Functional income distribution and aggregate demand in Brazil (1995-2013): an analysis of extensions to the neo-Kaleckian models through the VAR approach

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Abstract

The neo-Kaleckian theoretical framework focuses on the importance of effective demand in the income generation process in order to relate it to the functional distribution of income and thus characterize an economy's demand regime, either wage-led (wage share positively affecting demand) or profit-led (profit share positively affecting demand). Recent contributions include extensions to the standard model such as open economy effects, household debt and personal distribution of income to further characterize the regime type. Based on that approach, this paper aims to empirically analyze the performance of the Brazilian economy between 1995 and 2013 in order to explore the relationship between functional distribution of income and aggregate demand. The idea is not to define its demand regime but rather to test whether variables that are not present in the seminal model – such as consumer credit, personal distribution of income and commodity price – alter the relationship between the two variables. Our results suggest that the control for those aspects indeed change the intercept and inclination of our demand and distributive curves.

Key Words: demand regimes, functional distribution of income, brazillian economy, VAR estimation

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1 Introduction

The economic performance of Latin American countries in the 2000s, in which these combine higher economic growth – when compared to the prior period – with more even income distribution, as Lustig et al (2013)[1] point out, is an important research object for economists concerned with income inequality. Since the 1990s until now, the process of inequality reduction in some of its nations goes against the concentration trend in more mature economies as Thomas Piketty's *Capital in the XIX Century* (2014) adresses. This phenomena can be attributed to two main factors: a high worldwide demand for products exported by the region, acting as a positive foreign shock, and domestic policies that stimulated demand.

In the brazillian case in particular, according to Serrano and Summa (2012), the Lula administration years (2003-2010) are marked by social cash transfer policies, sustainable increase in real growth rates of the minimum wage, increase in health, education and infrastructure spending, as well as a legislation that made household credit access easier. These measures combined deepened mass consumption and boosted public and private investment, which in turn had a positive effect on the employment level, on reducing income inequality, and enhanced aggregate demand, which carried the periods economic growth.

The process is however interrupted in the following years in the first Dilma Roussef government, and culminate in an economic recession experienced by the country today. Besides the worse foreign environment, a clear twist in the course of domestic macroeconomic policies contribute to the country's economic slowdown. One should also consider the structural challenges arising from an economic growth model with distributive gains, taking into account some particularities behind the process, as Carvalho and Rugitsky (2015) observe. Among them, the expansion of consumption based on household debt, the shifts in the productive structure that improvements in distribution provoke, and the dependence of a strong international market for national exports.

In this context the neo-Kaleckian theoretical framework, that relates functional distribution of income and aggregate demand seems appropriate to analyze the Brazilian experience. These models emphasize the importance of effective demand in order to determine a country's demand regime; wage-led if an increase in the wage share positively affect aggregate demand and profit led otherwise (Badhuri and Marglin, 1990, Dutt, 1984 Taylor, 1985; Rowthorn, 1982). Recent contributions extend the basic model considering the influence of other factors that should alter the relationship between the two variables, including the open economy effect (Blecker, 2011), the household debt effect (Dutt, 2006; Palley, 2010), and the personal distribution of income effect (Carvalho and Rezai, 2015).

These models inspire several empirical studies that aim to investigate how changes in the functional distribution of income affect a country's macroeconomic performance, measured by the degree of capital utilization. There are two methods to do so: the individual equations method, in which one separately estimates the impact of the distributive variable on each aggregate demmand component, and the VAR method, which considers the two variables endogenous and provide a general overview of their reciprocal relationship.

Within this theoretical and empirical framework, we aim to analyze the relationship between income distribution and aggregate demand in Brazil from 1995 to 2013. The goal here is not to try to define its demand regime - as it is done in the basic model - but rather to identify which extensions seem relevant in our case when evaluating the relationship between the two variables. Our econometric strategy will try to overcome two faults that existing studies are somewhat accused of committing: the problem of omitted variables in the estimations and the assumption of exogeneity of the

[1] Lustig et al (2013) find that the Gini coefficient declined statistically significantly and robustly in 13 out of 17 Latin American countries. In a more deep study for Brazil, Mexico and Argentina's case, they attribute the decline to two factors: more progressive government transfers and a fall in the premium to skilled labor.

distributional variable. To do so, we shall use the VAR methodology and compare how the inclusion of exogenous control variables alter the estimations and the impulse response functions.

Besides this brief introduction, this paper is organized as follows. The next section considers the relationship between effective demand and functional distribution by discussing the neo-Kaleckian model, its extensions, remarks on the distributive curve, as well as a brief examination of the empirical studies in the field. In the third section, we address the Brazilian economy and the economic variables that seem fundamental to explain its path in the 2000s years. The econometric results of our VARs will be presented and analyzed in section 4, followed by our conclusion, references, and appendix.

2 Neo-Kaleckian models: theory and empirics

The issue of income distribution within the macroeconomic scope has long concerned political economists. Marx (2001) attempted to the capital concentration and centralization trend in the capitalist system; Keynes (1940) emphasized the importance of income redistribution induced by the state in order for a country to achieve higher levels of aggregate demand. Kaldor (1955) is the first to formalize the idea of different propensities to save between capitalists and workers, that is later used by Kalecki (1971) and Steindl (1952) to study how changes in income distribution affect effective demand.

This hypothesis combined with Kaleckian mark-up price theory and an independent investment function originates the neo-Kaleckian or post-Keynesians literature. These models, seminally exposed by Amadeo (1986), Rowthorn (1981), Taylor (1985), Dutt (1984) and Badhuri and Marglin (1990), discuss how functional income distribution affects the effective demand in an exceeding capital capacity scenario. In a closed economy without government, the two components of demand are consumption and investment. The first is defined by the sum of the wages and profits shares multiplied by their respective marginal propensity to consume. It is assumed that employees consume all their income, while capitalists save part of it, originating the economy's savings. The investment function in turn takes different forms in the many versions of the canonical model, although having in common the dependency on the degree of capacity utilization, a variable for demand expectation. In that way, it diverges from the conventional approach, in which investment depends exclusively on profit margins, neglecting the possibility, that even with high profit margins, the it might not occur if there's excess capacity or lack of demand. Later versions incorporate a variable for profitability; in Rowthorn (1989), Taylor (1985) and Dutt (1984), that is the profit rate; in Badhuri and Marglin (1990), its margin[2]. The equality between savings and investment define the economy's degree of capacity utilization. In Appendix A we mathematically expose a version the model.

Income distribution has therefore an ambiguous effect on aggregate demand. On the one hand a redistribution in favor of profits has a positive impact on investment; on the other, a negative impact on consumption since capitalists have lower propensity to consume than workers. In order to a wider wage share to have a positive impact on output, the contraction in investment it provokes via profit margins reduction should be offset by the increase in consumption through higher purchase power of workers. These economies are called wage-led [3], that is, economies in which the effect of wages on demand is positive. When however the investment is highly sensitive to changes in the profit rate or its margin, and increases considerably due to decreases in the wage share, the economy is profit-led. In that case, the reduction in workers' purchasing power is more than offset by higher investments, inducing negative relationship

[2]The investment function version that incorporates the profit margin as the profitability variable is named Kaleckian-Steindl function.

[3]Badhuri and Marglin (1990) are the first to distinguish the effects of functional distribution on demand and to introduce the wage versus profit-led terminology – or stagionationist versus exhilarationist – to address demand regimes.

between wage share and output. This distinction between wage and profit-led regimes enables economic expansion to benefit the two classes quite differently.

The research that emerges from this framework follows two distinct paths. The first, also within the theoretical range, emphasizes the need for extensions to the canonical model arguing that other variables should alter the relationship between distribution and demand. Among them, the open economy effect (Blecker, 2010; Rezai, 2011; Lavoie and Stockhammer, 2012); the personal income distribution effect (Dutt, 1992; Lavoie, 1996; Tavani and Vasudevan, 2012); and the household debt effect (Dutt, 2006; Palley, 2010). There is also extensions to the model derived from the literature on Goodwin Cycles (Goodwin, 1967), that consider the backward causal channel; how the economic cycle should affect functional distribution itself. The second path, of empirical nature, seeks to identify demand regimes in several countries following two methods: a structural approach, which estimates individual equations for consumption, investment, exports and imports (Bowles and Boyer, 1995; Naastepad and Storm, 2007; Ederer and Stockhammer, 2007; Stockhammer et al, 2009 Onaran and Galanis, 2012) and the aggregate approach, which estimates the overall relationship between distribution and demand through an autoregressive vector - VAR (Barbosa Filho and Taylor, 2006; Naastepad and Storm, 2006).

Within the theoretical front, the model gains an open economy version on Blecker (2010), Rezai (2011), Lavoie and Stockhammer (2012) and Von Armin, Tavani and Carvalho (2012) - although exponents of the basic model had already addressed to the effects of trade liberalization in the model. Blecker (2010) argues it is essential to characterize the macroeconomic dynamics of foreign trade in the model, given the current trade liberalization, financial deregulation and the high degree of integration between countries. This extension takes into account the effect that shifts in income distribution on the direction of wages have on production costs - unit labor cost - which entails higher export prices and lower foreign markets competitiveness. Opening the economy would also lead to domestic demand leakages through imports. Therefore, the effect of international trade in a longer run is to mitigate the wage led character of such economies. Hein e Vogel (2008) e Stockhammer e Ederer (2008) finds empirically that small open economies such as Austria and the Netherlands tend to be more profit led than large economic blocks, such as the Euro area or the United States. Thus the greater a country's dependence on foreign markets, and therefore the higher its sensibility to international prices, the more it tends to be weakly wage led or more intensively profit led. Blecker (2011) also raises questions about the effect of different economic policies in this scenario – for example currency devaluation, productivity shocks, increased workers' bargaining power – and concludes that its origin matters to the final result on demand and distribution.

Another important extension is the effect of personal income distribution - especially wage dispersion - on aggregate demand. Dutt (1992), Lavoie (1996) and Tavani and Vasudevan (2012) address the issue introducing a third economic class - unproductive managers - that also earns wages, but higher than workers'. In both the wage led or the profit led scenarios, the model becomes more unstable, as in more concentrating, and more "inequality-led" as Tavani and Vasudevan (2012) call it, that is, consumption becomes less sensible expansion of wages. Carvalho and Rezai (2015) instead of adding a third economic class, assume heterogeneous workers –wage share no longer equally distributed between them - with positive propensities to save that increase with on their income. In other words, workers also save and save more the higher their income [4]. They conclude on an empirical exercise that the concentration of income among the top salaries must have intensified US economy's profit led character, since wage concentration at the top of the distribution weakens the effects of shfts in the wage share on consumption. Palley (2014) agrees that the phenomenon of income concentration in several European countries and the United States must have contributed strengthen profit-led regimes, as the empirical studies in this area indicate.

[4]This assumption is verified empirically for the US economy in Carvalho and Rezai (2015)

The last aspect that when ignored should alter the relationship between the two variables is household debt. Dutt (2006) incorporates this factor in a Steindlist model of growth and distribution similar to Badhuri and Marglin (1990) and concludes that the availability of consumer credit has a positive effect on consumption, therefore on the level of economic activity, in the short run. In a longer time horizon, however, this effect is ambiguous because the family debt directs income from wages towards profits through interest rates payments. In that way, an accessible credit market might mitigate the higher wages effect on consumption, and therefore on aggregate demand. The end result is however subjected to the nature of the investment function and to the time horizon of the analysis.

Finally, Goodwin (1967) introduces the idea of endogenous economic cycles generated by fluctuations on product, unemployment and wages. In the neo-Kaleckian scope that means the existence of the opposite causal channel: the effective demand altering functional distribution. The model by Taylor (2009) defines besides the effective demand curve, a distributive curve that incorporates this effect. He assumes a conflictive market between workers and firms, in which both classes pursue a higher appropriation of the income. Households define their ideal wage growth rate function, while firms define their price growth rate function – both depending on productivity gains, nominal salaries, wage share and capacity utilization. The locus of equilibrium points where the wage share is stable is named distributive curve. If wages respond more than productivity to demand shocks, the distributive curve is upward sloping and called profit-squeeze, and in this case the demand gains are incorporated by the households. If the opposite happens, it is called forced savings – downward sloping – and then higher degrees of capacity utilization are appropriate by the firms through salaries compression. In that sense, the exogeneity hypothesis of the distributive variable is dropped leading to a more adequate treatment between distribution and demand on a dynamic macroeconomic model. The mathematical exposure of Taylor's (2009) model can be also found in the Appendix.

In the empirical ground, on the other hand, numeral studies that attempt to define countries' demand regime are conducted. The ones that use the separate equations method aim to capture the particular response of each demand component to shifts in the functional distribution and also to distinguish the open and closed economy effects. Departing from the aggregate demand equation, one estimates separately the effect of the wage (or profit) share in consumption, investment and net exports. A country's demand regime is then defined by summing up the distribution coefficient in each equation, divided by the Keynesian multiplier – this follows the derivation of the model [5]. The biggest advantage of this method is to decompose the effect of distribution on each demand component. It is, however, heavily criticized by the assumption that the distributive variable is exogenous. Skott (2015), for instance, questions the terminology "growth regime" or "demand regime" itself, arguing that it suggests that the causality nexus between the two varibales only works one way around – distribution "causing" demand –, when in his conception it is certainly mutual.

The second method, a dynamic and simultaneous equations system estimation in an autoregressive vector (VAR), addresses partially to such critique. It deals properly with the reciprocal relationship between the variables and thus

[5] Algebraically one starts from the following equation

$$AD = C(Y, \Omega) + I(Y, \Omega, z_I) + NX(Y, \Omega, z_{NX}) + G(Y, z_G),$$

where Ω is the wage share and z represents exogenous variables in each demand component equation. They assume goods market clearance, ie, product is equal aggregate demand ($Y^* = AD$). To define the demand regime's nature, we differ Y^* with respect to Ω and rearranging terms, we get:

$$\frac{dY^*}{d\Omega} = \frac{H_2}{1 - H_1}$$

where $H_1 = (\frac{\partial C}{\partial y} + \frac{\partial I}{\partial y} + \frac{\partial NX}{\partial y} + \frac{\partial G}{\partial y})$ and $H_2 = (\frac{\partial C}{\partial \Omega} + \frac{\partial I}{\partial \Omega} + \frac{\partial NX}{\partial \Omega})$. The term $1/(1 - H_1)$ is a standard multiplier and should be positive to guarantee the model's stability. The sign of the derivative depends, therefore, on the numerator, which can be determined econometrically estimating individual equations for consumption, investment and net exports one by one. If $H_2 > 0$, and therefore $\partial Y^*/\partial \Omega > 0$, the demand regime is wage led; otrherwise it is profit led.

overcomes the assumption that income distribution is exogenously determined. Its analysis however requires a more careful look, since it isn't possible to precisely detect the relationship between distribution and the economic variables individually, and neither to distinguish between the the open and closed economy effects (Onaran and Galanis, 2012).

The results of these studies are somewhat ambiguous. Estimations of the complete model suggest the dominance of profit led regimes, for instance, Barbosa Filho and Taylor (2006) and Naastepad and Storm (2006). Studies that estimate the response of each demand componet separetly (Bowles and Boyer, 1995; Naastepad and Storm, 2007; Stockhammer et al, 2009; Hein and Vogel, 2008; Onaran and Galanis, 2012), often find domestic demand wage led, but when considering distributional effects on net exports, they switch to profit led, especially in the case of small economies[6]. Possible sources to explaning the heterogeneity of the results are omitted variables – not taking into account the theoretical extensions discussed above –; lack of considering time horizon distinction on the analysis (Blecker, 2015), the distributive variable exogeneity hypothesis in the first method (Skott, 2015); possible non-linear regimes [7] (Nikiforos and Folley, 2012 dand Palley, 2014); and the need to consider other markets besides the goods (Schoder, 2015).

In the Brazilian case, the two empirical studies available follow the individual equations method. Araújo and Gala (2012) estimate individual equations for the response of the components of demand to distribution with quarterly data from 2002 to 2008, and find that the domestic growth pattern has wage-led nature, while with the inclusion of the foreign sector it turns profit-led, that is the Brazilian economy (2003- 2010) responds overall positively to the profit share in the income increases. They attribute that result to the international market dependency and argue in favor of real currency depreciation in order to achieve higher capital accumulation, higher net export volume and external savings, which would all together stimulate demand.

Bruno (2003), in turn, in a longer time horizon study using annual data, finds two patterns of accumulation[8]: a profit-led regime in the 1970-1990 period, that expires in 1991-2001, which he characterizes as a wage-led growth period under "growing financiarization". He attributes that twist to high profit gains from 1990 onwards on non productive investments, namely the financial speculative market, and therefore consumption rather than investment would respond more to functional distribution shifts.

Summarily, the neo-Kaleckian literature and its extensions relate functional distribution of income and aggregate demand. The existing empirical work in the area follows the two methods already mentioned and are subject of a few theoretical and econometric critiques. In the following session we discuss the path of Brazilian economic variables that relate to the Kaleckian model in order to justify the econometric exercise developed in the last session.

3 Brazilian Economy

The Brazilian economy experiences a prosperous period between 2003 and 2010, in which it manages to combine output growth and inequality reduction. According to Serrano and Summa (2012) the two main factors behind that process are the favorable external environment and domestic distributive and demand stimulating policies.

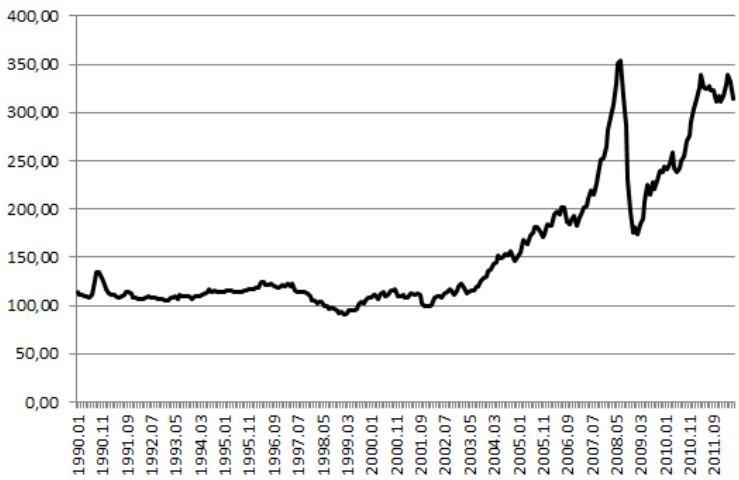
The first is well portrayed in Figure 1. The high primary products demand, mainly due to China's rapid growth, gets

[6]Conclusion based on Hein and Vogel (2008), which in a study for six european countries from 1960-2005, find wage-led regimes for France, Germany, the USA and England, and profit-led for the two smaller economies studied, Austria and Netherlands. In Austria's case, removing the net exports effects switches its regime to wage-led – that is, wage led domestically

[7]Otherwise, a wage led economy would find its maximum capacity utilization and growth in the limit point in which all income would go for wages, very unlikely assumption.

[8]He divides his data into two groups because of a change in the product-capital (Y/K) trend; while from 1970-1990 it is clearly downward sloping – higher capital accumulation growth than gross product growth –, from 1991 onwards that ratio stabilises.

Figure 1: Commodity price path



Source: IPEA-Data

reflected on the world's commodity price. From 2003 to 2011 there is a clear ascending trend on this index, that had remained constant until then. This guarantees a fair flow of income coming from exports into the country, which must have had a boosting effect on domestic demand. In an econometric study, Dos Santos et al (2015) finds that investment in Brazil responds to two factors significantly: the commodity price and the exchange rate. Domestic investment responds positively to the commodity price and Carvalho and Rugitsky (2015) explain this by two means following the Kaleckian-Steindlist investment function. The first related to the animal spirits of investors: high prices would be suggesting world demand growth for domestic exports urging capitalists to invest more. The second related to capacity utilization and to the profit margin; given the importance of primary products in the Brazilian productive structure, the commodity price should increase the profit margin and firm's utilization degree, thus affecting investment not only within the sector, but possibly in the neighborhood of the production chain. Whichever the channel, this factor's positive influence on economic growth untill 2010 seems evident, and the interruption of its rising trend must have contributed to the recent years' economic slowdown.

As for the exchange rate, the results found by Dos Santos et al (2015) goes in the opposite way of what is expected by the Kaleckian literature on open economy effects – and to what Araujo and Gala (2012) suggest as ideal economic policy given their econometric's results. The Brazilian investment responds negatively to the real exchange rate level. The increase in firm's mark up and the cheapening of domestic product in foreign markets that follow exchange devaluations would depress rather than boost investment. According to Carvalho and Rugitsky (2015) possible explanations for that result are the balance of payments effect on firms that hold foreign debt; the rising cost of importing machinery and equipment; the low primary products – the country's main exports – price elasticity as well as a dependence on imports without national equivalents; and the risk of firms incorporating the gains in profit margins instead of investing it. The negative impact of the currency devaluation - via consumption compression and inflationary pressures - may in our case outweigh the potential positive effect of more competitiveness. The final outcome of policies that target higher profits and more foreign competitiveness seem to be subject to the effect they should have domestically on aggregate demand[9].

[9]This conclusion can be also found in Blecker (2010) when he discusses the effects of different policy measures in different demand regimes

Figure 2: Personal versus Functional Distribution of Income

Source: IBGE and PNAD

Despite the indubitable international market boosting effect on Brazil's demand, the economic policies implemented in the Lula administration and its impact on functional and personal distribution of income should be also considered for a further analysis.

Among them, one can first mention a more active treatment in the minimum wage adjustment. Its real value growth rate has been increasing since price stabilization from the Real Plan (1995), but only on the 2000s this rise is more expressive, as stated in Carvalho and Rugitsky (2015). Mainly because of deliberate ajustment policies that corrected its value according to nominal GDP growth of the last two years and to the annual inflation rate - and from 2011 onwards this correction mechanism gets officialized by a law act. Aligned with that is increasing labor market formalization and unemployment reduction. Whereas the minimum wage also works as a baseline for social security programs payments, as well as rural workers transfers,the positive effect of these continuous rises on the distribution of income should not surprise.

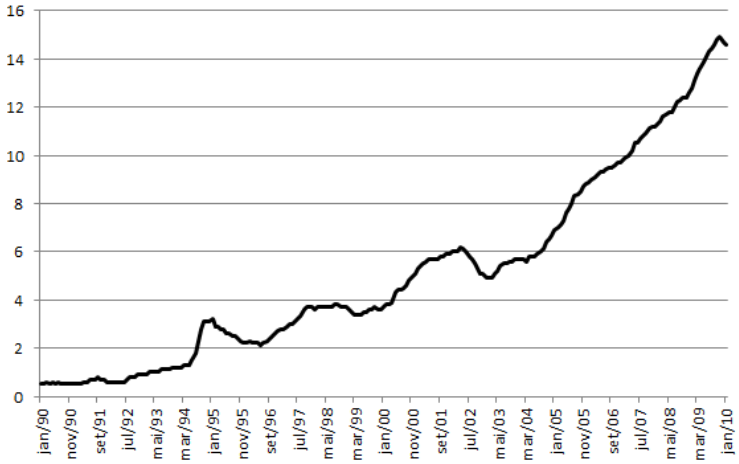
Another factor that certainly contributes to the inequality cutback is the diffusion of income transfer programs, essentially *Bolsa Família*, that aims in insuring a minimum income to poor families, conditional to the family's children school attendance as well as regular visits to health centers. Studies on the benefits granted estimate that 50% of the program's total expenditures are destined to families on the 15% bottom part of the distribution pyramid, while 90% of its value was allocated to the 45% poorest (Hoffmann, 2013: 209).

It's quite hard to measure the distributional impact of these policies. The Gini index, while giving less weight to the income earned by the richest part of the population, could be underestimating the income concentration. There is also suspicions on the percentage of the income appropriated by the richest estimate accuracy, observed in Medeiros et al (2015). When analyzing income tax data, he concludes that the income earned by the distribution top percentile should be around 25% instead of the 18% estimated by the census research. Despite its likely overestimation, it seems unquestionable the shift on income concentration in recent years, due somewhat to such policies. This gets illustrated in Figure 2, which shows the upward trend of the wage share (functional distribution) and the downward trend in the gini index for wages from the PNAD inquiry (personal distribution).

scenarios.

The effect of more equal distributed income on aggregate demand - especially on consumption - can be analyzed through the neo-Kaleckian framework. The seminal model (Badhuri and Marglin, 1990) states a positive effect of shifts in the wage share on the capacity utilizations - since the propensity to consume of workers is greater than that of the capitalists. The model's extensions that incorporate the personal distribution effect suggest that improvements on salaries dispersion should lift consumption up, since of the average propensity to consume of the families should rise – workers in the top of the distribution must have a smaller propensity to consume than those on its base. These theoretical hypotheses seem indeed to occur empirically: according to the SCN-IBGE (2000 referenced) research, household consumption grows on average 5.1% per year in real terms in the 2004-2011 period. Dos Santos (2013) also draws attention to the investment rise in the period, often overlooked by those who argue that growth was driven solely by consumption. Brazilian economy's gross fixed capital formation grows an average of 8.7% annually in the same period (SCN-IBGE 2000), boosted in part by the already mentioned export external demand effect, but also, as Dos Santos (2013) points out,by the impulse in domestic demand carried by the distributional improvements.

Figure 3: Financial system credit operations (total risk) - To natural person/GDP - %



Source: BCB

The household credit trajectory also seems relevant to explain mass consumption, especially its declining growth rates from 2011 onwards. According to Serrano and Summa (2015), domestic credit concessions have an upward trend on the 2003-2009 period, essentially because of cheap accessibility to the financial credit market to families previously excluded from it, which contributes to consumption expansion. The creation of payroll loans – a loan deducted monthly and automatically from the borrowers's bank account – in 2004 represents the process' institutional formalization. Extensions of neo-Kaleckian models that consider the effect of debt on consumption (Dutt, 2006 Setterfield, 2014) do not reach an unanimous conclusion about its effect. If in the one hand, the short term response is to positivelly affect aggregate demand, as it acts as an alternative financing source (to salaries) to consume. In fact, Schettini et al (2012) find econometric evidence that aggregate consumption in Brazil responds positively to the family credit (natural person) to GDP ratio. On the other hand, household debt has a concentrating effect in the medium and long run: through interest payments workers transfer part of their income to banks and other financial institutions profits, which intensifies the functional income inequality. As discussed in Carvalho and Rugitsky (2015), although consisting of an appropriate policy instrument in including new families in the consumer market in the short run, its concentrating

character might have concentrating effects on aggregate demand.

In short, there are three main elements we are looking at to explain the inequality reduction growth process that took place in Brazil in the 2000: a heated international market for the country's exports, policies that increased the average income of families situated in the distribution pyramid base, and an accessible credit market. The sustainability of the model can be questioned by the recent years' recession. We seek on the next session to enlighten the debate around it, testing some of the hypothesis raised above empirically.

4 Econometrics

As already mentioned, we here intend to examine the reciprocal relationship between functional distribution and capacity utilization through the VAR method, but controlling for exogenous variables that should alter that relationship and seem relevant in the brazilian case. These will be consumer credit, commodity price and gini index for wages. Through this approach we seek to partially address to the interpretation problem on the VAR method – since its derived results are somewhat hard to interpret because they only offer a overall relationship between the endogenous variable – and also to deal in a modest degree with the omitted variables problem. This method seems relevant for being able to point out how aspects are usually not incorporated into the basic model modify the effect of functional distribution and effective demand on each other and in that sense test for the relevance of the existing extensions.

The inclusion of exogenous variables apart from seasonal dummies, outlier dummies or time trends on an autoregressive vector is not usual, but possible to be done, as Lutkepohl and Kratzig (2004) state. A general VAR type model including these terms will have the form

$$y_t = \Gamma_1 y_{t-1} + \Gamma_2 y_{t-2} + ... + \Gamma_{p-1} y_{t-p-1} + CD_t + Bz_t + \epsilon_t \tag{1}$$

where $z_t's$ are the unmodelled stochastic variables, D_t contains all regressors associated with deterministic terms, and C and B are parameters matrices. The exogenous variables in z_t are not considered modeled because there is no explanatory equation for them in the system above. The inclusion of these variables can however compromise the model inference and its analysis if exogeneity assumptions are not met [10]. In this exercise we assured some degree of exogeneity through the Granger-causality tests[11], presented in the Appendix. The test presented was performed with 2 lags, but tests with other lags were performed for robustness.

We estimated VARs considering $y_t = (u_t \psi_t)$, where u_t is capital utilization and ψ_t the wage share, including each exogenous variable z_i one by one, and including the necessary outliers dummies, as in equations (2) and (3). Table 1 presents a description of the data used in our exercise.

[10] There are three definitions of exogeneity according to Engle, Hendry and Richard (1983). A set of variables z_t is said to be weakly exogenous to an array of parameters of interest, for example y_t if y_t's estimation conditional to z_t does not implies loss of information when compared to the non conditional estimation of y_t. Z_t is said to be strongly exogenous if it is weakly exogenous on estimation, but also on forecasts, that is forecasts of y_t conditional to z_t will not improve its prediction in comparison to the non-conditional model estimation. Finally, superexogeneity happens when a variable is weakly exogenous, and if policy actions that affect the marginal process of the conditional model and forecasts of y_t do not affect the parameters of the conditional process. Therefore, it can be said that weak exogeneity is important for inference, strong exogeneity for prediction, and superexogeneity for policy.

[11] The non rejection of the null hypothesis that a variable X granger-cause $(G - C)$ a variable Y combined with weak exogneity between variables is equivalent to the acceptance of strong exogeneity. In this exercise though we have not yet assured weak exogeneity, therefore we can not say that the "exogenous" variables are strongly exogenous to the "endogenous".

$$u_t = c_u + \gamma_{11} u_{t-1} + \gamma_{12} \psi_{t-1} + b_i z_i + c_{11} d2009q1 + c_{12} d1998q4 + c_{13} d2001q4 + \epsilon_{t1} \quad (2)$$

$$\psi_t = c_\psi + \gamma_{21} u_{t-1} + \gamma_{22} \psi_{t-1} + b_i z_i + c_{21} d2009q1 + c_{22} d1998q4 + c_{23} d2001q4 + \epsilon_{t2} \quad (3)$$

Table 1: Data

Variable	Noattion	Source	Description
Functional income distribution	par_sal_x12	Own estimation (1995-2013)	Temporal disaggregation of the series from annual to quarterly through the Denton method (1971). As the annual parameter we used the wage share computed with SCN-IBGE (2000 and 2010) data adjusted [12] by Gollin (2004). As the seasonal movement indicator we used a quarterly wage share estimation computed with PME data – only takes into account Metropolitan Regions[13]– divided by the IBGEs quarter GDP .
Capacity utilization	nuci_tri_x12	FGV/Conj. Econ (monthly from 1970.01 to 2015.10)	Installed capacity utilization - industry - average - (%). Quarter mean of the monthly data.
Credit	cred_pib	BCB (1988-2010)	Financial system credit operations (total risk) to Natural Person as % of GDP; quarter mean of the monthly data. Series ends in 2010.
Gini index for wages	gini_sal	PNAD (2004 and 2012)	Temporal disaggreation of the annual gini index series. Annual series constructed linking the two series available (PNAD 2004 and PNAD 2012)
Commodity price	p_commod	IPEA-data (1990-2012)	General commodities prices Index (jan. 2002 = 100) from the IPEA. Quarter mean of monthly data.

We estimated an specification with only the wage share (*par_sal_x12*), the capacity utilization (*nuci_tri_x12*) and dummies to serve as our benchmark and then added one by one the exogenous variables. Our estimations has between 70 to 75 periods. The endogenous variables were seasonally adjusted by the *x12* method in order to address the autocorrelation that would persist without it [14]. Unit root tests suggested that our endogenous variables were stationary, that is $I(0)$, while all four endogenous variables were found to be integrated of order one, $I(1)$. On the appendix we present a table with the test's coefficients.

Therefore we inserted the exogenous variables in first difference in our estimates, since it does not make theoretical sense to have a time series equation with dependent stationary variables, and explanatory non-stationary variable. To systematize the estimates we introduces dummies for first quarter 2009 (financial crisis), for fourth quarter 2000, and for fourth quarter 1998, that showed to be crucial to ensure the VARs' error normality. More dummies appeared to improve some of the specifications, but in order to standardize and assure a fair comparison of the results, we only kept what was necessary to assure the basic hypothesis. *Hannan-Quinn* and *Schwarz* lag leghth tests suggested one lag in all specifications.

The overall results suggest profit-led demand curves since wage share coefficients are negative in all specifications, although only significant at 10% level in the baseline VAR. The distributive curves in turn assume the profit-squeeze format as result of positive capacity utilization coefficients – significant in all of them. These trends are better seen in the impulse response functions soon discussed and are similar to Barbosa Filho and Taylor's (2006) results for the US economy's demand regime.

[14] We also tried to estimate the models with seasonal dummies instead of unseasoning each variable separately, but besides the lost of degrees of freedom, the model did not fulfill the fundamental VAR hypothesis for statistical inference.

Table 2: VAR coefficients

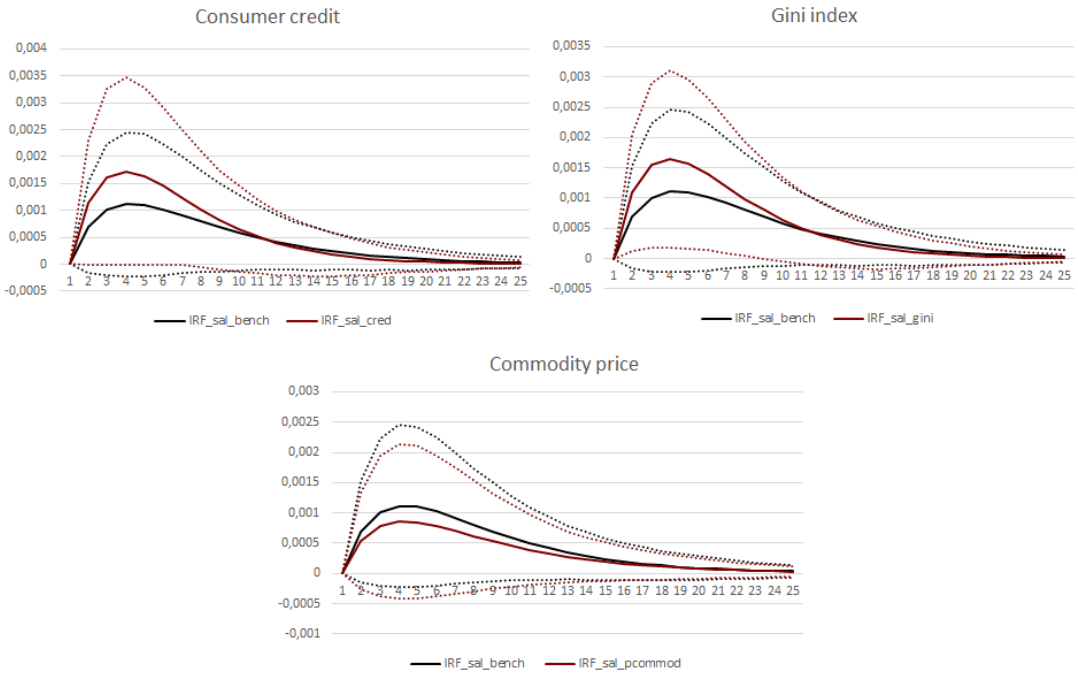
	VAR_bench_denton1		VAR_cred	
	nuci_tri_x12	par_sal_denton_x12	nuci_tri_x12	par_sal_denton_x12
nuci_tri_x12(-1)	0.855346***	0.000920*	0.812190***	0.001386**
par_sal_denton_x12(-1)	(-8,104008)*	0.611666***	-8,034337	0.610406***
c	(1,694321)***	0.155866**	(2,025368)***	(0.120406)**
dp_commod				
d_cambio				
d_credito			0.725290*	(-0.008964)*
dgini_sal				
d2009q1	(-4.407598)***	0.015695*	(-4.647010)***	0.018980**
d1998q4	(-2.464783)***	0.045770***	(-2.199805)**	0.042804***
d2001q4	(-1.137995)*	(-0.029444)***	(-1.139690)	(-0.029291***)

	VAR_pcommod		VAR_gini	
	nuci_tri_x12	par_sal_denton_x12	nuci_tri_x12	par_sal_denton_x12
nuci_tri_x12(-1)	0.855191***	0.000735*	0.817683***	0.001406**
par_sal_denton_x12(-1)	-7.094025	0.600940***	-7.933206	0.606276***
c	(1.625765)***	0.177883***	19.70264***	0.122473**
dp_commod	0.018687***	(-0.000170)***		
d_cambio				
d_credito				
dgini_sal			-182.3968*	2.783850**
d2009q1	(-3.942995)***	0.012081*	(-4.303250)***	0.014396*
d1998q4	(-2.323094)***	0.045029***	(-2.492624)**	0.046414***
d2001q4	-0.855855	(-0.031941***)	(-1.022376)*	(-0.031169)**

Table 2 shows the estimations, the coefficients and its significance. Note that all the exogenous variables coefficients were significant to both endogenous variables estimations in at least a 10% level. In the effective demand curve (for nuci_tri_x12), the most significant exogenous variable was commodity price – at 5% level – suggesting strong open economy effect sensibility. In the distributive curve equation, the most significant control was gini index for wages (5%).

Although the VAR coefficients do not precisely represent the effect of independent variables on the dependent, a comparative analysis between them seems legit in trying to understand the shifts in the effective demand (*ED*) and in the distributive curve (*DC*) – how each control increase or decrease the curves' intercept. For instance, in the credit concession and commodity price VARs, the coefficient both exogenous on the capacity utilization equation (*nuci*) is positive, suggesting the effective demand curve shifting outwards. The Kaleckian literature explain both of these moves: the positive household debt effect on demand is that of enhancing short-term consumption, as we discussed on the previous section; and commodity price can be seen as a positive external shock on the autonomous component of investment, which also move the *ED* out. These two findings confirm the importance of both consumer credit and export prices to boost Brazil's demand.

Figure 4: Wage share response to innovations shocks on capacity utilization



The remaining exogenous variable, gini index for wages, has a negative coefficient in the effective demand curve. The gini outcome is again expected, following Kaleckian literature; the greater the intra-wage income concentration, the lower the capacity utilization level given any wage share – that is ED moving inwards. Again, that is aligned with the discussion about Brazil's economy above: the reduction in wage dispersion has had an indeed positive impact on our demand variable, the *nuci*, since its coefficient is negative – and the gini index is decreasing.

The same analysis can be conducted for the distributive curve, the estimations for *par_sal_denton_x12*. The VAR coefficient for the gini index is positive and significant at a 5% level, signaling a shift outward of the distributive curve. That result is not the most obvious: higher wage dispersion would be enlarging its share. A possible explanation for

the positive relation between intra-wage concentration and the wage share is that workers at the top of the distribution have more bargaining power than those at the bottom, and therefore get raises more often.

The other two variables shift the distribution curve inward. Credit concession in the VAR_cred has a contractionary wage effect, although extremely small and significant only at the 10% level. One possible explanation is that of the income flow from wages to profit via interest rate payment, also addressed by the kaleckian literature, but more commonly in a longer run than what we are dealing with in our estimations. The result is anyhow consistent. The coefficient for commodity price follows the same line of a negative effect on the wage share. One could say that profit boost in the export sectors due to its high prices is not passed on to wage as rises, therefore increasing the relative weight of profits to wages.

The effect of including exogenous variables is also well portrayed by the impulse response functions. In all of them we followed Cholesky ordering and Kaleckian economic theory placing the wage share before the capacity utilization in the decomposition, that is, we assumed the latter to be more endogenous. Note that here we are analysing the slope rather than the shift of the curves. Table 3 shows that the two lags of both endogenous variables are significant in their own estimation at 1%. When it comes to cross significance, capacity utilization lagged is significant at a 10% level in the wage share equation in all specifications. In the debt and gini VARs, it is significant at a 5% level and is of greater magnitude when compared to the baseline model' coefficients.

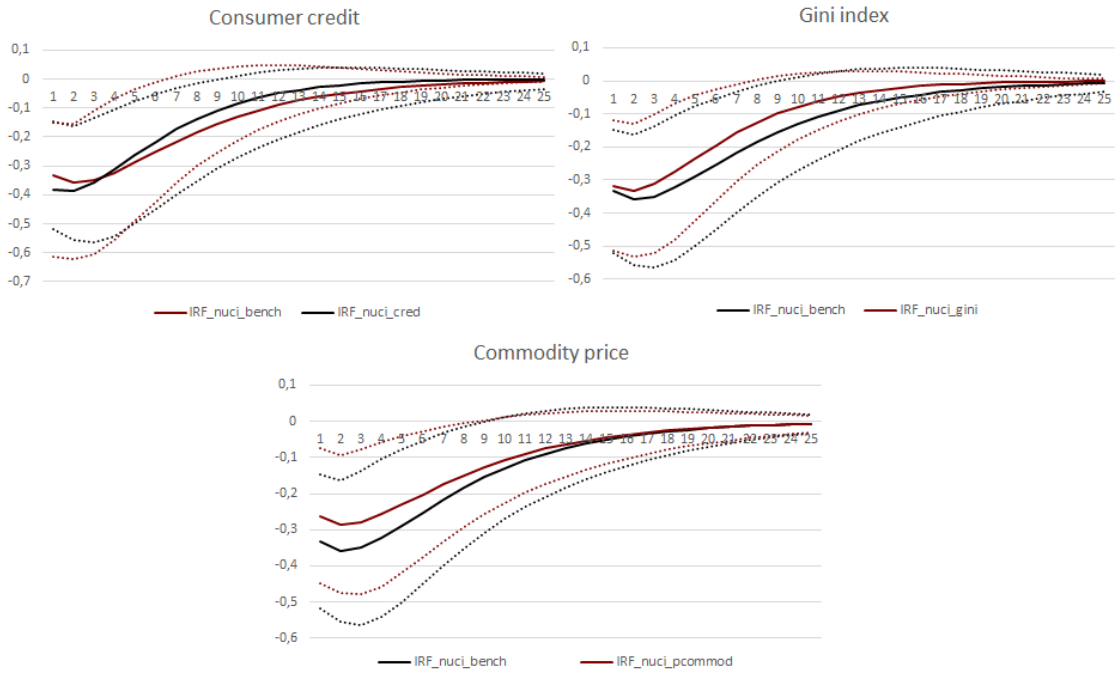
Figure 5: Wage share accumulated response to innovations shocks on capacity utilization

In the capacity utilization equation, on the other hand, previous period's wage share is only significant in the benchmark VAR at 10%; including exogenous variables leads to a loss of that significance in all other specifications. This may be suggesting that Brazilian's demand on the analysed period was more reactive to the exogenous variables than to the functional distribution itself. The distributive variable loss of significance also weakens the demand curve characterization as profit-led, and supports the problem of omitted variables biasing the empirical works that seek to identify demand regimes.

Figure 4 shows the responses in the wage share to innovations shocks in capacity utilization of all our 3 VARs with

its confidence intervals – dotted lines –, always compared to the baseline VAR – black line. Note that their significance is questionable in the benchmark and the commodity price specification, since the upper confidence interval bound is undoubtedly positive and its lower bound is negative. So the profit-squeeze trend is strongly suggested, although not confirmed in these specifications. The commodity price VAR's response is the only one that gets less profit-squeeze alike, despite the small magnitude of the change. That result is rather curious and goes against of what is expected by the Kaleckian literature on open economy effects. Taking away the commodity price effect is here making the response of the wage share less reactive to demand. Its lower confidence bound gets more negative, making it hard for us to claim a profit-squeeze nature for the distributive curve.

Figure 6: Capacity utilization response to innovations shocks on the wage share



In the controls for household credit concession as fraction of GDP and Gini index for wages, the confidence interval is all situated in the positive quadrant for 7 and 9 periods, respectively, and their limits get higher than the benchmark's. These results suggest that taking the effect of debt and wage concentration the profit squeeze tendency is strengthened, in other words, demand shocks would more meaningfully be appropriated by workers than by capitalists. In the debt case, we can explain by the already mentioned interest payment wage to profit flow effect that family debt brings about – even though we already exposed our suspicions that this mechanism would be working in the short run of our analysis. In the gini VAR in turn, we argue that salary concentration at the top as well as low wages in the base can compromise the average worker's bargaining power, and taking away this effect, that is, assuming equal distribution for instance, the distributive curve responds more to demand shocks getting more sloped.

We can also analyse functional distribution's accumulated response to shocks on the *nuci* exposed in Figure 5. Again, the profit-squeeze trend is clear, but maybe zero on the open economy effect specification – commodity prices. On that picture it is clear that its confidence interval range is indeed getting wider, compromising its characterization as profit-squeeze, as we already pointed out. In the other two, as mentioned above, the trend gains strength, and the figure makes it clear since the interval's limit is entirely located in the positive quadrant.

Figure 7: Capacity utilization accumulated response to innovations shocks on the wage share

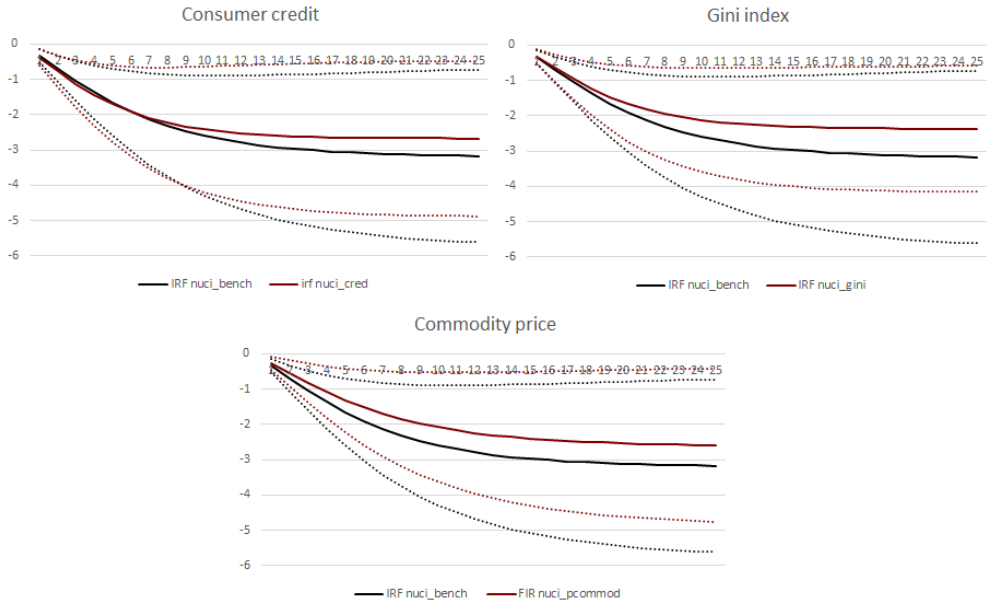


Figure 6 shows the capacity utilization's response to shocks in wages. The profit led trend is evident in all specifications, statistically different from zero for around 5 periods and dissipated in approximately 18 periods. The VAR controlling for credit has the most similar response to the baseline – both the response trace as well as its confidence interval–, which we interpret as a lack of change on the demand curve's slope when taking out the effect of household debt. Therefore we can say that the family debt effect only affects the intercept of the demand curve, result also consistent to the family debt extension's to the model in the short run.

In the remaining two specification, the effect of the inclusion of the exogenous variables is to make it less profit-led, since there's a timid shift up on the confidence interval, specially in the VAR controlling for commodity price. That result is expected on the Kaleckian open economy literature: the economy's profit led character gets undermined when one controls for the open economy price effect. The commodity price control seems to here increase the investment's sensibility to the profit share. When taking that effect out, the economy's demand regime gets less profit-led alike, suggesting weaker investment response relatively to consumption's due to a wage share shock. That result is aligned with Dos Santos (2015) for the determinants of investment in Brazil, in which he finds it positively responding to commodity price's level.

The result concerning personal distribution can also be explained through the model: the wage concentration at the top of the distribution weakens the response of consumption to shifts in the wage share, since the propensity to consume of those in the top of the distribution is smaller than of those in the bottom. Therefore controlling for that aspect should make the propensity to consume of the average worker higher resulting a less profit-led economy, as Carvalho and Rezai(2015) also point out.

The same results can be seen on the accumulated IRFs, plotted in Figure 7. Again, the profit led trend is clear and significant in all estimates. The VAR controlling for gini index has the highest accumulated lower bound (about 4), which supports the wage concentration making economies less sensitive to wage redistribution hypothesis. In the commodity price VAR the range gets less negative than the baseline because we are taking the open economy effect away, as we explained above. The VAR_cred's response – the one we argued to be the least regime reactive in

comparison with the benchmark VAR – gets to be seen from a different angle with the accumulated response: that of also becoming less profit-led. One possible explanation is that household credit concessions allows families to smooth consumption over time, resulting a more timid consumption response to shifts in the wage share. Therefore taking this effect out, we get a economy less profit-led, since the consumption movements are regained. Again, that effect is less perceptive than the other controls because it only gets evident in the accumulated response.

5 Conclusion

This article departed from the neo-Kaleckian theoretical framework and its extensions to analyze the relationship between aggregate demand and functional income distribution in Brazil. The country experiences a prosperous economic period between 2004 and 2010 with high output growth rates – carried by investment and consumption growth– combined with income inequality reduction, featuring some singularities, such as a more accessible credit market, high demand for the country's exports and distributive policies, that seemed to have acted together as demand boosters. Our aim here was to test whether these singularities were actually relevant empirically.

In order to do so, we followed the VAR method present in empirical studies that intent to characterize a country's demand regime (Barbosa-Filho and Taylor, 2006; Naastepad and Storm 2006). The news was the inclusion of exogenous control variables for each of the peculiarities mentioned above, which are already found in extensions of the neo-Kaleckian basic model. Namely the gini index for wages as a representative for personal income distribution, household credit concessions representing the household debt extension, and commodity price embodying the open economy effect. We then analysed whether the effect of functional distribution on effective demand and vice versa changed. In theoretic terms this means how the slope and the intercept of effective demand and the distributive curve were altered with the inclusion of each exogenous variable. Our results suggest that both demand and distribution's response to each other indeed change.

The effective demand curve showed to be most sensible to the open economy effect via commodity price – most significnat coefficient at 1%. Two effects were found: an enhancing demand effect given any distribution as those prices rises, and a loss of the profit-led tendency when that controll variable was included. This result seems in accordance with the Kaleckian literature: while a high world demand for the country's exports acts as a demand booster –intercept of the curve–, taking that effect out should weaken the profit-led trend – demands curve's slope. As for personal distribution, significant at a 10% level, higher wage concentration measured by the gini index for wage seemed to have a depressing effect on demand *ceteris paribus*, – probably because of the lower average propensity to consume of wage earners it brings about –, but also operated intensifying the profit-led character of the economy, result related to Carvalho and Rezai (2015) for the US economy. Finally, the household debt effect was of boosting demand – enhancing consumption in short run given any wage share – and of practically not altering the demand regime's character.

One last point is worth noting on the demand curve's estimations. Lagged functional distribution is those specifications was only significant in the baseline VAR at 10%. The inclusion of the exogenous control variables made that significance disappear, which might be signalling that Brazil's demand on the period responded more to the extensions analysed than to functional distribution itself. This points out to the relevance of omitted variables when one is trying to define a country's demand regime.

As for the distributive curve, the higher the wage concentration had an enlarging wage share effect given a demand level. Our explanation for that result was that the bargaining power of workers at the top of the distribution was higher than of those at the bottom, inducing more raises the more concentrated the wages are. On the other hand, wage concentration appeared to be making the distributive curve less profit-squeeze alike; taking that effect away would

make the wage share more sensible to demand cycles. The household debt effect acted contracting any wage share given a capacity utilization and made the distributive curve less profit-squeeze alike. We attributed that result to the flow of income from wages to profits that household debt induces, even though that effect is more likely in the long run. Finally, the open economy effect was of contracting the wage share *ceteris paribus* – probably the flow of profits coming from exports not passed on to wages – and of making the economy more profit-squeeze. That last result is intriguing as it goes against of the open economy effect on the wage share discussed in Blecker (2010).

These results contribute to the debate around Brazil's demand led growth in the 2000s and what factors were were behind it. The positive and significant effect of credit concessions and commodity price on capacity utilization confirm their influence in stimulating consumption and investment on the period. The gini's negative effect also signals that the fall in the intra-wage income concentration also boosted the period's demand. The country's recent economic slowdown however raises question about the sustainability of such model of growth. On the one hand it is complicated to have a country's demand relying on the international market's mood. Also, there is a limit for household debt to boost up consumption without comprising worker's income through interest rate payments and without adding some financial instability to the system. On the other, the personal distribution result suggest that macroeconomic distributive policies may still represent a valuable opportunity to boost up demand and carry economic growth, especially in the current moment of stagnation.

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A Neo-Kaleckian Model: Effective Demand Curve

There are two demand components in a closed economy: consumption and investment. The first is defined as the sum of wages and profits multiplied by their respective propensity to consume. The economy's savings is defined analogously as wages and profit multiplied by their propensity to save, as follows,

$$g^s = (s_p\pi + s_w(1-\pi))u$$

The investment function in its seminal formulation depends exclusively of the degree of capacity utilization,

$$g^i = \gamma + \gamma_u(u - u_n)$$

In posterior versions, a variable for profitability is incorporated; In Rowthorn (1989), Taylor (1983), Dutt (1984), and others, that is the profit rate

$$g^i = \gamma + \gamma_u + \gamma_r r$$

In Badhuri and Marglin (1990) it is the profit margin that enters the investment function,

$$g^i = \gamma + \gamma_u + \gamma_\pi$$

The equality between investment and savings defines the economy's capacity utilization, as evidenced in the following equation

$$g^s = (s_p\pi + s_w(1-\pi))u = f(\pi, u, \alpha) = g^i$$

Nothe that here we did not explicit a functional form for the investment function, we just defined it as depending on the profit share (but as $r = \pi u/v$) such specification includes both possibilities). The derivative from capacity utilization in terms of functional distribution is such as:

$$du/d\pi = \frac{-(s_p - s_w)u + f_\pi}{(s_p - s_w)\pi + s_w - f_u}$$

The positive denominator represents the model's Keynesian stability condition ($g^s/u > g^i/u$), therefore it is the numerator's signal that defines the demand regime. If $(s_p - s_w)u > f_\pi$, the economy is operating under a wage led regime, in other words, the effect of wages on the country's product is positive. If however $(s_p - s_w)u < f_\pi$ the country's demand is profit led. In that case, the workers' purchase power reduction due to shifts towards profit is more than compensated by investment growth, which indicating negative relationship between the wage share and the product when defined by aggregate demand.

B Distributive Curve

In Taylor (2009), the nominal wage growth rate is set by workers and has the following shape:

$$\hat{w} = f^w(u, \psi) + (1 - \sigma)\xi$$

where wages depend positively on capacity utilization and on its share –since it increases workers' bargaining power–, $f^w_u, f^w_\psi > 0$ and $(1 - \sigma)$ is the share of productivity gains appropriated by workers. Prices are set by the fims following the equation,

$$\hat{P} = f^p(u, \psi)$$

where $f_u^p, f_\psi^p > 0$ that if, firms adjust their prices when perceive higher capacity utilization degrees and also when they are faced with higher production costs via salaries. Labor productivity is defined as

$$\hat{\xi} = f^{\xi}(u, \psi)$$

with Kaldor-Verdoon effect –$f_u^\xi > 0$– and Webb effect – $f_\psi^\xi > 0$.

Defying ω as the real wage, the wage share on income can be expressed as follows,

$$\psi = \frac{wL}{Py} = \omega\xi$$

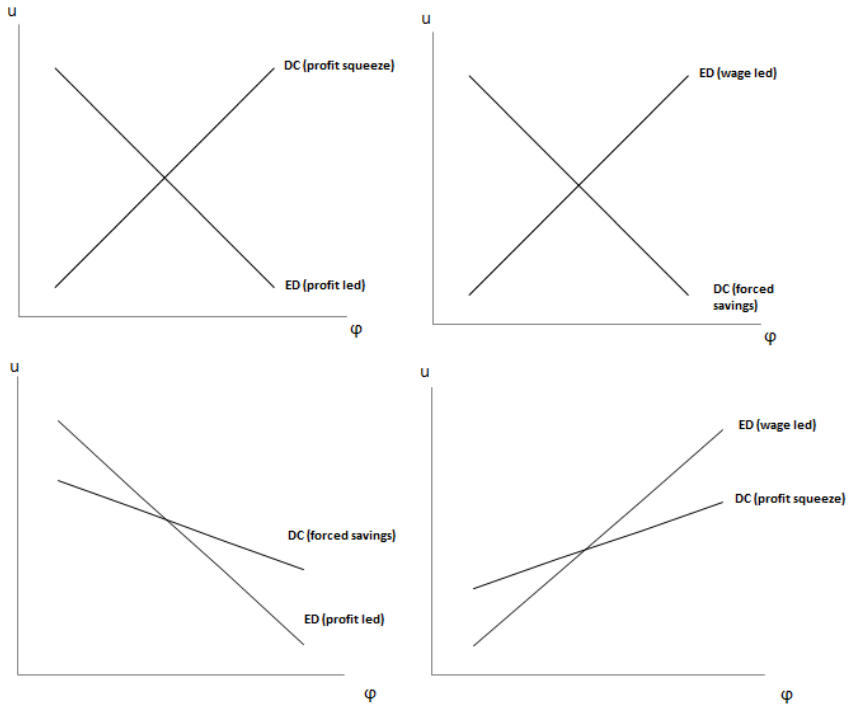
$$\hat{\psi} = \dot{\psi}/\psi = \hat{w} - \hat{P} - \hat{\xi}$$

The dots locus where $\dot{\psi} = 0$ is called distributive curve and its slope can be examined by taking the curve's total derivative,

$$\frac{du}{d\psi} = \frac{-(f_\psi^\omega - \sigma f_\psi^\xi)}{f_u^\omega - \sigma f_u^\xi}$$

Its numerator should be positive to guarantee the model's stability, that is, real wages should respond less to wage share rises then to producivity, because otherwise it would follow an epxlosive process. The numerator's signal will then define the distributive curve's slope. If $f_u^\omega > \sigma f_u^\xi$ wages respond more then productivity to demand schocks, the distributive curve is positive sloped and called profit squeeze. If $f_u^\omega < \sigma f_u^\xi$ then higher capacity utilization is appropriated by firms through profit enlargement , and the distributive curve is called forced savings.

Figure 8: Possible combinations of effective demand and distributive curve



C Unit Root Tests

Table 3: Unit Root Test

Null Hyphothesis: Series has a unit root *if 10% rejection, **if I reject at 5%, and *** if i reject at 1%					
Test	par_sal_denton_x12	nuci_tri_x12	cred_pib	p_commod	gini_sal
ADF (constant)	(-4.327953)***	(-3.234472)**	0,738745	-0,014638	1,871506
ADF (constant + linear trend)	(-5,019352)***	(-3.667370)**	-1,354968	-2,489587	-0,672059
DF GLS (constant)	(-1,976528)**	(-3.032598)***	0,594156	0,249665	0.147876
Df GLS (constant + linear trend)	(-2,835549)*	(-3.702252)***	-2,040464	-1,888693	-0.836717
Conclusion	I(0)	I(0)	I(1)	I(1)	I(1)

D Granger Causality Test

Table 4: Granger-Causality test: p-values

”Exogenous” Variables in level
Null hypothesis: Variable (column) is not Granger-caused by variable (line):
* if I reject at 10%, ** if I reject at 5% and *** at 1%

	nuci_tri_12	par_sal_denton_x12	cred_pib	p_commod	gini_sal
par_sal_denton_x12			0,693	0,883	0,722
nuci_tri_12			0,142	0,946	0,343
cred_pib	0,222	0,693			
p_commod	0,0002***	0,292			
gini_sal	0,095*	0,761			

”Exogenous” variables differenced
Null hypothesis: Variable (column) is not Granger-caused by variable (line):
* if I reject at 10%, ** if I reject at 5% and *** at 1%

	nuci_tri_12	par_sal_denton_x12	dcred_pib	dp_commod	dgini_sal
par_sal_denton_x12	0,043**		0,409	0,749	0,624
nuci_tri_12		0,076*	0,362	0,433	0,769
dcred_pib	0,273	0,936			
dp_commod	1,E-06***	0,112			
dgini_sal	0,245	0,514			