

The Belgian economy in global value chains

An exploratory analysis

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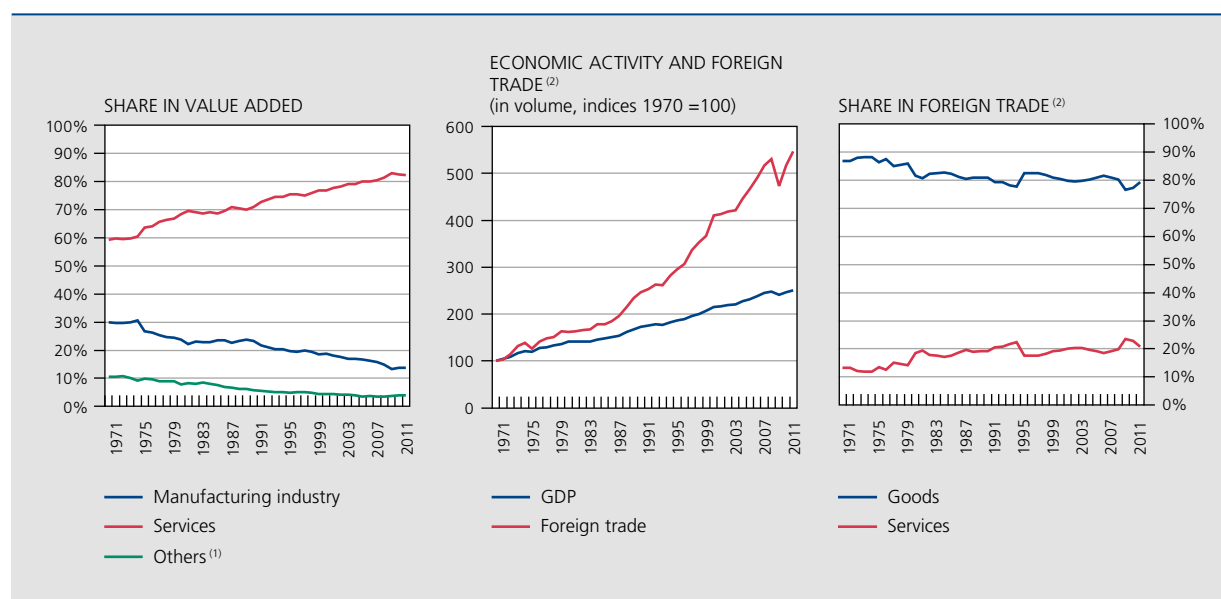
Introduction

Over the past four decades, the structure of developed economies' production and trade has been marked by two major trends. On the one hand, the manufacturing industry's importance has declined in terms of both jobs and value added in favour of service activities. On the

other hand, goods continue to play a predominant role in international trade. Furthermore, growth in trade has outpaced economic growth. Belgium has not been impervious to these trends. Indeed, the manufacturing industry's share in total employment has fallen by 20.1 percentage points, from 31.8% in 1970 to 11.7% in 2012, and its share in nominal value added has dropped from 30% to 13.3%. Over the same period, the volume of exports and imports has more than quintupled, while GDP has

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CHART 1 INDUSTRY'S CONTRASTING POSITION IN THE BELGIAN ECONOMY



Source: NAI.

(1) Includes the branches of agriculture and fishing, extraction, electricity and natural gas production and distribution, water, wastewater and waste. It should be noted that construction is part of the services sector.

(2) Average of imports and exports of goods and services.

risen by a factor of only 2.5. This huge increase in foreign trade is only marginally attributable to growth in imports and exports of services⁽¹⁾, as the share of goods has been stable at around 80 %.

Considered separately, this phenomenon of de-industrialisation or the turn towards a service-oriented economy, on the one hand, and the rise of globalisation largely driven by industry on the other, may seem contradictory. And yet, it has been amply demonstrated in numerous reports and articles, notably in the Economic Review⁽²⁾, that they have been overwhelmingly influenced by a shared group of technological and institutional factors. In particular, the development of means of transport and information technology and the lowering of customs barriers have all facilitated international trade. In countries with an international-scale port infrastructure, such as Belgium, the flow of merchandise in transit has thus increased. Furthermore, by stimulating international competition and offering firms easier access to a vast array of intermediary inputs from abroad⁽³⁾, the rise of international trade has triggered productivity gains in industry, which has freed up factors of production to develop service activities.

Services, on the other hand, have been less influenced by these forces. The international trade in services runs up against some natural barriers. Unlike merchandise, which can be stored, certain types of services require a close proximity in space or in time between the provider and the consumer. Administrative barriers are another impediment to their development, and stricter regulations are even desirable in the case of a natural monopoly or

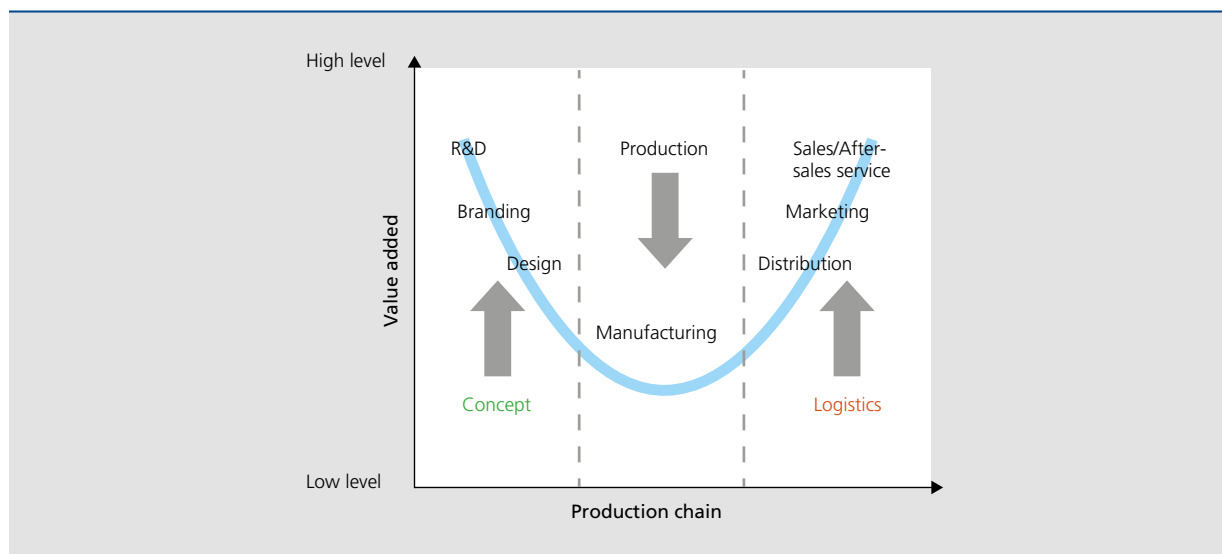
a public good, which is the case with some parts of the services sector.

However, some services are closely linked with the production and foreign trade of industrial goods in the context of the process of dividing up the value creation chain internationally. Advances in information and telecommunication technology have made it easier to manage the production process remotely and to incorporate services, often indirectly, into industrial production. In 2010, the share of value from the services sector at the global level amounted to nearly 40% of the total amount of industrial products intended for export. The smiling curve illustrates this trend. Services at the upstream end of the value chain, i.e. R&D, branding and design, as well as those at the downstream end, notably distribution, marketing and sales, today represent a substantial share of the value of industrial products. For certain products, particularly IT products, the proportion has actually risen substantially over time.

Today, firms have tremendous recourse to external inputs, sometimes imported ones, and in some cases subcontract certain activities. This trend, which is both fuelled by globalisation and productivity gains and reinforces them, reflects the disconnection between successive activities

- (1) In Belgium, the international trade of services involves principally travel, especially on the import side; transport; and miscellaneous business services (Duprez, 2011).
- (2) See, notably, Robert and Dresse (2005) for an analysis at the Belgian level. Huwart and Verdier (2013) have conducted a very detailed study at the global level.
- (3) An intermediate input is a good or service used in the production process to be transformed into an output, which may be destined for consumption or investment purposes in the domestic market, or may be exported.

CHART 2 SHARE OF SERVICES IN THE PRODUCTION PROCESS: THE SMILING CURVE



Source : Acer's Stan Shih : Empowering Technology - Making Your Life Easier, in De Backer (2013).

and tasks, each making up a link in itself in the production chain. Ultimately, the chain is growing progressively more fragmented, organising itself into occasionally complex networks of international relations, sometimes linear, sometimes concentric built around production nodes (Baldwin and Venables, 2010).

Apple products are an oft-cited example of this phenomenon. As sometimes indicated on the products, they are designed in California but assembled in China. The export price of the product when it leaves China, however, does not include much compensation for the Chinese company doing the assembling, because the parts and components come from South Korea, Japan, Germany and in some cases even the US (Xing and Detert, 2010; Dedrick *et al.*, 2010). Other examples also highlight the complex network of relationships among firms. In 1996, IBM found itself at the centre of a constellation of nearly a thousand listed companies. US clothing retail chain Gap employs around 3,000 factories around the world to fill its racks (Huwart and Verdier, 2013).

At the heart of these trends, multinational corporations have exploited the potential for making their production more efficient to the hilt, pairing their efforts with greater cost control. Capitalising on technological and economic advances and the comparative advantages offered by each production site, they have been full participants in the process of linking together production chains across national borders. The ability to locate certain production phases in countries where the tax, labour and environmental laws are more lax has also contributed to this trend. Lastly, the emergence of new economies with promising growth potential has pushed multinationals to set up operations around the world. These new sources of production and consumption have also fed the flow of merchandise between parent companies and their foreign subsidiaries, which in 2010 accounted for more than 80 % of world trade (UNCTAD, 2013).

While these trends have been observed for many years now, until recently it was impossible to precisely gauge their extent due to the lack of a suitable statistical tool. Traditional statistical systems provide detailed information on international flows of merchandise using foreign trade data, and on relations between branches of activity within the economy by using input-output tables, but they hardly make it possible to identify the international scope of these relations in an integral way. This obstacle has now been partially overcome with the publication of data on global value creation chains. Admittedly, the methodology used to compile the data is not completely transparent, and the data are still recent and subject to revision. Even so, they bring to light elements that help

us better understand the prevalence of goods in international trade in light of the relative importance of services in the economy.

To do so, this article presents and discusses the value added approach against the backdrop of these new statistics. After describing the principles used to compile the data in the first section, it looks at where the Belgian economy stands in the fragmented international production chain. Section 2 explains that its role is characterised by its specific traits as a hub for flows of goods between European economies and the rest of the world. Section 3 illustrates the degree to which domestic branches of activity are involved in value added chains, analysing both the manufacturing industry and the services sector. In addition to the lessons learned from this exploratory use of the new data, the conclusion presents potential avenues for future research and analysis.

1. A new statistical tool: global value chains

A desire to better understand the realities of foreign trade has sparked interest in the development of a suitable statistical tool. Among other projects⁽¹⁾, the OECD and WTO have collaborated to develop a new database on value chains⁽²⁾. In practice, development has centred on a global input-output table. Two principal sources were used to compile the table. The supply and use tables⁽³⁾ and input-output tables⁽⁴⁾ of the national economies studied were linked together with the help of foreign trade data. The use of the two types of table made it possible to determine, for each branch of each economy, the intermediate inputs used in production. The foreign trade data, detailed by country and by type of good, made it possible to identify the suppliers of intermediate inputs (using import data) and the direct recipients of exported goods (using

(1) Others are also working on aggregate input-output matrices similar to that of the OECD/WTO. The UNCTAD-Eora GVC database includes 187 countries, with the number of branches dependent upon the country in question, and covering the period 1990 to 2010. The Asian International I-O Tables developed by IDE-JETRO cover 76 branches in 10 Asian countries, with data collected every five years starting in 1975. The World Input-Output Database (WIOD) project, led by a consortium of research institutes financed by the European Union, contains annual data for 35 branches in 40 countries for the period 1995 to 2009. Furthermore, numerous academic research efforts rely on the Global Trade Analysis Project (GTAP) database created by Purdue University covering 57 branches in 129 countries for the years 2004 and 2007.

(2) For more detail, see OECD/WTO (2012).

(3) The supply-use tables, produced annually, supply a detailed description of the domestic production process and the transactions of goods in the national economy by branch of activity and by product group. They give insight into the structure of production costs, the revenue generated during the production process, the flows of goods and services produced in the national economy, and the flows of goods and services to and from foreign countries. They are asymmetrical, meaning that they pair product groups with branches of activity.

(4) The input-output tables, produced in Belgium every five years, offer detailed insight into production, cost structure, productivity, the use of various inputs in production, and the interdependence of branches of activity. Unlike the supply and use tables, input-output tables are symmetrical, meaning that they pair either product groups with product groups, or branches of activity with branches of activity.

export data). By going through the information for all the economies, it is possible to recreate the production chains.

This combination of various data sources, carried out in a multi-country framework as coherently as possible, allows us to approach the link between foreign trade and the value added generated within each economy in a more relevant way. A simplified imaginary scenario illustrates the thought process. Let us assume that country A exports € 90 of goods and services to country B. These are used as inputs for production that is then exported to country C for a total of € 100.

In the simplified example illustrated in chart 3, global exports amount to € 190 (90 + 100), while the total value added generated by the production of goods and services traded internationally amounts to € 100 (90 + 10). The difference comes from double-counting the inputs that A supplies to B, which, once transformed, are re-exported to C. Based on foreign trade statistics, country B is the biggest exporter, even though its share of value added in global foreign trade flows is marginal.

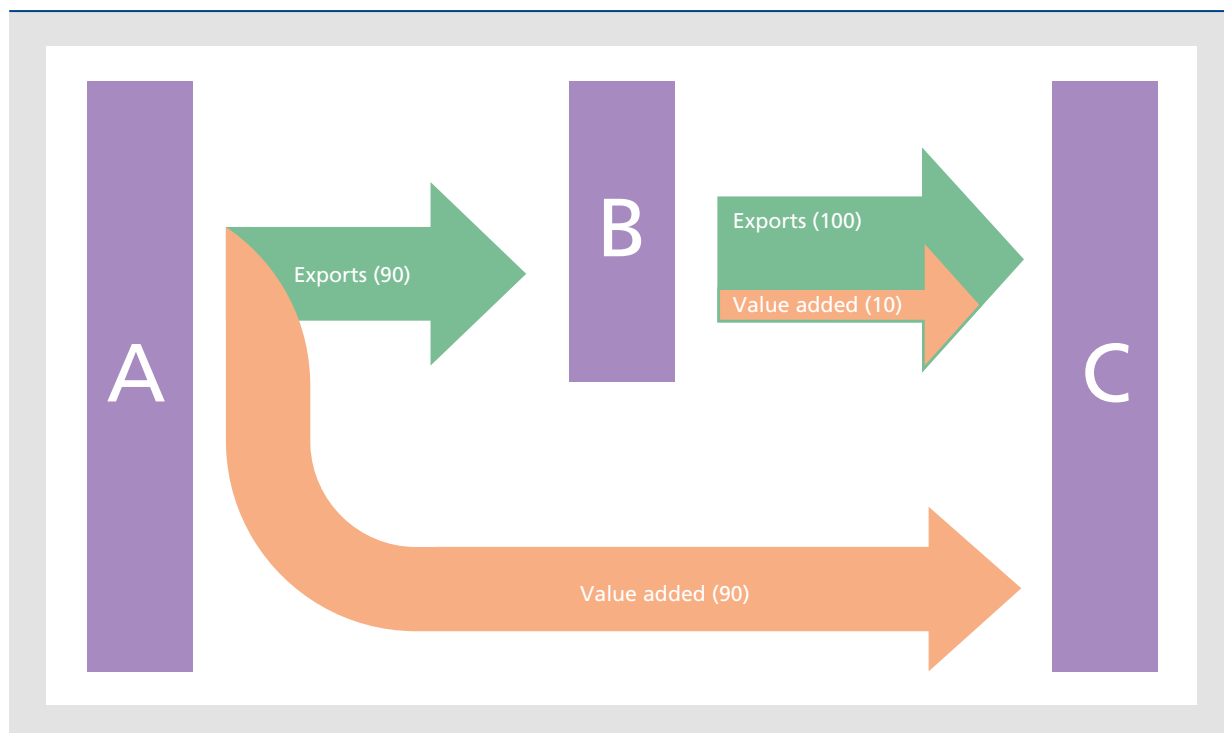
However, it is interesting to note that the total trade balances remain identical whether they are evaluated in terms of net exports or net value added. The trade balance represents production net of consumption, i.e. two aggregates that are not influenced by re-exports.

These balances come to, respectively, a € 90 surplus for A, a € 10 surplus for B and a € 100 deficit for C. But the bilateral trade balances differ depending upon which approach is used (Stehrer, 2012). Because they identify only the direct supplier and not the supplier further upstream in the production chain, foreign trade data show a trade deficit for C vis-à-vis B of € 100, whereas in reality, C is consuming production that mostly came from A. An evaluation from the standpoint of value added reveals C's deficit vis-à-vis A.

For illustrative purposes, the switch from the traditional indicator linking exports to GDP to an indicator showing the amount of domestic value added exported in GDP shows significantly stronger similarity between countries in terms of the degree of international openness. The ranking is also changed somewhat. For example, among all 58 countries covered by the OECD/WTO data, only a selection of which is presented in chart 4, Belgium ranks 9th according to the export indicator and 18th according to the value added indicator, with respective ratios of 71.7 % and 34.5 % of GDP in 2009.

In the May 2013 release of the OECD/WTO database, the one used for this article, a series of indicators are publicly available, but the full database is not accessible. The indicators cover the economic relations between 18 branches of activity in 58 countries. Overall, the database covers

CHART 3 MEASURING INTERNATIONAL TRADE FROM THE STANDPOINT OF VALUE ADDED



more than 90 % of world trade and more than 95 % of world GDP. The data were compiled every five years starting in 1995 and annually from 2008 onwards. Given that not all of the national data for 2010 have been published, the most recent data are those from 2009.

The rest of this article draws mainly on these most recent data. They do not appear to be characterised by specific cyclical factors that may have extraordinarily amplified the observed phenomena. As noted by Foster-McGregor and Stehrer (2013), the foreign value added content of exports fell marginally in 2009 compared with the period before the 2008-2009 crisis. Between 2009 and 2011, the situation appears to have stabilised, and in some countries even returned nearly to pre-crisis levels. Furthermore, as shown in chart 4, most economies' degree of openness in 1995 was already similar to their 2009 levels, underlining that the integration of national economies is not a recent phenomenon.

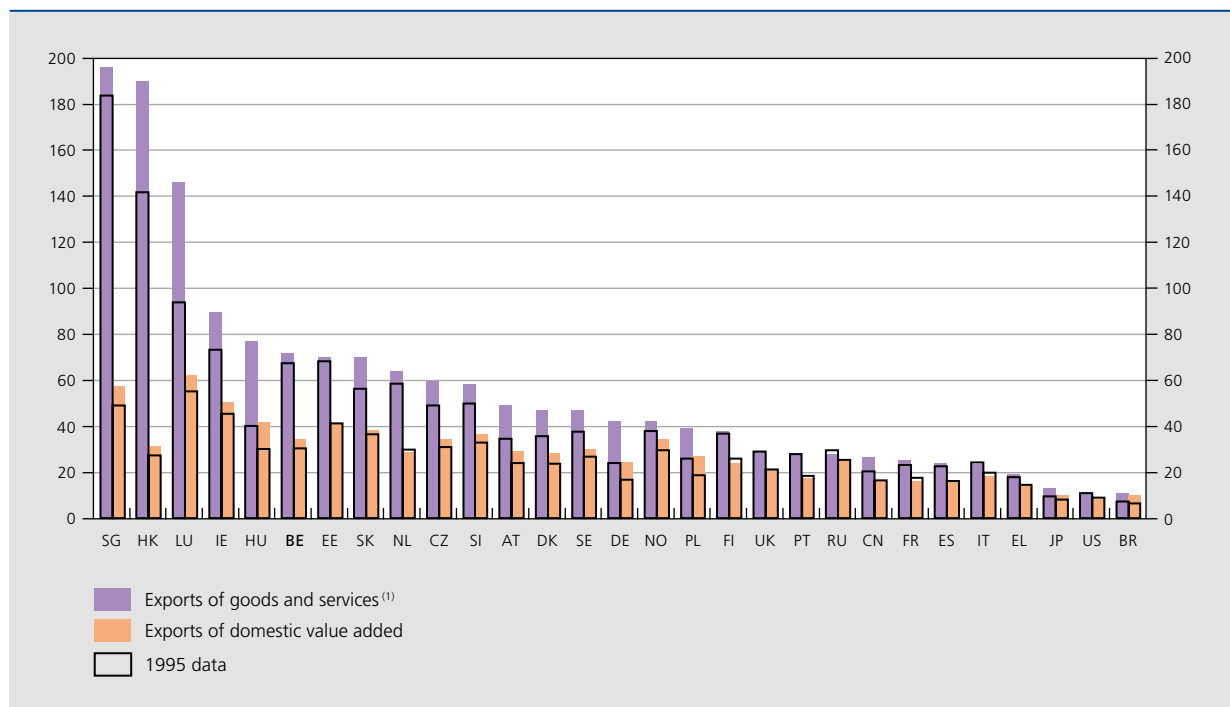
The value added approach, however, has certain methodological limits. In particular, in the foreign trade data, the exports recorded from country X to country Y rarely correspond to the imports recorded by country Y from country X. This asymmetry in the "mirror" data, in which

both relate to the same flow, is a statistical anomaly that makes building a global input-output matrix more complicated. It requires (sometimes important) trade-offs to be made. That said, the verification work that has been done shows that these trade-offs have a marginal impact for Belgium, as the values taken from the OECD/ WTO database correspond to the statistics available in the input-output and supply-use tables of the National Accounts Institute (NAI). However, they may have a significant influence when calculating the data on value added generated in countries that are upstream or downstream in the value chain. Furthermore, when analysing input-output tables, it is important to keep in mind that each branch of the economy is compiled so as to represent an average firm belonging to the branch. In reality, firms in the same branch may present very different characteristics with respect to employment, value added, use of inputs, destination of exports, and so on.

2. Re-exporting merchandise

The fragmentation of production processes beyond national borders creates a multiplier effect in the international trade of merchandise. This comes into play particularly

CHART 4 MEASURES OF THE DEGREE OF INTERNATIONAL OPENNESS
(as a % of GDP, 2009 data unless otherwise indicated)



Sources: World Bank, EC, OECD, NBB.
(1) According to balance of payments data.

when merchandise only passes through a country without going through any transformation activity. The import and subsequent re-export of goods is a substantial phenomenon in Belgium and is given particular attention when national statistics are compiled.

With the port of Antwerp, notably, Belgium has infrastructure that acts as a point of entry and exit for merchandise on a scale that goes far beyond Belgium, meaning that the infrastructure serves a large portion of the European market. Re-exportation involves merchandise, as re-exports of services are probably marginal and not subject to much measurement. Statistics compiled according to the so-called community concept show that of all merchandise entering Belgium, a substantial share is intended for re-export without any processing inside the country.

Belgian statistics make a distinction based on the whether or not the firm doing the re-exporting is a resident of the country. A certain number of foreign firms with a Belgian VAT number clear merchandise through customs and then send it abroad. Because their economic presence in Belgium is limited to this single role, these companies are considered non-resident entities for the purposes of Belgian statistics, and are thus excluded (NAI-NBB, 2009, 2012). Based on import prices⁽¹⁾ transit activities carried out by non-resident firms in 2005 amounted to 27.8 % of the value of all merchandise entering Belgium.

Stripping the non-resident transit trade out of the goods imports data gives the so-called national concept statistics, in the sense that they were necessarily generated by a resident. This is the concept used to draw up balance of payments statistics and Belgian national accounts. However, certain resident companies are also involved in re-exporting merchandise, whose estimated value in 2005 came to 25.5 % of Community concept imports, or 35.5 % of national concept imports. As these percentages show, re-exports significantly inflate the international trade of goods for countries such as Belgium that are trade route hubs.

While tricky because data are not perfectly comparable internationally, an analysis of the situation in the three neighbouring countries based notably on input-output tables shows that re-exports are also a major phenomenon in the Netherlands, where they accounted for over 55 % of the value of Community concept imports in 2005. Re-exports are also common in Germany, representing around 20 % of merchandise entering the country, whereas they are less of a phenomenon in France, at close to 11 %⁽²⁾. The OECD/WTO data on value chains can be used to evaluate these flows for a broader array of countries.

Based on these estimates, chart 5 gives a rough idea of the estimated share of re-exports among total exports of goods in 2009⁽³⁾.

It is interesting to note that, in general, international institutions and academic and public researchers base their studies of foreign trade, and exports in particular, on Community concept data, which thus encompass all re-export flows, including those of non-residents. These data are available for a large number of countries, whereas the creation of national concept statistics are a uniquely Belgian practice. In Belgium, as elsewhere, imported merchandise intended for re-export artificially inflates foreign trade. For this reason, but also because re-exports are influenced by specific determinants – such as the presence of a port or a location along trade routes – we exclude them from the rest of our analysis. In keeping with the method for calculating value chain statistics, we will focus exclusively on export-oriented domestic production⁽⁴⁾. For the rest of this article, then, the term exports of goods and services will mean those generated by domestic production, i.e. excluding re-exported merchandise.

3. The position of Belgian branches of activity in global value chains

Ultimately, Belgian producers' participation in global value chains is measured by the size of their exports of goods and services. These reflect their ability to find a place in globalised production processes and to meet the demand of end-markets. However, the traditional view of exports, in which an exporting country produces goods domestically to satisfy consumer or investment demand in the destination country, is woefully outdated. Today, it is hard to identify the origin of goods and services and their final destination in terms of demand. On the one hand, upstream in the chain, exports can be subsequently re-exported to third countries, sometimes after processing but not necessarily. On the other hand, in their production activities, notably those intended for export, companies incorporate not only their own added value by using their factors of production, but also domestic inputs from other branches of the economy, as well as inputs from abroad⁽⁵⁾. At the company level, it is a combination of intermediate

(1) Using import prices avoids the tricky issue of the margin earned on re-exports, for which a precise breakdown by type of flow is not always available.

(2) These observations are confirmed by the relative importance of maritime ports in the trade of merchandise (Mathys, 2013; Eurostat, 2013).

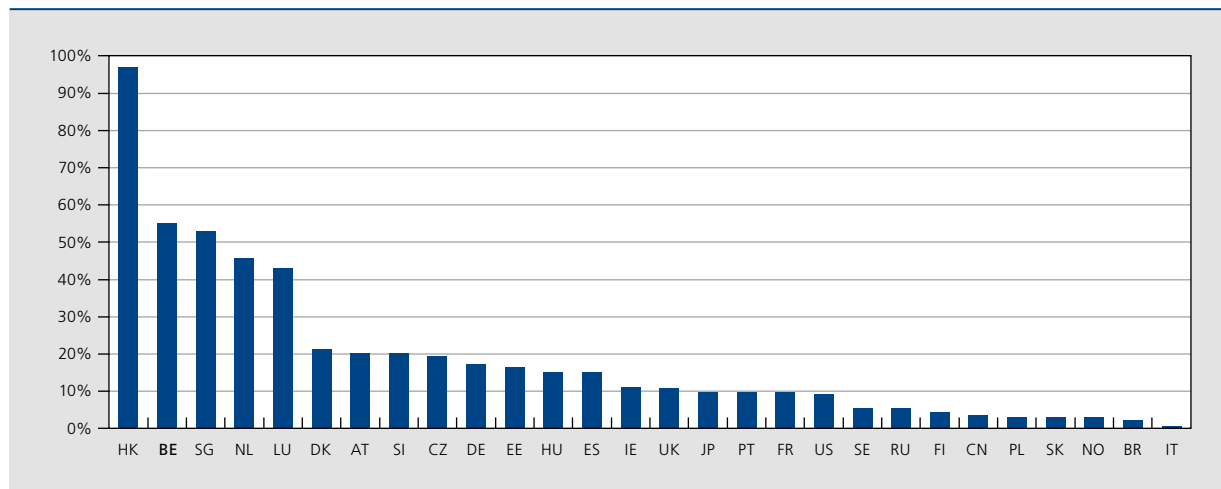
(3) There are divergences from the percentages calculated for neighbouring countries. The method and data used are slightly different. Furthermore, the evaluation looked at exports and the year 2009. However, the scale of the phenomenon is broadly identical.

(4) Any transport or logistics services provided by the national firms and the sales margins of residents which are earned from re-export activities are, however, included in domestic production for export.

(5) Companies also incorporate inputs from other firms belonging to the same branch of the economy. However, these are not measured in the input-output tables, and thus are not included in the data on value chains.

CHART 5 IMPORTANCE OF RE-EXPORTED MERCHANDISE AS A SHARE OF TOTAL EXPORTS

(share of goods exports according to the Community concept of foreign trade, 2009 data)



Sources: UNCTAD, OECD.

inputs and the company's own factors of production that determine its competitiveness.

These various characteristics are discussed in this section, using statistics for Belgium taken from the OECD/WTO database. This initial exploration of data on Belgium forms a complement to those presented in a more general manner in the OECD's publications (see, notably, De Backer and Miroudot, 2012) and those of the UNCTAD (2013). It shows the position of Belgium in the value chains by providing an initial identification of the branches and countries located upstream and downstream in the production chains of which Belgium is a part. We will tackle three specific questions from an exploratory descriptive standpoint, i.e. the general extent to which imports are used in the production of export goods and services; specifically, the extent to which services activities go into manufacturing exports; and lastly, the initial origin of imports and the final destination of exports.

3.1 The role of intermediate imports

Domestic production intended for export includes, in Belgium and in numerous other countries, a significant proportion of intermediate imports. At the global level, the share of foreign value added in exports, which measures the proportion of foreign intermediate goods and services used, thus amounts to roughly 28% (UNCTAD, 2013). As suggested in chart 4, the economies that incorporate proportionally less domestic value added in their exports are the most open. A corollary of this is that these

economies rely more on foreign value added. The foreign intermediate goods and services used in production inflate these countries' export figures. In chart 6, thus, it makes sense that the most open countries, i.e. those with the largest circles, are in the right-hand part of the chart, which includes the highest percentages of foreign value added incorporated in goods and services exports.

A large share of intermediate imports also signals that a country is located towards the end of the production chain. Thus, these countries are also generally those whose exports are intended for direct final consumption by their recipients rather than for use as inputs in the recipients' production for export (for this last indicator, see Hummels *et al.*, 2001). Thus, they are located towards the bottom of chart 6, as their exports are only marginally used as intermediate inputs for production abroad intended for export. All in all, a country located in the lower right quadrant is towards the end of the production chain, i.e. close to the final consumer. Such is the case of Luxembourg and Ireland, which are producers of final goods and, especially, services. Conversely, the countries towards the beginning of the production chain, i.e. those producing commodities, are located in the top left quadrant of the chart. Russia and Norway, rich in energy resources and raw materials, naturally supply intermediate inputs and employ little foreign value added in their production.

The specific characteristics of each economy influence its degree of participation and its place in multinational value creation chains. Small countries generally rely more

heavily on foreign inputs because domestic resources are not always sufficient to ensure a full range of intermediate products and services. Furthermore, countries with an international-scale port infrastructure, such as Singapore, Belgium or the Netherlands, capitalise on their competitive advantage in terms of supply costs to incorporate more foreign inputs.

A more detailed examination of Belgium's position relative to countries with similar characteristics, however, shows that it relies to a relatively large extent on foreign intermediate inputs. Apart from the factors cited above, this may be because it specialises to a great extent in the industrial branches that consume large amounts of raw materials. In turn, Belgian exports are also situated at an intermediate stage in the production process. They are thus, like those of comparable countries, used as inputs in the exports produced by other economies.

3.2 The services content of industrial exports

When we analyse the intermediate imports in each of the branches of the Belgian economy more closely, two significant findings stand out. The first is that exports of the manufacturing industry branches have a higher foreign value added (VA) content. Compared with services companies, manufacturers use more imported intermediate

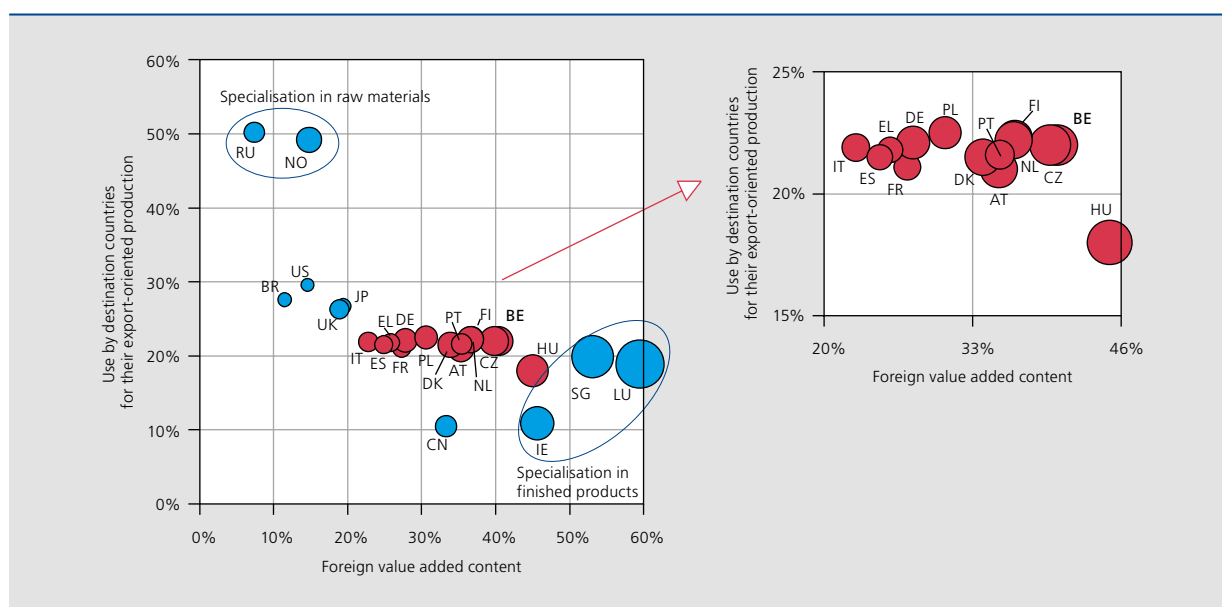
inputs. On average, the share of these imports in the total amount exported by the manufacturing industry came to 42 % in 2009. This heavy dependence on foreign goods and services is not unique to Belgian industry; it is a fact of life in many other countries (Johnson and Noguera, 2012).

In addition to the 42 % that comes from abroad, it turns out that an average of 32 % of the total value added put into industrial exports comes from the branch in question, whereas 25 % is from other branches of the Belgian economy⁽¹⁾. Even though these percentages depend directly on the way the branches are defined and their degree of aggregation, they illustrate a fragmentation of value chains within the country's borders that is similar to what is going on at the international level.

The second lesson has to do with the indirect importance of services to industrial exports. In 2009, intermediate inputs from the services branch represented nearly 36 % of the value of manufacturing industry exports, of which practically half came from abroad. Services thus make up a vital part of production for export. In this respect, they play an integral role in the economy's external competitiveness.

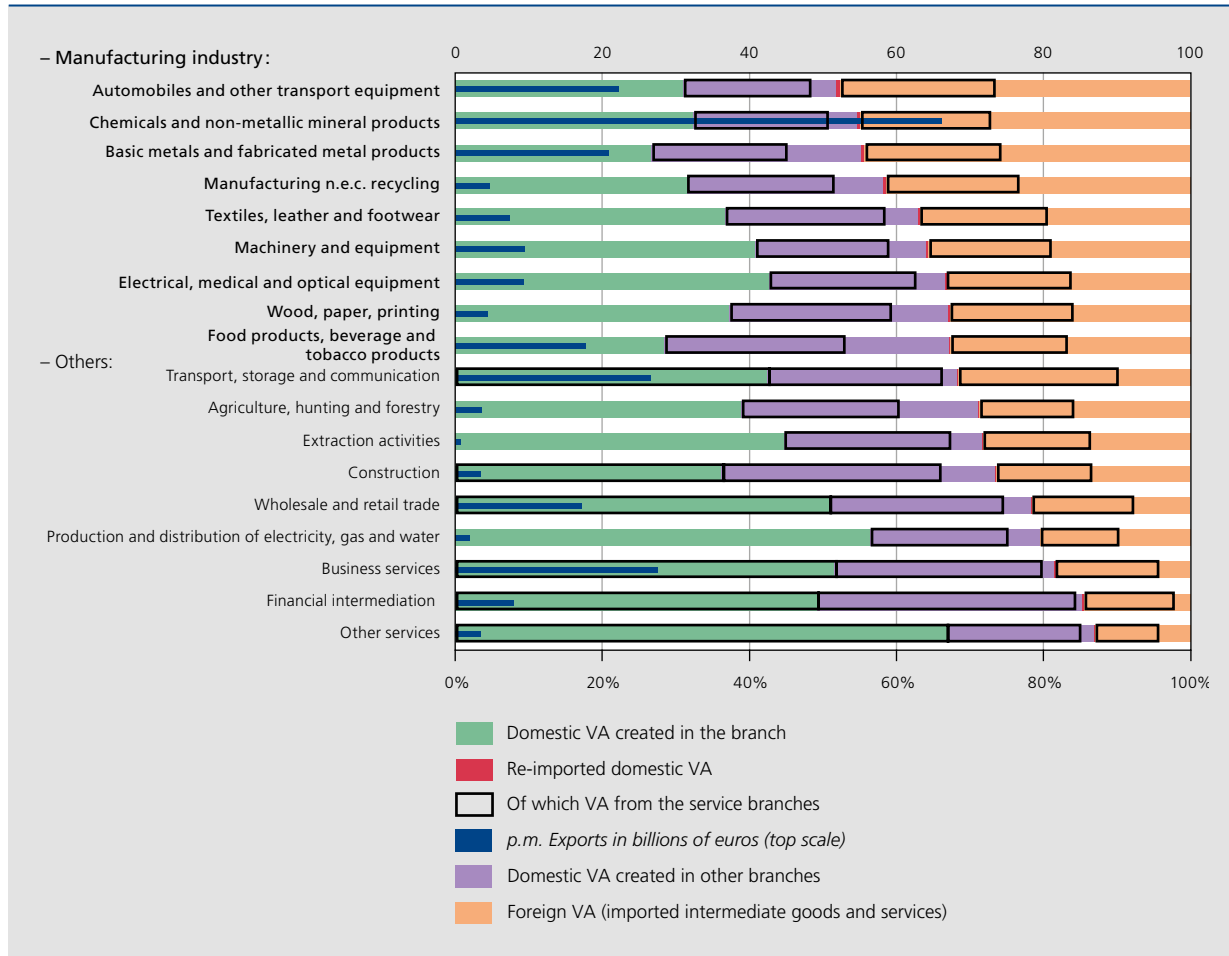
(1) The remaining 1 % corresponds to re-imported inputs.

CHART 6 POSITIONING IN THE VALUE CHAINS
(share of goods and services exports, 2008 data; the size of the circle is proportional to exports of goods and services expressed as a % of GDP)



Sources: World Bank, EC, OECD.

CHART 7 VALUE ADDED COMPONENTS BY BRANCH OF THE ECONOMY
(2009 data, in % of branch exports unless otherwise indicated)



Source: OECD.

This use of subcontracting for service activities is part of a broader trend towards specialisation, with each company focusing on its core activities and calling upon external suppliers for the other inputs, in particular services related to industrial activities. This trend is also one of the factors underlying the trend towards industrial decline illustrated in chart 1. Whereas before, different types of activities were performed within a single industrial firm, more and more services and related activities are outsourced. This situation is evident in the majority of advanced economies, although to differing degrees. For example, in 2009 in France, industrial exports incorporated 44 % of value added created by the services branches, compared with respectively 38 % and 35 % in Germany and the Netherlands.

(1) Real estate and rental companies included.

Of the intermediate services used by the manufacturing industry in Belgium for its export-oriented production, 37 % were created in wholesale and retail trade (including hotels, restaurants and catering), 34 % in business services⁽¹⁾, 16 % in transport, storage and communication, 7 % in financial intermediation, and the rest – roughly 6 % – in the other services branches. These proportions vary somewhat, however, depending upon whether or not the intermediate services are produced domestically. Among services inputs from abroad, the share of transport, storage and communications is higher, whereas that of wholesale and retail trade is lower.

Overall, while manufactured goods still represent the lion's share of exports, their production includes a wide array of inputs that are imported or come from other branches of the economy. They rely on value added generated directly by labour and capital at work in other branches of activity,

particularly the services branches. All these factors work together to determine the external competitiveness of manufacturing companies.

3.3 The initial origin of inputs and final destination of exports

The traditional approach to the question of goods' input origin and export destination is to use foreign trade data⁽¹⁾. This source defines the direct supplier country by way of import data. Unlike these statistics, which only tell the previous link in the chain, the new data on production chains reveal all the upstream supplier countries. Each country's participation is quantified by calculating the value added content that they successively create during the production of inputs. Similarly, whereas traditional export data show the immediate destination, i.e. the next link in the production chain, value chain analysis determines the final destination country of the value added created by Belgian industry. By referring to chart 3, and assuming that Belgian industry is represented by C, the import data can identify the € 100 from B, whereas the

production chain data can retrace the € 90 from A and the € 10 from B. In the same way, with the new statistics it is possible to know who the final consumers of the exported value added are, i.e. those located at the very end of the value chain. If Belgian industry is represented by A in chart 3, country C then represents the final consumer in place of country B.

Table 1 shows a comparison between, on the one hand, the data on the origin of inputs used in Belgian industry and the final destination of the value added it creates, and on the other hand, foreign trade statistics. It turns out that the European Union in general, and neighbouring countries in particular, decline in relative importance. This is due to the fact that the re-exports recorded in goods exports are sent to neighbouring countries, thus inflating their role as outlets for the Belgium economy. In addition, certain products exported by Belgium to, for example, Germany, are transformed and then re-exported to third countries. Ultimately, the euro area and the EU

(1) For services, the balance of payments data also offer this breakdown, although it is based on a survey of a limited sample of firms.

TABLE 1 ORIGIN OF INTERMEDIATE INPUTS AND FINAL DESTINATION OF EXPORTS
(in %, 2009 data)

	Upstream		Downstream		
	Origin of the foreign VA incorporated into Belgian industrial exports	<i>p.m.</i> Imports of goods ⁽¹⁾	Final destination of the VA exported by Belgian industry	<i>p.m.</i> Exports of goods ⁽¹⁾	<i>p.m.</i> Potential annual growth from 2013 to 2015
EU27	60.7	74.4	64.6	75.5	1.2 ⁽²⁾
Euro area	48.9	63.0	48.1	62.5	0.9
Germany	13.0	16.7	10.1	16.8	1.2
France	9.9	13.1	14.6	18.1	1.5
Netherlands	11.8	22.7	5.5	13.7	1.4
Italy	3.7	3.4	7.6	4.2	0.0
Spain	2.4	2.4	4.0	3.1	0.4
United Kingdom	6.3	6.0	10.0	7.1	1.7
Norway	2.7	1.5	0.6	0.5	2.8
United States	8.9	4.3	6.8	4.3	2.0
Russia	4.0	1.9	1.8	0.9	3.3
China	2.5	2.8	2.4	1.9	8.3
Japan	3.0	2.8	1.3	0.6	0.8
India	1.2	1.1	1.8	2.4	6.8
Rest of the world	17.0	11.1	20.7	13.9	3.9

Sources: OECD, NAI.

(1) National concept.

(2) Excluding BG, CY, LT, LV, MT and RO.

represented respectively 48.1 % and 64.6 % of exports of Belgian industry value added in 2009, whereas their direct weights in exports were respectively 62.5 % and 75.5 %. On the import side, the Netherlands' role decreases significantly when switching from direct trade data to value added data, as it is also a transit point for inputs used in Belgium, particularly for energy products. Conversely, the UK, the US and various Asian countries take on greater importance as outlets for Belgian industry than what is shown in the foreign trade statistics. Even though care needs to be taken in several respects when comparing the two sets of data⁽¹⁾, the analysis does establish that the value added by Belgian industry is exported to multiple destinations. The mapping in chart 8 paints a more detailed picture.

Taking into account Belgian exporters' contribution, both direct and indirect, to foreign final demand, the shift from foreign trade data to that of exported value added makes it possible to compare, to some extent, the geographic

distribution of outlets with the relative weights of the principal sources of world growth. Naturally, gravity considerations such as geographic proximity or membership in an integrated currency and trading area explain why nearby economies continue to dominate (see Amador *et al.*, 2013). There is no avoiding the fact that, for Belgium, the growth potential of neighbouring economies appears to be relatively weak compared with other economic zones.

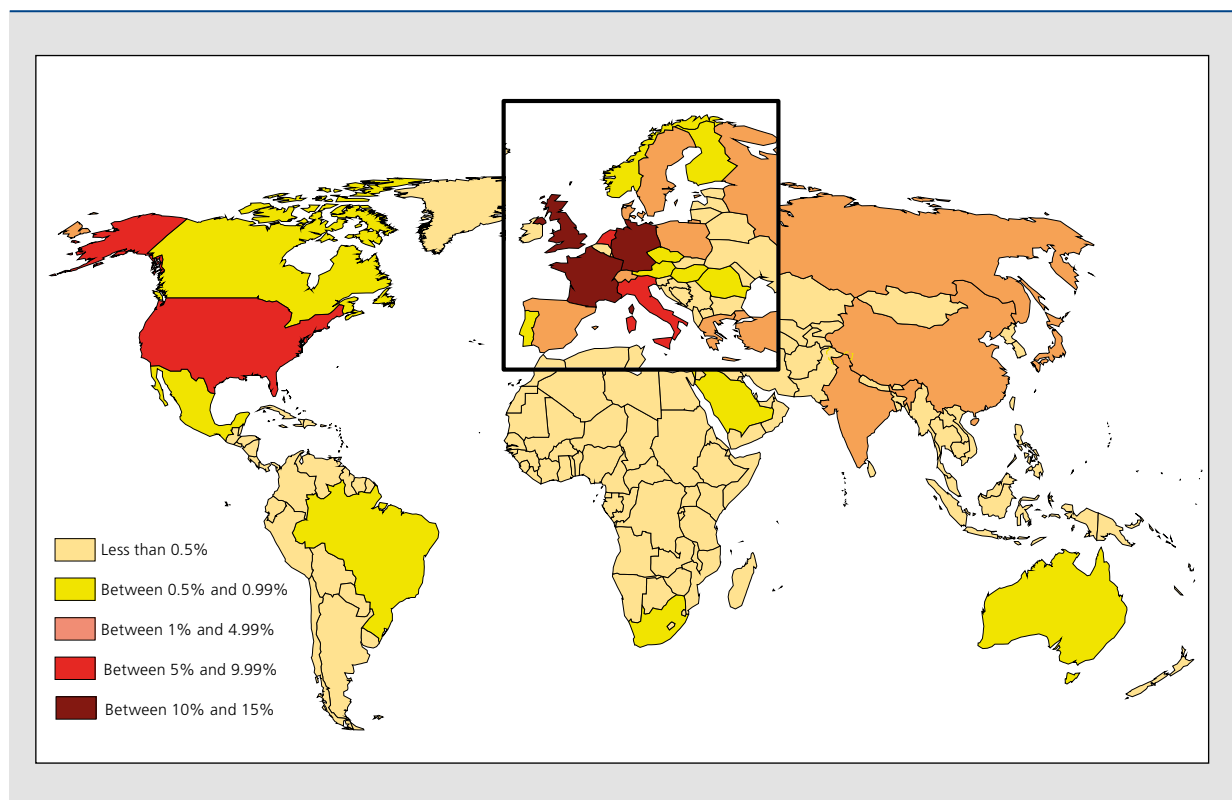
Initial conclusions and avenues for future analysis

With its integrated approach, the study of global value added chains makes it possible to understand the phenomena of globalisation and the shift to a services-based economy within a coherent framework. In particular, an initial exploration of the data assembled recently by the OECD/WTO provided some interesting insight with respect to Belgium, chiefly:

- The prevalence of goods in foreign trade is partly due to the re-export of merchandise, which is estimated to represent around one-third of imports of goods as

(1) The merchandise includes products from branches other than just the manufacturing industry. In addition, the value added of industry can be exported indirectly via the services branch, even though this appears to be marginal in the statistics.

CHART 8 FINAL DESTINATIONS OF VALUE ADDED EXPORTED BY BELGIUM'S MANUFACTURING INDUSTRY
(as a %, 2009 data)



Source: OECD.

recorded in the national accounts. This phenomenon is particularly pronounced in Belgium because, with Antwerp, it has one of the European market's principal entry and exit points.

- Domestic production for export, with re-exported imports stripped out, contains a substantial amount of foreign value added content in the form of imported intermediate inputs. The level was close to 40 % of Belgian manufacturing industry exports in 2009.
- Manufacturing industry exports also rely heavily on intermediate services, both domestic and foreign, to the tune of around 35 %. Services are thus indirectly incorporated into industrial goods exports. In this respect, they are a vital part of the economy's external competitiveness.
- The importance of European countries in general, and neighbouring countries in particular, as outlets for Belgian industrial exports must be put into context relative to the image given by foreign trade data.

Some of these conclusions, when quantified, confirm some of what we already knew or assumed. The first few conclusions help reconcile the seeming paradox of industry's place in the economy as illustrated in Chart 1, i.e. that the share of goods in foreign trade is close to 80 % whereas services activities dominate the economy. Conceptually, they underline that the economic interpretation of export data is muddled by the phenomenon of multiple counting when a single good or a single component incorporated into a good travels across multiple borders (Koopman *et al.*, 2012). Other observations constitute new insights, notably those related to the origin of inputs or the final destination of exported value added. New conclusions will undoubtedly be drawn as the data are refined, or as the period and the geographic scope considered are enlarged.

In this regard, analysis of value chains is a useful complement for putting traditional studies of export performance or deindustrialisation into a broader perspective. However, it cannot replace those studies, notably because it needs to employ complex, extended and – at this stage – not necessarily harmonised systems of statistical data on value chains. The various available sources used to create a global input-output table are, in fact, not always coherent, which leads to statistical trade-offs that can have a substantial influence on outcomes. Before using these data for any economic policy purposes, it would be good to thoroughly validate the data by comparing them with all of the available aggregates. In addition, the data on value chains are only available after a delay of three to

four years because they are dependent upon the availability of statistics for all of the economies studied. This delay limits the potential for using these data to monitor current economic evolution. Lastly, the breakdown by branch of activity is also not very precise, once again because it relies on the existence of detailed national aggregates. The data broken down by type of goods traded and, to a lesser extent, by type of services in the balance of payments are thus still the preferred sources of detailed information. Furthermore, differences between firms, even within certain branches, are a reason to continue analysis based on data for individual firms.

Despite these weaknesses and limits, it is still interesting to think about the prospects for research and analysis that this new approach opens up. At this point, several possible avenues appear to be emerging.

The data in the global input-output table provides a useful complement to the data from the national table for creating an overall view of Belgian production processes, both domestic production and export production. Furthermore, the 2010 input-output matrix for Belgium, elaborated by the Federal Planning Bureau, will be available in the coming months.

The breakdown of value chains makes it possible to retrace the ways economies are interconnected. This information may prove useful for better understanding how shocks spread between economies. The spread of supply shocks that occur early in the chain, or demand shocks that occur downstream, can thus be better measured. Because it highlights the multiplier effect of foreign trade, the use of these data also provides explanations for the abrupt drop in trade during the 2008-2009 crisis (Altomonte *et al.*, 2012). As part of economic forecasting exercises, these data might improve the accuracy of foreign trade estimates, at the very least by supplying a better assessment of risks.

With the recent publication of these new statistics, which allow for an alternate measurement of external trade flows, we have new elements with which to analyse competitiveness. Indicators acting as alternatives or complements to existing indicators could thus be employed. The share of value added in global exports could be a useful complement to existing indicators of share in global exports⁽¹⁾. An economy's area of specialisation could be defined in the light of data on exported value added (Koopman *et al.*, 2010). The trade balance broken down

(1) The share of a country's exports in global exports is an indicator traditionally used to measure an economy's external competitiveness. This is why it was chosen by the European Commission for its Scoreboard for monitoring macroeconomic imbalances.

by product type could be juxtaposed with a trade balance of domestic value added, measuring exports of domestic value added with regard to imports of foreign value added, and for each branch of the economy.

Analysing value chains also raises a certain number of questions regarding an economy's ability to capture value added and labour-intensive production phases. Because it lacks raw materials and has a high average level of human capital, as well as high labour costs, the challenge

for Belgium is clearly to develop the technological tools and recognised expertise it needs to attract or retain the most technical and specialised stages of the production chain. The question of how to adapt the functioning and structure of the economy so that it can take advantage of changes in global conditions remains a crucial one. Based on an initial analysis of the value added chains, the issue appears more multifaceted than ever, and researchers will have to take into account a vast number of dimensions in an integrated manner.

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