Kalecki versus Lewis on economic development:
Exploring supply constraints and demand-led dynamics

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This article revisits Michal Kalecki's 1953 lecture in Mexico to examine his original perspective on financing economic development through a demand-led model. Unlike Lewis's classical dual-sector approach, Kalecki highlights the central role of income distribution and the structural interplay between the primary and industrial departments. His framework integrates effective demand and the supply side restrictions, stressing how investment and income distribution jointly shape growth. Then, the primary sector constraints can endogenously limit growth by weakening the multiplier effect by increasing profit share. The analysis derives three key corollaries: the need for sufficient capacity in the primary sector, the strategic importance of capital goods production, and the crucial role of equitable income distribution in sustaining domestic demand.

Keywords: Kalecki, Lewis, Economic Development, Financing

INTRODUCTION

Michal Kalecki (1899–1970) stands as one of the most influential economists of the twentieth century, particularly due to his formulation of the principle of effective demand. His structural approach to economic dynamics—developed independently and prior to Keynes—constitutes a core component of his intellectual legacy (López and Assous, 2010). Nevertheless, many implications of his theory—particularly on economic development—remain underexplored, offering fertile ground for further research and debate.

In this context, Kalecki's first approach to developing economies was through his critique of Manoilesco (1931), where he refuted the idea that trade alone could drive development (McFarlane, 1996). He then deepened his analysis in a series of 1953 lectures at the *Centro de Estudios Monetarios Latinoamericanos* (CEMLA) in Mexico City, subsequently published in *El Trimestre Económico*.

The arguments presented in Kalecki (1954a) marked a turning point in understanding development challenges by highlighting the role of effective demand within the context of supply constraints. His ideas influenced macroeconomic policy in India, shaped early research in Brazil, and left a lasting impact on Latin American structuralism—particularly in the theory of structural inflation.

While Kalecki's model was highly influential, its limited formalization constrained its analytical depth and broader applicability. Nonetheless, this limitation spurred two productive research trajectories: (1) multisectoral extensions of the original framework, and (2) systematic efforts at formalization (discussed in Section 2).

The former has generated particularly noteworthy contributions. Saumya Chakrabarti's work, in particular, has been pivotal in positioning the public sector as a key driver of development (Chakrabarti 2003, 2011; Chakrabarti and Datta, 2019) and in analysing India's labour market through formal–informal sector dynamics (Chakrabarti 2013, 2014; Sadhu and Chakrabarti, 2021).[1] More recently, Aboobaker (2024) has furthered this research agenda by incorporating inter-class consumption differentials to explore structural transformation within a neo-Kaleckian framework.

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[1] On the other hand, the compilation by Chattopadhyay (2020) is significant for its application of the Kaleckian model to the study of "growth without employment."

In parallel, Brazilian scholars have further developed the model. Young and da Silveira (1988) proposed a departmental matrix including public, external, and capitalist sectors. Paiva et al. (2023) emphasized the role of the informal economy, while Araujo et al. (2024) extended Aboobaker's (2019) analysis of growth regimes. The model has also been applied beyond Brazil—for instance, Von Arnim and Rada (2011) examined its relevance to Egypt's energy sector.

Within this body of literature, the present study re-examines Kalecki's (1954a) canonical model of economic development, addressing two central questions: What does Kalecki's model reveal about the role of income distribution and the supply-side structural constraints in the dynamics of development? and how does this contrast with the classical dual-sector approach of Lewis?

Through a formal reconstruction of Kalecki (1954), we pursue three interrelated objectives: (1) to analyse the model's core logic regarding the tripartite interaction between demand expansion, productive capacity growth, and income distribution evolution in developing economies; (2) to demonstrate how Kalecki's demand-determined pricing sector and distribution-centred approach fundamentally challenge the labour reallocation and profit-led assumptions of traditional dual-sector models; and (3) to thereby establish both the theoretical originality and contemporary relevance of Kalecki's structuralist perspective vis-à-vis Lewis (1954) dual model paradigm.

The article is structured into four sections, in addition to this introduction. The first section compares the original works of Lewis and Kalecki, highlighting their divergent insights within the economic development literature. The second section formalizes Kalecki's original model using the three Department model. The third section examines how supply-constrained industries (Department III) play a central role in economic growth by generating inflationary pressures and endogenously limiting the aggregate demand effect of profit-led distributional shifts. It also analyses changes in the composition of employment resulting from the interaction between supply and demand in each department. The article concludes with Section Four.

THE DUAL INSIGHT OF ECONOMIC DEVELOPMENT

The study of economic development in the post-World War II era led to the emergence of various theoretical approaches, each shaped by the political context of its time. Structuralism stands out for its focus on how economic structures influence development and deepen the disparities between advanced and developing economies. Unlike neoclassical theory, which emphasizes individual optimization from a microeconomic perspective, structuralism presents a more comprehensive view that considers both internal transformations and a country's international integration (Dutt, 2019; Ranis, 2004).

Between 1940 and 1970, the prevailing view was that developing economies exhibited distinct structural characteristics that required specific theoretical approaches and policy interventions to foster growth. Early structuralists, particularly within the Anglo-Saxon tradition, emphasized the productive constraints that hindered growth in developing economies.

Their analysis questioned the efficiency of market price mechanisms and emphasized state intervention as a critical component of development. From this standpoint, raising productivity, modernizing agriculture, and fostering industrialization were viewed as essential prerequisites for economic growth and initial steps toward structural transformation (Storm, 2015).[2] As a result, structural barriers such as poverty traps, weak productive linkages, economic dualism, and external foreign exchange constraints were identified as major obstacles to development (Sanchez-Ancochea, 2007).

One of the most influential approaches within the analysis of supply-side constraints was Arthur Lewis's dual model. This model explains the transition from a traditional economy, based on subsistence labour, to an industrialized economy with wage employment. Its significance lies in providing a theoretical framework to understand how industrialization increases productivity and creates jobs—key elements for overcoming the structural limitations of developing economies (Dutt, 2019).

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[2] This optimism gradually faded, as pointed out by Hirschman (1968). Over time, it became clear that many of these countries were unable to sustain long-term growth. The persistent dependency, along with the accumulation of unsustainable foreign debt, ultimately led to widespread disillusionment with the industrialization process (Storm, 2015).

A second, distinct perspective emerged through the Latin American structuralist school, developed by the Economic Commission for Latin America and the Caribbean (ECLAC), under Raúl Prebisch's leadership. This approach introduced the center-periphery framework to analyse how historical patterns of primary commodity specialization perpetuated dependent integration into the global economy, systematically constraining industrial development (Bielschowsky, 1998). Later structuralist scholars, particularly Celso Furtado, expanded this paradigm by incorporating demand-side analysis. Their work demonstrated how income inequality - through its dampening effect on domestic consumption - created additional constraints on economic growth (Bielschowsky, 2006; Furtado, 1967).

From a complementary yet distinct perspective, Michal Kalecki analysed structural development barriers through a demand-centred lens while maintaining a dual-economy framework comparable to Lewis (1954). His analysis highlights the crucial role of savings and investment flows, arguing that the issue lies not in a lack of savings but in their unequal distribution and its implications for growth. This perspective creates significant theoretical convergence with Latin American structuralism, as both frameworks identify income inequality as a critical determinant of aggregate demand and, consequently, structural transformation capacity in developing economies (Toporowski, 2015).

In general terms, Kalecki and Lewis approach economic development through the concept of dualism, which is crucial for understanding less developed economies. This concept refers to the coexistence of heterogeneous economic sectors, characterized by different levels of technology, markets, and institutions. However, their applications differ substantially: Lewis focuses on labour market dualism between traditional subsistence and modern industrial sectors, while Kalecki emphasizes demand-side dualism. The latter manifests through distributional inequalities that constrain consumption patterns, limit investment flows, and ultimately inhibit the growth of productive sectors.

Lewis: Profit-driven industrialization

The structural duality of developing economies has fundamentally shaped development economics, particularly through the pioneering work of Lewis and Kalecki. Departing from abstract theorization, both scholars employed stylized empirical observations to construct frameworks that better explained developing economies' complexities—where

conventional growth models proved inadequate. Their approaches uniquely addressed the sectoral interdependencies realities that unisectoral models systematically overlooked.

While these contributions addressed key theoretical gaps, challenges related to their mathematical formalization remain. Within this context, Lewis's framework stands out as a influential solution: a profit-driven industrialization model in which the expansion of the modern sector gradually absorbs surplus labour from traditional subsistence activities.

Much of the development economics literature is widely viewed as an extended elaboration of the ideas introduced by Lewis (1954), who, drawing on a classical framework[3], centred his model on the notion of an unlimited supply of labour as the key distinction between developed and developing economies. To illustrate this, Lewis posits the existence of two sectors: a capitalist sector and a subsistence sector. In the latter, labour is abundant relative to available resources, resulting in extremely low—or even zero—marginal productivity, which manifests as "disguised unemployment" or underemployment. This surplus labour thus represents a potential reserve for the expansion of the capitalist sector.[4]

With an unlimited supply of agricultural labour, the capitalist sector can maintain constant wages at the subsistence level. The near-zero marginal productivity of labour in agriculture keeps wages stagnant, boosting profits in the capitalist sector. These profits attract rural workers to the urban sector, where wages are slightly higher.

In turn, capitalists hire labour until the marginal product equals the wage, preventing a reduction in surplus. Driven by profit motives, capitalists reinvest earnings to expand capital, leading to higher employment and further accumulation without increasing wages, thus fuelling profit-led industrialization.

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[3] According to Khan (2014), Lewis' model blends classical and neoclassical elements. It assumes a horizontal labour supply at a subsistence wage, while labour demand follows a neoclassical, downward-sloping curve reflecting diminishing marginal productivity.

[4] Lewis also identifies other factors contributing to the abundant labour supply, such as significant population growth due to low mortality and high birth rates, the release of daughters and wives from domestic work, workers from the informal sector, and unemployment generated by increased efficiency.

Kalecki: Wage-driven development

In his pioneering work, Kalecki (1954a) builds on the concerns of early development theorists, focusing on factors that impede capital accumulation in developing economies. He highlights investment as a key mechanism for stimulating effective demand (López and Assous, 2010).

His model distinguishes between two sectors—different from Lewis's framework—each with its own price-setting mechanisms: an agricultural sector limited by supply, with flexible prices, and a manufacturing sector driven by demand, characterized by imperfect competition and a profit share determined by the degree of monopoly (Ros, 2013). Additionally, he identifies three social classes—capitalists, workers, and small landowners—where only the capitalists engage in saving.

Like Lewis, Kalecki argues that capital scarcity is the primary obstacle preventing underdeveloped economies from fully absorbing their labour force. To address this, investment must be increased, but Kalecki identifies three constraints to financing: insufficient private investment, limited availability of capital goods, and the inability of the supply of basic goods to meet demand, which can lead to inflationary pressures.

While public investment or the import of capital goods can ease the capital shortage and supply constraints, Kalecki stresses that the main challenge in accelerating investment in less developed economies is inflation. These inflationary pressures have structural roots, particularly related to primary goods production and pricing mechanisms. For example, as employment in industrial sectors rises, demand for food increases. However, if agricultural supply is inflexible due to structural constraints, inflationary tensions emerge, as prices in the agricultural sector are more flexible.

In this regard, according to Toporowski (2015), Kalecki's structural perspective on economic development emphasizes the flow of savings and investment, viewing it not as a problem of savings constraint, but rather of income distribution. The impact of this process depends on who benefits from the price increase. If the gains favour agricultural producers rather than landowners or lenders, the rise in their incomes can stimulate the demand for consumer industrial goods. Moreover, in this model the rigidity in primary goods supply can lead to the productive capacity underutilization of the industrial Departments.

However, if workers with inelastic supply curves benefit from rising prices, their incomes increase, enabling higher spending on industrial goods (Kalecki, 1954a). While recognizing the unique challenges of developed and underdeveloped economies, Kalecki emphasizes a shared core principle: effective demand as the engine of growth. Thus, the key task for developing countries is to remove structural barriers that weaken the multiplier's demand-driven effects.

In underdeveloped economies, unemployment is rooted in structural issues—chronic capital shortages and supply bottlenecks—whereas in developed economies, it results primarily from insufficient effective demand typical of business cycle fluctuations (Ghosh, 2005).

For this reason, the author acknowledged that developing economies may also encounter demand-side limitations. Unlike perspectives that attribute underdevelopment solely to supply-side constraints, Kalecki consider that addressing supply-side constraints is crucial to restoring the centrality of effective demand, as capital scarcity remains the most significant challenge (Sawyer, 1985). In this context, development emerges from a demand-led process that stimulates both industrial and primary sectors, rather than reflecting a linear transition toward a one-sector economy.

Divergent paths from a dual perspective: Kalecki versus Lewis

Once the dual dynamics in both authors' approaches are understood, it becomes crucial to outline their key differences. While both models agree that a shortage of capital impedes the full absorption of labor in developing economies, they differ in their interpretation of this constraint and in the strategies, they propose to address it.

Broadly, Lewis emphasizes supply-side factors and the transition toward industrial modernization, ultimately envisioning a single-sector capitalist economy driven by profits. In contrast, Kalecki highlights structural constraints on aggregate demand and income distribution. Unlike Lewis, he underscores the agricultural sector's dual role in ensuring food supply and sustaining demand for industrial goods, pointing to a more balanced development path between sectors.

Kalecki identifies the lack of productive capacity as the main obstacle to development, leading to structural underemployment that goes beyond fluctuations in aggregate

demand or wage rigidity (Ros, 2013). His solution lies in increasing investment to expand productive capacity and ease structural supply-side constraints.

In contrast, Lewis views the surplus of labour as the defining feature of underdeveloped economies, where the excess workforce is not absorbed by the modern sectors. For him, development depends on transferring this surplus labor to more productive capitalist sectors. Thus, while Kalecki emphasizes boosting productive capacity, Lewis focuses on labor reallocation as the key to reducing underemployment.

Another key distinction lies in how each author understands the relationship between profits and capital accumulation. Lewis assumes that profits are automatically reinvested, leading to an immediate expansion of productive capacity, greater surplus generation, and, ultimately, the absorption of surplus labor into the capitalist sector. This direct reinvestment ensures a self-sustaining process of growth and capital accumulation.

Kalecki, by contrast, challenges this assumption. He argues that an increase in the profit share—whether achieved through wage suppression or a higher degree of monopoly—does not automatically translate into higher absolute profits. For profits to rise, there must also be an increase in capitalist consumption or investment. Otherwise, lower wages alone may reduce overall demand, undermining profitability. This critique reflects Kalecki's broader concern with the role of effective demand in shaping economic outcomes.

Moreover, while Lewis largely sets aside issues of demand, Kalecki places effective demand at the center of his analysis. He argues that supply-side constraints—such as limited productive capacity or bottlenecks in essential goods—impair the operation of the demand-driven multiplier mechanism. This emphasis led Kalecki to formulate a distinct framework that would significantly shape later development theory (López and Assous, 2010; Ros, 2013; Ranis, 2004; Toporowski, 2015).

In summary, as shown in Table 1, an important distinction is that Kalecki does not incorporate the concept of a subsistence wage in the same manner as Lewis. For Kalecki, the central concern is maintaining an adequate level of overall consumption, which entails ensuring sufficient agricultural output to support both industrial consumption and food consumption. In contrast, Lewis introduces the notion of a subsistence wage as a benchmark that, being lower than the wage offered in the capitalist sector, generates a wage differential that incentivizes labour migration from agriculture to industry.

Table 1

In this context, the role of the agricultural sector stands out. For Kalecki, this sector is crucial for economic development, as its productive conditions are essential for sustaining the consumption of industrial workers without generating inflationary pressures. In contrast, Lewis emphasizes industry as the main engine of economic growth, relegating the importance of the subsistence agricultural sector. He contends that food shortages can be resolved through imports in an open economy, without considering the potential inflationary effects.

The distinction primarily lies in the pricing mechanisms between the two sectors, as outlined by Kalecki. He argues that the capitalist economy operates under conditions of monopoly, which is reflected in a price-setting mechanism driven by demand in the industrial sector, coupled with the underutilization of productive capacity. In contrast, Lewis views competition as the driver of economic progress, focusing on the transition to a fully industrialized economy, where growth is propelled by the capitalist sector.

For this reason, in terms of intersectoral constraints, Kalecki emphasizes that industrial expansion is limited by the availability of primary goods, necessitating an analysis of the terms of trade between sectors. Lewis, on the other hand, focuses on the reallocation of labour to the industrial sector until the tipping point is reached, marking the end of economic dualism.

Building on this, the next section revisits Kalecki's original dual perspective to explore the scope of his reasoning, with the goal of reconsidering the implications of income distribution for development—an element absents in Lewis's classical perspective.

A KALECKIAN MULTISECTORAL MODEL PROPOSAL

Attempts to formalize the seminal model of Kalecki (1954) have led to various adaptations. In this context, one key reference is Fitzgerald (1988, 1990), whose work aims to 'systematize the large number of analytical ideas contained in a few pages … in order to extend its logic into a formal algebraic construction' (Fitzgerald, 1990, p. 196).[5]

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[5] A relevant critique is presented by Wuyts (1988).

His analysis delves into the macroeconomic implications of the model without resorting to the usual simplifications.

In a complementary line of thought, Ghosh (1983) expands the framework by incorporating unemployment and capital accumulation as structural issues linked to food supply conditions. This perspective connects macroeconomic dynamics with sectoral constraints, providing a more comprehensive view of development. While previous studies have served their purpose, this research aims to formalize the analysis of intersectoral dynamics and, specifically, clarify the factors that position Department III, or the "primary sector," as equally significant as the industrial sectors (Departments I and II) within the model.[6]

The model presented in this section highlights two central ideas. First, supply-constrained sectors (Department III) play a central role in economic growth by generating inflationary pressures and limiting the effect of aggregate demand by endogenously generating distributional shifts in favour of profits. This complements the neo-Kaleckian theory, which posits that an increase in the profit share negatively affects output and employment (wage-led demand regime).

Second, we argue that faster productivity growth in industrial sectors alone is insufficient to address underemployment. Demand-side effects and structural heterogeneity, resulting from varying productivity and aggregate demand across sectors, shape income distribution and long-term growth prospects.

Three-Department economy structure

First, based on the identity of aggregate demand for an open economy 3.1, a reformulation is made considering three sectors, as shown in Table 2.

$$Y = C_P + A + I_P + G + X - IM \tag{3.1}$$

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[6] Ghosh's (2002) analysis, which explores the role of the agricultural sector and its relation to savings propensities, also firmly follows Kalecki's dual model. Other important extensions include studies by Ryoo and Skott (2008), Beqiraj (2019), Fujita (2019), Nishi (2020), and Fanti and Zamparelli (2021).

In equilibrium, income (Y) equals aggregate demand (Y^D), defined as the sum of industrial consumption (C_P), consumption of primary goods (A), private investment (I_P), public expenditure (G) - the sum of public industrial consumption (C_G) and public investment (I_G) - together with aggregate exports (X) of industrial (X_3), primary (X_2) and investment (X_1) goods and services minus aggregate imports (M) of industrial (M_2), primary (M_3), and investment (M_1) goods and services.

This economic structure, organized into three sectors, is founded on two main criteria. The first differentiates production based on its intended use, categorizing it into consumer goods and investment goods. The second criterion focuses on the price formation mechanism within each sector, assuming vertical integration. This means that each sector internally incorporates all the required inputs for its production.

This classification offers a fundamental advantage: it allows the integration of structural elements of both demand and supply within a simplified analytical framework, thereby facilitating the study of interactions between these two components. However, its main limitation lies in its failure to account for transmission processes along the global value chain, from production to final sale. As a result, it does not fully capture phenomena such as the propagation of inflation through the various stages of production.

In this framework, all sectors play a crucial role in articulating the relationships between the others. Each sector generates income, which, in turn, increases the demand for the other sectors. Therefore, a decline in production within one sector will transmit as a reduction in demand across the other sectors.

Departments I and II share a price formation mechanism based on costs, while Departments II and III have a common orientation toward the demand for consumer goods. This configuration not only highlights the structural interdependence between the various sectors but also enables an economic analysis from a dual perspective. Depending on the segmentation criterion—whether based on the destination of production or the price formation mechanism—distinct analytical approaches emerge, contributing to a more comprehensive understanding of the productive structure.

It is important to note that Department III, in addition to including primary goods, can be seen as a broader category encompassing sectors with inelastic supply, such as natural resources, energy, and real estate. These sectors share a structure defined by supply

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constraints and heavy reliance on external factors, which significantly impact their economic dynamics.

Analyzing these sectors is essential not only for identifying the structural limitations they face but also for recognizing potential opportunities in the current context. Understanding their interaction with the industrial sector enables a more accurate assessment of transmission mechanisms between departments, which is crucial for studying the productive structure and its effects on economic development.

Table 2

Disaggregating Table 2, we observe that it integrates the following characteristics:

1. The value of production, expressed as the output (Y_i) in real terms, is equal to the total real demand for each component (C, I, A) where $i = \{1, 2, 3\}$.

$$Y_1 + Y_2 + Y_3 = Y = I + C + A \tag{3.2}$$

2. Department I produces investment goods (I), also referred to as capital or equipment goods, Department II produces industrial consumer goods (C), and Department III produces primary consumer goods (A).

3. The distribution of the generated value is divided between labour income (W_i) and property income (R_i), whether from industrial sectors (R_1 and R_2) or sectors with inelastic supply (R_3).

4. The industrial sectors employ a variable amount of labour (L_1 and L_2), adjusting their supply through variations in the degree of utilization of installed capacity. In contrast, Department III utilizes its entire production capacity (K_3), meaning the amount of labour it employs is fixed.

The assumptions underpinning the three-department model require a more in-depth analysis. First, it is crucial to consider the implications and significance of incorporating the primary consumption sector into the model's structure. Second, it is important to differentiate between the various types of industrial sectors, taking into account their specific roles and characteristics within the proposed framework.

As a starting point, Kalecki (1954a) argues that any increase in investment must be accompanied by an adequate supply of primary consumer goods, which not only sustains employment growth but also prevents an inflationary spiral that erodes real wages. Within this framework, Department III not only ensures the supply of primary consumer goods but, by generating direct demand for industrial goods, significantly contributes to economic dynamism.

In this context, primary sectors exhibit inelastic supply, meaning that the prices of these goods are primarily determined by demand and influenced by structural constraints inherent in the production process, such as the availability of natural resources, investment, and technology. This characteristic distinguishes them from traditional monopolistic competition markets.

On the other hand, the installed capacity in industry is closely tied to capital accumulation and the availability of labour. Industrial sectors often operate with underutilized capacity, providing flexibility to respond to increases in aggregate demand. This adjustment toward greater utilization rate is reflected in both increased output and employment, which in turn explains the pricing mechanism in the industrial sector, where prices are determined by supply.

The industrial sector's capacity for adjustment enables the multiplier effect both in the short and long term, contributing to phenomena like the savings and the cost paradoxes. This is because, in the medium and long term, industrial capacity can be expanded through investment decisions in machinery and technology.

In contrast, Department III has a more rigid structure due to its reliance on natural factors. Unlike the industrial sector, its supply cannot adjust as quickly, as it cannot easily increase its utilization rate or installed capacity. As a result, an increase in demand leads to more significant price increases.

This analysis focuses on a distributive perspective, as structural differences between sectors directly affect ability of economic agents to demand goods and services. Price increases in Department III[7] primarily benefit owners, as labour is fixed and wages are

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[7] It is important to consider that the transmission effect occurs along the value chain, as it is assumed that the sectors are vertically integrated. Thus, an increase in sectoral inputs (e.g., energy) would impact all three Departments, albeit with different intensities.

set exogenously. As a result, the price rise shifts the distribution in favour of profits, which have a lower marginal propensity to consume, thereby reducing demand for industrial goods. This mechanism fosters structural inequalities and limits overall aggregate demand growth.

Therefore, the issue lies in the fact that the price increase in Department III, due to restricted supply, generates a distributive shift that favours profits. This, in turn, reduces consumption and investment across the entire economy. This phenomenon produces the same effect as an increase in profit margins in Departments I and II. Thus, the original concept can be expanded as follows: *The main problem of financing development is ultimately distributive and arises as a consequence of the economic structure through two channels. In Department I and II, related to industrial goods, it is due to the effect of exogenously set profit margins. In Department III, related to primary consumer goods, it is due to insufficient productive capacity to meet increased demand, which raises the share of profits endogenously.*

Once the implications of integrating the inelastic supply sector have been analysed, the next step is to distinguish between the two types of industrial sectors. This differentiation provides relevant nuances due to the differences in the destination of their production, whether oriented toward consumption or investment.

On one hand, Department I is responsible for producing investment goods that increase both tangible and intangible productive capacity. In this context, in modern economies where services play a significant role, it is appropriate to include professional services to businesses, as they contribute the knowledge and intangible resources necessary for the production process. Thus, the manufacturing of tangible investment goods also generates demand for specialized services throughout its value chain.

On the other hand, Department II produces consumption goods and services for households, primarily including consumer goods manufacturing and personal services.

In dual models determined by supply, such as the Feldman-Mahalanobis model[8], the allocation of productive resources presents a dilemma. Allocating more resources to the investment goods sector increased productive capacity, which in turn generated more

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[8] For a more detailed review, see (Basu and Miroshnik, 2020)

resources for the subsequent period. The recommendation in this context was to prioritize the development of the industrial sector of capital goods as an essential condition for economic growth.

The only challenge to adapt these ideas to our model lies in the interpretation of the capital stock, which must also include the intangibles associated with it. Thus, the fundamental distinction between industries with prices determined by costs lies in the destination of their production.

On the other hand, in models based on the principle of effective demand, as addressed in this analysis, causality is reversed. The production of capital goods depends on prior investment demand, which in turn requires an initial demand for consumption goods. This interdependence introduces greater complexity into the economic dynamic, as the growth of each sector is conditioned by the other's ability to absorb demand.

Behavioural equations

Once the general structure of the model is established and the assumptions are defined, this section presents the behavioural equations governing the interaction between its variables. These equations are organized into three fundamental blocks for the comprehensive solution of the model: aggregate demand (production), prices, and employment.

First, aggregate demand is determined by investment and consumption decisions. Within this framework, the production of Department I, which includes the capital goods produced domestically, depends on four factors: private investment decisions (I), public sector investment decisions (I_G), exports of investment goods (X_1), and imports of investment goods (M_1).

In this case, the simplest representation of the investment function is adopted, where private investment decisions depend exclusively on the level of production in each sector. These decisions are determined by the marginal propensity to invest (γ_i) for each department and by an autonomous component (I_0), which encompasses other factors not directly linked to income. This latter component includes public investment (I_G), exports of investment goods (X_1), and imports of these goods (M_1). We assume that imports are in proportion to exports of each Department, since imports require international

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currencies and both must balance in the long run ($XN_1 = X_1 - M_1 = X_1 - m_1 X_1 = (1 - m_1)X_1$). According to Thirlwall's law, the proportion of imports on exports is restricted ($m_1 \leq 1$). Otherwise, it would imply that the departments would always have a debtor national or international position and a constant expansion of their national or external debt. The same restriction applies on Department II and III.

$$Y_1 = I_P + I_G + X_1 - M_1 = I_1 + I_2 + I_3 + I_G + X_1 - M_1$$
$$= I_G + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 Y_3$$

$$(3.3)$$

Secondly, the consumption decisions for industrial goods produced by Department II are determined by the incomes of various economic agents, specifically workers and capitalists[9].

$$Y_2 = C_P + C_G + X_2 - M_2 = (C_1 + C_2 + C_3) + C_G + X_2 - M_2$$
$$= C_0 + c_w(W_1 + W_2 + W_3)\theta_w + c_R(R_1 + R_2$$
$$+ R_3)\theta_R$$

$$(3.4)$$

Additionally, by including non-industrial goods (or goods with a rigid supply) in Department III, the effect of Engel's Law is incorporated. This is captured by the parameter θ, which represents the proportion of income allocated to the consumption of industrial goods, while $(1 - \theta)$ denotes the fraction of income spent on primary goods.

According to this law, in the long run, the consumption of industrial goods tends to rise as income increases. Consequently, since capitalists have higher individual incomes, they allocate a larger portion of their profits to industrial goods consumption compared to workers ($\theta_R > \theta_w$). Thus A_1, A_2 and A_3 are the demand for Department III goods coming from each Department respectively.

$$Y_3 = A_1 + A_2 + A_3 + X_3 - M_3 =$$
$$= A_0 + c_w[W_1 + W_2 + W_3](1 - \theta_w) + c_R[R_1 + R_2$$
$$+ R_3](1 - \theta_R)$$

$$(3.5)$$

In summary, the fundamental characteristics of the model from the demand side, organized around three departments, are as follows:

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[9] To simplify the notation, the marginal propensities to consume are expressed in lowercase, where c_w indicates income from wages, and c_R refers to income derived from profits.

1. Private investment decisions: follow the basic accelerator rule, i.e., they depend on the production level of each sector.

2. Consumption decisions for industrial goods: depend on the distribution of income between workers and capitalists.

3. The distribution of consumption expenditure: between industrial and primary goods depends on Engel's Law.

Consequently, this model is framed within a demand regime driven by wages (wage-led)[10]. In this regime, an increase in profit margins tends to lead to a contraction in economic activity and employment. To analyse this effect, it would be necessary to incorporate the price determination process in goods and services markets. However, since our focus is on the change in the composition of employment, we simplify the issue of relative prices by considering all variables in real terms.

Incorporating the usual definitions of Kaleckian models, in the industrial sectors (Departments I and II), the share of profits in value added ($\pi = R/Y$) is determined by the profit margins established in each sector, unit labour costs, and intermediate input costs (Kalecki, 1954b). In contrast, in Department III, the share of profits is endogenous: an increase in the demand for goods produced by this sector leads to a rise in the proportion of profits relative to the value added generated. Since the share of total profits in aggregate income corresponds to the weighted sum of each sector:

$$\pi = \pi_1 Y_1/Y + \pi_2 Y_2/Y + \pi_3 Y_3/Y \qquad (3.6)$$

Ceteris paribus, any increase in profit margins in Departments I or II (where prices are set based on costs), or a rise in demand for goods from Department III (where prices are determined by demand), generates the same effect through price increases: a redistribution of income in favor of profits. Consequently, it is crucial for the production of Department III to grow at an appropriate rate to meet demand, thus avoiding inflationary pressures that could lead to a redistributive shift toward profits.

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[10] It is important to note that, while there are also regimes driven by profits, these align with the post-Kaleckian tradition, particularly with modifications to the investment function proposed by Bhaduri and Marglin (1990), Blecker (1989), and Kurz (1991).

On the supply side, the Leontief production functions are defined for each department (3.7).

$$Y_1 = [q_1 L_1; u_1 \sigma_1 K_1] \tag{3.7}$$
$$Y_2 = [q_2 L_2; u_2 \sigma_2 K_2] \tag{3.8}$$
$$\bar{Y}_3 = [q_3 L_3; \sigma_3 K_3] \tag{3.9}$$

The output is the result of the quantity of labour employed (L_i) weighted by labour productivity (q_i) and simultaneously by the installed capital stock (K_i) and capital efficiency (σ_i). The first two departments operate with underutilized installed productive capacity (u_i), which implies the existence of elastic supply. In contrast, Department III, dedicated to primary products, operates at full capacity, establishing a maximum limit to the employment level in this sector.

$$u_1 = Y_1/\sigma_1 K_1; \quad u_2 = Y_2/\sigma_2 K_2; \quad u_3 = 1 \tag{3.10}$$

It is important to note that, in the industrial sectors (Departments I and II), economic adjustment occurs through variations in the degree of utilization of the installed productive capacity, which allows for an increase in the employment level in response to demand. In contrast, in the primary sector (Department III), the amount of labour employed remains fixed due to the structural constraints inherent in its productive capacity, meaning that income in this sector does not depend on the level of employment.

$$L_3 = (\sigma_3/q_3)K_3 \tag{3.11}$$

This phenomenon explains the generation of rents in Department III, arising from the sale of goods with limited supply. Unlike the industrial sectors, the adjustment in the primary sector in response to excess demand does not occur through employment but rather through price increases, allowing producers to generate higher income. Profits in this sector grow because the increased demand cannot be met with higher production, leading to relative scarcity and inflationary pressures. Thus, in Department III, the increase in prices and rents depends on both excess demand and supply insufficiency, highlighting the key difference in the adjustment mechanisms between industrial and primary sectors.

In this way, the total labour in the economy ($L = L_1 + L_2 + L_3$) is determined by the demand for industrial goods and the conditions of productive capacity, with the labour structure resulting from the following equations.

Short-run solutions

In the short run, starting with Department I (3.3), where, by definition, excluding the capital stock in 3.7), employment depends on the following factors:

$$q_1 L_1 = Y_1 = I_0 + \gamma_1 Y_1 + \gamma_2 Y_2 + \gamma_3 \bar{Y}_3$$

Thus, the level of employment in Department I is determined as a function of autonomous investment decisions (I_0), investment induced by firms in Department II ($\gamma_2 Y_2$), and investment induced by Department III ($\gamma_3 Y_3$), all of which are weighted by the multiplier effect of the investment itself, $[q_1(1 - \gamma_1)]^{-1}$, since the production of capital goods also requires the utilization of capital goods.[11]

$$Y_1 = \left[\frac{I_0 + \gamma_2 Y_2 + \gamma_3 \bar{Y}_3}{(1 - \gamma_1)}\right] \tag{3.12}$$

Applying the same reasoning to Department II (3.4), the production of consumer goods can be expressed as follows:

$$\begin{aligned} Y_2 = C_0 + I_0[(1 - \pi_1)Y_1 + (1 - \pi_2)Y_2 + (1 - \pi_3)\bar{Y}_3]\theta_w \\ + c_R[\pi_1 Y_1 + \pi_2 Y_2 + \pi_3 \bar{Y}_3]\theta_R \end{aligned} \tag{3.13}$$

By substituting and performing the corresponding algebraic operations, the equilibrium level of production and employment in Department II is obtained. This level is expressed as a function of three exogenous variables: autonomous consumption, autonomous investment, and the demand from Department III.

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[11] This equation can be expressed in terms of employment by substituting into the production function, respectively:

$$L_1 = \left[\frac{I_0 + \gamma_2 q_2 L_2 + \gamma_3 \bar{Y}_3}{q_1(1 - \gamma_1)}\right]$$

$$Y_1 = \left[\frac{\alpha_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] I_0 + \left[\frac{(1-\gamma_1)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] C_0$$
$$+ \left[\frac{(\gamma_3\alpha_1 + (1-\gamma_1)\alpha_3)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] \bar{Y}_3$$

(3.14)

where

- $\alpha_1 = [c_w\theta_w + (c_R\theta_R - c_w\theta_w)\pi_1]$;
- $\alpha_2 = [1 - c_w\theta_w + (c_w\theta_w - c_R\theta_R)\pi_2]$;
- $\alpha_3 = [c_w\theta_w + (c_R\theta_R - c_w\theta_w)\pi_3]$.

Substituting the solution for Department II 3.14 into 3.12 yields the solution for Department I:

$$Y_2 = \left[\frac{\alpha_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] I_0 + \left[\frac{\gamma_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] C_0$$
$$+ \left[\frac{(\gamma_3\alpha_2 + \gamma_2\alpha_3)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] \bar{Y}_3$$

(3.15)

Considering that total production is the sum of the three departments (3.2), the equilibrium solution can be expressed for the entire economy as follows:

$$Y = \left[\frac{\alpha_1 + \alpha_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] I_0 + \left[\frac{(1-\gamma_1 + \gamma_2)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] C_0$$
$$+ \left[\frac{\gamma_3(\alpha_1 + \alpha_2) + (1-\gamma_1 + \gamma_2)\alpha_3}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] \bar{Y}_3$$

(3.16)

From the results obtained, several key conclusions can be highlighted. First, the dynamics of income distribution condition the conversion of autonomous expenditures into production and employment levels. Given the complexity of the underlying interactions, it is useful to analyze this phenomenon in detail through three parameters (α_i), which capture the effect of an increase in the share of profits in each sector.

The second key point refers to the differentiated effects of the different types of demanded goods. In this regard, each term reflects the multiplier effect exerted by exogenous variables—autonomous investment, autonomous consumption, and the income generated by Department III—on the production of Departments I and II, as well as on total production. Consequently, a key feature of the model is that expenditures on investment,

industrial consumption, or primary consumption generate different multipliers on production and employment.

The third point highlights that, although production and employment in Department III do not depend on the mechanisms in Departments I and II, they do impact the latter through two channels. First, Department III serves as a source of demand for the industrial departments through the income generated in this sector (Y_3).

Second, inflation derived from the inelastic supply in Department III leads to a distributional shift that favors profits (π_3). This effect is reflected in the industrial departments through the marginal impact of the increase in the profit share in Department III (α_3). Consequently, the rise in prices in Department III reduces the available income for consumption in the industrial departments, thus affecting both production and employment in these sectors.

A first corollary of the above is that it is necessary to maintain an adequate volume of installed capacity in Department III to meet demand. If this is not the case, economic expansion in Departments I and II could result in an increase in the share of profits (through the aforementioned mechanisms), which, in turn, would negatively impact aggregate demand and reduce the level of employment across all sectors.

The second corollary highlights that the productive capacity of Department I is key to economic development, as it must supply capital goods to the other sectors. If domestic production of these goods is insufficient and imports cannot be increased, a bottleneck would arise due to the scarcity of both production and primary goods. Therefore, investment, driven by production in Department I, plays a crucial role in accelerating economic development.

Finally, the third corollary emphasizes that the factors mentioned above are primarily related to income distribution. Therefore, a third condition arises: it is essential to have an income distribution that appropriately favors workers, as this would allow for the development of domestic demand.

THE RELEVANCE OF DEMAND-DETERMINED PRICING SECTOR

A key feature of the model is the distinction between sectors where prices are determined by costs (Departments I and II) and a sector where prices are shaped by supply and

demand dynamics (Department III). This distinction highlights a fundamental characteristic: in Departments I and II, the profit share is exogenously set through markups, whereas in Department III, it emerges as an endogenous variable.

Specifically, the mechanism that ensures supply meets demand is the adjustment of the profit share in Department III (π_3).[12]

From the equation that determines demand (3.5) and the supply equation (3.7), the following equilibrium solution for Department III is obtained.

$$\bar{Y}_3 = \sigma_3 K_3 = c_w[(1-\pi_1)Y_1 + (1-\pi_2)Y_2 + (1-\pi_3)\bar{Y}_3](1-\theta_w)$$
$$+ c_R[\pi_1 Y_1 + \pi_2 Y_2 + \pi_3 \bar{Y}_3](1-\theta_R) \tag{4.1}$$

By operating and substituting into the solutions for Department I (3.15) and Department II (3.14), the equation that endogenously determines the profit share is obtained:

$$\pi_3 = \psi_0 + \psi_1 \frac{I_0}{\sigma_3 K_3} + \psi_2 \frac{C_0}{\sigma_3 K_3} + \psi_3 \frac{A_0}{\sigma_3 K_3} \tag{4.2}$$

Analyzing equation 4.2[13] from a dynamic perspective[14]. The condition for the income distribution to remain constant ($\dot{\pi}_3 = 0$) is obtained as: *the growth rate of output in*

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[12] Defining the profit share as $\pi_3 = \overline{p_3 Y_3 - \bar{W}_3}/p_3 Y_3$, and assuming that prices in Department III are determined by supply and demand as $p_3 = A/Y_3$, we obtain: $\pi_3 = \frac{A/Y_3 - W_3}{A/Y_3} = 1 - \bar{W}_3 \frac{Y_3}{A}$; Under the assumption that the total wage bill remains constant, the growth rate of the profit share is equal to the difference between the growth rates of production and demand in Department III.

[13] With the following parameter definitions:

$$\alpha_4 = (1 - c_w(1-\theta_w)) + [c_w(1-\theta_w) - c_R(1-\theta_R)]$$

$$\psi_0 = \frac{\gamma_3 \alpha_1 \alpha_2 + \gamma_3 \alpha_1 (1-\alpha_2) + [\gamma_2 \alpha_1 + (1-\gamma_1)(1-\alpha_2)]c_w \theta_w}{\alpha_4[(1-\gamma_1)\alpha_2 - \gamma_2 \alpha_1] - [\gamma_2 \alpha_1 + (1-\gamma_1)(1-\alpha_2)](c_R \theta_R - c_w \theta_w)}$$

$$\psi_1 = \frac{\alpha_1 \alpha_2 + (1-\alpha_2)\alpha_1}{\alpha_4[(1-\gamma_1)\alpha_2 - \gamma_2 \alpha_1] - [\gamma_2 \alpha_1 + (1-\gamma_1)(1-\alpha_2)](c_R \theta_R - c_w \theta_w)}$$

$$\psi_2 = \frac{(1-\gamma_1)(1-\alpha_2) + \gamma_2 \alpha_1}{\alpha_4[(1-\gamma_1)\alpha_2 - \gamma_2 \alpha_1] - [\gamma_2 \alpha_1 + (1-\gamma_1)(1-\alpha_2)](c_R \theta_R - c_w \theta_w)}$$

$$\psi_3 = \frac{[(1-\gamma_1)\alpha_2 - \gamma_2 \alpha_1]}{\alpha_4[(1-\gamma_1)\alpha_2 - \gamma_2 \alpha_1] - [\gamma_2 \alpha_1 + (1-\gamma_1)(1-\alpha_2)](c_R \theta_R - c_w \theta_w)}$$

[14] The notation used includes the instantaneous variation $\dot{x}$ and the growth rate $\hat{x} = \frac{\dot{x}}{x}$

Department III ($\hat{Y}_3$) must be equal to the growth rate of its demand ($\hat{A}$), which is determined by the sum of the contributions from the autonomous components, defined as a weighted average of the growth rates of each department ($\hat{I}_0$, $\hat{C}_0$, $\hat{A}_0$), weighted by their respective shares.

$$\hat{Y}_3 = \frac{\psi_1 I_0}{\psi_1 I_0 + \psi_2 C_0 + \psi_3 A_0} \hat{I}_0 + \frac{\psi_2 C_0}{\psi_1 I_0 + \psi_2 C_0 + \psi_3 A_0} \hat{C}_0$$
$$+ \frac{\psi_3 A_0}{\psi_1 I_0 + \psi_2 C_0 + \psi_3 A_0} \hat{A}_0 \qquad (4.3)$$

Consequently, the growth of its productive capacity (Y_3) in proportion to the increase in demand (A) is essential to mitigate the inflationary pressures that generate a distributive shift in favor of profits. In this way, the interaction between supply and demand in Department III plays a crucial role by influencing the other departments through the multiplier effect and the dynamics of income distribution.

Specifically, a redistribution from wages to profits of agricultural owners ($\dot{\pi}_3 > 0$) will occur, provided that demand increases more than supply ($\hat{A} > \hat{Y}_3$), either due to a faster increase in its autonomous consumption ($\hat{A}_0$) or by other factors ($\hat{I}_0$, $\hat{C}_0$). This increase in the profit share would lead to a reduction in the demand for industrial goods consumption and investment. On the other hand, a larger increase in productive capacity relative to demand would result in a reduction in the profit share, which would raise demand and production in the industrial departments, I and II.

At the same time, the growth rate of output depends on the growth of the capital stock in Department III, which, in turn, is determined by the net investment decisions of the capitalists in that sector ($\gamma_3 Y_3$). Assuming constant technology, the growth rate of production in the sector will increase at a constant rate ($\sigma_3 \gamma_3$).

$$\dot{Y}_3 = \sigma_3 \dot{K}_3 = \sigma_3 \gamma_3 Y_3; \; \hat{Y}_3 = \sigma_3 \gamma_3 \qquad (4.4)$$

Ultimately, the slow growth in the primary sector arises as a consequence of low initial production levels, low efficiency in capital utilization, or, more crucially, a reduced marginal propensity to invest by the capitalists in Department III.

Consequently, without improvements in capital utilization or higher investment propensities, Department III represents a limit to economic growth on the demand side, endogenously reducing the multiplier effect of the industrial departments. In the end, we arrive at the same conclusion as (Kalecki, 1954a, p. 387): *"It is therefore clear that the expansion of food production, simultaneously with industrial development, is of utmost importance to avoid inflationary pressures"*[15]

Corollary: Productivity growth and labour structural change

Thus far, the analysis has focused on the behavior of aggregate demand (production) and income distribution (prices). In the following section, the analysis shifts to employment. In this regard, productivity growth serves as a key variable for understanding the dynamics of structural change in employment. Consequently, the equilibrium solutions for production are presented in terms of labour. This is achieved by applying the identity $Y = qL$ to the equations that represent the equilibrium level of production. Building on this treatment of employment, the model explores how changes in productivity across sectors condition the capacity of the economy to absorb labour, shedding light on the limits of structural transformation in developing economies.

The employment in Department I is determined by the following expression:

$$L_1 = \left[\frac{\alpha_2/q_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]I_0 + \left[\frac{\gamma_2/q_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]C_0$$
$$+ \left[\frac{(\gamma_3\alpha_2 + \gamma_2\alpha_3)/q_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]\bar{Y}_3$$

(5.1)

The employment in Department II is determined by the following expression:

$$L_2 = \left[\frac{\alpha_1/q_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]I_0 + \left[\frac{(1-\gamma_1)/q_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]C_0$$
$$+ \left[\frac{(\gamma_3\alpha_1 + (1-\gamma_1)\alpha_3)/q_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right]\bar{Y}_3$$

(5.2)

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[15] Originally in Spanish: *"Queda, por tanto, aclarado que la expansión de la producción de alimentos, simultáneamente con el desarrollo industrial, es de suma importancia para evitar presiones inflacionarias"*

Finally, the total employment across the three departments can be expressed based on the previous equations as follows:

$$L = \left[\frac{\alpha_1/q_2 + \alpha_2/q_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] I_0 + \left[\frac{(1-\gamma_1)/q_2 + \gamma_2/q_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}\right] C_0$$
$$+ \left[\frac{1}{q_3} + \frac{\gamma_3(\alpha_1/q_2 + \alpha_2/q_1) + [(1-\gamma_1)/q_1 + \gamma_2/q_2]\alpha_3}{[(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1]}\right] \bar{Y}_3$$

These equations reveal that the structure of employment depends on the relative levels of demand and productivity across departments. Consequently, shifts in employment patterns result from the combined dynamics of aggregate demand and sectoral productivity, with the potential to drive structural change[16]. For balanced growth to occur, however, it is essential that all components grow at a rate consistent with labour productivity in the industrial departments and with the growth of the capital stock in Department III ($\hat{\sigma}_3 = 0$[17]).

$$\hat{L}_1 = \frac{\lambda_1^1 I_0}{\lambda_1^1 I_0 + \lambda_2^1 C_0 + \lambda_3^1 Y_3} \hat{I}_0 + \frac{\lambda_2^1 C_0}{\lambda_1^1 I_0 + \lambda_2^1 C_0 + \lambda_3^1 Y_3} \hat{C}_0$$
$$+ \frac{\lambda_3^1 A_0}{\lambda_1^1 I_0 + \lambda_2^1 C_0 + \lambda_3^1 Y_3} \hat{Y}_3 - \hat{q}_1$$

(5.3)

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[16] With the following parameter definitions:
$$\lambda_1^1 = \frac{\alpha_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}; \ \lambda_2^1 = \frac{\gamma_2}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}; \ \lambda_3^1 = \frac{(\gamma_3\alpha_2 + \gamma_2\alpha_3)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}$$

$$\lambda_1^2 = \frac{\alpha_1}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}; \ \lambda_2^2 = \frac{(1-\gamma_1)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}; \ \lambda_3^2 = \frac{(\gamma_3\alpha_1 + (1-\gamma_1)\alpha_3)}{(1-\gamma_1)\alpha_2 - \gamma_2\alpha_1}$$

[17] Including changes in the capital efficiency of Department III does not change the main results, it has the same effect as the increase in the capital stock, as previously mentioned.

$$\hat{L}_2 = \frac{\lambda_1^2 I_0}{\lambda_1^2 I_0 + \lambda_2^2 C_0 + \lambda_3^2 Y_3} \hat{I}_0 + \frac{\lambda_2^2 C_0}{\lambda_1^2 I_0 + \lambda_2^2 C_0 + \lambda_3^2 Y_3} \hat{C}_0$$
$$+ \frac{\lambda_3^2 A_0}{\lambda_1^2 I_0 + \lambda_2^2 C_0 + \lambda_3^2 Y_3} \hat{Y}_3 - \hat{q}_2 \tag{5.3}$$

$$\hat{L}_3 = \hat{K}_3 - \hat{q}_3 \tag{5.4}$$

the analysis begins by considering an increase in productivity within the industrial sector. Although such an increase may occur in both Department I and Department II, it is expected to be more pronounced in Department I. Naturally, higher productivity in the industrial departments reduces the amount of labour required to produce a given output level in that sector ($\hat{L}_1 = \hat{Y}_1 - \hat{q}_1 < 0$), leading to a proportional decline in employment within that sector.

The result is that, even without any distributive change, a slowdown in the pace of labour transition from the primary sector to the industrial sector will occur, especially as industrial productivity grows faster, due to the endogenous growth of demand. Consequently, the sectoral shift in employment has a significant impact on the overall behavior of the economy.

This dynamic proposed by Kalecki can be generalized as follows. By definition, labour productivity grows faster in capital-intensive manufacturing and professional services (Department I) than in consumer goods manufacturing and personal services (Department II). Moreover, the productivity of agriculture (Department III) is lower than the productivity in industrial sectors (Department I and II).

During the industrialization phase, there is a transfer of labour from agriculture, which initially has low productivity but high growth, to industrial sectors with higher productivity. In this way, urban industries are able to achieve positive productivity growth rates while simultaneously absorbing an increasing portion of the labour force. The increase in the proportion of urban employment generates a relocation effect that raises the productivity growth rates across the entire economy. The industrialization process

boosts labour productivity, provided that the growth in supply capacity in Department III prevents any distributive shift.

In the maturity phase, the increase in consumer demand for industrial goods (Department II), in line with Engel's law, leads to a rise in the share of employment in this sector. This, in turn, slows down investment growth as it requires less capital expansion. Consequently, the growing proportion of employment in Department II implies a transfer of labour to sectors with lower relative productivity, thus reducing the overall growth of labour productivity across the country. In this way, structural heterogeneity[18] emerges as the result of three contradictory forces: the higher productivity growth in Department I, the greater demand growth in Department II, and the labour transfer from Department III.

In this way, in a wage-led economy, a reduction in profit share would promote economic development through expanded production growth, improved income distribution, and greater labour absorption in Department I. High growth rates in output would enable the simultaneous growth of employment and productivity, thus avoiding situations of structural underemployment or structural heterogeneity.

In this regard, the described dynamics represent a process of structural change that helps overcome productive heterogeneity. As concluded by (Kalecki, 1954a, p. 389): *"The optimal process should typically lie between these two extremes: the increase in industrial production should be based on both productivity growth and employment growth."*[19]

CONCLUSIONS

Kalecki's contributions to the study of economic growth in developing countries have been instrumental in shaping the evolution of the discipline. In contrast to Lewis's model and, more broadly, the classical development tradition, Kalecki integrates the principle of effective demand through the multiplier effect, while also emphasizing the critical role of income distribution. Furthermore, he highlights the dual function of investment as both a driver of demand and a means of expanding productive capacity, thereby offering a more

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[18] See Juárez and Moreno-Brid (2024)

[19] Originally in Spanish: *"El proceso optimo debería estar normalmente entre estos dos extremos: el aumento de la producción industrial deberá basarse tanto en el aumento de la productividad como de la ocupación"*

comprehensive framework for understanding the dynamics of economic growth in developing economies.

These ideas can be formalized through a model with three vertically integrated sectors, referred to as Departments, which differentiate between goods whose prices are determined by costs (investment goods and industrial consumption goods) and those whose prices are subject to the dynamics of demand (mainly primary goods).

In this framework, the multiplier effect is conditioned by income distribution. Since the marginal propensities to consume differ among economic agents, an increase in the profit share of total income can reduce the economic growth rate by weakening the multiplier effect. This result, widely discussed in post-Kaleckian literature, is known as a "wage-led" growth regime.

In this regard, we have highlighted two main differences with respect to classical development models, such as that of Lewis (1954). The first difference lies in the existence of a department where prices are determined by demand, which implies that the profit share in income is endogenous.

Thus, to prevent the growth of demand in Department III from causing a distributive shift in favor of profits—which could slow down economic growth—it is necessary for this demand growth to be accompanied by a proportionally higher expansion of productive capacity. This requires, simultaneously, a marginal propensity to invest in Department III and a sufficiently high productive capacity in Department I to absorb the increased demand.

Consequently, the interaction between income distribution, investment decisions, and the productive capacities of each Department—classified according to price-setting criteria and the destination of production—highlights the need to refine the mechanisms outlined by Lewis in light of the principle of effective demand.

The second key idea that emerges from the comparative analysis with Lewis's model, as a corollary of the previous one, is the effect of the shift of the labour force from the agricultural sector to the industrial sector. In Lewis's model, industrial wages depend on subsistence wages, with the differential between them being the source that drives

employment dynamics. According to this logic, a lower subsistence wage leads to greater absorption of labour by the modern sector and a reduction of the traditional sector.

In contrast, within Kalecki's framework, it is the conditions of productive capacity and the demand of each sector, influenced by income distribution, that drive employment shifts between sectors. In this context, the evolution of productivity plays a central role, as its effects are manifested through the differentials between the various Departments, positioned between two extreme scenarios.

In a scenario with high differentials in productivity growth, an accelerated increase in productivity in Department I, capable of absorbing the entire increase in production, will lead to the formation of a dual labour structure. This will be manifested in the coexistence of a low-productivity sector with a high concentration of employment (primary and consumption goods) and a high-productivity sector with limited job creation (investment goods industries).

When Department I experiences productivity growth, which is usually faster and higher due to the technology of the sectors in its production chain, it is crucial that the investment rate is sufficiently high to avoid negative effects on employment in this Department. If investment is insufficient, there will be a shift of the labour force toward other sectors, especially Department II, which has a higher demand for labour.

This perspective has been extensively developed by the structuralist approach of the ECLAC, which emphasizes structural heterogeneity as the key factor for understanding peripheral economies. In this context, sectors with high productivity and few jobs coexist with others that, despite concentrating a large volume of labour, exhibit low productivity. This disparity results in a reduced average productivity and, therefore, lower incomes. The effect is a vicious cycle where weak productive capacity hinders investment in productive capacity, limiting growth in both infrastructure and technological innovation.

In a scenario of slow productivity growth, all increases in industrial output would be achieved with constant productivity. In this case, the low growth in industrial productivity would act as a brake on economic growth due to the limitations of increasing supply at the same pace as demand, generating endogenous inflationary pressures. The consequence would be a long-term stagnation in growth, as the mechanism through which

an increase in investment leads to higher aggregate demand would be neutralized by the constraints on productive capacity.

The solution, therefore, lies in achieving a sufficiently robust aggregate demand growth that can drive both productivity and employment, preventing both variables from deviating excessively toward either extreme. Otherwise, an increase in productivity, even without a distributive change, could lead to a highly unequal productive structure, where a few industries or firms experience high levels and growth of productivity, while the majority of activities are characterized by low and slow productivity growth.

In conclusion, although peripheral economies have evolved over time, the core ideas proposed by Kalecki 70 years ago remain vital for understanding long-term economic growth theory in developing economies.

REFERENCES

Aboobaker, A. (2019) 'Disarticulation as a constraint to wage-led growth in dual economies', Working Paper no. 2019-11. UMass Amherst Economics

Aboobaker, A. (2024) 'Hierarchical consumption preferences, redistribution, and structural transformation', *Industrial and Corporate Change*, 33(2), 490–506.

Araujo, R. A., P.C. Rodrigues Fonseca and T.S. Antunes (2024). 'A multi-sector Post-Kaleckian Growth Model of Structural Change', *Review of Political Economy,* 36(4), 1635–1653.

Basu, D. and V. Miroshnik (2020) *Feldman–mahalanobis model of development planning*. Imperialism and Capitalism, Volume II: Normative Perspectives, 87–120.

Beqiraj, E., Fanti, L. and Zamparelli (2019) 'Sectoral composition of output and the wage share: The role of the service sector', *Structural Change and Economic dynamics*, 51, 1-10.

Bhaduri, A. and S. Marglin, (1990) 'Unemployment and the real wage: the economic basis for contesting political ideologies', *Cambridge Journal of Economics*, 14(4), 375–393.

Bielschowsky, R. (1998) 'Evolución de las ideas de la CEPAL' [Evolution of ECLAC's ideas], *Revista de la CEPAL.* Extraordinary Number, October: 21–46.

Bielshowsky, R. (2006) 'Vigencia de los aportes de Celso Furtado al estructuralismo' [The Relevance of Celso Furtado's Contributions to Structuralism], *Revista de la CEPAL*, 88, 7-15.

Blecker, R. A. (1989) 'International competition, income distribution and economic growth', *Cambridge Journal of Economics*, 13(3), 395–412.

Chakrabarti, S. (2003) 'Agriculture-industry linkage: The problems of effective demand and supply constraint', *Review of Development and Change*, 8(2), 145–170.

Chakrabarti, S. (2011) 'A macroeconomic structure of employment: rural-urban conflict in a Kaleckian framework', *Review of Radical Political Economics*, 43(2), 172–197.

Chakrabarti, S. (2013) 'Interrogating inclusive growth: formal-informal duality, complementarity, conflict', *Cambridge journal of economics*, 37(6), 1349–1379.

Chakrabarti, S. (2014) 'The formal–informal dichotomy: Revisiting the debate on the agriculture–industry linkage', *The Economic and Labour Relations Review*, 25(1), 154–178.

Chakrabarti, S., and P. K. Datta (2019) 'Problems of financing development management: a Kaleckian analysis', *Review of Radical Political Economics*, 51(3), 457–476.

Chattopadhyay, S. (2020) 'Growth, income distribution and unemployment in a two-sector economy', *Metroeconomica*, 71(4), 715–733.

Dutt, A. K. (2019) *Structuralists, structures, and economic development*. The Palgrave handbook of development economics: Critical reflections on Globalisation and development, 109–14.

Fanti, L., and L. Zamparelli (2021) 'The paradox of thrift in a two-sector Kaleckian growth model', *Metroeconomica*, 72(3), 526-538.

FitzGerald, E. V. K. (1988) 'Kalecki on planned growth in the mixed economy', *Development and Change*, 19(1), 33–52.

FitzGerald, E. V. K. (1990) 'Kalecki on financing development: an approach to the macroeconomics of the semi-industrialised economy', *Cambridge Journal of Economics*, 14(2), 183–203.

Fujita, S. (2019) 'Mark-up pricing, sectoral dynamics, and the traverse process in a two-sector Kaleckian economy', *Cambridge Journal of Economics*, 43(2), 465-479.

Furtado, C. (1967) *Development and underdevelopment*. Univ of California Press.

Ghosh, D. (2002) 'Savings behaviour of the traditional sector and employment generation in a dual economy', *Savings and Development*, 381-394.

Ghosh, J. (2005) Michal Kalecki and the economics of development, in: K.S. Jomo (Ed.) *The Pioneers of Development Economics: Great Economists on Development* (London: Zed Books).

Gollin, D. (2014) 'The Lewis model: A 60-year retrospective', *Journal of Economic Perspectives*, 28(3), 71–88.

Hirota, Y. (2002) 'Reconsidering the Lewis model: Growth in a dual economy', *Okayama Economic Review,* 34(1), 49–55.

Hirschman, A. O. (1968) 'The political economy of import-substituting industrialization in Latin America', *The Quarterly Journal of Economics*, *82*(1), 1-32.

Juárez, J., and J. C. Moreno-Brid, (2024) 'Kaleckian insights on structural heterogeneity', *Revista Economia e Políticas Públicas*, 12(1), 01–11.

Kalecki, M. (1954a) 'El problema del financiamiento del desarrollo económico' [The problem of financing of economic development], *El Trimestre Económico*, 21(84 (4), 381–401.

Kalecki, M. (1954b) *Theory of economic dynamics*. Unwin University Books.

Khan, S. R. (2014) *A history of development economics thought: challenges and counter-challenges*. Routledge.

Kurz, H. D. (1991) *Technical change, growth and distribution: a steady-state approach to 'unsteady 'growth on Kaldorian lines*. In Nicholas Kaldor and mainstream economics: Confrontation or convergence? (pp. 421–448). Springer.

Lewis, W. A. (1954) 'Economic development with unlimited supplies of labour', *The Manchester School*, 22(2), 139–191.

López, J. G., and M. Assous (2010) *Michal kalecki: A pioneer of development economics*. Michal Kalecki, 174–191.

Manoilesco, M. (1931) *The theory of protection and international trade*. London: P. S. King and Son.

McFarlane, B. (1996) *Michal Kalecki and the political economy of the third world*. In An alternative macroeconomic theory: The Kaleckian model and post-Keynesian economics (pp. 187–218). Springer.

Nishi, H. (2020) 'A two-sector Kaleckian model of growth and distribution with endogenous productivity dynamics', *Economic Modelling*, *88*, 223-243.

Paiva, H., J. G. Oliveira and J. Teixeira (2023) 'A Kaleckian model of growth and distribution considering the effects of the urban informal sector', *Journal of Post Keynesian Economics*, 46(1), 65–86.

Ranis, G. (2004) 'Arthur Lewis's contribution to development thinking and policy', *The Manchester School*, 72(6), 712–723.

Ros, J. (2013) *Rethinking economic development, growth, and institutions*. Oxford University Press.

Ryoo, S., and P. Skott (2008) 'Financialization in Kaleckian economies with and without labor constraints', *European Journal of Economics and Economic Policies*, *5*(2), 357-386.

Sadhu, K. and S. Chakrabarti, (2021) 'Neo-dualism: Accumulation, distress, and proliferation of a fissured informality', *Review of Radical Political Economics*, 53(4), 694–724.

Sanchez-Ancochea, D. (2007) *Anglo-saxon versus Latin American Structuralism in development economics*. In Ideas, policies and economic development in the Americas (pp. 226–244). Routledge.

Sawyer, M. C. (1985) *The economics of Michal Kalecki*. Springer.

Storm, S. (2015) 'Structural change', *Development and Change*, *46*(4), 666-699.

Toporowski, J. (2015) *Kalecki and the savings constraint on economic development*. In Development and financial reform in emerging economies (pp. 75–80). Routledge.

Von Arnim, R., and C. Rada (2011) 'Labour productivity and energy use in a three-sector model: An application to Egypt*Development and Change*, *42*(6), 1323-1348.

Wutys, M. (1988) 'The food balance and economic growth: an appraisal of FitzGerald's reformulation of Kalecki', *Development and Change*, 19(4), 649-668

Young, C. E. F., and A. H. P. da Silveira (1988) 'A matriz departamental de Kalecki: um exercício de construção para o Brasil' [Kalecki's Departmental Matrix: A Construction Exercise for Brazil], *Ensaios FEE*, 9(1), 39–53.

Table 1: Summary of Differences between Kalecki and Lewis

Aspect	Kalecki	Lewis
Subsistence Wage	No subsistence wage or industrial wage incentives. Consumption must be maintained to support industrial production.	Subsistence wage exists, and wages in the capitalist sector are higher to incentivize labour mobility.
Agricultural Sector	Central to economic development, supporting capitalist sector workers' consumption.	Industry is the main driver of economic development.
Profits	Profits increase with capitalist consumption or investment, not just falling wages or monopoly growth.	Industrial wage stagnation leads to higher profits, reinvested to boost productivity and capital accumulation.
Competition and Development	Capitalist economy operates in monopoly conditions, with price setting and underutilization.	Competition drives progress, focusing on a one-sector growth model. (Ranis, 2004)

Productive Capacity	Food supply rigidity leads to underutilization of industrial capacity unless farmers benefit from higher food prices. (López and Assous, 2010)	Assumes full utilization, increasing food production with demand without addressing inflation pressures.	
Agricultural Coverage	Advocates securing agricultural coverage to avoid inflationary pressures.	Proposes food shortages can be solved by imports, disregarding inflation risks.	
Intersectoral constraints	Industrial expansion is limited by food availability and exchange terms between sectors.	Focuses on labour reallocation until a tipping point, after which dualism ends and the economy modernizes. (Ranis, 2004)	
Source: Own elabouration			

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Table 2: Economy Structure in 3 Departments

Dept. I	Dept. II	Dept. III	Total
$I_P + I_G + X_1 - M_1$	$C_P + C_G + X_2 - M_2$	$A_P + X_3 - M_3$	Y^D
$W_1 + R_1$	$W_2 + R_2$	$W_3 + R_3$	Y^I
$q_1 L_1$	$q_2 L_2$	$\sigma_3 K_3$	Y^S
Y_1	Y_2	Y_3	Y
Source: Own elabouration			

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