

Inequalities and income distribution policies in Morocco: towards inclusive growth under balance of payments constraints.

Auteur 1 : AIT SGHAIR Nisrine,

AIT SGHAIR Nisrine, PhD in economic sciences.

University Mohamed V

Faculty of Legal, Economic and Social Sciences of Agdal, Morocco.

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Abstract:

The objective of this article is to verify if there is a long-term relationship between the distribution of income and the growth under the constraint of the balance of payments, then to study the impact of the policy of redistribution of income on the growth rate, with a model theoretically based on Ribeiro et al. (2016), using data from a panel of 9 heterogeneous countries that are economically comparable with Morocco.

The empirical estimation of this study covers a period from 1980 to 2024. Through these time series, the work was carried out using the cointegration technique for the income elasticities of imports, based on the estimation of the global import request function.

The results show the existence of a long-term relationship at least in one direction and we see that the model is significant. According to the results, there is a positive long-term relationship between the variables and it is found that income distribution policies have a positive impact on the constrained growth rate of the balance of payments.

Keywords: Growth; Balance of payment; Income distribution, inequality, redistribution policy

Introduction:

Income distribution and economic growth are closely interconnected dimensions of economic development. While economic growth is generally associated with improvements in living standards and productive capacity, its benefits are not necessarily distributed evenly across social groups. Persistent inequalities in income and access to economic opportunities may limit the inclusiveness of growth and, in some circumstances, weaken the foundations of long-term development. The relationship between inequality, income distribution and growth has therefore remained a central issue in economic analysis, particularly in developing and emerging economies where structural transformation, external dependence and limited productive capacities continue to shape the growth process. The issue becomes particularly relevant when economic growth is considered under a balance of payments constraint. According to the post-Keynesian approach initiated by Thirlwall (1979), the long-term growth rate of an economy may ultimately be constrained by its capacity to generate the foreign exchange required to finance imports. In this framework, the structure of domestic demand and the income elasticity of imports play a crucial role in determining the sustainable growth rate. Income distribution can therefore affect growth not only through its effects on consumption, saving and investment, but also through its influence on the composition of domestic demand, imports and the productive structure of the economy. This relationship is particularly important for emerging economies such as Morocco. Over the past decades, Morocco has experienced significant structural transformations, accompanied by increasing integration into international markets and persistent challenges related to productivity, technological capabilities, employment and income distribution. More recently, the COVID-19 crisis, international inflationary pressures, rising energy and food prices, and disruptions in global value chains have reinforced the importance of social protection and redistributive policies. Morocco has consequently strengthened its social and redistributive policy framework, notably through the gradual generalization of social protection, the Unified Social Register and reforms aimed at improving social and economic inclusion. However, the effectiveness and sustainability of these policies cannot be assessed independently of the country's productive capacity and external constraint. Against this background, the central question of this research is: to what extent can income distribution and redistributive policies contribute to inclusive economic growth when growth is constrained by the balance of payments? More specifically, the study seeks to examine whether changes in income distribution affect the long-term growth path through their effects on the income elasticity of imports and, consequently, on the balance-of-payments-constrained growth rate. The analysis also aims to assess the importance of complementarity between redistributive policies and productive public investment. This issue is particularly relevant in

economies where an increase in domestic demand may stimulate economic activity but simultaneously increase import dependence when domestic productive capacity remains insufficient. The theoretical framework of the study is based primarily on the balance-of-payments-constrained growth approach developed by Thirlwall (1979, 2011) and extended by Ribeiro, McCombie and Lima (2016), which explicitly incorporates the interactions between exchange rates, income distribution, technological change and external constraints. Within this framework, income distribution can influence the composition of consumption and therefore the income elasticity of imports, while public investment can contribute to reducing the technological gap and strengthening productive capabilities. The study consequently considers redistributive policies and public investment as potentially complementary instruments for achieving a more inclusive and sustainable growth trajectory. The empirical analysis uses a panel of nine heterogeneous but economically comparable countries: Morocco, South Africa, Brazil, Egypt, India, Malaysia, Mexico, Tunisia and Turkey. The period of analysis extends from 1980 to 2025, allowing the study to capture major structural and policy transformations affecting these economies. The empirical strategy focuses on the estimation of the aggregate import demand function and on the existence of long-run relationships between imports, domestic income and the real exchange rate. Cointegration techniques are employed to investigate the long-term dynamics of the variables and to assess the direction of causality within the system. The study thus provides comparative evidence that can contribute to understanding the conditions under which income distribution policies may support growth without aggravating the external constraint. The contribution of this research is twofold. First, it extends the literature on balance-of-payments-constrained growth by examining the role of income distribution and redistributive policies in a comparative panel including Morocco, a country that has received relatively limited attention in this specific theoretical framework. Second, it highlights the importance of combining social redistribution with productive investment, technological upgrading and structural transformation. From this perspective, inclusive growth cannot rely exclusively on the redistribution of existing income; it also requires strengthening the productive and technological capacities necessary to accommodate increased domestic demand while preserving external equilibrium. The article is organized as follows: first, a review of the theoretical literature will focus particularly on classical, Keynesian, and post-Keynesian approaches; second, a review of the empirical literature will examine the relationship between income distribution, growth, and the balance of payments constraint. Next, we will present the theoretical model of growth under a balance of payments constraint, incorporating income distribution, technological progress, and government spending. After describing the data, variables, and econometric methodology used in the empirical analysis,

we will analyze the econometric results, including unit root, cointegration, long-term relationship, and causality tests. Finally, the conclusion will summarize the main results and discuss their implications for redistribution, productivity, and industrial policies in Morocco and comparable emerging economies.

1. Overview of Theoretical Literature:

In literature, growth and distribution were a central issue for 19th-century economists. Different theoretical approaches were developed to gain insight into the long-term impact of economic development on social structures. The different theoretical approaches focus on studies conducted by different authors. In economic theory, there are two radically opposed ways of addressing the issue of distribution from a positive perspective: on the one hand, there are those who conceive it as the sharing of the product—of a company, or of society as a whole—between various social groups, according to a more or less conflictual relationship; on the other hand, there are those who consider it as the result of economic activity—and therefore of the laws that govern it. The first group includes the founders of political economy – Adam Smith (1723-1790)¹, David Ricardo (1772-1823)², John Stuart Mill (1806-1873)³ – and Karl Marx (1818-1883)⁴. The product then comes essentially from (living) labor, and it is shared between the workers themselves, the capitalists (who provide the means of production) and the owners of land or other natural resources (mines, privileged places in one way or another, etc.). Due to the fragility of their position, workers – who have no other resource than their labor force – will see their wages oscillate around a subsistence level (obviously relative to the characteristic living conditions of the society in which they live, and taking into account the need to raise children, etc.), depending on the circumstances (starting with the level of unemployment). Kuznets in (1953) with his curve, found on the one hand that inequalities increase at the beginning of industrialization, then decrease during the advanced phases of development, this is what is called: self-balancing mechanism. With a first work of great importance, he showed the reduction of inequalities in the capitalist regime. And on the other hand, that there is a considerable influence. The Kuznets curve is represented in graph 1 in the shape of an inverted U:

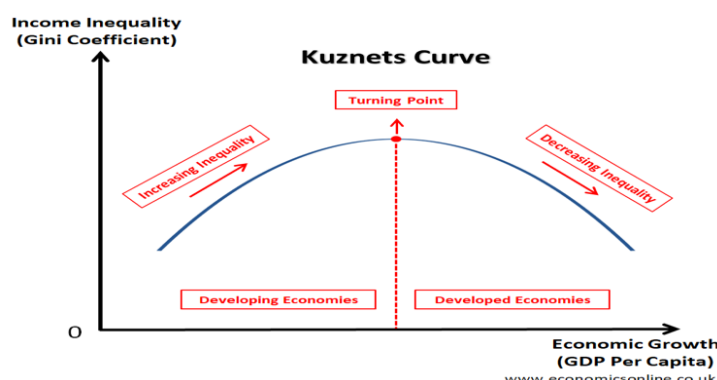
¹ Piketty Thomas (2011) : « Croissance économique et répartition des richesses : Le capitalisme du 21^{ème} siècle sera-t-il aussi inégalitaires et instable que celui du 19^{ème} ? », Collège de France, 2 Mars.

² Ibid

³ Jensen Hans E. (2010) : « John Stuart Mill's Theories of Wealth and income distribution », Review of social economy, p. 491-507, novembre.

⁴ Piketty Thomas (2011) : « Croissance économique et répartition des richesses : Le capitalisme du 21^{ème} siècle sera-t-il aussi inégalitaires et instable que celui du 19^{ème} ? », Collège de France, 2 Mars.

Figure N°1: Kuznets curve ∩



Source: Ansari Saddique (Economicsonline)

To explain this curve, Kuznets⁵ proposed a general law that can be summarized as follows: in the first stages of development, inequalities increase and decrease in the following stages. There are in fact two different ways of interpreting the statistical link: the first, from Kuznets' perspective, is the influence of economic growth on the evolution of inequalities that is tested, and most often the results confirm the hypothesis, and the second is the inverse hypothesis of a causal link going from inequalities to growth, which is rarely validated and appears extremely fragile. In both cases, however, national development strategies and the structural and historical configurations of each society retain a very large place in determining the joint evolutions of income and its distribution. Solow in (1956)⁶ emphasized the growth path where everything progresses at the same rate (production, income, capital, wealth, wages, profits, real estate, etc.). Also, growth is a wave that lifts the boats. For Kuznets-Solow, there is a consensual model for the enchanted world of the thirty glorious years. But the problem is that Kuznets' self-balancing mechanism is unclear; we do not know whether it has a relationship with supply and demand (mobility of labor and/or capital) or with the diffusion of technical progress or something else. For Solow, growth and capital-labor substitution balance growth despite the fact that there are other unbalancing forces in particular cases. The Kuznets curve came to an end with the rise in inequality since the 1970s and 1980s, which destroyed this fragile consensus (or should destroy it...). For example, in the United States, between 1977 and 2007, more than 50% of growth was absorbed by the top 1% of income earners. Capitalist growth must be rethought in its foundations, calmly and radically. Béraud A. (2011)⁷ summarizes in his article the various works contributed by Kaldor to income distribution as a Keynesian theory in 1955-1956. The basic work was based on the work developed by Harrod (1939) and Domar (1946-1947) concerning growth models. Harrod's idea was to show that an

⁵ Ibid

⁶ Solow Robert M. (1956) : « A Contribution to the Theory of Economic Growth », Quarterly Journal of Economics 70 (1) : 65-94.

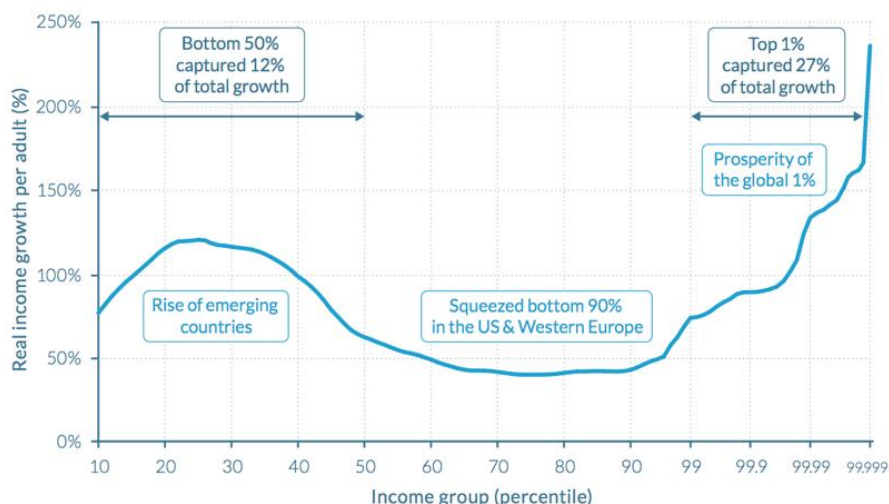
⁷ Béraud Alain (2011) : « Kaldor et la théorie keynésienne de la répartition », l'Harmattan, cahiers d'économie politique/Papers in political economy, n°61/ p : 113 à 155.

economic policy that sought to ensure development faces two difficulties. If the authorities can, by stimulating investment, ensure equilibrium in the goods market, their intervention only postpones the problem. On the one hand, it is by no means clear that the investment thus made provides the workforce with the means of production it needs: the capital thus created may be insufficient or excessive. On the other hand, investment creates productive capacities which may be excessive or insufficient to satisfy the demand induced by the income it generates. At the beginning of the 19th century, this problem was raised by Malthus who said that there was a difficulty: the insufficiency of effective demand can limit the growth of the product and a balanced growth at full employment appears impossible. Then come Solow and Swan (1956)⁸ with their conclusions, which are opposed to those of Harrod and Domar, which are based on the assumption that the coefficient of capital is constant, whereas it is, in fact, variable. If labor is in short supply, the real wage rate increases, which encourages entrepreneurs to choose techniques that use less labor. If, on the contrary, workers are in surplus, the real wage rate decreases and entrepreneurs choose techniques that use more labor. Capital-labor substitution thus ensures full employment. Kaldor believed that the remuneration of each factor is equal to its marginal productivity. Thus, he proposed a solution based on the idea that the propensity to save of employees is lower than that of capitalists. If the profit margin is flexible, it can adjust so that the growth rate ensures full employment of labor. Kaldor's inspiration came from the contributions of Keynes, in *A Treatise on Money*, and Kalecki. He drew the idea that the expenses of entrepreneurs generate the profits that finance their expenses. Indeed, Keynes (1930, p. 125) argues that if entrepreneurs decide to spend a fraction of their profits by consuming them, the profits they derive from the sale of consumer goods are increased by an amount exactly equal to the profits thus spent. While these two ideas appear similar, and while Kaldor's analysis is based on Keynes's, it must be admitted that there are differences between Kaldor and Keynes. What characterizes Keynes's approach in the *Treatise on Money* is that he does not include profits in income. He defines the monetary income of the community as the value of product Y at its production cost. He includes, in income, four types of remuneration: Wages and salaries paid to employees, including unemployment benefits and pensions, because these gains are, in the long run, costs for industry just as much as other expenses that remunerate the factors of production; The normal remuneration of entrepreneurs, which Keynes defines as that remuneration which, if they were to enter into new negotiations with all the factors of production at the rate of remuneration now prevailing, would give them no motive to increase or decrease the scale of operations; Interest on capital; And monopoly gains, rents and similar incomes. Pasinetti, by suggesting that Kaldor's article is based

⁸ Solow Robert M. (1956) : « A Contribution to the Theory of Economic Growth », *Quarterly Journal of Economics* 70 (1) : 65-94.

on a logical error and that correcting this error makes it possible to show that the rate of profit depends only on the natural growth rate of the economy and the capitalists' propensity to save, helped to reorganize the debate. However, his thesis is questionable because one cannot claim, as he does, that Kaldor's saving function is logically inconsistent. Finally, the crucial assumption on which Pasinetti's reasoning is based, the existence of a class of individuals who derive all of their income from profits, hardly seems to characterize in a relevant way the economic systems that predominate in developed economies. Note in graph 2 the elephant curve⁹ where the x-axis represents the world population, which is divided into one hundred groups of equal size and ranked from left to right in ascending order of income. The top percentile was divided into ten groups, the richest of these was further divided into ten groups, and again for the top fractile¹⁰. The y-axis shows the total income growth of an individual in each group between 1980 and 2016.

Figure N°2: Global inequality and growth: the elephant curve, 1980-2016



Source : Rapport sur les inégalités mondiales, World Inequality Lab (2018)¹¹

Here, for the 99-99.1 millimeter (the poorest 10% of the world's richest 1%), growth was 74%. Collectively, the world's top 1% of income earners captured 27% of total growth. Income estimates account for differences in the cost of living between countries. Values are net of inflation.¹² We can also see that Globalization affects a country's economy through various means: trade, foreign investment, technology transfer, and labor migration. Figure 1 shows how globalization and the adopted development strategy jointly influence the structure of growth, the level of inequality, and the incidence of poverty in a country. The transmission mechanisms are complex and involve several links, as shown in the figure. Each of these links should be carefully studied.

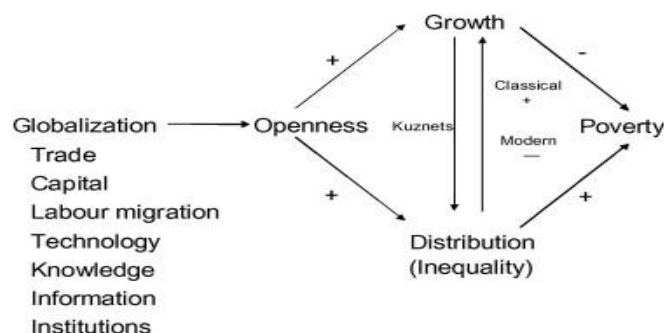
⁹ The curve represents the cumulative gains in real per capita income, between 1988 and 2008, by fractiles of world income.

¹⁰ The fractiles are divisions of the total population into classes of equal numbers.

¹¹ Source: WID.world (2017). See wir2018.wid.world for series and ratings.

¹² Galland Olivier (2018) : « Que nous dit la courbe de l'éléphant de Branko Milanovic ? », 29 Octobre.

Figure N°3: Globalization and development strategy: Interactions between growth, inequality and poverty



Source: African Development Bank Group (2016)

Generally speaking, globalization (through its effects on trade and foreign direct investment) and country-specific development policies and institutions will have positive repercussions on growth (the top-left arrow in the diagram). Their effect on income distribution (bottom-left arrow) is more difficult to determine. Growth and distribution transmission channels, on the other hand, interact dynamically and produce a triangular relationship between growth, inequality, and poverty (the right-hand triangle in the diagram). In this triangle, the link from inequality (of income and wealth) to growth is essential but controversial. It gives rise to two different theories. According to the classical theory, income inequality is a precondition for growth, because the rich are characterized by a marginal propensity to save, which is higher than that of the poor. For the same level of aggregate income, an unequal distribution of income will therefore generate a greater total flow of savings, which will favor investment and growth (Kaldor, 1956). In contrast, the new, more modern political economy of development argues strongly that widening income inequality can hamper growth through various transmission mechanisms, such as spreading political and social instability, unproductive rent-seeking activities, and increasingly insecure property rights. The link from growth to poverty (top right in the diagram) reflects the degree of inclusiveness of the growth model. The more inclusive the growth, the greater the resulting reduction in poverty. The last link in the diagram reflects the influence of income distribution on poverty. Again, the more unequal the distribution, the lower the likelihood that the poor will reap the benefits of growth. Blecker (1998) combines Thirlwall's BPCG model with mark-up pricing and partial exchange rate pass-through to discuss the Post-Keynesian quantity adjustment and Neoclassical price adjustment mechanisms. Changes in the exchange rate thus affect prices and, consequently, distribution – which, in turn, affects demand and output. In this way, Blecker (1998) was able to include the functional distribution of income the BP-equilibrium framework via international competitiveness. Nishi (2019), interacting the BPCG approach with Goodwin cycles, assumes a conflict model of inflation, where the conflict between workers and capitalists over their desired income shares

drives inflation and affects the RER. Including the dynamics of employment and labor-saving technological progress in the model, the author arrives at a modified version of Thirlwall's law that accounts for relative price changes (Blecker 2022, p. 455).¹³ In the next section, we will focus on the empirical literature that will reinforce our theories through several studies conducted on this topic.

2. Growth under Balance of payments constraint and income distribution: Review of the empirical literature

Open-economy demand-led growth models have focused on two main subjects: the impacts of income distribution on international competition, highlighted by the Neo-Kaleckian tradition, and the balance of payments as a constraint to growth, highlighted by the Kaldor–Thirlwall tradition.¹⁴ Although the inequality–growth nexus has been widely studied, most research relies on income-based measures and restrictive parametric models, leading to inconclusive findings.¹⁵ The impact of income distribution on non-price competitiveness in a balance of payments constraint framework is a recent development in the post-Keynesian literature.¹⁶ Porcile et al. (2007)¹⁷ discuss how an increase in real wages can boost non-price competitiveness. The story is quite simple: up to a certain critical point, higher real wages improve workers' ability to learn, imitate, and improve foreign technology, with positive effects on non-price competitiveness. Ribeiro et al. (2016) discuss several channels through which exchange rate policy can affect non-price competitiveness. Among them, in their paper they discuss how changes in the real exchange rate affect income distribution and how the latter influences consumption patterns and firm decisions. However, some limitations appear in this work. First, for Porcile et al. (2007), there is no discussion of the impact of income distribution on consumption patterns and, subsequently, on the income elasticity of imports. Second, for Ribeiro et al. (2016), even though the authors provide an extensive discussion on the effects of both income elasticities (and state that "the net impact of changes in the wage share on each income elasticity can go either way..." (Ribeiro et al., 2016, p. 12)), the ultimate assumption of a positive impact of income distribution on the trade elasticity ratio may not hold for a country's economy (Souto, 2015). We can orient our study towards several

¹³ Brenck and Setterfield (2026): « Income distribution sensitive Thirlwall's law: A decomposition of import income elasticities and estimation for the Brazilian economy », The new school for social research, Working paper, February.

¹⁴ Vaz and Freitas (2026): « Income distribution and the balance of payments constraint: reconciling open economy demand-led growth models », Review of Keynesian Economics 14(2) : 205-226.

¹⁵ Konaté and Hanchane (2026): « Nonlinear effects of wealth inequality on economic growth: evidence from a semiparametric panel analysis of low-income countries », Development studies research, Volume 13, Issue 1.

¹⁶ Rather, in a different context, Blecker (1989) presents how, under certain conditions, the decrease in the target margin increases real wages and positively affects growth.

¹⁷ Soares Antonio Martins Neto (2017): "Income distribution and external constraint: Brazil in the commodities boom", Economic Commission for Latin America and the Caribbean, Nova Economica v. 27 n.1.

avenues of research, namely: the literature on income distribution, discussing its interactions with non-price competitiveness and growth; in a macrodynamic model dominated by the balance of payments of Ribeiro et al. (2016), analyzing the impact of income distribution policies on the growth rate under balance of payments constraints. We can explore the public sector as in Cimoli et al. (2015), where there are tax benefits and expenditures in distribution programs and productive investment. Consequently, we must see the best balance between the two types of expenditures. Under certain circumstances, policies that target income distribution will negatively affect long-term growth. Following these ideas, we will attempt to make two contributions in this section. The first contribution will be to present the conditions under which an increase in social spending can harm economic growth. We take the Moroccan economy as a background for our theoretical model and discuss how, in an economy with a weak productive structure, an increase in distribution programs can affect the income elasticities of trade, and then long-term growth consistent with the balance of payments equilibrium. On the one hand, the increase in wages (when not offset by an increase in productivity) slows innovation, because it reduces the profits of firms. As a result, specialization in primary goods (which normally has a lower income elasticity of demand) is intensified. On the other hand, if the increase in demand for luxury goods by workers exceeds the fall in demand for luxury goods by capitalists, cash transfers and the increase in minimum wages lead to a greater elasticity of imports. The second contribution will be to discuss the importance of complementarity between public investment and social spending. While the former is important for reducing the technological gap and ensuring that domestic supply meets demand, the latter allows for the distribution of the fruits of rapid development. Overall, the right balance of public investment and distributive programs would allow a virtuous cycle of growth and income distribution to emerge.¹⁸ The relationship between inequality and growth has been the subject of considerable debate in the economic literature, as it is not defined in the same way by all authors. There is a vast literature dealing with the effect of income inequality and redistribution on economic growth, but few empirical studies explore the inverse relationship. Thus, much econometric evidence has been devoted to the analysis of this effect, which can be positive or negative, taking into account the evolution of macroeconomic factors. In this context, previous empirical studies dealing with the subject with different methods will be reviewed. In their article, Attanasio O. and Binelli C. (2004)¹⁹ address the interaction between inequality, growth, and different redistributive policies. Their study focused first on the theoretical channel through which inequality exerts a (possibly negative) impact on growth, and second on the empirical evidence on

¹⁸ Since it is assumed that there is no financial market, companies finance their investments only by retained profits, so that a decrease in profits slows down investment.

¹⁹ Attanasio O. et Binelli C. (2004) : « Inégalités, croissance et politiques redistributives », CAIRN, DE BOECK Supérieur/ Afrique contemporaine », n°211/p : 107 à 139.

the relationship between inequality and growth. Unfortunately, they concluded that the latter point was negative and that the relationship between inequality and growth is theoretically very complex and many channels are likely to interact. Bohman H. and Nilsson D. (2007)²⁰ in their consumer studies, have a long tradition of incorporating non-homothetic preferences into their models, while this has been a very rare procedure in international trade studies. They used a model by Mitra and Trindade (2005) to establish a gravity model in which they include measures of income distribution as explanatory variables for both exporting and importing countries. The study includes 61 countries spread across all continents. The majority of the countries are from Europe, North America, and Latin America. Data to estimate the gravity model were collected from the WIID database. The results indicate that non-homothetic preferences significantly affect both exports and imports. Specifically, we find that greater inequality generates greater exports of necessities and greater imports of luxuries. Countries with a more equitable income distribution tend to export more luxuries and import more necessities. Our results are robust to changes in model specification. Ndulu et O'Connell (2008, p.18)²¹ decomposed growth for a subset of sub-Saharan African countries for the period 1960-2000. It appears that GDP per worker increased by 0.61% per year (less than after 2000), driven by increases in capital per worker (0.36%) and education per worker (0.25%), but the authors did not find that total factor productivity (TFP) growth contributed. Growth would therefore be explained by factor accumulation in a context of stagnant productivity. Labor productivity has increased by around 1.8% per year in recent years (2009-2012). Given the stagnation of the capital-labor ratio, it can be assumed that TFP growth and human capital accumulation have indeed contributed to the rise in income, but it is unclear to what extent they have influenced the distribution of this income. Seguino Stephanie (2008)²² discusses in her article an unresolved debate in the development literature regarding the impact of gender inequality on economic growth. Previous studies have shown that the effect varies depending on the measure of inequality (wages or capabilities). Thus, this paper expands this discussion by considering both short- and long-term objectives and by assessing the effects of gender equality in two types of economies: semi-industrialized economies (SIEs) and low-income agricultural economies (LIAEs). In addition, it incorporates the effect of gender equality on the balance of payments constraint to growth. These preliminary results suggest that gender equality is more likely to boost growth in LIAEs than in LIEs in both the short and long run. Alarco. German

²⁰ Bohman H. and Nilsson D. 52007): "Income inequality as a determinant of trade flows", International Journal of Applied Economics, v.4, n. 1, March, p. 40-59.

²¹ African Development Bank Group (2016): "De fortes inégalités érodent les effets de la croissance sur le recul de la pauvreté », Rapport sur le développement en Afrique 2015, chapitre 3, Juin.

²² Seguino Stephanie (2008): "Gender, Distribution and Balance of Payments Constrained Growth in Developing Countries", Political Economy Research Institute, University of Massachusetts Amherst, Workingpaper series, number 133.

(2016)²³, after reviewing previous studies on economic growth regimes, his study focused on two fundamental variables: the share of gross operating surplus in GDP and the share of wages and salaries in the 16 Latin economies, applying an econometric model capable of determining the growth regime. The latter presented an econometric model covering a period from 1950 to 2012, capable of determining the growth regime of 16 economies, namely: Argentina (1950-2012), Plurinational State of Bolivia (1960-2012), Brazil (1950-2012), Chile (1950-2012), Colombia (1950-2012), Costa Rica (1953-2012), El Salvador (1960-2012), Ecuador (1953-2012), Honduras (1950-2012), Mexico (1950-2012), Nicaragua (1960-2012), Panama (1950-2012), Paraguay (1962-2012), Peru (1950-2012), Uruguay (1955-2012) and the Bolivarian Republic of Venezuela. (hereinafter Venezuela) (1957-2012). To do this, he uses data on the respective shares of wages and profits in GDP, analyzing the evolution of the factorial distribution of income in relation to economic growth. Alarco adopted a macroeconomic perspective in his study and did not take into account the structural and socio-political factors specific to the national context. Thus, the basic structural modeling used by the author to determine the growth regime is a variant of that of Naastepad and Storm (2007). He sought to determine what the effects on GDP (X) would be of a change in the share of the wage bill. Thus, he found that increasing the wage share in GDP has a favorable effect on household consumption but can harm private investment and exports; it seems possible to improve the factorial distribution of income and, with it, its personal distribution. Finally, he found that most economies in the region have a wage-led growth regime and that wage-oriented redistribution policies contribute to economic growth. Pacheco-Lopez, Penelope ; Thirlwall A. P. (2016)²⁴ in their paper apply the balance of payments constrained growth model to 17 Latin American countries over the period 1977-2002. Despite extensive trade liberalization in the last twenty years or so, their growth has remained mediocre. Between 1960 and 1970, Latin America was a region of import substitution, macroeconomic populism, and protectionism, and then in the 1990s, it became a region of openness, privatization, and liberalization. Thus, the main objective of this paper was to examine whether trade liberalization in 17 Latin American countries led to an increase in the income elasticity of import demand (controlling for the effect of real exchange rate changes on import growth), which would slow economic growth for any export growth unless there were offsetting capital inflows. This is a test for Latin America of the balance of payments constrained growth model originally developed by Thirlwall (1979). Arguably, the crucial parameter to be estimated is the income elasticity of import demand, which is done for

²³ Alarco German (2016): "Répartition factorielle des revenus et régimes de croissance en Amérique Latine de 1950 à 2012 », in Revue Internationale du Travail, vol. 155 n°1, Mars.

²⁴ Pacheco-Lopez Penélope and Thirlwall A. P. (2006) : "Trade liberalization, the income elasticity of demand for imports and growth in Latin America", ECONSTOR, Leibniz information center of economics, Department of Economics discussion paper, n° 05, 06, provided in Cooperation with University of Kent, School of Economics.

Latin America as a whole and for each country. In addition to estimating over the entire period, the rolling regression technique is also used to test whether an upward trend can be discerned following trade liberalization. A trend increase is found for Latin America as a whole and for selected countries, and the balance of payments equilibrium growth rate is a good indicator of growth performance in nine of the 17 countries. There is no evidence that the balance of payments equilibrium growth rate has increased in Latin America as a result of trade liberalization. Mbazia Nadia (2017)²⁵ in her article, she explores the relationships between income inequality, economic development, growth, and key macroeconomic factors in Tunisia. She studies two effects: the effect of inequality on growth, and in particular, the effect of growth on inequality. She also focused on the role of monetary policy, introducing money supply as an independent variable, affecting inequality and growth. Her empirical study is based on an annual data series from 1975 to 2015 using the dynamic ordinary least squares (DOLS) method to estimate cointegrating equations. The paper's findings show that income inequality increases economic growth in Tunisia. Other factors that have positive effects on economic growth include money supply and life expectancy at birth. However, inflation rate, primary education, and unemployment have statistically significant effects and negative effects on economic growth. On the other hand, the results indicate that money, supply, inflation rate, unemployment and savings are positively and significantly related to income inequality, while life expectancy at birth and gross fixed capital formation will reduce inequality in Tunisia. The policy implications of these results are discussed. Bahmani-Oskooee M. et Motavallizadeh-Ardakani A. (2017)²⁶ in their paper, see that because wages adjust slowly to the inflationary effects of currency depreciation, income might shift from workers to producers. The question is, might currency appreciation do the opposite? They study the asymmetric effects of exchange rate changes on a measure of income distribution in each of the 41 countries for which a GINI coefficient is available. Shin et al.'s (2014) recent application of skewness error correction and skewness cointegration modeling provides support for short-run asymmetric effects in 34 countries and long-run asymmetric effects in 22 countries, a unique finding obscured by previous research. The asymmetric effects revealed that while depreciations had non-equalizing effects in 10 countries, they had equalizing effects in only five countries. Dvoskin A. and Feldman G. D. (2018)²⁷ in their paper, they explore the interaction between income distribution and the balance of payments by evaluating the contributions of three Argentine exponents of the Latin American structuralist school: Adolfo Canitrot, Oscar Braun, and Marcelo

²⁵ Mbazia Nadia (2017) : "Inequality and growth in Tunisia : Empirical evidence on the role of macroeconomic factors", Faculty of Economic Sciences and Management of Tunis, September, in : Munich Personal RePEc Archive (MPRA).

²⁶ Bahmani-Oskooee M. and Motavallizadeh-Ardakani A. (2017) : "Exchange rate changes and income distribution in 41 countries: Asymmetry analysis", The quarterly Review of Economics and Finance, ELSEVIER, online at ScienceDirect, November 21.

²⁷ Dvoskin A. and Feldman G. D. (2018): "Income distribution and the balance of payments: a formal reconstruction of some Argentinian structuralist contributions", Part II : Financial dependency, Review of Keynesian Economics, vol. 6 N° 3, pp. 369-386, Autumn.

Diamand. The objective was to introduce a two-sector model inspired by the classical tradition. Their work was divided into two parts. In the first part, they examined the role of "technical dependence" in conditions of low capital mobility, as was the case during the Bretton Woods conference, an era that extended into the 1950s and 1960s. In this sense, it was plausible to assume a real wage exogenously attributed to the price system, which determines the rate of profits. And in the second part, they examined the implications of "Financial Dependence" that emerged after the liberalization of capital flows following the abandonment of the Bretton Woods system. In other words, the influence exerted on the profit rate of peripheral economies by the international profit rate. In the new institutional framework, they saw that the real wage is no longer the variable that mainly influences the behavior of the domestic profit rate, but rather the international rate of profits, determined by the monetary policy of the core countries. The contributions analyzed here allow us to conclude that the interaction between prices (and distribution) and quantities are not subject to a general explanation, but rather depend on institutional and historical factors that must be evaluated case by case. However, compared to the closed economy, the interaction of a peripheral of the world economy with the rest of the world imposes new restrictions of a purely economic nature. Tang Tuch Cheong (2020)²⁸ applied a cointegration approach, his study aimed to examine the validity of the Harrod-Thirlwall balance of payments constrained growth model in Malaysia. The results show that real income and real exports are not cointegrated during the period 1960-2000. This reveals that the Harrod-Thirlwall balance of payments constrained growth hypothesis was not supported in Malaysia. In this regard, we have seen that when the influence of trade is exclusively considered following the path of real output growth, only the subset of real wage values consistent with a non-negative current account can be maintained in the long run, while the complement of influence exerted by financial flows across borders further reduces the ability of workers to achieve persistent increases in the real wage. The simple reason is that in this case, the wage rate must also be consistent with the internationally determined profit rate. The main conclusion is that this new phenomenon reinforces the negative consequences of technical dependence on the economy's ability to grow and further limits workers' bargaining possibilities for higher real wages.

3. Growth under Balance of payments constraint and income distribution: Review of the empirical literature

The This section presents a model of growth under balance of payments constraints, based on Ribeiro et al. (2016), which has been applied to the Brazilian case but never to the Moroccan

²⁸ Tang Tuch Cheong (2020) : "Balance of payments constrained growth model : empirical evidence from Malaysia", School of business Monash University Malaysia, International journal of management studies.

case. Income elasticities of trade are determined by gap and income distribution. Government expenditures are included and the difference between those affecting the technology gap and those affecting income distribution is highlighted. For our case, we will try to apply this model to the Moroccan case and come out with concrete results.

3.1. Balance of payments constrained growth:

We assume that the long-run growth rate corresponds to the balance of payments equilibrium, i.e., the ratio of its income elasticity of exports to its income elasticity of imports (Thirlwall, 2011). We assume that the world economy consists of two countries: South and North - the South being the lagging economy. For simplicity, we assume that there are no capital flows between the two economies. Formally, the demand equations for exports and imports are:

$$X = A \left(\frac{P}{P^*E} \right)^\eta Z^\varepsilon \quad (1)$$

$$M = A \left(\frac{P^*E}{P} \right)^\psi Y^\pi \quad (2)$$

Where X represents the South's real exports, and M its real imports. P is the price level in the South (denominated in South's currency), while P* is the price level in the North (denominated in North's currency) and E is the nominal exchange rate (units of South's currency per unit of North's currency). Y is the South's real income and Z is the North's real income, while η is the price elasticity of exports, ψ is the price elasticity of imports, ε is the income elasticity of exports and π is the income elasticity of imports of consumer goods. A and B are positive constants.²⁹ Current account equilibrium requires that:

$$P^*EM = PX \quad (3)$$

Substituting equations (1) - (2) into equation (3), we take the logs, differentiating them with respect to time and assuming fixed real exchange rates:³⁰

$$y_{BP} = \frac{\varepsilon z}{\pi} \quad (4)$$

Where y_{BP} is the growth rate under the balance of payments constraint, and z is the growth rate of the North. As in Ribeiro et al. (2016), we define the ratio of trade income elasticities as a function of the technology gap and the income distribution:

$$\frac{\varepsilon}{\pi} = \alpha_1 \pm \alpha_2 \sigma_L + \alpha_3 T \quad (5)$$

²⁹ Soares Antonio Martis Neto (2017) : "Income distribution and external constraint : Brazil in the commodities boom", Economic Commission for Latin America and the Caribbean, Nova Economica v. 27 n. 1.

³⁰ The assumption of a fixed real exchange rate may be questionable, especially for the experience of some countries. As one of the referees pointed out, if a country has experienced a constant appreciation of its currency over a period, with relevant and negative impacts on the economy (see, for example, Nassif et al. 2015), a possible extension of the model is to assume that the rate of appreciation of the real exchange rate enters as a component of the payment-limited growth rate. In the simplest case where the appreciation of the real exchange rate has a negative impact on growth, this new variable would have a positive impact on the intercept of equation (17), so it would not change the following qualitative results. However, for reasons of traceability and in order to remain focused on the effects of income distribution and technological change on growth, the real exchange rate is assumed to be constant.

Where T represents the technology gap, defined as the ratio of the level of technological capabilities of the home country to the level of technological capabilities of foreign countries, and σ_L is the wage share. α_1 , α_2 , et α_3 are positive constants.³¹ The impact of income distribution on the income elasticity of trade can be positive or negative. In terms of the income elasticity of imports, as the wage share increases, capitalist demand for luxury goods decreases, while workers' demand for luxury goods increases; therefore, the magnitude of each case will indicate the net effect. The literature (e.g., Bohman and Nilsson 2007; Dalgin et al. 2008) highlights that, given non-homothetic preferences, more equal economies tend to import fewer luxury goods, which would result in a negative impact of the wage share on the income elasticity of imports.³²

3.2. Technology gap and income distribution:

There are three types of agents in the economy: capitalists, workers, and the government. We assume that the government levies a tax on profits at rate τ and spends a share δ on distributive programs and a share $(1 - \delta)$ on public investment, so that the remainder of total income is divided between capitalists and workers. Formally, total income before tax can be expressed as:

$$Y = W + \Pi \quad (6)$$

Where W represents total real wages and Π are total profits. The government's budget constraint is given by:

$$\tau\Pi = D + I \quad (7)$$

Where D is the distribution expenditure and I is the public investment flow, so that $D = \delta \tau \Pi$ and $I = (1 - \delta) \tau \Pi$. Substituting equation (7) into (6), and defining the distribution expenditure and the public investment flow as a function of profits, and normalizing it by total income (Y), then the share of taxable wages can be defined as follows:

$$\sigma_{Lat} = 1 - \sigma_{Kat} + (1 - \delta)\tau\sigma_K \quad (8)$$

Where σ_K is the share of profits, $\sigma_{Lat} = \frac{W+D}{Y}$ et $\sigma_{Lat} = \frac{(1-\tau)\Pi}{Y}$.

As in Ribeiro et al. (2016), we assume that the rate of change of the inverse of the technology gap is a function of the wage share and the inverse of the technology gap itself. In addition, we highlight the impact of public investment on technological progress. Formally:

$$\dot{T} = \beta_1 + \beta_2\sigma_L - \beta_3\sigma_L^2 - \beta_4T + \beta_5(I/Y) \quad (9)$$

Where β_1 , β_2 , β_3 , β_4 et β_5 are positive constants. As Cimoli and Porcile (2014) find, a lower gap reduces opportunities for imitation and catching up, so the higher the gap, the higher its rate of change (see also Narula, 2004). As in Lima (2004), technological innovation is determined by

³¹ Thirlwall Anthony P. (2011) : "Balance of payments constrained rowth models : History and overview", PSL Quarterly Review, vol. 64 n. 259, 307-351.

³² Structuralist authors argue (see Furtado (1969), for example, and Ribeiro et al. (2016) review of this literature) that higher income inequality leads to higher consumption of luxury goods, which in turn increases the income elasticity of imports.

distribution in a non-linear manner. When the profit (wage) share is low (high) (assuming that innovation is financed solely by profits), firms aim to invest, but are insufficient in terms of resources. In contrast, when the profit (wage) share is high (low), firms have sufficient resources to invest, but the incentives to invest are low (for an empirical analysis, see Aghion et al. 2005). Finally, following Cimoli et al. (2015), we assume that public investment has a positive impact on technological capabilities. Public investments that support innovation and technology diffusion are essential for catching up. Public investment increases the quality of infrastructure and education, funds basic R&D, and improves the quality of other essential institutions. Moreover, as Mazzucato (2013) points out, the public sector not only funds basic R&D but also plays a key role in the development and diffusion of new technologies as an entrepreneur. Overall, public investment is an important variable in the speed at which a developing economy is able to close the technology gap. Furthermore, note that Equation (9) does not explicitly consider a negative effect of taxation on firms' investment decisions. For simplicity, we assume that the positive impact of public investment is always greater than the negative effect of taxation, so we can avoid an additional term in Equation (9). In other words, if we assume that business investment is a quadratic function of taxation (τ), we assume here that any change in taxation takes place with τ remaining to the left of a given maximum value. This assumption, however, does not change the following qualitative results. On the other hand, the wage share is determined by a bargaining process, where workers set their desired wage. In many developing countries, there are well-organized unions with considerable bargaining power, which demand a higher wage share in response to an increase in production and labor demand. Even when there is a significant surplus of labor in the economy, segmented labor markets allow unions to demand higher wages. Formally:

$$\sigma_L = \theta(\sigma_L^E - \sigma_L) \quad (10)$$

Où θ : is a positive adjustment parameter and σ_L^E is the desired wage share, which is defined endogenously due to variations in the employment rate and the ratio of public spending on distribution programs and total income:

$$\sigma_L^E = \gamma_0 + \gamma_1(D/Y) + \gamma_2(l - n) \quad (11)$$

Where: γ_0 , γ_1 , γ_2 et γ_3 are positive constants, l is the rate of change in employment, and n is the growth rate of workers (exogenously determined). For simplicity and to focus on the effect of distributive programs, we assume that the government allocates the desired wage share through its distributive spending, which is defined exclusively as pension spending. An increase in the minimum wage can be formally interpreted as an increase in δ - assuming a constant tax rate. Since the minimum wage sets a floor for worker demand, it has a positive impact on the desired wage share. In other words, once the government increases the minimum wage, it will choose to increase

its spending (social spending) and, in turn, increase wages on average. It could be argued that a higher flow of public investment increases labor productivity, which in turn may have a negative impact on the wage share. However, even if we assume a negative impact of public investment on the wage share due to an increase in labor productivity, the following qualitative results will only change if this impact exceeds the positive impact of distribution programs. For the sake of simplicity, we refrain from considering such an effect. The rate of change in employment is determined as the difference between growth and labor productivity growth. Officially:

$$l = y_{BP} - \hat{a} \quad (12)$$

Where: $\hat{a}$ is the rate of change in labor productivity. Assuming that labor productivity is positively related to growth (Verdoorn's law), we have:

$$\hat{a} = \lambda y_{BP} + a_0 \quad (13)$$

Where: a_0 is the autonomous growth rate of productivity and λ is a positive constant. Equation (12) can then be rewritten as:

$$l = (1 - \lambda)y_{BP} - a_0 \quad (14)$$

All these equations and assumptions can be demonstrated in our empirical study in the next chapter, using the database collected from various sources.³³ After the theoretical and empirical aspects of growth under balance of payments constraints and income distribution as well as the different theories and evidence, we will carry out our analysis in the following section through variables from several databases, following a precise methodology in order to see what would be the impact of the income distribution policy in comparison with other countries in the panel on the growth rate under balance of payments constraints.

4. Data, methodology and choice of variables:

The Along with a vast theoretical literature, interest in the dynamics of the development process and the endogenous evolution of income distribution has necessitated several empirical tests to highlight the relationship between inequality and growth. The empirical literature faces several challenges, including:

- **A fundamental identification problem:** The growth performance of different countries is most likely influenced by many factors that are not necessarily observed and measured consistently. It could therefore be that inequality measures reflect these differences in unobserved factors and not the causal link advanced by theoretical models. In addition, it could be statistically difficult to distinguish the effect of inequality from the effect of other associated phenomena, such as the prevalence of poverty. While it is true that inequality is

³³ Soares Antonio Martis Neto (2017) : "Income distribution and external constraint : Brazil in the commodities boom", Economic Commission for Latin America and the Caribbean, Nova Economica v. 27 n. 1.

determined by the entire distribution while the prevalence of poverty is determined only by its lower end, in practice, the variation of the two variables across countries can be quite similar.

- **There are real data problems:** most theoretical models see wealth inequality as the determinant of the long-term growth rate, since it is the distribution of productive assets that determines investment in human and physical capital, which in turn influences the growth.³⁴

In this section, we will try to apply the cointegration method to answer the problem, then we will organize the candidate variables by studying the identity of each one. We will try to see the implication of these variables in the equations of the model. Then, we will test the long-term relationship, followed by the correlograms, then the correlation table.

4.1. Data and methodology:

By expanding the literature, we will attempt to apply tests and provide new empirical evidence for the Moroccan case by comparing it with a panel set for the following countries: South Africa, Brazil, Egypt, India, Malaysia, Mexico, Tunisia, and Turkey. We chose the latter, given that they are heterogeneous and economically comparable countries (each country has its own currency), in order to avoid any selection bias related to geographical, political, or cultural considerations. The empirical estimation period of this study covers the period from 1980 to 2025; this period was not chosen arbitrarily. It corresponds to a pivotal phase in the economic development of Morocco and the international context. Indeed, the beginning of the 1980s marked Morocco's entry into an era of profound structural reforms, characterized by the implementation of structural adjustment programs, market liberalization, and the gradual opening of the national economy to global trade and financial flows. This structural shift profoundly changed income distribution mechanisms, productive structures, and growth dynamics. This period of nearly four decades thus offers a long and robust reading of the interactions between economic growth, external constraints, and changes in income inequality, making it possible to assess the impact of successive economic policies on the distribution and sustainability of growth in Morocco. Using this time series of the entire panel (9 countries), we will attempt to estimate the income elasticities of imports using the cointegration technique, based on the estimation of the aggregate import demand function using the following equation:

$$\text{Ln} (M_t) = \psi \text{Ln} (R_t) + \pi \text{Ln} (Y_t)$$

³⁴ Attanasio O. and Binelli C. (2004) : « Inégalités, croissance et politiques redistributives », CAIRN, De Boeck Supérieur/ Afrique contemporaine », n° 211/ p : 107.

This technique will allow us to first verify the existence of a cointegration relationship among these variables. The bounds testing procedure developed by Pesaran et al. (2001) was used in an autoregressive lag ratio (ARDL). Second, when a cointegration relationship is verified, the coefficients can be estimated. Thus, an ARDL (1, 0, 2) specification is used. This approach will be carried out in three steps: unit root tests, Johansen cointegration tests with verification of the results of the long-run relationship test, and Granger causality tests within a vector error correction model.

4.2. Choice of variable:

We tried to choose appropriate variables to estimate our model. Thus, all data were collected from several sources, namely: Imports **M** and exports **X** are from COMTRADE according to SITC, according to Gouvea and Lima (2013) trade data were deflated using the US GDP deflator from WDI. For the real exchange rate **R**, the variable was collected from the IMF. The real exchange rate is constructed as the nominal exchange rate for each country multiplied by the ratio between the US wholesale price index and the consumer price index for each country. As for domestic GDP **Y**, the data are available in WDI and the GDP data in 2000 US dollars are constant. All these variables are used in the following equation:

$$\ln(M_t) = \psi \ln(R_t) + \pi \ln(Y_t)$$

To better understand the results, we favored reasoning in terms of elasticity by transforming variables into logarithms. As for the model of growth under the constraint of the Balance of Payments, we produced a second summary table of the necessary variables (see appendix). Also, to study the variables more closely, we proceeded to the calculations of descriptive statistics and the correlation matrix. We noted from this, that the variables are not correlated (see appendix).

5. Results and comparative analysis of the panel:

We will study our model with the chosen methodology by carrying out several tests with the different variables, which will help us to understand what would be the impact of the distribution of income on growth under balance of payments constraint for all the countries in the panel, namely: unit root tests, cointegration test, long-term relationship and error correction vector (VCEM).

5.1. Analysis of unit root tests:

In the unit root test in table 1, we will seek to verify the null hypothesis against the alternative hypothesis.

Table N°1: Results of unit root tests on the series of elasticity of income, imports and exchange rates (in level and in first difference

Test	With constant	Associated probability	With trend and consistency	Associated probability	Without trend or consistency	Associated probability
log_E						
Im, Pesaran and Shin W-stat	0,19510	0,5773	0,75159	0,7739		
ADF - Fisher Chi-square	17,9199	0,7107	13,9974	0,8160	29,8132	0,1231
PP - Fisher Chi-square	15,4065	0,8442	8,74032	0,9946	35,9506	0,0307
Alog_E						
Im, Pesaran and Shin W-stat	-7,89658	0,0000	-6,81319	0,0000		
ADF - Fisher Chi-square	109,210	0,0000	86,8029	0,0000	134,421	0,0000
PP - Fisher Chi-square	148,003	0,0000	117,720	0,0000	187,883	0,0000
log_M						
Im, Pesaran and Shin W-stat	0,98607	0,8380	0,65800	0,7447		
ADF - Fisher Chi-square	22,3220	0,4408	13,5034	0,9182	0,26846	1,0000
PP - Fisher Chi-square	44,6291	0,0030	10,5207	0,9809	0,14441	1,0000
Alog_M						
Im, Pesaran and Shin W-stat	-8,8234	0,0000	-7,72685	0,0000		
ADF - Fisher Chi-square	120,870	0,0000	97,1131	0,0000	131,282	0,0000
PP - Fisher Chi-square	215,397	0,0000	201,105	0,0000	240,639	0,0000
log_Y						
Im, Pesaran and Shin W-stat	2,99703	0,9986	-0,39745	0,3455		
ADF - Fisher Chi-square	11,3951	0,9686	26,7064	0,2226	0,07675	1,0000
PP - Fisher Chi-square	18,2846	0,6890	23,1146	0,3953	0,00092	1,0000
Alog_Y						
Im, Pesaran and Shin W-stat	-8,6981	0,0000	-7,87897	0,0000		
ADF - Fisher Chi-square	119,601	0,0000	103,087	0,0000	64,8636	0,0000
PP - Fisher Chi-square	207,131	0,0000	280,817	0,0000	118,944	0,0000

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

The Im, Pesaran and Shin, ADF and Philip Perron (PP) tests show that the three variables being lower in level than all the critical values at the thresholds of 1%, 5%, and 10%, are significantly integrated in first difference without constant or trend.

5.2. Estimation of the cointegration test:

This model is estimated by the Johansen test to determine the long-term relationship. The results are presented as follows in Table 2:

Table N°2: Johansen Fisher panel cointegration test

Johansen Fisher Panel Cointegration Test				
Series: LOG_M LOG_E LOG_Y				
Sample: 1980 2018				
Included observations: 351				
Trend assumption: No deterministic trend				
Lag interval (in first differences): 1 1				
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	121.4	0.0000	102.8	0.0000
At most 1	43.98	0.0006	31.52	0.0250**
At most 2	32.90	0.0171	32.90	0.0171***
* Probabilities are computed using asymptotic Chi-square distribution.				
** = 5%				
*** = 1%				
Individual cross section results				
Cross Section	Trace Test Statistics	Prob.**	Max-Eigen Test Statistics	Prob.**
Hypothesis of no cointegration				
MAR	55.7091	0.0000	48.4620	0.0000
BRA	20.0838	0.1544	14.1778	0.1615
EGY	22.8476	0.0749	16.7693	0.0708
IND	49.3743	0.0000	42.0617	0.0000
MEX	54.2027	0.0000	27.6127	0.0012
MYS	32.1739	0.0041	19.4695	0.0278
TUN	34.8824	0.0016	28.2042	0.0010
TUR	28.3303	0.0146	13.9049	0.1752
ZAF	16.5866	0.3385	11.0146	0.3843
Hypothesis of at most 1 cointegration relationship				
MAR	7.2471	0.3012	6.6959	0.2771
BRA	5.9060	0.4476	4.8973	0.4919
EGY	6.0783	0.4265	6.0589	0.3430
IND	7.3127	0.2951	4.7131	0.5186
MEX	26.5900	0.0001	16.8992	0.0046
MYS	12.7044	0.0431	9.3994	0.1030
TUN	6.6782	0.3583	6.6764	0.2790
TUR	14.4254	0.0219	9.4939	0.0993
ZAF	5.5720	0.4901	5.1930	0.4505
Hypothesis of at most 2 cointegration relationship				
MAR	0.5512	0.5201	0.5512	0.5201
BRA	1.0087	0.3658	1.0087	0.3658
EGY	0.0194	0.9093	0.0194	0.9093
IND	2.5996	0.1263	2.5996	0.1263
MEX	9.6908	0.0022	9.6908	0.0022
MYS	3.3049	0.0819	3.3049	0.0819
TUN	0.0018	0.9734	0.0018	0.9734
TUR	4.9315	0.0313	4.9315	0.0313
ZAF	0.3790	0.6013	0.3790	0.6013

**MacKinnon-Haug-Michelis (1999) p-values

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

The Johansen test shows conclusive results at the 10% and 5% confidence threshold, these results are interpreted as follows: the analysis of the trace and the maximum eigenvalue reveals at least one cointegration relationship in the 5% confidence interval of the likelihood test, as long as the null hypothesis is rejected (see Johansen test). Thus, the presence of a constant significantly different from 0 was rejected, for which the model chosen for this integration is a first difference model without constant or trend. This supports the choice of the vector cointegration model with error correction (VCEM). The coefficients of the long-term relationship then become:

$$\text{LOG(M)} = (0,108751 \text{ LOG(E)}) - (0,751938 \text{ LOG(Y)}) + 1,9642 \text{ (C)}$$

5.3. Long-term relationship:

The results in Table 3 below postulate the existence of a long-term relationship in at least one direction. Recall that the Engle-Granger representation theorem demonstrates that non-stationary series, particularly those with a unit root, must be represented in the form of an error correction model if they are cointegrated.

Table N°3: Testing the long-term relationship in a panel

Dependent Variable: LOG_M Method: Panel Least Squares Sample: 1980 2018 Periods included: 39 Cross-sections included: 9 Total panel (unbalanced) observations: 321				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_E	0.108751	0.011541	9.423283	0.0000
LOG_Y	0.751938	0.028278	26.59084	0.0000
C	1.964200	0.322617	6.088336	0.0000
R-squared	0.707882	Meandependent var		10.55733
Adjusted R-squared	0.706045	S.D. dependent var		0.581797
S.E. of regression	0.315436	Akaike info criterion		0.539582
Sumsquaredresid	31.64103	Schwarz criterion		0.574829
Log likelihood	-83.60293	Hannan-Quinn criter.		0.553655
F-statistic	385.3010	Durbin-Watson stat		0.054376
Prob(F-statistic)	0.000000			

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

In this long-term relationship, we note that the model is significant in view of the Fischer statistic (F-statistic = 385.3010) and that the variability of the elasticity of M is explained at 70% by this model ($R^2 = 70.79\%$). We also note that imports react positively to the impulses of the exchange rate (log E), as well as to the level of income (Log Y) and in a significant way even at the threshold of 1%. The restoring forces of the relationship pull towards the trend by reducing the gap (negative elasticity of the coefficients attached to the variables in first difference), see table 4 below:

Table N°4: Negative elastic of the coefficients attached to the variables in first difference

Adjustment coefficients (standard error in parentheses)	
D(LOG_M)	-0.000448 (9.2E-05)
D(LOG_E)	-5.42E-06 (0.00013)
D(LOG_Y)	-0.000214 (1.8E-05)

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

5.4. Vector error correction estimation (VECM):

At the theoretical level, the identification of causal relationships between economic variables provides food for thought that promotes a better understanding of economic phenomena. In practical terms, "causal knowledge" is necessary for the correct formulation of economic policy (Bourbonnais, 2003). The presence of a cointegration relationship between two variables generates the existence of a causal relationship between them in at least one direction. This causal relationship can be analyzed using the Granger causality test, which is based on the vector error correction model (VECM). According to the Granger representation theorem, any cointegrated system implies the existence of an error correction mechanism that prevents the variables from deviating too far from their long-term equilibrium. In our case, if the variables studied are cointegrated, we deduce that there is an error correction mechanism.

Table N°5: Granger causality test

Pairwise Granger Causality Tests Sample: 1980 2018 Lags: 1			
NullHypothesis:	Obs	F-Statistic	Prob.
LOG_E does not Granger Cause LOG_M LOG_M does not Granger Cause LOG_E	311	1.47469	0.2255
		4.02803	0.0456
LOG_Y does not Granger Cause LOG_M LOG_M does not Granger Cause LOG_Y	311	6.51594	0.0112
		0.17580	0.6753
LOG_Y does not Granger Cause LOG_E LOG_E does not Granger Cause LOG_Y	378	18.6698	2.E-05
		2.12581	0.1457

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

Table 5 shows that the relationship between the elasticity of the three variables is not symmetrical and that the direction of causality goes from income and the exchange rate to imports. Like the adjustment model, the error correction model can be interpreted as a particular form of autoregressive scaled lag (ARDL) models. The coefficient of the error term is only relevant when it is significant and between -1 and 0. The estimation of the error correction model provided in Table 6 shows that the quality of the results is acceptable with regard to the expected signs and the coefficient of determination. Note that the variable at the top of the table corresponds to the dependent variable. The variables in each row represent the independent variables. Each independent variable contains three numbers. The first corresponds to the coefficient of the variable associated with it, the second, which is in parentheses, is the standard deviation, and the third expresses Student's t-value. Finally, the numbers that represent a greater interest are those of the error correction term. It should be noted that their parameters are all significant and that the model is valid if the analysis of the residuals represents white noise. The battery of tests applied to the residuals shows that they are independent, decorrelated from all variables and present all the

characteristics of white noise (see Appendix). In the event of short-term imbalance, economic growth adjusts more slowly than imports.

Table N°6: The error-correcting vector mode

Vector Error Correction Estimates			
Sample: 1980 2018			
Included observations: 301			
Standard errors in () & t-statistics in []			
Cointegrating Eq:		CointEq1	
LOG_M(-1)		1.000000	
LOG_E(-1)		14.59474	
		(1.83824)	
		[7.93953]	
LOG_Y(-1)		-7.024979	
		(3.47221)	
		[-2.02320]	
C		64.68130	
Error Correction:			
	D(LOG_M)	D(LOG_E)	D(LOG_Y)
CointEq1	0.000271	-0.002433	3.19E-05
	(0.00025)	(0.00031)	(4.7E-05)
	[1.09084]	[-7.91619]	[0.67261]
D(LOG_M(-1))	0.028060	0.117421	0.004864
	(0.06370)	(0.07879)	(0.01215)
	[0.43957]	[1.49028]	[0.40022]
D(LOG_E(-1))	0.043448	0.649700	-0.003906
	(0.03035)	(0.03755)	(0.00579)
	[1.43132]	[17.3035]	[-0.67445]
D(LOG_Y(-1))	-0.141181	0.358560	0.055121
	(0.33507)	(0.41446)	(0.06394)
	[-0.42135]	[0.86513]	[0.86215]
C	0.034036	0.008907	0.016989
	(0.00749)	(0.00926)	(0.00143)
	[4.54654]	[0.96186]	[11.8937]
R-squared	0.008769	0.758928	0.015443
Adj. R-squared	-0.004626	0.755671	0.002138
Sum sq. resids	1.532998	2.345522	0.055815
S.E. equation	0.071966	0.088017	0.013732
F-statistic	0.654674	232.9628	1.160685
Log likelihood	367.3222	303.5172	866.1189
Akaike AIC	-2.408785	-1.983503	-5.721721
Schwarz SC	-2.347205	-1.921923	-5.660141
Mean dependent	0.035223	0.060953	0.017900
S.D. dependent	0.071800	0.180089	0.013747
Determinant resid covariance (dof adj.)		5.63E-09	
Determinant resid covariance		5.36E-09	
Log likelihood		1584.944	
Akaike information criterion		-10.41159	
Schwarz criterion		-10.18990	

Source: Table calculated and produces by us using data from the World Bank and the IMF, 2026.

6. Discussion:

Empirical analysis confirms the existence of a long-term relationship between economic growth, income distribution, and the balance of payments constraint for Morocco and the countries in the panel studied. The results show that income distribution influences growth through its effects on domestic demand, imports, and the productive structure. In line with the work of Thirlwall (1979) and Ribeiro et al. (2016), the growth of emerging economies remains limited by their capacity to generate foreign exchange. A better distribution of income can stimulate consumption, but can also increase dependence on imports if the local productive capacity is weak. This aligns with the findings of Bohman and Nilsson (2007) and Alarco (2016), who emphasize the importance of a balance between redistributive policy and productivity. For Morocco, the results

indicate a causal relationship running from income and the exchange rate to imports, reflecting a structural dependence on imports. Social and redistributive policies can therefore only sustainably support growth if they are accompanied by productive public investment and industrial upgrading. This complementarity between redistribution and public investment confirms Cimoli and Porcile's (2014) view that inclusive growth requires strengthening both productive demand and supply. In terms of economic policy, these results suggest that Morocco must reconcile social equity, economic efficiency, and external sustainability by linking redistribution, industrialization, and innovation. Future research could explore the role of institutions, governance, innovation, and the energy transition in this dynamic. In short, income redistribution, when combined with a coherent industrial and investment policy, can become a sustainable driver of inclusive and sustainable growth for Morocco.

Conclusion:

The analysis conducted in this article confirms that the relationship between economic growth and income inequality is complex, multidimensional, and largely dependent on the institutional context and public policies in place. Contrary to the hypothesis of an automatic mechanism for reducing inequality through growth, our results highlight that growth can, in some cases, contribute to increased income concentration if not accompanied by effective redistribution measures. They also show that income distribution policies can have a positive impact on economic growth, particularly in a context of balance of payments constraints. It is therefore essential to adopt policies that promote public investment and innovation, while ensuring that income distribution is equitable and beneficial for the entire population. In terms of future prospects, it is important to further explore the relationship between economic growth, income distribution, and inequality. It would be wise to further explore the mechanisms by which a more equitable income distribution can stimulate growth and promote economic development. Furthermore, it is important to examine how redistributive policies can be implemented effectively while minimizing negative impacts on investment and innovation. Ultimately, it is essential to continue seeking solutions that achieve a balance between economic growth, income distribution, and inequality, in order to promote inclusive and sustainable economic development.

APPENDICES:

Appendix A

Table A1. Summary of the balance of payments constrained growth model

Variable	Identify	Equation
X	Real exports from the South	$X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
M	Real imports	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$
P	Southern price level (denominated in Southern currency)	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$ et $X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
P^*	Northern price level (denominated in Northern currency)	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$ et $X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
E	Nominal exchange rate (units of Southern currency per unit of Northern currency)	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$ et $X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
Y	Real income of the South	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$
Z	Real income of the North	$X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
η	Price elasticity of exports	$X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
ψ	Price elasticity of imports	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$
ε	Income elasticity of exports	$X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
π	Income elasticity of consumer goods imports	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$
A et B	Are positive constants	$M = B \left(\frac{P^*E}{P} \right)^{\psi} Y^{\pi}$ et $X = A \left(\frac{P}{P^*E} \right)^{\eta} Z^{\varepsilon}$
y_{BP}	Growth rate under balance of payments constraint	$y_{BP} = \frac{\delta Z}{\pi}$
z	Northern growth rate	$y_{BP} = \frac{\delta Z}{\pi}$
T	Technological gap	$\frac{\delta}{\pi} = \alpha_1 \pm \alpha_2 \sigma_L \pm \alpha_3 T$
σ_L	Employee share	$\frac{\delta}{\pi} = \alpha_1 \pm \alpha_2 \sigma_L \pm \alpha_3 T$
α_1, α_2 , et α_3	Are positive constants	$\frac{\delta}{\pi} = \alpha_1 \pm \alpha_2 \sigma_L \pm \alpha_3 T$

Table A2. Correlation matrix

	LOG_ M	LOG_ _Y	LOG_ _E
LOG_ M	1.0000	- 0.056 2	0.399 8
LOG_ Y	- 0.0562	1.000 0	- 0.117 9
LOG_ E	0.3998	- 0.117 9	1.000 0

Appendix B

Table B1. Residual graphs

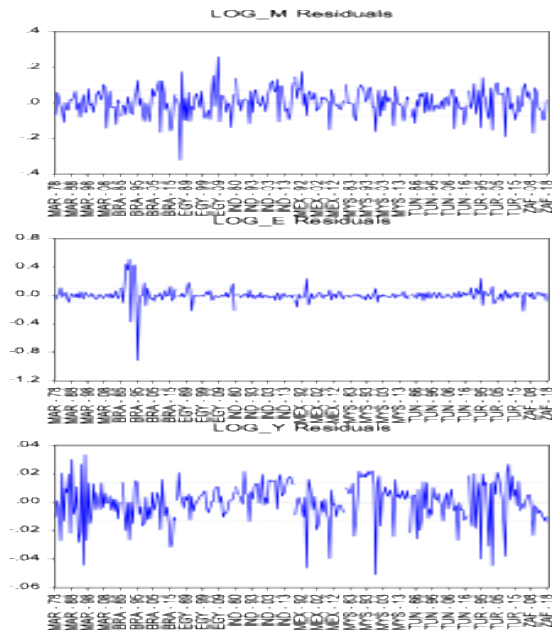
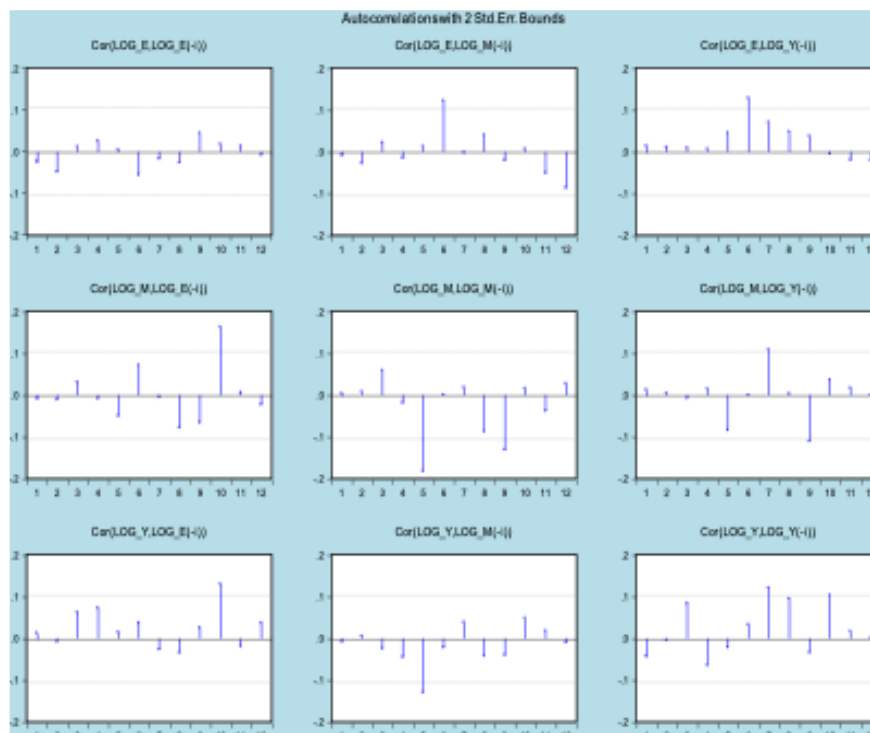


Table B2. Correlogram with respect to variables



Appendix C

Table C1. Correlogram of residuals

Sample: 1980 2018 IF COUNTRY<"ESP" AND COUNTRY<"PRT" Included observations: 301						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
-.	-.	1	-0.003	-0.003	0.0035	0.953
-.	-.	2	0.041	0.041	0.5286	0.768
-.*	-.*	3	0.077	0.077	2.3232	0.508
-.	-.	4	-0.012	-0.013	2.3652	0.669
* .	* .	5	-0.150	-0.158	9.3427	0.096
-.	-.	6	0.017	0.011	9.4358	0.151
-.	-.	7	0.017	0.035	9.5254	0.217
* .	-.	8	-0.072	-0.050	11.126	0.195
* .	* .	9	-0.128	-0.143	16.252	0.062
-.	-.	10	0.028	0.005	16.489	0.086
-.	-.	11	-0.037	-0.006	16.921	0.110
-.	-.	12	-0.003	0.022	16.923	0.152
-.*	-.	13	0.077	0.054	18.805	0.129
-.	-.	14	0.030	-0.005	19.091	0.162
-.	-.*	15	0.072	0.080	20.747	0.145
-.	-.	16	0.060	0.051	21.885	0.147
-.	-.	17	-0.002	-0.023	21.886	0.189
-.	-.	18	0.058	0.048	22.975	0.192
-.	-.	19	-0.061	-0.064	24.178	0.189
* .	* .	20	-0.089	-0.086	26.770	0.142

Table C2. Residual normality test

VEC ResidualNormality Tests Orthogonalization: Cholesky (Lutkepohl) NullHypothesis: residuals are multivariate normal Sample: 1980 2018 Included observations: 301				
Component	Skewness	Chi-sq	df	Prob.
1	-0.338990	5.764851	1	0.0163
2	-1.373329	94.61590	1	0.0000
3	-0.320337	5.147891	1	0.0233
Joint		105.5286	3	0.0000
Component	Kurtosis	Chi-sq	df	Prob.
1	4.279609	20.53572	1	0.0000
2	33.61312	11753.59	1	0.0000
3	4.008280	12.75022	1	0.0004
Joint		11786.87	3	0.0000
Component	Jarque-Bera	df	Prob.	
1	26.30057	2	0.0000	
2	11848.20	2	0.0000	
3	17.89811	2	0.0001	
Joint	11892.40	6	0.0000	

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