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**Tracing incomes generated by domestic and foreign
demand for manufacturing**

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Abstract

The growing size and complexity of global value chains (GVCs) affects the relative role domestic and foreign demand plays in the generation of income at the national level. This paper proposes a methodology to decompose GDP into a domestic and a foreign absorption component, fully taking into account the complex chain of linkages connecting domestic and foreign suppliers within GVCs using Multi-Regional Input-Output (MRIO) tables. The method's flexibility allows for a further distinction by sectoral types of final demand and consequently, a detailed analysis of the relative role of domestic and foreign absorption of manufactured goods in driving GDP growth. The paper's findings indicate that domestic absorption of manufactured goods is a major contributor to GDP and its growth, especially across Developing Countries and Emerging Industrial Economies. Moreover, this significance seems to have been increasing rather than declining since the turn of the century.

Keywords: manufacturing, growth accounting, world input-output tables, global value chains

JEL codes: C67, F63, O57, O47

1 Introduction

Production is ultimately oriented towards final demand. Household consumption, government expenditure and the formation of productive capital are the main drivers determining a firm's sales and more broadly, a country's. This is true not only for those firms directly serving final demand, but also for the complex network of actors involved in the production of primary commodities and intermediate goods and the provision of business services, transport and logistics. All economic activity is—in one way or another—tied to some specific source of final demand.

The interconnections between economic activities and their link to final demand have been a major area of study in the field of industrial development. From the development pioneers back in the 1950s (Hirschman, 1958; Lewis, 1954; Prebisch, 1950) to recent literature on so-called *product space* (Hausmann & Hidalgo, 2011; Hidalgo & Hausmann, 2009; Hidalgo, Klingler, Barabási, & Hausmann, 2007), the linkages and pull potential of different industries has been at the centre of attention. One key feature of successful industrial development has always been related to its capacity to produce multiplier effects that can reach far beyond the same activity and irradiate the development process to the largest possible share of the domestic economy.

The toolkit offered by input-output tables and the Leontief model of interdependencies between sectors has been central to this analysis. Under certain broad assumptions on the functioning of the economy at a given point in time, this model can be used to quantify the pull potential of different components of final demand in terms of augmented production in all industries directly and indirectly involved. It therefore provides a unique tool to trace income generated (or the multiplier effect) by the final absorption of different types of goods and services.

This type of analysis has become even more important in the current context of increased globalization and fragmentation of production. Two concurrent phenomena justify this renewed interest. On the one hand, the dislocation between production and consumption has become much more intense since the late 1970s with the remarkable increase in global trade over the last decades. On the other hand, production itself has become more scattered as new technologies enable the coordination of activities at the global level at decreasing costs. In this context, the chain of linkages connecting final demand with specific activities becomes much more complex since these activities can take place in many different countries.

In view of these transformations of production and consumption in the global landscape, one important question that arises is to what extent the relative importance of domestic and foreign sources of demand in creating new income has changed over the past decades. The main

objective of this paper is to address this empirical question and provide a simple technique that can be used to examine the relative importance of different components of final demand in different periods, geographical locations or industries. The proposed approach builds on the traditional toolkit of input-output analysis applied to contexts of interconnected economies at the global level. More specifically, it draws elements from two strands of literature: import-adjusted GDP decompositions¹ and trade in value added (TiVA) literature².

The basic intuition of the approach is that final demand (say, for example, private household consumption of automobiles) triggers a series of interrelated demands for intermediate inputs and factors of production. Building on raw materials, value is added at each stage of the production process by different industries in different countries of the world. The final price paid by consumers (in this case, the price of the car) results from the sum of each fragment of value that has been added along the process. Using multiregional input-output tables, the proposed approach traces back these intermediate demands, and estimates the contribution in terms of value added by each industry in every country of the world. That is, the entire international *value chain* involved in the production of a final good is reconstructed.

This approach provides a *backward-looking* view of the value chain since it traces back the country origin of the value added embodied in a final good. But it can also be used in a *forward-looking* perspective to estimate the part of a country's aggregate income (gross domestic product) that can be associated with the production of specific types of final goods or services. The versatility of the method allows different decompositions of the income generated in one economy, for example, in terms of what type of goods are demanded (manufactured goods or non-manufactured goods) and where these goods are absorbed (domestically or abroad).

Applying this approach to the Eora MRIO database³, we calculate the relative contribution of domestic and foreign final demand to GDP in the period 1990-2013 for different groups of countries. Our main interest focuses on the changes that took place in this relative contribution at different stages of industrial development⁴ and the specific role played by the final absorption of manufactured goods. A key finding of this paper is that contrary to the common view, domestic demand continues to be a key driver of income creation, and its significance is increasing in some countries. This seems to be related with the recent re-balancing of some emerging economies, most notably China, which have shifted their development strategies towards a larger reliance on their domestic markets.

¹ See Kranendonk and Verbruggen (2005)

² See Johnson (2014) and Los et al. (2015a) for a recent overview of this literature.

³ See Lenzen et al. (2013) for details on this data source.

⁴ To classify countries by stages of industrial development, we follow the approach put forth in Upadhyaya (2013).

The remainder of this paper is structured as follows. Section 2 presents a review of the literature that inspired the decomposition proposed in this paper. Sections 3 and 4 provide the details of the approach proposed and the data used to apply it. Section 5 presents the main findings derived from the application of this method and Section 6 concludes. An appendix with additional technical details is included at the end of the paper.

2 Literature review

In this section, we present a brief overview of studies that use input-output techniques to investigate the contribution of different components of final demand to the generation of value added. We classify these contributions in two broad categories. The first strand presents import-adjusted GDP decompositions, which typically relies on the use of data from national input-output tables. The import-adjusted decomposition method is an alternative to traditional growth decomposition methods from the demand side. The second strand draws from the so-called *trade in value added* literature. This is a growing body of recent literature that uses international input-output tables to trace the value added content of exports. Building on these two strands of literature, the next section discusses how an import-adjusted GDP decomposition can also be applied to world input-output models as an avenue to analyse the relative contribution of foreign and domestic demand for different types of goods to income generation.

2.1 GDP and growth decomposition from the demand side

GDP can be calculated using different approaches. It can be calculated as the sum of value added generated in the economy (income approach) or as the difference between total final expenditures and imports (expenditure approach). The income approach evaluates GDP from the supply side, measuring how much value added is generated within each sector of the economy. The expenditure approach, on the other hand, evaluates GDP from the demand side. It sums domestic expenditures and net exports (exports minus imports, $E - M$). Total domestic expenditures, in turn, are commonly divided into private consumption (C), public consumption (G) and investment (I). Equation (1) presents this macroeconomic identity. From a conceptual point of view, the equation can also be interpreted as the contribution of different expenditure components to GDP. In the particular case of net exports, the sign of the contribution depends on the country's trade balance.

$$Y = C + G + I + (E - M) \tag{1}$$

The time difference of GDP divided by its initial value yields the growth rate between two generic points in time 0 and 1:

$$\frac{\Delta Y}{Y^0} = \frac{Y^1 - Y^0}{Y^0} \quad (2)$$

Substituting Equation (1) in Equation (2), it is possible to decompose total GDP growth into the contribution that changes in different expenditure components have to total growth. Moreover, it is possible to identify the specific role played by domestic expenditures and net exports:

$$\frac{\Delta Y}{Y^0} = \underbrace{\frac{(C^1 - C^0) + (G^1 - G^0) + (I^1 - I^0)}{Y^0}}_{\text{Contribution of domestic expenditure to GDP growth}} + \underbrace{\frac{[(E^1 - M^1) - (E^0 - M^0)]}{Y^0}}_{\text{Contribution of net exports to GDP growth}} \quad (3)$$

The decomposition of GDP and GDP growth outlined in these equations is commonly used in the literature⁵. Here, the negative contribution of imports to GDP (and GDP growth) is fully deducted from the export component. Transactions with the external sector (imports and exports) are separated from the remainder of the economy and analysed separately in their contribution to GDP. This, however, presents a limitation since a share of total imports is typically directly linked to domestic consumption and investment. Take the case, for instance, of rising demand for imported goods by private households. In Equation (3), this increase would not affect the private household's contribution to GDP. Instead, the negative impact of higher imports would be directly deducted from the export component. Framing the decomposition this way could lead to the misleading conclusion that a country's imports are exclusively linked to its exports (Amar, Torchinsky Landau, & Wirkierman, 2016).

Domestic households, firms and governments absorb imports directly (imported final goods) or indirectly (as imported inputs and components contained in domestically produced goods). Exports are also increasingly contained in imported content as a result of the increasing global fragmentation of production (Hummels, Ishii, & Yi, 2001; Baldwin, 2013). With trade to GDP ratio having risen from 39 per cent in 1990 to 60 per cent in 2013, the presence of imports in both domestic consumption and exports is rising. As a result, the *traditional* GDP decomposition method summarized in Equations (1) and (3) is not fully capable of capturing the net (or "real") contribution of the demand components. It tends to overestimate the contribution of domestic demand to economic growth since imported goods associated with domestic

⁵ See, for example, IMF (2017).

absorption are not correctly deducted (Kranendonk & Verbruggen, 2008; Akyüz, 2011; Wu, Lei, & Li, 2015).

In view of this limitation, other approaches have been put forward in the literature. Kranendonk and Verbruggen (2005) propose an alternative decomposition method in which imports are attributed to the expenditure component to which they ultimately belong. This method has been generally labelled as the “import-adjusted method”⁶. Applying this method to Dutch data between 1990 and 2004, Kranendonk and Verbruggen (2005) show that exports are a much more prominent driver of economic growth in the Netherlands compared to the results obtained with the traditional method.

The core difference of this method is that total imports are divided by their ultimate use. This is shown in Equation (4) where each M_j element represents the imports embodied in the corresponding expenditure component j . From these components, only a portion is used in the production of exports (M_E) while the rest is ultimately consumed domestically ($M_C + M_G + M_I$). For the decomposition, the specific imported components are directly deducted to the corresponding expenditure aggregate (see Equation (5)).

$$\mathbf{M} = \mathbf{M}_C + \mathbf{M}_G + \mathbf{M}_I + \mathbf{M}_E \quad (4)$$

$$\mathbf{Y} = (\mathbf{C} - \mathbf{M}_C) + (\mathbf{G} - \mathbf{M}_G) + (\mathbf{I} - \mathbf{M}_I) + (\mathbf{E} - \mathbf{M}_E) \quad (5)$$

Each M_j element in Equation (5) includes both final and intermediate imports associated with the corresponding demand component. These components can be separated, as done in Equation (6), where $M_{j_{int}}$ stands for the intermediate imports contained in the expenditure component j and $M_{j_{fin}}$, which captures the final import consumed in expenditure component j :

$$\mathbf{M} = (\mathbf{M}_{C_{fin}} + \mathbf{M}_{C_{int}}) + (\mathbf{M}_{G_{fin}} + \mathbf{M}_{G_{int}}) + (\mathbf{M}_{I_{fin}} + \mathbf{M}_{I_{int}}) + \mathbf{M}_{E_{int}} \quad (6)$$

$$\mathbf{Y} = \underbrace{(\mathbf{C} - \mathbf{M}_{C_{fin}} - \mathbf{M}_{C_{int}})}_{\mathbf{Y}_C} + \underbrace{(\mathbf{G} - \mathbf{M}_{G_{fin}} - \mathbf{M}_{G_{int}})}_{\mathbf{Y}_G} + \underbrace{(\mathbf{I} - \mathbf{M}_{I_{fin}} - \mathbf{M}_{I_{int}})}_{\mathbf{Y}_I} + \underbrace{(\mathbf{E} - \mathbf{M}_{E_{int}})}_{\mathbf{Y}_E} \quad (7)$$

⁶ Sometimes it is also labelled as the “attribution method” or the “Dutch method”. The latter responds to the fact that by 2005, this method was already being used by the Dutch *Centraal Planbureau* and the Central Bank as a complementary indicator to identify demand-side drivers of GDP growth.

By deducting final and intermediate imports ultimately consumed by each demand component (as done in Equation (7)), the decomposition captures each component's net contribution to GDP (Y_j):

$$\mathbf{Y} = \mathbf{Y}_C + \mathbf{Y}_G + \mathbf{Y}_I + \mathbf{Y}_E \quad (8)$$

Each component's net contribution to GDP (Y_j) may also be understood as the value added generated (or induced), directly and indirectly, in the economy by the production of the final good. That is, the income generated in all steps of the production process when producing the final goods under analysis can be determined. Imports are deducted as they do not generate income in the domestic economy – the underlying assumption being that they are fully composed of foreign value.

The main challenge for applying the import-adjusted decomposition lies in the measurement of income generated by the production of a given combination of final goods. This is done using the input-output model. In the fundamental input-output identity presented by Leontief, a vector with the output of each sector (\mathbf{x}) can be obtained by multiplying the Leontief inverse matrix (\mathbf{L}) by the total final demand vector ($\tilde{\mathbf{f}}$):⁷

$$\mathbf{x} = \mathbf{L}\tilde{\mathbf{f}} \quad (9)$$

The value of GDP (Y) can also be calculated in the model from both a supply-side and a demand-side perspective. In the setting of the model, the value added generated in each sector of a country is represented in a row vector \mathbf{v} . From a supply-side perspective, the value of GDP is obtained by simply multiplying the value added vector (\mathbf{v}) by a transposed summation vector (summation column vector, $\boldsymbol{\mu}'$):

$$\mathbf{Y} = \mathbf{v}\boldsymbol{\mu}' \quad (\text{supply-side perspective}) \quad (10)$$

Using the vectors \mathbf{v} and \mathbf{x} , it is also possible to define a value added to output vector (\mathbf{w}) which contains the value added generated in each sector divided by the output of that same sector:

$$\mathbf{w} = \mathbf{v}\hat{\mathbf{x}}^{-1} \quad (11)$$

⁷ Variables in capital and bold represent matrices and those in lowercase letters and in bold represent vectors. The Leontief inverse matrix is calculated as follows: first, the technical coefficient matrix (\mathbf{A}) is obtained by multiplying the intermediate consumption matrix by the transposed and diagonalized output vector ($\hat{\mathbf{x}}'$). Then, the Leontief inverse (\mathbf{L}) is obtained from the inverse of the matrix $\mathbf{I} - \mathbf{A}$, where \mathbf{I} is an identity matrix:

$$\mathbf{A} = \mathbf{Z}\hat{\mathbf{x}}'$$

$$\mathbf{L} = (\mathbf{I} - \mathbf{A})^{-1}$$

Recalling that in the input-output model, gross output at the sector level is calculated by multiplying the Leontief inverse matrix and the total final demand vector (see Equation 9), it is easy to calculate GDP from the demand-side perspective. This can be achieved by multiplying the value added to output vector (\mathbf{w}) by the Leontief inverse (\mathbf{L}) and the final demand vector ($\tilde{\mathbf{f}}$):

$$\mathbf{Y} = \mathbf{wL}\tilde{\mathbf{f}} \quad (\text{demand-side perspective}) \quad (12)$$

The total final demand vector contains the sum of final demand of private households ($\tilde{\mathbf{f}}_C$), the government ($\tilde{\mathbf{f}}_G$), investments ($\tilde{\mathbf{f}}_I$) and exports ($\tilde{\mathbf{f}}_E$)⁸:

$$\tilde{\mathbf{f}} = \tilde{\mathbf{f}}_C + \tilde{\mathbf{f}}_G + \tilde{\mathbf{f}}_I + \tilde{\mathbf{f}}_E \quad (13)$$

By introducing Equation (13) into Equation (12), it is possible to calculate the GDP contribution (value added-induced) of each component of final demand within the input-output model (Equations (14) and (15)):

$$\mathbf{Y} = \underbrace{\hat{\mathbf{wL}}\tilde{\mathbf{f}}_C\boldsymbol{\mu}}_{Y_C} + \underbrace{\hat{\mathbf{wL}}\tilde{\mathbf{f}}_G\boldsymbol{\mu}}_{Y_G} + \underbrace{\hat{\mathbf{wL}}\tilde{\mathbf{f}}_I\boldsymbol{\mu}}_{Y_I} + \underbrace{\hat{\mathbf{wL}}\tilde{\mathbf{f}}_E\boldsymbol{\mu}}_{Y_E} \quad (14)$$

$$\mathbf{Y} = Y_C + Y_G + Y_I + Y_E \quad (15)$$

Analogously to traditional GDP decomposition, we can also decompose GDP growth with the import-adjusted method by attributing the growth to the different final demand components (Equation (16))⁹:

$$\frac{\Delta \mathbf{Y}}{\mathbf{Y}^0} = \frac{\Delta Y_C}{Y_C^0} + \frac{\Delta Y_G}{Y_G^0} + \frac{\Delta Y_I}{Y_I^0} + \frac{\Delta Y_E}{Y_E^0} \quad (16)$$

The import-adjusted decomposition has been applied in multiple studies to a number of different countries. Formalization of the import-adjusted method and early applications include the decomposition applied to the Netherlands for the periods 1999-2004 and 2003-2007 (Kranendonk & Verbruggen, 2005, 2008). These authors also applied the method to other five European economies¹⁰ and the United States. The method has also been used to decompose the annual and quarterly GDP growth of the euro zone (Hoekstra & Van Der Helm, 2010; Van Der

⁸ Note that final demand of private households (differs from the expenditure of private households (C), where .

⁹ Kranendonk and Verbruggen (2008) note that that to accurately decompose the net contribution of each final demand component in GDP and GDP growth, *complete* IOTs are required for all years under analysis and should be valued at constant prices. If these requirements are not fulfilled, the exercise gives an approximation of the *real* decomposition.

¹⁰ Other regions include Germany, France, Italy, Spain, Belgium and the aggregate of the euro area.

Helm & Hoekstra, 2006, 2008). Amar et al. (2016) applied the method to three Latin American countries (Brazil, Chile and Mexico) for the period 2004-2011.

Compared to the net exports approach, the import-adjusted decomposition frequently finds different drivers of growth from the supply side. For example, the exports decomposition of GDP growth between 2005 and 2007 indicates that about one-third of Germany's GDP growth resulted from the expansion of exports. Using the import-adjusted method, Kranendonk and Verbruggen (2008) find that the expansion of exports explains two-thirds of GDP growth for the period.

In the case of Latin America, Amar et al. (2016) find that the traditional decomposition yields a negative contribution of net exports to growth in Brazil, Chile and Mexico, while the import-adjusted method provides a positive contribution in all countries. Exports had a modest positive contribution to growth in Brazil, while results indicate that exports explained as much as 20 per cent of GDP growth in Chile and 30 per cent in Mexico. This is due to the fact that a high share of the countries' imports is ultimately consumed as part of domestic consumption.

Akyüz (2011) evaluates Chinese GDP growth between 2004 and 2008 using the two decomposition methods, net exports and import-adjusted. While the former indicates that about 15 per cent of Chinese growth in the period can be attributed to the expansion of exports, the latter method estimates the contribution of exports at over 30 per cent of growth. The author highlights that exports contribute more to growth than was previously expected. Wu et al. (2015) find similar results: exports were important drivers of growth, but only in some provinces. These authors apply the import-adjusted method to decompose GDP growth of 30 Chinese provinces between 1997 and 2007¹¹. China's international exports production is concentrated in the Eastern region provinces where their contribution to GDP rose from 16.8 per cent in 2002 to 21.7 per cent in 2007. In the remaining regions of the country, the contribution of international exports to GDP remained largely unchanged at around 4 per cent of GDP over the same period. As a result, growing international exports explained 24.4 per cent of GDP growth between 2002 and 2007 in the eastern provinces, but explained less than 1 per cent of GDP growth of other regions.

It is important to note that the expansion of domestic demand remains the largest contributor to GDP growth in the reviewed studies despite the fact that the contribution of exports is typically

¹¹ Wu et al. (2015) decompose the contribution of four final demand components to GDP and GDP growth: consumption (private plus government), investment, foreign exports and inter-provincial exports.

higher with this method in comparison to traditional decomposition¹². While the method offers insights into the terms of the demand-side drivers of growth, one of the main limitations is the large data requirement. As a result, this type of studies typically presents the decomposition results for a small number of countries in scatter years. This restricts the possibility of drawing more general conclusions.

2.1 World input-output tables

World input-output tables extend traditional (national level) input-output tables to include several countries. The tables are constructed by combining individual national IOTs with international trade data. By matching these two data sources, these tables provide detailed information on the origins of inputs used in production by a given country-sector¹³ – both from domestic and foreign sources. They also detail the country-sector destination of intermediate exports and the country destination of final exports. As such, the tables include all transactions of intermediate goods at world level within the intermediate consumption table. This is an important distinction, as the final demand vector in these cases does not include intermediate goods exports, while they are included in the national IOTs.

Over the past years, several international initiatives have constructed world input-output tables (WIOTs). These include the Eora MRIO (Lenzen, Kanemoto, Moran, & Geschke, 2012; Lenzen, Moran, Kanemoto, & Geschke, 2013), the WTO-OECD Inter-Country Input Output table (ICIO) (OECD, 2017), and the World Input-Output Database (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015).

These tables have been extensively used to analyse the emergence and evolution of global value chains. They have also been used to analyse demand-side drivers of economic growth. Los, Timmer and de Vries (2015b), for instance, present a methodology to capture GDP induced by domestic and foreign final demand. From a given country's perspective, domestic demand is defined as the absorption of final goods, which occurs in the country in question, and foreign demand is the absorption of final goods abroad. By tracking the evolution of GDP induced by foreign demand as the share of the country's GDP, these authors show that among the emerging economies included in the WIOD, there appears to be a reduction in the dependence on income generated by foreign demand from the 2000s onwards.

WIOTs could also be used for GDP decompositions, in a similar way as the method described above using national IOTs. A recent example in this regard is provided by Escaith (2016), who

¹² Kranendonk and Verbruggen (2008) finds that exports were the main contributor to GDP growth in Germany (200-2007) and the Netherlands (2004-2007).

¹³ The term country-sector refers to a sector in a given country, for instance, Chinese transport equipment.

applies the import-adjusted method to the 2015 edition of the OECD ICIO¹⁴ and decomposes the GDP growth of G-20 economies between 1995 and 2011. As the ICIO is only available in current prices, the decomposition is presented in nominal terms. Results indicate that exports are the most dynamic (fastest growing) component of demand among the G-20 countries, having induced 25.6 per cent of GDP growth in the 1995-2011 period for this country group. The remaining 74.4 per cent of growth was explained by the expansion of domestic demand.

3 Methodology

A review of the previous applications of the import-adjusted method indicates that it can yield important insights into the terms of the drivers of economic growth from a demand perspective. Calculating the decomposition using WIOTs allows us to apply the method with relative ease to a large number of countries. In what follows, we propose a simple approach to apply this type of decomposition in the context of WIOTs providing, at the same time, a sectoral focus. Our main interest is the relative role of domestic and foreign demand for manufactured goods in driving income creation.

3.1 GDP decomposition in a WIOT

An important difference when conducting the GDP decomposition in a WIOT context concerns the Leontief inverse matrix. Instead of the local Leontief inverse (L), we use the global Leontief inverse (B). This means that intermediate exports and imports are treated differently. In the global inverse, intermediate trade is included in the intermediate consumption matrix, whereas in the local inverse, this type of flows is included in the final demand vector. As a result, the linkages with foreign industries are not being accounted for in the local inverse.

An implicit assumption in the national IO model is that imports do not generate value added in the domestic economy because they are fully composed of foreign value. However, in the current context of increasing fragmentation of global production, this assumption can be misleading¹⁵. As WIOTs incorporate the trade of intermediates into the intermediate consumption matrix (and therefore, the global Leontief inverse), the vector of final demand only includes those exports geared towards final use.

¹⁴ The 2015 OECD Inter Country Input-Output (ICIO) tables contain individual economic data for 61 countries plus a Rest of the World, which represents the aggregate of all other countries not included individually.

¹⁵ In the national IO table, exports are considered as part of final demand – since they cross the borders of the country. However, exports of primary inputs or intermediate goods might return to the country of origin after being processed abroad if the absorption of the final good takes place at home. Using the global Leontief inverse, the value added generated in exporting the intermediate good ultimately consumed in the home country is allocated to domestic demand (part of DVA of imports). However, using the local Leontief inverse, the DVA generated in producing the good would be allocated to exports.

Los et al. (2015a) present an interesting application of the global Leontief model. They capture the direct and indirect value added generated (domestically and abroad) in a given value chain (\mathbf{g}) through an equation of the following form:

$$\mathbf{g} = \widehat{\mathbf{w}}\mathbf{B}\mathbf{p} \quad (17)$$

where \mathbf{B} = global Leontief inverse; \mathbf{p} = country's demand for the final products of a given country-sector.

Using a similar approach, we can capture the value added generated in a given country i (\mathbf{g}_i) due to the final absorption of \mathbf{p} by including only the value added to output ratios of the country in question in the matrix $\widehat{\mathbf{w}}$. That is, by constructing an adjusted vector $\widehat{\mathbf{w}}_i$ which only contains the ratios from country i , while all other elements are set to 0:

$$\mathbf{g}_i = \widehat{\mathbf{w}}_i\mathbf{B}\mathbf{p} \quad (18)$$

By selecting the world total final absorption of goods and services (\mathbf{f}), we can calculate country i 's GDP in the context of a WIOT:

$$\mathbf{Y}_i = \mu\widehat{\mathbf{w}}_i\mathbf{B}\mathbf{f} \quad (19)$$

Note that vector \mathbf{f} differs from $\tilde{\mathbf{f}}$ used in previous equations in two important aspects: first, it contains the final demand of all countries in the world (not only that of the domestic economy); second, it does not include intermediate exports.

From country i 's perspective, it is possible to divide world final demand into domestic and foreign components (see Equation (20)). This distinction is made on the basis of the country where final absorption takes place. Domestic absorption (F_{D_i}) includes all goods absorbed in the country regardless of whether they have been domestically produced or imported. Foreign absorption (F_{F_i})—from country i 's perspective—includes all goods absorbed outside country i . As a result, from any given country's perspective, the sum of foreign and domestic demand is equal to total world final demand.

$$\mathbf{f} = \mathbf{f}_{D_i} + \mathbf{f}_{F_i} \quad (20)$$

Plugging in Equation (20) into (19), it is possible to obtain an expression that captures the net GDP contribution of domestic and foreign final demand in a given country within the context of a WIOT:

$$Y_i = \widehat{w}_i B f_{D_i} + \widehat{w}_i B f_{F_i} \quad (21)$$

A country's domestic demand can be further decomposed into its main components: private consumption, government consumption and investment (see Equation (22)). By the same token, its GDP can be decomposed into the value added generated by foreign final demand and the value added generated by each of the three components of domestic final demand (see Equation (23)).

$$f_{D_i} = f_{C_i} + f_{G_i} + f_{I_i} \quad (22)$$

$$Y_i = \underbrace{\mu \widehat{w}_i B f_{C_i} + \mu \widehat{w}_i B f_{G_i} + \mu \widehat{w}_i B f_{I_i}}_{\substack{\text{GDP contribution of} \\ \text{Domestic Final} \\ \text{Demand}}} + \underbrace{\mu \widehat{w}_i B f_{F_i}}_{\substack{\text{GDP contribution of} \\ \text{Foreign Final} \\ \text{Demand}}} \quad (23)$$

The approach proposed in these equations differs from Escaith (2016) in that it focuses exclusively on the final country of absorption of the final good. Value added generated in the production of intermediate exports that are ultimately consumed in the home country (re-exports) is associated with domestic demand, despite being initially exported by the country. In Escaith (2016), instead, all the value added generated from intermediate exports is attributed to the export component, independently of the final place of absorption. Here, domestic demand is defined as goods ultimately absorbed by the country, independent of whether they have been exported or not in between¹⁶. In this sense, the methodology used here is closer to that presented in Los et al. (2015a).

3.2 Focusing on demand for manufactured goods

The accounting methods discussed so far have decomposed total demand by its main components, depending on the ultimate use of the goods (consumption, investment, exports). However, it is also possible to disaggregate each component of demand further into the specific sector or origin of the good. This can provide interesting insights into the terms of how changes in consumption patterns affect domestic and foreign income creation.

Our focus here relies on tracing the income specifically generated by the final absorption of manufactured goods and its contribution to GDP growth. To achieve this, we divide the world final demand vector into two components: final goods produced by the manufacturing sector (manufacturing final demand, f_m) and final goods (and services) produced by other sectors (non-manufacturing final demand, f_{nm}):

¹⁶ The inclusion of re-exports as part of domestic demand shifts part of what was being considered foreign demand towards domestic demand. Eora data indicates that DVA as a share of gross imports may also be high. In 2013, for instance, the DVA share of gross imports was over 6 per cent in the U.S. and Germany and over 4 per cent in China.

$$\mathbf{f} = \mathbf{f}_m + \mathbf{f}_{nm} \quad (24)$$

Once again, it is possible to disaggregate each component of the final demand vector into the domestic and foreign parts, from country i 's perspective:

$$\mathbf{f}\mathbf{f} = \left(\underbrace{\mathbf{f}_{D,m_i}}_{MADA_i} + \underbrace{\mathbf{f}_{F,m_i}}_{MAFA_i} \right) + \left(\mathbf{f}_{D,nm_i} + \mathbf{f}_{F,nm_i} \right) \quad (25)$$

In the analysis, we focus on the first bracket of Equation (25). The first element within this bracket (\mathbf{f}_{D,m_i}) contains country i 's manufacturing domestic absorption, which includes the country's absorption of domestically produced manufactured goods and imported final manufactured goods. To facilitate the exposition, this component will be labelled $MADA_i$. The second element (\mathbf{f}_{F,m_i}) captures manufacturing foreign absorption from country i 's perspective, and will be labelled $MAFA_i$.

Using a similar procedure as before, it is possible to estimate the value added generated by each of these components of final demand and derive the corresponding decomposition of GDP, not only in terms of foreign and domestic demand, but also taking into account the type of good absorbed:

$$Y_i = \underbrace{\left(\frac{DVA_{MADA}}{\widehat{w}_i \mathbf{B} \mathbf{f}_{D,m_i}} + \frac{DVA_{MAFA}}{\widehat{w}_i \mathbf{B} \mathbf{f}_{F,m_i}} \right)}_{\substack{\text{GDP contribution} \\ \text{of manufacturing} \\ \text{final absorption}}} + \underbrace{\left(\widehat{w}_i \mathbf{B} \mathbf{f}_{F,nm_i} + \widehat{w}_i \mathbf{B} \mathbf{f}_{D,nm_i} \right)}_{\substack{\text{GDP contribution} \\ \text{of non-manufacturing} \\ \text{final absorption}}} \quad (26)$$

Once again, we are interested in the first part of the equation. The first element ($\widehat{w}_i \mathbf{B} \mathbf{f}_{D,m_i}$) captures the value added generated in country i (domestic value added, or DVA) attributable to the country's manufacturing domestic absorption. Therefore, it will be generically labelled DVA_{MADA} . The second element ($\widehat{w}_i \mathbf{B} \mathbf{f}_{F,m_i}$), in turn, captures value added generated in country i due to the foreign absorption of manufactured goods and will be generically labelled DVA_{MAFA} . The sum of the first two elements captures the value added generated in country i by manufacturing final demand (DVA_{MAFID}).

In what follows we will use this decomposition to analyse the relative importance of different components of final demand in driving domestic income. Before doing so, we provide a brief summary of the data used.

4 Data

In this paper, we apply the decomposition presented above to the Eora Multi-Region Input-Output Table (Lenzen et al., 2012, 2013). Eora contains two different versions of its MRIO dataset: Eora Full and the Eora26. While Eora Full includes country-sector data at the highest level of disaggregation for the available data, Eora26 harmonizes the data into a fixed 26-sector structure (9 manufacturing sectors). It includes 187 economies plus a “Rest of the world” estimate, with annual tables for the period 1990-2013. Since our main interest is to compare different country groups across the last decades, we use Eora26.

Eora provides a higher country coverage compared to other available WIOTs, such as the OECD ICIO (OECD, 2017) and the WIOD (Timmer et al., 2015). It is also the only WIOT database with a comprehensive coverage of developing countries, especially of lower income economies. However, it does so by accepting a higher degree of uncertainty in the values included in the model (Lenzen et al., 2013). The Eora was constructed using available (but limited) raw data on national IOTs, SUTs, national accounts aggregates and trade data. Therefore, individual data points may be largely dependent on the process used for balancing the international matrix.

In view of these uncertainties and to minimize potential biases in the final estimates, we use a subset of Eora26. To account for possible outliers in the dataset, we exclude observations from countries that: (1) did not exist at both the initial and/or final year of analysis (1990-2013); (2) were relatively small (population below 500.000 inhabitants in 2013); (3) presented large differences in the aggregates of their demand components compared to those reported in the UNSD National Accounts Main Aggregates Database¹⁷. Using these three listed criteria, we retain 127 countries out of the total sample of 187 countries.

The domestic final demand of each country in Eora MRIO is divided into six components: household private consumption, non-profit institutions serving households, government final consumption, gross fixed capital formation, changes in inventories and acquisitions less disposal of valuables. We group the six components into three to facilitate the analysis. Household private consumption is considered on its own and is simply referred to as “private consumption”. Government final consumption is merged with non-profit institutions serving households and referred to as “public consumption”. The third domestic demand component is

¹⁷ More specifically, we have excluded countries in which the difference between private household consumption plus non-profit institution as a share of total final demand between the two sources differing by more than 15 percentage points.

“gross capital formation”, the sum of gross fixed capital formation, changes in inventories and acquisitions less disposal of valuables.

Results are presented using the country classification put forward in Upadhyaya (2013). The classification groups countries by their level of industrial development and distinguishes four broad categories: Industrialized Economies, Emerging Industrial Economies, Other Developing Economies and Least Developed Countries.

Table 1 includes the number of observations by country group available in the complete Eora26 dataset and the subsample used here (without *outliers*):

Table 1 Countries included in database by level of industrialization

	Total	Industrialized Economies	Emerging Industrial Economies	Other Developing Economies	Least Developed Countries
Eora26 (complete)	187	48	32	61	41
Eora26 (selection)	127	38	26	38	25

Note: Country grouping based on Upadhyaya (2013)

5 Main findings

This section presents the main findings and results of the GDP decomposition using Eora MRIO tables. Results are presented in four subsections. First, we present the insights that can directly be drawn by looking at the characteristics of each country’s final demand vector. Secondly, we present data on the value added generated by domestic absorption of final goods and services – both in the country under analysis (DVA) and in other countries (FVA). This captures domestic demand’s interlinkage to the world economy, but also the leakage of value added that occurs when producing for the local market using imported inputs. Next, we present the results of GDP decomposition using the methodology described in Section 3. Finally, we compare the results of the GDP decomposition of multiple years to decompose the growth dynamics of country groups and discuss the drivers of growth from the demand side. In all sections, special emphasis is given to analysing the specific role the final absorption of manufactured goods plays.

5.1 A closer look at final demand

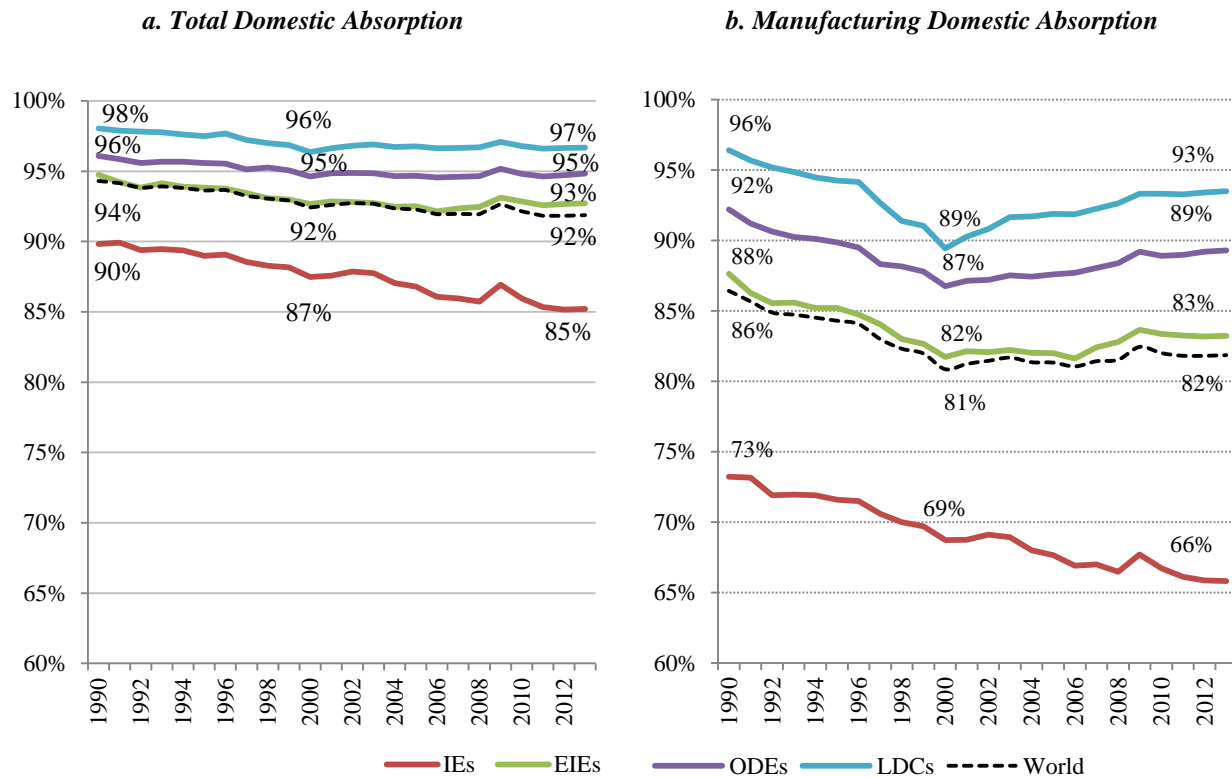
Some interesting insights can be directly drawn from the information contained in the Eora MRIO's final demand vector. We initially decompose the final demand vector into its domestic and foreign absorption components (as done in Equation (20))¹⁸. Additionally, we present results for the specific case of manufacturing final demand. As we will see, some peculiarities of final demand for manufactured goods already become evident when looking at the final demand vector, serving the interpretation of the decompositions' results in the following subsections.

Figure 1 presents each country's domestic absorption as a share of its total final demand. Results are presented for the total demand of each economy (panel *a*) and for the specific case of manufacturing final demand (panel *b*). Domestic absorption includes domestically produced goods and imported final goods consumed in the local market. Total final demand here is defined as the country's exports plus its domestic absorption. One striking feature in the figure is the clearly dominant role played by domestic absorption, which represents at least 85 per cent of total demand and 65 per cent of manufacturing demand.

There are, however, important differences in the levels and trends observed in each country group. In general terms, more advanced economies tend to rely more on foreign demand, although domestic absorption continues to be, by far, the largest component. When we focus on manufacturing domestic absorption only, this difference between country groups is even higher. The share of domestic absorption in total final demand for manufactured goods in Industrialized Economies (IEs) is much lower than the world average. In 2013, domestic absorption of manufactured goods represented, on average, 82 per cent of final demand at the world level, while it only represented 66 per cent in IEs. Least Developed Countries (LDCs) indicated the largest reliance on domestic demand, which explained more than 90 per cent of final demand for manufactured goods.

¹⁸ This analysis does not include exported intermediates as part of foreign demand.

Figure 1 Domestic absorption as a share of a country's total demand for final goods. Average values by country groups, 1990-2013



Source: Authors' elaboration based on Eora.

Note: Each line shows the unweighted averages of the indicator for the world and by country group calculated at current prices. Total demand is defined as domestic absorption plus the country's final exports. IEs = Industrialized Economies; EIEs = Emerging Industrial Economies; ODEs = Other Developing Countries; LDCs = Least Developed Countries

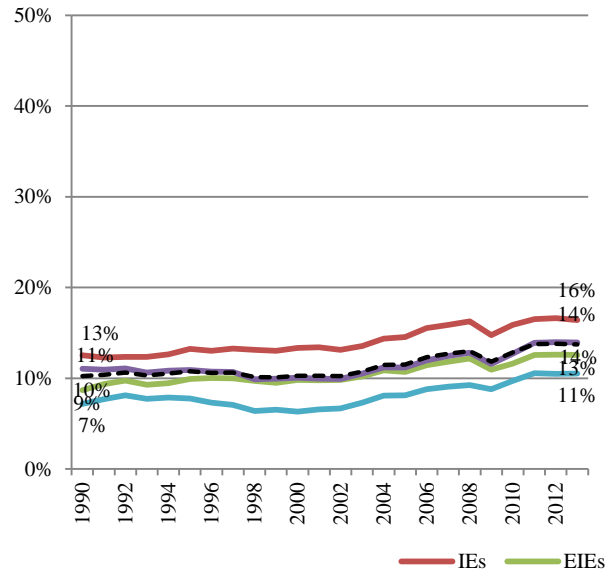
Figure 1 also shows a declining trend of the significance of domestic absorption at the world level and for all country groups, reflecting globalization's impact on the increasing role of foreign demand. This is especially true for the period from 1990 to 2000, during which all groups showed a clear declining trend. Since 2000, however, the relative size of domestic absorption of manufactured final demand in Emerging Industrial Economies and Developing Countries has been growing, partially reversing the trend observed in the previous decade. In the case of industrialized economies, instead, the importance of domestic absorption continuously decreased in the 1990-2013 period, indicating a contrasting behaviour when compared to industrializing countries.

While we find that the role of foreign demand appears to be more pervasive for the consumption of manufactured goods, domestic demand is still, on average, the most important component for all country groups. This is especially the case for Developing Countries as well as Emerging Industrial Economies. As countries' wealth increases, however, the gap between domestic and foreign sources of demand progressively reduces. In fact, there is a clear negative correlation between the income level of countries and the importance of domestic demand for manufactured goods. This suggests that countries tend to primarily rely on their domestic market at lower levels of income.

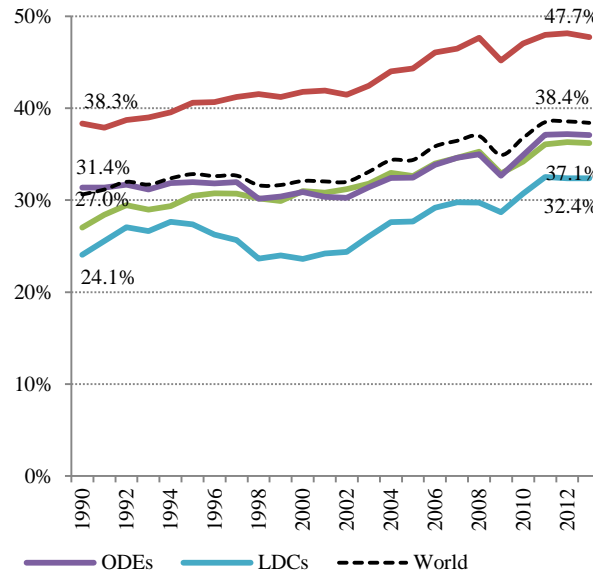
Next, we look at the share of imports within domestic absorption. As discussed earlier, not all domestic absorption is devoted to locally produced goods. Instead, an important (and increasing) share is dedicated to the purchase of imports. Figure 2 presents these shares both for the case of total domestic absorption (panel *a*) and the case of domestic absorption of manufactured goods only (panel *b*). In both cases, we observe an increasing trend, but this is much more striking for manufacturing domestic absorption. This reflects the increasing interdependence across economies when it comes to manufacturing consumption. The share has increased at a particularly rapid pace since 2000, despite a short slump during the international crisis of 2009.

Figure 2 Final imports as a share of domestic absorption. Average values by country group, 1990-2013

a. Total Domestic Absorption



b. Manufacturing Domestic Absorption



20

Source: Author's elaboration based on Eora

Note: Each line shows the unweighted averages of the indicator for the world and by country group. IEs = Industrialized Economies; EIEs = Emerging Industrial Economies; ODEs = Other Developing Countries; LDCs = Least Developed Countries

As expected (in view of the high share of non-tradable goods in total domestic absorption), the imported share for the total economy (panel a) typically range between 5 per cent and 15 per cent of domestic absorption while that of manufactured goods is typically above 25 per cent and can represent up to half of domestic absorption. Once again, more advanced economies display larger shares of imported goods compared with less developed ones. In 2013, the share of imported final manufactured goods in the domestic absorption of *IEs* was above 45 per cent, while in the *LDCs*, it accounted for less than 35 per cent. This would indicate that richer economies tend to be more integrated in world markets, probably due to the fact that demand among domestic consumers is more diversified and can hardly be fully sourced from domestic providers.

5.2 Value added generated by domestic absorption

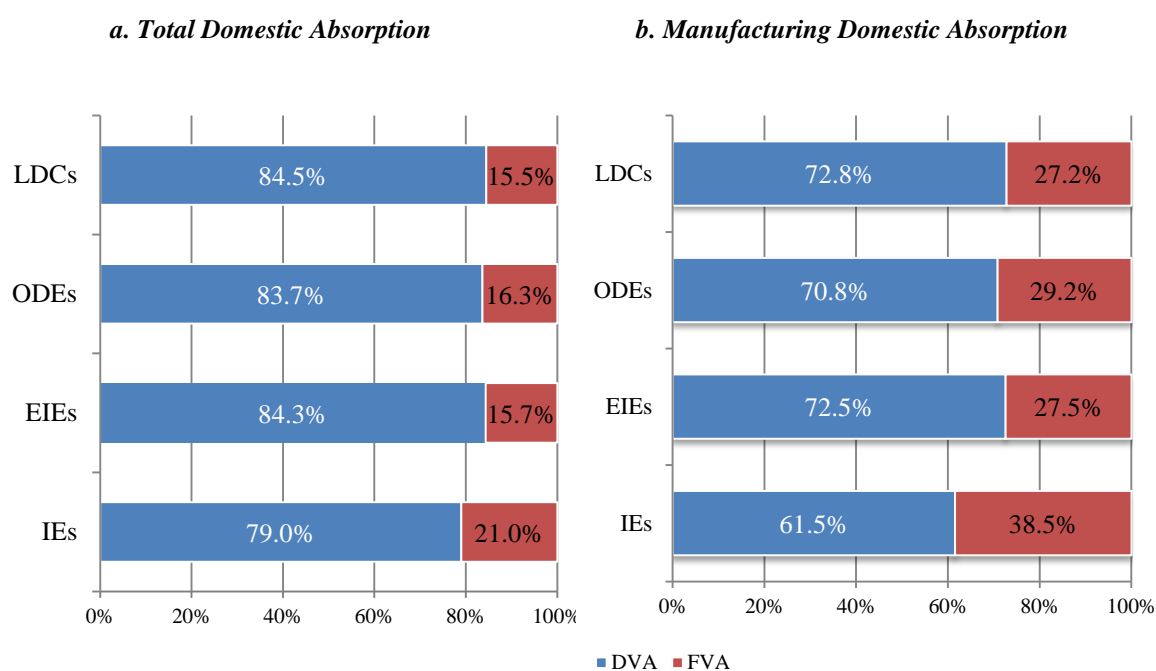
Domestic demand does not only generate income in the domestic economy, but generates income abroad as well. Part of the value added associated with global value chains, for instance, occurs abroad due to the imported inputs of final goods in domestic production. By the same token, part of the demand that originates outside the domestic economy can generate local income. Whether this is the case or not depends on the complex chain of productive linkages operating both in the domestic economy and abroad in terms of local suppliers to final goods producers.

The growing international fragmentation of production has resulted in an increased reliance on imported goods. Considering all of the backward linkages involved in today's industrial production, it would be nearly impossible to find an example of a good that does not rely to any extent on imported inputs. Imported inputs even for primary production such as agriculture may represent an important share of overall costs in terms of, for instance, chemical components, such as fertilizers or pesticides. Hence, it is important to trace the value added generated in the same country (DVA) and in all foreign countries (FVA) in the production of domestically produced and absorbed final goods and services. Figure 3 presents the details of this exercise, once again distinguishing the cases of total domestic absorption and manufacturing domestic absorption.

As panel *a* shows, a substantial share of the total value added generated in the production of domestically produced and absorbed goods in reality takes place in other countries. Of the value added generated in the production of goods catering to domestic demand in industrialized economies, 21 per cent is generated outside the country of absorption (FVA in domestic absorption). Among industrializing countries, the results indicate similar levels of FVA in the

production of domestically produced and absorbed goods (FVA between 15.5 per cent and 16.3 per cent). The FVA in local production for the domestic market is even higher if we focus exclusively on manufactured goods (panel *b*). Nearly one-third of the total value of domestically produced final manufactured goods occurs abroad. Again, the share of FVA is more pronounced in *IEs* (on average, 38.5 per cent) and is 10 percentage points higher than in all absorption categories when compared with the developing world.

Figure 3 Distribution between domestic and foreign value added generated in domestically produced and absorbed goods and services, 2013



Source: Authors' elaboration based on Eora

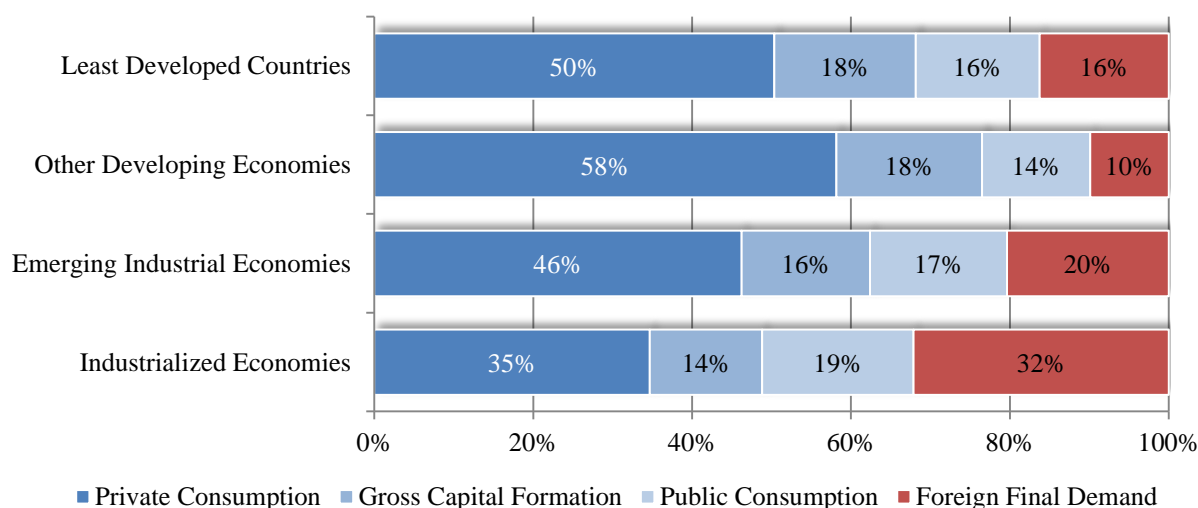
Note: IEs = Industrialized Economies; EIEs = Emerging Industrial Economies; ODEs = Other Developing Countries; LDCs = Least Developed Countries; DVA = Domestic Value Added; FVA = Foreign Value Added

Interesting differences are also visible when comparing the main aggregates of final demand: private consumption, public consumption, investment and exports of final goods. Table 3 in the Appendix presents the FVA in each component of domestic absorption based on the Eora database. Results based on all goods (Table 3A) show that FVA shares are higher for investment and lower for government consumption. This is in line with Amar et al.'s (2016) findings for Latin American countries. The FVA share in the components of domestic absorption is considerably higher when we focus on manufactured goods only (Table 3B). In the table, we observe that the FVA share for all components of domestic absorption in industrialized economies also rose significantly. This is true for developing economies as well, although the intensity of the increase is much lower.

5.3 Decomposing GDP using the WIOT-based import-adjusted method

The previous two sections have provided some preliminary insights on how the increasing fragmentation of production is affecting the relative role of domestic demand in income creation. In this section, we go one step further and apply the adapted import-adjusted GDP decomposition described in Section 3. Hence, we focus exclusively on the DVA generated in the production of final goods and decompose countries' GDP by the net contribution of each component of final demand (as represented in Equations (23) and (26)). Based on these equations, Figure 4 presents the average contribution of each component of final demand to GDP for countries at different stages of development.

Figure 4 GDP induced by total domestic (blue) and foreign (red) absorption, 2013



Source: Authors' calculations based on Eora.

Note: Domestic Final Demand = Private Consumption + Gross Capital Formation + Government Consumption. Government Consumption includes that of Non-Profit Institutions.

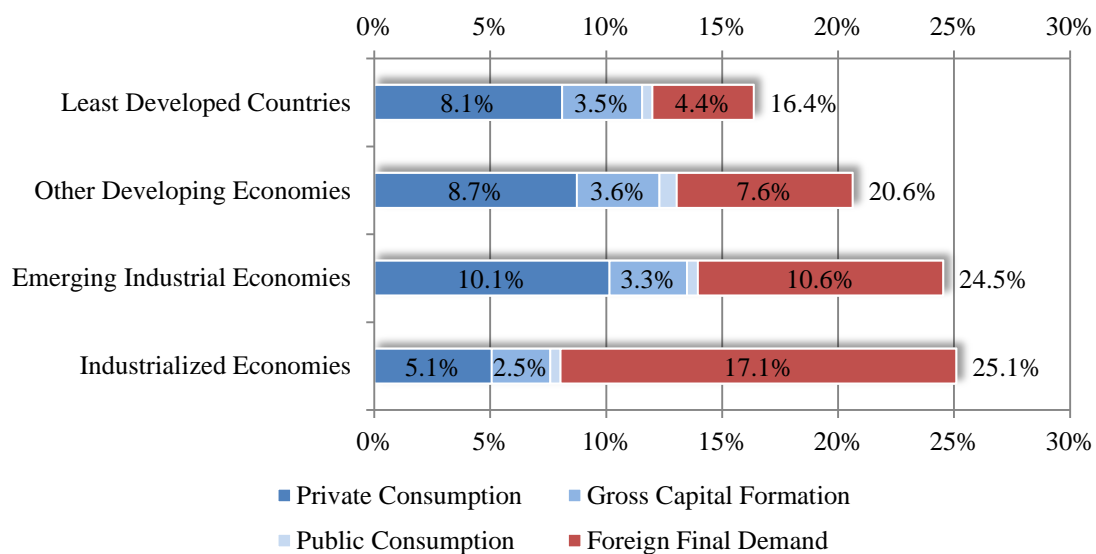
Domestic demand is, by far, the most important component across all stages of industrial development. However, we observe a growing importance of foreign final demand as countries attain higher levels of industrialization. This figure increases from 10 per cent to 16 per cent in LDCs and Other Developing Economies to around 20 per cent in industrial emerging economies and then jumps to more than 30 per cent in the case of industrialized countries. The counterpart of these changes seems to be a reduction in the relative importance of private consumption.

To analyse the specific role played by domestic and foreign demand of manufactured goods, we trace back the total value added directly and indirectly generated by this type of absorption and relate it to total GDP (see Figure 5). A number of interesting insights emerge from this exercise.

First and foremost, there appears to be a positive correlation between the importance of manufacturing absorption in GDP and a country's level of industrial development. GDP induced by the absorption of manufactured goods was 10 percentage points lower in Least Developed Countries than in Industrialized Economies.

Secondly, the GDP induced by manufacturing absorption seems to exceed the share of MVA in GDP in all country groups and years under consideration. The MVA in GDP of each country group calculated from the Eora database is between 21 per cent (*IEs*) and 12 per cent (*LDCs*), while the VA generated by the absorption of manufactured goods oscillates between 25 per cent (*IEs*) and 16 per cent (*LDCs*). Due to manufacturing interlinkages with other sectors of the economy, the value added created due to the absorption (demand perspective) of manufactured goods for consumption is much higher than the VA directly generated in the production of these goods (production perspective).

Figure 5 GDP induced by manufacturing domestic (blue) and foreign (red) absorption as a share of GDP, 2013



Source: Authors' calculations based on Eora.

Note: Domestic Final Demand = Private Consumption + Gross Capital Formation + Government Consumption. Government Consumption includes that of Non-Profit Institutions.

The figure also divides manufacturing consumption's contribution to GDP by components of final demand. When looking at income generated by the absorption of manufactured goods only, we find that the contribution of foreign demand is significantly higher among Industrialized Economies than Developing Countries and Emerging Industrial Economies – its contribution increases progressively from the least to most industrialized country group. On

average, foreign demand for manufactured goods is more important among Industrialized Economies than domestic demand. By comparison, the contribution of domestic demand is particularly important in LDCs, where it explained more than 70 per cent of the value added generated by final manufacturing demand in 2013.

On average, 17 per cent of GDP in Industrialized Economies is generated by participating in the production of final manufactured goods ultimately consumed abroad. By comparison, foreign final demand contributed less than 5 per cent of GDP, on average, among Least Developed Countries. This partially reflects the better developed capabilities of Industrialized Economies to participate in the value chains of manufacturing products internationally.

Private consumption of manufacturing's contribution to GDP presents a different pattern. The results indicate that the significance of income generated by this component is higher among Developing Countries and Emerging Industrial Economies than among Industrialized ones – and is highest among Emerging Industrial Economies. This indicates the continued importance of income generated by supplying manufactured goods to countries at different stages of industrial development. It might indicate that income generated from the production of manufactured goods domestically absorbed is complementary to the expansion of income generated from foreign absorption.

The results presented here refer to the year 2013, which is the most recent year with available data on the source used. To evaluate changes in the importance of the contribution of manufacturing absorption to GDP and the relative importance of the different components of final demand over time, we calculate the decomposition for other years as well (see Figure 8 and Figure 9 in the Appendix). The results indicate that the relative importance of domestic demand declined in all country groups between 1990 and 2013, confirming yet again the process of increased global fragmentation of production previously referred to. This decline is primarily driven by the falling contribution of private consumption to GDP, most notably for the Industrialized Economies. In the Developing Countries and Industrial Emerging Economies, however, the decline is only visible between 1990 and 2000. In the 2000s, instead, the relative importance of domestic demand in creating new income remained fairly stable.

5.4 Decomposing GDP growth

In the previous sections, the focus has been on the relative importance of domestic and foreign demand at different points in time. What really matters when it comes to development, however, is the contribution of these components to economic growth, that is, to the changes observed during certain periods of time. This can provide interesting insights into the development

strategy followed by different country groups in terms of their relative reliance on domestic and foreign demand for manufactured goods.

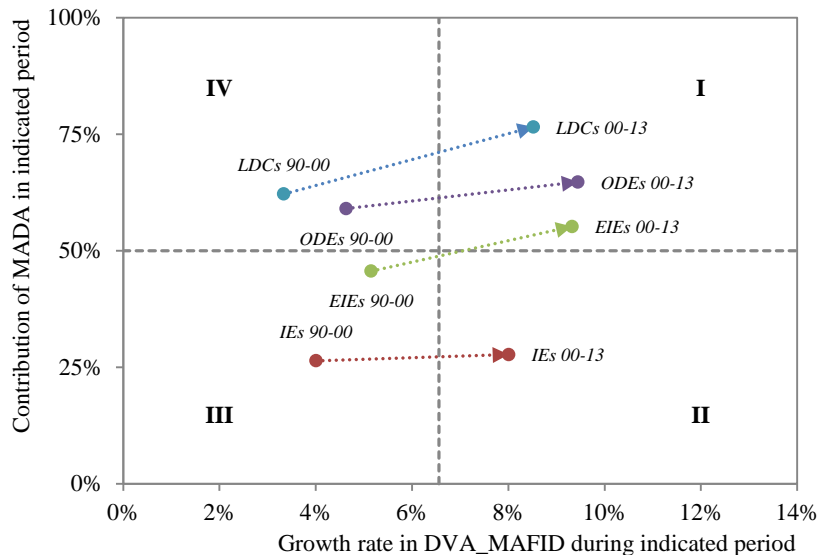
In what follows we present the results of our decomposition in terms of contribution to the changes observed in two periods: 1990-2000 and 2000-2013. The selection of these periods responds to the different dynamics observed within the two periods. As discussed above, the first period is characterized by a growing importance of foreign demand, while in the second period, reliance on domestic demand seems to have increased in many countries.

The specific details of the decomposition are presented in Tables 5 and 6 in the Appendix. The tables detail the total growth attributed to each component of domestic absorption and to foreign absorption for total final demand (Table 5) and for manufacturing final demand (Table 6). Here, we focus on the salient results for the specific case of manufacturing as illustrated in Figure 6.

The figure presents the average compound annual growth rate of value added generated by manufacturing final demand (DVA_{MAFID}) for two periods (1990-2000 and 2000-2013, by country group) and the contribution of domestic absorption to the growth observed in each period¹⁹. It also provides indications of the average growth rate observed across different regions of the world (dashed vertical line) and the average contribution of domestic demand (dashed horizontal line). These averages provide an interesting reference point to distinguish four stylized cases: i. rapid growth with high reliance on domestic demand (quadrant I); ii. rapid growth with low reliance on domestic demand (quadrant II); iii. slow growth with low reliance on domestic demand (quadrant III); and iv. slow growth with high reliance on domestic demand (quadrant IV).

¹⁹ This is calculated as the contribution of DVA_{MADA} to the observed absolute change in DVA_{MAFID} during the period.

Figure 6 Annual compound growth rate in domestic value added generated by manufacturing final demand (DVA_{MAFID}) and the contribution of domestic absorption (DVA_{MADA}). Average values by country group, 1990-2000 and 2000-2013



Source: UNIDO elaboration based on Eora

Note: IEs = Industrialized Economies; EIEs = Emerging Industrial Economies; ODEs = Other Developing Countries; LDCs = Least Developed Countries.

Looking at the horizontal dimension (average growth) we observe a general shift of all country groups to the right, reflecting an acceleration of the nominal income generated by final demand for manufactured goods. This is true for all groups, though the increase seems to be larger in the case of *LDCs*, which moved from an average annual growth of about 3.5 per cent in the 1990s to an average growth of nearly 9 per cent after the year 2000. At this point, it is important to stress that we are looking at nominal figures which include both increases in quantity and price. Due to the commodity prices boom, the global inflation rate was higher after the 2000s as compared to the 1990s.²⁰

Perhaps more interesting for our analysis are the insights obtained when looking at the vertical dimension of the figure. In this case, there seems to be a clear upward trend for all developing regions, highlighting once again the increased importance of domestic demand after the 2000s. The case of *EIEs* is particularly interesting: between the two periods, this country group moved from the *III* to the *I* quadrant, indicating a rapid acceleration of income creation based on final demand for manufactured goods, which is increasingly relying on the domestic markets.

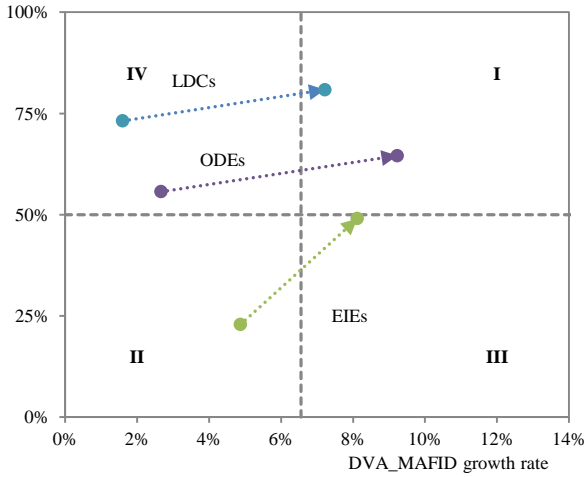
²⁰ According to the UNSD National Accounts Main Aggregates Database, the annual compound growth rate of GDP prices at the world level jumped from 1.1 per cent in the period 1990-2000 to 4.3 per cent in the period 2000-2013.

These overall trends, however, mask some interesting contrasts across regions. Figure 7 presents the same information but distinguishes by broad geographical regions. Developing countries in Africa and Asia show a similar pattern of high acceleration in growth rates and an increased reliance on domestic demand. Among Asian economies, there is a stark difference in the trajectory observed for industrialized economies and developing ones. In developing Asian economies, a rise in the contribution of manufacturing domestic absorption to growth is accompanied by an increase in the growth rate. Among the developed economies, growth accelerated to a lesser extent and no increase in the role of domestic absorption is observed.

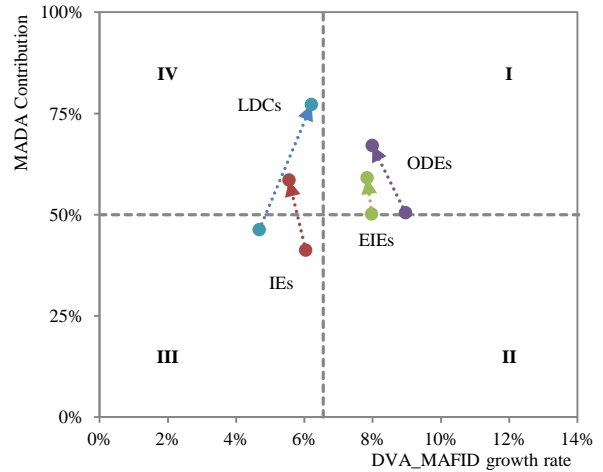
Countries in the Americas follow a completely different pattern from that observed in the other two continents with a rising importance of domestic absorption for growth observed among the country groups. The increase in the importance of domestic demand to growth was not accompanied by a rise in the growth rate of demand for manufactured goods. Developing countries in Latin America, instead, showed slight declines in their growth rates. Among European countries, the importance of domestic absorption of manufacturing reduced or was stable across the period. Other Developing Economies in Europe seem to be the only developing region in which the importance of domestic demand declined between the two periods.

Figure 7 Annual compound growth rate in domestic value added generated by manufacturing final demand (DVA_{MAFID}) and the contribution of domestic absorption (DVA_{MADA}). Average values by country group and geographical region, 1990-2000 and 2000-2013

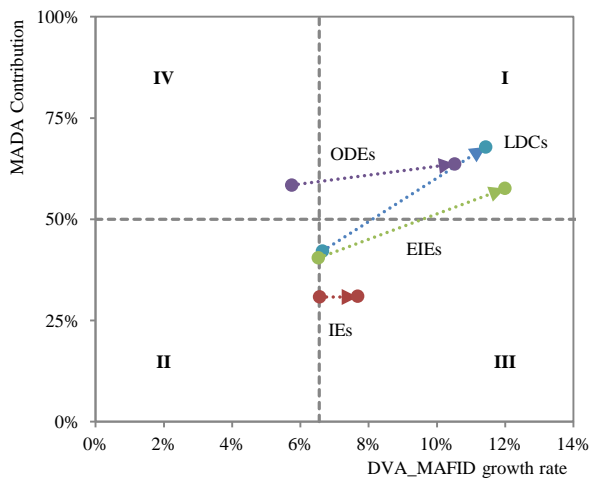
a. Africa



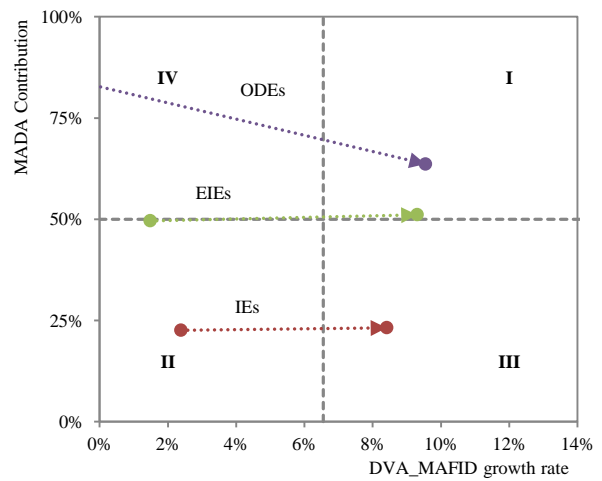
b. America



c. Asia and the Pacific



d. Europe



Source: UNIDO elaboration based on Eora

Note: IEs = Industrialized Economies; EIEs = Emerging Industrial Economies; ODEs = Other Developing Countries; LDCs = Least Developed Countries

6 Final remarks

This paper has taken the perspective that final demand is the ultimate driver of production activity. Building on this key notion, we have presented and applied a methodology to capture the contribution of manufacturing final demand to income creation based on multiregional input-output GDP decomposition techniques. The approach drew on two strands of literature: the framework developed in the context of national input-output models to perform import-adjusted GDP decompositions and recent studies on the emergence and dynamism of global value chains that make use of multiregional input-output tables. One key aspect of the methodology presented is that it allows for a disaggregation of the contribution of manufacturing consumption to GDP into the part that can be attributed to domestic and foreign sources of demand.

The methodology was used to evaluate the relative role of domestic and foreign absorption of goods and services in the generation of domestic income for a large sample of countries over the last 23 years using EORA multiregional input-output tables. The findings of the paper indicate that the growth of final demand (for the economy as a whole as well as for manufacturing) is still mostly driven by domestic absorption. Import-adjusted decomposition methods typically attribute a higher role to foreign demand compared to the net-exports method. Despite this, domestic demand remains the largest contributor to GDP from the demand side at the global level and across countries at different stages of industrial development.

Some interesting contrasts, however, emerge both in terms of the level and trends of different country groups. Generally speaking, more advanced economies tend to rely more on foreign demand, although domestic absorption continues to be, by far, the largest component. Schematically, the results obtained suggest a two-step process, whereby countries first rely on the expansion of their domestic market to develop capabilities in relatively less technologically advanced industries, and only subsequently—building on the foundations provided by the domestic market—start entering foreign markets.

The findings also suggest that as countries' wealth expands, they tend to increasingly rely on the global economy. On the one hand, the share of imports for final consumption tend to rise as consumer preferences diversify away from less sophisticated, domestically sourced goods. On the other hand, those goods that are locally produced tend to increasingly draw on inputs and components sourced from abroad – local production is progressively integrated within GVCs.

One important implication from this finding is that the requirements of foreign exchange tend to increase rapidly with income and so does the pressures on external accounts, unless specific

action is taken to build domestic capabilities for export to counterbalance these pressures. This is an important point to keep in mind, especially in emerging economies trying to rebalance their economies towards larger domestic consumption. In some instances encouraging foreign investment and, in particular, the offshoring of production from firms in higher income countries may facilitate the emergence of export-oriented firms, even at very low levels of industrialization – thus providing the necessary foreign exchange to finance a greater influx of imports.

The approach proposed in this paper provides interesting insights into current debates on the effects of globalization in domestic economies, the relative importance of domestic and foreign demand in driving income creation and the diverse strategies followed by different countries in terms of how much they tend to rely on different sources of demand. A question that has been left open by the analysis relates to the underlying forces that explain the reasons why some sources of demand are more important than others. This will be a matter of future research. A preliminary analysis of this line indicates that at least three factors have an important effect on the relative role played by domestic demand for manufactured goods: the size of the middle class, the share of wages in aggregate income and the degree of diversification of domestic consumption. A positive correlation seems to exist between each of these factors and the income created by domestic demand for manufactured goods.

Bibliography

- Akyüz, Y., 2011. Export Dependence and Sustainability of Growth in China. *China Amp World Econ.* 19, 1–23. <https://doi.org/10.1111/j.1749-124X.2011.01224.x>
- Alders, J.A.J., 1988. De bijdrage van bestedingscategorieën aan de groei (Economisch Statistische Berechten). De Nederlandsche Bank.
- Amar, A., Torchinsky Landau, M., Wirkierman, A., 2016. Descomposición alternativa de los componentes de la demanda agregada: hacia un análisis del corto plazo con más contenido estructural.
- Baldwin, R., 2013. Trade and Industrialization after Globalization's Second Unbundling: How Building and Joining a Supply Chain Are Different and Why It Matters, in: NBER. pp. 165–212.
- De Backer, K., Miroudot, S., 2013. Mapping Global Value Chains (OECD Trade Policy Papers). Organisation for Economic Co-operation and Development, Paris.
- Escaith, H., 2016. Aggregate Demand, Vertical Specialization and Growth Accounting. *J. Int. Commer. Econ. Policy* 07, 1650016. <https://doi.org/10.1142/S1793993316500162>
- Gereffi, G., 2015. Global Value Chains, Development and Emerging Economies (Inclusive and Sustainable Industrial Development Working Paper Series No. 18). United Nations Industrial Development Organization, Vienna.
- Hoekstra, R., Van Der Helm, R., 2010. Attributing GDP growth of the Euro Area to final demand categories. Presented at the 8th International Input-Output Conference, Sydney, Australia.
- Hummels, D., Ishii, J., Yi, K.-M., 2001. The nature and growth of vertical specialization in world trade. *J. Int. Econ., Trade and Wages* 54, 75–96. [https://doi.org/10.1016/S0022-1996\(00\)00093-3](https://doi.org/10.1016/S0022-1996(00)00093-3)
- IMF, 2017. Gaining momentum?, *World Economic Outlook*. International Monetary Fund, Washington, DC.
- Johnson, R.C., 2014. Five Facts about Value-Added Exports and Implications for Macroeconomics and Trade Research. *J. Econ. Perspect.* 28, 119–142.
- Johnson, R.C., Noguera, G., 2012. Accounting for intermediates: Production sharing and trade in value added. *J. Int. Econ.* 86, 224–236. <https://doi.org/10.1016/j.jinteco.2011.10.003>
- Kranendonk, H., Verbruggen, J., 2008. Decomposition of GDP-growth in some European Countries and the United States (No. 203), CPB Memorandum. CPB Netherlands Bureau for Economic Policy Analysis.
- Kranendonk, H., Verbruggen, J., 2005. How to determine the contributions of domestic demand and exports to economic growth? (No. 129), CPB Memorandum. CPB Netherlands Bureau for Economic Policy Analysis.

- Lenzen, M., Kanemoto, K., Moran, D., Geschke, A., 2012. Mapping the Structure of the World Economy. *Environ. Sci. Technol.* 46, 8374–8381.
- Lenzen, M., Moran, D., Kanemoto, K., Geschke, A., 2013. Building Eora: A Global Multi-Region Input–Output Database at High Country and Sector Resolution. *Econ. Syst. Res.* 25, 20–49. <https://doi.org/10.1080/09535314.2013.769938>
- Los, B., Timmer, M.P., de Vries, G.J., 2015a. How important are exports for job growth in China? A demand side analysis. *J. Comp. Econ.* 43, 19–32. <https://doi.org/10.1016/j.jce.2014.11.007>
- Los, B., Timmer, M.P., de Vries, G.J., 2015b. How Global Are Global Value Chains? A New Approach to Measure International Fragmentation. *J. Reg. Sci.* 55, 66–92. <https://doi.org/10.1111/jors.12121>
- Los, B., Timmer, M.P., Vries, G.J., 2015c. How Global Are Global Value Chains? A New Approach To Measure International Fragmentation. *J. Reg. Sci.* 55, 66–92.
- OECD, 2017. OECD Inter-Country Input-Output (ICIO) Tables, 2016 edition [WWW Document]. OECD.org. URL oe.cd/icio
- Sturgeon, T.J., Memedovic, O., 2010. Mapping Global Value Chains: Intermediate Goods Trade and Structural Change in the World Economy (Development Policy and Strategic Research Brand Working Paper No. 5). United Nations Industrial Development Organization, Vienna.
- Timmer, M.P., Dietzenbacher, E., Los, B., Stehrer, R., de Vries, G.J., 2015. An Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production. *Rev. Int. Econ.* 23, 575–605. <https://doi.org/10.1111/roie.12178>
- Upadhyaya, S., 2013. Country grouping in UNIDO statistics (Working Papers No. 1/2013), UNIDO Working Papers. United Nations Industrial Development Organization, Vienna.
- Van Der Helm, R., Hoekstra, R., 2008. Attributing quarterly GDP growth rates of the Euro Area to final demand components (Report prepared for the European Central Bank (ECB)).
- Van Der Helm, R., Hoekstra, R., 2006. Attributing the Euro Area GDP Growth Rate to Final Demand Component (Report prepared for the European Central Bank (ECB)).
- Wang, Z., Wei, S.-J., Yu, X., Zhu, K., 2017. Measures of Participation in Global Value Chains and Global Business Cycles (Working Paper No. 23222). National Bureau of Economic Research. <https://doi.org/10.3386/w23222>
- World Bank, 2017. World Development Indicators (Database) [WWW Document]. URL <https://data.worldbank.org/data-catalog/world-development-indicators> (accessed 1.2.17).
- Wu, S., Lei, Y., Li, L., 2015. Evaluation of the Contributions of Four Components of Gross Domestic Product in Various Regions in China. *PLOS ONE* 10, e0121594. <https://doi.org/10.1371/journal.pone.0121594>

7 Appendix

7.1 Eora sector classification and group used

Table 2 Eora26 sector classification and sector grouping

	Sector Name	Sector Group
1	Agriculture	Non-Manufacturing Sector
2	Fishing	Non-Manufacturing Sector
3	Mining and Quarrying	Non-Manufacturing Sector
4	Food & Beverages	Manufacturing Sector
5	Textiles and Wearing Apparel	Manufacturing Sector
6	Wood and Paper	Manufacturing Sector
7	Petroleum, Chemical and Non-Metallic Mineral Products	Manufacturing Sector
8	Metal Products	Manufacturing Sector
9	Electrical and Machinery	Manufacturing Sector
10	Transport Equipment	Manufacturing Sector
11	Other Manufacturing	Manufacturing Sector
12	Recycling	Manufacturing Sector
13	Electricity, Gas and Water	Non-Manufacturing Sector
14	Construction	Non-Manufacturing Sector
15	Maintenance and Repair	Non-Manufacturing Sector
16	Wholesale Trade	Non-Manufacturing Sector
17	Retail Trade	Non-Manufacturing Sector
18	Hotels and Restaurants	Non-Manufacturing Sector
19	Transport	Non-Manufacturing Sector
20	Post and Telecommunications	Non-Manufacturing Sector
21	Financial Intermediation and Business Activities	Non-Manufacturing Sector
22	Public Administration	Non-Manufacturing Sector
23	Education, Health and Other Services	Non-Manufacturing Sector
24	Private Households	Non-Manufacturing Sector
25	Others	Non-Manufacturing Sector
26	Re-export & Re-import	Non-Manufacturing Sector

Source: Eora MRIO.

7.2 List of Eora26 outlier countries excluded

The following countries were excluded from the EORA26 database (as discussed in Section 4):

Belarus, Brunei Darussalam, Kazakhstan, Latvia, Mauritius, Serbia, Aruba, Bermuda, Greenland, Iceland, Liechtenstein, Malta, New Caledonia, French Polynesia, Qatar, British Virgin Islands, Democratic Rep. of the Congo, Eritrea, Ethiopia, Guinea, Liberia, Mali, Mauritania, Niger, South Sudan, Sao Tome and Principe, Sudan, Chad, United Republic of Tanzania, Vanuatu, Samoa, Zambia, Andorra, Netherlands Antilles, Cayman Islands, Monaco, Gaza Strip, San Marino, Former Soviet Union, Angola, Armenia, Antigua and Barbuda, Azerbaijan, Bahamas, Belize, Barbados, Congo, Cuba, Ghana, Guyana, Honduras, Libya, Republic of Moldova, Maldives, Nigeria, Panama, Papua New Guinea, Democratic People's Rep of Korea, Seychelles, Turkmenistan, Trinidad and Tobago, and Zimbabwe.

The following countries remain in the database:

Argentina, Bulgaria, Brazil, Chile, China, Colombia, Costa Rica, Cyprus, Greece, Croatia, Indonesia, India, Mexico, The Former Yugoslav Rep. of Macedonia, Oman, Poland, Romania, Saudi Arabia, Suriname, Thailand, Tunisia, Turkey, Ukraine, Uruguay, Venezuela (Bolivarian Republic of), South Africa, United Arab Emirates, Australia, Austria, Belgium, Bahrain, Canada, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, China, Hong Kong SAR, Hungary, Ireland, Israel, Italy, Japan, Republic of Korea, Kuwait, Lithuania, Luxembourg, China, Macao SAR, Malaysia, Netherlands, Norway, New Zealand, Portugal, Russian Federation, Singapore, Slovakia, Slovenia, Sweden, China, Taiwan Province, United States of America, Afghanistan, Burundi, Benin, Burkina Faso, Bangladesh, Bhutan, Central African Republic, Djibouti, Gambia, Haiti, Cambodia, Lao People's Dem. Rep, Lesotho, Madagascar, Myanmar, Mozambique, Malawi, Nepal, Rwanda, Senegal, Sierra Leone, Somalia, Togo, Uganda, Yemen, Morocco, Albania, Bosnia and Herzegovina, Bolivia (Plurinational State of), Botswana, Côte d'Ivoire, Cameroon, Cabo Verde, Dominican Republic, Algeria, Ecuador, Egypt, Fiji, Gabon, Georgia, Guatemala, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kyrgyzstan, Lebanon, Sri Lanka, Montenegro, Mongolia, Namibia, Nicaragua, Pakistan, Peru, Philippines, Paraguay, El Salvador, Swaziland, Syrian Arab Republic, Tajikistan, Uzbekistan, and Viet Nam.

7.3 Foreign value added content of domestic demand components

Table 3 Foreign value added content of domestic absorption components in domestic absorption, 1990-2013

	C Private Households			I Gross Capital Formation			G Gov. Cons. + Non-Profit Inst.			Domestic Absorption Aggregate		
	1990	2000	2013	1990	2000	2013	1990	2000	2013	1990	2000	2013
Industrialized Economies	13.4%	14.6%	21.0%	20.4%	22.2%	29.5%	8.3%	11.0%	14.4%	13.9%	15.7%	21.5%
Emerging Industrial Economies	11.1%	14.9%	16.5%	20.2%	26.7%	26.8%	9.3%	11.9%	12.8%	13.0%	17.3%	19.1%
Other Developing Economies	16.2%	15.2%	18.6%	27.0%	26.2%	30.0%	17.0%	18.6%	18.4%	18.8%	18.3%	21.3%
Least Developed Countries	11.2%	11.3%	14.1%	20.4%	17.6%	23.6%	21.7%	21.4%	25.9%	14.5%	13.8%	17.8%

Source: Authors' elaboration based on Eora.

Note: Each line shows the unweighted averages of the indicator for the world and by country group.

Table 4 Foreign value added content of manufacturing demand absorption components of domestic absorption, 1990-2013

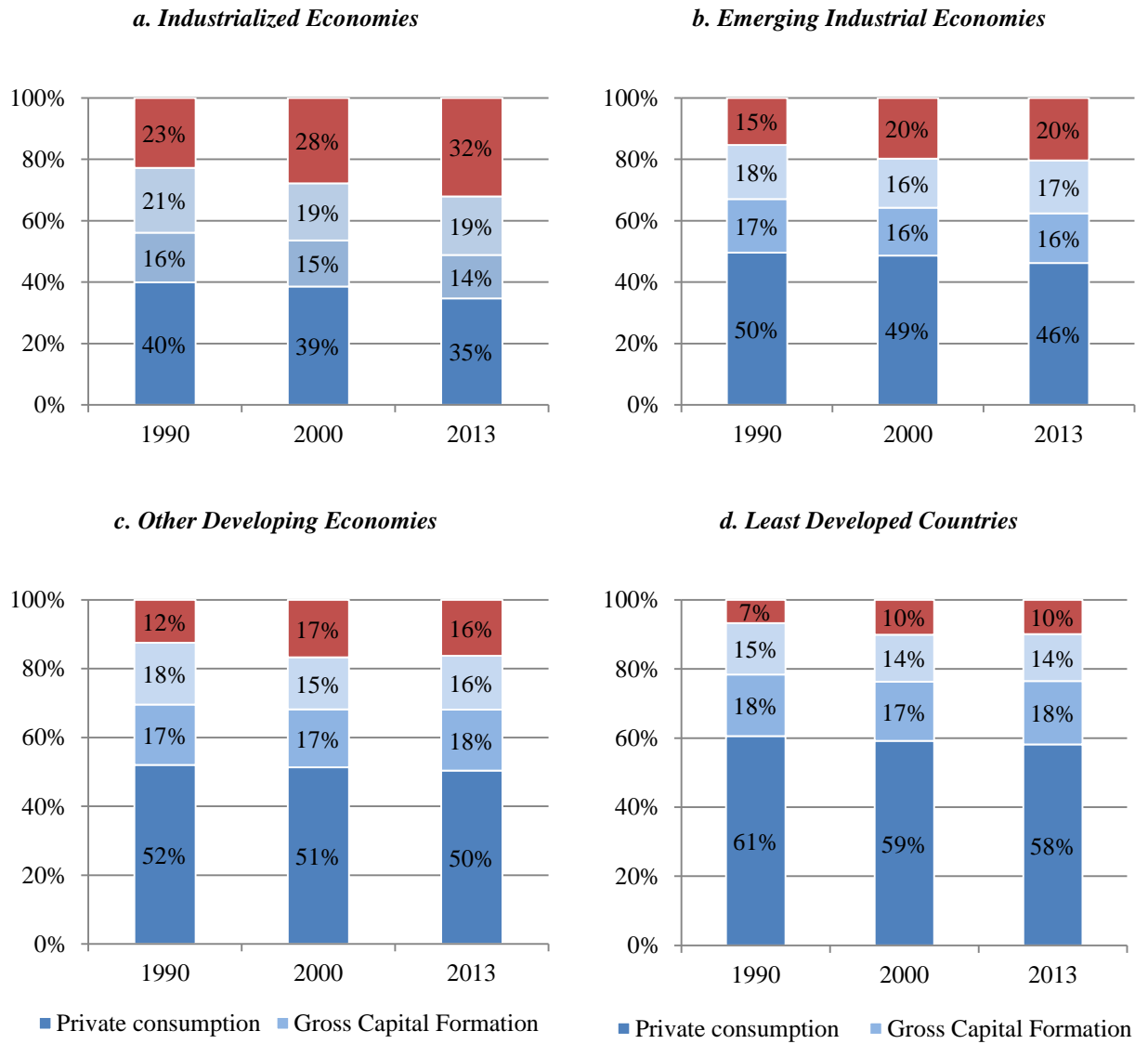
	C			I			G			Manuf. Domestic Absorption Aggregate		
	Private Households			Gross Capital Formation			Gov. Cons. + Non-Profit Inst.			1990	2000	2013
	1990	2000	2013	1990	2000	2013	1990	2000	2013	1990	2000	2013
Industrialized Economies	34.8%	41.6%	51.8%	37.6%	43.6%	49.9%	47.2%	60.3%	66.1%	36.6%	43.4%	51.9%
Emerging Industrial Economies	20.1%	27.5%	27.2%	38.1%	48.4%	44.9%	46.8%	56.4%	56.2%	27.0%	35.3%	35.4%
Other Developing Economies	32.4%	30.5%	35.1%	46.0%	46.9%	49.7%	64.5%	69.4%	66.8%	38.4%	35.7%	45.3%
Least Developed Countries	28.3%	28.1%	35.1%	46.9%	39.0%	50.5%	79.0%	80.3%	84.3%	40.1%	38.8%	43.2%

Source: Authors' elaboration based on Eora.

Note: Each line shows the unweighted averages of the indicator for the world and by country group.

7.4 GDP contribution of final demand components

Figure 8 GDP induced by total domestic (blue) and foreign (red) absorption, 1990, 2000 and 2013



7.5 GDP contribution of manufacturing final demand, by demand component

Figure 9 GDP induced by manufacturing domestic (blue) and foreign (red) absorption as a share of GDP, 1990-2013



7.6 GDP growth decomposition

Table 5 GDP growth decomposition by source and component of final demand, 1990-2013

	1990-2000				2000-2013			
	Industrialized Economies	Emerging Industrial Economies	Other Developing Economies	Least Developed Countries	Industrialized Economies	Emerging Industrial Economies	Other Developing Economies	Least Developed Countries
GDP growth^a	3.6%	4.7%	3.7%	2.8%	10.1%	12.4%	13.1%	11.6%
Contribution to growth by demand component	100%	100%	100%	100%	100%	100%	100%	100%
Domestic Absorption	60.6%	74.9%	79.6%	81.8%	65.9%	78.2%	83.5%	89.9%
<i>Private Consumption</i>	<i>34.7%</i>	<i>48.4%</i>	<i>56.8%</i>	<i>55.7%</i>	<i>32.9%</i>	<i>43.2%</i>	<i>46.9%</i>	<i>57.4%</i>
<i>Gross Capital Formation</i>	<i>14.8%</i>	<i>14.1%</i>	<i>14.8%</i>	<i>17.1%</i>	<i>14.1%</i>	<i>17.6%</i>	<i>18.5%</i>	<i>18.8%</i>
<i>Public Consumption</i>	<i>11.1%</i>	<i>12.3%</i>	<i>8.0%</i>	<i>8.9%</i>	<i>18.9%</i>	<i>17.4%</i>	<i>18.1%</i>	<i>13.6%</i>
Foreign Demand	39.4%	25.1%	20.4%	18.2%	34.1%	21.8%	16.5%	10.1%

Source: Authors' elaboration based on Eora.

Note: Each line shows the unweighted averages by country group calculated at current prices. a: Compound Annual Growth Rate of period. The contribution of domestic absorption is equal to the sum of the contribution of private, consumption, gross capital formation and public consumption.

Table 6 GDP growth decomposition by source and component of final demand, 1990-2013

	1990-2000				2000-2013			
	Industrialized Economies	Emerging Industrial Economies	Other Developing Economies	Least Developed Countries	Industrialized Economies	Emerging Industrial Economies	Other Developing Economies	Least Developed Countries
Manufacturing Induced VA Growth Rate	4.0%	5.2%	4.6%	3.3%	8.0%	9.3%	9.4%	8.5%
Domestic Absorption	26.4%	45.6%	59.1%	62.2%	27.7%	55.2%	64.8%	76.6%
Foreign Absorption	73.6%	54.4%	40.9%	37.8%	72.3%	44.8%	35.2%	23.4%

Source: Authors' elaboration based on Eora database.

Note: Each line shows the unweighted averages by country group calculated at current prices. a: Compound Annual Growth Rate of period. Manufacturing Domestic Absorption (MADA) contribution has been restricted to the interval (0,1). All values above 1 were imputed as 1, and all values below 0 were imputed as 0 in the original country estimates for each period.



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