The role of imports in alternative methods for demand-led growth accounting: net exports, import-adjusted demand, and import content

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Abstract:

This paper compares three methods of demand-led growth accounting, focusing on their treatment of imports. The traditional Net Exports approach calculates the contributions of domestic demand and net exports, but neglects that imports are demand-induced. Moreover, aggregate national accounts data do not distinguish whether demand is met by domestic or imported production. As a result, when domestic demand expands, both domestic production and imports increase, leading to a reduction in net exports that is misleadingly interpreted as a negative contribution of the external sector to growth. To address this issue, Alders (1988) introduced the Attribution method, which adjusts demand components for imports when calculating growth contributions. While this method improves the Net Exports approach, it prevents the computation of the external sector's contribution, as imports are distributed across all demand components. We present the Import Content method to solve both problems by decomposing import growth into two effects: one driven by demand growth given a fixed import content and another caused by changes in import content at a given level of aggregate demand. The latter allows for a more accurate computation of the external sector's contribution by discounting the import content change from the export contribution, while the former is used to adjust demand components accordingly. Although the import content method is typically applied within the Sraffian supermultiplier framework (Freitas and Dweck, 2013), we apply it directly to aggregate macroeconomic data without assuming any specific growth theory, allowing us to isolate the effects of import treatment. Using data from developed (US,

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Germany, Netherlands, and Japan) and developing (Brazil, Mexico, China, and India) countries, we show that the traditional method overestimates the contribution of domestic demand and often misleadingly indicates a negative contribution of the external sector to growth when net exports are negative. Meanwhile, the attribution method underestimates the domestic demand's contribution when the import content increases. These findings have important implications for comparative political economy and the growth model approach, as well as for the recent discussion proposed by Baccaro and Hadziabdic (2024) on how to operationalize growth models. This paper has two main takeaways: (i) the Import Content method gives a wider diagnosis of the growth drivers, being the recommended method for those using IOTs; (ii) in case using IOTs is not an option, the Average Content Method seems to produce more similar conclusions to the Import Content.

Keywords: demand-led growth decomposition; net exports; import-adjusted demand; import content

JEL Codes: E01; E1; C67; O11

1. Introduction

A standard tool for decomposing economic growth, the net exports approach, relies on the national accounting identity, where GDP is equal to the sum of domestic final demand plus the external demand net of imports. This method is widely used by national accounting institutions (eg. US Bureau of Economic Analysis) and by researchers (Hein, 2011a; 2011b). However, this method contains a fundamental flaw when interpreting the role of the external sector: it fails to account for the fact that a significant portion of import growth is induced by expansions in domestic demand.

A solution for this issue was first proposed by Alders (1988), was largely used by researchers at Centraal Planbureau (CPB) and the Dutch Central Bank (DNB) and has been recently introduced in the comparative political economic and growth models literature by Baccaro and Hadziabdic (2024). These authors propose to attribute intermediate and final imports to the demand component that cause them – for this reason this method is known as the attribution method. The result is stating the GDP identity through import-adjusted demand components. Although this method represents an improvement over net exports method, it still fails to recognize whether a change in imports is caused by demand growth or by a change in the supply composition between domestic or imported output.

To overcome the limitations of both the net exports and attribution methods, this paper draws on and adapts the import content decomposition. This framework, often associated with the Sraffian supermultiplier model (Freitas and Dweck, 2013), offers a key analytical advantage by distinguishing between two distinct channels of import growth: the pure demand effect and the import content effect. A central innovation of our application is that we employ this method

outside of its original theoretical framework, using it as a neutral accounting tool to isolate the impact of import treatment on growth decomposition.

To assess the real-world significance of these methodological differences, we apply all three accounting frameworks to a diverse set of national economies, including developed nations (the United States, Germany, the Netherlands, Japan) and developing ones (Brazil, Mexico, China, India). Our results reveal a clear pattern. The conventional net exports method consistently overstates the contribution of domestic demand components. More problematically, it often paints a misleading picture of the external sector's role, interpreting the increase in imports driven by a domestic boom as a drag on growth from abroad. The attribution method, while solving this first issue, introduces a different bias by underestimating domestic demand's contribution in contexts of rising import content, such as during trade liberalization or integration into global value chains. The choice of method, therefore, is not neutral. It directly shapes the diagnosis of a country's growth drivers, with critical implications for the comparative political economy project of identifying national "growth models" and for ongoing methodological discussions, such as the one advanced by Baccaro and Hadziabdic (2024), on how to classify them empirically.

This paper is organized as follows: Section 2 presents all the discussed decomposition methods. Section 3 presents the database and the required adjustments to perform the comparative exercise for our sample. Next, in section 4, we compare the results across countries and methods. Section 5 concludes the paper, while Appendix A brings more details on the use of IOTs.

2. Alternative growth decomposition methods

2.1 Import content method

By definition, aggregate supply is equal to aggregate demand. This produces the basic national accounting identity and holds true to any accounting period. In an open economy, it can be expressed as in equation (1) for an arbitrary initial period (0):

$$M_0 + Y_0 \equiv C_0 + I_0 + E_0 + G_0 + X_0 \quad (1)$$

In equation (1), we can note that aggregate supply (LHS) has two components, imports (M) and domestic output (Y). Aggregate demand (RHS) presents four domestic components: household consumption (C_0), gross capital formation (I_0), change in inventories (E_0) and government consumption (G_0); and an external component, exports (X_0).

Each demand component in the RHS of the equation will be supplied either by domestic production or imported final goods and/or services. Moreover, domestic production may entail importing intermediate goods or services.

Equation (2) exemplifies the calculation for the household consumption (henceforth, consumption):

$$C_0 = Y_0^c + M_0^{cf} + M_0^{c\,i}$$

(2)

On the RHS of equation (2), there are, respectively, domestic production of final consumer goods and services (Y_0^c), imports of final consumer goods or services (M_0^{cf}), and imports of intermediate goods or services ($M_0^{c\,i}$) used in domestic production of final consumer goods and services. [5]

We can aggregate all imports (final and intermediate) associated with consumption expenditures as in equation (3):

$$M_0^c \equiv M_0^{cf} + M_0^{c\,i}$$

(3)

We can now calculate the import content for consumption (m_0^c) at period (0) as in equation (4):

$$m_0^c = \frac{M_0^c}{C_0}$$

(4)

The import content represents the share of total final demand supplied by imported production. We proceeded with this calculation for every other demand component. Next, we present an equation for GDP (Y_0) using the imported content for each demand component, as in equation (5):

$$Y_0 \equiv (1 - m_0^c)C_0 + (1 - m_0^I)I_0 + (1 - m_0^E)E_0 + (1 - m_0^G)G_0 + (1 - m_0^X)X_0$$

(5)

[5] The data on imports of final goods and services are directly available from input output tables (IOT). In appendix A, we show how to calculate the imports of intermediate goods or services associated with each demand component.

Where the complement of the import content of each expenditure is its domestic content.

From the identity expressed in (5), it is possible to derive the growth decomposition equation as in equation (6): [6]

$$g = (1 - m_1^c)\left(\frac{C_0}{Y_0}\right)g_c + (1 - m_1^I)\left(\frac{I_0}{Y_0}\right)g_I + (1 - m_1^E)\left(\frac{E_0}{Y_0}\right)g_E + (1 - m_1^G)\left(\frac{G_0}{Y_0}\right)g_g + (1 - m_1^X)\left(\frac{X_0}{Y_0}\right)g_X - m_0^c\left(\frac{C_0}{Y_0}\right)g_{mC} - m_0^I\left(\frac{I_0}{Y_0}\right)g_{mI} - m_0^E\left(\frac{E_0}{Y_0}\right)g_{mE} - m_0^G\left(\frac{G_0}{Y_0}\right)g_{mG} - m_0^X\left(\frac{X_0}{Y_0}\right)g_{mX}$$

(6)

in which g refers to the GDP real growth rate, and g_i refers to the real growth rate of each variable i.

The first term in the RHS of equation (6) shows that the consumption contribution for GDP growth depends on its rate of growth (g_c) weighted by its share on GDP in the initial period ($\frac{C_0}{Y_0}$) and its domestic content in the final period ($1 - m_1^c$). The same is valid for the other four demand components, amounting to the first five terms of the RHS of equation (6).

The last five terms of the RHS of equation (6) show the contribution of changes in the imported content for each demand component. Considering the consumption import content as an example, its contribution to GDP growth depends on (i) its growth rate, (ii) its value in the initial period, and (iii) the share of consumption on GDP for the initial period.

In this way, the first five terms represent the contribution of aggregate demand for growth, while the last five represent the contribution of structural change to growth. This modification allows us to take a step further in relation to the Attribution method, in which the contribution of the external section cannot be computed. This issue will be further discussed in section 2.3.

Alternatively, it is useful to separate the contribution to the growth of the domestic sector from the external sector. The domestic sector contribution (DSC) is as in equation (7). The last six terms of equation (6), in turn, represent the external sector contribution (XSC), as in equation (8):

[6] The full derivation of equation (6) is presented in appendix B.

$$DSC_{dc} = (1 - m_1^c)\left(\frac{C_0}{Y_0}\right)g_c + (1 - m_1^I)\left(\frac{I_0}{Y_0}\right)g_I + (1 - m_1^G)\left(\frac{G_0}{Y_0}\right)g_g$$

(7) [7]

$$XSC_{dc} = (1 - m_1^X)\left(\frac{X_0}{Y_0}\right)g_X - m_0^c\left(\frac{C_0}{Y_0}\right)g_{mC} - m_0^I\left(\frac{I_0}{Y_0}\right)g_{mI} - m_0^E\left(\frac{E_0}{Y_0}\right)g_{mE} - m_0^G\left(\frac{G_0}{Y_0}\right)g_{mG} - m_0^X\left(\frac{X_0}{Y_0}\right)g_{mX}$$

(8)

2.2 Average import content method

One of the limitations of the import content method of growth decomposition is that it relies on input-output tables (IOTs). Although this is not an issue *per se*, IOTs are not updated with the same frequency as other data sources. A possible solution is calculating the average import content using only aggregate data from national accounting data. This method allows us to use more updated and granular information. Overall, this alternative offers a more straightforward calculation procedure at the expense of accuracy.

Startint from identity (1), we can represent the average import content for aggregate demand (m), as in equation (9), and follow a similar procedure from equation (6) to derive the growth decomposition of GDP in equation (10):

$$m_0 = \frac{M_0}{C_0 + I_0 + E_0 + G_0 + X_0}$$

(9)

$$g = (1 - m_1)\left(\frac{C_0}{Y_0}\right)g_c + (1 - m_1)\left(\frac{I_0}{Y_0}\right)g_I + (1 - m_1)\left(\frac{E_0}{Y_0}\right)g_E + (1 - m_1)\left(\frac{G_0}{Y_0}\right)g_g + (1 - m_1)\left(\frac{X_0}{Y_0}\right)g_X - m_0\left(\frac{DA_0}{Y_0}\right)g_m$$

(10)

Where DA represents aggregate demand (the RHS of equation 1).

[7] Following Freitas and Dweck (2013), we do not include inventory changes, because we cannot know which part of it is voluntary and which is involuntary.

The domestic sector contribution (DSC_{aic}) to growth and the contribution of the external sector (ESC_{aic}) using this method are in equations (11) and (12), respectively:

$$DSC_{aic} = (1 - m_1)\left(\frac{C_0}{Y_0}\right)g_c + (1 - m_1)\left(\frac{I_0}{Y_0}\right)g_I + (1 - m_1)\left(\frac{G_0}{Y_0}\right)g_g$$

(11)

$$XSC_{aic} = (1 - m_1)\left(\frac{X_0}{Y_0}\right)g_X - m_0\left(\frac{DA_0}{Y_0}\right)g_m$$

(12)

While the contribution of exports differs between the two methods, depending on how different the import content of exports is in relation to the average import content, the contribution of the changes in the imported content is the same in the two methodologies. [8]

2.3 Attribution Method

The Attribution Method was originally proposed by Alders (1988). It was used by the Netherlands Bureau for Economic Policy Analysis and, because of that, was also known as the Dutch method. It has been used by several authors to analyze growth patterns of several countries and recently has been introduced in the literature of comparative political economy and growth model perspective by Baccaro and Hadziabdic (2024.

This method departs from the correct assumption that imports are related to demand. Nevertheless, it does not take into account if imports are induced by demand (for a given import content) or caused by changes in the supply composition (changes in the import content). In this sense, this method discounts the value of imports from each demand component associated with it.

Using identity (1) and equation (3), we have another identity for GDP as in equation (12), followed by the associated growth decomposition (equantion 13):

$$Y_0 \equiv C_0 - M_0^C + I_0 - M_0^I + E_0 - M_0^E + G_0 - M_0^G + X_0 - M_0^X$$

[8] The change in the average contribution to import is simply a weighted average of the change of each specific import content. The weights are simple each specific domestic content period and the share of the corresponding demand content on GDP:

CDI=-m0cC0Y0 gmC-m0II0Y0 gmI-m0EE0Y0 gmE-m0GG0Y0 gmG-m0XX0Y0 gmX= -^{m0}DA0Y0 gm

(12)

$$g = \left[\left(\frac{C_0}{Y_0}\right) g_c - \left(\frac{M_0^c}{Y_0}\right) g_{M^c}\right] + \left[\left(\frac{I_0}{Y_0}\right) g_I - \left(\frac{M_0^I}{Y_0}\right) g_{M^I}\right] + \left[\left(\frac{E_0}{Y_0}\right) g_E - \left(\frac{M_0^E}{Y_0}\right) g_{M^E}\right] + \left[\left(\frac{G_0}{Y_0}\right) g_G - \left(\frac{M_0^G}{Y_0}\right) g_{M^G}\right] + \left[\left(\frac{X_0}{Y_0}\right) g_X - \left(\frac{X_0^I}{Y_0}\right) g_{M^X}\right]$$

(13)

Where each term in brackets represents the import-adjusted contribution to growth for each demand component. Illustrating once again for consumption, we have that its contribution to growth depends on the growth of consumption weighted for its share of GDP, discounted by the growth of total imports (final and intermediate) associated with consumption also weighted for its share of GDP. [9]

One limitation of this method is that it cannot single out the external sector contribution to growth. Alves-Passoni and Neria (2023), alternatively, consider the import-adjusted contribution of exports to growth as the contribution of the external sector (XSC_{am}) presented in equation (14):

$$XSC_{am} = \left(\frac{X_0}{Y_0}\right) g_X - \left(\frac{X_0^I}{Y_0}\right) g_{M^X}$$

(14)

2.4 Net exports method

The Net Exports method is the most common one. It is widely used by researchers, analysts, and even national accounting institutions, like the US Bureau of Economic Analysis (BEA). Its main characteristic is the simplicity to implement: one just needs to aggregate national accounting data and to change identity (1) in the following way:

$$Y_0 \equiv C_0 + I_0 + E_0 + G_0 + (X_0 - M_0)$$

(15)

[9] It is interesting to note that if someone decompose the change in the imports in the change of demand for a given import content and the change in import content for a given demand, he or she will achieve the same result as the import content method. We show this result in appendix X.

Deriving the growth decomposition from this expression, we have:

$$g = \left(\frac{C_0}{Y_0}\right) g_c + \left(\frac{I_0}{Y_0}\right) g_I + \left(\frac{E_0}{Y_0}\right) g_E + \left(\frac{G_0}{Y_0}\right) g_G + \left(\frac{X_0}{Y_0}\right) g_X - \left(\frac{M_0}{Y_0}\right) g_M$$

(16)

The contribution of each demand component to growth is simply its growth rate weighted by its share in GDP. As we can see, this method treats imports as if it could increase autonomously.

In this method, the external sector contribution (XSC_{nx}) is the net export contribution to growth:

$$XSC_{nx} = \left(\frac{X_0}{Y_0}\right) g_X - \left(\frac{M_0}{Y_0}\right) g_M$$

(17)

3. Description of the database

We use the most recent release of the OECD Input–Output Tables (IOTs) (Release 2023) to conduct a comparative analysis of different methods of demand-led growth accounting. The OECD IOTs covers all years between 1995 and 2020 for 76 countries, with a disaggregation level of 45 industries. All data are expressed in current US dollars (USD) at basic prices.

As highlighted by Baccaro and Hadziabdic (2024), the OECD Input-Output Tables (IOTs) stand out from earlier versions and other available datasets[10] due to three key features: (i) a longer time series of IOTs; (ii) broader coverage of countries and sectors; and (iii) the consistent use of ISIC Rev. 4 across all years, which ensures compatibility in the classification of economic activities across the entire database. In addition, the OECD IOTs provide sectoral disaggregated data on the origin of goods and services output, distinguishing between domestic and imported use. This distinction is essential for a deeper understanding of countries' productive structures and is also used in accounting methods for demand-driven growth.

[10] The main source of standardized IOTs for a large set of countries is the World Input–Output Database (WIOD), which provides IOTs for 43 countries covering the period from 2000 to 2014 (Dietzenbacher et al., 2013).

Although the OECD database covers 76 countries, our analysis focuses on a selected sample of eight countries. This sample includes developed countries such as the United States (US), Germany, Netherlands, and Japan, and underdeveloped countries such as Brazil, Mexico, China, and India. The selected countries represent a variety of economic structures and growth models, allowing a comparison of how different approaches to decomposing growth impact the contribution of domestic and external sectors over time. For example, on the one hand, economies such as Germany, Netherlands, and Mexico are notably dependent on the contribution of the foreign sector, while on the other hand, economies such as the United States, India, and Brazil exhibit a predominant weight of the domestic sector in the growth decomposition.

The IOTs were deflated and converted into each country's national currency, following the methodology used by Baccaro and Hadziabdic (2024). For the database price adjustment, GDP deflators at consumer prices provided by the OECD Economic Outlook were used[11]. Since these deflators have different base years, all were standardized to a common base year (1995). The same procedure was applied when converting values into the respective national currencies of each country[12]. Each element in the IOTs was multiplied by the corresponding exchange rate (units of national currency per US dollar) provided by the OECD.

Regarding the structure of final demand in the OECD IOTs, it is originally disaggregated into eight components. To simplify accounting and facilitate the presentation of the different methods of demand-led growth accounting, we aggregate these eight final demand components into five main components: household consumption (C)[13], gross capital formation (I), change in inventories (E), government consumption (G), and exports (X)[14].

[11] The deflation procedure uses each country's GDP implicit deflator to adjust all components of national IOTs.

[12] The OECD database provides implicit GDP deflators and exchange rates for the eight countries in our sample.

[13] The household consumption component (C) is defined as the aggregation of final consumption expenditure of households (HFCE), final consumption expenditure of non-profit institutions serving households (NPISH), and direct purchases abroad by residents (imports) (DPABR). The inclusion of direct purchases abroad by residents (DPABR) in household consumption (C) follows the OECD IOTs' construction methodology, which classifies this component as an integral part of consumption (Yamano et al., 2023).

[14] The exports component (X) corresponds to the aggregation of exports (cross-border) (EXPO) and direct purchases by non-residents (exports) (CONS_NONRES).

4. Comparing the methods

4.1 General results

Figure 1 below shows all the results from the four different methods for all components of aggregate demand (consumption, capital formation, government expenditures, exports and inventories change), imports and for the GDP growth rate.[15] The data covers all the years of our sample: 1995-2020. The first column is the results for the import content (IC) method, the second column for the average import content (AIC) method, the third for attribution (A) method and the fourth the net exports (NX) methods.

Figure 1: Growth decomposition across different methods

Figure 1a: Developed countries

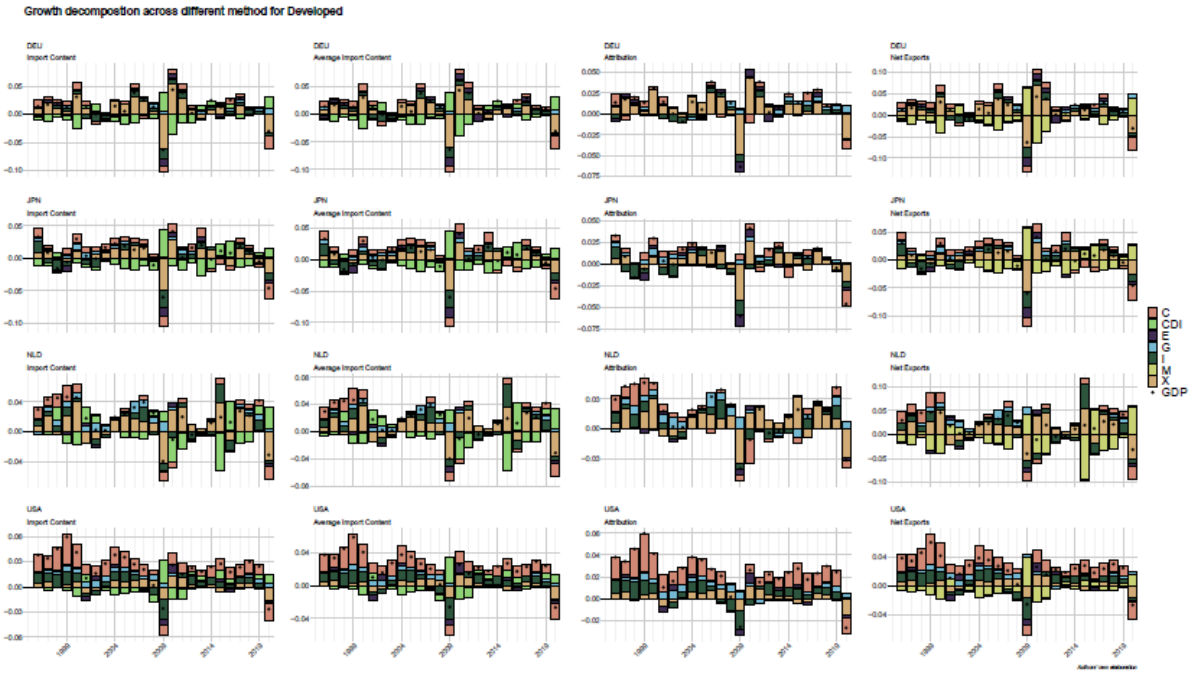
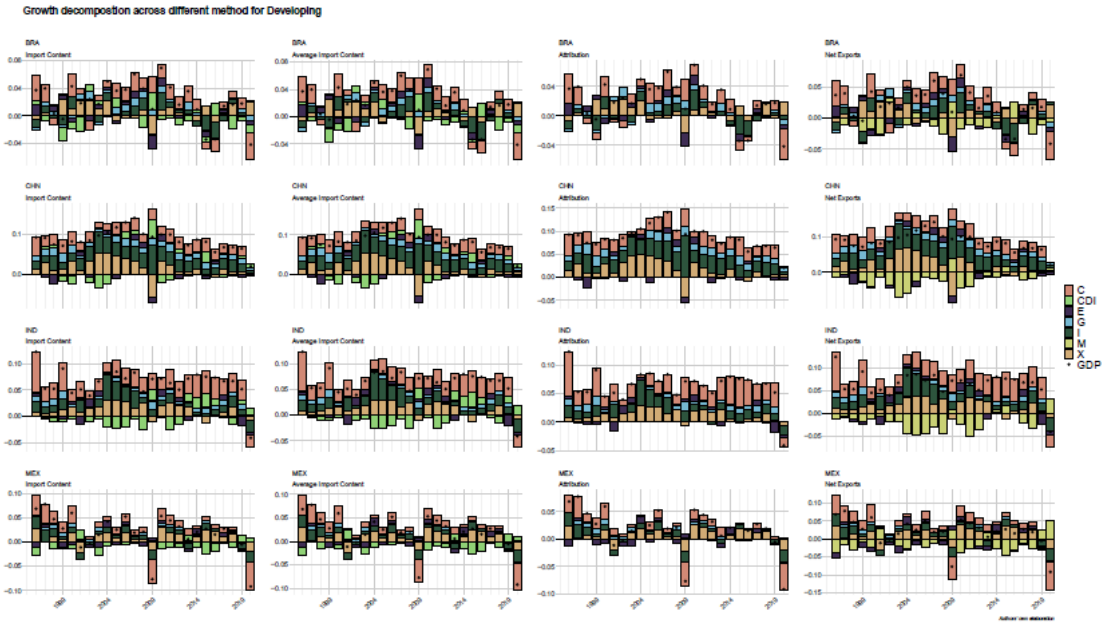


Figure 1b: Developing countries

[15] We present the result for inventories change just for the reader to have the opportunity to check the accounting by adding up all the contributions. We are not going to discuss the change in inventories contribution for the reasons already stated, mainly that it is a residuum variable and it is not possible to distinguish what is a desired and what is an undesired inventories change.



In general, it is possible to see that the net exports methods and the attribution method give the most extreme results for the contribution to growth of aggregate demand components. For positive values, net exports results in the largest contribution to growth, while attribution method gives the smallest contribution. While for negative values, the opposite happens. The Import Content and Average Import Content methods gives moderate results compared to the previous two.

The reason for those different contributions stems from the alternative ways for dealing with imports. Net exports method considers imports as autonomous and treats it as if it was a demand component. In this sense, the contribution of each demand component is considered indistinctly of the imports of finals and intermediate goods generated by it. Even if a demand is fully satisfied by foreign production (imports) it will have a positive contribution to aggregate demand and them the imports negative contribution will be discounted.

The attribution method, in its turn, discount all the imports for the demand component it is associated with, independently if the imports were generated by an increase in demand or by a change in the supply composition. It results in the less intense contribution for this reason. The imported content and average import content method shows the more moderate results because it considers only the contribution of each demand component discounting for a given imported content. The contribution of the change of the import content is considered separately.

On a broader picture, all methods produce relatively similar results. This conclusion is expected since all of them depart from accounting identities. In short, the comparison should be performed at a conceptual level. In the following subsections, we further explore the main sources of divergence and their main consequences.

4.2 Exports and the external sector

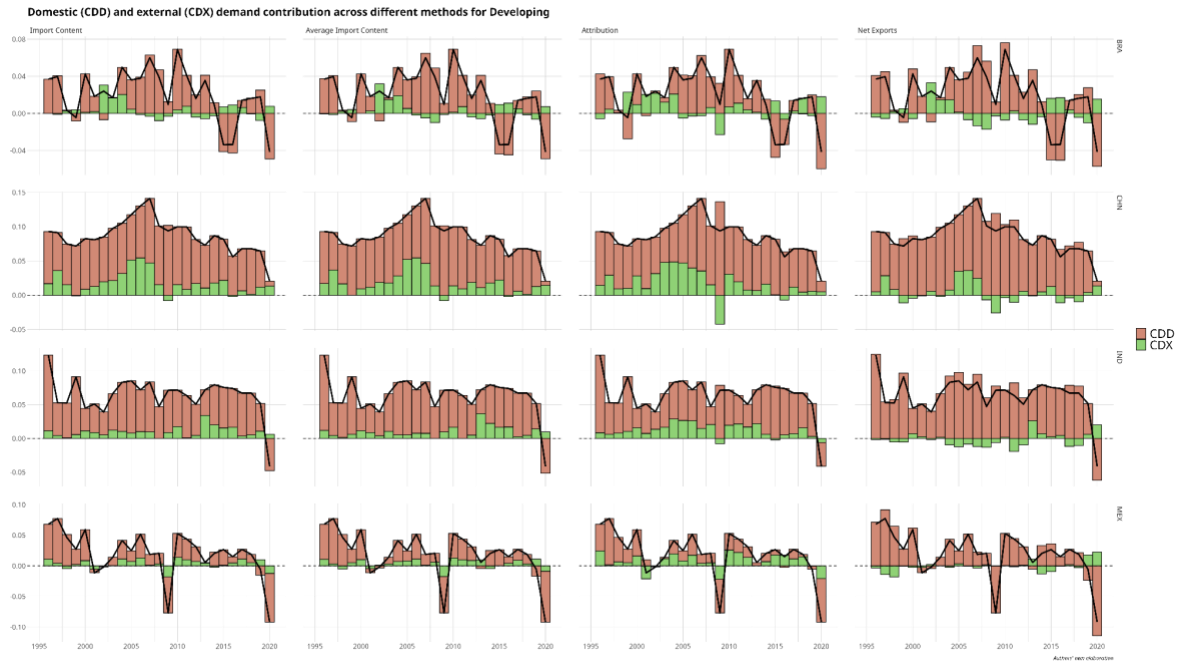
Until now the results seems too similar among all the different methods. But their differences become apparent when we discuss more specifically the contribution of exports and external sector. The first issue to consider is that net exports method, as its own name indicate, does not present the contribution of exports alone, but the contribution of exports discounting all imports – the net exports contribution.

The Figure 2 shows the contribution to growth of the domestic and external sector across all decomposition methods for each country. In each subplot, we focus on developed (Fig. 2a) and developing (Fig. 2b) countries. It is possible to see that for the whole timespan of our sample, the net exports method indicates a higher occurrence of negative contribution for the external sector than the other methods. Those results are consistent regardless of the country analyzed.

Figure 2 Domestic (CDD) and external (CDX) demand contribution across different methods

Figure 2 (a) Developed countries

Figure 2 (b) Developing countries



This comparative exercise also explores other distinction between methods. Not only the net exports approach has a higher occurrence of negative contribution for the external sector, but it also has different magnitudes when it contributes positively to growth. Taking Germany as an example, it is notable that the attribution method indicates a larger contribution for the external sector for this country[16]. This reveals the relevance of understanding the consequences of each method. At a first glance, might be considered as an export-led economy. However, when contrasting this result with the import content method, the contribution of the external sector is more modest in most periods and more intense during downturns. A similar picture can be described for Brazil, in which the net exports method indicates more recurrency in the external sector contributing negatively to growth, while the Attribution method might overestimate it. As for Germany, the import content approach shows a mild contribution of the external sector, but at odds with this particular case, there is no clear distinction between booms and bursts.

One of the main conclusions from these results is that net exports method frequently indicates a contribution to growth of the external sector with the opposite sign comparing to the other

[16] As discussed previously, the contribution of the external sector on the attribution method should be evaluated with caution, as it is not possible to properly analyse the contribution of the external sector, but only the import-adjusted contribution of exports.

three methods. Those results have strong implications for the classification of growth regimes and growth models. In other words, the consequences are beyond fine-tuning the contribution of each component but also implicate conflicting normative conclusions depending on the chosen method – regardless of the growth theory guiding the analysis.

For the import content and the average import content method, Serrano (2008) and Freitas and Dweck (2013) suggest that we should discount from the exports' contribution to growth the change in the import content as shown in equations (8) and (12). In that sense, every time exports grow there will be a positive contribution to growth sector and every time the import content of any demand component increase (or the average import content increases) there is a reduction in the contribution to growth. The external sector contribution to growth is the balance between these two components.

The attribution method, in its turn, does not have any independent account for the imports, since it is discounted from each component of aggregate demand. Alves-Passoni and Neria (2023) takes the exports contribution to growth as the contribution of the external sector.

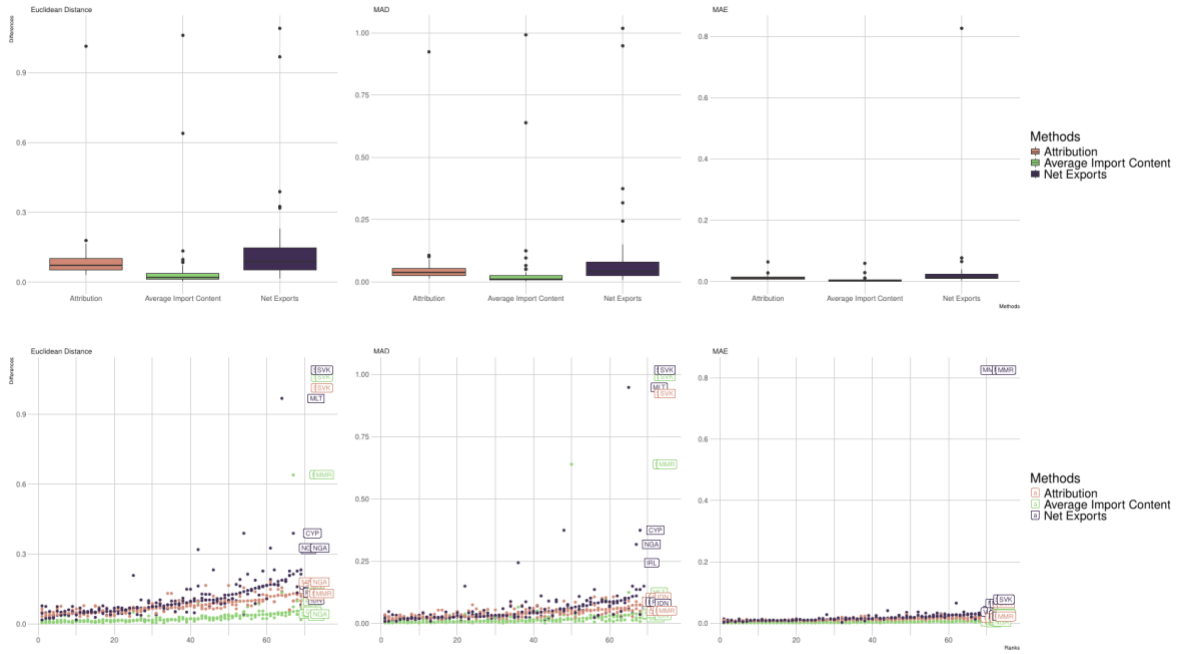
4.3 Overall comparison

As previous stated, the proper way to define which method is the better should not rely on its values, but on the conceptual level. As the Import Content method is able to solve some issues of the Attribution method, we will consider it as the benchmark approach. Taking this into consideration, the subsection aims to give an overall comparison across all methods to evaluate if there is a second best that should be used and if there is a method that should be avoid.

Considering the discussion of section 4.2 in which the contribution of the external sector is the main source of distinction, Figure (3) presents different point-wise dissimilarity measurement across all countries in the OECD database in respect to the XSC contribution of the import content method (benchmark) *vis-a-vis* the alternative methods. The direction of interpretation of this measurement is the following: the lower its values, the lower is its dissimilarity between the XSC contribution of the import content method. the upper part of this figure presents boxplots of the euclidean distance, maximum absolute difference (MAD), and mean absolute

error (MAE).[17] The first conclusion is that the net export method is the one producing more dissimilar results, while average import content method performs relatively better.

Figure 3. Point-wise dissimilarity among the alternative decomposition methods



The bottom part of Figure 3 tells a similar story. Instead of presenting the dissimilarity in a box plot, it arranges the countries in terms of distance from the import content method on the x-axis. This visualization device shows that the average import content method is almost always closer the alternative methods in regard to the IC. On the opposite, the net exports method is the one producing more dissimilar conclusions.

Concluding remarks

Besides presenting another method for growth decomposition, this paper also gives another contribution to the literature. Considering that the use of IOTs is not as spread as it should in the profession, it offers a recommendation of a second-best alternative that can be computed only using national accounts: average import content. At one hand, this method is the one that produces most similar results compared to the one considered to be the best at the conceptual level (import content). On the other hand, it shows that the net exports method should be

[17] In other terms, we are considering the Important Content method as the "ground truth" and we investigate how "distant" (dissimilar) each decomposition methodology is from it. Stating differently, we are using the term "error" as the difference from our benchmark method, not in the strict statistical sense.

avoided. One strong argument in favor of not using the NE is that it can be replaced by an alternative (AIC) that requires the same level of granularity and frequency of updates.

Finally, it should be noted that the contribution of this paper is not a call for mathematical precision. Instead, it has been shown that different methods imply different diagnosis for the growth drivers for a given economy. More precisely, a country might be mistakenly labeled as export-driven when the contribution of the external sector is lower than expected. In this regard, this paper provides a handshake to a wider literature, specifically to the Comparative Political Economy (CPE), in which this discussion might enlight some debates about growth regimes, political social blocks, varieties of capitalism, and so on.

References

ALDERS, J. A. J. De Bijdrage van Bestedingscategorieën aan de Groei. Amsterdam: De Nederlandsche Bank, 1988.

BACCARO, Lucio; HADZIABDIC, Sinisa. Operationalizing growth models. Quality & Quantity, p. 1-36, 2024.

Freitas, F. N. P., and E. Dweck. 'The Pattern of Economic Growth of the Brazilian Economy 1970–2005: A Demand-Led Growth Perspective.' In Sraffa and the Reconstruction of Economic Theory: Volume Two, edited by E. S. Levrero, A. Palumbo, and A. Stirati, 158–191. London: Springer, 2013.

HEIN, E. (2011a). 'Redistribution, global imbalances and the financial and economic crisis – the case for a Keynesian New Deal', International Journal of Labour Research, 3(1), 51-73.

HEIN, E. (2011b). 'Financialisation, re-distribution, and the financial and economic crisis – a Kaleckian perspective', In Stabilising an unequal economy? Public debt, financial regulation, and income distribution, edited by T. Niechoj, Ö. Onaran, E. Stockhammer, A. Truger and T. van Treeck. Marburg: Metropolis.

KRANENDONK, H. E VERBRUGGEN, J. "How to determine the contributions of domestic demand and exports to economic growth?" CPB memorandum. Business cycle analysis unit, CPB Netherlands Bureau for Economic Policy Analysis, 2005.

KRANENDONK, H., and J. VERBRUGGEN. 'Decomposition of GDP Growth in Some European Countries and the United States.' **De Economist** 156 (3): 295–306, 2008

Appendices

Appendix A : Estimation of imports of intermediate goods and services through IOTs

This appendix details the method for indirect estimation of imports of intermediate goods and services through IOTs. Unlike imports of final goods and services (M^f), intermediate imports (M^i) are not disaggregated by final demand components in the IOTs.

Therefore, to address this limitation, we adopt the same method used by Fevereiro (2016). The imports of intermediate goods and services (M^i) associate with domestic final demand (F^d) are estimated using the following expression:

$$M^i = A^m(I - A^n)^{-1}F^d$$

Where:

- A^m is an $n \times n$ matrix of imported input coefficients, where each element ${a^m}_{ij}$ represents the amount of imported inputs from sector required to produce one unit of output in sector ;
- $(I - A^n)^{-1}$ is the $n \times n$ Leontief inverse matrix, capturing both direct and indirect intermediate input requirements needed to satisfy one unit of final demand;
- F^d is an $n \times k$ matrix containing the k components of domestic final demand by sector.

In other words, for the indirect estimation of imports of intermediate goods and services (M^i , $n \times k$) associated with each final demand component, we assume these imports follow a similar pattern of production linkages triggered by domestic final demand (F^d) within the national productive structure, as captured by the Leontief inverse matrix ($[I - A^n]^{-1}$).