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TESIS PARA OBTENER EL TÍTULO DE DOCTORADO EN ECONOMÍA DEL DESARROLLO

ESSAYS IN IDENTIFYING DEMAND-LED GROWTH REGIMES

PAUL ALEXANDER CARRILLO MALDONADO

JULY 2022

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JULY 2022

DEDICATION

To Michelle, Julian, Lia, Fernando, Jonny, Christian, David, Silvia and Eduardo.
I love you since the Alfa to Omega.

DEDICATORIA

Para Michelle, Julian, Lia, Fernando, Jonny, Christian, David, Silvia y Eduardo.
Les amo desde el Alfa a Omega.

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Quito, julio de 2022.

PAUL ALEXANDER
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Abstract

This study presents two different and novel methodologies to evaluate the effects of changes in the functional distribution of income on economic activity and identify the regime of growth of an economy. This study problem goes back to the works of classical economists, but that has been renewed within the modern theories of growth developed by the post-Keynesian school of thought. The basic logic of the relationship between income distribution and aggregate demand has been widely developed in the so-called neo-Kaleckian macro models giving rise to the possibility of identifying growth regimes. The main distinction (though not the only one) is between profit-led and wage-led growth regimes.

With these alternatives in mind, researchers have tried to empirically identify the growth regimes along these lines and an entire generation of empirical research has attempted to determine whether various countries have wage- or profit-led regimes. The vast literature that has appeared until now has yet to reach a consensus and efforts to understand the different results reported seem to point to econometric identification methodologies. In this work I first expose the canonical model of Bhaduri and Marglin (1990) to understand the distributive conflict between workers and entrepreneurs. This framework show the theoretical response of aggregate demand when is exposed to a change in the distribution of income. In the same chapter, I extend the model with open economy variables to understand the reaction of growth to changes in the functional distribution of income.

Secondly, I introduce the zero and sign restrictions to estimate the structural (causal) effect of a change in the distribution of income on the output. To do this I use a novel data of functional income distribution for Latin America countries, consolidated by Alarco Tosoni (2014). I also present a theoretical discussion about the endogeneity of distribution of income with respect to variations in output. Within this framework, I identify that there are heterogeneous cases where Bolivia, Colombia, and Honduras have profit-led regimes; Costa Rica, Ecuador, Nicaragua, Peru, and Venezuela have wage-led regimes; however, the results are not conclusive with respect to the growth regimes of Brazil, Mexico, Panama, and Uruguay.

Third, I review the theoretical literature of wage-led and profit-led about the nonlinear results and the possibility of a regimen shift in the economy. This framework introduces different assumptions about the labor market, investment functions, etc., to understand the change in growth regimes. In this chapter, I propose to use a time-varying parameters model to estimate the impact of a change in income distribution on output in the U.S. economy as well as the possibility of a regimen shift in this economy. This novel empirical methodology allows to identify distri-

butional effect on output leading the conclusion that that degree of profit-ledness of the U.S. economy has decreased over the last four decades.

Introduction

Since the early 2000s, research by Thomas Piketty, Emmanuel Saez, and their coauthors have put the analysis of income distribution back on center stage. The distinction between property income and labor income plays a central role in this framework and has revolutionized our understanding of income distribution and wealth inequality. The book by Piketty (2014) also provided some facts about income distribution and growth of the capitalist system. Later, some New Keynesian studies, like Athreya, Owens, and Schwartzman (2017), Auclert and Rognlie (2018), or Bayer et al. (2019), proposed models with heterogeneous agents that intend to capture (or match) the inequality of personal income. These authors present a Dynamic Stochastic General Equilibrium framework with different discount factors and include labor supply or consumption preferences to understand the short and long-run effect in the distribution of income.

However, the exploration around the relationship between economic activity and income distribution is an old idea, traceable back to classical economists, like Ricardo and Marx, who intended to understand the determinants of the shares of the functional distribution and the links to the production process (Kaldor 1955). The link between functional and personal income distribution is documented by Dutt (2015a), Palley (2015), and Carvalho and Rezai (2015), where the first concept refers the relation between capital and labor, and the personal income distribution explains the vertical and horizontal inequality.[1]

Under the same classical approach, post-Keynesian economists have studied this relationship introducing the keynesian notion of effective demand (see Keynes 1936). First, Kaldor (1955) and Kalecki (1938b, 1938a, 1971), then Dutt (1984), Rowthorn (1981) and Taylor (1985) introduced some models to explain how the functional distribution impacted aggregate demand and growth. The Kaleckians show that an increase in the wage share (wages and salaries) has a negative effect on economic performance. Kaldor's approach is similar to the standard Marxian idea, where higher growth requires a more unequal distribution, but by means of forced saving.

Although along the same line of thinking, Bhaduri and Marglin (1990) proposed a model with some different assumptions. For instance, they introduced an investment function that depends on demand and supply factors to show that the theoretical relationship between a more progressive income distribution and growth could be positive or negative. Therefore, if the share of wages increases (and profit share fall) in the income distribution and leads to an increase in output, then it would be identified as a wage-led regime. In contrast, if the increase in the entrepreneurs' profit share in the distribution induces higher economic growth, then the economy would have a profit-led regime.

This seminal study of Bhaduri and Marglin, and the distinction between wage-led and profit-led growth has resulted in a voluminous empirical literature purporting to estimate the

1. The vertical inequality refers the distribution between rich capitalists and poor workers, and the horizontal inequality explains the relation between different classes of people with distinct behaviors and interests (Dutt 2015a)

regime in various economies, specifically developed countries. Recently, Blecker (2016) presents an overview of the methodologies implemented for such identification of demand regimes. In his study, Blecker (2016) shows the advantages and disadvantages of these methods for obtaining short- and long-term estimations.

The present document concentrates in the identify the growth regime because this is essentially relevant for the generation of distributive policies by the government, through tax, labor market and social reforms. Pro-capital policies normally seek wage and labour market flexibility. Also, these policies weaken the collective bargaining institutions, labour unions and employment protection legislation. In contrast, pro-labor policies impulse the welfare state, labour market institutions, labour unions as well as better unemployment benefits or higher minimum wages. Then, if we identify correctly the regime, the implementation of these policies may strengthen the economic performance. However, the lack of identification causes an unstable growth or a decreased rate (see Oficina Internacional del Trabajo 2011; Lavoie and Stockhammer 2013).

In this work, the first chapter exposes the theoretical framework of Bhaduri and Marglin (1990) emphasizing the main assumptions about the distribution of income as well as the components of aggregate demand. Also, the canonical framework is extended to open economic model to understand the response of the growth to a change of the functional distribution of income. Then, I expose the distributional conflict contained in this model and theoretical results. The chapter ends up with a review of the methodologies to identify the growth regimes.

The second chapter shows a methodology that allows for identifying the effects of an exogenous change of wage share on growth, taking into account Blecker's criticisms about the endogeneity in the methodologies that identify the growth regime. This methodology introduces the zero and sign restrictions in the parameters to estimate a structural vector autoregressive model. I use a novel data of functional distribution of income for Latin America countries and for the period 1960–2014 built by Alarco Tosoni (2014). The main results reveal that Bolivia, Colombia, and Honduras have profit-led regimes, and Costa Rica, Ecuador, Nicaragua, Peru, and Venezuela have wage-led regimes. The regimes of Brazil, Mexico, Panama, and Uruguay could not be determined.

Within the realm of the post-Keynesian growth models, the multiple equilibrium literature has grown in recent years with different theoretical models. Those studies present a variety of assumptions on the labor market, investment functions, and so on. The third chapter presents a time-varying parameters model as an empirical alternative to identify regime shifts. This approach is applied to the U.S. economy to identify possible changes in the effects that a change in the distributional of income may have on the output. The main result is that the degree of profit-ledness has decreased over the last four decades.

Chapter I
Regimes of Demand-led Growth Model

1.1 Introduction

One of the fundamental problems considered by most classical economists was that of the causes and consequences of economic growth. Among these consequences particular attention was devoted to the effect of economic growth on the structure of factor prices and thereby on income distribution. This problem was treated in detail by Ricardo who claimed that "to determine the laws which regulated the distribution . . . of rent, profit and wages in different stages of society . . . is the principal problem in Political Economy" (Ricardo, Vol 1, pag. 5). Kaldor (1955) highlighted the theories of Ricardo, Marx, Neoclassical and Keynesian economists. In line with the seminal works of Kalecki (1938b, 1938a, 1971), some post-Keynesian authors argue that, in an environment of imperfect competition, firms know and drive the degree of market concentration and market power, and this in turn determine the distribution of income among capitalist and workers. Then, demand adjusts to changes in the functional distribution and output as well. In contrast, another strand of post-Keynesian authors like Kaldor, modified this assumption and argued that in the face of an aggregate demand shock capitalists also adjust their profit margins leading to change in the distribution of income. Hence, while for Kaleckian followers the distribution of income can be assumed as exogenous and given by a constant mark-up, from the Kaldorian point of view, income distribution can be determined endogenously under certain specific assumptions.

Since the 80's, the seminal contributions of Rowthorn (1981), Dutt (1984) and Taylor (1985) have shown the theoretical relationship between the functional distribution and countries' growth under the so called "neo-Kaleckian approach." Rowthorn–Dutt-Taylor model can be termed an 'underconsumptionist' or 'stagnationist' version of the Kaleckian model in the sense that a higher share of wages in national income leads to a higher growth rate of output. In a step forward, Bhaduri and Marglin (1990) showed that there are, at least, two growth regimes. The first, called wage-led or "stagnationist" regime, occurs if the rise of wage share (or real wage) is related to an increase in the aggregate demand and growth. The second, denominated profit-led or "exhilarationist" regime, indicates that the same rise impact negatively on aggregate demand and growth. In the same period, Blecker (1989) and Krugman and Taylor (1978) showed that the income distribution changes in an open economy may have impacts on growth but introducing new channels. However, these efforts do not include the identification of the growth regimes.

The main aim of this chapter is to highlight the fundamental structure of the Neo-kaleckian demand-led growth model to identify its main growth regimes. For that, I present the theoretical model of Bhaduri and Marglin, its assumptions, main structure, and theoretical conclusions. Moreover, the chapter shows an extension of the open economy model and the identification of demand and growth regimes. Finally, I explain the different methodological strategies applied in the empirical literature to identify growth regimes.

1.2 The Canonical Model

In a two-class economy Bhaduri and Marglin (1990) suggested that there might be a degree of exogeneity of the real wage, which would cause the wage share to also have an exogenous component. According their seminal model, in a closed economy, any redistribution of income between profits and wages affects aggregate demand through two different channels. If the propensity to consume out of wage income is higher than that out of profit income, redistributing income against the wage earners would depress total consumption expenditure, but at the same time it might stimulate investment expenditure through higher profit share to counteract the depressing effect of lower consumption on aggregate demand. Depending on which of these two effects dominates quantitatively, two alternative possibilities emerge for a demand-led expansion. The case dominated by greater consumption expenditure due to higher real wages and lower profit share is called wage-led, whereas the case dominated by greater investment expenditure due to higher profit share and lower real wages is termed as profit-led.

As a matter of fact, in their closed-economy version Bhaduri and Marlin are able to generate different regimes of demand and growth, hence positive or negative effects of a lower wage share on capacity utilization, capital accumulation, growth and the rate of profit, depending on the relative weights of accelerator and profitability terms in the investment function and on the differential in the propensity to save from profits and from wages. This ambiguity in the results that derives from the effects of a change in the distribution of income on aggregate demand, output and growth is explained from the fact that an increase in wages would lead to a rise in workers' income, which would subsequently lead to an increase in consumption, but also leads to an increase in unit production costs, a reduction in firms' profits and a fall in capitalists investment desires.

In an open economy framework, however, the theoretical developments of the canonical model show that growth is much less likely to be wage-led. This is because while redistribution towards workers boosts consumption demand, it simultaneously reduces external demand by making the domestic good less competitive in international markets.

In formal terms, the Bhaduri and Marglin model proposes that total national income is distributed between workers and employers, in the same line of (Kalecki 1938a, 1971), Rowthorn (1981), Dutt (1984) and Taylor (1985). Workers derive income from their work and consume all this income in goods and services. The income of the capitalists comes from the realized profits of the firms, saving a constant part of it and the rest is directed to consumption[2]. Formally, one can express:

2. Some authors propose that workers also save at a constant rate but less than the saving propensity of the capitalists. Even if this hypothesis was applicable, it does not modify the original conclusions.

$$PY = W + R \tag{1}$$

$$W = wL \tag{2}$$

$$R = rK \tag{3}$$

Where Y is total income, P is price level, W is total wages payments, R is the profit of capitalist, w is the (average) nominal wage, L is total employment, r is the real rate of profit, and K is the value of capital.

In a closed economy with no government intervention, output equals consumption plus investment, in nominal terms, as:

$$PY = PC + PI \tag{4}$$

$$S = Y - C = sY \tag{5}$$

$$S = I \tag{6}$$

Where C is total consumption, I is total investment, S is total savings, and s is the constant average propensity to save of capitalists income.

The main contribution of the study of Bhaduri and Marglin (1990) is regarding the theoretical specification of the investment function. The authors assumed that the investment function separately depends on the profit share (or margin) from the supply side; and on the level of economic activity (or capacity utilization), as an accelerator effect, from the demand side. These changes in the investment function allow a connection between the real wage and capacity utilization that it is not necessarily inverse, as post-Keynesian economist used to believe before 1990 (see Kalecki 1938a, 1971; Rowthorn 1981; Dutt 1984; Taylor 1985). In contrast, the results and reaction of output and growth to a change in the distribution of income will depend on the reaction of savings and investment to those changes. This approach of Bhaduri and Marglin links the exogenous variation of real wage with the distributional conflict.

Thus, the saving and investment functions depend on the profit share and the level of capacity utilization, as shown by the following equations:

$$S = S(\pi, u) \tag{7}$$

$$I = I(\pi, u) \tag{8}$$

Where S is the saving function and I is the investment function (both equations normalized by potential income)[3], $\pi = \frac{R}{Y}$ is the profit share of entrepreneurs calculated by dividing profit (R) into total income Y, u is the capacity utilization ($0 < u < 1$) as ratio of the effective output level Y against potential Y^*, the last implying full capacity utilization.

Moreover, Bhaduri and Marglin (1990) implemented a pricing rule in which the price of domestic goods P, in environment of imperfect competition, depends on the unit cost of production (w), the inverse of labor productivity (b) and the profit margin (m) as a percentage mark-up:

$$P = (1+m)(bw) \tag{9}$$

Equations (2) and (9) allow us to understand the positive relationship between the profit margin (m) and the profit share (π):

$$\pi = \frac{m}{1+m} \tag{10}$$

The same equations also exhibits the distributional conflict between profit share/margin (m) and the real wage (ω), holding productivity constant:

$$\omega b = \frac{1}{(1+m)} \tag{11}$$

A rise in real wages will be matched by a fall in the profit margin and the profit share, then decreasing savings and negatively impacting on investment. Meanwhile, the increase in ω shifts the income of the working class and impulses the consumption. These contradictory impacts on aggregate demand ($C+I$) do not allow for a theoretical conclusion on the impact on the real economy of changes in the distribution of income.

With the equations (7) and (8), the macroeconomic equilibrium ($I = S$) implies that the profit share determines the capacity utilization. Then, the changes in the functional distribution impacts on capacity utilization as:

$$\frac{\partial u}{\partial \pi} = \frac{\frac{\partial I}{\partial \pi} - \frac{\partial S}{\partial \pi}}{\frac{\partial S}{\partial u} - \frac{\partial I}{\partial u}} \tag{12}$$

Assuming that savings react more than investment to changes in the output $\frac{\partial S}{\partial u} > \frac{\partial I}{\partial u}$ (Keynesian stability condition), then the impact of the distribution on capacity utilization will be a function of the reaction of savings and investment to profit share.

Then, the Bhaduri and Marglin model found two theoretical results. First, if savings reacts more than investment to changes on the profit share ($\frac{\partial I}{\partial \pi} < \frac{\partial S}{\partial \pi}$), then the impact on capacity utilization is negative ($\frac{\partial u}{\partial \pi} < 0$). This result is called the wage-led regime. Second, if the rise

3. Authors, like Nikiforos (2016a), proposed that investment function could be normalized to capital stock without fundamental changes in the model.

of the profit share is related to an increase of the output ($\frac{\partial u}{\partial \pi} > 0$) because investment is more sensitive than the savings ($\frac{\partial I}{\partial \pi} > \frac{\partial S}{\partial \pi}$). This result is called profit-led regime.

Given the school of thought, the model presented in this part of the paper drives by demand factors. Therefore, the supply factors are given and are constant in this abstraction. Then, the technology changes, financialization, and labor supply hold constant (Lavoie and Stockhammer 2013). Some studies include these factors in the post-Keynesian model to understand the growth regime (see Palley 2015, 2017; Dutt 2017). The next subsection presents an extension of this model with open economy variables.

1.3 Extension of the Open Economy Model

Bhaduri and Marglin (1990) extends this model to the open economy to understand the regimes of the economy. Blecker (1989), Krugman and Taylor (1978), and Taylor (1985) also included the international variables in the post-Keynesian framework, but not to explain the demand-led regimes. Bhaduri and Marglin showed that international factors may have an impact on the determination of the regimes, where the real exchange rate is the principal channel of transmission.

Following Blecker (2010) and Bhaduri and Marglin (1990), the model modifies the pricing rule with the inclusion of the cost of imported raw material. Formally, the pricing rule is:

$$P = (1+m)(bw + \kappa v P^f) \tag{13}$$

Where p^f is the cost of imported raw material in foreign currency, κ is the fixed ratio of production to imports, and v is the nominal exchange rate (domestic currency/foreign currency). The new rule can consider particularities like those of the international competitiveness (Bhaduri and Marglin 1990). We could also see the distributive conflict (like equation 11), since the negative relationship of the real wage with the profit margin is still maintained and (now) with the real exchange rate:

$$\omega b = \frac{1}{1+m} - \kappa q \tag{14}$$

Where $q = \frac{vP^f}{P}$ is the real exchange rate.

The trade balance (TB) in domestic currency is the difference of volume of exports (X) and volume of imports (M). If the exports are greater than the imports, there is trade surplus. When the exports are less than the imports, the economy has trade deficit. Then, exports depends of real exchange rate (q) and foreign economic activity (u^f). Otherwise, imports is function of real exchange rate (q) and domestic economic activity (u). Formally, the open economy variables express as:

$$TB = X(q, u^f) - M(q, u) = TB(q, u, u^f) \tag{15}$$

Then, a real depreciation (rise in q) increases the competitiveness of domestic goods and boosts exports. Moreover, it also raises the price of external products, which reduces volume of imports. Consequently, the trade balance improves, subject to the Marshall-Lerner condition holds (Blecker 2010). However, the equation (14) shows that the increase in q impact negatively in the real wage (ω), reducing the wage share and rising the profit share (Bhaduri and Marglin 1990).

The macroeconomic equilibrium to open economy (without government) is modified to:

$$S + M = I + X \tag{16}$$
$$S = I + TB$$

Like the closed economy model, the changes in the functional distribution impacts on capacity utilization as:

$$\frac{\partial u}{\partial \pi} = \frac{\frac{\partial I}{\partial \pi} + \frac{\partial TB}{\partial \pi} - \frac{\partial S}{\partial \pi}}{\frac{\partial S}{\partial u} - \frac{\partial I}{\partial u} + \frac{\partial TB}{\partial u}} \tag{17}$$

If the Keynesian stability condition holds, there are also two results about the change of the profit share (wage share) on the economic activity. If this derivative is positive, the economy has profit-led regime, and there is wage-led regime when the derivative is negative. The impact of the distribution on capacity utilization will be a function of the reaction of savings, investment and trade balance to profit share (Blecker 2010).

When the economy has a wage-led regime, a rise in q reduces the real wage and so the economic activity falls. Then, this improvement in international competitiveness weakens the wage-led regime and could change the domestic economy with a wage-led regime to an open economy with a profit-led regime. Meanwhile, a real depreciation causes an increase in the profit share, through price adjustment, boosting capacity utilization in the economy. Hence, it intensifies the degree of profit-led regime (Blecker 2010; Bhaduri and Marglin 1990).

Many authors extended the Bhaduri-Marglin model to understand the effect of the functional distribution change in different context and introducing additional complexities. Some papers, like Stockhammer (2017), tried to understand how the financial sector affects the identification of the growth regime. Also, economists, like Onaran (2016) or Storm and Naastepad (2017), studied the role of fiscal policy in strengthening the effect of the functional distribution on macroeconomic performance. Ros (2016) and Razmi (2015, 2016) used this approach to study the relationship between income distribution and real macroeconomic variables under a dual economy perspective in developing countries.

1.4 Identify the Demand-led Regimes

The majority of the post-Keynesians use capacity utilization to explain the relationship between the functional distribution of income and the principle of effective demand (see Rowthorn 1981; Dutt 1984; Taylor 1985; Bhaduri and Marglin 1990; Marglin and Bhaduri 1990). The concept of capacity utilization explains the expansion or reduction the economic activity in these models in the short run. This variable comes from the division of output and potential output. Several economists use a proxy that divides the output by the capital stock (see Blecker 2002, 2010).

However, this variable has been difficult to capture fully, in principle because of the conceptualization of potential output (see Nikiforos 2016b). From the empirical side, this has made it difficult for researchers to correctly identify regimes a la Bhaduri and Marglin. In this sense, post-Keynesians have incorporated economic growth rate (a variable fully observable through GDP) into the canonical model explained above. Thus, growth (variation of output) has its regime, independent of the regime of capacity utilization.

Following Blecker (2010) and Nikiforos (2016a), the saving and investment functions must be expressed in a parametric form for a closed economy model. Then, I assume a simple linear form of these functions as:

$$g^i = \gamma + g^i_u u + g^i_\pi \pi \tag{18}$$

$$g^s = \lambda + g^s_u u + g^i_\pi \pi \tag{19}$$

where γ and λ are exogenous constants, g^i_u and g^i_π are the marginal propensities to invest out of the utilization and profit share, and g^s_u and g^s_π are the marginal propensities to save out of the utilization and profit share. All the marginal propensities are positive and constant in the short run. In line with the above subsections, the equilibrium capacity utilization and growth ($g^i = g^s = g$) is:

$$u* = u_0 + \frac{g^i_\pi - g^s_\pi}{g^s_u - g^i_u}\pi \tag{20}$$

$$g* = g_0 + \frac{g^i_\pi g^s_u - g^s_\pi g^i_u}{g^s_u - g^i_u}\pi \tag{21}$$

where $u_0 = \frac{\gamma - \lambda}{g^s_u - g^i_u}$ and $g_0 = \gamma + g^i_u u_0$. The Keynesian stability condition also allows that the equilibrium is stable, in this case $g^s_u - g^i_u > 0$.

The regimes of the capacity utilization can identify with equation (20). The profit-led regime is when $\frac{\partial u}{\partial \pi} > 0$ as long as when the reaction of investment g^i_π are higher than the propensity of save g^s_π ($g^i_\pi > g^s_\pi$). By contrast, there is a wage-led regime in capacity utilization when the reaction of the saving function is higher than the propensity of invest ($g^i_\pi < g^s_\pi$). The equation (21) shows that a economy as identify with profit-led regime if $g^i_\pi g^s_u > g^s_\pi g^i_u$ ($\frac{\partial g}{\partial \pi} > 0$).

Otherwise, the economy is wage-led if the rise of profit share decreases the rate of growth ($\frac{\partial g}{\partial \pi} < 0$). As we can see the growth rate could have different regime of the capacity utilization because the identification depends of the other parameters, in this case.

This identification process can become theoretically more complex when one includes more variables. For example, the model can extend to an open economy with government intervention, which involves proposing functions (with new parameters) for exports, imports, government spending, and tax revenues (see Blecker 2010; Onaran 2016; Storm and Naastepad 2017). Another alternative would be to switch to a nonlinear function to analyze regimes like Assous and Dutt (2013), Marglin (2017), or Nikiforos and Foley (2012). In line with this complexity, the literature has proposed different methodologies to identify regimes in a specific economy. The following subsection reviews these proposals.

1.5 Methodology to Identify the Growth Regimes

This section presents an overview of the empirical methodologies employed in the literature to estimate the relationship between income distribution and economic activity, and identify the growth regimes. Following Blecker (2016), two methods are examined: structural and aggregative. In addition, the advantages and disadvantages of each method are discussed. However, the structural approach of Blecker (2016) is referred to behavioural equation approach of Stockhammer (2017) to avoid any confusion with the structural VAR methodology[4]. See Cauvel (2019), Jiménez (2020) or Stockhammer (2017) for a review of the literature that applies to these methods.

As Blecker (2016) shows, empirical studies of the Bhaduri and Marglin (1990) model have faced criticism regarding the methodology, the specifications and included variables, and other interpretative aspects. As previously mentioned, most post-Keynesian empirical works on the relationship between income distribution and growth estimate the effect of the functional distribution on the demand or their components using two approaches: behavioural equation and aggregative. To understand these approaches, it is helpful to summarize the analytical model that supports empirical research. Blecker (2016) defines the aggregate demand ($AD = Y$) as:

$$Y = AD = C(Y,W,Z_C) + I(Y,\psi,Z_I) + X(Y^f,P,Z_X) - M(Y,P,Z_M) + G \tag{22}$$

where Y is income (gross domestic product, GDP), ψ is the wage (labor) share, C is consumption, I is investment, X is exports, M is imports, Y^f is foreign demand, P is domestic price ($P(\psi, Z_P)$), and Z_j is the vector of exogenous (control) variables[5] that directly affect the

4. I don't want confuse the reader between this strategy identify of growth regime with separate equation of component of aggregate demand and the structural vector autoregressive model that I use later to obtain the growth regime.

5. The studies include some variables such as primary sector, financial variables, the international price of commodities, etc. (see Blecker 2016; Stockhammer, Rabinovich, and Reddy 2021).

dynamics of $j = C, I, NX, P$. Ceteris paribus (holding everything constant), the effect of the distributive change in demand is:

$$\frac{dY}{d\psi} = \frac{\frac{\partial AD}{\partial \psi}}{1 - \frac{\partial AD}{\partial Y}} = \frac{\frac{\partial C}{\partial \psi} + \frac{\partial I}{\partial \psi} + (\frac{\partial X}{\partial P} - \frac{\partial M}{\partial P})\frac{\partial P}{\partial \psi}}{1 - \frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} - \frac{\partial M}{\partial Y}} \quad (23)$$

If the stability condition holds ($\frac{\partial AD}{\partial Y} < 1$), the sign of the distributive effect depends on the numerator ($\frac{\partial AD}{\partial \psi}$). In other words, the sign only depends on the reaction of the consumption, investment, export, import, and price to a change in the functional distribution of income, or the impact on the aggregate demand. The sign above will determine the growth regime, where a positive result indicates a wage-led regime; otherwise, the economy has a profit-led regime with a negative effect.

The behavioural equation strategy estimates the partial impact of a change in income distribution on consumption, investment, exports, imports, and price level. The implicit assumption is that government spending is not affected by changes in the wage share. Then the methodology adds the effects together to determine the effect of a distributional shift on total AD (holding all control variables constant). In contrast, the aggregative method estimates the direct effect on GDP without considering the impact on the components. Practically, the researcher implements a (basic) system model of two equations:

$$Y_t = Y(\psi_t, Y_{t-1}, \ldots, Y_{t-p}, \psi_{t-1}, \ldots, \psi_{t-q}, Z) \quad (24)$$

$$\psi_t = \psi(Y_t, Y_{t-1}, \ldots, Y_{t-p}, \psi_{t-1}, \ldots, \psi_{t-q}, Z) \quad (25)$$

where ψ_{t-j} and Y_{t-j} are the vectors of the lag of the labor share and aggregate demand, respectively. Some studies use the growth of gross domestic product (GDP) to represent Y. Blecker (2016) indicates that the aggregate approach is also called "systems approach" because the researcher implements a system of equation like structural vector autoregressive model. If the demand components add to the model, the behavioural approach transforms into the systems (aggregative) approach.

Both methods have strengths and weaknesses in estimating the effect of functional distribution on growth. The behavioural equation approach allows us to obtain the impact on the demand components and understand the differentiated effects associated with the domestic and external factors. However, the specification may be exposed to problems of endogeneity due to simultaneous relationships; there are also numerous criticisms about the specification of the investment function. Conversely, although the systems method uses simultaneous equation models, such as VAR to estimate the distributive effects on the aggregate demand, it does not yield estimations of the effect of a distributive shock on several components of demand (Blecker 2016). Numerous authors have used the two approaches to estimate the effects in the short and long run, where the behavioural equation method depends on the stationary properties while the aggregative method does not necessarily depend on it (see Sims, Stock, and Watson 1990).

In sum, the advantage of the systems approach is that it estimates a consistent effect of the functional distribution on growth against the behavioural equation method that can evaluate the impact on the demand components. Some studies, such as Cauvel (2019) and Barbosa-Filho and Taylor (2006) use the filters (for example, Hodrick-Prescott) or other transformation (for example, first difference of logarithm) to obtain stationary variables of these models. Theoretically, Sims (1988), Sims, Stock, and Watson (1990), and Sims and Uhlig (1991) indicate that these transformations do not necessarily deal with unit root problem in the SVAR models and Caldara and Kamps (2017) and Arias, Caldara, and Rubio-Ramírez (2019) evidence empirically that these transformations are unnecessary. Meanwhile, if the model is statistically stable, the components of the demand can be recursively included. For this reason, the current study adopts the systems method and implements a new approach to obtain the structural effects.

Chapter II
Partial Identification for Growth Regimes[6]

2.1 Introduction

Recently, Blecker (2016) highlighted the bias problems in the estimation of the impact of changes in the functional distribution on aggregate demand and growth. In line with the model found in Bhaduri and Marglin (1990), most studies present two different methodological strategies to identify growth regimes in the economies under scrutiny. In the structural approach, introduced by Bowles and Boyer (1995) and applied in many studies, all these studies estimate single equations for each private aggregate demand component (investment, consumption and net exports) and sums the partial effects of a functional income redistribution on each of them to calculate the overall effect on the economy. Stockhammer (2017) and Stockhammer, Rabinovich, and Reddy (2021) called this empirical strategy as behavioural equation approach. Despite its widespread use, some methodological shortcomings of this approach have been pointed out in the literature. Particularly, the treatment of income distribution as an exogenous variable may add a simultaneity bias to these estimations and as reported by Blecker (2016) the estimation of separate equations losses the systems aspect of the model.

The (second) aggregative approach uses simultaneous equations to estimate the effect of the distribution on the output. As with the structural approach, some characteristics of the aggregative approach have also been subject to criticism in the literature. Blecker (2016), for instance, argues that because many studies use the deviation of actual GDP from a Hodrick-Prescott filtered trend to measure capacity utilization they rule out the possibility of long-run relations and may be capturing only cyclical and short-run effects. In addition, the aggregative approach estimations may be subject to omission bias as, in general, no control variables are added (Blecker 2016). Hence, each approach has its strengths and shortcomings.

Following the aggregative approach, the current study proposes use the partial identification of a structural vector autoregressive (SVAR) model to estimate the effect of change in the functional distribution on economic performance and identify the growth regime. A recent database constructed for Alarco Tosoni (2014), which includes 15 Latin American countries for the period 1960–2014, is used. This data has an annual frequency. The SVAR resolves the endogeneity problem because all variables are endogenous, and allows the structural (orthogonal or exogenous)[7] shock of functional distribution to be identified.

The main contribution of this study to post-Keynesian growth literature through the investigation and identification of growth regimes in Latin American countries. The Alarco Tosoni (2014) database is used to estimate the distribution effect in these economies using the ag-

6. The chapter is being published as an article in a Scopus-indexed academic journal.
7. I use the terms structural, orthogonal and exogenous interchangeably to explain the unexpected change of the functional distribution of income.

gregative methodology, where the empirical literature has been scarce. Previous studies such as Onaran and Galanis (2012) include Argentina (Latin American country) in a group of developing countries such as China, India, and South Africa in their separate estimations (structural approach). They find that these economies present profit-led regimes since a change in the distribution to favor entrepreneurs increases output. Alarco Tosoni (2016) also attempts to estimate the growth regime in Latin American countries with the same structural methodology. He finds that Bolivia, Chile, Honduras, Nicaragua, and Panama have profit-led growth, while stagnationism prevails for the rest of the economies. Jiménez (2020) analyzed Central American countries using separate estimations and revealed that Costa Rica, El Salvador, Honduras, and Nicaragua have a wage-led regime, while for Panama, growth is driven by profit. Jesus, Araujo, and Drumond (2017), Loaiza-Quintero, Tobon-Arias, and Hincapie-Velez (2017), Luyano Cuevas and Herrera Revuelta (2018), Tomio (2020), and Sánchez and Luna (2014) estimate the growth regime for specific countries such as Brazil, Colombia and Mexico.

This study also contributes with the implementation of the partial identification of the dynamic effect of orthogonal changes in the functional distribution in macroeconomic variables. Stockhammer and Onaran (2004) and Barbosa-Filho and Taylor (2006) used the aggregative approach to estimate this relationship by imposing exclusion (zero) restrictions on the entire system, but it constrains all results because the authors impose (unnecessary) restrictions that condition the response of output and others endogenous variables of SVAR model (for more details, see Kilian and Lütkepohl 2017). In contrast, to identify the functional distribution effect, this study implements the partial approach that includes signs and zero restrictions only on the variables of interest and not on the whole SVAR. Specifically, the Arias, Rubio-Ramírez, and Waggoner (2018) methodology is used to estimate the orthogonal change in the distribution equation to obtain the SVAR tools (impulse response function (IRF) and forecast error variance decomposition (FEVD)) and identify the growth regime. This method proposes Bayesian algorithms that are better than frequentist inference approach (related to estimators such as ordinary least squares or maximum likelihood) for a small sample (Koop 2003), particularly in developing countries like those in the study sample.

2.2 The Partial Identification

This section presents the methodology used to estimate the dynamic response (effect) of growth to a unexpected change (structural shock) in the functional distribution. In addition, I show the identification problem in the SVAR models is exposed to obtain the structural shocks. There are different identification approaches, but only the partial approach is reviewed herein. This allows for restrictions exclusively on the equation used (not necessarily in all equations) to obtain the structural shock. The Bayesian algorithm and the data to estimate the SVAR are also presented.

2.2.1 The Structural Vector Autoregressive Model

Following Rubio-Ramírez, Waggoner, and Zha (2010), this study considers the following SVAR model:

$$y_t' A_0 = \sum_{l=1}^{p} y_{t-l}' A_l + \varepsilon_t', \quad \text{for } 1 \le t \le T, \tag{26}$$

where y_t is an $n \times 1$ vector of the endogenous variables, A_l is an $n \times n$ matrix of structural parameters for $j = 0 \dots p$, ε_t is an $n \times 1$ vector of structural shocks, n is the number of endogenous variables, p is the number of lags, and T is the sample size. Conditional on past information and the initial conditions, the vector of structural shocks is assumed to be a normal distribution with a mean of zero and a covariance matrix I_n ($n \times n$ identity matrix). Equation (26) can be written more compactly as

$$y_t' A_0 = x_t' A_+ + \varepsilon_t' \tag{27}$$

where the matrix $A_+ = \begin{bmatrix} A_1' & \dots & A_p' \end{bmatrix}$ and the vector $x_t' = \begin{bmatrix} y_{t-1}' & \dots & y_{t-p}' \end{bmatrix}$. Matrix A_+ has the dimension $k = np$. If A_0 is invertible, the reduced form of the SVAR model is

$$y_t' = x_t' B + \mu_t' \tag{28}$$

where $B = A_+ A_0^{-1}$, $\mu_t' = \varepsilon_t' A_0^{-1}$, and the covariance matrix of μ is $E[\mu\mu'] = \Sigma = (A_0 A_0')^{-1}$. Equations (27) and (28) indicate that there is a relationship between the reduction parameters (B, μ) and the structural parameters (A_0, A_+), which allow the identification of structural shocks. For the multivariate model, the IRF that obtains the effect of the jth unexpected change in the ith variable at time h is estimated as

$$L_h(A_0, A_+) = (A_0^{-1} J' F^h J)' \tag{29}$$

$$F = \begin{bmatrix} A_1 A_0^{-1} & I_m & \dots & 0 \\ \vdots & \vdots & \dots & \vdots \\ A_{p-1} A_0^{-1} & 0 & \dots & I_m \\ A_p A_0^{-1} & 0 & \dots & 0 \end{bmatrix} \tag{30}$$

$$J = \begin{bmatrix} I_m \\ 0 \\ \vdots \\ 0 \end{bmatrix} \tag{31}$$

2.2.2 Identification Problem and Estimation

Identification is fundamental for the SVAR to estimate the effect of one variable on another (the IRF). In other words, the main problem with the SVAR model is the estimation of the structural shock[8]. Rothenberg (1971) indicated that it is necessary to impose $n(n-1)/2$ restrictions to identify the effect, where n is the number of endogenous variables (known as the "order condition"). Sims (1980) took this condition and included the Cholesky decomposition to identify the structural shocks in SVAR (recursive method). Other proposals (not recursive) include some short- or long-run restrictions on the entire system of equations that condition the results on the objective variable (see Kilian and Lütkepohl 2017, chapters 8-12). Stockhammer and Onaran (2004) and Burle and Carvalho (2021) used this approach to estimate the effect of the distribution on output and identify the growth regimes. The problem with this identification is that it may be sensitive to the order of occurrence of the shocks and could produce inconsistent estimations. Other studies only implement the reduced form of the SVAR to obtain the regime (see Barbosa-Filho and Taylor 2006). However, this methodology does not estimate the structural effect of the functional distribution in the growth.

In recent years, a new identification approach, known as the agnostic approach, has been developed. It demonstrates that it is not necessary to impose constraints on the entire SVAR to obtain the identification of specific orthogonal shocks. Instead, the researcher agnostically includes restrictions to identify the studied shock, which is part of the research question, and leave the data help explain the response of the target variables and not impose unnecessary restrictions on the all equations (Uhlig 2005). In this approach, Rubio-Ramírez, Waggoner, and Zha (2010) denominate that the recovery of all shocks of the SVAR model is a "global identification", and, by contrast, if we only want to obtain specific shocks this approach has been called "partial identification". In present study, the aim is to recover only the functional distribution shock without constraining the entire system of equations, then I use the agnostic approach with partial identification.

Gafarov, Meier, and Olea (2018) and Granziera, Moon, and Schorfheide (2018) present methods of agnostic identification using the frequentist approach. From a Bayesian perspective, Faust (1998), Canova and Nicoló (2002), Uhlig (2005), Baumeister and Hamilton (2015), and Arias, Rubio-Ramírez, and Waggoner (2018) proposed different estimation algorithms based on their own assumptions. The study of Moon and Schorfheide (2012) compares both methodologies (Bayesian and frequentist) and demonstrates under which conditions similar results can be obtained[9].

Arias, Rubio-Ramírez, and Waggoner (2018) present an approach to identify the structural shock with the Bayesian agnostic perspective. This methodology is completely agnostic as it

8. "Structural" refers to the causal estimation, similar to microeconometrics studies. There continues to be an open discussion on this subject. See Hoover (2001) or Nakamura and Steinsson (2018).

9. The comparison in Moon and Schorfheide (2012) does not include proposals from Arias, Rubio-Ramírez, and Waggoner (2018) and Baumeister and Hamilton (2015) since they were published later.

does not impose unnecessary restrictions such as in Uhlig (2005). Moreover, they implement the Uniform-Normal-inverse Wishart (UNIW) conjugate distribution[10], which allow estimation of independent draws and mean it is not necessary to carry out (burn-in) discarded simulations to suppress the initial values (Koop 2003). Their algorithm is more computationally efficient than that of Baumeister and Hamilton (2015), a property that has been recognized by econometricians in recent years (see Aruoba and Fernández-Villaverde 2015; Aldrich 2014).

One of the strengths of Arias, Rubio-Ramírez, and Waggoner (2018) is that it is better than the frequentist method for small samples, such as the Latin American database. Essentially, Bayesian econometrics treats the parameters (A_0, A_+, B, Σ) as random variables that introduce uncertainty around their inference. Bayesian econometrics use simulation methods to obtain the distribution of parameters with prior information, which allows asymptotic estimation without assumptions of central limit theorem and large sample size ($T \to \infty$) (see Zellner 1996; Geweke 2005; Greenberg 2009). It is an advantage for Latin American data given that Alarco Tosoni (2014) can only obtain the annual functional distribution between 1950 and 2014 (55 observations).

To solve the identification problem, Arias, Rubio-Ramírez, and Waggoner (2018) developed a theory and simulation technique that allows for the inclusion of some sign and/or zero restrictions on any function $F(A_0, A_+)$ to obtain the structural shock (e.g., IRF). The authors first stated that the two parameter sets (A_0, A_+) and $(\overline{A_0}, \overline{A_+})$ are observationally equivalent if and only if they have the same distribution, thus implying that they have the same reduced form in a linear Gaussian model. If one can obtain a $Q \in O$, the set of all $n \times n$ orthogonal matrices, then $A_0 = \overline{A_0}Q$ and $A_+ = \overline{A_+}Q$. The identification with the sign and zero restrictions implies that some function satisfies the condition $F(A_0Q, A_+Q) = F(A_0, A_+)Q$ for every Q.

Arias, Rubio-Ramírez, and Waggoner (2018) propose use the Markov Chain Monte Carlo simulations on the conjugate distribution as the $UNIW(v, \Phi, \Psi, \Omega)$ to estimate the SVAR model and its functions. They use this family distribution because it is more efficient regarding time estimation and obtains independent draws; however, their algorithms work well with any prior distributions. The posterior distribution is defined as:

$$\tilde{v} = T + \hat{v} \tag{32}$$
$$\tilde{\Omega} = (X'X + \hat{\Omega}^{-1})^{-1} \tag{33}$$
$$\tilde{\Psi} = \tilde{\Omega}(X'Y + \hat{\Omega}^{-1}\hat{\Psi}) \tag{34}$$
$$\tilde{\Phi} = Y'Y + \hat{\Phi} + \hat{\Psi}'\hat{\Omega}^{-1}\hat{\Psi} - \tilde{\Psi}'\tilde{\Omega}^{-1}\tilde{\Psi} \tag{35}$$

The authors proposed estimating these functions and parameters with the change of variable theorems about the structural and reduced-form parameterization. One could use these

10. In Bayesian inference, the conjugate distribution allows the combination of different distributions (Normal, Gamma, Bernoulli, etc.), where the prior and posterior marginal distribution have the same properties (Koop 2003).

algorithms, depending on the inclusion of sign, zero, or both restrictions. Here, algorithm 3 of Arias, Rubio-Ramírez, and Waggoner (2018) including the other two algorithms in each step is presented as follows:

1. Draw (B,Σ) from $NIW(v,\Phi,\Psi,\Omega)$ distribution.
2. For every equation j, draw x_j independently from a standard normal distribution and set $w_j = x_j / \|x_j\|$.
3. Define $Q = \begin{bmatrix} q_1 & \dots & q_{j-1} \end{bmatrix}$ recursively by $q_j = K_j w_j$ for any matrix K_j whose columns form an orthonormal basis for the null space.
4. Set (A_0,A_+) with the equation (27) and (28).
5. If (A_0,A_+) satisfies the sign restrictions, then set its importance weight.
6. Return to step 1 until the required number of draws has been obtained.
7. Re-sample with replacement using the importance weights.

Following Arias, Rubio-Ramírez, and Waggoner (2018), distribution $UNIW(v,\Phi,\Psi,\Omega)$ is used for the informative priors over the orthogonal reduced-form parameterization for the estimation of the SVAR model. The parameters $v = np+1, \Phi = 0_{n\times n}, \Psi = 0_{k\times n}, \Omega = I_{k\times k}$ are set for the prior density. A total of 10,000 draws were run to obtain the posterior distribution of the structural parameters and the IRF.

2.2.3 Identification Restrictions of Demand-led Growth

Major studies on the macroeconomic dynamics of Kalecki (1938a, 1971) and the most neo-Kaleckian growth models propose a relationship between economic growth and income distribution, where the latter is purely exogenous as a closure of the macrosystem (Dutt 2017). Following the conventional assumption of the classical political economy, Kalecki highlights the role of institutional factors and social norms in determining real wages and distribution, known as the pure exogenous effect. In this line, none of the economic variables can determine the shares of wage and profit if real wage and labor productivity always move synchronously (Nikiforos 2021).

However, both theoretical and empirical studies indicate that there is a possibility of endogeneity in the wage share. By construction, the wage share is equal to the real wage divided by labor productivity (Nikiforos and Foley 2012; Taylor 2004). From the empirical side, some studies, such as Barbosa-Filho and Taylor (2006) and Stockhammer and Onaran (2004), use the systems (aggregative) approach to deal with the endogeneity of distribution. In contrast, the behavioural equation approach does not mitigate this bias problem, at least using the instrumental variable method (see Blecker, Cauvel, and Kim 2020).

From a theoretical or analytical perspective, there are at least three ways of conceiving the endogeneity of income distribution in these non-mainstream models. Post-Keynesians, such as Robinson and Kaldor, use the full employment assumption in a long-run context to treat the distribution of income as a completely endogenous variable to shocks or changes in aggregate demand. This may be achieved thorough a forced saving mechanism. A second approach is the so-called profit-squeeze hypothesis in which as utilization and employment increase, the bargaining power of the workers increase, and the wage share increases, squeezing profits. Nikiforos (2021) argues that this idea goes back to chapter 25 of the Marx's Capital (1976) though it was formalized by Goodwin (1967) cyclical growth model.

The third approach is the so-called overhead labor approach and goes back to Kalecki (1971) distinction between salaries and wages, where the former is the labor income of managers and administrative personnel (indirect or overhead labor), and the latter is the labor income of workers (direct labor) The labor input is directly involved in the production process and reacts to changes in the level of utilization. However, the overhead labor does not follow this relationship (labor-output) because it rises (falls) less during boom (depression) given its characteristic of an overhead. Due to overhead labor effects, if the bargaining position of workers is weak and they cannot claim a higher share of income as utilization increases, the share of profits will increase as utilization increases. The presence of overhead labor cost seems to have important implications for the relationship between income distribution and growth. Lavoie (2017), for instance, argues that profit-led results of many empirical studies might be capturing the cyclical effect of overhead labor and Palley (2017) shows that a redistribution of wages towards managers (overhead labor) might increase the likelihood of a profit-led regime.

In the traditional Keynesian approach, the effective demand defines the level of output, which in turn determines the real wage (Bhaduri and Marglin 1990; Lavoie 2017). Post-Keynesians use the full employment assumption in a long-run context to treat the distribution of income as a completely endogenous variable. This approach produces a different closure of the macroeconomic model. In this sense, the rise (decline) of real activity and employment allow for an increase (reduction) in the bargaining power of workers and an increase (reduction) in wage share. Then, the profit share reduces (rises) by a decrease (increase) of output, known as the profit-squeeze effect (Nikiforos 2021).

Followers of Kalecki recognized the endogeneity of the distribution of income and real wages[11], but still claims that there is an exogenous component that is important as a policy variable, such as minimum wage (Bhaduri and Marglin 1990). Then, the distribution equation is built for its systematic component, which describes how the distribution reacts endogenously to the economic variables, and the exogenous component, which captures the institutional characteristics and social norms[12]. With this in mind, the identification in the functional distribution

11. Some studies, such as Assous and Dutt (2013) or Nikiforos (2015), presented theoretical models that combined these restrictions.

12. Skott (2017) criticizes this exogenous component approach to the functional distribution of income. He confirms Kaldor (1955)'s statement that wage and profit shares are completely endogenous to institutional factors

equation is fundamental to obtain the unexpected change (structural shock) of wage share (symmetrically profit share). Empirically, the concept of the growth regime occurs only through the exogenous term of the distribution (Nikiforos 2021). Without loss of generality, the first equation (y'_{1t}) of the SVAR (equation 26) was taken as the (functional distribution) wage share equation ($y'_{\psi t}$), which contains the systematic component ($y'_t a_{0,\psi}$), lagged variables ($\sum_{l=1}^{p} y'_{t-l} a_{l,\psi}$), and structural shock ($\varepsilon_{\psi,t}$):

$$y'_t a_{0,\psi} = \sum_{l=1}^{p} y'_{t-l} a_{l,\psi} + \varepsilon_{\psi,t}, \quad \text{for } 1 \leq t \leq T, \tag{36}$$

where $a_{l,w}$ is the first column of A_l for $0 \leq l \leq p$. Following Stockhammer and Onaran (2004), if SVAR model includes wage share (ψ), output (Y), and investment (I), abstracting from lag variables, can be written as

$$a_{0,11}\psi_t = a_{0,21}Y_t + a_{0,31}I_t + \varepsilon_{\psi,t}, \quad \text{for } 1 \leq t \leq T \tag{37}$$

In line with this systematic component, restrictions that capture the endogeneity criteria discussed earlier are included. Here, this study includes a zero restriction on investment ($a_{0,31} = 0$), that this variable does not contemporaneously affect wage share, based on theoretical models (Dutt 2017), and a positive restriction on the parameter $a_{0,11}$ of econometric normalization (Kilian and Lütkepohl 2017). Alternatively, the three restrictions are inserted in the output coefficient:

- Pure exogenous: $a_{0,21} = 0$.
- Profit-squeeze: $a_{0,21} > 0$.
- Overhead labor: $a_{0,21} < 0$.

To understand which growth regime dominates in Latin American countries, the SVAR model is estimated with each restriction of the output mentioned separately. The structural shock can be estimated with these conditions and we obtain the effect of the wage share in the rest of the variables of the SVAR through the IRF (equation 29). The entire system of equations is presented as:

$$\begin{bmatrix} (a_{0,11} > 0) & (a_{0,21} \lesseqqgtr) & 0 \\ a_{0,12} & a_{0,22} & a_{0,32} \\ a_{0,13} & a_{0,23} & a_{0,33} \end{bmatrix} \begin{bmatrix} \psi_t \\ Y_t \\ I_t \end{bmatrix} = A_+ x_t + \begin{bmatrix} \varepsilon_{\psi,t} \\ \varepsilon_{2,t} \\ \varepsilon_{3,t} \end{bmatrix} \tag{38}$$

To obtain the structural shock ($\varepsilon_{\psi,t}$), it is only necessary to impose restrictions on $a_{0,11}$, $a_{0,21}$ and $a_{0,31}$, and not on the entire SVAR. It is also observed that there are no restrictions on

and social norms. Skott proposes that aggregate demand or growth depends on these factors and that the proposal of regimes is unhelpful. Nikiforos (2021) responds to Skott's approach, where he mentions that it is incorrect as it loses the level of abstraction that such a model should have.

the lags. Thus, one could identify the unexpected change of wage share, estimate its effect on other variables (IRF), and define the growth regime in any country.

2.2.4 Dataset

An SVAR model was estimated for each of the following countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. Each model contains annual country data with the wage share, real GDP, and real demand components. In addition, the global activity index of Kilian (2009, Global Demand), and price indices of energy and non-energy commodities are included to control the international factors that affect domestic economies (see Carrillo-Maldonado and Díaz-Cassou 2019). The functional distribution data were obtained from Alarco Tosoni (2014)[13], and the GDP, its components, and the commodity price indices were downloaded from the World Bank website. All the variables were logarithmically transformed, except for the wage share.

Alarco Tosoni (2014) consolidates a database of the wage share (compensation to salaried workers as a percentage of GDP) and profit share (gross operating surplus) for 15 Latin American countries between 1950 and 2011. His main source of information is The Statistical Yearbook for Latin America and The Economic Commission for Latin America and the Caribbean (ECLAC). In addition, the author uses International Labour Organization data and national sources as a complement. In subsequent studies, Alarco updates his database up to 2014 (see Alarco Tosoni 2016, 2017). The data presented by Alarco Tosoni shows that the wage share remains constant in the Latin American region between 1950 and 1970[14]. He also observes a declining trend since the 1970s and until 2005 with a slight recovery between 1985 and 1996. A recovery of the regional wage share is observed from 2005 until 2014.

In terms of the relationship between income distribution and growth, Alarco Tosoni (2016) uses the behavioural equation approach to identify the growth regime of Latin American countries. He finds that Bolivia, Chile, Honduras, Nicaragua, and Panama have profit-led economies. In contrast, the growth of Argentina, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Paraguay, Peru, Uruguay, and Venezuela follow a wage-led regime. Using the same behavioural equation methodology, Jiménez (2020) focuses on Central American countries (Costa Rica, El Salvador, Honduras, Nicaragua, and Panama) between 1970 and 2016. The author finds that Panama has a profit-led regime, and the growth of the other countries is driven by wages[15]. Alarco Tosoni (2017) also investigates the growth regime of these countries, but concentrates on a regional analysis with panel data methodology (random effects and dynamic panel). The author identifies two key periods in the analysis: the first is between 1950 and 1980, where the regional economy had a wage-led regime, and a profit-led regime in the second period between 1980 and 2014, with exports being a key variable in this transition.

13. I am grateful to German Alarco for sharing this information
14. Specifically, the author used the Holdrick-Prescott filter of the aggregate region of the 15 countries.
15. Jiménez (2020) conducted a literature review for developing countries, highlighting specific country studies.

2.3 Results

This section presents the results of the effect of an unexpected change (structural shock) in the functional distribution of income on economic growth in the several Latin American countries under scrutiny. In line with the identification of endogeneity criteria and estimation of the growth regime, the process is divided into three parts. The first shows the pure exogenous approach where any economic variable affect the functional distribution variable. The second presents the estimations of the structural effect with the positive restriction in the output coefficient (profit-squeeze effect). The results of the overhead labor effect are also presented to determine whether the analyzed economies are wage- or profit-led. For the three approaches, the shocks were defined as a one-percentage point increase in the wage share, always controlling for global demand and international primary commodity prices. A further two subsections are included in which robustness checks and separate results with SVAR are presented.

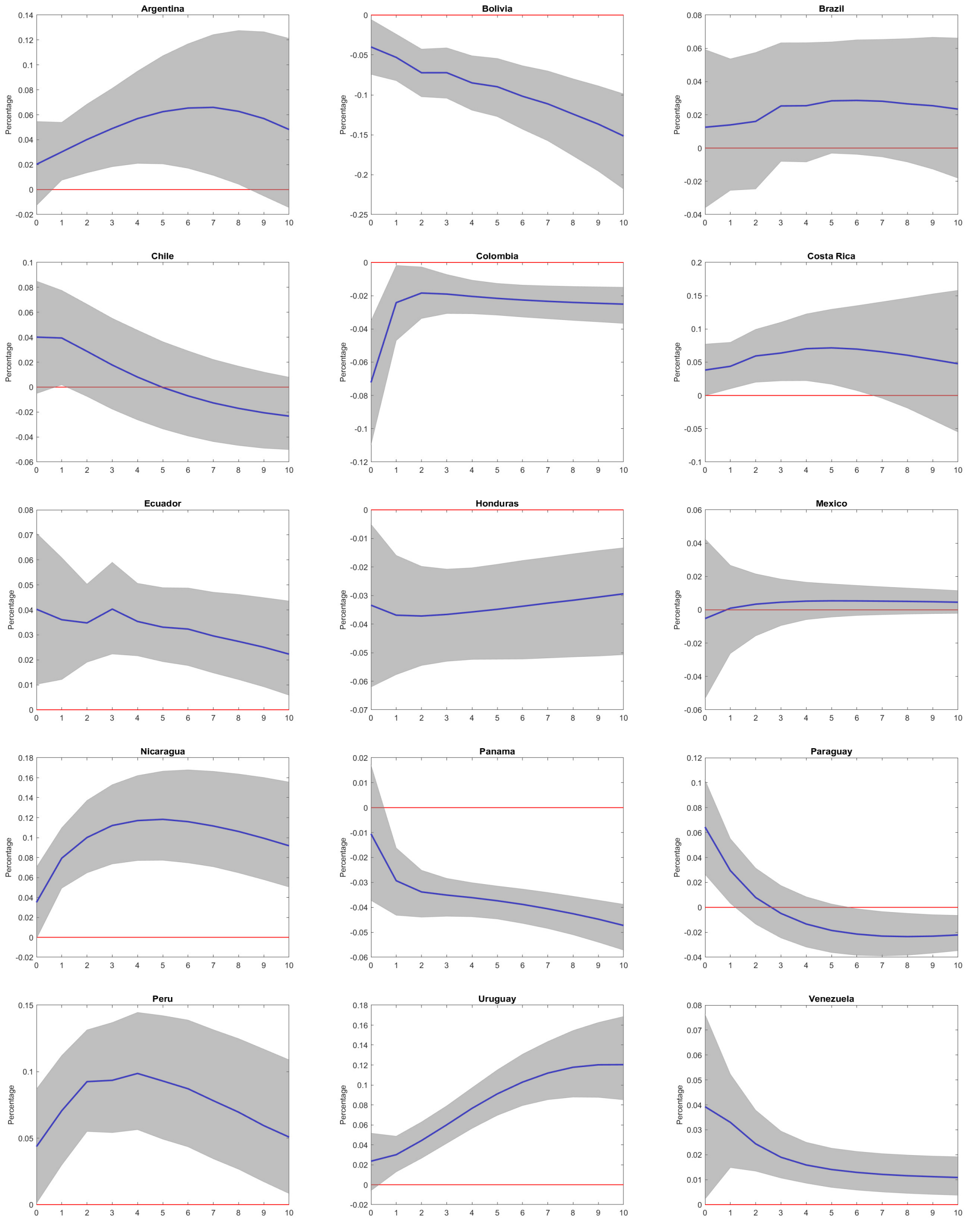
2.3.1 Pure Exogenous Approach

Figure 1 presents the IRF results of SVAR estimation with the pure exogenous approach. The algorithm above presented is used to estimate the model with the zero restriction on the coefficient of GDP and investment in the equation (37). The IRF results explain the effect on the output of each country at ten time points after the distribution shock. It can be seen that Argentina, Brazil, Chile, Mexico, Panama, and Uruguay present a non-statistically significant impact ($t = 0$) on GDP. The unexpected increase of wage share has a positive impact in Costa Rica, Ecuador, Nicaragua, Paraguay, Peru, and Venezuela. By contrast, countries such as Bolivia, Colombia, and Honduras have a negative contemporaneous effect. All results indicate the impact on growth is less than one percent.

The effects (after impact, $t > 0$) on countries have different patterns: transitory and permanent, positive, and negative, and change in the sign of IRF. The results for countries such as Brazil, Chile, and Mexico were not statistically significant over the period, except Chile, one year after the shock. Figure 1 shows that the unexpected shock of wage share produces a positive permanent effect in Ecuador, Nicaragua, Peru, Uruguay, and Venezuela. In contrast, the output of Bolivia, Colombia, Honduras, and Panama decreases permanently if the distribution moves in favor of workers. Paraguay presents a positive reaction to increasing the wage share in the beginning ($t = 0, 1$), but the effect is negative in the 7^{th} year.

Moreover, I cannot identify the growth regime in six of the 15 countries in the short run with the assumption of purely exogenous distribution because the impact is not statistically significant at $t = 0$. Stick to a strict short-term framework, Argentina, Costa Rica, Ecuador, Nicaragua, Peru, Uruguay, and Venezuela could display wage-led regimes, while profit-led regimes are identified in the short run in Bolivia, Colombia, Honduras, and Panama. In the medium run ($t = 10$), Ecuador, Nicaragua, Peru, Uruguay, and Venezuela are identified as having wage-led regimes due to the positive effect of distribution shocks on growth; the economies

Figure 1: Effects of wage share shock to GDP with pure exogenous approach



Note: The solid line depicts a posterior point-wise median response of GDP and the shaded area represent the 68 percent equal-tailed point-wise posterior probability bands.

of Bolivia, Colombia, Honduras, Panama, and Paraguay have profit-led regimes. Argentina, Brazil, Chile, Costa Rica, and Mexico show an ambiguous effect in the 10^{th} period.

In the frequentist approach, the Wald test can be used to understand the statistical significance of specific values (see Wooldridge 2019). In contrast, Bayesian econometrics use the Markov Chain Monte Carlo method to estimate the (posterior) distribution of the parameters (Koop 2003). The naive way to not assume exogenous dynamics of the functional distribution is to leave the growth parameter (β_1) unrestricted and use algorithm of above section to obtain the estimator[16]. The results of using this algorithm without restriction on the GDP parameter are presented in Table 1. There is approximately the same probability that it takes positive rather than negative values on β_1. Colombia has a relatively small probability of obtaining a positive coefficient (41%), and Paraguay has a high probability. This estimation provides a way to impose both positive and negative restrictions.

Table 1: Results of Systematic Component of GDP (β_1)

Countries	**Median**	**Q16**	**Q84**	$p(B1 > 0)$	$p(B1 < 0)$
Argentina	0.26	-6.63	6.95	52%	48%
Bolivia	-0.52	-7.04	5.78	46%	54%
Brazil	0.00	-5.62	5.76	50%	50%
Chile	0.36	-4.65	5.42	54%	46%
Colombia	-1.05	-7.47	4.95	41%	59%
Costa Rica	0.43	-5.49	6.18	54%	46%
Ecuador	0.75	-7.02	7.96	56%	44%
Honduras	-0.70	-8.92	7.26	45%	55%
Mexico	-0.06	-4.86	5.04	49%	51%
Nicaragua	0.32	-6.30	6.52	53%	47%
Panama	-0.25	-9.33	8.52	48%	52%
Paraguay	0.83	-5.49	6.76	57%	43%
Peru	0.37	-4.86	5.70	54%	46%
Uruguay	0.46	-7.58	8.32	53%	47%
Venezuela	0.38	-5.73	6.85	54%	46%

2.3.2 Profit-Squeeze Approach

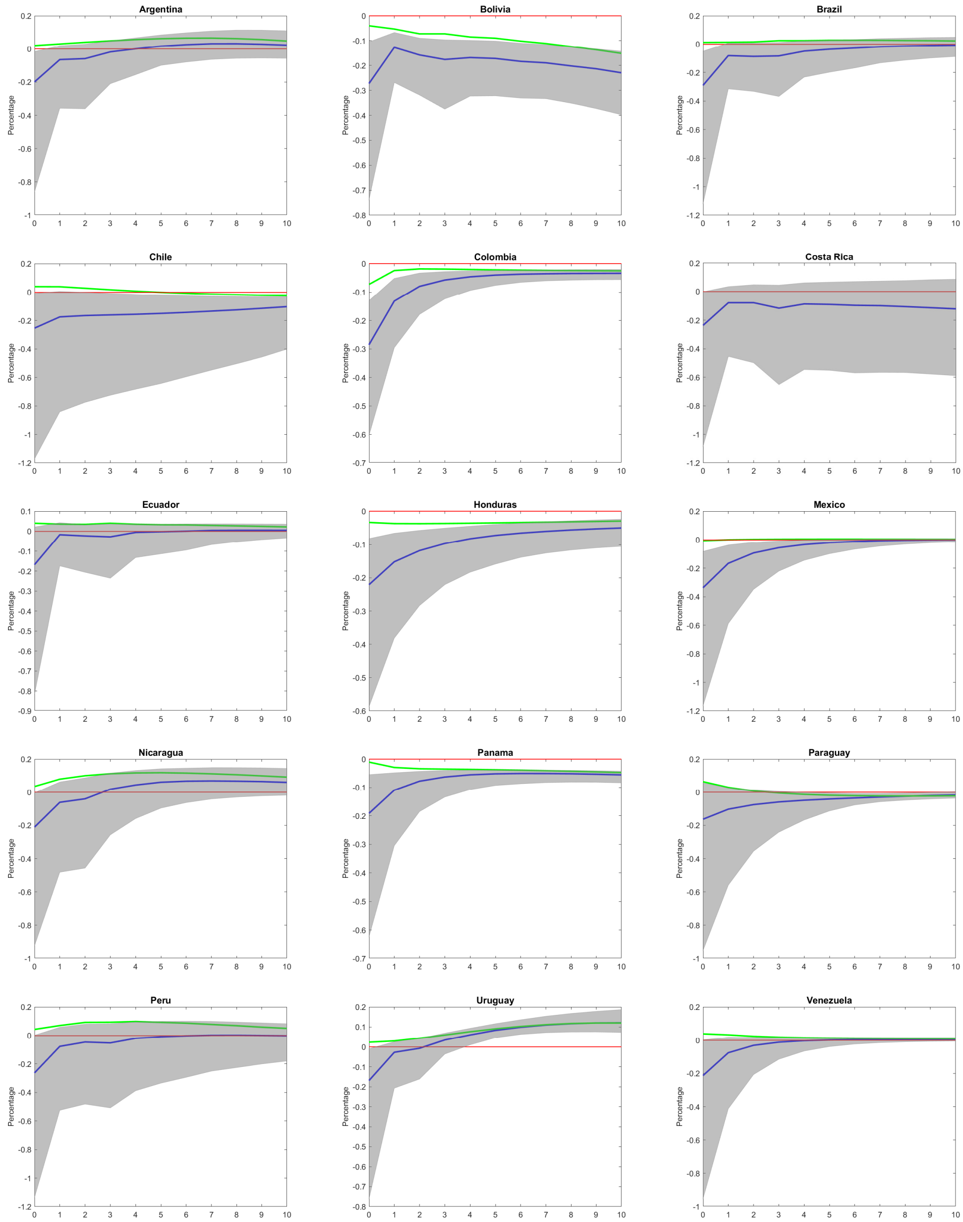
As discussed in subsection 2.2.3, the profit-squeeze approach indicates that the entrepreneurs and firms react to change in the functional distribution (wage and profit share). If economic activity falls due to economic non-distributional factors, then the profit share (wage share) increases (decreases). The current subsection presents the IRF results with the profit-squeeze restriction in the systematic component of the functional distribution (equation 37).

Figure 2 illustrates the effect of output on the structural change in wage share with the profit-squeeze approach. The majority of countries in the region show a negative impact on growth ($t = 0$) with the unexpected rise of wage share. Only Ecuador, Paraguay, Peru, and Venezuela have no statistical significance in the IRF at $t = 0$. Argentina, Brazil, Chile, Costa Rica, Nicaragua, and Uruguay react temporarily negatively to an orthogonal increase in wage

16. Stockhammer, Onaran, and Ederer (2008) uses the Cholesky decomposition and different orders to mitigate the endogeneity of the functional distribution in the systems method.

share for a period of one year. In contrast, Bolivia, Colombia, Chile, Honduras, and Panama present permanent and negative effects on growth. Meanwhile, the Uruguayan economy shows a negative impact, but the growth increases after the four periods of shock.

Figure 2: Effects of functional distribution shock to GDP with profit-squeeze approach



Note: The solid line depicts the posterior point-wise median response of GDP and the shaded area represents the 68 percent equal-tailed point-wise posterior probability bands. The green solid line represents the posterior point-wise median response of GDP with the pure exogenous approach.

Under the profit-squeeze approach, I propose that economies of Bolivia, Chile, Colombia, Honduras, and Panama have profit-led regimes. From the perspective of the negative influence of growth on the profit share, these countries show permanent negative effects in all periods after the structural shock of the wage share. These results confirm the pure exogenous approach in Bolivia, Colombia, Honduras, and Panama. The other countries do not show a temporary impact, nor are they statistically significant.

2.3.3 Overhead Labor Approach

Under the overhead labor approach some post-Keynesian economists argue that the functional distribution is endogenous. With the economic expansion the profit share will increase because unit labor costs decrease (as total direct labour costs increase proportionally with production, but total overhead labor costs remain constant). The opposite just will happen (an increase in the wage share) during an economic contraction (Rowthorn 1981). This subsection presents the IRF results on output generated by an structural shock of wage share with this restriction.

Figure 3 illustrates the results of a one-percentage point increase in the wage share of each country. First, it can be observed that most economies increase their output temporarily for one year. Only the GDPs of Bolivia, Colombia, and Honduras do not present statistically significant growth. Countries like Brazil, Costa Rica, Ecuador, Mexico, Nicaragua, Peru, Uruguay, and Venezuela present a permanent and positive effect on output growth for ten periods after the shock. Meanwhile, the structural shock of the wage share produces a medium-run effect on the GDP of Argentina, Chile, and Paraguay between years one and eight.

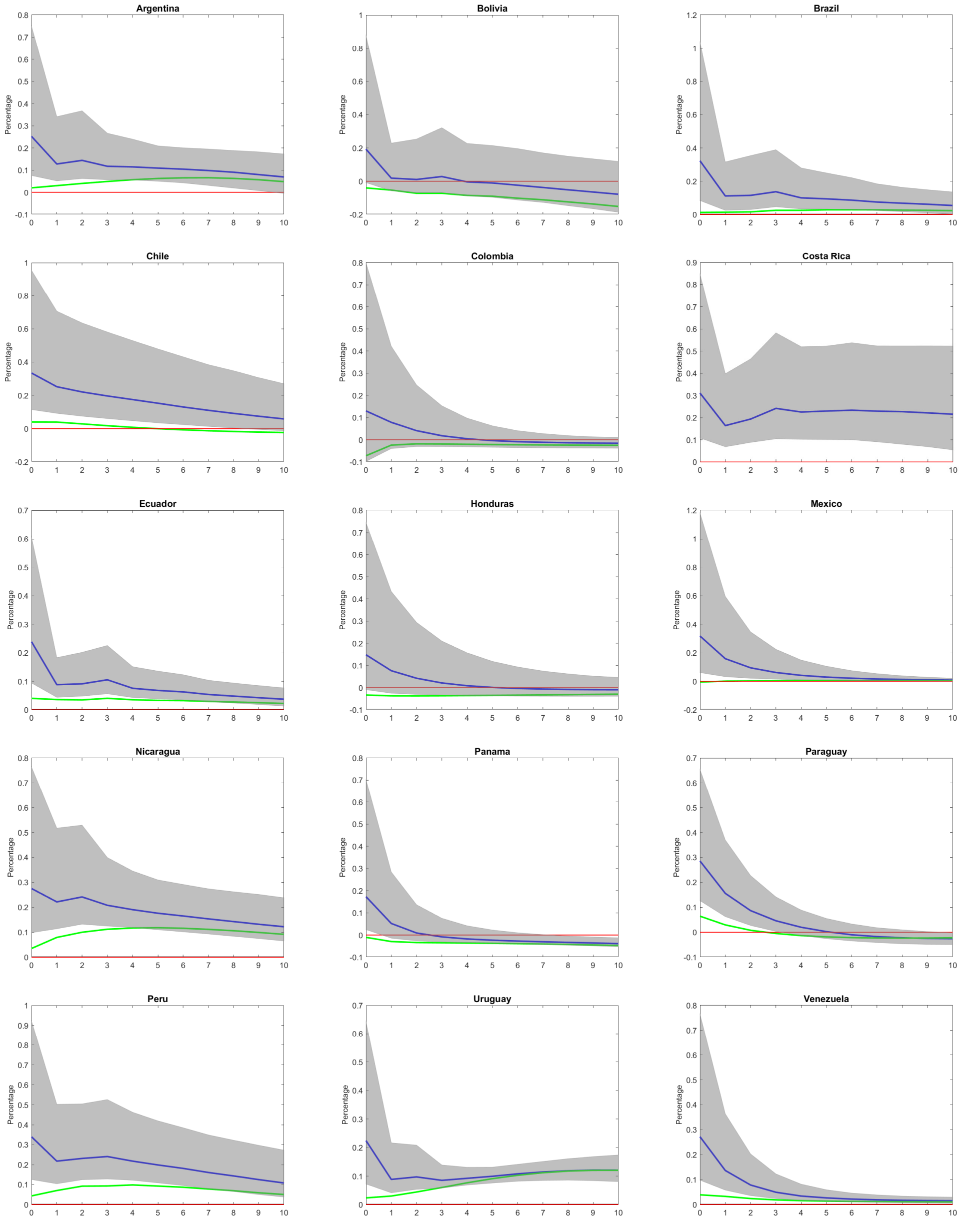
The overhead labor approach demonstrates that economies like Brazil, Costa Rica, Ecuador, Mexico, Nicaragua, Peru, Uruguay, and Venezuela may have wage-led regimes in the period analyzed. In contrast to the profit-squeeze restriction, Bolivia, Colombia, and Honduras do not present any increase in GDP when the output parameter is negatively imposed in the distribution equation. These overhead labor results confirm that Ecuador, Nicaragua, Peru, Uruguay, and Venezuela present wage-led regimes with the exogenous approach.

2.3.4 Robustness Check

The three subsections above present the results of SVAR estimation with different restrictions. The profit-squeeze, and overhead labor approaches allow the mitigation of the endogeneity of the functional distribution. In this section, robustness checks are presented to obtain the effect of wage share on output. The GDP and wage share of the initial SVAR model (equation 26) are retained, and the other components of demand (consumption, exports, imports, and government spending) are recursively changed. These estimations will show that the growth regime holds with different specifications.

Figures 4 and 5 illustrate the median of the results of the structural shock of wage share to output with the different components of demand in the profit-squeeze approach as well as in the overhead labor approach. I can see that the median of the effect of a one-point percentage increase in the wage share on output is similar in most models. The impact as a dynamic response of output also maintains the same path. Both restrictions present a similar point estimation,

Figure 3: Effects of functional distribution shock to GDP with overhead labor approach



Note: The solid line depicts the posterior point-wise median response of GDP and the shaded area represents the 68 percent equal-tailed point-wise posterior probability bands. The green solid line represents the posterior point-wise median response of GDP with the pure exogenous approach.

which confirms the results of the SVAR model with different components and thus, the regimes are maintained for the countries under analysis.

In some economies, such as Argentina, Bolivia, and Ecuador, the effect of distribution shock on growth is more intensive with the incorporation of external variables. The concentration of exports and imports, or external buffers, probably produces this different response and persistence in terms of growth (see Carrillo-Maldonado and Díaz-Cassou 2019). It can also be seen that the model does not behave similarly with the components of demand for some countries, such as Chile or Costa Rica.

2.3.5 Does the Effect of Functional Distribution on Output matter?

The previous subsections discuss the effect of the increase in wage share on GDP. However, it is essential to understand the importance of this structural shock in terms of GDP. In this section, the forecast error variance decomposition (FEVD) is used to estimate wage share shock as a percentage of output' variance. It should be noted that the model includes commodities prices and global demand to control the effect of external conditions, which contribute to a significant proportion of the dynamic macroeconomic variables of the region (Carrillo-Maldonado and Díaz-Cassou 2019).

Table 2 reports the contribution of the shock of wage share in the GDP variance under different assumptions of the endogenously functional distribution. In the first instance, it is evident that under the classic approach of complete exogeneity, the wage share has a smaller contribution to the FEVD of GDP, in contrast to its criticisms of endogeneity (profit-squeeze and overhead labor). The exceptions to this are Nicaragua and Uruguay, which have a greater share of GDP under the pure exogenous assumption than for the profit squeeze assumption. In addition, Bolivia has a greater share of GDP under the classic approach than under the assumed overhead labor.

Table 2 indicates that, under the pure exogenous approach, wage share has the highest contribution of GDP for Uruguay (52%), and, in contrast, has the lowest for Mexico (1%) and Chile (2%). For the profit-squeeze approach, Honduras, Panama, Bolivia, and Chile show that changes in functional distribution have the highest contribution to output (60%, 58%, 57%, and 57%, respectively). In contrast, the Peruvian, Costa Rican, Nicaraguan, and Ecuadorian economies have the lowest GDP contributions at 24%, 26%, 28%, and 29%, respectively. Meanwhile, under the assumption of the overhead labor approach, Nicaragua, Peru, Ecuador, and Argentina have the largest shares in the region at 68%, 67%, 64%, and 61%, respectively. In the same model (overhead labor), the wage share has lower shares of GDP in Bolivia (20%) and Honduras (27%). The remaining countries show values in these ranges.

Table 2: Forecast Error Variance Decomposition of Output

Countries	**Classical**	**Profit squeeze**	**Overhead**
Argentine	22%	33%	61%
Bolivia	28%	57%	20%
Brazil	7%	38%	56%
Chile	2%	36%	39%
Colombia	8%	57%	33%
Costa Rica	10%	26%	58%
Ecuador	13%	29%	64%
Honduras	11%	60%	27%
Mexico	1%	44%	43%
Nicaragua	37%	28%	68%

Countries	Classical	Profit squeeze	Overhead
Panama	19%	58%	32%
Paraguay	7%	37%	48%
Peru	18%	24%	67%
Uruguay	52%	41%	55%
Venezuela	5%	37%	55%

Note: the table presents the posterior point-wise median share of variance explain to wage share on output.

2.3.6 Regimes of Latin American Countries

As mentioned in section 1.5, the identification of growth regimes depends on the sign of the response of output to a change in the wage share. Under the systems (aggregative) approach, if the unexpected change in the distribution in favor of workers has a positive effect on GDP, the analyzed country has a wage-led regime. In contrast, if the IRF is negative given a structural shock to the wage share, it has a profit-led regime. Similarly, it is possible to identify the regime in the short- ($t = 0$) and medium-term ($t > 0$) because the SVAR allows obtaining the dynamic response (effect) of output to a structural shock in the wage share.

Table 3 presents a summary of the findings regarding the growth regime of Latin American countries in the short and medium run with the three restrictions. I can identify the regime for nine out of 15 countries in the short run with the exogenous assumption. Of these, Costa Rica, Ecuador, Nicaragua, Paraguay, Peru, and Venezuela have a wage-led regime, while Bolivia, Colombia, and Honduras have a profit-led regime. When imposing endogeneity by using the profit squeeze approach, Bolivia, Colombia, and Honduras have a profit-led regime, as do Brazil, Mexico, and Panama. In addition, no country has a wage-led regime. However, only Bolivia, Colombia, and Honduras do not have a regime with the overhead labor approach. The rest of the countries have wage-led growth, confirming the regimes under the exogenous assumption. Contrary to my expectations, Brazil, Mexico, and Panama have contradictory results between overhead labor and profit-squeeze constraints.

In the medium run, it is not possible to identify the regime only for Brazil, Chile, Mexico, and Paraguay with the pure exogenous restriction. The growth of Bolivia, Colombia, Honduras, and Panama shows a profit-led regime. Meanwhile, a wage-led regime is determined for Argentina, Costa Rica, Ecuador, Nicaragua, Peru, Uruguay, and Venezuela. When solving for endogeneity by profit-squeeze, Bolivia, Colombia, Honduras, Mexico, Panama, and Uruguay have a profit-led regimes, unlike any other country. In contrast, 11 countries have a wage-led regime when considering endogeneity by overhead labor, which confirms the regime for Argentina, Costa Rica, Ecuador, Nicaragua, Peru, and Venezuela, under the pure exogenous assumption. In this medium horizon, it is also observed that Mexico and Uruguay have contradictory regimes, without being able to identify them.

Table 3: Regimes of Latin American Countries

	Short-run ($t = 0$)			Medium-run ($t > 0$)		
Countries	**Pure exogenous**	**Profit squeeze**	**Overhead labor**	**Pure exogenous**	**Profit squeeze**	**Overhead labor**
Argentina	n/a	n/a	wage-led	wage-led	n/a	wage-led
Bolivia	profit-led	profit-led	n/a	profit-led	profit-led	n/a
Brazil	n/a	profit-led	wage-led	n/a	n/a	wage-led
Chile	n/a	n/a	wage-led	n/a	n/a	wage-led
Colombia	profit-led	profit-led	n/a	profit-led	profit-led	n/a
Costa Rica	wage-led	n/a	wage-led	wage-led	n/a	wage-led
Ecuador	wage-led	n/a	wage-led	wage-led	n/a	wage-led
Honduras	profit-led	profit-led	n/a	profit-led	profit-led	n/a
Mexico	n/a	profit-led	wage-led	n/a	profit-led	wage-led
Nicaragua	wage-led	n/a	wage-led	wage-led	n/a	wage-led
Panama	n/a	profit-led	wage-led	profit-led	profit-led	n/a
Paraguay	wage-led	n/a	wage-led	n/a	n/a	wage-led
Peru	wage-led	n/a	wage-led	wage-led	n/a	wage-led
Uruguay	n/a	n/a	wage-led	wage-led	profit-led	wage-led
Venezuela	wage-led	n/a	wage-led	wage-led	n/a	wage-led

Note: The table describes the growth regime between wage-led and profit-led with the three restrictions. One country must have statistically significant IRF at $t = 0$ to identify the regime at short-run, and statistically significant IRF at $t > 0$ for medium-run. If IRF is positive, the regime is wage-led and the regime is profit-led when the sign of IRF is negative. Finally, the country has not regime (n/a) when the IRF are not statistically significant

In general, Bolivia, Colombia, and Honduras have a profit-led regime in the short and medium-term. The regime for Bolivia and Honduras is consistent with that found by Alarco Tosoni (2016) but contrasts with the Colombian economy. In addition, a wage-led regime is observed in the economies of Costa Rica, Ecuador, Nicaragua, Peru, and Venezuela. A wage-led regime can identify only with the overhead labor restriction for Argentina, Chile, and Paraguay. These results agree with Alarco Tosoni (2016) and Jiménez (2020), although it is not the same for Chile as Alarco Tosoni (2016) estimates a wage-led regime. I show contradictory results between the short and medium-term for Brazil, Mexico, Panama, and Uruguay. Burle and Carvalho (2021) show that the regime for Brazil cannot identify either regime, although Tomio (2020) identifies a wage-led regime and Jesus, Araujo, and Drumond (2017) evidence a profit-led regime. This same contradiction is evident for Mexico with a wage-led regime of Alarco Tosoni (2016) and, Sánchez and Luna (2014) and Luyano Cuevas and Herrera Revuelta (2018) find the profit-led regime for Mexico. In contrast to this paper, Alarco Tosoni (2016) and Jiménez (2020) obtain a profit-led growth regime, and Alarco Tosoni (2016) identifies a wage-led regime for Uruguay.

2.4 Conclusions

This chapter finds to identify the growth regime of the Latin American countries between 1960-2014. Other multi-country studies although include countries of the region, do so in a not strictly regional context as I do here in the overall sample. The exception is the studies by Alarco Tosoni (2016, 2017), where the predominant econometric approach is behavioural equation strategy. This study introduces a new methodology of SVAR in the empirical debate on growth regimes in the post-Keynesian literature on income distribution and growth. This study contributes to the literature by presenting a partial identification method to determine the effect of the functional distribution on output. I discussed the different endogeneity theories of the distribution to understand the identification.

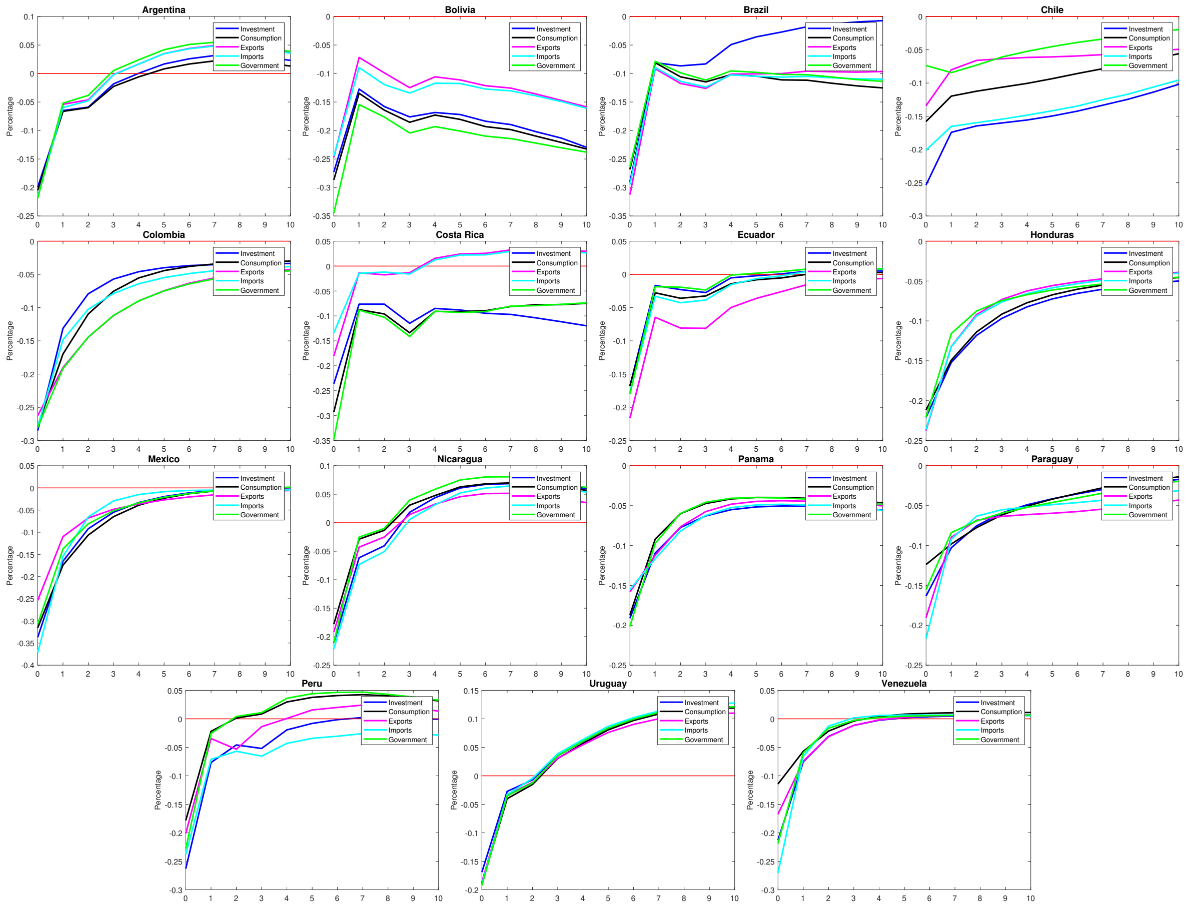
The response of output to an unexpected changes in the wage share, through IRF, shows different dynamics in each country, all models controlled for global variables. Under pure exogenous and profit-squeeze perspectives, Bolivia, Colombia, and Honduras present negative effects on their GDP. In contrast, the growth of Costa Rica, Ecuador, Nicaragua, and Peru show a positive IRF when the exogenous and overhead labor restrictions are employed at short-term. Contrary to my expectations to clearly identify a regime, the IRF of Brazil and Mexico could be positive or negative, depending on restriction (overhead labor and profit-squeeze). Moreover, the sign restriction allows the results of Argentina and Chile to be clarified. For the pure exogenous and profit-squeeze approaches, the results indicate that Bolivia, Colombia, and Honduras have profit-led regimes. In addition, I observe that Chile, Costa Rica, Ecuador, Nicaragua, Peru, and Venezuela have wage-led regimes under the pure exogenous and overhead labor assumptions. Finally, the regimes of Brazil, Mexico, Panama, and Uruguay could not be determined at medium term.

My results confirm that allowing different types of endogeneity over the distribution of income may improve and clarify the identification of growth regimes in Latin American countries. However, in those cases where contradictory results are obtained, we should leave the door open for further empirical research with higher frequency data (quarterly or monthly) or with other methodologies (nonlinear or state-space models). Some studies, like Assous and Dutt (2013), Marglin (2017) or Nikiforos (2016a, 2022), propose that there is a nonlinear relationship between functional distribution and output, implying that the country can to shift between profit and wage regime. Carrillo-Maldonado and Nikiforos (2022) use the time varying parameter model to identify changes in the regime over time of the US economy. In addition, the effect of distribution on aggregate demand, conditional on the level of capacity utilization, can be explored.

Appendix

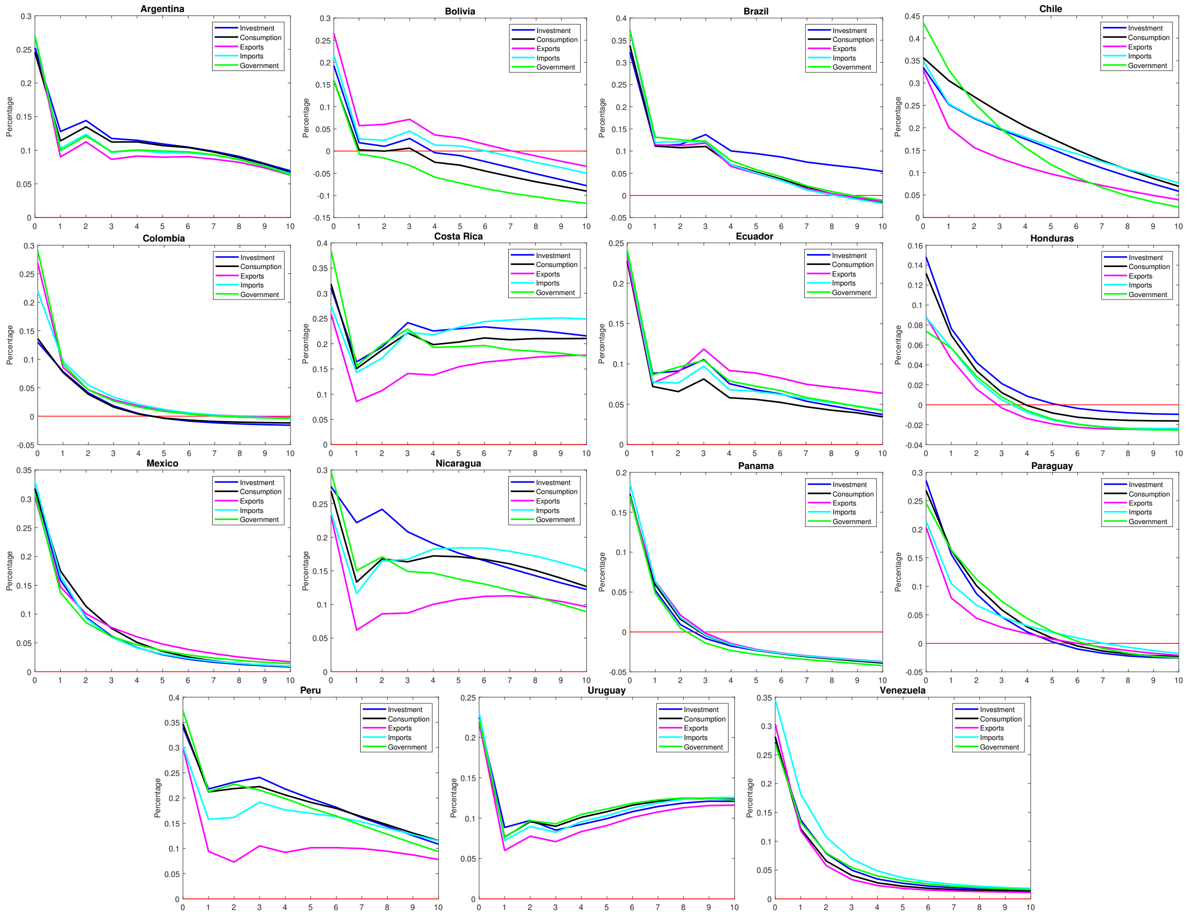
Figures of Robustness Check

Figure 4: Comparison of effects of functional distribution shock to GDP with profit-squeeze approach



Note: The solid line depicts the posterior point-wise median response of GDP with different components of demand in the SVAR model.

Figure 5: Comparison of effects of functional distribution shock to GDP with the overhead labor approach



Note: The solid line depicts the posterior point-wise median response of GDP with different components of demand in the SVAR model.

Chapter III
Varying Distribution-led Regimes[17]

3.1 Introduction

The introduction of the concept of wage- and profit-led growth by Bhaduri and Marglin (1990) has led to a very extensive empirical literature that aims to estimate the regime of various economies around the world. Using the taxonomy distinguished by Blecker (2016) this literature uses two main approaches for the estimation of the regime: the 'structural' and 'aggregative' approaches. The structural approach decomposes total output into the various components of aggregate demand (consumption, investment and net exports) and estimates the effects of changes in distribution on each of these components individually. The overall regime is then calculated as the sum of these individual effects. On the other hand, the aggregative approach estimates the effect of changes in distribution on total output, or the rate of capacity utilization. Overall, contributions following the first approach tend to produce wage-led results, while contributions following the aggregative approach tend to produce profit-led results.

The obvious benefit of the structural approach is that one can distinguish between the effects of redistribution on the different components of aggregate demand, and therefore the process that these results produce are transparent specifiying the effects on each component of demand. On the other hand, these contributions suffer from serious endogeneity problems, as ordinary least squares (OLS) regressions are used. Since causality between distribution and growth runs both ways, simple OLS regressions capture the correlation between the variables under investigation rather than the causal effect of (changes in) distribution on growth. Another weak point of this approach is that the investment function is famously difficult to estimate. The strategy that is usually being employed is that if the coefficient of the regression of growth on distribution is statistically insignificant, it is being treated as zero. This can explain why this approach tends to show that economies are wage-led. On the other hand, the aggregative approach has the advantage of dealing with the endogeneity problem, and as a related contribution usually employ vector autoregressive (VAR) or instrumental variables (IV) models. From this approach the research does not have to specify an investment function—at the cost of not being able to distinguish between the different components of aggregate demand.

Another problem in this literature, which is highlighted by Nikiforos (2016a), is that the regime of the economy is taken to be fixed over the whole period of estimation. The usual strategy is to use data for a country, run a regression and conclude if the economy is wage- or profit-led. For example, in the case of the US, data are available in quarterly frequency since 1947. Hence, the implicit assumption of most studies is that the distribution-led regime of the economy is the same for the period 1947 until the last year of the sample in the 1990s or the 2000s. This is problematic because there are good theoretical and empirical reasons that explain

17. The chapter is being published as an article in a Scopus-indexed academic journal.

why the regime of an economy might change over time. Accordingly, a well established stylized fact from the financialization literature is that there has been a decoupling of investment from cash flows over the last four decades. This implies that the propensity to invest out of profits has decreased and therefore economies such as the US has become less profit-led or more wage-led over that period.

The change over time of the effect of a change in the distribution of income on economic growth is explained in the same well-known study of Bhaduri and Marglin (1990). They propose that the growth regime depends on the level of the distribution and the utilization of capacity (see pages 338-339). The authors also show that investment would be a nonlinear function that causes multiple equilibria on the identification of the growth regime (see pages 392-393). Finally, not less important, Bhaduri and Marglin indicate that the slopes of the proposed functions are locals. This implies that the parameters are not unique, that the effect of a change of income distribution on output could change and and therefore more than a single growth regimen may exist.

The present chapter is to the best of my knowledge the first attempt to estimate the regime of an economy allowing for changes in the regime itself over time. For that purpose, I employ a time-varying parameter vector autoregressive (TVP-VAR) model to estimate the changing effect of the distribution variable (wage share) on output using long time series and data corresponding to the US economy (between 1952.II and 2019.IV). I use Bayesian econometrics to estimate this model with partially information of prior distribution (see Koop and Korobilis 2010). The methodology resembles the approaches of Tavani, Flaschel, and Taylor (2011) and Nikiforos and Foley (2012) who only found derived regimes from multiple equilibria. However, they neither allow to estimate the distributional impact over a specific period (e.g. decade 70s) nor the change of the growth regime between periods (e.g. of decade 80s to 90s) for the same sample. This research contributes to the post-Keynesian empirical literature with an empirical proposal in which I estimate the growth regime at a specific period and when there is change of regime.

I estimate different specifications of the TVP-VAR model to understand the time-varying effect of the wage share on gross domestic output and detect the demand regime for the U.S. economy. Although a regime change cannot be identified, I find, as expected, that the degree of profit-ledness has decreased over the last four decades when I use what I call a basic model (that relates the wage share and economic growth). When I include the debt and loans to households (normalize by disposable income), the negative effect does not significantly modify the basic results, but results show higher volatility. Interestly enough, the profit-led regime intensifies when I replace the distributional variable with the wage share adjusted for the share of the bottom 99% of the distribution of income.

3.2 Changes in Distribution-ledness

The implicit or explicit assumption of most of the theoretical and empirical literature on wage- and profit-led growth is that the regime of each economy is constant over time. This is surprising given that the concept of the distribution-led growth and the distinction between wage- and profit-led growth emerged from a research project that emphasized regime changes over time Marglin (1990) and Marglin and Bhaduri (1990).

An important step forward in that respect have been the recent contributions that emphasizes the possibility of multiple equilibria (Nikiforos and Foley 2012; Assous and Dutt 2013; Tavani, Flaschel, and Taylor 2011). If there are multiple equilibria the regime of the economy is not unique. Nikiforos and Foley (2012) suggest the distributive schedule is non-linear: the wage share is decreasing for low levels of utilization and increases for high levels. Coupled with a monotonic demand schedule there is the possibility of two equilibria. In this case, even if demand is profit-led an increase in the profit share could be contractionary for a low-utilization equilibrium.

Assous and Dutt (2013) suggest that labor market conditions and the firms level of concentration determinate capacity utilization and distribution simultaneously. The authors also propose that the mark-up and profit rate aren't constant over the time because the market structure, workers power and the firms concentration change over time. Assous and Dutt conclude that it is necessary to understand that there are small and large changes. Small changes do not move the system to a different equilibrium, but a large shock can do that.

Tavani, Flaschel, and Taylor (2011) use non-parametric methods to determine the distributive schedule. Like Assous and Dutt the non-linearities they detect lead to three possible equilibria: i) low level of wage share and high capacity utilization, ii) high level of wage share and low capacity utilization, and iii) an intermedium point between these variables.

Unlike these papers, more recent contributions by Nikiforos (2016a, 2022), and Marglin (2017) have emphasized the non-linearities in demand. Marglin (2017) argues that over the course of the business cycle investment reacts to profitability in different ways. During a crisis -at low levels of utilization- enterpreneurs are less sensitive to distribution and are more interested in the performance of the economy. Profitability plays a more important role at high levels of utilization. As a result, Marglin concludes, the regime of the economy is different at different phases of the cycle: an economy tends to be wage-led during a crisis and profit-led at high levels of utilization. Thus, Marglin arrives at the same conclusions with Nikiforos and Foley (2012), albeit from a different path.

Nikiforos (2016a, 2022) examines the evolution of the distribution-led regimes in the long-run. He suggests that an economy tends to become less profit-led (or more wage-led) as the profit share is increasing. He provides a series of theoretical and empirical reasons why this might be the case. If this mechanism is coupled with an unstable distribution, where each class becomes more able to tilt distribution in its favor as its share of income is increasing, it is likely that the system exhibits predator-prey cycles with distributionledness as the predator and distribution as the prey. Such a system moves endogenously between periods of wage- and profit-led growth. For the present paper, the model proposed by Nikiforos is important since it suggests that, over the last decades, as the profit share has increased the economy has become less profit-led.

3.3 The Empirical Strategy

This section presents the econometric strategy that I carried out to estimate whether the impact of the functional distribution of income on output varies over time. I use the state-space representation to obtain the change of the parameters, called as time-varying parameters (TVP) model. The state-space representation has the measurement (observed) equation that contains the observed variables, which is a function of state variables and a stochastic residual, and the state (unobserved) equation fits the dynamic of the state variable (Kim and Nelson 1999). This subsection is divided into three parts: a first part presents the time-varying parameters model, the second subsection explains the estimation of the TVP model, and the third describes the data used.

3.3.1 Time-Varying Parameters Model

Following Koop and Korobilis (2010), Nakajima (2011), and Primiceri (2005), I considered a time-varying parameter structural vector autoregressive (TVP-SVAR) model as

$$A_{0,t}Y_t = \sum_{l=1}^{p} A_{l,t}Y_{t-l} + D_t\varepsilon_t, \quad \text{for} \quad 1 \leq t \leq T \tag{39}$$

Where Y_t is the $1 \times n$ vector of the endogenous variables, $A_{j,t}$ is $n \times n$ matrix of structural parameters for $j = 0 \dots p$ that vary over time, D_t is $n \times n$ diagonal matrix of standard deviation $(\sigma_{j,t})$ that vary over time, ε_t is the $1 \times n$ vector of structural shocks with mean zero and variance I $(\varepsilon \sim \mathcal{N}(0,I))$, n is the number of endogenous variables, p is the number of lags, and T is the sample size. Note that A_0 is the lower triangular matrix and D is the diagonal matrix as:

$$A_0 = \begin{bmatrix} 1 & 0 & \dots & 0 \\ a_{2,1} & 1 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ a_{n,1} & a_{n,2} & \dots & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} \sigma_1 & 0 & \dots & 0 \\ 0 & \sigma_2 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & \sigma_n \end{bmatrix}$$

The structural parameters are meant to capture time variation in the contemporaneous relationship and lag structure of the model. It leaves up that the data explicates the variation of this linear structure that comes from changes in the size of shocks or the propagation mechanism (Kim and Nelson 1999). As Primiceri (2005) and Nakajima (2011), I implemented a stationary process for time-varying parameters (state variables). Then, the state variables have the following process:

$$\alpha_t = \alpha_{t-1} + \eta_t \tag{40}$$

$$\beta_t = \beta_{t-1} + \nu_t \tag{41}$$

$$\log \sigma_t = \log \sigma_{t-1} + \xi_t \tag{42}$$

Where α_t is the vector of stacked matrix $A_{0,t}$, β_t is the vector of stacked matrix $B_t = [A_{1,t} \ldots A_{p,t}]$, and $\log \sigma_t$ is the vector of diagonal of matrix D.

I also assumed that the innovations components of the model have jointly independent and identical distribution with the variance as:

$$V = Var\left(\begin{bmatrix} \varepsilon_t \\ \eta_t \\ \nu_t \\ \xi_t \end{bmatrix}\right) = \begin{bmatrix} I_n & 0 & 0 & 0 \\ 0 & Q & 0 & 0 \\ 0 & 0 & S & 0 \\ 0 & 0 & 0 & W \end{bmatrix} \tag{43}$$

where I_n is $n \times n$ identity matrix, and Q, S and W are positive define matrices. I implemented the TVP-SVAR with independent innovations, under the premise that there is no correlation between the parameters as Primiceri (2005) evidence to U.S. economy.

3.3.2 Estimation Method

There are some methods to estimate the TVP-SVAR models. Recently, studies as Bitto and Frühwirth-Schnatter (2019) and Hauzenberger et al. (2019) propose algorithms for these state-space models, but focusing on many variables (big data) with shrinking and sparsity problems. I carried out the standard method through the Kalman filter and bayesian inference because traditionally growth regime models include only the distribution of income and growth as endogenous variables (see Dutt 2017; Cauvel 2019; Stockhammer 2017). I do not here describe the mathematical process, but present the algorithm to estimate this state-space model. One can review the documents of Kim and Nelson (1999), Koop and Korobilis (2010), Primiceri (2005), and Nakajima (2011) to obtain more econometric details.

I estimated the model with Bayesian methods that allow obtaining the distribution of the unknown parameters by algorithms of simulation. I used the Markov Chain Monte Carlo (MCMC) algorithms in order to exploit the blocking structure of state-space form (see Kim and Nelson 1999). Conditional on observed data and prior hyperparameters, I implemented the Gibbs sample in four steps:

- Conditional on A_0^T, D^T and V^T, the posterior distribution of B^T can be drawn using the standard Kalman filter.
- Conditional on B^T, D^T and V^T, the posterior distribution of A^T can be obtained through product of normal (Gaussian) densities.
- Conditional on B^T, A^T and V^T, the posterior distribution of D^T can be drawn transforming a nonlinear and non-Gaussian state space representation in a linear and approximately normal model, that allow use the standard simulation smoothers.
- Conditional on A_0^T, D^T and B^T, I simulated hyperparameters V as product of independent inverse-Wishart distributions.

The Bayesian methods use the prior information to estimate the unknown parameters. Following Koop and Korobilis (2010), I used partial informative hyperparameters to the initial values[18]:

$$\begin{aligned} B &\sim \mathcal{N}(0,I) \\ A_0 &\sim \mathcal{N}(0,I) \\ D &\sim \mathcal{N}(0,I) \\ Q &\sim \mathcal{IW}(k_Q^2 * I, n+1) \\ S &\sim \mathcal{IW}(k_S^2 * I, n+1) \\ W &\sim \mathcal{IW}(k_W^2 * I, n+1) \end{aligned}$$

The dimension of I identify matrix depends of the rank of matrices. I also set $k_Q = 0.01$, $k_S = 0.01$ and $k_W = 0.01$ to present the results in the next section.

I ran 12,000 draws to estimate the conditional posterior distribution of the parameters. To mitigate the initial values, I discarded 2,000 draws (burn-in simulations) that allow converge the posterior values. Finally, I present the posterior median of the parameters and the 68 percent equal-tailed point-wise posterior probability bands.

3.3.3 Dataset and Order

I estimated the basic model that involve the wage share (WS) and gross domestic product (GDP). Then, I added a financial variable to contrast the main results. Finally, I replaced the traditional variable of wage share with an adjusted variable that only considers workers in the

18. I implemented ordinary least square and uninformative prior, but the results are similar

bottom 99% of the distribution. The variables are retrieved from Federal Reserve Bank of St. Louis (FRED), using the following mnemonics: PRS85006173 (Labor Share of Nonfarm Business Sector), GDPC1 (Real GDP), and TLBSHNO (Total Liabilities of Households and Nonprofit Organizations). I also used the mnemonics sptinc992j (Pretax national income share held by 1% top group) of World Inequality Database (WID). I transformed to annual change of GDP and normalized the financial variable with disposable income (DPI). Normally, the variables are demeaning and standardized to estimate the state-space models (see Stock and Watson 2016).

As I presented before, I established a recursive identification (Cholesky decomposition) in matrix A_0 to obtain the structural shock. So, I proposed use the basic model where labor share is completely exogenous to GDP in the contemporaneous relationship ($t = 0$). When I included the financial variable I added first this variable. The model with adjustable wage share use the same order without modification[19].

3.4 Results

This subsection presents the results obtained with the time-varying parameters model to explain how changes the effect of variation in the functional distribution on output. The first part shows the effect of exogenous change of labor share on growth over time in the basic model. In the second part, I expose the time-varying response of GDP to an increase of the wage share with the financial variables. I also present the results obtained regarding the demand regime when I replace the traditional distribution variable for the wage share adjusted by the income of workers in the bottom 99% of the distribution. All results are normalized to a exogenous change of the one point percentage of the labor share.

3.4.1 Time-Varying Effects of the Functional Distribution

Figure 6 shows the results of time-varying effect on GDP to orthogonal increase of the labor share with the basic model. This graph presents the median and 68 percent equal-tailed pointwise posterior probability bands of impulse-response function. The cumulative IRF is estimated at different horizon ($0 : h$) to understand time-varying response of GDP in the short (less than four quarters) and medium-run (more than one year) across the sample. The sample used is between second quarter of 1952 to fourth quarter of 2019.

The first left panel of figure 6 presents time-varying impacts on GDP from a structural shock in the functional income distribution ($t = 0$). I observe that the U.S. economy has had a profit-led regime, since the response of the GDP has been negative with statistically significance to an orthogonal increase in the labor share. The median of impact ($t = 0$) varied from -0.96 to -0.42 percentage points on annual growth. Meanwhile, the first right panel shows that output

19. I test different orders but the results are the same because I maintain the assumptions of output not affect the wage share at short-run.

also falls with statistically significance one quarter after the income distribution shock. The cumulative response of GDP started with -2.02 percentage points at second quarter of 1952 and falls to -2.10 percentage points in the third quarter of 1962. Then, the effect raised to -0.74 percentage points at the end of 2019, with statistically significance.

One year after the shock in the labor share (second panel on the left of figure 6), growth continues to be profit-led since the effect on the GDP is still negative. The cumulative response of output in the first year shows three periods. First, the effect intensified negatively, with the median estimate moving from -3.24 percentage points in the second quarter of 1952 to -3.74 percentage points in the third quarter of 1965. Secondly, the profit-led regime quickly weakened, with GDP response at the end of the first year by up to -2.81 percentage points in the third quarter of 1985. Third, the cumulative effect shows a slow change over time to reach -1.04 percentage points by the end of 2019. All time-varying effect of GDP shows statistical significance over sample.

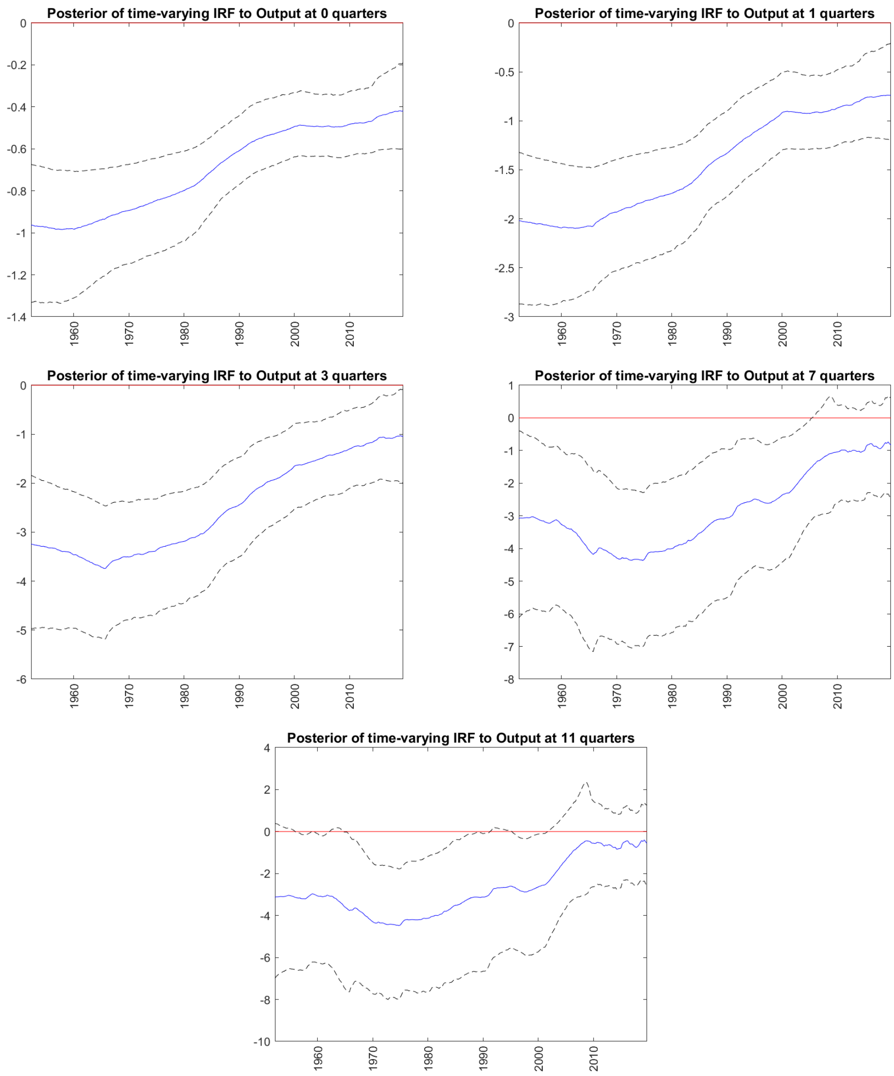
The cumulative effect on GDP loosed statistically significance at the medium-run (see second right panel and middle last panel of figure 6). The impulse-response function after seven quarters shows that the innovation was statistically significance between third quarter of 1952 and second quarter of 2005. The cumulative effect in the GDP (median point estimation) at this horizon varied -1.52 and -4.37 percentage points. During this period, the figure 6 first shows that the GDP reaction falls to -4.37 percentage points until the end of 1974, then it increases to -1.52 percentage points at the end of the second quarter of 2005. Since the end of 2005, output response after two years has no longer been statistically significant. This evidence permits us to identify that the profit-led regime continues in the medium term between 1952 and 2005, even though it has weakened in recent years.

The medium-run response (after three years) of GDP to the structural shock in the labor share is not statistically significant in most of the sample (last panel of figure 6). I can identify that this cumulative effect (over 11 quarters) is statistically significant between the fourth quarter of 1964 and the third quarter of 1991. Interestingly, the figure shows an approximately U-shaped effect at the three-year horizon, with its minimum value of -4.48 percentage points at the end of 1974. Therefore, it is not possible to ensure that the profit led regime will be maintained in this horizon (three years later).

3.4.2 The Financial Leverage on Effect of Functional Distribution

There are several studies that suggest that financial deepening has had impacts on the identification of growth regimes (see Hein, Meloni, and Tridico 2020; Kohler, Guschanski, and Stockhammer 2019; Onaran, Stockhammer, and Grafl 2009). To better understand the time-varying effect of a change in the wage share I include debt securities and loans of households (normalize to disposable income) in the so-called basic model (wage share and output growth) to understand the bias that cause the financial-dominance of U.S. economy. Figure 7 shows the

Figure 6: Time-Varying Effects of labor share shock on output at different horizon



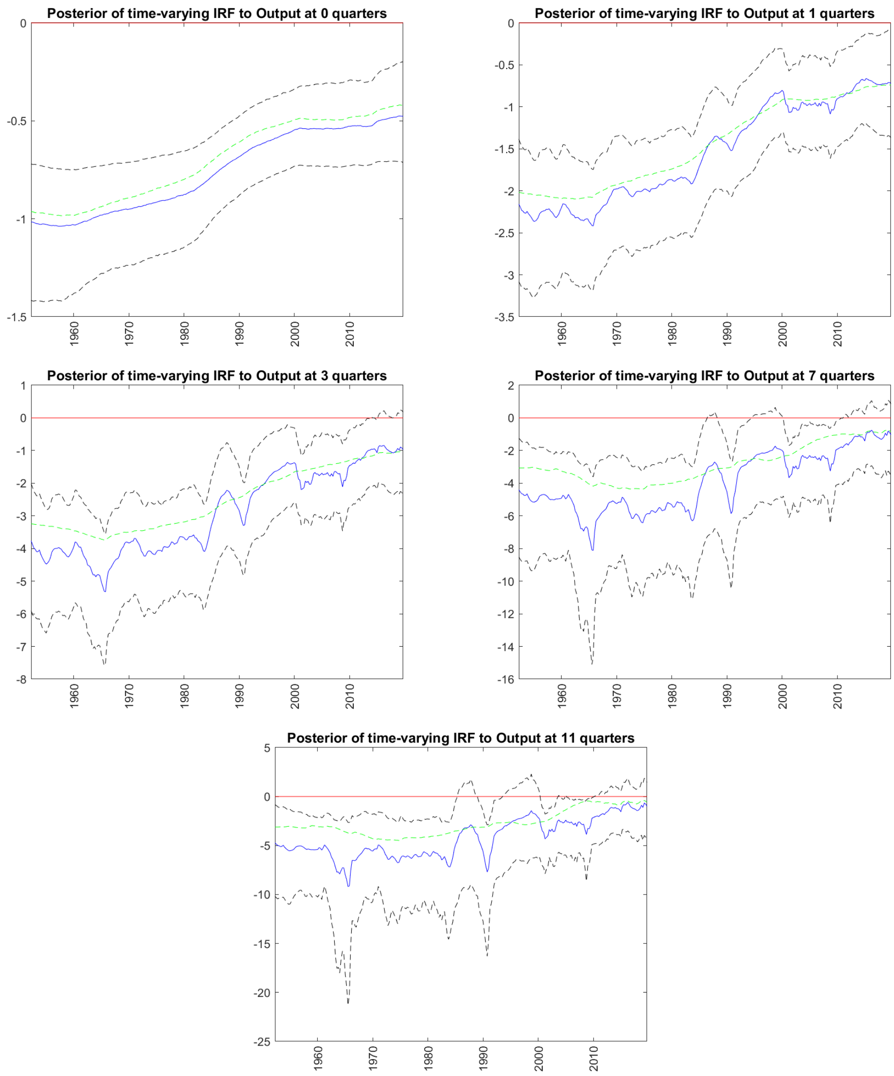
Note: The blue solid line depict posterior point-wise median response of GDP and the shaded area represent the 68 percent equal-tailed point-wise posterior probability bands.

response of output to an orthogonal change of the wage share at different horizons. I add also the posterior point-wise median response of GDP to the basic model of subsection 3.4.1.

I observe that the point-wise median of impact ($h = 0$) with the financial variable is slightly greater than that obtained with the basic model, although statistically equal. Moreover, the effect at horizon zero would maintain the same dynamics throughout the sample. Thus, the impact moved from -1.02 percentage points at the beginning of 1953 to 0.48 percentage points at the end of 2019. In this sense, the inclusion of this variable intensifies the profit-led regime in the short term.

For the other horizons, the same greater intensity is evident when including the financial variable. I can also observe that the results of the basic model are smooth than the current impulse response functions. After one quarter ($h = 1$), the response of GDP to an orthogonal change was always statistically significant moving from -2.16 percentage points at second quar-

Figure 7: The wage share shock with financial variable



Note: The blue solid line depicts posterior point-wise median response of GDP, the shaded area represent the 68 percent equal-tailed point-wise posterior probability bands, and the green solid line represents posterior point-wise median response of GDP of basic model.

ter of 1952 until -0.72 at the fourth quarter of 2019. At this horizon, figure 7 shows that the results of the basic model and with household debt was similar, after the international financial crisis (since 2010). The same dynamic is observed at one year of structural shock of wage share, although it lost its statistical significance since the beginning of 2015.

Interestingly, the IRFs at seven and eleven quarters show that the effect on GDP is statistically significant for most of the sample period, in contrast to the basic model. The second panel of the figure 7 shows that the effect on GDP lost statistical significance only in 1986.III-1988.I, 1994.III-2000.I, and 2011.II-2019.IV. After the first two years of the shock, the point-wise median of output response remains more intensive, and then converges to the IRF of the baseline model. The last panel of figure 7 shows similar results after three years with the horizons analyzed above, around the higher intensity of the median effect and the convergence of the IRFs since 2010. Likewise, the structural effect of a change in the wage share has no statistical significance in the periods 1985.III-1988.IV, 1993.IV-2000.II, and 2010.II-2019.IV.

3.4.3 The Effect of Functional Distribution with the Bottom 99%

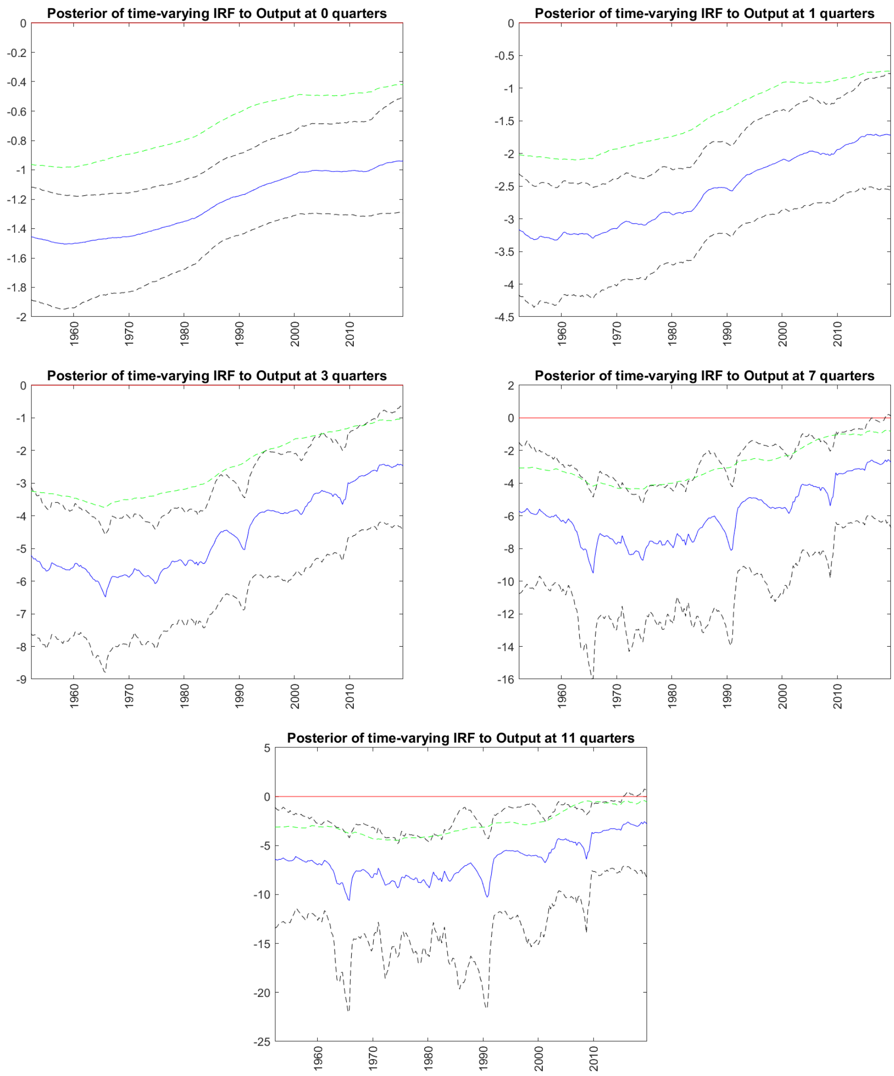
Thomas Piketty's best-selling book 'Capital in the 21st Century' Piketty (2014) triggered a renewed interest in empirical research regarding the accumulation and distribution of wealth, and a lively debate about their causes and consequences. The book has impacted the literature with some stylized facts regarding the distribution of income and growth of the capitalist system. Together with his colleagues, Piketty has shown that the top 1% of the population concentrates a large part of the world's income, assets, and wealth. Some heterodox economics as Bivens and Mishel (2013) or Dutt (2015b), explain that there is a concentration of income in the upper tail by managers and rentiers (top 1%), which could bias the analysis of the effect of distribution on economic growth. In this context, I adjust the traditional wage share variable with the share of the bottom 99% of the distribution of income. This allows us to show the aforementioned effect of income concentration and, together with the post-Keynesian model, to know the response of GDP to orthogonal changes in the distribution on the TVP-SVAR model.

Specifically, I include the adjusted wage share, the annual growth of GDP, and debt and loans of households in the TVP-SVAR model for the period that goes between second quarter of 1952 and the fourth quarter of 2019. Figure 8 presents the time-varying impulse-response functions with the adjusted wage share at impact one, three, seven and eleven quarters of the distribution shock. Also, I include the point-wise median of the basic model to have a reference.

These results ratify what was obtained in the two previous subsections, a negative effect on GDP and, therefore, the confirmation of the profit-led regime in the U.S. economy. In fact, when fit the wage share with adjustment of bottom 99%, the response of GDP is more negative at all studied horizons. I observe that the time-varying response of GDP with the adjusted wage share were more negative at impact ($t = 0$) in all sample, moving from -1.45 percentage points at second quarter of 1952 to -0.94 percentage points at fourth quarter of 2019, although it maintained the same dynamics of basic model. In contrast, with financial variable, this response of output was different. The right panel of figure 8 shows the same logic at one quarter after wage shock.

The results over a one year and medium-run horizon showed in figure 8 also confirm that the dynamic response of GDP was more intensive when I leave out the top 1% of income. In other words, an exogenous change of the workers participation in distribution of income worsened the dynamic of the output. I also observe that the trending dynamic of the IRF at the medium-run was similar to the one found in the basic model, and for some periods the results were statistically different. I ratify that the IRFs in the model with financial variables present more variability than the other specifications.

Figure 8: The wage share shock with adjustment of bottom 99%



Note: The blue solid line depicts posterior point-wise median response of GDP, the shaded area represent the 68 percent equal-tailed point-wise posterior probability bands, and the green solid line represents posterior point-wise median response of GDP of basic model.

3.5 Conclusions

This chapter introduces the time-varying parameters model to explore the possibility of a change of the growth regime in U.S. economy over the post war period. First, I review the literature about multiple equilibrium in the post-Keynesian growth literature and propose that an economy may change its equilibrium position over time in that framework. This may lead in turn to a change of the growth regime or at least to a change of the intensity of the growth regime. Then, I show how the TVP-SVAR methodology can be implemented to take into account this development of the literature. Finally, I present the results.

Among the main results I found there is evidence that the U.S. economy has had profit-led demand regime in the short-run, with a time-varying negative effect along the sample. Indeed, the response of output to an exogenous shock of the labor share has slowly lost its intensity over time, hence, the U.S. economy has become less profit-led. The medium-run results show that U.S. also is profit-led, but at some periods and not along all the sample.

I ratify the reduction of the degree of distributionledness of the U.S. economy with the two different specifications. With the financial variable, the time-varying IRF is statistically significantly similar, showing the loss of intensity of the profit-led regime. I also presented that the financial variables increase the volatility of the effect in output by a distribution shock. Additionally, the adjustment of the traditional variable of wage share with the bottom 99% of the distribution of income intensifies the time-varying effect in output at least in short-run.

Final Reflections

This paper focuses on the identification of growth regimes through innovative econometric techniques. For this purpose, in the first chapter, I propose a theoretical review of the model of Bhaduri and Marglin (1990), a scheme that allows us to identify whether an economy is driven by wages or by profits. In this same chapter, the model of an open economy is reviewed showing that domestic demand could have one regime and another regime for aggregate demand. It is also made clear that including more variables (or sectors) or modifying the functional form in a theoretical model implies a greater complexity in the analysis of regimes. Finally, I present the main empirical strategies to obtain regimes in economies. In this paper, I do not conduct a review because there are already existing papers that contribute to the literature (see Cauvel 2019; Jiménez 2020; Stockhammer 2017).

In the second chapter, I propose to use a structural autoregressive vector model to treat all variables as endogenous relative to macroeconomic dynamics. However, it is proposed that the functional distribution of income has an endogenous component regarding economic activity and an exogenous component that obeys institutional factors and social norms as proposed by classical economists. In this line, the pure exogeneity, profit-squeeze, and overhead labor approaches are used to identify these components of the distribution between workers and entrepreneurs. This approach is used to obtain the growth regimes for 16 Latin American countries with the partial identification technique for SVAR models of Arias, Rubio-Ramírez, and Waggoner (2018). In addition, they propose to use Bayesian econometrics because it works better for small samples as the database under analysis (see Koop 2003). The model also includes international variables such as commodity prices and external demand to control for the external environment as Burle and Carvalho (2021), but it is not prudent to include too many variables because of the sample size, although Bayesian inference is used.

The third chapter presents a methodological approach to identify that a country's growth regime can change over time. The theoretical basis for changes in growth regimes is the proposed multiple equilibria of Assous and Dutt (2013), Marglin (2017), Nikiforos and Foley (2012), and Nikiforos (2016a, 2022). Empirically, I propose to use the time varying parameters -SVAR model, which allows the parameters to move in time and obtain the effect, like an SVAR, over time. This allows us to identify the change in the regime. This approach is implemented for the U.S. economy, where a profit-led regime for economic growth is identified but has weakened. The results of reducing the degree of profit-ledness are robust to including other variables in the model.

The TVP methodology can be implemented in other countries that have high-frequency information (quarterly or monthly data) since this greater fluctuation of the data allows the parameters to move over time. In this sense, this econometric technique cannot be used for the Latin American countries in the second chapter since the sample has an annual frequency. However, the partial identification technique of chapter two can be implemented with a TVP-SVAR model such as Chen, Zhu, and Li (2020), and Marfatia, Gupta, and Miller (2020). Moreover, this methodology is combined with Bayesian inference and with a large data sample allows estimating models with many variables such as Bitto and Frühwirth-Schnatter (2019) and Hauzenberger et al. (2019).

References

Alarco Tosoni, Germán. 2014. "Participación salarial y crecimiento económico en América Latina, 1950-2011." Revista CEPAL (August).

———. 2016. "Factor income distribution and growth regimes in Latin America, 1950–2012." International Labour Review 155, no. 1 (March): 73–95.

———. 2017. "Ciclos distributivos y crecimiento económico en América Latina." Revista Cuadernos de Econo 36, no. 72 (October).

Aldrich, Eric M. 2014. "Chapter 10 - GPU Computing in Economics." In Handbook of Computational Economics Vol. 3, edited by Karl Schmedders and Kenneth L. Judd, 3:557–598. Handbook of Computational Economics. Elsevier. doi:https://doi.org/10.1016/B978-0-444-52980-0.00010-4. http://www.sciencedirect.com/science/article/pii/B9780444529800000104.

Arias, Jonas E., Dario Caldara, and Juan F. Rubio-Ramírez. 2019. "The systematic component of monetary policy in SVARs: An agnostic identification procedure." Journal of Monetary Economics 101:1–13. ISSN: 0304-3932. doi:https://doi.org/10.1016/j.jmoneco.2018.07.011. https://www.sciencedirect.com/science/article/pii/S0304393218303908.

Arias, Jonas E., Juan F. Rubio-Ramírez, and Daniel F. Waggoner. 2018. "Inference Based on Structural Vector Autoregressions Identified With Sign and Zero Restrictions: Theory and Applications." Econometrica 86 (2): 685–720. doi:10.3982/ECTA14468. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA14468. https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA14468.

Aruoba, S. Borağan, and Jesús Fernández-Villaverde. 2015. "A comparison of programming languages in macroeconomics." Journal of Economic Dynamics and Control 58:265–273. ISSN: 0165-1889. doi:https://doi.org/10.1016/j.jedc.2015.05.009. http://www.sciencedirect.com/science/article/pii/S0165188915000883.

Assous, Michael, and Amitava Krishna Dutt. 2013. "Growth and income distribution with the dynamics of power in labour and goods markets." Cambridge Journal of Economics 37, no. 6 (March): 1407–1430. ISSN: 0309-166X. doi:10.1093/cje/bes086. eprint: http://oup.prod.sis.lan/cje/article-pdf/37/6/1407/4817846/bes086.pdf. https://dx.doi.org/10.1093/cje/bes086.

Athreya, Kartik, Andrew Owens, and Felipe Schwartzman. 2017. "Does redistribution increase output? The centrality of labor supply." Quantitative Economics 8 (3): 761–808. doi:10.3982/QE578. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/QE578. https://onlinelibrary.wiley.com/doi/abs/10.3982/QE578.

Auclert, Adrien, and Matthew Rognlie. 2018. Inequality and Aggregate Demand. Working Paper, Working Paper Series 24280. National Bureau of Economic Research, February. doi:10.3386/w24280. http://www.nber.org/papers/w24280.

Barbosa-Filho, Nelson H., and Lance Taylor. 2006. "Distributive and Demand Cycles in the US Economy -A Structuralist Goodwin Model." Metroeconomica 57, no. 3 (July): 389–411. doi:10.1111/j.1467-999X.2006.00250.x.

Baumeister, Christiane, and James D. Hamilton. 2015. "Sign Restrictions, Structural Vector Autoregressions, and Useful Prior Information." Econometrica 83 (5): 1963–1999. doi:10.3982/ECTA12356. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA12356. https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA12356.

Bayer, Christian, Ralph Luetticke, Lien Pham-Dao, and Volker Tjaden. 2019. "Precautionary Savings, Illiquid Assets, and the Aggregate Consequences of Shocks to Household Income Risk." Econometrica 87 (1): 255–290. doi:10.3982/ECTA13601. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA13601. https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA13601.

Bhaduri, Amit, and Stephen Marglin. 1990. "Unemployment and the real wage: the economic basis for contesting politicaI ideologies." Cambridge Journal of Economics, 14:375–393.

Bitto, Angela, and Sylvia Frühwirth-Schnatter. 2019. "Achieving shrinkage in a time-varying parameter model framework." Journal of Econometrics 210, no. 1 (May): 75–97. doi:10.1016/j.jeconom.2018.11.006. https://doi.org/10.1016/j.jeconom.2018.11.006.

Bivens, Josh, and Lawrence Mishel. 2013. "The Pay of Corporate Executives and Financial Professionals as Evidence of Rents in Top 1 Percent Incomes." Journal of Economic Perspectives 27, no. 3 (September): 57–78. doi:10.1257/jep.27.3.57. https://www.aeaweb.org/articles?id=10.1257/jep.27.3.57.

Blecker, Robert A. 1989. "International competition, income distribution and economic growth." Cambridge Journal of Economics 13 (3): 395–412.

———. 2002. "Distribution, Demand and Growth in Neo-Kaleckian Macro-Models." In The Economics of Demand-Led Growth. Cheltenham, UK: Edward Elgar Publishing. ISBN: 9781840641776. https://www.elgaronline.com/view/1840641770.00017.xml.

———. 2010. Open economy models of distribution and growth. Working Papers 2010-03. American University, Department of Economics, February.

———. 2016. "Wage-led versus profit-led demand regimes: the long and the short of it." Review of Keynesian Economics (Cheltenham, UK) 4 (4): 373–390. https://www.elgaronline.com/view/journals/roke/4-4/roke.2016.04.02.xml.

Blecker, Robert A, Michael Cauvel, and Yun Kim. 2020. Systems Estimation of a Structural Model of Distribu Working Papers PKWP2012. Post Keynesian Economics Society (PKES), May.

Bowles, Samuel, and Robert Boyer. 1995. "Wages, aggregate demand, and employment in an open economy: a theoretical and empirical investigation." Chap. 5 in Macroeconomic Policy after the Conservative Era: Studies in Investment, Saving and Finance, edited by Gerald A. Epstein and Herbert M. Gintis, 129–152. Cambridge University Press.

Burle, Julia, and Laura Carvalho. 2021. "Omitted-variable bias in demand-regime estimations: the role of household credit and wage inequality in Brazil." Review of Keynesian Economics 9, no. 3 (July): 368–393. doi:10.4337/roke.2021.03.04. https://doi.org/10.4337/roke.2021.03.04.

Caldara, Dario, and Christophe Kamps. 2017. "The Analytics of SVARs: A Unified Framework to Measure Fiscal Multipliers." The Review of Economic Studies 84, no. 3 (July): 1015–1040. ISSN: 0034-6527. doi:10.1093/restud/rdx030. https://academic.oup.com/restud/article/84/3/1015/3805543.

Canova, Fabio, and Gianni De Nicoló. 2002. "Monetary disturbances matter for business fluctuations in the G-7." Journal of Monetary Economics 49 (6): 1131–1159. ISSN: 0304-3932. doi:https://doi.org/10.1016/S0304-3932(02)00145-9. http://www.sciencedirect.com/science/article/pii/S0304393202001459.

Carrillo-Maldonado, Paul, and Javier Díaz-Cassou. 2019. An Anatomy of External Shocks in the Andean Regi IDB Working Paper Series IDB-WP-01042. Inter-American Development Bank, October. doi:10.18235/0001949. https://doi.org/10.18235/0001949.

Carrillo-Maldonado, Paul, and Michalis Nikiforos. 2022. Estimating a Time-Varying Distribution-Led Regime Technical report, Working Papers Series. Levy Economics Institute. https://www.levyinstitute.org/publications/estimating-a-time-varying-distribution-led-regime.

Carvalho, Laura, and Armon Rezai. 2015. "Personal income inequality and aggregate demand." Cambridge Journal of Economics 40, no. 2 (March): 491–505. doi:10.1093/cje/beu085. https://doi.org/10.1093/cje/beu085.

Cauvel, Michael. 2019. The neo-Goodwinian model reconsidered. Working Papers PKWP1915. Post Keynesian Economics Society (PKES), July.

Chen, Jinyu, Xuehong Zhu, and Hailing Li. 2020. "The pass-through effects of oil price shocks on China's inflation: A time-varying analysis." Energy Economics 86:104695. ISSN: 0140-9883. doi:https://doi.org/10.1016/j.eneco.2020.104695. https://www.sciencedirect.com/science/article/pii/S0140988320300347.

Dutt, Amitava Krishna. 1984. "Stagnation, Income Distribution and Monopoly Power." Cambridge Journal of E 8, no. 1 (March): 25–40.

———. 2015a. "Growth and Distribution in Heterodox Models with Managers and Financiers." Metroeconomica 67, no. 2 (September): 364–396. doi:10.1111/meca.12102. https://doi.org/10.1111/meca.12102.

———. 2015b. "Growth and Distribution in Heterodox Models with Managers and Financiers." Metroeconomica 67, no. 2 (September): 364–396. doi:10.1111/meca.12102. https://doi.org/10.1111/meca.12102.

———. 2017. "Heterodox Theories of Economic Growth and Income Distribution: A Partial Survey." Journal of Economic Surveys 31, no. 5 (October): 1240–1271. doi:10.1111/joes.12243. https://doi.org/10.1111/joes.12243.

Faust, Jon. 1998. "The robustness of identified VAR conclusions about money." Carnegie-Rochester Conferenc 49:207–244. ISSN: 0167-2231. doi:https://doi.org/10.1016/S0167-2231(99)00009-3. http://www.sciencedirect.com/science/article/pii/S0167223199000093.

Gafarov, Bulat, Matthias Meier, and José Luis Montiel Olea. 2018. "Delta-method inference for a class of set-identified SVARs." Journal of Econometrics 203 (2): 316–327. ISSN: 0304-4076. doi:https://doi.org/10.1016/j.jeconom.2017.12.004. http://www.sciencedirect.com/science/article/pii/S0304407617302440.

Geweke, John. 2005. Contemporary Bayesian Econometrics and Statistics. John Wiley & Sons, Inc., September. doi:10.1002/0471744735. https://doi.org/10.1002/0471744735.

Goodwin, Richard M. 1967. "A Growth Cycle." In Socialism, Capitalism and Economic Growth: Essays Presented to Maurice Dobb, edited by C.H. Feinstein, 54–58. Cambridge University Press.

Granziera, Eleonora, Hyungsik Roger Moon, and Frank Schorfheide. 2018. "Inference for VARs identified with sign restrictions." Quantitative Economics 9 (3): 1087–1121. doi:10.3982/QE978. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/QE978. https://onlinelibrary.wiley.com/doi/abs/10.3982/QE978.

Greenberg, Edward. 2009. Introduction to Bayesian Econometrics. Cambridge University Press. doi:10.1017/cbo9781139058414. https://doi.org/10.1017/cbo9781139058414.

Hauzenberger, Niko, Florian Huber, Gary Koop, and Luca Onorante. 2019. Fast and Flexible Bayesian Inferenc arXiv: 1910.10779 [econ.EM].

Hein, Eckhard, Walter Paternesi Meloni, and Pasquale Tridico. 2020. "Welfare models and demand-led growth regimes before and after the financial and economic crisis." Review of International Po (March): 1–36. doi:10.1080/09692290.2020.1744178. https://doi.org/10.1080/09692290.2020.1744178.

Hoover, Kevin. 2001. Causality in Macroeconomics. Cambridge University Press.

Jesus, Cleiton Silva de, Ricardo Azevedo Araujo, and Carlos Eduardo Drumond. 2017. "An empirical test of the Post-Keynesian growth model applied to functional income distribution and the growth regime in Brazil." International Review of Applied Economics 32, no. 4 (July): 428–449. doi:10.1080/02692171.2017.1351528. https://doi.org/10.1080/02692171.2017.1351528.

Jiménez, Valeria. 2020. Wage shares and demand regimes in Central America: An empirical analysis for Costa IPE Working Papers 151/2020. Berlin School of Economics and Law, Institute for International Political Economy (IPE).

Kaldor, Nicholas. 1955. "Alternative Theories of Distribution." Review of Economic Studies 23 (2): 83–100.

Kalecki, M. 1938a. Essays in the Theory of Economic Fluctuations. George Allen & Unwin.

———. 1938b. "The Determinants of Distribution of the National Income." Econometrica 6 (2): 97–112. ISSN: 00129682, 14680262. http://www.jstor.org/stable/1907142.

———. 1971. Selected Essays on the Dynamics ofthe Capitalist Economy. Cambbridge University Press.

Keynes, John Maynard. 1936. The General Theory of Employment, Interest and Money. xxxv, 428 p. Macmillan for the Royal Economic Society, London. ISBN: 0333009428.

Kilian, Lutz, and Helmut Lütkepohl. 2017. Structural Vector Autoregressive Analysis. Themes in Modern Econometrics. Cambridge University Press. doi:10.1017/9781108164818.

Kim, Chang-Jin, and Charles Nelson. 1999. State-Space Models with Regime Switching: Classical and Gibbs-
1st ed. Vol. 1. The MIT Press.

Kohler, Karsten, Alexander Guschanski, and Engelbert Stockhammer. 2019. “The impact of financialisation on the wage share: a theoretical clarification and empirical test.” Cambridge Journal of Econ
43, no. 4 (July): 937–974. ISSN: 0309-166X. doi:10.1093/cje/bez021. eprint: https://academic.oup.com/cje/article-pdf/43/4/937/29002587/bez021.pdf. https://doi.org/10.1093/cje/bez021.

Koop, Gary. 2003. Bayesian Econometrics. Wiley-Interscience. ISBN: 0470845678.

Koop, Gary, and Dimitris Korobilis. 2010. “Bayesian Multivariate Time Series Methods for Empirical Macroeconomics.” Foundations and Trends(R) in Econometrics 3 (4): 267–358.

Krugman, Paul, and Lance Taylor. 1978. “Contractionary effects of devaluation.” Journal of International Econo
8 (3): 445–456. ISSN: 0022-1996. doi:https://doi.org/10.1016/0022-1996(78)90007-7.

Lavoie, Marc. 2017. “The origins and evolution of the debate on wage-led and profit-led regimes.” European Journal of Economics and Economic Policies: Intervention 14, no. 2 (September): 200–221. doi:10.4337/ejeep.2017.02.04.

Lavoie, Marc, and Engelbert Stockhammer, eds. 2013. Wage-Led Growth: An Equitable Strategy for Economic
London: Palgrave Macmillan / International Labour Office.

Loaiza-Quintero, Osmar Leonardo, Alexander Tobon-Arias, and Guillermo David Hincapie-Velez. 2017. “Impacto de la distribución funcional del ingreso sobre el producto interno bruto de Colombia, 1970-2011” [in es]. Lecturas de Economía (January): 63–104. ISSN: 0120-2596.

Luyano Cuevas, Jose Raul, and Julio Herrera Revuelta. 2018. “Distribución funcional del ingreso y régimen de crecimiento en México y España.” Cuadernos de Economıa 37, no. 73 (January): 121–142. doi:10.15446/cuad.econ.v37n73.58811. https://doi.org/10.15446/cuad.econ.v37n73.58811.

Marfatia, Hardik A., Rangan Gupta, and Stephen Miller. 2020. “125 Years of time-varying effects of fiscal policy on financial markets.” International Review of Economics & Finance 70:303–320. ISSN: 1059-0560. doi:https://doi.org/10.1016/j.iref.2020.07.011. https://www.sciencedirect.com/science/article/pii/S1059056020301660.

Marglin, Stephen. 1990. “Lessons of the golden age: an overview.” In The Golden Age of Capitalism, edited by Stephen Marglin and Juliet Schor, 1–38. Oxford: Clarendon Press.

———. 2017. “Wages, prices, and employment in a Keynesian long run.” Review of Keynesian Economics 5 (3): 360–425.

Marglin, Stephen, and Amit Bhaduri. 1990. “Profit Squeeze and Keynesian Theory.” In The Golden Age of Capitalism: Reinterpreting the Postwar Experience, edited by Stephen Marglin and Juliet Schor, 153–186. Oxford: Clarendon Press.

Moon, Hyungsik Roger, and Frank Schorfheide. 2012. “Bayesian and Frequentist Inference in Partially Identified Models.” Econometrica 80 (2): 755–782. doi:10.3982/ECTA8360. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.3982/ECTA8360. https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA8360.

Nakajima, Jouchi. 2011. Time-Varying Parameter VAR Model with Stochastic Volatility: An Overview of Met IMES Discussion Paper Series 11-E-09. Institute for Monetary and Economic Studies, Bank of Japan, March.

Nakamura, Emi, and Jón Steinsson. 2018. "Identification in Macroeconomics." The Journal of Economic Persp 32 (3): 59–86. ISSN: 08953309. https://www.jstor.org/stable/26473065.

Nikiforos, Michalis. 2015. "Uncertainty and Contradiction: An Essay on the Business Cycle." Review of Radical Political Economics 49, no. 2 (December): 247–264. doi:10.1177/0486613415621748. https://doi.org/10.1177/0486613415621748.

———. 2016a. "Distribution-led growth in the long run." Review of Keynesian Economics (Cheltenham, UK) 4 (4): 391–408. https://www.elgaronline.com/view/journals/roke/4-4/roke.2016.04.03.xml.

———. 2016b. "On the 'utilisation controversy': a theoretical and empirical discussion of the Kaleckian model of growth and distribution." Cambridge Journal of Economics 40, no. 2 (January): 437–467. doi:10.1093/cje/beu076. https://doi.org/10.1093/cje/beu076.

———. 2021. "Abstraction and closure: a methodological discussion of distribution-led growth." Journal of Economic Methodology 28 (2): 207–230. doi:10.1080/1350178X.2020.1849772.

———. 2022. "Induced shifting involvements and cycles of growth and distribution." Cambridge Journal of Ec 46, no. 1 (September): 73–103. doi:10.1093/cje/beab038. https://doi.org/10.1093/cje/beab038.

Nikiforos, Michalis, and Duncan K. Foley. 2012. "Distribution and Capacitity Utilization: Conceptual Issues and Empirical Evidence." Metroeconomica 63 (1): 200–229. doi:10.1111/j.1467-999X.2011.04145.x. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1467-999X.2011.04145.x. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-999X.2011.04145.x.

Oficina Internacional del Trabajo. 2011. "Hacia una recuperación sostenible: por una política de crecimiento basada en los salarios." Boletín Internacional de Investigación Sindical 3 (2). ISSN: 2076-9865.

Onaran, Özlem. 2016. "Wage- versus profit-led growth in the context of globalization and public spending: the political aspects of wage-led recovery." Review of Keynesian Economics (Cheltenham, UK) 4 (4): 458–474. https://www.elgaronline.com/view/journals/roke/4-4/roke.2016.04.07.xml.

Onaran, Özlem., and Giorgos. Galanis. 2012. Is aggregate demand wage-led or profit-led? National and global ILO Working Papers 994786233402676. International Labour Organization.

Onaran, Özlem, Engelbert Stockhammer, and Lucas Grafl. 2009. The finance-dominated growth regime, distrib Department of Economics Working Paper Series 126. Vienna: Inst. für Volkswirtschaftstheorie und -politik, WU Vienna University of Economics and Business. https://epub.wu.ac.at/1306/.

Palley, Thomas I. 2015. "The middle class in macroeconomics and growth theory: a three-class neo-Kaleckian-Goodwin model." Cambridge Journal of Economics 39 (1): 221–243. doi:10.1093/cje/beu019. https://doi.org/10.1093/cje/beu019.

Palley, Thomas I. 2017. "Wage- vs. profit-led growth: the role of the distribution of wages in determining regime character." Cambridge Journal of Economics 41 (1): 49–61.

Piketty, Thomas. 2014. Capital in the Twenty-First Century. 816. Belknap Press. http://www.hup.harvard.edu/catalog.php?isbn=9780674430006.

Primiceri, Giorgio E. 2005. "Time Varying Structural Vector Autoregressions and Monetary Policy." The Review of Economic Studies 72 (3): 821–852. ISSN: 00346527, 1467937X. http://www.jstor.org/stable/3700675.

Razmi, Arslan. 2015. "The Limits to Wage-Led Growth in A Low-Income Economy." Metroeconomica 66 (4): 740–770. doi:10.1111/meca.12092. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/meca.12092. https://onlinelibrary.wiley.com/doi/abs/10.1111/meca.12092.

———. 2016. "Growth and distribution in low-income economies: modifying post-Keynesian analysis in light of theory and history." Review of Keynesian Economics (Cheltenham, UK) 4 (4): 429–449. https://www.elgaronline.com/view/journals/roke/4-4/roke.2016.04.05.xml.

Ricardo, D. On the principles of political economy and taxation. Cambridge, 1953.

Ros, Jaime. 2016. "Can growth be wage-led in small open developing economies?" Review of Keynesian Econo (Cheltenham, UK) 4 (4): 450–457. https://www.elgaronline.com/view/journals/roke/4-4/roke.2016.04.06.xml.

Rothenberg, Thomas J. 1971. "Identification in Parametric Models." Econometrica 39 (3): 577–591. ISSN: 00129682, 14680262. http://www.jstor.org/stable/1913267.

Rowthorn, B. 1981. Demand, Real Wages and Economic Growth. Thames papers in political economy. Thames Polytechnics. ISBN: 9780902169173.

Rubio-Ramírez, Juan F., Daniel F. Waggoner, and Tao Zha. 2010. "Structural Vector Autoregressions: Theory of Identification and Algorithms for Inference." The Review of Economic Studies 77, no. 2 (April): 665–696. ISSN: 0034-6527. doi:10.1111/j.1467-937X.2009.00578.x. eprint: http://oup.prod.sis.lan/restud/article-pdf/77/2/665/18368803/77-2-665.pdf. https://dx.doi.org/10.1111/j.1467-937X.2009.00578.x.

Sánchez, Gustavo Vargas, and Albino Luna. 2014. "Slow growth in the Mexican economy." Journal of Post Keynesian Economics 37 (1): 115–134. doi:10.2753/PKE0160-3477370108.

Sims, Christopher A. 1980. "Macroeconomics and Reality." Econometrica 48 (1): 1–48. ISSN: 00129682, 14680262. http://www.jstor.org/stable/1912017.

———. 1988. "Bayesian skepticism on unit root econometrics." Journal of Economic Dynamics and Control 12 (2): 463–474. ISSN: 0165-1889. doi:https://doi.org/10.1016/0165-1889(88)90050-4. https://www.sciencedirect.com/science/article/pii/0165188988900504.

Sims, Christopher, James Stock, and Mark Watson. 1990. "Inference in Linear Time Series Models with Some Unit Roots." Econometrica 58 (1): 113–44.

Sims, Christopher, and Harald Uhlig. 1991. "Understanding Unit Rooters: A Helicopter Tour." Econometrica 59 (6): 1591–99.

Skott, Peter. 2017. "Weaknesses of 'wage-led growth'*." Review of Keynesian Economics (Cheltenham, UK) 5 (3): 336–359. https://www.elgaronline.com/view/journals/roke/5-3/roke.2017.03.03.xml.

Stock, J.H., and M.W. Watson. 2016. "Chapter 8 - Dynamic Factor Models, Factor-Augmented Vector Autoregressions, and Structural Vector Autoregressions in Macroeconomics," edited by John B. Taylor and Harald Uhlig, 2:415–525. Handbook of Macroeconomics. Elsevier. doi:https://doi.org/10.1016/bs.hesmac.2016.04.002. http://www.sciencedirect.com/science/article/pii/S1574004816300027.

Stockhammer, Engelbert. 2017. "Wage-led versus profit-led demand: what have we learned? A Kaleckian–Minskyan view." Review of Keynesian Economics 5 (1): 25–42. https://www.elgaronline.com/view/journals/roke/5-1/roke.2017.01.03.xml.

Stockhammer, Engelbert, O. Onaran, and Stefan Ederer. 2008. "Functional income distribution and aggregate demand in the Euro area." Cambridge Journal of Economics 33, no. 1 (June): 139–159. ISSN: 0309-166X. doi:10.1093/cje/ben026.

Stockhammer, Engelbert, and Özlem Onaran. 2004. "Accumulation, distribution and employment: a structural VAR approach to a Kaleckian macro model." Structural Change and Economic Dynamic 15 (4): 421–447. ISSN: 0954349X. doi:10.1016/j.strueco.2003.07.002.

Stockhammer, Engelbert, Joel Rabinovich, and Niall Reddy. 2021. "Distribution, wealth and demand regimes in historical perspective: the USA, the UK, France and Germany, 1855–2010." Review of Keynesian Economics 9, no. 3 (July): 337–367. doi:10.4337/roke.2021.03.03. https://www.elgaronline.com/view/journals/roke/9-3/roke.2021.03.03.xml.

Storm, Servaas, and C.W.M. Naastepad. 2017. "Bhaduri–Marglin meet Kaldor–Marx: wages, productivity and investment." Review of Keynesian Economics (Cheltenham, UK) 5 (1): 4–24. https://www.elgaronline.com/view/journals/roke/5-1/roke.2017.01.02.xml.

Tavani, Daniele, Peter Flaschel, and Lance Taylor. 2011. "Estimated non-linearities and multiple equilibria in a model of distributive-demand cycles." International Review of Applied Economics 25 (5): 519–538. doi:10.1080/02692171.2010.534441. eprint: https://doi.org/10.1080/02692171.2010.534441. https://doi.org/10.1080/02692171.2010.534441.

Taylor, Lance. 1985. "A stagnationist model of economic growth." Cambridge Journal of Economics 9 (4): 383–403. doi:10.2307/23597054. https://www.jstor.org/stable/23597054.

———. 2004. Reconstructing Macroeconomics: Structuralist Proposals and Critiques of the Mainstream. Harvard University Press, March. ISBN: 0674010736.

Tomio, Bruno Thiago. 2020. "Understanding the Brazilian demand regime: a Kaleckian approach." Review of Keynesian Economics (Cheltenham, UK) 8 (2): 287–302. https://www.elgaronline.com/view/journals/roke/8-2/roke.2020.02.08.xml.

Uhlig, Harald. 2005. "What are the effects of monetary policy on output? Results from an agnostic identification procedure." Journal of Monetary Economics 52 (2): 381–419. ISSN: 0304-3932. doi:https://doi.org/10.1016/j.jmoneco.2004.05.007. http://www.sciencedirect.com/science/article/pii/S0304393205000073.

Wooldridge, Jeffrey M. 2019. Introductory Econometrics: A Modern Approach. Cengage Learning, January. ISBN: 1337558869.

Zellner, Arnold. 1996. An Introduction to Bayesian Inference in Econometrics. John Wiley & Sons, Inc., August. ISBN: 978-0-471-16937-6.