio do GDP).

Making $ca = \bar{d}$ in (30) and solving for *i*, we get:

$$i = (i^f + \rho) + \left[\frac{\bar{d} - ca_0}{ca_1}\right] \quad (31)$$

Assuming $\bar{d} > ca_0$, then equation (31) shows that in order to the policy makers to set the real exchange rate at a level compatible with the target for current account deficit as a ratio to GDP; than domestic interest rate must be set in a level higher than the international interest rate adjusted for country-risk premium. This means that the necessary counterpart of the growth with external savings is a high level of interest rates in developing economies.

In order to show that real exchange rate overvaluation in developing countries is the joint result of Dutch disease and growth with external savings model, let us make some algebraic manipulations in equation (29), as shown below.

$$\left(q^{ES} - q^i\right) = \left(q^{CAB} - q^i\right) - \frac{\bar{d}}{d_1} \quad (29a)$$

Considering that $\frac{\bar{d}}{d_1} = (q^{CAB} - q^{ES})$, then we get in (29a)

$$\left(q^{ES} - q^i\right) = \left(q^{CAB} - q^i\right) + (q^{ES} - q^{CAB}) \quad (29b)$$

In equation (29b) we can see that total real exchange rate overvaluation, i.e. $\left(q^{ES} - q^{i}\right) < 0$, can be decomposed in two parts. The first one is the real exchange rate overvaluation due to the Dutch disease problem, which is given by $\left(q^{CAB} - q^{i}\right) < 0$. The second one is the real exchange rate overvaluation due to the adoption of a growth with external savings model, which is given by $(q^{ES} - q^{CAB}) < 0$.

f. Price Setting, Income Distribution and Real Exchange Rate.

As we have already told in previous sections, we are considering a small open economy that produces a homogeneous output, which is an imperfect substitute for goods produced abroad. Let us assume that labor is the only variable input used in the production of this homogenous good, and that firms in domestic markets had a limited discretion over the prices charged for their goods, which means that they are capable, under certain limits, to fix the prices by a mark-up over the direct unitary costs of production. The price setting rule is given by:

$$p = (1 + z)\frac{w}{y} \quad (32)$$

Where: z is the mark-up rate; w is the nominal wage rate, y is the labor productivity.

Since we presume that the final good produced by domestic firms is an imperfect substitute for the final goods produced abroad, then trade opening does not impose the law of one price for internationally traded goods; that is, 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 the direct unitary production costs depends on the real exchange rate. In this setting a devaluation of real exchange rate allows domestic firms to increase the mark-up on production costs in line with the decrease in competitiveness of the final goods imported from abroad (Bresser-Pereira, Oreiro and Marconi, 2015, pp.86-87).

As a result of this reasoning, we may express the mark-up rate as a function of real exchange rate as in equation (33) below:

$$z = z_0 + z_1 q \quad (33)$$

The share of profits in income (π) is given by:

$$\pi = \frac{pY - wL}{pY} = 1 - \frac{v}{y} \quad (34)$$

Where: $v = \frac{w}{p}$ is the level of real wage.

From equation (32) we get:

$$\frac{v}{y} = \frac{1}{1+z} \quad (32a)$$

Substituting (32a) in (34), we arrive at the following expression:

$$\pi = \frac{z}{1+z} \quad (35)$$

Substituting (33) in (35) we get:

$$\pi = \frac{z_0 + z_1 q}{1 + z_0 + z_1 q} \quad (36)$$

Equation (36) shows that income distribution between wages and profits will be fully determined by the level of real exchange rate.

Taking the derivative of π with respect to *q*, we get:

$$\frac{\partial \pi}{\partial q} = \frac{z_1}{(1+z)^2} > 0 \quad (37)$$

Equation (37) shows that profit share is an increasing function of the level of real exchange rate.

One important implication of this relation between income distribution and real exchange rate is the idea that a side effect of real exchange rate overvaluation is that profit share (wage share) will be lower (higher) compared to the level that would prevail if the real exchange rate was set at the industrial equilibrium level.

Let $\pi^i = \frac{z_0 + z_1 q^{\,i}}{1 + z_0 + z_1 q^i}$ as the level of profit share that results from the real exchange rate at the level of industrial equilibrium. Making some algebraic manipulations in equation (36), we can get the following expression:

$$\pi - \pi^i = \left(\frac{z_1}{1+z}\right)\left[q - q^i\right] \quad (38)$$

In equation (38) we can easily see that a real exchange rate over-valuation, i.e. $\left[q - q^i\right] < 0$; implies a level for the profit share (wage-share) that is lower (higher) than the level of profit share compatible with the industrial equilibrium exchange rate.

g. Distributive Conflict, Wage Indexation and Inflation

In many developing countries, mainly in Latin America, the inflation rate is higher than in developed countries. New developmentalism see high inflation in developing economies as a result of (a) the factor that *accelerates* inflation, which is the *struggle* between firms and workers to increase or recover their income shares; (b) the factor that *sustains* inflation which is the struggle of firms and workers to preserve their income shares through *indexation mechanisms* to adjust prices and wages in face of past inflation; and (c) by the factor that *sanctions* inflation, which is the 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 (Bresser-Pereira, Oreiro and Marconi, 2015, p.85).

Regarding inflation, we will consider that the rate of change of domestic prices is equal to the rate of change of nominal wages minus the rate of change of labor productivity:

$$\hat{p} = \hat{w} - \hat{y} \quad (38)$$

Where: $\hat{p}$ is the rate of inflation, $\hat{w}$ is the nominal wage inflation and $\hat{y}$ is the growth rate of labor productivity.

Following Dutt (1994) we will suppose that over time the money wage changes according to the gap between the wage share targeted by workers, ws^*, and the actual wage share and the expected rate of inflation. Since $(ws = 1 - \pi)$, we can write the following equation for the rate of change of nominal wages:

$$\hat{w} = \mu_1(\pi - \pi^*) + \mu_2\widehat{p^e} \quad (39)$$

Where: $\mu_1 > 0$ and $\mu_2 < 1$

Due to the existence of indexation mechanisms, we will assume that expected inflation is fully determined by past inflation $\hat{p}_{-1}$. So, we get:

$$\hat{w} = \mu_1(\pi - \pi^*) + \mu_2\hat{p}_{-1} \quad (40)$$

Substituting (40) in (38) we arrive at the following equation for the rate of inflation:

$$\hat{p} = \mu_1(\pi - \pi^*) + \mu_2\hat{p}_{-1} - \hat{y} \quad (41)$$

In steady-state the rate of inflation must be kept constant over time; i.e. $\hat{p} = \hat{p}_{-1}$, then we get:

$$\hat{p} = \frac{\mu_1}{1-\mu_2}(\pi - \pi^*) - \frac{\hat{y}}{1-\mu_2} \quad (42)$$

Assuming that $\pi > \pi^*$, then in equation (42) we can see that the equilibrium rate of inflation is a function of the gap between the actual level of profit share and the profit share that is targeted by workers. Since profit share is a positive function of the level of real exchange rate, we can conclude that a devaluation of real exchange rate is followed by a permanent increase in the rate of inflation. This result is due to *real wage resistance*, that is, the attempt of workers to preserve their real wages (and wage share in income) by means of bid up money wages as a reaction to offset the effect of currency devaluation over real wages (Setterfield, 1997, p.62). The real wage resistance will be higher (and the increase in the rate of inflation) as higher is the magnitude of the coefficient μ_1.

Solving equation (38) for π and substituting the resulting equation in (43) we get:

$$\hat{p} = \frac{\mu_1}{1-\mu_2}\left(\left(\pi^i - \pi^*\right) - \left(\frac{z_1}{1+z}\right)\left[q^i - q\right]\right) - \frac{\hat{y}}{1-\mu_2} \quad (43)$$

Equation (43) shows that the equilibrium rate of inflation in developing economies depends on the size of distributive conflict $\left(\pi^i - \pi^*\right)$ and on the size of real exchange rate overvaluation. It can be easily shown that:

$$\frac{\partial \hat{p}}{\partial(\pi^i - \pi^*)} = \frac{\mu_1}{1-\mu_2} > 0 \quad (44a)$$

$$\frac{\partial \hat{p}}{\partial[q^i - q]} = -\frac{\mu_1}{1-\mu_2}\left(\frac{z_1}{1+z}\right) < 0 \ (44b)$$

It is important to notice that a higher level of real exchange rate overvaluation is associated with a lower equilibrium level for the rate of inflation.

4. The working of the new developmentalist model

a. Steady-state solution and over-determination problem.

The model presented in the last section is summarized by the following equations:

$$\hat{e} = g_Y - g_y - n \quad (4)$$

$$g_y = \frac{\alpha_0}{1 - \beta_0 \gamma} \quad (2)$$

$$g_Y = \alpha . g_g + (1 - \alpha) . g_x + \dot{h}\sigma \quad (13)$$

$$\dot{u} = u . \left[\alpha g_g + (1 - \alpha) g_x + \delta + \dot{h}\sigma - \frac{h}{v} . u \right] \quad (16)$$

$$\dot{h} = h . \mu . (u - u_n) \quad (17)$$

$$\dot{\alpha} = \alpha . (1 - \alpha) . \left(g_g - g_x \right) \quad (18)$$

$$\hat{\gamma} = \gamma_1 \left(q - q^i \right) \quad (25)$$

$$\bar{d} = d_0 - d_1 q \quad (26)$$

$$\bar{d} = ca_0 + ca_1 (i - i^f - \rho) \quad (30)$$

$$\pi = \frac{z_0 + z_1 q}{1 + z_0 + z_1 q} \quad (36)$$

$$\hat{p} = \mu_1 (\pi - \pi^*) + \mu_2 \hat{p}_{-1} - g_y \quad (41)$$

The steady-state solution requires $\hat{e} = \dot{u} = \dot{h} = \dot{\alpha} = \hat{\gamma} = 0$, and $\hat{p} = \hat{p}_{-1}$. So, we get:

$$\frac{\alpha_0}{1 - \beta_0 \gamma} + n = g_x \quad (4a)$$

$$u = u_n \quad (20)$$

$$h = \frac{(g_x + \delta) . v}{u_n} \quad (21)$$

$$g_g = g_x \quad (19)$$

$$q = q^i = \frac{\gamma_2}{\gamma_1} G - \frac{\gamma_0}{\gamma_1} \quad (24)$$

$$q = q^{ES} = \frac{d_0 - \bar{d}}{d_1} \quad (29)$$

$$i = (i^f + \rho) + \left[\frac{\bar{d} - ca_0}{ca_1}\right] \quad (31)$$

$$\pi = \frac{z_0 + z_1 q}{1 + z_0 + z_1 q} \quad (36)$$

$$\hat{p} = \frac{\mu_1}{1 - \mu_2}(\pi - \pi^*) - \frac{\alpha_0}{(1 - \beta_0 \gamma)(1 - \mu_2)} \quad (42)$$

The exogenous variables of the model are: n , g_x, u_n, v, δ, G, $\bar{d}$, i^f, ρ and π^*; and the endogenous variables are: γ, u , h , g_g, q , i , π and $\hat{p}$. There are eight endogenous variables for a system with nine independent equations, which means that the *model is over-determined*.

The over-determination problem occurs because real exchange rate had to accomplish two different roles in the model. The first role is to generate a sufficiently high level of *price competitiveness* in order to compensate domestic firms for their lack of *non-price competitiveness* due to technological gap. The level of real exchange rate that do this role is the *industrial equilibrium exchange rate*. The second role is to attract foreign capital flows in order to generate the desired level of external savings by policymakers. This requires for policymakers to set domestic interest rates at a level higher than the one given by the sum of international interest rate and country risk premium. It is impossible for the real exchange rate to accomplish both roles, since due to the existence of Dutch disease, a real exchange rate at the industrial equilibrium level would generate a negative external saving (a current account surplus), just the opposite of what is desired by policymakers.

The only possible solution for the over-determination problem is to make *d* an endogenous variable, which means that policymakers may let the current account deficit to assume the value that is compatible with the real exchange rate at its industrial equilibrium level.

Substituting (24) in (29) and remembering that $q^{CAB} = \frac{d_0}{d_1}$ then we get:

$$\bar{d} = -d_1\left(q^i - q^{CAB}\right) < 0 \quad (29a)$$

Equation (29) shows the value of current account deficit as a ratio to GDP that is required for a determinate steady-state solution of the New-Developmentalist model. As

we can see, this value is negative if the economy at hand suffers from Dutch disease, which means that the country must run a current account surplus.

A negative value for $\bar{d}$ requires domestic interest rate to be lower than the sum of international interest rate and country risk premium in equation (31). This means that for a developing economy manage to run a current account surplus it had to accept a capital account deficit of equal amount.

Once the over-determination problem is solved, the manufacturing share in real output will be determined by equation (4a), being the adjusting variable between natural growth rate and the growth rate of non-capacity generating autonomous demand (exports). The steady-state solution for γ will be given by:

$$\gamma = \beta_0 \left[\frac{g_x - n - \alpha_0}{g_x - n}\right] \qquad (4b)$$

Taking the derivative of γ relative to g_x we get:

$$\frac{\partial \gamma}{\partial g_x} = \beta_0 \left[\frac{\alpha_0}{(g_x - n)^2}\right] > 0 \quad (4c)$$

Taking the derivative of *h* relative to g_x in equation (21) we get:

$$\frac{\partial h}{\partial g_x} = \frac{v}{u^n} > 0 \quad (21a)$$

Equations (4c) and (21a) shows that an increase in the growth rate of exports will produce both an increase in the manufacturing share and in the investment share in real output. Thus, capacity growth and structural change can be both stimulated by a faster growth rate of manufacturing exports.

b. Getting Stuck in a Middle-Income Trap.

How a developing economy can get stuck in a MIT according to the New Developmentalist School? As we had told in the introduction, new developmentalism sees economic policy as the deep determinant of the process of economic development; so a MIT presupposes some change in the macroeconomic policy regime that prevents the continuation of the development process once it had started and the country had achieved a middle level of per-capita income.

The experience of many Latin American countries in the period between 1970 and 1990 clearly shown that the change in the economic policy regime was the adoption of

some version of the external savings growth model. In the case of Brazil this model was adopted after 1973 in the context of the II PND (Second National Development Plan) in the government of General Ernesto Geisel. The II PND was designed to be a massive program of government investment expenditures in oil exploration and production of capital goods, which are required to complete the process of import substitution that had started in the beginning of 1930. The program generated a huge current account deficit and a fast accumulation of external debt, that increased from USS$ 7.947 million in 1971 to 71.788 million in 1981 (Giambiagi et al. 2005), a 10 time increase in a decade!

This evolution of external debt was clearly unsustainable and resulted in an external debt crisis in the early 1980´s, which was the immediate cause of growth slowdown of Brazilian economy during the whole decade. The fully adoption of the *external savings growth model* was only possible, however, in the 1990´s after the financial liberalization occurred during Fernando Collor government, which starts a process of *increasing openness of capital account*. Finally, under Fernando Henrique Cardoso government, the *external savings growth model* was converted in official government policy because the successful implementation of *Plano Real* for inflation stabilization was due to the introduction of an *exchange rate anchor*, which required domestic interest rates at very high level in order to attract foreign capital inflows and make real exchange rate to appreciate.

Once the external savings growth model is adopted, real exchange rate starts to overvalue, and will remains in a level that is incompatible with the industrial equilibrium. The overvaluation of real exchange rate will start a (premature) de-industrialization process and hence a slowdown in the growth rate of labor productivity. There are also be effects over the demand side of the economy. As a matter of fact, the value of the so-called Harrod-Hicks super-multiplier of autonomous expenditures is given by: $\sigma = \frac{1}{s+qm(q,\gamma)-h}$. The appreciation of real exchange rate combined with a reduction of the manufacturing share on real output will both increase the marginal propensity to import and, under certain conditions[23], will *decrease the size of the super-multiplier*. For a given

[23] The real exchange rate appreciation will also reduce the savings ratio (s), since this ratio is an increasing function of the profit share, which is a positive function of the level of real exchange rate. Let $\Delta = [s(\pi(q)) + qm(q,\gamma) - h]$ and $\sigma = \frac{1}{\Delta}$. It can be show that $\frac{\partial \Delta}{\partial q} = m + [1 - c_w(1-\tau)] + q\left[\frac{\partial m}{\partial q} + \frac{\partial m}{\partial \gamma}\frac{\partial \gamma}{\partial q}\right]$. The first term $m + [1 - c_w(1-\tau)]$ is positive, but the second term $q\left[\frac{\partial m}{\partial q} + \frac{\partial m}{\partial \gamma}\frac{\partial \gamma}{\partial q}\right]$ is negative. This means that $\frac{\partial \Delta}{\partial q}$ can be either positive or negative, thereby making the relation between the value of the super-

level of autonomous expenditures, there will be a permanent fall in the level of real output and hence on the level of capacity utilization. The fall of capacity utilization will result in $u < u^n$, thereby inducing a fall in the investment share ($\dot{h} < 0$). The fall in investment share will result in a reduction in the growth rate of real output [see equation 13] relative to the growth rate of autonomous demand. If the fall in the growth rate of real output was higher than the fall in the growth rate of productivity of labor then employment share will start to decrease. The combined result of all these developments (see figure 1) will be stagnation of economic growth, reduction of capital accumulation, de-industrialization, growing levels of excess capacity and increasing unemployment. The exchange rate appreciation may also have a negative feedback effect over the growth rate of exports, since the income elasticity of exports can be reduced as a result of the deindustrialization of the economy (See Oreiro, Missio and Gonzaga, 2015)[24]. The reduction in the growth rate of autonomous demand will reinforce the decrease in the level of employment and in the level of capacity utilization.

multiplier and real exchange rate indeterminate. However, the size of the second term clearly depends on the level of real exchange rate, so there must be a critical level of real exchange rate above which $\frac{\partial \Delta}{\partial q} < 0$, making $\frac{\partial \sigma}{\partial q} > 0$. Indeed, it can be show that this critical level is given by $q^c = -\frac{\{m+[1-c_w(1-\tau)]\}}{\left[\frac{\partial m}{\partial q}+\frac{\partial m \partial \gamma}{\partial \gamma \partial q}\right]} > 0$.

[24] I would like to thank to Peter Skott to call my attention to this issue.

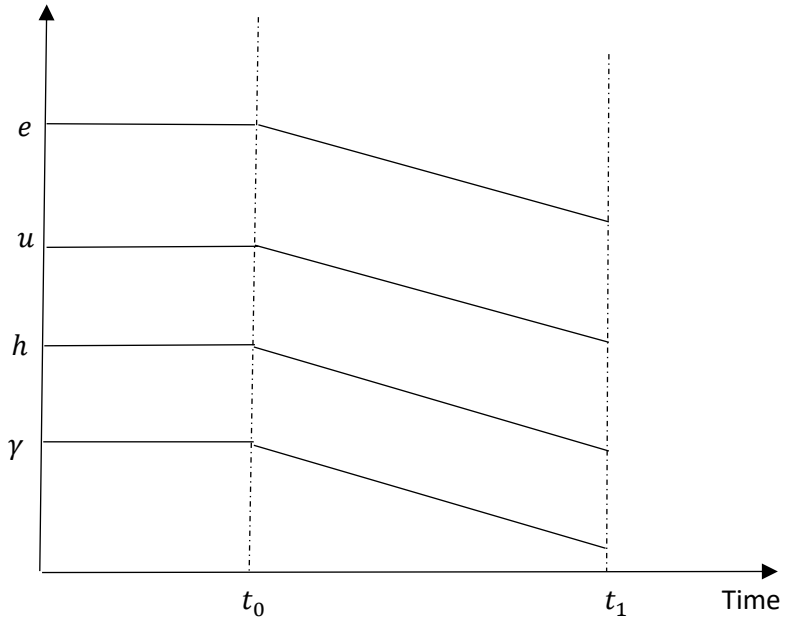

***Figure 1*- Evolution of the Employment share, Capacity Utilization, Investment Share and Manufacturing Share After a Real Exchange Rate Overvaluation due to the adoption of an External Savings Growth Model.**

The negative effects of exchange rate overvaluation over the supply side of the economy, however, can be *downplayed by political actors* due to its effects over inflation rate 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 (and thus, higher real wages). In other words, political actors can adopt a kind of *exchange rate populism* (Bresser-Pereira, 2009, ch.4). On the other hand, the overvaluation of real exchange rate is also associated with high levels of domestic interest rates (above the international level adjusted for country risk premium), which increases the financial income of the *rentier class*. This means that both workers and rentiers can have economic benefits from real exchange rate overvaluation, at least in the short to medium term. In the long-term, however, workers will be damaged by deindustrialization, since the high-wage jobs are in the manufacturing industry.

The political economy problem to get out of the MIT is that it requires a huge exchange rate devaluation and, hence, a sharp decline in real wages in the short term. Once real exchange rate is set at level slightly above the industrial equilibrium level, the manufacturing share could start increasing and productivity growth will accelerate. This will made possible for real wages to grow at a faster rate, making workers to recover their

wage losses due to exchange rate devaluation in some years (See Figure 2). The political economy problem is to convince workers and political actors that the long-term gains compensate the short-term losses. Brazilian experience in the last 10 years appears to show that this can be an impossible task.

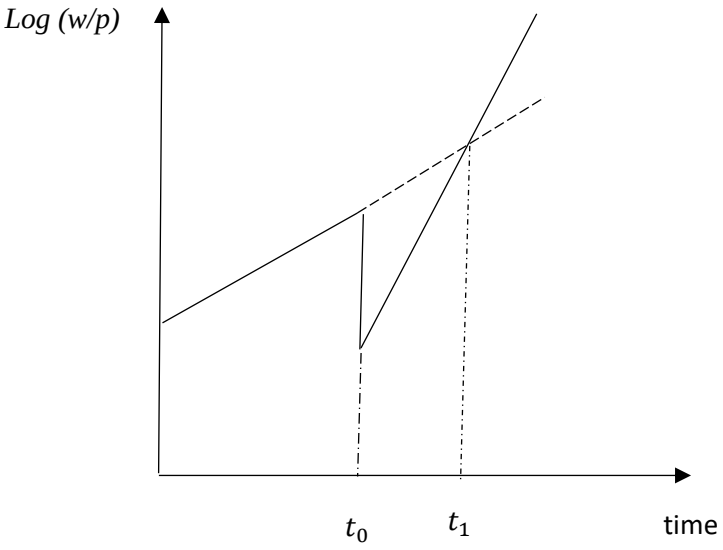

Figure 2: **Evolution of (log) of Real Wages before and after a Real Exchange Rate Devaluation.**

5. Final Remarks

Through this article we presented a New-Developmentalist Model of Growth and Structural change in order to show how new developmentalism can be understood both as a synthesis of elements between Classical Development Theory and Post-Keynesian Theory of Demand-Led Growth and as an theoretical explanation for the Middle-Income Trap affecting some developing countries, mainly in Latin America.

As a synthesis of between Classical Development Theory and Post-Keynesian Theory of Demand-Led Growth, the New Developmentalist Model shows that the growth rate of non-capacity generating external autonomous demand (exports) is the engine of long-term growth of real output. If the exchange rate is at the industrial equilibrium level both the investment and manufacturing share will adapt to the growth rate of exports, making the required *structural change* in order to eliminate both capacity and balance of payments constraint to economic growth. Such constraints are given by political economy considerations and/or Dutch disease. These developments may produce a substantial real

exchange rate overvaluation, with negative effects for both the demand and the supply side of the economy.

As an explanation for the MIT, new developmentalism shows that such a trap is a result of the adoption of an external savings growth model in an economy that suffers from Dutch disease. The combined effects of the external savings growth model and Dutch disease will be premature deindustrialization, a slowdown in the growth rate of labor productivity, a permanent fall in the level and in the growth rate of real output, declining capacity utilization, investment and employment share. These negative results, however, can be *downplayed by political actors* due to the positive effects that real exchange rate overvaluation has on the inflation rate and income distribution. Both workers and rentiers can have economic benefits from real exchange rate overvaluation, at least in the short to medium term. In the long-term, however, workers will be damaged by deindustrialization, since the high-wage jobs are in the manufacturing industry.

The political economy problem to get out of the MIT is that it requires a huge exchange rate devaluation and a sharp decline in real wages in the short term. 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.

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Annex 1: Derivation of the current account to GDP equation

Let *D* be the current account deficit in real terms, given by the following equation:

$$D = (qM - X) - iEB \quad (A.1)$$

Where: i is the international interest rate; B is the nominal stock of external debt measured in foreign currency. For convenience let us assume $E = 1$.

Dividing both sides of equation (A.1) by the real level of output, *Y*, we get:

$$d = q\,m - x + i\,b \quad (A.2)$$

Where: $d = \frac{D}{Y}$ is the current account deficit as a ratio to GDP; $m = \frac{M}{Y}$ is the marginal propensity to import; $x = \frac{X}{Y}$ is the ratio between exports and GDP; $b = \frac{B}{Y}$ is the debt to GDP ratio.

Taking time derivative of equation (A.2) we get:

$$\dot{d} = \dot{q}m + \frac{\partial m}{\partial q}\dot{q}q - x(g_X - g_Y) + i(d - g_Y b) \qquad (A.3)$$

In steady state, it is required that: $\dot{d} = \dot{q} = 0$ so we get:

$$id = (ib - x)g_Y + xg_X \qquad (A.4)$$

But we know that: $(ib - x) = d - qm$, so we get:

$$d = \frac{x}{i - g_y}g_x - \frac{mg_Y}{i - g_y}q \qquad (A.5)$$

Let us define $\frac{x}{i-g_y} g_x = d_0$ as the autonomous component of the current account to GDP ratio and $\frac{mg_Y}{i-g_y} = d_1$, then we get:

$$d = d_0 - d_1 q \quad (A.6)$$

Which is equal to the equation (26) of the manuscript.