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# Growth theory and the growth model perspective: insights from the supermultiplier

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## Abstract

Recently, demand-led growth theories reshaped the study of comparative political economy. Since the Baccaro and Pontusson critique of Varieties of Capitalism, a new wave of studies has sought to analyze national economies in terms of their main demand driver of growth. Post-Keynesian authors provided extensions to perfect the fit between demand-led growth theories and comparative political economy. We argue that the Sraffian supermultiplier provides a growth theory compatible with the growth model perspective advanced by Baccaro and Pontusson and has advantages over Kaleckian and New Keynesian approaches. The concept of the autonomous components of demand, which comprise government spending, export, and debt-financed consumption, is already central for the studies of growth models. The supermultiplier provides a theory that coherently understands the relation between the autonomous demand drivers and the other induced components of demand. We demonstrate our arguments by decomposing the growth of four advanced economies: the United States, Germany, Japan, and Sweden. The decomposition shows the importance of separating the autonomous from the induced components and highlights the relevance of public expenditures and exports as growth drivers in advanced economies.

**Key words**: Comparative Political Economy, growth models, Sraffian supermultiplier.

**JEL classification:** B52, E12, O47, O57, P52.

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# 1 Introduction

The study of macroeconomic phenomena is a fundamental ingredient of Comparative Political Economy (CPE). Varieties of Capitalism (VoC) (Hall and Soskice, 2001), firmly anchored to mainstream macroeconomics, have dominated CPE in recent years. Supply-side growth theories led the VoC literature to investigate mainly innovation, corporate finance systems, industrial relations regimes, and vocational training systems, almost ignoring the role of demand.

Baccaro and Pontusson have been among the most vocal critics of VoC, indicted for its overlooking of macroeconomic outcomes, such as unemployment, inflation, and growth, and the relations between inequality and growth (Pontusson and Baccaro, 2020). On the constructive side, the authors introduced the growth model perspective to bring back macroeconomic analysis into the comparative analyses of advanced capitalism (Baccaro and Pontusson, 2016). This meant embracing a demand-led growth perspective, to understand the mobilization of different components of demand within a national growth model.

Demand-led growth theories have a long-standing tradition in Post-Keynesian economics (Lavoie, 2014; Hein, 2014; Blecker and Setterfield, 2019). Recent events have shown that these theories are better equipped to deal with contemporary puzzles for supply-side economics. Among the several examples, we can recall the secular stagnation (Summers, 2015), hysteresis of potential output (Blanchard et al., 2015), and failure of austerity policies to restore growth prosperity (Hein, 2016; Girardi et al., 2020). Furthermore, the focus on demand and income distribution supports the analysis of who benefits from a given growth model. Thus, demand-led growth theories can incorporate Streeck's (2016, p. 245) proposal that "with capitalism comes conflict—not technocratic disagreement over optimal coordination, but distributional conflict."

Nonetheless, the demand-led approach is not an island but rather an archipelago, with its own internal debates and nuances and many alternative constructions to describe the growth process. As we try to argue in this article, the Kaleckian model, adopted by Baccaro and Pontusson, has numerous theoretical shortcomings, which can hinder the potentialities of the growth models perspective. As an alternative to the Kaleckian model, the Sraffian supermultiplier model gained traction within the Post-Keynesian scientific community recently.

We argue that the Sraffian supermultiplier implies a growth theory compatible with the growth models perspective advanced by Baccaro and Pontusson and has some advantages over other approaches. We show, in particular, that the central concept for the supermultiplier—the autonomous components of demand, which comprise government spending, export, residential investment, and debt-financed consumption—play a fundamental role for the growth models perspective. The combination of the growth model perspective and the Sraffian supermultiplier provides a powerful framework to evaluate the sociopolitical determinants of growth while coherently considering its demand-led nature. The ultimate determinants of growth are not to be found in the intricacies of economic modeling but in the political and social determinants of the autonomous demand components.

Passos and Morlin (2020) compare growth models in Latin America based on the Sraffian supermultiplier, indicating that cycles of commodity prices explain changes in the growth models. Contrary to that study, we explore a similar methodology to compare growth models in four advanced economies. We discuss the theoretical contribution of combining the supermultiplier and CPE. Finally, we contrast it with the other macroeconomic approaches used in CPE.

We demonstrate our arguments through a supermultiplier decomposition of GDP growth in the United States (U.S.), Japan, Germany, and Sweden. The separation of autonomous from induced components allows for the account of indirect effects of autonomous components through the supermultiplier. For all countries in the sample, exports assume a prominent role, especially in the cases of Germany and Sweden. Japan presents a mix of high exports and public expenditures. After the crisis, Japan presented low growth rates owing to the lower growth of exports and public expenditures. The U.S. presented a prominent role of public expenditures before the 2008 crisis. Public expenditures decreased after the 2008 crisis, being partially replaced by other domestic expenditures. The lack of dynamism of the propensity to consume in Germany confirms the choice of a growth model focused on exports, whereas domestic demand is restrained by lower public expenditures and wage moderation.

Section 2 discusses the growth drivers of four advanced economies in light of the supermultiplier model, comparing our methodology with recent contributions of Post-Keynesian scholars as well. Section 3 shows how the concept of autonomous demand and the supermultiplier relates to CPE. Section 4 appraises other macroeconomic theories employed in CPE studies and compares them with the

supermultiplier. The final section concludes that the supermultiplier contributes to the comparison of growth models, while CPE can explain the political causes of the growth drivers.

## 2 Growth Models before and after the Great Recession

Stimulated by Baccaro and Pontusson (2016), Post-Keynesians have started investigating the evolution of advanced economies' growth models before and after the 2008 crisis (Hein et al., 2019; Kohler and Stockhammer, 2021). In addition to looking at sectoral financial balances and welfare state data, Hein et al. (2019) elucidated some issues in the growth decomposition proposed by Baccaro and Pontusson (2016). Hein and Martschin (2021) analyze European growth models on the basis of growth contributions of the main demand components and financial balances. Furthermore, the authors emphasized the importance of macroeconomic policies and their relationship with the growth models.

Kohler and Stockhammer (2021) propose the concept of "growth drivers" as a superior alternative to that of the contributions of the demand components. Growth drivers are "distinct factors that are not themselves part of aggregate income but influence the growth of its components" (Kohler and Stockhammer, 2021, p. 6). As examples of growth drivers, Kohler and Stockhammer (2021) closely analyze financial cycles, fiscal policy and non-price competitiveness, and foreign demand. Although the authors analyze these growth drivers, they do not focus on the growth contributions of demand components.

The growth drivers identified by Kohler and Stockhammer (2021) can be related to the autonomous expenditures identified by the supermultiplier literature. In the supermultiplier model, autonomous components of demand are the drivers of the growth of demand and thus of output. In the supermultiplier literature, the relative importance of an autonomous component on demand is identified by growth decompositions that consider the supermultiplier effects (similar to Freitas and Dweck, 2013).

Growth contributions, criticized by Kohler and Stockhammer (2021), are actually a coherent way of describing the relative importance of growth drivers (also refer to Hein and Martschin, 2021). To elucidate this point, we can mention the study of fiscal policy as a growth driver. Kohler and Stockhammer (2021, pp. 14–15) account for

the structural fiscal balance to capture the impact of discretionary fiscal policies. However, the growth of government expenditure is the relevant cause of economic growth, rather than the level of deficit or surplus in the fiscal balance. A public deficit does not necessarily imply a growth of demand. Government pushes aggregate demand when it increases its total expenditure. Public balance depends on the income generated by the whole of expenditures, which generate tax revenues. For instance, after the 2008 crisis in the U.S., the increase in public deficit did not cause an increase in the government's contribution to growth. However, the decrease in public expenditures led to a negative contribution from the government.

The growth decomposition proposed by Freitas and Dweck[4] can capture the relative importance for the growth of each autonomous component (or growth driver). In addition, the supermultiplier model maps the relation between the growth drivers and the components of demand induced by these drivers, providing an encompassing framework to the growth model analysis.

The supermultiplier decomposition accounts for exports as a source of (autonomous) demand. This differs from Baccaro and Pontusson (2016), Hein et al. (2019), and Hein and Martschin (2021), who focus on net exports, that is, exports minus imports. However, considering only net exports, "is not well suited to providing an economic representation of how income and activity are generated" (ECB, 2005, p. 54) and "may understate the extent to which external developments generate activity in the economy, through the creation of additional income" (ibid., p. 53). Following the supermultiplier approach, we consider exports separately, which contribute to driving growth, and imports, which are induced by—and therefore follow—demand. A large share of imports implies a smaller supermultiplier, that is, a smaller indirect impact of autonomous demand on output owing to the greater leakage of domestic demand to the rest of the world. In turn, exports growth affects output growth directly and indirectly (through the supermultiplier effect). Its impact on growth is therefore larger than it would be if the growth decomposition did not distinguish between autonomous and induced demand.[5] The net effect of foreign trade can still be obtained by the sum of the two different effects.

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[4] Freitas and Dweck (2013) decompose the growth of the Brazilian economy and reveal the importance of public expenditures as the main growth driver during the XX century.

[5] The appendix provides a comparison between these two methodologies.

## 2.1 Growth decomposition before and after the crisis

The supermultiplier theory can be illustrated by the growth decomposition of four advanced economies: the U.S., Germany, Sweden, and Japan, for the period 2000–2018. We segregate the analysis into the periods 2000–2008 and 2010–2018, thereby comparing the growth models of the sampled countries before and after the Great Recession. The growth accounting methodology that we employ explicitly distinguishes between induced and autonomous components of demand. That is the key novelty with respect to other analysis of growth models based on demand-led growth. The final impact of an increase in autonomous expenditures on income accounts for the supermultiplier effect, which is determined by the induced components.

Analyzing the dynamics of the autonomous components of demand for this heterogeneous sample of advanced economies shows the usefulness of a supermultiplier approach in a comparative analysis of growth models. This adds to the relevant comparisons among those countries performed by the welfare state and institutionalist scholars (Esping-Andersen, 1992; Steinmo, 2010).[6] We argue, in particular, that the supermultiplier framework provides an additional map for contrasting such diverse engagements to the global economy.

We employed the methodology proposed by Freitas and Dweck (2013, pp. 168–174), according to the data availability and comparability of the four countries. Two sets of variables affect GDP growth: autonomous demand components and supermultiplier components. Autonomous demand comprises exports, government expenditures, and household residential investment.[7] The supermultiplier components are the propensity to consume, propensity to invest, and complement of imports' share.

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[6] In his comparison of Japan, Sweden, and the United States, Sven Steinmo (2010, p. 22) reminds us that "these very different nations share a large number of features: they are all democracies with regular elections, freedom of the press, the rule of law, and a wide range of individual liberties. They have market-based economies, with relatively free capital markets, stock exchanges, and strong commitments to private property. In each case their governments intervene and regulate private affairs, tax companies, and citizens through the same set of tax instruments and provide a remarkably consistent set of public programs and social services for its citizens – from old age care and pensions to unemployment insurance, to support for the needy and systems of higher education."

[7] We do not include debt-financed consumption (or autonomous consumption, in general), owing to the lack of comparable data for the sampled countries. The growth decomposition assumes that all consumption comprises an induced expenditure.

**Figure 1) Supermultiplier decomposition for selected countries, 2000–2018**
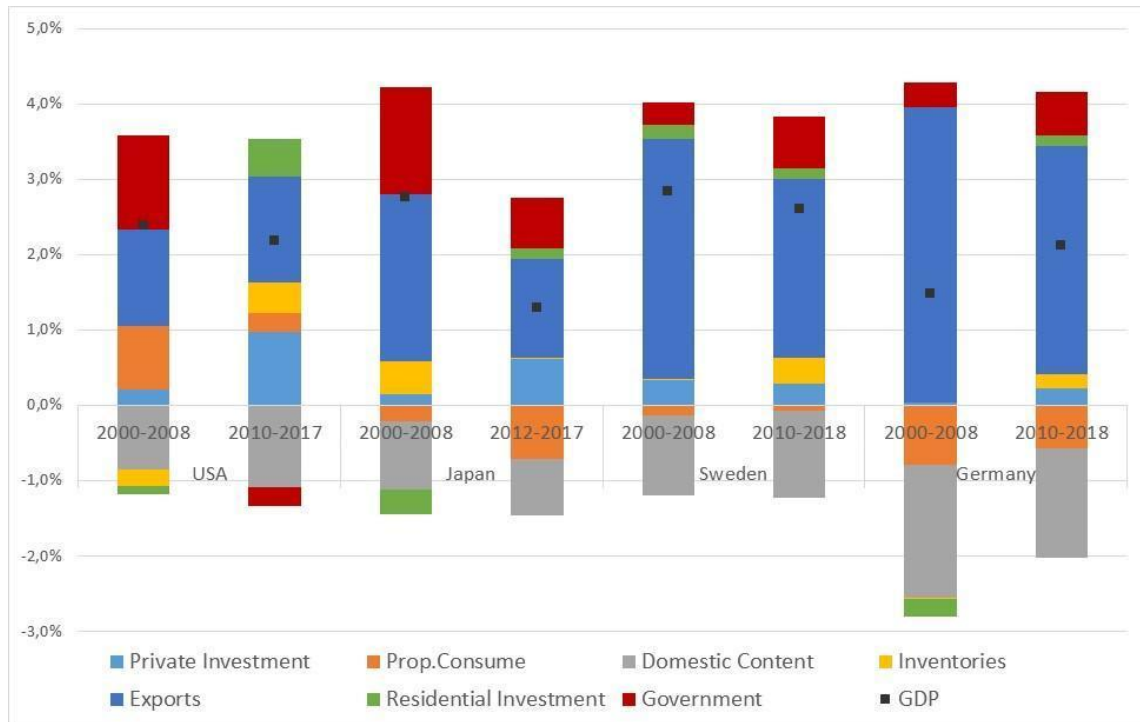


Source: Authors' elaboration using OECD data.

A key conclusion of the supermultiplier decomposition is the prominent role of exports for every developed economy analyzed, as seen in Figure 1. Our decomposition not only reaffirms the export-led growth model of Germany but also emphasizes a recent reduction in the contribution of exports to growth.[8] Slightly higher growth in Germany from 2010 to 2018 follows the diversification of the demand drivers. Similarly, Hein and Martschin (2021) report that Germany transited from a mercantilist growth model to a weak-mercantilist model, wherein exports are still fundamental but lost relative importance. In a context of lower European demand, the German growth model adapted by increasing government expenditures, residential investment and a lower increase of imports. Following this trend, in 2019, the impact of government expenditures on growth was larger than that of exports for the first time in 20 years.

The increase in inequality in Germany may be responsible for the negative effects of changes in the propensity to consume, which decreased from 0.6 to 0.52 between 1999 and 2018, on growth, owing to a lower supermultiplier effect. Wealth

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[8] Germany's growth model is the typical example of an economy that migrated from a "growth pulled by net exports and consumption simultaneously to almost exclusively export-led growth" (Baccaro and Benassi, 2017). The export-led growth is based on a contraction of wages, reduction of social security, and low company taxes (Baccaro and Benassi, 2017; Nolke, 2021, p. 66).

inequality in Germany, for example, has increased by 20% between 2010 and 2018, as estimated by the Gini coefficient (Nolke, 2021, p. 66).

The U.S. have long been "the world's indispensable spender" (Klein and Pettis, 2019, p. 182), a position guaranteed by the position of the dollar in the international financial system (Klein and Pettis, 2019; Vernengo 2021). Before the crisis, government expenditure had the largest contribution to GDP growth, with the American government guaranteeing the country the status of the world's indispensable spender. This changed during the period 2011–2014, when the government negatively affected the growth. However, after 2015, the American government again had an average annual positive impact of 1% on growth. Overall, however, it is possible to observe a decline in the aggregate growth rate after 2010, whose causes have to be searched (also) in the political decisions on the government budget.

Contrary to the case in Germany, the propensity to consume in the U.S. had a positive effect on GDP growth during the entire period. This cannot be explained by a decrease in inequality as the inequality was increased in the country. We attribute this effect to debt-financed consumption (Setterfield and Kim, 2020), which is commonly seen as the pre-crisis engine of growth in the U.S. In fact, departing from a multiplier framework, Cynammon and Fazzari (2015, p.180) conclude that the effect of inequality on demand generation in the U.S. was postponed by massive consumer borrowing for an extended period prior to the Great Recession.

Japan has a mixed growth model that combines exports and government demand (Picot, 2021, p. 151). This combination is usually considered unfeasible that lacks a consistent theoretical explanation, because it would require public deficits and trade surpluses simultaneously (Iversen and Soskice, 2012, pp. 62–63). The case of Japan shows that these two sources of demand are compatible and assured Japan a rate of growth of the same level as for the other advanced economies before the crisis.

After the crisis, Japan kept a mixed growth model. However, it showed the worst growth performance in our sample, even without considering the years of the Fukushima nuclear disaster. Lower GDP growth was explained mainly by the fall of the exports, government demand, and the propensity to consume. Macroeconomic policies have not been able to address the persisting problem of weak demand in Japan (Shibata, 2017). Concurrently, flexibilization policies in the labor market increased wage inequality and contributed to the stagnation of wages, also weakening the institutions

that enabled workers to benefit from productivity growth (Shibata, 2017). These factors explain the fall in the propensity to consume, and its negative contribution to growth.

In Sweden, the propensity to consume decreased gradually over the years, and therefore, induced consumption affected growth negatively. Notably, consumption did not have the strong effect captured by Baccaro and Pontusson (2016; 2019), who describe Sweden as a mix between consumption and export-led. In our analysis, Swedish growth is largely led by exports, with a recent increase in the relevance of government expenditures. Government did not have a vital contribution before the 2008 crisis; however, the increase in government expenditures after the crisis helped in sustaining growth.

The comparison of the supermultiplier across countries provides additional information about the growth models. Figure 2 illustrates the evolution of the supermultiplier in the four countries. The difference among countries is explained primarily by the share of imports to GDP.[9] The U.S. and Japan have a lower share of imports in GDP, so they have a higher supermultiplier. Autonomous demand shocks have higher effects in countries with higher supermultiplier, so fiscal policy is more effective. Further, an increase in the import share in Germany led to a decrease in the supermultiplier.

**Figure 2) The evolution of the supermultiplier**
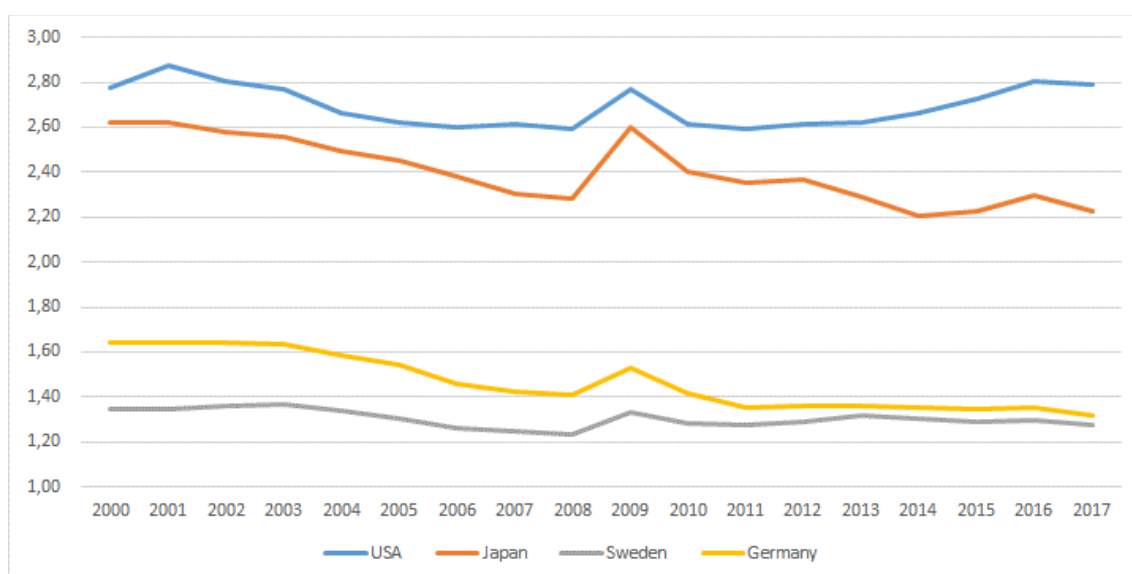


Source: Authors' elaboration using OECD data.

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[9] See Figure 2 in the Appendix.

## 3 The Sraffian supermultiplier and CPE

## 3.1 CPE through the lenses of the Sraffian supermultiplier

The autonomous components of demand are the proximate cause of economic growth in the supermultiplier model.[10] Autonomous components of demand are those that are neither financed by current income (wage and salary) nor do they affect productive capacity. Public expenditure, exports, household residential investment, and consumption financed out of debt are considered autonomous components of aggregate demand in the literature.[11] These components have two characteristics: they do not increase the (private) productive capacity of the economy and they are neither caused nor funded by domestic income.[12]

Nevertheless, the supermultiplier model itself does not explain the factors that determine the growth of autonomous demand. Therefore, the supermultiplier has been labeled as an *exogenous theory of growth*. This point has been highlighted, for example, by Blecker and Setterfield (2019, p. 366), who claim, "Sraffian-inspired developments in supermultiplier analysis have prompted a sudden, late, and undesirable turn towards exogenous growth theory in heterodox macrodynamics."

Exogeneity, for the critics of this approach, is considered an indictment. However, we believe that it is a strength that makes the supermultiplier particularly apt for CPE studies.

The ultimate causes of growth in the supermultiplier are not found in the intricacies of economic modeling but in the political and social determinants of autonomous demand components. For instance, in an export-led case, the growth rate of

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[10] The Sraffian supermultiplier was proposed by Serrano (1995) and has caught the attention of other Post-Keynesian macroeconomists (e.g., Allain, 2015; Lavoie, 2016; Palley, 2019; Fazzari et al., 2020).

[11] An interesting discussion has explored to which extent those components are really autonomous from current income. Nikiforos (2018) and Skott (2019) argue that no component of demand can be considered really autonomous. Theorists of the Balance of Payments growth theory argue that only exports are really an autonomous component (Thirlwall, 2019). Fiebiger and Lavoie (2019) use the prefix "semi" to emphasize that what portion of effective demand is more stable is country and time specific (Fiebiger 2021). For our purposes, we argue that exports, debt-financed consumption, and government-led are generally considered autonomous in both the supermultiplier model and the CPE literature.

[12] Recent studies investigate the sustainability of debt (or the wealth stock) financing autonomous consumption and explore how consumer debt can have long-term impact on output, generating cycles and crises (Pariboni, 2016b; Fiebiger and Lavoie, 2019; Mandarino et al., 2020). Allain (2015) and Hein (2018) show that growth can be led by public expenditures while preserving the long-term sustainability of public finances. Dejuán (2017) and Nah and Lavoie (2017) manage the stability conditions for export-led growth, whereas Freitas and Christianes (2020) and Hein and Woodgate (2020) study the interaction between autonomous consumption, government expenditures, and income distribution.

exports determines the growth rate of output in the long run. Thus, the proximate cause of the aggregate growth is export growth. However, the ultimate cause, or what leads to a high export growth rate, is found in national and international dynamics of competitiveness and power. In addition, supermultiplier authors consider international hierarchies, international monetary arrangements, and national development policies as relevant determinants of growth (Serrano and Medeiros, 2004). Such matters open room for a relationship between growth models and International Political Economy (Blyth and Matthijs, 2017).

The concept of autonomous demand is therefore readily suitable for the growth model perspective. Baccaro and Pontusson (2016) develop the idea that some components of demand, especially exports and debt-financed consumption, are the main sources of growth in developed countries. The supermultiplier model provides a coherent framework where those autonomous components of demand are the proximate cause of growth. Moreover, the supermultiplier explicitly deals with government expenditure as a component of autonomous demand. That brings an expenditure directly related to political decisions to the center of the growth model analysis. We argue, thus, that the Sraffian supermultiplier is compatible with the objectives of the growth model perspective, investigating the ultimate causes of growth in both the domestic growth coalitions and international determinants.

Conversely, induced expenditures are influenced by the level of income and production. A part of household consumption[13] is then considered an induced expenditure because it is funded out of wages or profits, and the same goes for imports. The argument is slightly different for private investment, which is not necessarily funded by (current or past) income, but still depends on the evolution of demand and is systematically related to the production requirements. Capitalists invest to make production meet expected demand. Thus, investment follows the capital stock adjustment principle, so that permanent increases in demand and production induce the expansion of productive capacity.

The induced components of demand contribute to determining the magnitude of the supermultiplier, which gives the name to the model. Analogously to the Keynesian multiplier, the supermultiplier is a factor multiplying autonomous expenditures to determine output according to aggregate demand. However, the traditional Keynesian

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[13] The other part of consumption is, obviously, financed out of debt or wealth.

multiplier includes only the propensity to consume and to import. The supermultiplier further includes a term that can be labeled as the propensity to invest[14] and that captures the functioning of the accelerator mechanism, making investment an induced expenditure. The supermultiplier, thus, considers the indirect effects of autonomous expenditures on output through consumption and investment (and imports, but with a negative sign).

Through the propensity to consume, the supermultiplier also defines a relation between growth and distribution. An increase in the wage share, for instance, implies an increase in the aggregate marginal propensity to consume and consequently in the supermultiplier. This leads to a permanent positive level effect on production and income, but only a temporary one on the economy's growth rate,[15] which tends to converge to the growth rate of autonomous expenditures.[16]

As autonomous expenditures determine the pace of growth, they acquire a significant political meaning owing to their impact on wages and income distribution. A relation between growth, unemployment, and wage inflation can define a conflict-augmented Phillips curve (Serrano, 2019).[17] An acceleration in growth of aggregate demand leads to lower unemployment rates, thereby enhancing workers' bargaining power and increasing the average rate of growth of money wages (which, in turn, will be associated with a higher rate of inflation).[18] By affecting growth and employment,

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[14] It is important to recall that, in the supermultiplier literature, the propensity to invest is not a parameter or a datum, rather an endogenous variable that adjusts to discrepancies between realized and desired utilization of the installed capacity or analogously to discrepancies between the actual and the expected rate of growth, depending on the specific investment function adopted. Refer to Freitas and Serrano (2015) and Cesaratto et al. (2003) for the analytical details.

[15] Although changes in distribution affect growth only temporarily, growth can lead to persistent changes in income distribution. Classical political economy understood that, during periods of fast capital accumulation, the "scarcity of hands" would improve workers' bargaining position, allowing for an increase in the wage rate (Stirati, 1994).

[16] See Freitas and Serrano (2015) for an extended discussion on level vs growth effects in the supermultiplier and other demand-led growth models. The lack of a permanent effect of distribution on growth contrasts with the neo-Kaleckian model, wherein changes in income distribution exert a permanent impact on economic growth, owing to the non-convergence of the equilibrium degree of capacity utilization to its normal level. Despite the neo-Kaleckian claim that distribution permanently affects growth rates, Lavoie (2016, p. 196) notes that "(nearly all) empirical works about wage-led and profit-led regimes that derive from the post-Kaleckian growth model are in fact based on calculations of level effects."

[17] Additionally, refer to Palley (2019), Fazzari et al. (2020), and Summa and Braga (2020).

[18] In this view, "there is a long-run trade-off between cost-push inflation and the rate of unemployment and also the rate of growth of output and of the capital stock and productive capacity" (Serrano, 2018, p. 31). Recent empirical findings support these conclusions (Summa and Braga, 2020; Stirati and Paternesi Meloni, 2018).

macroeconomic policies interact with wage bargaining and income distribution (Doorslaer and Vermeiren, 2021).

## 3.2 The Political Economy of Autonomous Demand

The distinct role of autonomous expenditures leads to the necessity of discussing the political economy of government expenditures, exports, and debt-financed private expenditures.

Government demand can influence the pace of growth through direct public expenditure or public companies. However, the fact that governments can actively contribute to demand management and, for example, to fight unemployment does not automatically mean that governments will actually do so. As a well-known, classical work of Kalecki highlighted almost 70 years ago, ruling classes in capitalist economies tend to oppose the adoption of fiscal policy dedicated to the pursuit of full employment. Kalecki identifies three reasons for this opposition. First, government intervention reduces the power of capitalists as a class in determining the level of employment in the economy. In this case, capitalists would no longer be able to claim that other policies against their interest would damage employment by harming the "degree of confidence." Once the government is perceived to be able to lead the economy toward full employment, capitalists lose (at least in a large degree) the possibility to use employment creation as a political resource when defending their own class interests (e.g., to reduce capital taxation). The rhetorical artifice through which capitalists use the opening of job vacancies by the private enterprise as proof of the coincidence of their own interests with the interests of the working class and the society, in general, would be unveiled and neutralized.

The second reason highlighted by Kalecki is that capitalists usually dislike the direction of public expenditure because it tends to concentrate on public investments or consumption subsidies. The first kind of expenditure might imply competition for public companies in markets previously restricted to the private sector. As a result, consumption subsidies would contradict the "moral of capitalism," according to which "you shall earn your bread in sweat, unless you happen to have private means" (Kalecki, 1943, p. 326). In this regard, it is interesting to consider that social policy reduces workers' dependency on employers, strengthening its bargaining power in wage negotiations. Finally, capitalists dislike the social and political changes resulting from

prolonged maintenance of full employment, particularly the weakening of labor discipline, increase in the frequency of strikes, and tension on labor relations owing to the general enhancement of the power of labor (Kalecki, 1943).

When discussing the end of the Golden Age, Steindl (1979) extends Kalecki's conclusions regarding the political business cycle to the discussion of long-run trend of the economy, an interpretation reclaimed by Hein (2016) as well to interrogate the political determinants of the Secular Stagnation:

> In fact, the business opposition to full employment policies, which Kalecki had so vividly described in his analysis of the 'political business cycle' (1972), gathered more and more strength towards the end of the growth period. It seems to have now, however, a more persistent and lasting character than in Kalecki's political cycle, so that we might rather speak of a 'political trend'. This policy of stagnation is likely to continue, since governments are preoccupied with inflation and the public debt. Budget deficits can only disappear if private investment soars again. This is unlikely in view of excess capacity, which would only disappear if there were fiscal expansion. (Steindl, 1979, p. 119)

The focus on controlling budget deficits and inflation would then constitute a "stagnation policy" that reduces the pace of economic growth, implemented for meta-economic and political reasons, making clear that the pattern, direction, and magnitude of public expenditure constitute one of the most important grounds on which conflict among class interests is exerted.

Moving to exports, they can be analyzed considering international monetary arrangements and trade coalitions (Serrano and Medeiros, 2004). Historically, privileged access to international markets (conceived according to geopolitical interests) influences the ability of countries to export. For example, that was the case with some Asian countries that obtained a political priority in the U.S. international relations, adopting the so-called "development by invitation" (Wallerstein, 1974; Medeiros, 2013). During the Golden Age, the U.S. pulled aggregate demand internationally, contributing to the fast growth of trade between advanced capitalist countries, which certainly contributed to the prosperity of advanced economies in the period (Marglin, 1990; Glyn et al., 1990).

International financial relations cannot be neglected either. As ruler of the international payments system, in which the role of dollar as an international currency stood out, U.S. capital flows (as the Marshall Plan and direct investment of

multinationals) contributed to the stability of the Balance of Payments of advanced capitalist countries. This allowed robust growth performances for those countries for a long period, which might have been a central issue in the American strategy to win the Cold War (Serrano, 2004; Korpi, 2006). More recently, the Federal Reserve ensured international liquidity in dollars during the Great Recession (Matthijs, 2020) and the pandemic crisis (Bortz et al., 2020), thereby contributing to financial stability on a global basis. Although those interventions avoided a reversion in international trade and debt defaults from peripheral economies, they consolidated the dollar hegemony in the international system (Vernengo, 2021).

Exports gained central importance in the establishment of growth models for advanced economies. Baccaro and Pontusson (2016, p. 180) assign "a key role to exports of services and manufactured goods and to the entrenchment of export-led growth at the expense of consumption-led growth." Price or non-price competitiveness would clarify the diverging paths of advanced economies. However, exports growth for one economy depends crucially on the growth of aggregate demand in the rest of the world. Demand from leading economies may drive global trade, boosting exports growth (Matthijs, 2020). Thus, the lack of dynamism of foreign demand can explain the weak results of export-oriented growth strategies (Kohler and Stockhammer, 2021).

Furthermore, the fundamental distinction between core and peripheral economies, as developed by Latin American Structuralist tradition, can be employed to comprehend the political underpinnings of export growth (Prebisch, 1949; Rodríguez, 2006). Historically, the economic system in the periphery was shaped by the connection with core economies. Hence, the source of the economic dynamism of peripheral economies usually relied on (and was often restrained to) the commodity-exporting sector (Furtado, 1976). Although foreign trade is still extremely relevant for those economies, nowadays, the dependency on core economies is mainly financial and technological (Tavares, 1972; Vernengo, 2006).

From the perspective of demand-led growth, the balance of payments constraint can be a central obstacle to growth in emerging economies, comprising a financial constraint associated with the availability of international currency (mostly dollars) (Thirlwall, 2019). Foreign trade supplies inputs for domestic production, capital goods employed in investment projects, and consumption goods. Smaller economies rely on foreign markets to maintain their regular economic activities. Peripheral countries are usually subject to vulnerabilities coming from the volatility of capital flows and sudden

changes in terms of trade (especially owing to the high share of primary commodities in the total exports). Naturally, a country can sustain a lasting trade deficit if it obtains a sufficient amount of international currency through capital flows and foreign direct investment. A lasting surplus in the balance of payments allows for the accumulation of foreign reserves and is not expected to be corrected by any automatic mechanism. However, a deficit position cannot be sustained permanently (unless the country issues the internationally accepted currency as the U.S.), leading to unsustainable loss of foreign reserves or pressure over the exchange rate. Sooner or later, authorities will slow down growth by reducing aggregate demand to cope with the instability arising from the balance of payments deficit (Freitas and Dweck, 2013).

Finally, in recent decades and in several countries, debt-financed household expenditures have been one of the main engines of growth,[19] giving rise to a further peculiar growth model. As argued especially but not exclusively by Post-Keynesian authors, in the face of the depressive effects of fiscal austerity and the observed trends in income distribution in most advanced economies, private debt-expenditures have acted as a counterbalancing, albeit deeply unstable, force. In a similar vein, residential investment, stimulated by the increase in real estate prices, has also constituted an important source of dynamism for aggregate demand (Kohler and Stockhammer, 2021; Pérez-Montiel and Pariboni, 2021), in the context of what has been defined a "privatized Keynesianism" model (Crouch, 2009), characterized by the role of property price bubbles and mortgage debt in inducing (autonomous) consumption. Obviously, these phenomena do not occur in a vacuum and respond to a complex intersection of institutional, cultural, and social norms-related factors. In addition, they are the outcome of the political process, as "government policies are clearly of critical importance for the political economy of housing and household debt and that the analytical categories of the mainstream CPE tradition shed remarkably little light on this important topic" (Baccaro and Pontusson, 2019, p. 8).

Ultimately, the supermultiplier model reads the political economy of growth through two kinds of impacts. First, permanent changes in the growth of autonomous expenditures (exports, government, and debt-led private expenditure) affect the long-run GDP growth rate. Second, changes in functional income distribution have short-run

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[19] See, for example, among many others, Barba and Pivetti (2009), Kumhof and Rancière (2010), Rajan (2010), and Stockhammer (2015).

effects on GDP growth but persistent ones on its level. However, the analysis of the ultimate causes of growth is still missing. This is where CPE steps forward to investigate the political and social determinants of autonomous demand components and income distribution.

## 4 Other approaches of Macroeconomics in CPE

## 4.1 New Keynesian shortcomings in CPE

After presenting our "constructive" contribution to the debate in the previous sessions, we now move to the "critical" part. Indeed, as the introductory session indicated, CPE studies have been, traditionally, mostly informed by a standard, mainstream macroeconomic view, especially in its New Keynesian incarnation.

However, recently some cracks have emerged on the surface, credits to Baccaro and Pontusson especially. One of the main critiques raised by these scholars (Baccaro and Pontusson, 2016) to New Keynesian economics, and particularly to its influence on CPE, centers on the fact that, in the aforementioned theoretical approach, growth is immune to demand variables in the long run. Only technology and labor supply—hence, supply-side variables—would affect growth rates. Concurrently, aggregate demand would only be capable of causing short-run deviations from a predetermined long-run path (Carlin and Soskice, 2014). In this framework, analyzing the political economy of demand aggregates is hardly meaningful, being confined to short-run growth or the first stages of crises. In the long run, however, New Keynesian economics is restricted to the discussion of institutional features, innovation, and policies that affect labor supply (as migrations, female labor, and the rate of participation). Therefore, New Keynesian economics brings no real novelty to the established VoC approach, limiting cross-fertilization between CPE and macroeconomics.

A first reaction to Baccaro and Pontusson (2016) can be found in Hope and Soskice (2016), wherein the authors defend the choice of using mainstream macroeconomics to analyze growth models and question the usefulness of Post-Keynesian macroeconomics.[20] In particular, they argue that the three-equation model, as exposed in Carlin and Soskice (2014),[21] is the most coherent framework for

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[20] Refer to Stockhammer (2021, p.6–8) as well for a critique on this viewpoint.

[21] A Post-Keynesian critique on this model can be found in Lavoie (2015).

comparative studies of growth. This theoretical tool does not need to rely on conventional and implausible assumptions of mainstream macroeconomics as rational expectations and perfect foresight and would be analytically superior for two reasons: (1) supply and demand are analyzed in a single coherent framework and (2) monetary and fiscal policy are built in the model (Hope and Soskice, 2016).

In the construction defended by Hope and Soskice (2016), the main tenets of the New Keynesian paradigm are preserved: there is no permanent trade-off between inflation and unemployment and money is neutral in the long term. These features derive from the assumption of a non-accelerating inflation rate of unemployment (NAIRU) not affected by hysteresis,[22] with "*a vertical Phillips curve, set at a unique rate of unemployment free of any influence arising from aggregate demand*" (Lavoie, 2015, p. 137) in the long run. Consequently, policies that expand aggregate demand can only affect output in the short run, causing temporary fluctuations in the output gap.

Therefore, the three-equation model rules out *a priori* any long-run effect of fiscal policy on production and growth.[23] Fiscal policy must adjust to the equilibrium output level, which corresponds to "*the output of the structural or supply-side features of the economy that lie behind the wage-setting and price-setting curves*" (Carlin and Soskice, 2014, p. 63). In the best-case scenario, fiscal policy has only an auxiliary role. For instance, let us assume that a country applies an austerity package and the output gap becomes negative. The Central Bank will fine-tune the monetary policy and lower the interest rate, so exports and investment will grow until the output gap closes (Hope and Soskice, 2016, p. 12). According to this view, no permanent effects on output or employment follow from austerity, which, however, has the beneficial effect of improving the health of the public budget. In fact, Carlin and Soskice (2014, p. 530) argue that despite a short-term recessive impact, "fiscal consolidation is likely to be beneficial for GDP in the long term," revealing an endorsement of the now-discredited expansionary austerity tale. Be as it may, it is hardly disputable that the standard New Keynesian model cannot elucidate the long-term contractionary effects of austerity,

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[22] See Stockhammer (2008) for an encompassing analysis of the NAIRU and how it can be interpreted by different schools of thought. The author, in particular, proposes a Post-Keynesian view in which the NAIRU is influenced by and converges to the actual rate of unemployment (i.e., there is hysteresis in the NAIRU), determined mainly by aggregate demand.

[23] Equivalently, even if monetary policy is included, it takes the form of a semi-automatic rule, usually a Taylor Rule. Changes in interest rate are able to bring output to its potential, but not to change the long-term growth rate.

which has been acknowledged by some of the most influential mainstream economists,[24] and the related issue of secular stagnation.

In comparison, the extension to the long run of the Keynesian principle of effective demand is at the heart of Post-Keynesian economics. Macroeconomic policy may be included in short-run Post-Keynesian models in a fashion similar to that done by New Keynesian three-equation models (Summa, 2016; Lavoie, 2014). More interestingly, however, fiscal policy also affects the long-run growth in demand-led models. Regarding monetary policy, Post-Keynesian authors have anticipated New Keynesians in analyzing money as endogenous and interest rates as a policy-determined variable (Lavoie, 2014). Therefore, it does not seem too far-fetched to argue that the Post-Keynesian perspective provides a richer setup for studying macroeconomic policy. This element should be an essential ingredient for any analysis of the political economy of growth models.

Post-Keynesian economics rejects the concept of a long-run equilibrium unemployment rate independent of aggregate demand, which ties and *de facto* neutralizes macroeconomic policy. In the three-equation model, monetary and fiscal policy cannot persistently affect unemployment, and deviations from the long-run equilibrium affect only the inflation rate (Carlin and Soskice, 2014). Conversely, Post-Keynesians fully acknowledge the existence of hysteresis in unemployment,[25] arguing that macroeconomic policy can affect both short- and long-run unemployment. It is quite straightforward to realize how hard it is to reconcile hysteresis, that is, the notion that persistent deviations from equilibrium position affect the equilibrium itself, with the main conclusions of the New Keynesian three-equation model (Storm and Naastepad, 2012; Stirati and Paternesi Meloni, 2018; Summa and Braga, 2020).

As aforementioned, Hope and Soskice identify a further reason that should warrant the superiority of mainstream macro, namely, the joint analysis of demand and supply in a coherent framework. However, this (implicit) criticism of Post-Keynesian theory seems problematic as well. The cornerstone of every growth theory is the dynamic between supply and demand drivers. Therefore, it is inadequate to state that

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[24] See, for example, Blanchard and Leigh (2013), Fatás and Summers (2016), and Jordà and Taylor (2016). In addition, refer to Deleidi et al. (2020) for a recent empirical estimation of fiscal multipliers that highlight the permanent expansionary effects of public investment.

[25] See Blanchard and Summers (1986) and Ball (1999) for early and influential contributions on hysteresis. See Stanley (2013) and Girardi et al. (2020), among many others, for empirical evidence.

demand-led growth models do not include the supply side. The supply side is always present in these models, but in general, productive capacity is expected to respond to demand drivers and not the other way around. Just to mention a few contributions, it is possible to recall here demand-led growth models that employ input-output matrices to evaluate how specific demand drivers affect the productive structure (Freitas and Dweck, 2010) or the exploration of innovation and technological change in demand-led models (Dosi et al., 2010; Cimoli et al., 2010) and, particularly, in autonomous demand-led models (Cesaratto et al., 2003; Nah and Lavoie, 2019; Deleidi and Mazzucato, 2021).

## 4.2 Neo-Kaleckian growth theory and the growth model perspective

After briefly reviewing some reasons for the dissatisfaction toward New Keynesian economics and its influence on CPE, we believe it is further useful to critically examine an influential nonmainstream contribution to macroeconomics to identify the differences with respect to the theoretical framework proposed in this article.

To study the political economy of growth and distribution, Baccaro and Pontusson (2016) rely on Kaleckian growth theory, particularly on the main insights developed in the seminal work of Bhaduri and Marglin (Marglin and Bhaduri, 1990; Bhaduri and Marglin, 1990). The dichotomy between wage and profit-led regimes is the central divide in this approach. A wage-led regime implies that a higher wage share leads to higher economic growth. Workers have a larger propensity to consume out of income than capitalists. In this case, a shift in income distribution in favor of the working class leads to higher consumption and, through the accelerator, higher investment and faster growth. On the contrary, in a profit-led regime, the direct negative impact of higher wages on investment[26] and net exports prevail over the positive boost given to consumption, with a negative net effect on growth.

Marglin-Bhaduri's model allows for both alternatives. The regime prevailing in a specific country is a matter to be investigated empirically. It depends on the model's

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[26] In the Marglin–Bhaduri model, investment is a positive function of capacity utilization and the profit share. As Pariboni (2016a, p. 423) clarifies, "an increase in the accumulation rate, stimulated by a rise in the profit share and not justified by an expected increase in aggregate demand, leads to over-accumulation." See Pariboni (2016a) for a detailed critique on this investment function.

parameters, particularly the relative sensitivity of the demand components to the profit share and the degree of capacity utilization.[27]

The crisis of the Fordist accumulation regime (i.e., the end of the Golden Age of Capitalism[28]) is the departure point of Baccaro and Pontusson's analysis. In the context of structural and institutional changes at the national and international levels, following several decades of wage share decline, welfare state retrenchments and a drastic reduction of the role of the state in the economy, with the ensuing demand-generating problems, in the post-Fordist era, advanced economies have faced and face the challenge of finding new engines for growth. Two patterns, in particular, have surfaced, which have given rise to two main growth strategies: the export-led growth model and the (private debt-financed) consumption-led growth model. Hence, a new dichotomy emerges, which Baccaro and Pontusson seem to consider an evolution and a continuation of the profit-led/wage-led dichotomy present in Marglin–Bhaduri's model.[29] In fact, Baccaro and Pontusson (2016) lack clarity in the connections between the wage-led/profit-led dichotomy and the proposed growth models led by demand components. The confusion mirrors a troubled relation between neo-Kaleckian models and autonomous components of demand, which has led some Kaleckian authors to adopt the supermultiplier approach (Lavoie, 2016).

In the last decades, neo-Kaleckian approaches have been perhaps the most influential interpretative tool among Post-Keynesians. However, criticisms of this approach have also grown louder, questioning its capacity to provide an adequate benchmark model to interpret contemporary capitalism. Running the risk of oversimplifying the issue, it seems possible to claim that the most controversial and critical aspect of Kaleckian macro models, among which one can include the Marglin–Bhaduri model is their failure to reconcile the actual and the normal desired rates of capacity utilization in equilibrium (Skott, 2012; Cesaratto, 2015). As also recognized by its proponents (e.g., Hein et al., 2012), within this model, any attempt by firms to restore their desired rate of capacity utilization via changes in accumulation (as a

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[27] Studies of whether countries follow profit or wage-led regimes amounted to dozens of econometric papers. Blecker (2016) and Lavoie (2017) present balanced views of the wage and profit-led debate. Additionally, see Rolim (2021) for a recent assessment of the relevant empirical literature.

[28] See Marglin and Schor (1990).

[29] Export-led regimes are usually associated with a profit-led economy as, in this case, wage increases reduce external competitiveness, harming the economic performance (Hein and Vogel, 2008). In the context of weakened unions and increasing inequality, consumption-led models are based on debt rather than on wage increases.

standard accelerator model of investment would imply) would generate instability in the Harrodian sense. Kaleckian authors have proposed several alternative mechanisms to overcome this problem. Nevertheless, such mechanisms have not been sufficient to settle the issue and assuage the skeptics.[30]

In the supermultiplier, the autonomous components of demand substitute the dichotomy of wage and profit-led growth regimes as the main determinants of growth. In this framework, wage increases still affect short-run growth (Freitas and Serrano, 2015). An increase in the wage share, for example, increases the (super) multiplier, as in the case of the traditional Keynesian multiplier. However, the long-run rate of growth, which tends to converge to the autonomous demand rate of growth, is not affected, and wage increases affect only the level of the output but not its growth rate.

It is noteworthy that the role of autonomous components has often been neglected in the Kaleckian tradition,[31] standing out from the frequent absence of the effect of public expenditure on growth. As explained, for instance, by Allain, in the Kaleckian literature, government expenditure or public deficits are assumed to be proportional to capital stock[32] and then to grow at the same rate (Allain, 2015), relegating in this way fiscal policy and government spending to a passive and ancillary role. Therefore, we have argued that the supermultiplier is better equipped to provide CPE as a suitable analytical tool, particularly complementary to the growth model perspective.

## 5 Conclusions

The supermultiplier model provides powerful theoretical lenses to understand and compare growth models. In this model, the proximate causes of growth are to be found on the evolution of the autonomous demand components. The ultimate causes of growth, however, have to be searched in the social and political underpinnings of each autonomous demand component.

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[30] A thorough investigation of this topic goes well beyond the scope of this article. The reader interested in recent rounds of the so-called "utilization controversy" can refer to Nikiforos (2016) and Girardi and Pariboni (2019).

[31] It is worth noting, however, that recent contributions, such as Allain (2015) and Lavoie (2016), among several others, include explicitly autonomous demand in an otherwise standard neo-Kaleckian model, providing an interpretation of the growth determinants akin to the one advanced by the supermultiplier.

[32] This is done, for example, in Blecker (2002, p. 140).

Government expenditures, exports, and debt-financed private spending are the main components of autonomous demand in advanced capitalist economies. We argue that these demand components should catch the attention of contemporary political economy scholars. Particular attention should be paid to government expenditures, which are often overlooked in growth models analyses. As shown in our estimates, even countries with an export-oriented profile display a significant role of government in pushing growth. Especially in periods in which international trade shrinks, as we have experienced in the aftermath of the Great Recession or in the midst of the covid-19 pandemic, the role of government can define the viability of growth in advanced economies.

The relationships of growth with distribution can be studied through the analyses of the propensities to consume. However, changes in income distribution have only temporary effects on growth. Higher wages do not imply permanently higher growth rates but relevant temporary impacts, as illustrated by the German case, where the constant decrease in the propensity to consume has affected growth over the last 20 years. Conversely, faster growth may boost wage growth. That explains the possible distributive impact of autonomous demand growth and may shed light on stagnationist policies.

Growth model classifications have overlooked public expenditure as a driver of domestic growth, emphasizing domestic demand as a whole. Nevertheless, in some cases, such as the U.S. before the Great Recession, government expenditures were at least as important as exports. In Sweden and Germany, an increase in public expenditures helped to sustain growth after the Great Recession.

Exports show notable importance in Germany, Sweden, and Japan. But in all three countries, the export contribution to growth has declined after the 2008 crisis. Sweden and Germany increased public expenditure and were able to preserve their previous growth rates. Japan's fall in exports was not compensated by any other demand source. In fact, it coincided with a fall in the growth contribution of public expenditure, leading to a decrease in growth. The U.S., in turn, has a distinctively diversified growth model. The fall in the contribution of public expenditure after the crisis was partially offset by the growth of residential investment. The supermultiplier provides a useful decomposition to understand the proximate causes of these changes, but only refined political and social analyses can explore the ultimate causes of growth in advanced economies.

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## Appendix 1 – Methodology

The methodology follows the work of Freitas and Dweck (2013), who analyzed the growth drivers of Brazil. The growth accounting methodology we employ distinguishes between induced and autonomous components of demand. That is the main novelty with respect to the literature on demand-led growth models. The final impact of an increase in autonomous expenditures on income accounts for the supermultiplier effect, which is determined by the induced components. The equation below shows the supermultiplier ($\alpha$) determined by the propensity to consume ($c$), the propensity to invest ($h$), and the complement of the import's share on aggregate demand, which yields the domestic content of aggregate demand ($\mu$):

**Equation 1: The supermultiplier model**

$$Y = \left(\frac{\mu}{1 - \mu(c + h)}\right) Z = \alpha Z$$

Consider, for instance, that government expenditure increases, affecting autonomous demand $Z$. That generates a flow of income of the same amount, which increases consumption, private investment, and imports, further affecting aggregate income. This additional effect is captured by the supermultiplier. The repercussions through the economy reveal the final contribution of government expenditure to economic growth. In addition, changes in the supermultiplier (caused by changes in the propensities to consume, to invest, or to import) have an impact on economic activity that is measured separately.

The decomposition of GDP growth into the contribution of each component of demand follows the equation below:

**Equation 2: Supermultiplier decomposition**

$$g = \alpha_1 c_0\, g_c + \alpha_1 h_0 g_h + \frac{\alpha_1}{\mu_1} g_\mu + \alpha_1 \left[\frac{G_0}{Y_0}\right] g_G + \alpha_1 \left[\frac{HI_0}{Y_0}\right] g_{HI} + \alpha_1 \left[\frac{X_0}{Y_0}\right] g_X + \alpha_1 \left[\frac{E_0}{Y_0}\right] g_E$$

The supermultiplier ($\alpha$) is determined using Equation 1. Imports' share in demand is the ratio between imports and aggregate demand, and its complement is the share of domestic content in aggregate demand ($\mu$); $c$ and $h$ denote the propensity to consume and propensity to invest, respectively. Altogether, $c$, $h$, and $\mu$ determine the supermultiplier. $g$ represents the growth rate of GDP. When followed by a subscript, $g$

denotes the growth rate of the indexed variable. Autonomous demand is composed of government expenditure (*G*), household residential investment (*HI*), and exports (*X*). Change in inventories (*E*) is a residual term often related to mismatches between supply and demand, usually presenting a small or negligible impact on output. Subscript *1* denotes the current period (for which the growth rate is observed), and Subscript *0* denotes the previous period (to which the growth rate refers).

In conclusion, from Equation 2, we obtain two sets of variables that affect GDP growth: autonomous demand components and supermultiplier components. Autonomous demand is composed, in our decomposition, by exports, government expenditures, and household residential investment. The supermultiplier components are the propensity to consume (*c*), propensity to invest (*h*), and complement of imports' share ($\mu$).

Government expenditure is the sum of General Government Final Consumption and Investment. Public investment is thus considered part of autonomous demand as this investment does not follow the capacity adjustment principle as in private firms but responds to political decisions and long-term plans.

We could not consider autonomous household consumption owing to the lack of comparable data for the sampled countries.

We conducted the growth decomposition for the period 2000–2018. We segregated the analysis into two periods: 2000–2008 and 2010–2018. Hence, we can compare the growth models of the sampled countries before and after the Great Recession. The year 2009 presents atypical results related to the Great Recession. Hence, we analyzed it separately, omitting it from the graphs of the results. In case of Japan, we disregarded the 2009–2011 period as the Fukushima nuclear disaster of 2011 also implies atypical results. The Fukushima disaster generated a huge destruction of inventories, which would distort our average for the period after the 2008 crisis.

Data was collected from OECDStat, which was originally generated in each country's System of National Accounts. Data on GDP and the components of aggregate demand was collected from the Annual National Accounts. Public and residential (household) investments were retrieved from the Financial Balance Sheets by institutional sectors. Private induced investment, whose share in GDP constitutes the propensity to invest (*h*), was calculated by subtracting from Gross Fixed Capital Formation (that is, total investment) public and residential investments.

## Appendix 2 – The decomposition in Baccaro and Pontusson (2016)

Traditional decomposition exercises follow the equation:

$$g = \left[\frac{C_0}{Y_0}\right]g_C + \left[\frac{I_0}{Y_0}\right]g_I + \left[\frac{G_0}{Y_0}\right]g_G + \left[\frac{X_0}{Y_0}\right]g_X - \left[\frac{M_0}{Y_0}\right]g_M + \left[\frac{E_0}{Y_0}\right]g_E$$

It obtains the aggregate rate of growth (g) by multiplying the share of each component of demand by its growth rate. This traditional decomposition is agnostic on the specific role of each demand component for the aggregate growth. The supermultiplier can be considered a theoretically informed decomposition by attributing an induced or autonomous role for demand components.

## Appendix 3 – Figures

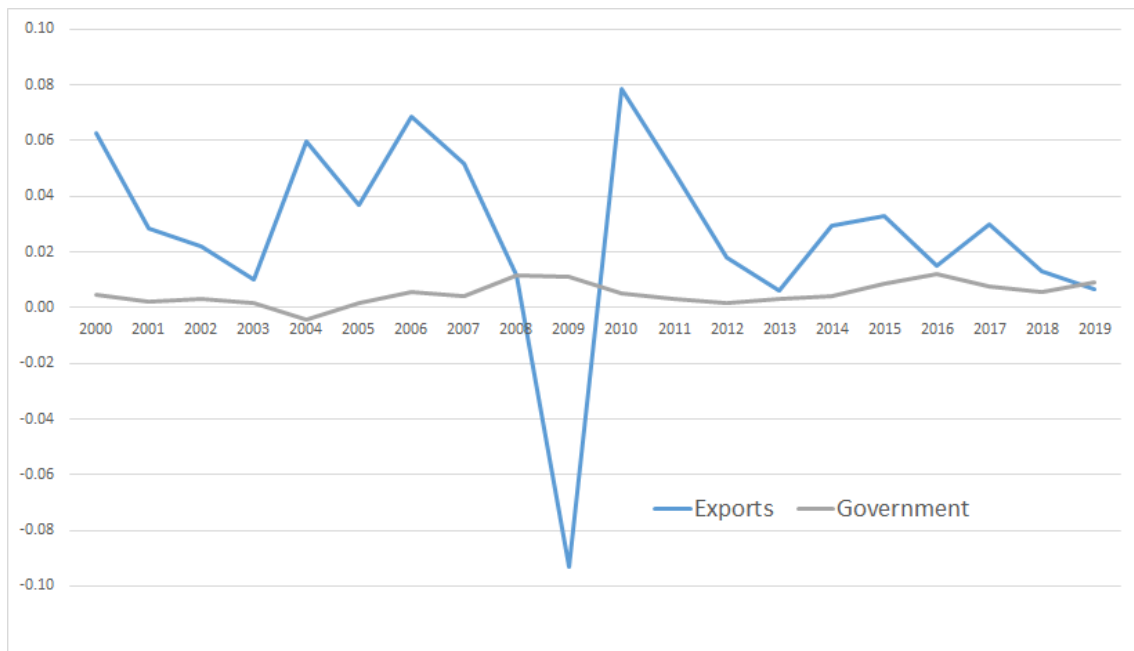**Figure A.1 – Export and government expenditure contributions to growth in Germany, 2000–2019**
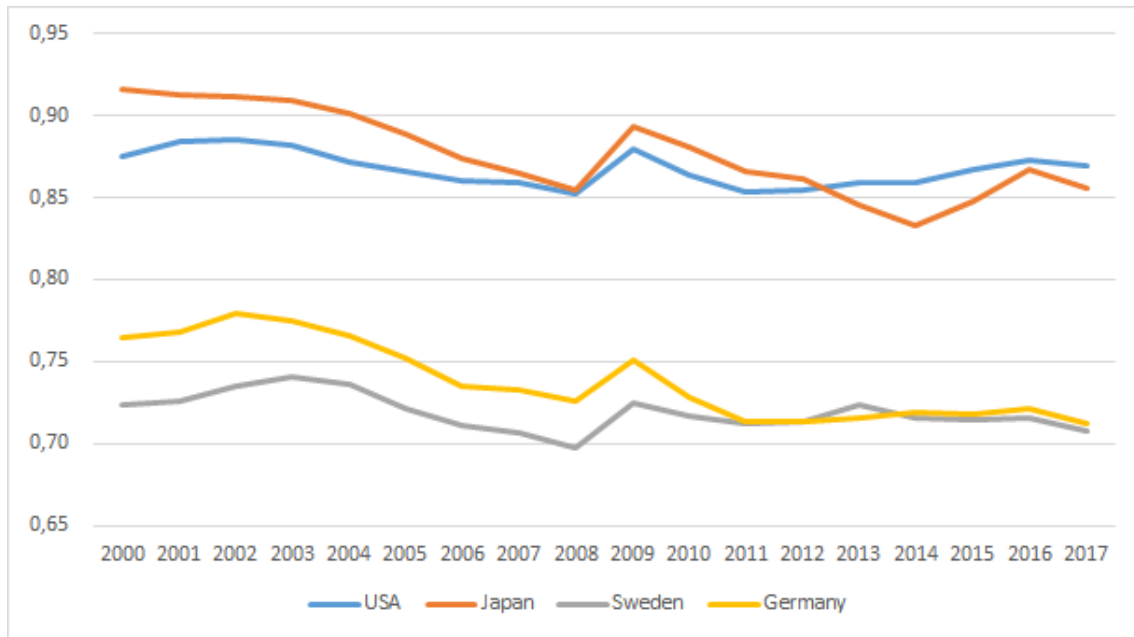
**Figure A. 2 – Domestic component of demand ($\mu$)**



**Figure A.3 – Traditional growth decomposition**